UNIVERSITY OF KENTUCKY
Division of Purchasing Services
CAPITAL CONSTRUCTION SECTION
RM 322, Peterson Service Building
Lexington, Ky. 40506-0005

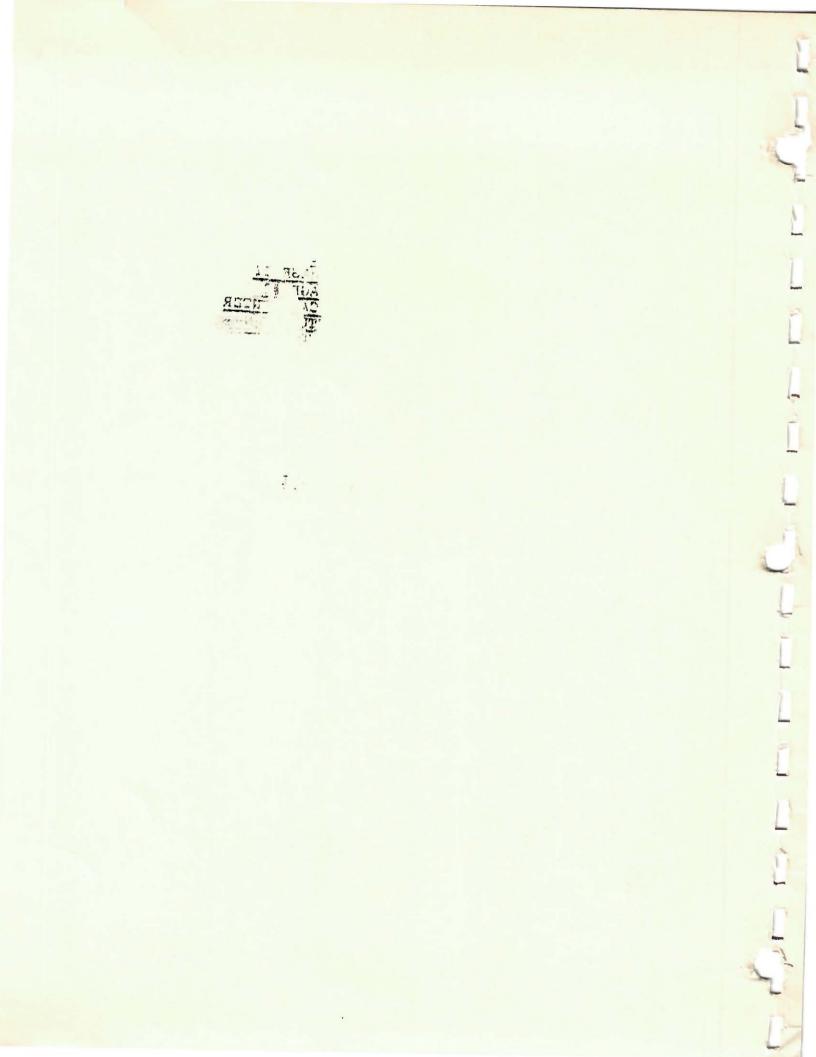




Project Number

304.1

HOSPITAL EXPANSION/PHASE II
ADDITION - BID PACKAGE #2
ALBERT B. CHANDLER MEDICAL CENTER
UNIVERSITY OF KENTUCKY
LEXINGTON, KENTUCKY



PROJECT #304.1

HOSPITAL EXPANSION/PHASE II

ADDITION - BID PACKAGE #2

ALBERT B. CHANDLER MEDICAL CENTER

UNIVERSITY OF KENTUCKY

LEXINGTON, KENTUCKY

TECHNICAL SPECIFICATIONS

DIVISION		SECTION PAG	
*********	*****	************	*
DIVISION 1	01011	Summary of the Work -	
General Requirements		Separate Prime Contracts	5
ocuerar medarromene	01045	Cutting and Patching	5
	01090	Definitions and Standards	6
	01340	Shop Drawings, Product Data	
	a 1 a	and Samples	10
	01400	Quality Control Services	4
	01501	Temporary Facilities - Separat	е
		Prime Contracts	15
	01631	Products and Substitutions	10
	01700	Project Closeout	7
		Sale To Art World Sale Tr	
*****	*****	**********	**
DIVISION 2	02070	Selective Demolition	6
Sitework	02110	Site Clearing	3
PiceMory	02200	Earthwork	13
	02480	Landscape Work	14
	02513	Bituminous Concrete Paving	4
	02514	Portland Cement Concrete Pavin	g 7
	02515		
and the second second	02700	Site Improvements	3 .4 3 7
	02710	Foundation Drainage	3
	02720	Storm Sewage Systems	7
******	*****	***********	**
DIVISION 3	03310	Concrete Work	25
Concrete	03320	Concrete Floor Topping	4
001102 0 0 0	03450	Architectural Precast Concrete	10
	03455	Lightweight Precast Concrete	
	989 T.	Panels	12
	03520	Lightwight Insulating Concrete)
1		Panels	4
*******	*****	********	**
			18
DIVISION 4		Unit Masonry	
Masonry		Stonework	15
M	04510	Stone Patching & Repair	9
******	******	**********	**
DIVISION 5	05120	Structural Steel	8
Metals	05300		4 15
120 0415	05500		15
	05520		8
*****************	******	***********	**

DINTATON		GEGETON	450
DIVISION ************	*****	SECTION PA	GES
DIVISION 6	06100		6
Wood and Plastics	06400	Architectural Woodwork	111
*******	*****	**********	**
DIVISION 7	07120	Fluid-Applied Waterproofing	5
Thermal and Moisture	07175	Water Repellents	3
Protection	07200	Insulation	6
	-07241	Exterior Finish System	6
	~ 07250	Sprayed-on Fireproofing	7
	07410	Preformed Roofing	5 7
	07530	Flexible Sheet Roofing System	7
	- 07600	Flashing and Sheet Metal	5 4
	07620	Metal Copings	4
	07700	Roofing Specialities and	
		Accessories	7
	07900	Joint Sealers	10
*******	*****	*********	**
DIVISION 8	08110	Steel Doors and Frames	6
Doors and Windows	08211	Flush Wood Doors	6
DOOLS and Windows	08305	Access Doors	30
	08311	ICU Sliding Glass Doors	6.
	08330	Overhead Coiling Doors	о. б
	08350	Folding Doors and Partitions	4
	08410	Aluminum Entrances and	4
	00410	Storefronts	7
	08460	Automatic Entrance Doors	.12
	08520	Aluminum Windows	12
	08710	Finish Hardware	32
	08800	Glass and Glazing	16
	08910	Slope Glazed Framing Systems	8
*****************************	• • • • • • • • • • • •	********	
DIVISION 9	09200	Lath and Plaster	14
Finishes	~09215	Veneer Plaster	5
	-09250	Gypsum Drywall	13
	-09270	Drywall Shaft Systems	9
	09300	Tile	9 12
	09400	Terrazo	
	09510	Acoustical Ceilings	4 8 4 9
	09521	Acoustical Wall Panels	4
	09650	Resilient Flooring	9
	09680	Carpeting	9,
	09690	Carpet Tile	11
	09800	Special Coatings	9
	09900	Painting	20
	09950	Wallcoverings	4
		194	

DIVISION *********	*****	SECTION PA	GES **
DIVISION 10 Specialties	10100	Chalkboards and Tackboards Toilet Partitions	5 5 6
	10200 10270	Louvers and Vents Access Flooring	9
	10440	Specialty Signs	58
	10500	Metal Lockers	5
	10522	Fire Extinguishers, Cabinets,	•
		and Accessories	6
	10800	Toilet And Bath Accessories	6 3
	10830	Mirror Units	3
	10900	Miscellaneous Specialties	7
*******	*****	**********	**
DIVISION 11	11132	Projection Screens	3
Equipment	11160	Loading Dock Equipment	3 8
ndarbwene	11600	Laboratory Equipment	11
	11601	Laboratory Furnishings	32
	11615	Laboratory Controlled	
		Temperature Rooms	11
	11700	Medical Equipment	47
*******	*****	**********	**
DIVISION 12	12345	Modular Casework and Storage	4.5
	12500	System	12
Furnishings	12500 12670	Window Treatment Entrance Mats	5 4
	12070	Entrance mats	4
********	******	*************	**
DIVISION 13 Special Construction	13091	X-Ray Protection	6
********	******	**********	**
DIVISION 14	14210	Electric Elevators	17
Conveying Systems		Annual Elevator Maintenance	16 .6
00211012119 010101112		Agreement	13
	14560		5
	14600	Hoisting Equipment	7
	14700	Pneumatic Tube System	6
	14710	Pneumatic Tube System -	
		Computer Controlled	8
*******	*****	***********	**
DIVISION 15		Indexed Separately	
Mechanical			

275

DIVISION 16 Electrical Indexed Separately

SECTION 01011 - SUMMARY OF THE WORK - SEPARATE PRIME CONTRACTS

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PART 1 - GENERAL

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RELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Special Conditions and Division-1 Specification sections, apply to work of this section.

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PROJECT/WORK IDENTIFICATION:

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General: Project name is "University of Kentucky Hospital Expansion and Renovation - Phase II - Addition Bid Pack 2 -Project No. 304.1. The project location is University of Kentucky Medical Center, Lexington, Kentucky." Contract Documents were prepared by OMNI/CMW Joint Venture, 212 North Upper Street, Lexington, Kentucky 40507. Consultants for the Project are:

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Hellmuth, Obata, and Kassabaum Associate Architects Mechanical/Electrical Staggs and Fisher Engineers Structural Engineers White, Walker & McReynolds Mechanical/Electrical HOK Engineers Engineers Mechanical/Electrical Zicherman-Bloome Consultants Medical Equipment Renshaw-Heilman Planners

39 40

Earl Walls & Associates Laboratory Equipment Planners

41 42 43

ASI, St. Louis Signage Consultants

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The Construction Manager for the Project is McCarthy Brothers. The drawings and specifications are dated November, (11/87).

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Prime Contracts, in the context used in this Section, are separate contracts that represent significant elements of work that are performed concurrently with and in close coordination with work performed on the project under other prime contracts. Prime contracts for this project are as listed in the Form of

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Contract Documents indicate the work of each prime Contract and related requirements and conditions that have an impact on the project. Related requirements and conditions that are indicated on the Contract Documents include, but are not necessarily limited to the following:

Existing site conditions and restrictions on use of the site.

Work performed prior to work under these prime Contracts.

Alterations and coordination with existing work.

Other work to be performed concurrently by the Owner.

Other work to be performed concurrently by separate contractors.

Work to be performed subsequent to work under these prime Contracts.

Definition of the extent of Prime Contract Work: The extent of the work of each prime Contract is indicated in the Contract Documents. General names and terminology on the drawings and in the specifications controls the determination of which prime Contract includes a specific element of required work, except where no other more specific definition is contained in the Contract Documents.

If it becomes necessary to refer to the contract documents to determine which prime Contract includes a specific element of required work, begin by referring to the prime Contracts, themselves; then, if a determination cannot be made from the prime Contracts, refer, in the following order, to the Special Conditions, this section of the Specifications, followed by the other Division-1 sections and finally with the Drawings and other Sections of the Specifications.

If, after referring to the contract documents, it cannot be clearly determined which prime Contractor will perform a specific item of required work, then, that item of work will be included as a part of the prime Contract for General Work.

Summary by References: Work of the prime Contracts can be summarized by reference the prime Contracts, to Conditions, Conditions, Specification Special sections, Drawings, Addenda and Modifications to Contract Documents issued subsequent to the initial printing of this Project Manual, and including but not necessarily limited to printed reference by any of these. It is recognized that the work of the prime Contracts is unavoidably affected or influenced

governing regulations, natural phenomenon, including weather conditions, and other forces outside the contract documents.

Abbreviated Written Summary: Briefly, and without force and effect upon the contract documents, the work of the prime Contracts can be summarized as follows:

The work includes construction of an addition to the UK

Hospital on the Southwest end of the site as shown. Landscape development, grading, paving and other site work are required. Also, a heliport with a hangar is to be constructed on the roof of this addition project.

The work includes poured-in-place concrete frame, precast concrete wall panels, roof accessories, waterproofing, doors, windows units, hardware, glazing and interior finishes and furnishings including woodwork, carpeting, vertical and horizontal blinds.

The work also includes specific items of equipment, including medical equipment, laboratory equipment, conveying equipment, plumbing, fire protection, heating-ventilating-air-conditioning, electrical systems, lighting, and communication-alarm-signal systems.

In earlier bid packages, separate contracts have been issued to perform work at site which precedes the work of these prime Contracts, and the foundation portion of which is scheduled to be under construction prior to the work of these Contracts. That separate-contract work can be summarized as follows:

A 550 car concrete frame parking garage.

Underground utility relocation.

Demolition of existing Pharmacology Building

Rough site grading and foundations for this addition project.

Temporary parking improvements.

Covered pedestrian walkway.

Fenced construction area.

PRIME CONTRACTORS USE OF PREMISES:

General: The Prime Contractors shall limit their use of the premises to the work indicated, so as to allow for Owner occupancy and use by the public.

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Use of the Site: Confine operations at the site to the areas permitted under the Contract. Portions of the site beyond areas on which work is indicated are not to be disturbed. Conform to site rules and regulations affecting the work while engaged in project construction.

Keep existing driveways and entrances serving the premises clear and available to the Owner and his employees at all times. Do not use these areas for parking or storage of materials.

Do not unreasonably encumber the site with materials of equipment. Confine stockpiling of materials and location of storage sheds to the areas indicated. If additional storage is necessary obtain and pay for such storage off-site.

Lock automotive type vehicles such as passenger cars and trucks and other types of mechanized and motorized construction equipment, when parked and unattended, so as to prevent unauthorized use. Do not leave such vehicles or equipment unattended with the motor running or the ignition key in place.

Refer to General and Special conditions on use of site and parking.

OWNER OCCUPANCY:

Full Owner Occupancy: The Owner will occupy the site and the existing Hospital during the entire period of construction. Cooperate fully with the Owner or his representative during construction operations to minimize conflicts and to facilitate Owner usage. Perform the work so as not to interfere with the Owner's operations.

DAMAGED FACILITIES:

Each Prime Contractor.shall cause to be repaired or replaced, to the satisfaction of the Architect, at no expense to the Owner, all paving, curbing, structures, plantings, walls, surfaces, elevators, and utility work that may be existing or that may have been completed under this Contract or other contracts of this Project that is damaged by work performed under this Contract or incidental thereto, whether by his own forces or by his subcontractors or by material suppliers.

Provide the repair and/or replacement of any damaged sections of existing roads, utilities and structures caused by work performed under this contract.

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PART 2 - PRODUCTS (Not Applicable).
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PART 3 - EXECUTION (Not Applicable).

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END OF SECTION 01011

SECTION 01045 - CUTTING AND PATCHING

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PART 1 - GENERAL

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RELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Special Conditions and other Division-1 Specification sections, apply to work of this section.

DESCRIPTION OF REQUIREMENTS:

 <u>Definition</u>: "Cutting and patching" includes cutting into existing construction to provide for the installation or performance of other work and subsequent fitting and patching required to restore surfaces to their original condition.

"Cutting and patching" is performed for coordination of the work, to uncover work for access or inspection, to obtain samples for testing, to permit alterations to be performed or for other similar purposes.

Cutting and patching performed during the manufacture of products, or during the initial fabrication, erection or installation processes is not considered to be "cutting and patching" under this definition. Drilling of holes to install fasteners and similar operations are also not considered to be "cutting and patching".

Refer to other sections of these specifications for specific cutting and patching requirements and limitations applicable to individual units of work.

Unless otherwise specified requirements of this section apply to mechanical and electrical work. Refer to Division-15 and Division-16 sections for additional requirements and limitations on cutting and patching of mechanical and electrical work.

QUALITY ASSURANCE:

Requirements for Structural Work: Do not cut and patch structural work in a manner that would result in a reduction of load-carrying capacity or of load-deflection ratio.

Operational and Safety Limitations: Do not cut and patch operational elements or safety related components in a manner that would result in a reduction of their capacity to perform in the manner intended, including energy performance, or that would result in increased maintenance, or decreased operational life

or decreased safety.

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 <u>Visual Requirements</u>: Do not cut and patch work exposed on the building's exterior or in it's occupied spaces, in a manner that would, in the Architect/Engineer's opinion, result in lessening the building's aesthetic qualities. Do not cut and patch work in a manner that would result in substantial visual evidence of cut and patch work. Remove and replace work judged by the Architect/Engineer to be cut and patched in a visually unsatisfactory manner.

If possible retain the original installer or fabricator, or another recognized experienced and specialized firm to cut and patch the following categories of exposed work.

Processed concrete finishes.

Stonework and stone masonry.

Ornamental metal.

Roofing.

Preformed metal panels.

Window wall system.

Stucco and ornamental plaster.

Acoustical ceilings.

Terrazzo.

Carpeting.

Wall covering.

HVAC enclosures, cabinets or covers.

SUBMITTALS:

<u>Procedural Proposal for Cutting and Patching:</u> Where prior approval of cutting and patching is required, submit proposed procedures for this work well in advance of the time work will be performed and request approval to proceed. Include the following information, as applicable, in the submittal:

Describe nature of the work and how it is to be performed, indicating why cutting and patching cannot be avoided. Describe anticipated results of the work in terms of changes to existing work, including structural, operational and visual changes as well as other significant elements.

List products to be used and firms that will perform work. 233

Give dates when work is expected to be performed.

List utilities that will be disturbed or otherwise be affected by work, including those that will be relocated and those that will be out-of-service temporarily. Indicate how long utility service will be disrupted.

Where cutting and patching of structural work involves the addition of reinforcement, submit details and engineering calculations to show how that reinforcement is integrated with original structure to satisfy requirements.

Approval by the Architect/Engineer to proceed with cutting and patching work does not waive the Architect/Engineer's right to later require complete removal and replacement of work found to be cut and patched in an unsatisfactory manner.

PART 2 - PRODUCTS

MATERIALS:

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General: Except as otherwise indicated, or as directed by the Architect/Engineer, use materials for cutting and patching that are identical to existing materials. If identical materials are not available, or cannot be used, use materials that match existing adjacent surfaces to the fullest extent possible with regard to visual effect. Use materials for cutting and patching that will result in equal-or-better performance characteristics.

PART 3 - EXECUTION

INSPECTION:

Before cutting, examine the surfaces to be cut and patched and the conditions under which the work is to be performed. If unsafe or otherwise unsatisfactory conditions are encountered, take corrective action before proceeding with the work.

Before the start of cutting work, meet at the work site with all parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict between the various trades. Coordinate layout of the work and resolve potential conflicts before proceeding with the work.

PREPARATION:

Temporary Support: To prevent failure provide temporary support of work to be cut.

<u>Protection</u>: Protect other work during cutting and patching to prevent damage. Provide protection from adverse weather conditions for that part of the project that may be exposed during cutting and patching operations.

Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

Take precautions not to cut existing pipe, conduit or duct serving the building but scheduled to be relocated until provisions have been made to bypass them.

PERFORMANCE:

General: Employ skilled workmen to perform cutting and patching work. Except as otherwise indicated or as approved by the Architect/Engineer, proceed with cutting and patching at the earliest feasible time and complete work without delay.

<u>Cutting</u>: Cut the work using methods that are least likely to damage work to be retained or adjoining work. Where possible review proposed procedures with the original installer; comply with original installer's recommendations.

In general, where cutting is required use hand of small power tools designed for sawing or grinding, not hammering and chopping. Cut through concrete and masonry using a cutting machine such as a carborundum saw or core drill to insure a neat hole. Cut holes and slots neatly to size required with minimum disturbance of adjacent work. To avoid marring existing finished surfaces, cut or drill from the exposed or finished side into concealed surfaces. Temporarily cover openings when not in use.

Comply with requirements of applicable sections of Division 2 where cutting and patching requires excavating and backfilling.

<u>Patching</u>: Patch with seams which are durable and as invisible as possible. Comply with specified tolerances for the work.

Where feasible, inspect and test patched areas to demonstrate integrity of work.

Restore exposed finishes of patched areas and where necessary extend finish restoration into retained adjoining work in a manner which will eliminate evidence of patching and refinishing.

Where removal of walls or partitions extends one finished

area into another finished area, patch and repair floor and wall surfaces in the new space to provide an even surface of uniform color and appearance. If necessary to achieve uniform color and appearance, remove existing floor and wall coverings and replace with new materials.

Where patch occurs in a smooth painted surface, extend final paint coat over entire unbroken surface containing patch, after patched area has received prime and base coat.

Patch, repair or rehang existing ceilings as necessary to provide an even plane surface of uniform appearance.

CLEANING:

Thoroughly clean areas and spaces where work is performed or used as access to work. Remove completely point, mortar, oils, putty and items of similar nature. Thoroughly clean piping, conduit and similar features before painting or other finishing is applied. Restore damaged pipe covering to its original condition.

END OF SECTION 01045

SECTION 01090 - DEFINITIONS AND STANDARDS

PART 1 - GENERAL

RELATED DOCUMENTS:

 Drawings and general provisions of Contract, including General and Special Conditions and other Division-1 Specification sections, apply to work of this section.

DESCRIPTION OF REQUIREMENTS:

General: This section specifies procedural and administrative requirements for compliance with governing regulations and codes and standards imposed upon the Work. These requirements include obtaining permits, licenses, inspections, releases and similar documentation, as well as payments, statements and similar requirements associated with regulations, codes and standards.

The term "Regulations" is defined to include laws, statutes, ordinances and lawful orders issued by governing authorities, as well as those rules, conventions and agreements within the construction industry which effectively control the performance of the Work regardless of whether they are lawfully imposed by governing authority or not.

Governing Regulations: Refer to General and Special Conditions for requirements related to compliance with governing regulations.

DEFINITIONS:

General Explanation: Certain terms used in contract documents are defined in this article. Definitions and explanations contained in this section are not necessarily complete, but are general for the Work to the extent that they are not stated more explicitly in another element of the contract documents.

General Requirements: Provisions and requirements of other Division-1 sections apply to the entire work of the Contract and, where so indicated, to other elements which are included in the project.

Indicated: The term "indicated" is a cross-reference to graphic representations, notes or schedules on the drawings, to other paragraphs or schedules in the specifications, and to similar means of recording requirements in contract documents. Where terms such as "shown," "noted," "scheduled," and "specified" are used in lieu of "indicated," it is for the purpose of helping the reader locate the cross-reference, and no limitation of

location is intended except as specifically noted.

Directed, Requested, etc.: Terms such as "directed," "requested," "authorized," "selected," "approved," "required," "accepted," and "permitted" mean "directed by the Architect/Engineer," "requested by the "Architect/Engineer," and similar phrases. However, no such implied meaning will be interpreted to extend the Architect's/Engineer's responsibility into the Contractor's area of construction supervision.

Approve: Where used in conjunction with the Architect's/Engineer's response to submittals, requests, applications, inquiries, reports and claims by the Contractor, the term "approved" will be held to limitations of the Architect's/Engineer's responsibilities and duties as specified in General and Supplementary Conditions. In no case will the Architect/Engineer's approval be interpreted as a release of the Contractor from responsibilities to fulfill requirements of contract documents or acceptance of the Work, unless otherwise provided by requirements of the contract documents.

<u>Project Site</u>: The term "project site" means the space available to the Contractor for performance of the Work, either exclusively or in conjunction with others performing other construction as part of the project. The extent of the project site is shown on the drawings, and may or may not be identical with the description of the land upon which the project is to be built.

Furnish: The term "furnish" is used to mean "supply and deliver to the project site, ready for unloading, unpacking, assembly, installation, and similar operations".

<u>Install</u>: The term "install" is used to describe operations at project site including the actual "unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing protecting, cleaning and similar operations".

<u>Provide</u>: The term "provide" means "to furnish and install, complete and ready for intended use".

<u>Installer</u>: The "installer" is "the entity" (person or firm) engaged by the Contractor, its subcontractor or subsubcontractor for performance of a particular element of construction at the project site, including installation, erection, application and similar required operations. It is a requirement that installers are experienced in the operations they are engaged to perform.

Testing Laboratories: A "testing laboratory" is an independent entity engaged to perform specific inspections or tests of the Work, either at the project site or elsewhere, and to report, and (if required) interpret results of those inspections or

tests.

SPECIFICATION FORMAT AND CONTENT EXPLANATION:

General: This article is provided to help the user of these specifications more readily understand the format, language, implied requirements and similar conventions of content. None of the following explanations shall be interpreted to modify the substance of contract requirements.

<u>Production Methods</u>: Portions of these specifications have been produced by editing master specifications; they may contain minor deviations from traditional writing formats. Such deviations are a natural result of this production technique, and no other meaning shall be implied.

<u>Specification</u> <u>Format</u>: These specifications are organized based upon the Construction Specifications Institute's 16-Division format. The organization of these specifications into Divisions, Sections or Trade Headings conforms generally to recognized industry practice.

<u>Specification</u> <u>Content:</u> This project specification has been produced employing certain conventions in the use of language as well as conventions regarding the intended meaning of certain terms, words, and phrases when used in particular situations or circumstances. These conventions are explained as follows:

 In certain circumstances, language used in specifications and other contract documents is of the abbreviated type. Implied words and meanings will be appropriately interpreted. Singular words will be interpreted as plural and plural words will be interpreted as singular where applicable and where the full context of the contract documents so indicates.

Imperative Language is used generally in the specifications. Requirements expressed imperatively are to be performed by the Contractor. At certain locations in the text, for clarity, contrasting subjective language is used to describe responsibilities which must be fulfilled indirectly by the Contractor, or by others when so noted.

Methods of Specifying: Techniques or methods of specifying requirements vary throughout the text. The method used for specifying one element of the Work has no bearing on requirements for another element of the Work.

Assignment of Specialists: In certain circumstances, the specification requires or implies that specific elements of the Work are to be assigned to specialists who must be engaged to perform that element of the Work. Such assignments are special requirements over which the Contractor has no choice or option. They are intended to establish which party or entity involved in



a specific element of the Work is considered as being sufficiently experienced in the indicated construction processes or operations to be recognized as "expert" in those processes or operations. Nevertheless, the ultimate responsibility for fulfilling all contract requirements remains with the Contractor.

DRAWING SYMBOLS:

General: Except as otherwise indicated, graphic symbols used on the drawings are those symbols recognized in the construction industry for purposes indicated. Where not otherwise noted, symbols are defined by "Architectural Graphic Standards," published by John Wiley & Sons, Inc., seventh edition.

 Mechanical/Electrical Drawings: Graphic symbols used on mechanical and electrical drawings are generally aligned with symbols recommended by ASHRAE. Where appropriate, these symbols are supplemented by more specific symbols as recommended by other technical associations including ASME, ASPE, IEEE and similar organizations. Refer instances of uncertainty to the Architect/Engineer for clarification before proceeding.

INDUSTRY STANDARDS:

Applicability of Standards: Except where more explicit or more stringent requirements are written into the contract documents, applicable construction industry standards have the same force and effect as if bound into or copied directly into the contract documents. Such industry standards are made a part of the contract documents by reference. Individual specification sections indicate which codes and standards the Contractor must keep available at the project site for reference.

Referenced standards (standards referenced directly in the contract documents) take precedence over standards that are not referenced but generally recognized in the industry for applicability to the Work.

<u>Unreferenced</u> <u>standards</u> are not directly applicable to the Work, except as a general requirement of whether the Work complies with recognized construction industry standards.

<u>Publication</u> <u>Dates</u>: Except as otherwise indicated, where compliance with an industry standard is required, comply with standard in effect as of date of contract documents.

<u>Updated</u> <u>Standards</u>: At the request of the Architect, Contractor or governing authority, submit a change order or field order proposal where an applicable industry code or standard has been revised and reissued after the date of the contract documents and before the performance of the Work

affected. The Architect will decide whether to issue the change order or field order proposal to proceed with the updated standard.

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Conflicting Requirements: Where compliance with two or more standards is specified, and where these standards establish different or conflicting requirements for minimum quantities or quality levels, the most stringent requirement will be enforced, unless the contract documents specifically indicate otherwise. Refer requirements that are different, but apparently equal, and uncertainties as to which quality level is more stringent to the Architect/Engineer for a decision before proceeding.

Minimum Quantities or Quality Levels: In every instance the quantity or quality level shown or specified is intended to be the minimum to be provided or performed. Unless otherwise indicated, the actual Work may either comply exactly, within specified tolerances, with the minimum quantity or quality specified, or may exceed that minimum within reasonable limits. In complying with these requirements, the indicated numeric values are either minimum or maximum values, as noted, or as appropriate for the context of the requirements. Refer instances of uncertainty to the Architect/Engineer for decision before proceeding.

Copies of Standards: The contract documents require that each entity performing work be experienced in that part of the Work being performed. Each entity is also required to be familiar with industry standards applicable to that part of the Work. Copies of applicable standards are not bound with the contract documents.

Where copies of standards are needed for proper performance of the Work, the Contractor is required to obtain such copies directly from the publication source.

Although copies of standards needed for enforcement of the requirements may be required submittals, the Architect/Engineer reserves the right to require the Contractor to submit additional copies as necessary for enforcement of the requirements.

Abbreviations and Names: Trade association names and titles of general standards are frequently abbreviated. Where acronyms or abbreviations are used in the specifications or other contract documents they are defined to mean the recognized name of the trade association, standards generating organization, governing authority or other entity applicable to the context of the text provision. Refer to the "Encyclopedia of Associations," published by Gale Research Co., available in most libraries.

GOVERNING REGULATIONS/AUTHORITIES:

General: The procedure followed by the Architect/Engineer has been to contact governing authorities where necessary to obtain information needed for the purpose of preparing contract documents; recognizing that such information may or may not be of significance in relation to the Contractor's responsibilities for performing the Work. Contact governing authorities directly for necessary information and decisions having a bearing on performance of the Work.

SUBMITTALS:

Permits, Licenses, and Certificates: For the Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, and similar documents, correspondence and records established in conjunction with compliance with standards and regulations bearing upon performance of the work.

<u>PART 2 - PRODUCTS</u> (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01090

SECTION 01340 - SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

PART 1 - GENERAL

RELATED DOCUMENTS:

 Drawings and general provisions of Contract, including General and Special Conditions and other Division-1 Specification sections, apply to work of this section.

DESCRIPTION OF REQUIREMENTS:

General: This section specifies procedural requirements for non-administrative submittals including shop drawings, product data, samples and other miscellaneous work-related submittals. Shop drawings, product data, samples and other work-related submittals are required to amplify, expand and coordinate the information contained in the Contract Documents.

 Refer to other Division-1 sections and other contract documents for specifications on administrative, non-work-related submittals. Such submittals include, but are not limited to the following items:

 Permits.

Payment applications.

Performance and payment bonds.

Insurance certificates.

Inspection and test reports.

Schedule of values.

Progress reports.

Listing of subcontractors.

Shop drawings are technical drawings and data that have been specially prepared for this project, including but not limited to the following items:

Fabrication and installation drawings.

Setting diagrams.

Shopwork manufacturing instructions.

Templates.

Patterns.

Coordination drawings (for use on-site).

Schedules.

Design mix formulas.

Contractor's engineering calculations.

Standard information prepared without specific reference to a project is not considered to be shop drawings.

Product data includes standard printed information on

manufactured products that has not been specially-prepared for 2 this project, including but not limited to the following items:

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Manufacturer's product specifications and installation instructions.

6 Standard color charts.

7 Catalog cuts.

Roughing-in diagram and templates.

Standard wiring diagrams. Printed performance curves. Operational range diagrams.

Mill reports.

Standard product operating and maintenance manuals.

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Samples are physical examples of work, including but not limited to the following items:

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Partial sections of manufactured or fabricated work.

Small cuts or containers of materials.

Complete units of repetitively-used materials.

Swatches showing color, texture and pattern.

Color range sets.

Units of work to be used for independent inspection and

testing.

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Mock-ups are special forms of samples, which are too large or otherwise inconvenient for handling in the manner specified for transmittal of sample submittals.

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<u>Miscellaneous</u> <u>submittals</u> are work-related, non-administrative submittals that do not fit in the three previous categories, including, but not limited to the following:

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Specially-prepared and standard printed warranties.

Maintenance agreements.

Workmanship bonds.

Survey data and reports.

Project photographs.

Testing and certification reports.

Record drawings.

Field measurement data.

Operating and maintenance manuals.

Keys and other security protection devices.

Maintenance tools and spare parts.

Overrun stock.

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SUBMITTAL PROCEDURES:

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General: Refer to the General Conditions for basic procedures for submittal handling:

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Coordination: Coordinate the preparation and processing submittals with the performance of the work. Coordinate each

separate submittal with other submittals and related activities such as testing, purchasing, fabrication, delivery and similar activities that require sequential activity.

Coordinate the submittal of different units of interrelated work so that one submittal will not be delayed by the Architect/Engineer's need to review a related submittal. The Architect/Engineer reserves the right to withhold action on any submittal requiring coordination with other submittals until related submittals are forthcoming.

<u>Scheduling</u>: In each appropriate administrative submittal, such as the progress schedule, show the principal work-related submittals and time requirements for coordination of submittal activity with related work.

<u>Listing:</u> Prepare a separate listing showing principal work-related submittals and their initial submittal dates as required for coordination of the work. Organize the listing by the related specification number sequence. Submit the listing within 45 days of the date of commencement of the work.

Coordination of Submittal Times: Prepare and transmit each submittal to the Architect/Engineer sufficiently in advance of the scheduled performance of related work and other applicable activities. Transmit different kinds of submittals for the same unit of work so that processing will not be delayed by the Architect/Engineer's need to review submittals concurrently for coordination.

Review Time: Allow sufficient time so that the installation will not be delayed as a result of the time required to properly process submittals, including time for resubmittal, if necessary. Advise the Architect/Engineer on each submittal, as to whether processing time is critical to the progress of the work, and if the work would be expedited if processing time could be shortened.

Allow two weeks for the Architect/Engineer's initial processing of each submittal. Allow a longer time period where processing must be delayed for coordination with subsequent submittals. The Architect/Engineer will advise the Contractor promptly when it is determined that a submittal being processed must be delayed for coordination.

Allow one week for reprocessing each submittal.

No extension of time will be authorized because of the Contractor's failure to transmit submittals to the Architect/Engineer sufficiently in advance of the work.

Submittal Preparation: Mark each submittal with a permanent

label for identification. Provide the following information on 2 the label for proper processing and recording of action taken. 3

Project name and University Project Number (304.1).

Name and address of Architect/Engineer.

Name and address of Contractor. Name and address of subcontractor.

Name and address of supplier.

Name of manufacturer.

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53 54 Number and title of appropriate specification section. Drawing number and detail references, as appropriate.

Similar definitive information as necessary.

Provide a space on the label for the Contractor review and approval markings, and a space for the Architect/Engineer's "Action" marking.

Submittal Transmittal: Package each submittal appropriately for transmittal and handling. Transmit each submittal Contractor to the Architect/Engineer, and to other destinations as indicated, by use of a transmittal form. Submittals received from sources other than the Contractor will be returned to the sender "without action".

Transmittal Form Prepare a draft of a transmittal form and submit it to the Architect/Engineer for acceptance. Provide on the form places for the following information:

Project name and University Project Number (304.1). Date.

To:

From:

Names of subcontractor, manufacturer and supplier.

References.

Category and type of submittal.

Submittal purpose and description.

Submittal and transmittal distribution records.

Signature of transmitter.

Contractor's certification stating that the information submitted complies with the requirements of Contract Documents, with a place for the Contractor's signature.

Record relevant information and requests for data on the transmittal form. On the transmittal form, or on a separate sheet attached to the form, record deviations from the requirements of the Contract Documents, if any, including minor variations and limitations.

SPECIFIC SUBMITTAL REQUIREMENTS:

General: Specific submittal requirements for individual units of

work are specified in the applicable specification section. Except as otherwise indicated in the individual specification sections, comply with the requirements specified herein for each type of submittal.

Where it is necessary to provide intermediate submittals between the initial and final submittals, provide and process intermediate submittals in the same manner as for initial submittals.

Shop Drawings: Information required on shop drawings includes, dimensions, identification of specific products and materials

which are included in the work, compliance with specified standards and notations of coordination requirements with other work. Provide special notation of dimensions that have been established by field measurement. Highlight, encircle or otherwise indicate deviations from the contract documents on the shop drawings.

Coordination Drawings: Provide continuous drawings where required for the integration of the work, including work first shown in detail on shop drawings or product data. Show sequencing and relationship of separate units of work which must interface in a restricted manner to fit in the space provided, or function as indicated. Coordination drawings are considered shop drawings and must be definitive in nature.

Refer to Division-15 and Division-16 sections for additional general requirements applicable to shop drawings for mechanical and electrical work, respectively.

Do not permit shop drawings copies without an appropriate final "Action" marking by the Architect/Engineer to be used in connection with the work.

<u>Preparation</u>: Submit newly prepared information, drawn to accurate scale on sheets not less than 8-1/2" x 11"; except for actual pattern or template type drawings, the maximum sheet size shall not exceed 36" x 48". Indicate the name of the firm that prepared each shop drawing and provide appropriate project identification in the title block. Provide a space not less than 20 sq. in. beside the title block for marking the record of the review process and the Architect/Engineer's "Action" marking.

Do not reproduce contract documents or copy standard printed information as the basis of shop drawings.

<u>Initial</u> <u>Submittal</u>: Provide one correctable translucent reproducible print and one blue-line or black-line print; the reporducible print will be returned.

Final Submittal: Provide prints in sufficient quantities to permit following minimum distribution:

Construction Manager 2 copies
University of Kentucky 1 copy
Relevant Consulting Engineers 1 copy
Field Copy 1 copy
Architects 2 copies
Maintenance Manuals (where required) 3 copies
Prime Contractor As Required

<u>Product</u> <u>Data</u>: General information required specifically as product data includes manufacturer's standard printed recommendations for application and use, compliance with recognized standards of trade associations and testing agencies, and the application of their labels and seals (if any), special notation of dimensions which have been verified by way of field measurement, and special coordination requirements for interfacing the material, product or system with other work.

Refer to Division-15 and Division-16 sections for additional general requirements applicable to product data for mechanical and electrical work respectively.

<u>Preparation</u>: Collect required product data into a single submittal for each units of work or system. Mark each copy to show which choices and options are applicable to the project. Where project data has been printed to include information on several similar products, some of which are not required for use on the project, or are not included on this submittal, mark the copies to show clearly that such information is not applicable.

Where product data must be specially prepared for required products, materials or systems, because standard printed data is not suitable for use, submit data as "shop drawings" and not as "product data".

Submittals: Product data submittal is required for information and record and to determine that the products, materials and systems comply with the provisions of the contract documents. Therefore, the initial submittal is also the final submittal, except where the Architect/Engineer observes that there is non-compliance with the provisions of the contract documents and returns the submittal promptly to the Contractor marked with the appropriate "Action".

Provide a preliminary single-copy submittal where required, for selection of options by the Architect/Engineer.

<u>Initial</u> <u>Submittal</u>: Except as otherwise indicated in individual sections of these specifications, submit 2 copies of each required product data submittal, plus 2

additional copies where required for maintenance manuals. The Architect/Engineer will retain one copy, and will return the other marked with "Action" and corrections or modifications as required.

Do not submit product data or allow its use on the project, until compliance with the requirements of the contract documents has been confirmed by the Contractor.

<u>Final Distribution</u>: Furnish copies of product data to subcontractors, suppliers, fabricators, manufacturers, installers, governing authorities and others as required for proper performance of the work. Show distribution on transmittal form.

<u>Installation</u> <u>Copy</u>: Do not proceed with installation of materials, products and systems until a copy of product data applicable to the installation is in the possession of the installer. Do not permit the use of unmarked copies of product data in connection with the performance of the work.

Samples: Submit samples for the Architect/Engineer's visual review of general generic kind, color, pattern, and texture, and for a final check of the coordination of these characteristics with other related elements of the work. Samples are also submitted for quality control comparison of these characteristics between the final sample submittal and the actual work as it is delivered and installed.

Refer to individual work sections of these specifications for additional sample requirements, which may be intended for examination or testing of additional characteristics. Compliance with other required characteristics is the exclusive responsibility of the Contractor; such compliance is not considered in the Architect/Engineer's review and "Action" indication on sample submittals.

Documentation required specifically for sample submittals includes a generic description of the sample, the sample source or the product name or manufacturer, compliance with governing regulations and recognized standards. In addition, indicate limitations in terms of availability, sizes, delivery time, and similar limiting characteristics.

Refer to Division-15 and Division-16 sections for additional general requirements applicable to samples for mechanical and electrical work, respectively.

<u>Preparation</u>: Where possible provide samples that are physically identical with the proposed material or product to be incorporated in the work; provide full scale, fully fabricated samples cured and finished in the manner specified. Where variations in color, pattern, or texture are

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inherent in the material or product represented by the sample, submit multiple units of the sample (not less than 3 units), which show the approximate limits of variations. Where samples are specified for the Architect/Engineer's selection of color, texture or pattern, submit a full set of available choices for the material or product. Mount, display or package samples in the manner specified to facilitate the review of indicated qualities. Prepare samples to match the Architect/Engineer's sample where so indicated.

Refer to individual sections of these specifications for samples which, because of their relatively high cost or other special considerations, are intended to be returned to the Contractor for incorporation in the work. Such samples must be in an undamaged condition at the time of use. On the transmittal form to the Architect/Engineer, indicate such special requests regarding the disposition of sample submittals.

Submittal: At the Contractor's option, and depending upon the anticipated of the response Architect/Engineer, the initial submittal of samples may be either a preliminary submittal or a final submittal.

Submittal of three sets of samples, is required where requirements indicate the Architect/Engineer's selection of color, pattern, texture or similar characteristics from a manufacturer's range of standard choices is necessary. Submittals will be reviewed and returned with the Architect/Engineer's "Action" marking.

Distribution of Samples: Maintain the final submittal sets of samples, as returned by the Architect/Engineer, at the project site, available for quality control comparisons throughout the course of performing the work. In addition, throughout the final submittal sets may be used to obtain final acceptance of the work associated with each set. Prepare and distribute additional sets of samples to subcontractors, suppliers, fabricators, manufacturers, installers, governing authorities, and others as required for proper performance of the work. Show final distribution on transmittal forms.

Mock-Ups and similar samples specified in individual work sections are special types of samples. Comply with sample submittal requirements to the fullest extent possible. Process transmittal forms to provide a record of activity.

Miscellaneous Submittals:

Inspection and Test Reports: Classify each inspection and test report as being either "shop drawings" or "product data" depending on whether the report is specially prepared for the project, or a standard publication of workmanship control

testing at the point of production. Process inspection and test reports accordingly.

<u>Warranties:</u> Refer to section "Products and Substitutions" for specific general requirements on warranties, product bonds, workmanship bonds and maintenance agreement. In addition to copies desired for the Contractor's use, furnish 2 executed copies of such warranties, bonds or agreements. Provide 2 additional copies where required for maintenance manuals.

<u>Survey Data</u>: Refer to section "Project Coordination" for specific general requirements on property surveys, field measurements, quantitative records of actual work, damage surveys and similar data required by the individual sections of these specifications. None of the specified copies will be returned.

Records of Actual Work: Furnish 4 copies of records of actual work, one of which will be returned for inclusion in the record documents as specified in section "Project Closeout".

Standards: Where submittal of a copy of standards is indicated, and except where copies of standards are specified as an integral part of a "Product Data" submittal, submit a single copy of standards for the Architect/Engineer's use. Where workmanship, whether at the project site or elsewhere is governed by a standard, furnish additional copies of the standard to fabricators, installers and others involved in the performance of the work.

Closeout Submittals: Refer to section "Project Closeout" and to individual sections of these specifications for specific submittal requirements of project closeout information, materials, tools, and similar items.

Record Documents: Furnish set of original documents as maintained on the project site. Along with original marked-up record drawings provide 2 photographic copies of marked-up drawings, which, at the Contractor's option, may be reduced to not less than half size.

Operating and Maintenance Data: Furnish 2 bound copies of operating data and maintenance manuals.

Materials and Tools: Refer to individual sections of these specifications for required quantities of spare parts, extra and overrun stock, maintenance tools and devices, keys, and similar physical units to be submitted.

General Distribution: Provide additional distribution of submittals to contractors, suppliers, fabricators, installers, governing authorities, and others as necessary

for the proper performance of the work. Include such additional copies of submittals in the transmittal to the Architect/Engineer where the submittals are required to receive "Action" marking before final distribution. Record distributions on transmittal forms.

ARCHITECT/ENGINEER'S ACTION:

 General: Except for submittals for the record and similar purposes, where action and return on submittals is required or requested, the Architect/Engineer will review each submittal, mark with appropriate "Action", and where possible return within 2 weeks of receipt. Where the submittal must be held for coordination the Architect/Engineer will so advise the Contractor without delay.

 Action Stamp: The Architect/Engineer will stamp each submittal to be returned with a uniform, self explanatory action stamp, appropriately marked and executed to indicate whether the submittal returned is for unrestricted use, final-but-restricted use (as marked), must be revised and resubmitted (use not permitted) or without action (as explained on the transmittal form).

PART 2 - PRODUCTS (Not Applicable).

PART 3 - EXECUTION (Not Applicable).

END OF SECTION 01340

SECTION 01400 - QUALITY CONTROL SERVICES

PART 1 - GENERAL

RELATED DOCUMENTS:

 Drawings and general provisions of Contract, including General and Special Conditions and other Division-1 Specification sections, apply to work of this section.

DESCRIPTION OF REQUIREMENTS:

 <u>General</u>: Required inspection and testing services are intended to assist in the determination of probable compliance of the work with requirements specified or indicated. These required services do not relieve the Contractor of responsibility for compliance with these requirements or for compliance with requirements of the contract documents.

<u>Definitions</u>: The requirements of this section relate primarily to customized fabrication and installation procedures, not to the production of standard products. Quality control services include inspections and tests and related actions including reports, performed by independent agencies and governing authorities, as well as directly by the Contractor. These services do not include Contract enforcement activities performed directly by the Architect or Engineer.

Specific quality control requirements for individual units of work are specified in the section of these specifications that specify the individual element of the work. These requirements, including inspections and tests, cover both production of standard products, and fabrication of customized work. These requirements also cover quality control of the installation procedures.

 Inspections, tests and related actions specified in this section and elsewhere in the contract documents are not intended to limit the Contractor's own quality control procedures which facilitate overall compliance with requirements of the contract documents.

 Requirements for the Contractor to provide quality control services as required by the Architect/Engineer, the Owner, governing authorities or other authorized entities are not limited by the provisions of this section.

RESPONSIBILITIES:

Contractor Responsibilities: Except where they are specifically

indicated as being the Owner's responsibility, or where they are to be provided by another identified entity, inspections, tests and similar quality control services are the Contractor's responsibility; these services also include those specified to be performed by an independent agency and not directly by the Contractor. Costs for these services shall be included in the Contract Sum. The Contractor shall employ and pay an independent agency, testing laboratory or other qualified firm to perform quality control services specified.

The Owner will only engage and pay for the services of an independent agency to perform inspections and tests that are specified as the Owner's responsibility.

Retest Responsibility: Where results of required inspections, tests or similar services prove unsatisfactory and do not indicate compliance of related work with the requirements of the contract documents, then retests are the responsibility of the Contractor, regardless of whether the original test was the Contractor's responsibility. Retest the work revised or replaced by the Contractor is the Contractor's responsibility, where required tests were performed on original work.

Responsibility for Associated Services: The Contractor is required to cooperate with the independent agencies performing required inspections, tests and similar services. Provide such auxiliary services as are reasonably requested. Notify the testing agency sufficiently in advance of operations to permit assignment of personnel. These auxiliary services include but are not necessarily limited to the following:

Providing access to the work.

Taking samples or assistance with taking samples.

Delivery of samples to test laboratories.

Security and protection of samples and test equipment at the project site.

Coordination: The Contractor and each independent agency engaged to perform inspections, tests and similar services for the project shall coordinate the sequence of their activities so as to accommodate required services with a minimum of delay in the progress of the work. In addition to Contractor and each independent testing agency shall coordinate their work so as to necessity of removing and replacing accommodate inspections tests. and The Contractor responsible for scheduling times for inspections, tests, taking of samples and similar activities.

QUALITY ASSURANCE:

Qualification for Service Agencies: Except as otherwise indicated, engage inspection and test service agencies, including independent testing laboratories, which are

prequalified as complying with "Recommended Requirements for Independent Laboratory Qualification" by the American Council of Independent Laboratories, and which are recognized in the industry as specialized in the types of inspections and tests to be performed.

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SUBMITTALS:

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Refer to Division-1 section on "Submittals" for the General: general requirements on submittals. Submit a certified written report of each inspection, test or similar service, directly to the Architect/Engineer, in duplicate, unless the Contractor is responsible for the service. If the Contractor is responsible responsible for the service. for the service, submit a certified written report of each inspection, test or similar service through the Contractor, in Submit additional copies of each written report directly to the governing authority, when the authority so directs.

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Written reports of each inspection, test or Report Data: similar service shall include, but not be limited to the following:

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Name of testing agency or test laboratory. Dates and locations of samples and tests or inspections. Names of individuals making the inspection or test. Designation of the work and test method. Complete inspection or test data.

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Test results. Interpretations of test results.

Notation of significant ambient conditions at the time of sample-taking and testing.

Comments or professional opinion as to whether inspected or tested work complies with requirements of the contract documents.

Recommendations on retesting, if applicable.

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PART 2 - PRODUCTS (Not Applicable).

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PART 3 - EXECUTION

REPAIR AND PROTECTION:

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Upon completion of inspection, testing, sample-taking and similar services performed on the work, repair damaged work and restore substrates and finishes to eliminate deficiencies, including deficiencies in the visual qualities of exposed Comply with the contract document requirements for finishes. "Cutting and Patching". Protect work exposed by or for quality control service activities, and protect repaired work.

and protection is the Contractor's responsibility, regardless of the assignment of responsibility for inspection, testing or similar services.

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END OF SECTION 01400

SECTION 01501 - TEMPORARY FACILITIES, SEPARATE PRIME CONTRACTS

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PART 1 - GENERAL

RELATED DOCUMENTS:

 Drawings and general provisions of each prime Contract, including General and Special Conditions and other Division-1 Specification sections, apply to work of this section.

DESCRIPTION OF REQUIREMENTS:

This section specifies administrative and procedural requirements for temporary services and facilities, including such items as temporary utility services, temporary construction and support facilities, and project security and protection.

Division of Responsibilities: Refer to Special Conditions

Use Charges:

No cost or usage charges for temporary services or facilities are chargeable to the Owner or Architect. Prime contractor's cost or use charges for temporary services or facilities will not be accepted as a basis of claims for a change-order extra.

Gas Service Use Charges: The Contractor for General Work shall pay gas service use charges for gas used by entities authorized to be at or to perform work at the project site. The Contractor for General Work shall exercise control over gas use in an effort to conserve energy.

Electrical Work shall pay electric power service use charges, whether metered or otherwise, for power used by all entities authorized to be at or to perform work at the project site. The Contractor for Electrical Work shall exercise control over power use in an effort to conserve energy.

<u>Sewer Service Use Charges</u>: The Contractor for Plumbing and Gas Piping shall pay water and sewer use charges for sewer usage by all entities authorized to be at or to perform work at the project site.

Temporary Construction and Support Facilities required for the project include but are not limited to the following:

Temporary heat.

Field offices and storage sheds.

1 Temporary roads and paving.

Sanitary facilities, including drinking water.

Dewatering facilities and drains.

Temporary enclosures.

Hoists and temporary elevator use.

First aid station.

Project bulletin boards and signs.

Waste disposal services. Rodent and pest control.

Construction aids and miscellaneous general services and

facilities.

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Each prime contractor may elect to use alternative temporary services and facilities equivalent to those specified, subject to acceptance by the Architect/Engineer.

Security and Protection Facilities and Services required for the project include but are not limited to the following:

Temporary fire protection.

Barricades, warning signs, lights.

Maintenance of Protected Pedestrian Walkways.

Environmental protection.

Alternative security and protection methods or facilities, equivalent to those specified, may be used subject to acceptance by the Architect/Engineer.

QUALITY ASSURANCE:

Regulations: Each prime contractor shall comply with local laws regulations governing construction and local standards, in the installation and maintenance of temporary services and facilities, including but not limited to the following:

Building Codes, including local requirements for permits, testing and inspection.

Health and safety regulations.

Utility company regulations and recommendations governing temporary utility services.

Fire Department rules and recommendations.

Police and Rescue Squad recommendations.

Environmental protection regulations governing use of water and energy, and control of dust, noise and other nuisances.

Standards: Each prime contractor shall comply with the "Building Construction and requirements of NFPA Code 241, Demolition Operations", the ANSI-A10 Series standards for "Safety Requirements for Construction and Demolition", and the NECA National Joint Guideline NJG-6 "Temporary Job Utilities and Services".

Inspections: Inspect and test each service before placing temporary utilities in use. Arrange for required inspections and tests by governing authorities. Obtain required certifications and permits for use.

SUBMITTALS:

Reports and Permits: During the progress of the Work, each prime contractor shall submit copies of reports and permits required by governing authorities, or necessary for the installation and efficient operation of temporary services and facilities.

Submit copies of reports of tests, inspections, meter readings and similar procedures performed on temporary utilities before, during and after performance of work. Submit copies of permits, easements and similar documentation necessary for installation, use and operation of temporary utility services. Reports and permits required for use of temporary utility services include but are not limited to the following:

Temporary heat.
Ventilation.
Temporary electric power and light.
Temporary Fire Protection.

JOB CONDITIONS:

General: Each prime contractor shall provide each temporary service and facility ready for use at each location, when first needed to avoid delays in performance of work. Maintain, expand as required, and modify as needed throughout the progress of the Work. Do not remove until services or facilities are no longer needed, or are replaced by the authorized use of completed permanent facilities.

With the establishment of the job progress schedule, each prime contractor shall establish a schedule for implementation and termination of service for each temporary utility. At the earliest feasible time, and when acceptable to the Owner and Architect/Engineer, change over from use of temporary utility service to use of the permanent service, to enable removal of temporary utilities and to eliminate possible interference with completion of the Work.

 Temporary use of permanent facilities: Regardless of previously assigned responsibilities for temporary services and facilities, the Installer of each permanent service or facility shall assume responsibility for its operation, maintenance and protection during use as a construction service or facility prior to the Owner's acceptance and

operation of the facility.

Conditions of Use: Operate temporary services and facilities in a safe and efficient manner. Do not overload, and do not permit temporary services and facilities to interfere with the progress of work. Do not allow unsanitary conditions, public nuisances or hazardous conditions to develop or persist on the site.

Temporary Utilities: Do not permit freezing of pipes, flooding or the contamination of water sources.

Temporary Construction and Support Facilities: Maintain temporary facilities in a manner to prevent discomfort to users. Take necessary fire prevention measures. Maintain temporary facilities in a sanitary manner so as to avoid health problems.

<u>Security and Protection</u>: Maintain site security and protection facilities in a safe, lawful, publicly acceptable manner. Take measures necessary to prevent site erosion.

PART 2 - PRODUCTS

MATERIALS AND EQUIPMENT:

General: Each prime contractor shall provide new materials and equipment for temporary services and facilities; used materials and equipment that are substantially undamaged and in serviceable condition may be used, if acceptable to the Architect/Engineer. Provide only materials and equipment that are suitable for their intended use.

Temporary Utilities: Where the local utility company provides only a portion of the temporary utility, provide the remainder with matching, compatible materials and equipment. Comply with utility company recommendations.

<u>Water Hoses</u>: Where shut-off nozzles are used at the water hose discharge, provide heavy-duty abrasion-resistant hoses with a pressure rating greater than the maximum pressure of the water distribution system.

<u>Electrical</u> <u>Service</u>: Comply with applicable NEMA, NECA and UL standards and governing regulations for materials and layout of temporary electric service, including requirements included in Division-16 sections.

Voltage Differences: Provide identification warning signs at power outlets other than 110-120 volt power. Provide polarized outlets for plug-in type outlets, to prevent insertion of 110-120 volt plugs into higher voltage outlets.

Ground-Fault Protection: Provide receptacle outlets equipped with ground-fault circuit interrupters, reset button and pilot light, for plug-in connection of power tools and equipment.

<u>Electrical</u> <u>Power Cords</u>: Use only grounded extension cords; use "hard-service" cords where exposed to abrasion and traffic. Use single lengths or waterproof connectors to connect separate lengths, if single lengths will not reach work areas.

Lamps and Light Fixtures: Provide general service incandescent lamps of wattage indicated or required for adequate illumination. Protect lamps with guard cages or tempered glass enclosures, where fixtures are exposed to breakage by construction operations. Provide exterior fixtures where fixtures are exposed to weather or moisture.

Temporary Construction and Support Facilities: Provide facilities that can be maintained properly throughout the course of use at the project site.

<u>Heating Units:</u> Provide temporary heating units that have been tested and labeled by UL, FM or another recognized trade association related to the fuel being consumed.

Temporary Offices and Similar Construction: For temporary offices, fabrication shops, storage sheds and similar construction, provide standard prefabricated or mobile units or the equivalent job-built construction. Provide insulated, weathertight units, that are heated or air-conditioned where indicated, with lockable entrances, operable windows, roofing, foundations adequate for normal loading, including wind loads, serviceable finishes, and mechanical and electrical equipment necessary to achieve ambient conditions indicated.

Fire-Resistance: Provide fire-resistant construction for offices, shops, walkways, and sheds located within the construction work area, or within 50 feet of the building lines. Provide UL labeled class "A" fire treated lumber and plywood for framing, sheathing and siding, and UL class "A" asphalt shingle or rollroofing. Provide gypsum board interior walls.

Self-Contained Toilet Units: Provide single-occupant self-contained toilet units of the chemical, aerated recirculation, or combustion type, properly vented and fully enclosed with glass fiber reinforced polyester shell or similar non-absorbent material.

Tarpaulins: Provide waterproof, fire-resistant, UL labeled

tarpaulins with flame-spread rating of 15 or less. For temporary enclosures where work is being or will be performed, provide translucent tarpaulins made of nylon reinforced laminated polyethylene to admit the maximum amount of daylight and reduce the need for temporary lighting.

First Aid Supplies: Comply with governing regulations and recognized recommendations within the construction industry.

<u>Drinking Water:</u> Provide potable water complying with local health authority requirements.

<u>Sign Materials</u>: For signs and directory boards, provide exterior type, Grade MDO Medium Density Overlay Plywood conforming to PS-1, of sizes and thicknesses indicated. Provide exterior grade acrylic-latex-base enamel for painting sign panels and applying graphics.

Security and Protection Facilities:

Fire Extinguishers: Provide type "A" fire extinguishers for temporary offices and similar spaces where there is minimal danger of electrical fires or grease-oil-flammable liquid fires. In other locations provide either type "ABC" dry chemical extinguishers, or a combination of several extinguishers of NFPA recommended types for the exposures in each case.

<u>Plywood</u>: For fences and vision barriers, provide exterior type, 3/8" thick minimum exterior type plywood, prime and finish painted. For safety barriers, sidewalk bridges and similar direct-contact uses, provide exterior type, 5/8" thick minimum prime and finish painted plywood.

Open-Mesh Fencing: Provide No. 11-gage galvanized chain link fabric fencing 6 feet high with galvanized barbed wire top strand, galvanized steel pipe posts, 1-1/2" I.D. for line posts, and 2" I.D. for corner posts.

PART 3 - EXECUTION

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INSTALLATION - GENERAL:

General: Use qualified tradesmen for installation of temporary services and facilities. Locate temporary services and facilities where they will serve the entire project adequately and result in minimum interference with performance of the Work.

Relocate, modify and extend services and facilities as required during the course of work so as to accommodate the entire work of the project.

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TEMPORARY UTILITY INSTALLATION:

General: Engage the local utility company to install temporary service to the project, or to make connections to existing service. Arrange with the companies and existing users for an acceptable time when service can be interrupted, where necessary, to make connections for temporary services.

Water Service:

 General: Install water service and distribution piping of sizes and pressures adequate for temporary construction purposes during the construction period and until permanent service is in use, including but not limited to the following uses:

Construction processes. Fire protection.

Drinking water.

Sanitary facilities.

Cleaning.

Plant and lawn watering.

Provide temporary water service with a 2" meter and shut-off valve near the connection to the water main.

Maintain hose connections and outlet valves in leakproof condition. Where finish work below an outlet might be damaged by spillage or leakage, provide a drip pan of suitable size to minimize the possibility of water damage. Drain water promptly from drip pans as it accumulates.

Sterilization: Except piping of non-potable water, sterilize temporary water piping prior to use. Refer to Division-15 sections for procedures.

Temporary Electric Power Service:

General: Provide a weatherproof, grounded electric power service and distribution system of sufficient size, capacity, and power characteristics to accommodate performance of work during the construction period. Whenever an overhead floor or roof deck has been installed, install temporary lighting adequate to provide sufficient illumination for safe work and traffic conditions in every work area.

Temporary Service: Install service and grounding in compliance with the National Electric Code (NFPA 70). Include necessary meters, transformers, overload protection disconnect and main distribution switch gear.

 Install electric power service overhead except where underground service must be used to avoid construction conflicts or to comply with governing regulations.

Connect temporary service to the local electric power company main in the manner directed by company officials.

 Provide temporary service with an automatic ground-fault interrupter feature, activated from the circuits of the system.

<u>Power Distribution System</u>: Provide circuits of adequate size and proper characteristics for each use. In general run wiring overhead. Rise vertically where wiring will be least exposed to damage from construction operations. Provide rigid steel conduit or equivalent raceways for wiring which must be exposed on grade, floors, decks or other areas of possible damage or abuse.

Provide metal conduit, tubing or armored cable for protection of temporary power wiring where exposed to possible damage during construction operations. Where permitted by code, wiring of circuits not exceeding 110-120 Volt 20 Amp rating and wiring of lighting circuits may be non-metallic sheathed cable in areas where located overhead and exposed. Do not wire temporary lighting with plain, exposed (insulated) electrical conductors. Provide metal enclosures or boxes for wiring devices.

Provide overload-protected disconnect switch for each temporary power circuit and each temporary lighting circuit, located at the power distribution center.

Temporary Lighting: See Special Conditions.

Temporary Telephones: See Special Conditions.

Sewers and Drainage:

General: If sewers are available for temporary drainage near the project site prior to completion of permanent sewers, provide temporary connections to remove effluent that can be lawfully discharged into the sewers. If existing sewers cannot be used for the discharge, provide drainage ditches, dry wells, and similar facilities to remove effluent that can be lawfully discharged in that manner. If neither sewers not drainage facilities can be lawfully used for discharge of effluent provide containers to remove and dispose of effluent off the site in a lawful manner.

Connect temporary sewers to the municipal sewer systems in the manner directed by sewer department officials.

Maintain temporary sewers and drainage facilities in a clean, sanitary condition, ready for use. Following heavy use, restore normal conditions promptly. Provide and maintain temporary earthen embankments and similar barriers in and

around construction excavations and subgrade construction, sufficient to prevent flooding of work by runoff of storm water from heavy storms.

TEMPORARY CONSTRUCTION AND SUPPORT FACILITIES INSTALLATION:

General: Provide a neat and uniform appearance in temporary construction and support facilities acceptable to the Architect/Engineer and the Construction Manager.

Locate field offices, storage and fabrication sheds and other facilities as directed by the Construction Manager. Position offices so that windows give the best possible view of construction activities.

Except as otherwise indicated, make the change-over from use of temporary services and facilities to use of permanent services and facilities at the earliest feasible date at each portion of the work, to minimize hazards and interferences with performance of the work.

Maintain field offices, storage and fabrication sheds, temporary sanitary facilities, waste collection and disposal system, and project identification and temporary signs until near substantial completion. Immediately prior to substantial completion remove these facilities. Personnel remaining at the site beyond substantial completion will be permitted to use certain permanent facilities, under restricted use conditions acceptable to the Owner.

Temporary Heat:

General: Provide temporary heat where indicated or needed for proper performance of the Work, curing or drying of recently installed work or protection of work in place from adverse effects of low temperatures or high humidity. Select facilities known to be safe and without deleterious effect upon work in place or being installed. Coordinate with ventilation requirements to produce indicated ambient condition required and to minimize consumption of fuel or energy.

Maintain a minimum temperature of 45 deg.F (7 deg.C) in permanently enclosed portions of the building and areas where finished work has been installed.

Heating Facilities: Except where conditions make it necessary to use another system, and where use of permanent heating system is available and authorized, provide properly vented self-contained LP gas or fuel oil heaters with individual space thermostatic control for temporary heat.

Limit use of gasoline-burning space heaters to the indirect-fired type, located outside the building space or space being

heated. Use gasoline-burning space heaters only where the specified system for temporary heating cannot be used.

Do not use open burning or salamander type temporary heating units where prohibited by governing regulations, or when combustible materials are located in or near the space being heated, or when work installed or being installed includes work exposed to view in the completed project.

Field Offices: See Special Conditions.

Storage and Fabrication Sheds: Install storage and fabrication sheds, properly sized, furnished and equipped, as required to accommodate work. Comply with applicable provisions specified elsewhere for distribution and use of temporary utilities. Sheds may be open shelters or fully enclosed spaces, within the building construction area or elsewhere on the project site.

Sanitary Facilities:

 General: Sanitary facilities include temporary toilets, and drinking water fixtures. Comply with governing regulations including safety and health codes for the type, number, location, operation and maintenance of fixtures and facilities; provide not less than specified requirements. Install in locations which will best service the project's needs.

Supply and maintain toilet tissue, paper cups and other disposable materials as appropriate for each facility. Provide covered waste containers for used material.

Owner's Toilets: Use of the Owner's existing toilet facilities will not be permitted.

Toilets: Install self-contained toilet units.

Provide separate toilet facilities for male and female construction personnel at ground level.

<u>Drinking Water Fixtures</u>: The Contractor for General Work shall provide containerized tap-dispenser bottled-water type drinking water units, including the paper supply.

Dewatering Facilities and Drains:

General: For temporary drainage and dewatering facilities and operations not directly associated with performance of work included under individual work sections, comply with dewatering requirements of applicable Division-2 sections. Where feasible, utilize the same facilities. Maintain site, excavations and construction free of water.

Dispose of rainwater in a lawful manner which will not result in flooding of the project or adjoining property, or endanger either permanent work or temporary facilities.

Provide temporary drainage where roofing or similar waterproof deck construction is completed prior to connection and operation of permanent drainage piping system.

Temporary Enclosure:

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General: At the earliest practical time provide temporary enclosure of materials, equipment, work in progress and completed portions of work to provide protection to the Work and employees from effects of exposure, foul weather, other construction operations, and similar activities on the site.

Provide temporary enclosures where temporary heat is needed and permanent building enclosure is not yet completed, and there is no other provision for containment of temporary heat. Coordinate enclosures with ventilating and material drying or curing requirements to avoid dangerous conditions and adverse effects.

Enclosure: Install tarpaulins or equivalent materials securely, using a minimum of wood framing and combustible materials. Individual openings of 25 sq. ft. or less may be closed with plywood or similar materials.

Close openings through the floor or roof decks and other horizontal surfaces with substantial load-bearing wood-framed or similar construction.

Where temporary wood or plywood enclosure exceeds 100 sq. ft. in area, use fire-retardant treated material (UL labeled class "A") for the main sheathing, and use a minimum of non-treated wood framing and trim.

Hoists and Temporary Elevator Use:

General: Provide facilities for hoisting materials and employees. Do not permit employees to ride hoists which comply only with requirements for hoisting materials. Selection of type, size and number of facilities is the Contractor's option. Truck cranes and similar devices used for hoisting are considered "tools and equipment" and not temporary facilities.

Temporary Elevator Use: Refer to Division-14 "Elevator" sections.

Responsibility: The Contractor for General Work is responsible for all general hoisting.

Collection and Disposal of Wastes:

General: Establish a system for daily collection and disposal of waste materials from construction areas and elsewhere on the

site. Enforce requirements strictly. Do not hold collected materials at the site more than 7 days during normal weather or 3 days when the daily temperature is expected to rise above 80 deg.F (27 deg.C). Handle hazardous, dangerous, or unsanitary waste materials separately from other inert waste by containerizing appropriately. Dispose of waste material in a lawful manner.

Burying or burning of waste materials on the site will not be permitted. Washing waste materials down sewers or into waterways will not be permitted.

Provide rodent proof containers located on each floor level to encourage depositing of garbage and similar wastes by construction personnel.

Construction Aids and Miscellaneous Services and Facilities:

General: Design, construct, and maintain construction aids and miscellaneous services and facilities as needed to accommodate performance of work. Construction aids and miscellaneous services and facilities include, but are not limited to the following:

Temporary stairs and ladders. Guardrails and barriers. Walkways.

Stairs: Until permanent stairs are available, provide temporary stairs where ladders are not adequate for performance of work. Cover finished permanent stairs exposed to occupants' use, with a durable protective covering of plywood or similar material so that finishes will undamaged at the time of acceptance.

<u>Walkways</u>: Maintain temporary pedestrian walkways around construction work and to field offices, toilets and similar places. Construct walkways as indicated on Drawings.

SECURITY AND PROTECTION FACILITIES INSTALLATION:

General: Provide a neat and uniform appearance in security and protection facilities acceptable to the Architect/Engineer and the Owner.

Except for utilization of permanent fire protection facilities, as soon as available in each area, do not change over from use of temporary security and protection facilities to use of permanent facilities until substantial completion, or longer as requested by the Architect/Engineer.

Temporary Fire Protection:

54 General: Until fire protection needs may be fulfilled by

permanent facilities, install and maintain temporary protection facilities of the types needed to adequately protect against reasonably predictable and controllable fire losses. Comply with the applicable recommendations of NFPA Standard 10 "Standard for Portable Fire Extinguishers". Locate fire extinguishers where most convenient and effective for their intended purpose, but provide not less than one extinguisher on each floor at or near each usable stairwell. Store combustible materials in containers in fire-safe locations.

Where temporary water outlets are available, provide hoses of sufficient length to reach construction areas. Hang hoses with a warning sign, to indicate that they are for fire protection purposes and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.

 <u>Permanent Fire Protection</u>: At the earliest feasible date in each area of the project, complete installation of permanent fire protection facilities, including connected services, and place into operation and use. Instruct key personnel at the site on how to use facilities which may not be self-explanatory.

Barricades, Warning Signs and Lights:

General: Comply with recognized standards and code requirements for erection of substantial, structurally adequate barricades where needed to prevent accidents and losses. Paint with appropriate colors, graphics and warning signs to inform personnel at the site and the public, of the hazard being protected against. Provide lighting where appropriate and needed for recognition of the facility, including flashing red lights where appropriate.

<u>Pedestrian</u> <u>Covered</u> <u>Walkways:</u>

General: Maintain in a substantial, structurally adequate and protective manner, the existing pedestrian covered walkway. Coordinate it's control with project entrance gates and other facilities and obstructions. Comply with governing regulations and requests of governing authorities.

Security Enclosure and Lockup:

<u>General</u>: Install substantial and durable general temporary enclosure of partially completed areas of construction. Provide locking entrances adequate to prevent unauthorized entrance, vandalism, theft and similar violations of project security.

Storage: Where materials and equipment must be temporarily stored, prior to and during construction, and are of substantial value or are attractive for possible theft, provide a secure lockup. Enforce strict discipline in connection with the timing of installation and release of materials, so that the

opportunity for theft and vandalism is minimized.

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Environmental Protection:

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Provide protection facilities, operate temporary facilities, conduct construction activities, and enforce strict discipline for personnel on the site in ways and by methods that comply with environmental regulations, and that minimize the subsoil possibility that air, waterways and contaminated or polluted, or that other undesirable effects might result from performance of work at the site. Avoid the use of tools and equipment which produce harmful noise. Restrict use of noise making tools and equipment to hours that will minimize complaints from persons near the project site.

OPERATION, TERMINATION AND REMOVAL:

Enforce strict discipline in the use of temporary Supervision: services and facilities at the site. Limit availability of temporary services and facilities to essential and intended uses minimize waste and abuse. permit temporary Do not installations to be abused or endangered. Do not allow hazardous, dangerous or unsanitary conditions to develop or persist on the site.

Operate and maintain temporary services and Maintenance: facilities in good operating condition throughout the time of use and until removal is authorized. Protect from damage by freezing temperatures and similar elements.

Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation and similar facilities on a 24hour day basis where required to achieve indicated results in the work and avoid the possibility of damage to work or the temporary facilities.

Protection: Prevent water filled piping from freezing, by use of ground covers, insulation, by keeping drained or by temporary heating. Maintain distinct markers for underground lines. Protect from damage during excavation operations.

Termination and Removal: Unless the Architect/Engineer requests that it be maintained for a longer period of time, remove each temporary service and facility promptly when the need for it has ended, or when it has been replaced by authorized use of a permanent facility, or no later than the time of substantial completion. Complete or, if necessary, restore permanent work which may have been delayed because of interference with the temporary service or facility. Repair damaged work, clean exposed surfaces and replace work which cannot be satisfactorily repaired.

Materials and facilities that constitute temporary services

and facilities are and remain the property of each prime contractor. The Owner reserves the right to take possession of the project identification signs.

Remove temporary roads and paving materials not intended for or acceptable for integration into permanent paving. the area shown is intended for landscape development, remove aggregate fill that soil and does not comply requirements for fill or subsoil in the landscape area. Remove materials contaminated with road oil, asphalt and other petro-chemical compounds, and other substances which might impair plant materials or lawns. Repair or replace street paving, curbs and sidewalks at temporary entrances, as required by the governing authority.

At substantial completion, clean and renovate permanent services and facilities that have been used to provide temporary services and facilities during the construction period, including but not limited to the following:

Replace air filters and clean the inside of ductwork and housings.

Replace significantly worn parts and parts that have been subject to unusual operating conditions.

Replace lamps in the lighting system that are burned out or dimmed by substantial hours of use.

END OF SECTION 01501

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SECTION 01631 - PRODUCTS AND SUBSTITUTIONS

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PART 1 - GENERAL

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RELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Special Conditions and other Division-1 Specification sections, apply to work of this section.

DESCRIPTION OF REQUIREMENTS:

<u>Definitions</u>: Definitions used in this paragraph are not intended to negate the meaning of other terms used in the contract documents, including such terms as, "specialties", "systems", "structure", "finishes", "accessories", "furnishings", "special construction" and similar terms. Such terms are self-explanatory and have recognized meanings in the construction industry.

 "Products" are items purchased for incorporation in the Work, regardless of whether they were specifically purchased for the project or taken from the Contractor's previously purchased stock. The term "product" as used herein includes the terms "material", "equipment", "system" and other terms of similar intent.

"Named Products" are products identified by use of the manufacturer's name for a product, including such items as a make or model designation, as recorded in published product literature, of the latest issue as of the date of the contract documents.

 "Materials" are products that must be substantially cut, shaped, worked, mixed, finished, refined or otherwise fabricated, processed, or installed to form units of work.

"Equipment" is defined as a product with operational parts, regardless of whether motorized or manually operated, and in particular, a product that requires service connections such as wiring or piping.

<u>Substitutions</u>: The Contractor's requests for changes in the products, materials, equipment and methods of construction required by the contract documents are considered requests for "substitutions", and are subject to the requirements specified herein. The following are not considered as substitutions:

Revisions to the contract documents, where requested by the Owner, Architect or Engineer are considered as "changes" not substitutions.

Substitutions requested during the bidding period, which have been accepted prior to the Contract Date, are included in the contract documents and are not subject to the requirements for substitutions as herein specified.

Specified Contractor options on products and construction methods included in the contract documents are choices available to the Contractor and are not subject to the requirements for substitutions as herein specified.

Except as otherwise provided in the contract documents, the Contractor's determination of and compliance with governing regulations and orders as issued by governing authorities do not constitute "substitutions" and do not constitute a basis for change orders.

 Standards: Refer to Division-1 section "Definitions and Standards" for the applicability of industry standards to the products specified for the project, and for the acronyms used in the text of the specification sections.

Separate Prime Contractors: Provisions of this section apply to the work of each separate prime contract. It is the responsibility of each separate prime contractor to provide work that is compatible with the work of each other prime contractor or separate contractor. In the event a dispute arises between separate prime contractors regarding priority where concurrently selectable products are incompatible, the Architect/Engineer shall determine which products are sustained and which are incompatible and must be replaced.

Where a proposed substitution involves the work of more than one prime contractor, each prime contractor involved shall cooperate and coordinate the work with each other prime contractor involved, so as to provide uniformity and consistency and to assure the compatibility of products.

QUALITY ASSURANCE:

 Source Limitations: To the fullest extent possible, provide products of the same generic kind, from a single source, for each unit of work.

When it is discovered that specified products are available only from sources that do not or cannot produce an adequate quantity to complete project requirements in a timely manner, consult with the Architect/Engineer for a determination of what product qualities are most important before proceeding. The Architect/Engineer will designate those qualities, such as visual, structural, durability, or compatibility, that are most important. When the Architect/Engineer's determination has been made, select products from those sources that produce products that possess the most important qualities,

to the fullest extent possible.

Compatibility of Options: Compatibility of products is a basic requirement of product selection. When the Contractor is given the option of selecting between two or more products for use on the project, the product selected must be compatible with other products previously selected, even if the products previously selected were also Contractor options. The complete compatibility between the various choices available to the Contractor is not assured by the various requirements of the Contract documents, but must be provided by the Contractor.

SUBMITTALS:

General: Prepare a product-listing schedule in a form acceptable to the Architect/Engineer. Show names of the principal products required for the work, by generic name. Show proprietary product names and the name of the manufacturer for each item listed that is to be purchased and incorporated into the Work.

Form: Prepare the product-listing schedule with information on each item tabulated under the following scheduled column headings:

Generic name as used in contract documents.

Proprietary name, model number and similar product designation.

Manufacturer's and supplier's name and city/state addresses.

Related unit-of-work specification section number.

Installer's name and primary trade of workmen.

Projected delivery date, or time span of delivery period.

<u>Submittal</u>: Submit 3 copies of the product-listing schedule within 30 days after the date of commencement of the Work. Provide a written explanation for omissions of data, and for known variations from contract requirements.

At the Contractor's option, the initial submittal of the product-listing schedule may be limited to product selections and product designations that must be established early in the Contract Time. Submit the completed product-listing schedule within 60 days after commencement of the Work.

Architect/Engineer's Action: The Architect/Engineer will respond to the Contractor in writing within 2 weeks of receipt of the

PRODUCTS AND SUBSTITUTIONS

product-listing schedule. No response by the Architect/Engineer within the 2 week time period constitutes no objection to the listed products or manufacturers, but does not constitute a waiver of the requirement that products comply with the requirements of the contract documents. The Architect/Engineer's response will include the following:

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The Architect/Engineer's listing of unacceptable product selection, if any, containing an explanation of the reasons for this action.

A request for additional data necessary for the review and possible acceptance of the products and manufacturer's listed.

Substitution Request Submittal:

Requests for Substitutions: Submit 3 copies of each request for substitution. In each request identify the product or fabrication or installation method to be replaced by the substitution; include related specification section and drawing numbers, and complete documentation showing compliance with the requirements for substitutions. Include the following information, as appropriate, with each request.

Provide complete product data, drawings and descriptions of products, and fabrication and installation procedures.

Provide samples where applicable or requested.

Provide a detailed comparison of the significant qualities of the proposed substitution with those of the work originally specified. Significant qualities include elements such as size, weight, durability, performance and visual effect where applicable.

Provide complete coordination information. Include all changes required in other elements of the work to accommodate the substitution, including work performed by the Owner and separate Contractors.

Provide a statement indicating the effect the substitution will have on the work schedule in comparison to the schedule without approval of the proposed substitution. Include information regarding the effect of the proposed substitution on the Contract Time.

Provide complete cost information, including a proposal of the net change, if any in the Contract Sum.

Provide certification by the Contractor to the effect that, in the Contractor's option, after thorough evaluation, the proposed substitution will result in work that in every significant respect is equal-to or better than the work

required by the Contract documents, and that it will perform adequately in the application indicated.

Include in this certification, the Contractor's waiver of rights to additional payment or time, which may subsequently be necessary because of the failure of the substitution to perform adequately.

<u>Change Order</u> <u>Form</u>: Submit requests for substitutions in the form and in accordance with procedures required for change order proposals.

Architect/Engineer's Action: Within one week of receipt of the Contractor's request for substitution, the Architect/Engineer will request additional information or documentation as may be needed for evaluation of the request. Within 2 weeks of receipt of the request, or within one week of receipt of the requested additional information or documentation, which ever is later, the Architect/Engineer will notify the Contractor of either the acceptance or rejection of the proposed substitution.

Acceptance will be in the form of a change order.

Rejection will include a statement giving reasons for the rejection.

PRODUCT DELIVERY, STORAGE, AND HANDLING:

General: Deliver, store, and handle products in accordance with manufacturer's recommendations, using means and methods that will prevent damage, deterioration and loss, including theft. Control to prevent overcrowding of construction spaces. In particular coordinate delivery and installation to ensure minimum holding or storage times for items known or recognized to be flammable, hazardous, easily damaged, or sensitive to deterioration, theft and other sources of loss.

Deliver products to the site in the manufacturer's sealed container or other packaging system, complete with labels and instructions for handling, storage, unpacking, protecting and installing.

Store products at the site in a manner that will facilitate inspection and measurement of quantity or counting of units.

Store heavy materials away from the project structure in a manner that will not endanger the supporting construction.

PART 2 - PRODUCTS

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GENERAL PRODUCT COMPLIANCE:

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General: Requirements for individual products are indicated in the contract documents; compliance with these requirements is in itself a contract requirement. These requirements may be specified in any one of several different specifying methods, or in any combination of these methods. These methods include the following:

Proprietary.
Descriptive.
Performance.

Compliance with Reference Standards.

Compliance with codes, compliance with graphic details, allowances, and similar provisions of the contract documents also have a bearing on the selection process.

<u>Procedures</u> for <u>Selecting Products</u>: The Contractor's options in selecting products are limited by requirements of the contract documents and governing regulations. They are not controlled by industry traditions or procedures experienced by the Contractor on previous construction projects. Required procedures include but are not limited to the following for the various indicated methods of specifying:

Proprietary and Semiproprietary Specification Requirements:

Single Product Name: Where only a single product or manufacturer is named, provide the product indicated, specification indicates possible the consideration of other products. Advise the Architect/Engineer before proceeding, when discovered that the named product is not a reasonable or a feasible solution.

Two or More Product Names: Where two or more products or manufacturers are named, provide one of the products named, at the Contractor's option. Exclude products that do not comply with specification requirements. Do not provide or offer to provide an unnamed product, unless the specification indicates possible consideration of other products. Advise the Architect/Engineer before proceeding where none of the named products comply with specification requirements. or are feasible for use.

Where products or manufacturers are specified by name, accompanied by the term "or-equal" or similar language, comply with the contract document provisions concerning "substitutions" to obtain approval from the Architect/Engineer for the use of an unnamed product.

Non-Proprietary Specification Requirements: Where the specifications name products or manufacturers that are

available and may be incorporated in the Work, but do not restrict the Contractor to the use of these products only, the Contractor may, at his option, use any available product that complies with contract requirements.

Descriptive Specification Requirements: Where the specifications describe a product or assembly generically, in detail, listing the exact characteristics required, but without use of a brand or trade name, provide products or assemblies that provide the characteristics indicated and otherwise comply with contract requirements.

Performance Specification Requirements: Where the specifications require compliance with indicated performance requirements, provide products that comply with the specific performance requirements indicated, and that are recommended by the manufacturer for the application indicated. The manufacturer's recommendations may be contained in published product literature, or by the manufacturer's individual certification of performance. General overall performance of a product is implied where the product is specified for specific performances.

 Compliance with Standards, Codes, and Regulations: Where the specifications require only compliance with an imposed standard, code or regulation, the Contractor has the option of selecting a product that complies with specification requirements, including standards, codes, and regulations.

Visual Matching: Where matching an established sample is required, the final judgement of whether a product proposed by the Contractor matches the sample satisfactorily will be determined by the Architect. Where there is no product available within the specified product category that matches the sample satisfactorily and also complies with other specified requirements, comply with the provisions of the contract documents concerning "substitutions" and "change orders" for the selection of a matching product in another product category, or for non-compliance with specified requirements.

<u>Visual Selection</u>: Except as otherwise indicated, where specified product requirements include the phrase "++.as selected from the manufacturer's standard colors, patterns, textures++." or similar phrases, the Contractor has the option of selecting the product and manufacturer, provided the selection complies with other specified requirements. The Architect is subsequently responsible for selecting the color, pattern and texture from the product line selected by the Contractor.

SUBSTITUTIONS:

Conditions: The Contractor's request for a substitution will be received and considered when extensive revisions to the contract documents are not required, when the proposed changes are in keeping with the general intent of the contract documents, when the requests are timely, fully documented and properly submitted, and when one or more of the following conditions is satisfied, all as judged by the Architect/Engineer; otherwise the requests will be returned without action except to record non-compliance with these requirements.

The Architect/Engineer will consider a request for substitution where the request is directly related to an "or equal" clause or similar language in the contract documents.

 The Architect/Engineer will consider a request for substitution where the specified product or method cannot be provided within the Contract Time. However, the request will not be considered if the product or method cannot be provided as a result of the Contractor's failure to pursue the work promptly or to coordinate the various activities properly.

The Architect/Engineer will consider a request for substitution where the specified product or method cannot receive necessary approval by a governing authority, and the requested substitution can be approved.

 The Architect/Engineer will consider a request for a substitution where a substantial advantage is offered the Owner, in terms of cost, time, energy conservation or other considerations of merit, after deducting of offsetting responsibilities the Owner may be required to bear. These additional responsibilities may include such considerations as additional compensation to the Architect/Engineer for redesign and evaluation services, the increased cost of other work by the Owner or separate contractors, and similar considerations.

The Architect/Engineer will consider a request for substitution when the specified product or method cannot be provided in a manner which is compatible with other materials of the work, and where the Contractor certifies that the the substitution will overcome the incompatibility.

The Architect/Engineer will consider a request for substitution when the specified product or method cannot be properly coordinated with other materials in the work, and where the Contractor certifies that the proposed substitution can be properly coordinated.

 The Architect/Engineer will consider a request for substitution when the specified product or method cannot receive a warranty as required by the contract documents and where the contractor certifies that the proposed substitution receive the required warranty.

<u>Work-Related</u> <u>Submittals</u>: The Contractor's submittal of and the Architect/Engineer's acceptanc of shop drawings, product data or samples which related to work not complying with requirements of the contract documents, does not constitute an acceptable or valid request for a substitution, nor approval thereof.

GENERAL PRODUCT REQUIREMENTS:

General: Provide products that comply with the requirements of the contract documents that are undamaged and, unless otherwise indicated, unused at the time of installation. Provide products that are complete with all accessories, trim, finish, safety guards and other devices and details needed for a complete installation and for the intended use and effect.

<u>Standard</u> <u>Products</u>: Where they are available, provide standard products of types that have been produced and used successfully in similar situations on other projects.

Continued Availability: Where, because of the nature of its application, the Owner is likely to need replacement parts or additional amounts of a product at a later date, either for maintenance and repair or replacement, provide standard, domestically produced products for which the manufacturer has published assurances that the products and its parts are likely to be available to the Owner at a later date.

<u>Nameplates</u>: Except as otherwise indicated for required labels and operating data, do not permanently attach or imprint manufacturer's or producer's nameplates or trademarks on exposed surfaces of products which will be exposed to view either in occupied spaces or on the exterior of the completed project.

<u>Labels</u>: Locate required product labels and stamps on a concealed surface or, where required for observation after installation, on an accessible surface which, in occupied spaces, is not conspicuous.

Equipment Nameplates: Provide a permanent nameplate on each item of service-connected or power-operated equipment. Locate the nameplate on an easily accessible surface which is inconspicuous in occupied spaces. The nameplate shall contain the following information and other essential operating data.

Name of manufacturer Name of product Model number Serial number Capacity Speed Ratings

PART 3 - EXECUTION

INSTALLATION OF PRODUCTS:

General: Except as otherwise indicated in individual sections of these specifications, comply with the manufacturer's instructions and recommendations for installation of the products in the applications indicated. Anchor each product securely in place, accurately located and aligned with other work. Clean exposed surfaces and protect surfaces as necessary to ensure freedom from damage and deterioration at time of acceptance.

END OF SECTION 01631

SECTION 01700 - PROJECT CLOSEOUT

PART 1 - GENERAL

RELATED DOCUMENTS:

 Drawings and general provisions of Contract, including General and Special Conditions and other Division-1 Specification sections, apply to work of this section.

DESCRIPTION OF REQUIREMENTS:

<u>Definitions</u>: Project closeout is the term used to describe certain collective project requirements, indicating completion of the Work that are to be fulfilled near the end of the Contract time in preparation for final acceptance and occupancy of the Work by the Owner, as well as final payment to the Contractor and the normal termination of the Contract.

Specific requirements for individual units of work are included in the appropriate sections in Divisions 2 through 16.

Time of closeout is directly related to "Substantial Completion"; therefore, the time of closeout may be either a single time period for the entire Work or a series of time periods for individual elements of the Work that have been certified as substantially complete at different dates. This time variation, if any, shall be applicable to the other provisions of this section.

PREREQUISITES TO SUBSTANTIAL COMPLETION:

General: Complete the following before requesting the Architect/Engineer's inspection for certification of substantial completion, either for the entire Work or for portions of the Work. List known exceptions in the request.

In the progress payment request that coincides with, or is the first request following, the date substantial completion is claimed, show either 100% completion for the portion of the Work claimed as "substantially complete", or list incomplete items, the value of incomplete work, and reasons for the Work being incomplete.

Include supporting documentation for completion as indicated in these contract documents.

Submit a statement showing an accounting of changes to the Contract Sum.

Advise Owner of pending insurance change-over requirements.

 Submit specific warranties, workmanship/maintenance bonds, maintenance agreements, final certifications and similar documents.

Obtain and submit releases enabling Owner's full, unrestricted use of the Work and access to services and utilities. Where required, include occupancy permits, operating certificates and similar releases.

Deliver tools, spare parts, extra stocks of material and similar physical items to the Owner.

Make the final change-over of locks and transmit the keys to the Owner. Advise the Owner's personnel of the change-over in security provisions.

Complete start-up testing of systems, and instruction of the Owner's operating and maintenance personnel. Discontinue or change over and remove temporary facilities and services from the project site, along with construction tools and facilities, mock-ups, and similar elements.

<u>Inspection Procedures</u>: Upon receipt of Contractor's request for inspection, the Architect/Engineer will either proceed with inspection or advise Contractor of unfulfilled prerequisites.

Following the initial inspection, the Architect/Engineer will either prepare the certificate of substantial completion, or will advise Contractor of work which must be performed before the certificate will be issued. The Architect/Engineer will repeat the inspection when requested and when assured that the Work has been substantially completed.

Results of the completed inspection will form the initial "punch-list" for final acceptance.

PREREQUISITES TO FINAL ACCEPTANCE:

 General: Complete the following before requesting the Architect/Engineer's final inspection for certification of final acceptance, and final payment as required by the General Conditions. List known exceptions, if any, in request:

Submit record drawings, maintenance manuals, final project photographs, damage or settlement survey, property survey, and similar final record information.

Submit the final payment request with final releases and supporting documentation not previously submitted and accepted. Include certificates of insurance for products and

1 completed operations where required.
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Submit an updated final statement, accounting for final additional changes to the Contract Sum.

Submit a certified copy of the Architect/Engineer's final punch-list of itemized work to be completed or corrected, stating that each item has been completed or otherwise resolved for acceptance and has been endorsed and dated by the Architect/Engineer.

Submit final meter readings for utilities, a measured record of stored fuel, and similar data either as of the date of substantial completion, or else when the Owner took possession of and responsibility for corresponding elements of the Work.

Submit consent of surety.

Submit a final liquidated damages settlement statement, acceptable to the Owner.

Submit evidence of final, continuing insurance coverage complying with insurance requirements.

Reinspection Procedure: The Architect/Engineer will reinspect the Work upon receipt of the Contractor's notice that the work, including punch-list items resulting from earlier inspections, has been completed, except for these items whose completion has been delayed because of circumstances that are acceptable to the Architect/Engineer.

Upon completion of reinspection, the Architect/Engineer will either prepare a certificate of final acceptance, or will advise the Contractor of work that is incomplete or of obligations that have not been fulfilled, but are required for final acceptance.

If necessary, the reinspection procedure will be repeated.

RECORD DOCUMENT SUBMITTALS:

General: Specific requirements for record documents are indicated in the individual sections of these specifications. Other requirements are indicated in the General Conditions. General submittal requirements are indicated in "submittals" sections.

Do not use record documents for construction purposes; protect from deterioration and loss in a secure, fire-resistive location; provide access to record documents for the Architect/Engineer's reference during normal working hours.

Record Drawings: Maintain a record set of blue or black line white-prints of contract drawings and shop drawings in a clean, undamaged condition. Mark-up the set of record documents to show the actual installation where the installed work varies substantially from the work as originally shown. Mark whichever drawing is most capable of showing the actual "field" condition fully and accurately; however, where shop drawings are used for mark-up, record a cross-reference at the corresponding location on the working drawings. Give particular attention to concealed work that would be difficult to measure and record at a later date.

Mark record sets with red erasable pencil and, where feasible, use other colors to distinguish between variations in separate categories of work.

Mark-up new information which is known to be important to the Owner, but for some reason was not shown on either contract drawings or shop drawings.

Note related change-order number where applicable.

Organize record drawing sheets into manageable sets, bind with durable paper cover sheets, and print suitable titles, dates and other identification on cover of each set.

Record Specifications: Maintain one complete copy of the Project Manual, including specifications and addenda, and one copy of other written construction documents such as change orders and similar modifications issued in printed form during construction. Mark these documents to show substantial variations in the actual work performed in comparison with the text of the specifications and modifications as issued. particular attention to substitutions, selection of options and similar information on work where it is concealed or cannot otherwise be readily discerned at a later date by direct observation. Note related record drawing information product data, where applicable.

Upon completion of the Work, submit record specifications to the Architect/Engineer for the Owner's records.

Record Product Data: Maintain one copy of each product data submittal. Mark these documents to show significant variations in the actual Work performed in comparison with the submitted information. Include both variations in the products as delivered to the site, and variations from the manufacturer's instructions and recommendations for installation. Give particular attention to concealed products and portions of the Work which cannot otherwise be readily discerned at a later date by direct observation. Note related change orders and mark-up of record drawings and specifications.

Upon Completion of mark-up, submit complete set of record product data to the Architect/Engineer for the Owner's records.

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Record Sample Submittal: Immediately prior to date or dates of substantial completion, the Contractor will meet at the site with the Architect/Engineer and the Owner's personnel, if desired, to determine which, if any, of the submitted samples that have been maintained by the Contractor during progress of the Work, are to be transmitted to the Owner for record purposes. Comply with delivery to the Owner's sample storage space.

Miscellaneous Record Submittals: Refer to other sections of these specifications for requirements of miscellaneous record-keeping and submittals in connection with the actual performance of the Work. Immediately prior to the date or dates of substantial completion, complete miscellaneous records and place in good order, properly identified and bound or filed, ready for continued use and reference. Submit to the Architect/Engineer for the Owner's records.

Maintenance Manuals: Organize operating and maintenance data into suitable sets of manageable size. Bind data into individual binders properly identified and indexed. Bind each set of data in a heavy-duty 2-inch, 3-ring vinyl-covered binder, with pocket folders for folded sheet information. Mark the appropriate identification on both front and spine of each binder.

Include the following types of information in operation and maintenance manuals:

Emergency instructions.
Spare parts listing.
Copies of warranties.
Wiring diagrams.
Recommended "turn-around" cycles.
Inspection procedures.
Shop drawings and product data.

<u>PART 2 - PRODUCTS</u> (Not Applicable)

PART 3 - EXECUTION

CLOSEOUT PROCEDURES:

 General Operating and Maintenance Instructions: Arrange for each installer of operating equipment and other work that requires regular or continuing maintenance, to meet at the site with the Owners personnel to provide necessary basic instruction

in the proper operation and maintenance of the entire Work. Where installers are not experienced in the required procedures, include instruction by the manufacturer's representatives.

As part of this instruction provide a detailed review of the following items:

Maintenance manuals Record documents Spare parts and materials

Tools

Lubricants

Fuels

Identification systems

Control sequences

Hazards

Cleaning

Warranties, bonds, maintenance agreements and similar continuing committments.

As part of this instruction for operating equipment demonstrate the following procedures:

24 Start-up 25 Shut-down

Emergency operations

Noise and vibration adjustments

Safety procedures

Economy and efficiency adjustments

Effective and energy utilization

FINAL CLEANING:

General: Special cleaning requirements for specific units of Work are included in the appropriate sections of Divisions 2 through 16. General Cleaning during the regular progress of the Work is required by the General Conditions and is included under section "Temporary Facilities".

 Cleaning: Provide final cleaning of the Work at the time indicated. Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit of work to the condition expected from a normal, commercial building cleaning and maintenance program. Comply with the manufacturer's instructions for operations.

Complete the following cleaning operations before requesting the Architect/Engineer's inspection for certification of final completion.

Remove labels which are not required as permanent labels.

Clean transparent materials, including mirrors and glass

in doors and windows, to a polished condition. Remove putty and other substances which are noticeable as vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials.

Clean exposed exterior and interim hard-surfaced finishes to a dust-free condition, free of dust, stains, films and similar noticeable distracting substances. Restore reflective surfaces to their original reflective condition. Leave concrete floors broom clean. Vacuum carpeted surfaces.

Wipe surfaces of mechanical and electrical equipment clean. Remove excess lubrication and other substances. Clean plumbing fixtures to a sanitary condition. Clean light fixtures and lamps.

Clean the project site, including landscape development areas, of rubbish, litter and foreign substances. Sweep paved areas to a broom-clean condition; remove stains, spills, and other foreign deposits. Rake grounds that are neither paved not planted, to a smooth, even-textured surface.

<u>Pest Control</u>: Engage an experienced exterminator to make a final inspection of the project, and to rid project of rodents, insects, and other pests.

Removal of Protection: Except as otherwise indicated or requested by the Architect/Engineer, remove temporary protection devices and facilities which were installed during the course of the work to protect previously completed work during the remainder of the construction period.

Compliance: Comply with safety standards and governing regulations for cleaning operations. Do not burn waste materials at the site. Do not bury debris or excess materials on the Owner's property. Do not discharge volatile or other harmful or dangerous materials into drainage systems. Remove waste materials from the site and dispose of in a lawful manner.

Where extra materials of value remaining after completion of associated work have become the Owner's property, dispose of these to the Owner's best advantage as directed.

END OF SECTION 01700

SECTION 02070 - SELECTIVE DEMOLITION

PART 1 - GENERAL

RELATED DOCUMENTS:

 Drawings and general provisions of Contract, including General and Special Conditions and Division-1 Specification sections, apply to work of this section.

DESCRIPTION OF WORK:

Extent of selective demolition work is indicated on drawings.

 Types of Selective Demolition Work: Demolition requires the selective removal and subsequent offsite disposal of the following:

Portions of building structure indicated on drawings and as required to accommodate new construction.

Removal of interior partitions as indicated on drawings.

Removal of doors and frames indicated "remove."

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Removal of limestone panels for reuse.

Removal of granite veneer for reuse.

Removal and protection of existing fixtures and equipment items indicated "salvage."

Removal work specified elsewhere:

Cutting non-structural concrete floors and masonry walls for underground piping and ducts, and for above grade piping, ducts, and conduit is included with the work of the respective mechanical and electrical Divisions 15 and 16 specification sections.

Related work specified elsewhere:

Remodeling construction work and patching is included within the respective sections of specifications, including removal of materials for re-use and incorporated into remodeling or new construction.

Relocation of pipes, conduits, ducts, other mechanical and electrical work are specified by respective trades.

SUBMITTALS:

Schedule: Submit schedule indicating proposed methods and sequence of operations for selective demolition work to Construction Manager for review prior to commencement of work. Include coordination for shut-off, capping, and continuation of utility services as required, together with details for dust and noise control protection.

Provide detailed sequence of demolition and removal work to ensure uninterrupted progress of Owner's on-site operations.

Coordinate with Owner's continuing occupation of portions of existing building, with Owner's partial occupancy of completed new addition, and with Owner's reduced usage during summer months.

JOB CONDITIONS:

Occupancy: Owner will be continuously occupying areas of the building immediately adjacent to areas of selective demolition. Conduct selective demolition work in manner that will minimize need for disruption of Owner's normal operations. Provide minimum of 72 hours advance notice to Owner of demolition activities which will severely impact Owner's normal operations.

Condition of Structures: Owner assumes no responsibility for actual condition of items or structures to be demolished.

 Conditions existing at time of commencement of contract will be maintained by Owner insofar as practicable. However, variations within structure may occur by Owner's removal and salvage operations prior to start of selective demolition work.

<u>Partial Demolition</u> <u>and Removal</u>: Items indicated to be removed but of salvable value to Contractor may be removed from structure as work progresses. Transport salvaged items from site as they are removed.

Storage or sale of removed items on site will not be permitted.

<u>Protections</u>: Provide temporary barricades and other forms of protection as required to protect Owner's personnel and general public from injury due to selective demolition work.

Provide protective measures as required to provide free and safe passage of Owner's personnel and general public to and from occupied portions of building.

Provide interior and exterior shoring, bracing, or support to prevent movement, settlement, or collapse of structure or

element to be demolished, and adjacent facilities or work to remain.

Protect from damage existing finish work that is to remain in place and becomes exposed during demolition operations.

Protect floors with suitable coverings when necessary.

Construct temporary insulated solid dustproof partitions where required to separate areas where noisy or extensive dirt or dust operations are performed. Equip partitions with dustproof doors and security locks if required.

Provide temporary weather protection during interval between demolition and removal of existing construction on exterior surfaces, and installation of new construction to insure that no water leakage or damage occurs to structure or interior areas of existing building.

Remove protections at completion of work.

<u>Damages</u>: Promptly repair damages caused to adjacent facilities by demolition work at no cost to Owner.

Traffic: Conduct selective demolition operations and debris removal in a manner to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities.

Do not close, block or otherwise obstruct streets, walks or other occupied or used facilities without written permission from authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.

Explosives: Use of explosives will not be permitted.

<u>Utility</u> <u>Services</u>: Maintain existing utilities indicated to remain, keep in service, and protect against damage during demolition operations.

Do not interrupt existing utilities serving occupied or used facilities, except when authorized in writing by authorities having jurisdiction. Provide temporary services during interruptions to existing utilities, as acceptable to governing authorities.

Environmental Controls: Use water sprinkling, temporary enclosures, and other suitable methods to limit dust and dirt rising and scattering in air to lowest practical level. Comply with governing regulations pertaining to environmental protection.

Do not use water when it may create hazardous or objectionable conditions such as ice, flooding, and

pollution.

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<u>PART 2 - PRODUCTS</u> (Not Applicable).

PART 3 - EXECUTION

INSPECTION:

<u>Prior to commencement of selective demolition work,</u> inspect areas in which work will be performed. Photograph existing conditions to structure surfaces, equipment or to surrounding properties which could be misconstrued as damage resulting from selective demolition work; file with Construction Manager prior to starting work.

PREPARATION:

<u>Provide</u> <u>interior</u> <u>and</u> <u>exterior</u> <u>shoring</u>, bracing, or support to prevent movement, settlement or collapse of structures to be demolished and adjacent facilities to remain.

Cease operations and notify the Owner's Representative immediately if safety of structure appears to be endangered. Take precautions to support structure until determination is made for continuing operations.

Cover and protect furniture, equipment and fixtures to remain from soiling or damage when demolition work is performed in rooms or areas from which such items have not been removed.

<u>Erect</u> and <u>maintain</u> <u>dust-proof</u> <u>partitions</u> and closures as required to prevent spread of dust or fumes to occupied portions of the building.

Provide weatherproof closures for exterior openings resulting from demolition work.

Locate, identify, stub off and disconnect utility services that are not indicated to remain.

Provide by-pass connections as necessary to maintain continuity of service to occupied areas of building. Provide minimum of 96 hours advance notice to Owner if shut-down of service is necessary during change-over.

DEMOLITION:

Perform selective demolition work in a systematic manner. Use

such methods as required to complete work indicated on Drawings in accordance with demolition schedule and governing regulations.

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Demolish concrete and masonry in small sections. Cut concrete and masonry at junctures with construction to remain using power-driven masonry saw or hand tools; do not use power-driven impact tools.

Locate demolition equipment throughout structure and promptly remove debris to avoid imposing excessive loads on supporting walls, floors or framing.

Provide services for effective air and water pollution controls as required by local authorities having jurisdiction.

Demolish foundation walls to a depth of not less than 36" below existing ground surface. Demolish and remove below-grade wood or metal construction. Break up below-grade concrete slabs.

If unanticipated mechanical, electrical or structural elements which conflict with intended function or design are encountered, investigate and measure both nature and extent of the conflict. Submit report to Owner's Representative in written, accurate detail. Pending receipt of directive from Owner's Representative rearrange selective demolition schedule as necessary to continue overall job progress without delay.

SALVAGE MATERIALS:

Salvage Items: Where indicated on Drawings as "Salvage-Deliver to Owner," carefully remove indicated items, clean, store and turn over to Owner and obtain receipt.

DISPOSAL OF DEMOLISHED MATERIALS:

Remove debris, rubbish and other materials resulting from demolition operations from building site. Transport and legally dispose of materials off site.

If hazardous materials are encountered during demolition operations, comply with applicable regulations, laws, and ordinances concerning removal, handling and protection against exposure or environmental pollution.

Burning of removed materials is not permitted on project site.

CLEAN-UP AND REPAIR:

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<u>Upon completion of demolition work</u>, remove tools, equipment and demolished materials from site. Remove protections and leave interior areas broom clean.

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Repair demolition performed in excess of that required. Return structures and surfaces to remain to condition existing prior to commencement of selective demolition work. Repair adjacent construction or surfaces soiled or damaged by selective demolition work.

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END OF SECTION 02070

SECTION 02110 - SITE CLEARING

PART 1 - GENERAL

RELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Special Conditions and Division-1 Specification sections, apply to work of this section.

DESCRIPTION OF WORK:

Extent of site clearing is shown on drawings.

<u>Site clearing includes</u>, but is not limited to:

Protection of existing trees.

Removal of trees and other vegetation.

Topsoil stripping.

Clearing and grubbing.

Removing above-grade improvements.

Removing below-grade improvements.

JOB CONDITIONS:

Traffic: Conduct site clearing operations to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities. Do not close or obstruct streets, walks or other occupied or used facilities without permission from authorities having jurisdiction.

<u>Protection</u> of <u>Existing Improvements</u>: Provide protections necessary to prevent damage to existing improvements indicated to remain in place.

Protect improvements on adjoining properties and on Owner's property.

Restore damaged improvements to their original condition, as acceptable to parties having jurisdiction.

<u>Protection</u> of <u>Existing Trees</u> and <u>Vegetation</u>: Protect existing trees and other vegetation indicated to remain in place, against unnecessary cutting, breaking or skinning of roots, skinning and

bruising of bark, smothering of trees by stockpiling construction materials or excavation materials within drip line, excess foot or vehicular traffic, or parking of vehicles within drip line. Provide temporary guards acceptable to Construction Manager to protect trees and vegetation to be left standing.

Water trees and other vegetation to remain within limits of contract work as required to maintain their health during course of construction operations.

Provide protection for roots over 1-1/2" diameter cut during construction operations. Coat cut faces with an emulsified asphalt, or other acceptable coating, formulated for use on damaged plant tissues. Temporarily cover exposed roots with wet burlap to prevent roots from drying out; cover with earth as soon as possible.

Repair or replace trees and vegetation indicated to remain which are damaged by construction operations, in a manner acceptable to Architect. Employ licensed arborist to repair damages to trees and shrubs.

Replace trees which cannot be repaired and restored to fullgrowth status, as determined by arborist.

PART 2 - PRODUCTS

 Not applicable to work of this section.

PART 3 - EXECUTION

SITE CLEARING:

General: Remove trees, shrubs, grass and other vegetation, improvements, or obstructions interfering with installation of new construction. Remove such items elsewhere on site or premises as specifically indicated. Removal includes digging out stumps and roots.

Carefully and cleanly cut roots and branches of trees indicated to be left standing, where roots and branches obstruct new construction.j

Topsoil: Topsoil is defined as friable clay loam surface soil found in a depth of not less than 4". Satisfactory topsoil is reasonably free of subsoil, clay lumps, stones, and other objects over 2" in diameter, and without weeds, roots, and other objectionable material.

Strip topsoil to whatever depths encountered in a manner to prevent intermingling with underlying subsoil or other

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objectionable material.

to main root system.

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Remove heavy growths of grass from areas before stripping.

Where trees are indicated to be left standing, stop

topsoil stripping a sufficient distance to prevent damage

END OF SECTION 02110

Stockpile topsoil in storage piles in areas shown, or where directed. Construct storage piles to freely drain surface water. Cover storage piles if required to prevent wind-blown dust.

<u>Dispose of unsuitable or excess topsoil</u> same as waste material, herein specified.

Removal of Improvements: Remove existing above-grade and belowgrade improvements necessary to permit construction, and other work as indicated.

Abandonment or removal of certain underground pipe or conduits may be shown on mechanical or electrical drawings, and is included under work of those sections. Removal and/or abandonment of other underground piping or conduit interfering with construction is specified in Section 02200.

DISPOSAL OF WASTE MATERIALS:

Burning on Owner's Property: Burning is not permitted on Owner's property.

Removal from Owner's Property: Remove waste materials and unsuitable and excess topsoil from Owner's property and dispose of off site in legal manner.

SECTION 02200 - EARTHWORK

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PART 1 - GENERAL

RELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Special Conditions and Division-1 Specification sections, apply to work of this section.

DESCRIPTION OF WORK:

Extent of earthwork is indicated on drawings.

Preparation of subgrade for building slabs, walks, and pavements is included as part of this work.

Drainage fill course for support of building slabs is indicated as part of this work.

Backfilling of trenches within building lines is included as part of this work.

 <u>Prior Earthwork:</u> Excavation and backfilling to establish the general building subgrade elevations has been (or will be) accomplished under a prior contract and, except for limited adjustments, is not included as work of this section. The extent of this prior work is shown on the Reference Drawings. Verify elevations indicated, and adjust subgrade elevations as necessary to meet the requirements of this section.

Excavation for Storm and Sanitary Sewer System Work: Excavation and backfill required in conjunction with underground storm and sanitary sewer systems, and buried appurtenances outside of building lines is included as work of this section.

Excavation for Mechanical/Electrical Work: Refer to Divisions 15 and 16 sections for excavation and backfill required in conjunction with underground mechanical and electrical utilities, and buried mechanical and electrical appurtenances; not work of this section.

Topsoil Work: Furnishing and the spreading of topsoil is specified in Section 02480 and is not work of this section.

Definition:

52 <u>Excavation</u> consists of removal of material encountered to subgrade elevations indicated and subsequent disposal of

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materials removed.

Finish Grades mean the required final grade elevations indicated on the drawings. Bring any conflict in finish grades between spot elevations and contours to the attention of the Architect who will determine which elevations govern.

Required Subgrades mean the required subgrade elevations as fixed by the building construction or surface improvements to be placed thereon as shown on the drawings. Required subgrades shall be true planes, parallel to finish grades, at depths as follows:

Below concrete floor slabs on grade - 11".

Below lawn areas - 6".

Below other surfacing - as fixed by depth of surfacing and base, if required, and as shown on the drawings.

QUALITY ASSURANCE:

<u>Codes</u> <u>and</u> <u>Standards</u>: Perform excavation work in compliance with applicable requirements of governing authorities having jurisdiction.

Testing and Inspection Service:

Employ, at Contractor's expense, testing laboratory to perform soil testing and inspection service for quality control testing during earthwork operations.

SUBMITTALS:

Test Reports-Excavating: Submit following reports directly to Architect Engineer from the testing services, with copy to Contractor:

Test reports on borrow material.

Verification of each footing or caisson subgrade.

Field density test reports.

One optimum moisture-maximum density curve for each type of soil encountered.

Report of actual unconfined compressive strength and/or results of bearing tests of each strata tested.

JOB CONDITIONS:

<u>Site Information</u>: Data on site reference drawings and indicated subsurface conditions are not intended as representations or warranties of accuracy or continuity between soil borings. It is expressly understood that Owner will not be responsible for interpretations or conclusions drawn therefrom by Contractor. Data are made available for convenience of Contractor.

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Additional test borings and other exploratory operations may be made by Contractor at no cost to Owner.

Existing Utilities: Locate existing underground utilities in areas of work. If utilities are to remain in place, provide adequate means of support and protection during earthwork operations.

 Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult utility owner immediately for directions. Cooperate with owner and utility companies in keeping respective services and facilities in operation. Repair damaged utilities to satisfaction of utility owner.

Do not interrupt existing utilities serving facilities occupied and used by Owner or others, during occupied hours, except when permitted in writing by Architect/Engineer and then only after acceptable temporary utility services have been provided.

Provide minimum of 48-hour notice to Architect/Engineer, and receive written notice to proceed before interrupting any utility.

Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies for shut-off of services if lines are active.

Use of Explosives: The use of explosives is not permitted.

Obstructions: Unless otherwise indicated remove entirely all existing walls, floors, footings, piers, and other construction from the location of new buildings. Outside of the areas of building excavation within the project site, remove to a minimum depth of 2' below finish grade all existing walls, floors, curbs, pavements, and other improvements, unless shown to be retained in the project. Clean out any existing dug wells, cisterns, abandoned manholes, catch basins, septic tanks, sink holes, and other similar structures and fill with granular material firmly compacted contacted. Plug with concrete or masonry the open ends of abandoned sewers encountered in any excavation; plug in the same manner sewer openings in abandoned manholes and catch basins. Break up masonry or concrete bottoms of existing structures to permit drainage.

Protection of Persons and Property: Barricade open excavations

occurring as part of this work and post with warning lights.

Operate warning lights as recommended by authorities having jurisdiction.

Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout and other hazards created by earthwork operations.

Perform excavation within drip-line of large trees to remain by hand, and protect the root system from damage or dryout to the greatest extent possible. Maintain moist condition for root system and cover exposed roots with burlap. Paint root cuts of 1" diameter and larger with emulsified asphalt tree paint.

PART 2 - PRODUCTS

SOIL MATERIALS:

Definitions:

<u>Drainage Fill:</u> Washed evenly graded mixture of crushed stone, or crushed or uncrushed gravel, with 100% passing a 1-1/2" sieve and not more than 5% passing a No. 4 sieve.

Roadway Subbase Material: Dense graded aggregate conforming to Kentucky Department of Highways Standard Specifications, Sections 303.

<u>Subbase</u> <u>Material</u>: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, crushed slag, natural or crushed sand.

Earth Fill and Backfill: Material shall be approved by the Architect. Excavated materials from the site may be used if approved. Imported fill, where required, shall be a non-expansive and predominantly granular soil or soil-rock mixture which is free from organic matter and deleterious substances and which does not contain materials over 6" in greatest dimension. Material having a dimension greater than 4" shall not be used in the upper 6" of fill.

PART 3 - EXECUTION

EXCAVATION:

Excavation Classifications: The following classifications of excavation will be made when rock excavation is encountered in

work:

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Earth excavation includes excavation of pavements and other obstructions visible on ground surface; underground structures, utilities and other items indicated to be demolished and removed; together with earth and other materials encountered that are not classified as rock or unauthorized excavation.

General building rock excavation includes any subsurface material (except as otherwise defined as earth excavation) encountered during mass building excavation operations which cannot be excavated and loaded out by either a 3 1/4 cubic yard capacity front end loader or a 2 cubic yard capacity hydraulic backhoe.

Pit and/or footing rock excavation includes any subsurface material (except as otherwise defined as earth excavation) encountered during pit and/or footing excavation operations which cannot be excavated and loaded out be a 2 cubic yard capacity hydraulic backhoe.

<u>Utility trench rock excavation</u> includes any subsurface material encountered during trench excavation operations which cannot be excavated and loaded out by a 1 cubic yard capacity hydraulic backhoe.

<u>Drilled caisson rock excavation</u> includes any subsurface material encountered during drilled caisson excavation operations which cannot be excavated by a drilling rig with earth auger whose rated down pressure and torque is equivalent to a Hughes Model LDH-60 digger. (37,000 lb. down pressure/50,000 ft. lb. torque.)

Do not perform rock excavation work until material to be excavated has been cross-sectioned and classified by the Construction Manager. Such excavation will be paid on basis of contract conditions relative to changes in work.

Rock payment lines are defined in the Special Conditions:

<u>Unauthorized excavation</u> consists of removal of materials beyond indicated subgrade elevations or dimensions without specific direction of Architect/Engineer. Unauthorized excavation, as well as remedial work directed by Architect/Engineer, shall be at Contractor's expense.

Under footings, foundation bases, or retaining walls, fill unauthorized excavation by extending indicated bottom elevation of footing or base to excavation bottom, without altering required top elevation. Lean concrete fill may be used to bring elevations to proper position, when acceptable to Architect/Engineer.

Elsewhere, backfill and compact unauthorized excavations as specified for authorized excavations of same classification, unless otherwise directed by Architect/Engineer.

<u>Additional</u> <u>Excavation</u>: When excavation has reached required subgrade elevations, notify Architect/Engineer who will make an inspection of conditions.

If unsuitable bearing materials are encountered at required subgrade elevations, carry excavations deeper and replace excavated material as directed by Architect/Engineer.

Removal of unsuitable material and its replacement as directed will be paid on basis of contract conditions relative to changes in work.

Stability of Excavations: Slope sides of excavations to comply with local codes and ordinances having jurisdiction. Shore and brace where sloping is not possible because of space restrictions or stability of material excavated.

Maintain sides and slopes of excavations in safe condition until completion of backfilling.

Shoring and Bracing: Provide materials for shoring and bracing, such as sheet piling, uprights, stringers and cross-braces, in good serviceable condition.

Establish requirements for trench shoring and bracing to comply with local codes and authorities having jurisdiction.

Maintain shoring and bracing in excavations regardless of time period excavations will be open. Carry down shoring and bracing as excavation progresses.

<u>Dewatering</u>: Prevent surface water and subsurface or ground water from flowing into excavations and from flooding project site and surrounding area.

Do not allow water to accumulate in excavations. Remove water to prevent softening of foundation bottoms, undercutting footings, and soil changes detrimental to stability of subgrades and foundations. Provide and maintain pumps, well points, sumps, suction and discharge lines, and other dewatering system components necessary to convey water away from excavations.

 Establish and maintain temporary drainage ditches and other diversions outside excavation limits to convey rain water and water removed from excavations to collecting or run-off areas. Do not use trench excavations as temporary drainage ditches.

<u>Material</u> <u>Storage</u>: Stockpile satisfactory excavated materials where directed, until required for backfill or fill. Place, grade and shape stockpiles for proper drainage.

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Locate and retain soil materials away from edge of excavations. Do not store within drip line of trees indicated to remain.

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Dispose of excess soil material and waste materials as herein specified.

Excavation for Structures: Conform to elevations and dimensions shown within a tolerance of plus or minus 0.10', and extending a sufficient distance from footings and foundations to permit placing and removal of concrete formwork, installation of services, other construction, and for inspection.

In excavating for footings and foundations, take care not to disturb bottom of excavation. Excavate by hand to final grade just before concrete reinforcement is placed. Trim bottoms to required lines and grades to leave solid base to receive other work.

Excavation for Pavements: Cut surface under pavements to comply with cross-sections, elevations and grades as shown.

Excavation for Trenches: Dig trenches to the uniform width required for particular item to be installed, sufficiently wide to provide ample working room. Provide 6" to 9" clearance on both sides of pipe or conduit.

Excavate trenches to depth indicated or required. Carry depth of trenches for piping to establish indicated flow lines and invert elevations. Beyond building perimeter, keep bottoms of trenches sufficiently below finish grade to avoid freeze-ups.

Where rock is encountered, carry excavation 6" below required elevation and backfill with a 6" layer of crushed stone or gravel prior to installation of pipe.

For pipes or conduit 5" or less in nominal size and for flatbottomed multiple-duct conduit units, do not excavate beyond indicated depths. Hand excavate bottom cut to accurate elevations and support pipe or conduit on undisturbed soil.

For pipes or conduit 6" or larger in nominal size, tanks and other work indicated, or, if not otherwise indicated, to 6" below bottom of work to be supported.

Except as otherwise indicated, excavate for exterior water-bearing piping (water, steam, condensate, drainage) so top of piping is not less than 3'-6" below finished grade.

Grade bottoms of trenches as indicated, notching under pipe bells to provide solid bearing for entire body of pipe.

Backfill trenches with concrete where trench excavations pass within 18" of column or wall footings and which are carried

below bottom of such footings, or which pass under wall footings. Place concrete to level of bottom of adjacent footing.

Concrete is specified in Division 3.

Do not backfill trenches until tests and inspections have been made and backfilling authorized by Architect/Engineer. Use care in backfilling to avoid damage or displacement of pipe systems.

For piping or conduit less than 2'-6" below surface of roadways, provide 4" thick concrete base slab support. After installation and testing of piping or conduit, provide minimum 4" thick encasement (sides and top) of concrete prior to backfilling or placement of roadway subbase.

<u>Cold Weather Protection:</u> Protect excavation bottoms against freezing when atmospheric temperature is less than 35 degrees F (1 degree C).

COMPACTION:

2 3 4

General: Control soil compaction during construction providing minimum percentage of density specified for each area classification indicated below.

Percentage of Maximum Density Requirements: Compact soils to not less than the following percentages of maximum density determined in accordance with ASTM D 698.

Footings: Compact top 12" of subgrade and each layer of backfill material at 95% maximum density.

Structures, Building Slabs, Walks, and Pavements: Compact top 12" of subgrade and each layer of backfill or fill material at 95% maximum density.

Lawn or Unpaved Areas: Compact top 6" of subgrade and each layer of backfill or fill material at 85% maximum density.

Moisture Control: Where subgrade or layer of soil material must be moisture conditioned before compaction, uniformly apply water to surface of subgrade, or layer of soil material, to prevent free water appearing on surface during or subsequent to compaction operations.

Remove and replace, or scarify and air dry, soil material that is too wet to permit compaction to specified density.

Soil material that has been removed because it is too wet to permit compaction may be stockpiled or spread and allowed to dry. Assist drying by discing, harrowing or pulverizing until moisture content is reduced to a satisfactory value.

BACKFILL AND FILL:

4 5

General: Place acceptable soil material in layers to required subgrade elevations, for each area classification listed below.

In excavations, use approved excavated or borrow material.

<u>Under grassed areas</u>, use approved excavated or borrow material.

<u>Under pavements</u>, use subbase material, or satisfactory excavated or borrow material, or combination of both.

Under building slabs, use drainage fill material.

<u>Under piping and conduit</u>, use subbase material where subbase is indicated under piping or conduit; shape to fit bottom 90 degrees of cylinder.

Backfill excavations as promptly as work permits, but not until completion of the following:

Acceptance of construction below finish grade including, where applicable, dampproofing, waterproofing, and perimeter insulation.

Inspection, testing, approval, and recording locations of underground utilities.

Removal of concrete formwork.

Removal of shoring and bracing, and backfilling of voids with satisfactory materials. Cut off temporary sheet piling driven below bottom of structures and remove in manner to prevent settlement of the structure or utilities, or leave in place if required.

Removal of trash and debris.

Permanent or temporary horizontal bracing is in place on horizontally supported walls.

Ground Surface Preparation: Remove vegetation, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface prior to placement of fills. Plow, strip, or break-up sloped surfaces steeper than 1 vertical to 4 horizontal so that fill material will bond with existing surface. After removal of surface material proof roll all natural soils prior to placement of fill.

 At line 50, add the following: Often proof rolling under building slabs and pavements, perform density testing as specified under Field Quality Control and prepare subgrade as required. Unless existing material must be removed for recompaction, all fill under the pavement slab gravel drainage fill material.

(Add/A-2)

optimum moisture content, and compact to required depth and percentage of maximum density.

<u>Placement</u> and <u>Compaction</u>: Place backfill and fill materials in layers not more than 8" in loose depth for material compacted by heavy compaction equipment, and not more than 4" in loose depth for material compacted by hand-operated tampers.

Before compaction, moisten or aerate each layer as necessary to provide optimum moisture content. Compact each layer to required percentage of maximum dry density or relative dry density for each area classification. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.

Place backfill and fill materials evenly adjacent to structures, piping or conduit to required elevations. Take care to prevent wedging action of backfill against structures or displacement of piping or conduit by carrying material uniformly around structure, piping or conduit to approximately same elevation in each lift.

GRADING:

 General: Uniformly grade areas within limits of grading under this section, including adjacent transition areas. Smooth finished surface within specified tolerances, compact with uniform levels or slopes between points where elevations are indicated, or between such points and existing grades.

Grading Outside Building Lines: Grade areas adjacent to building lines to drain away from structures and to prevent ponding.

Finish surfaces free from irregular surface changes, and as follows:

Lawn or Unpaved Areas: Finish areas to receive topsoil to within not more than 0.10' above or below required subgrade elevations.

<u>Walks:</u> Shape surface of areas under walks to line, grade and cross-section, with finish surface not more than 0.10' above or below required subgrade elevation.

<u>Pavements</u>: Shape surface of areas under pavement to line, grade and cross-section, with finish surface not more than 1/2" above or below required subgrade elevation.

Grading Surface of Fill Under Building Slabs: Grade smooth and even, free of voids, compacted as specified, and to required elevation. Provide final grades within a tolerance of 1/2" when tested with a 10' straightedge.

Compaction: After grading, compact subgrade surfaces to the

depth and indicated percentage of maximum or relative density for each area classification.

3 4 5

ROADWAY AND PAVEMENT SUBBASE COURSE:

General: Subbase course consists of placing subbase material, in layers of specified thickness, over subgrade surface to support a pavement base course.

See other Division-2 sections for paving specifications.

<u>Grade Control</u>: During construction, maintain lines and grades including crown and cross-slope of subbase course.

<u>Placing:</u> Place subbase course material on prepared subgrade in layers of uniform thickness, conforming to indicated cross-section and thickness. Maintain optimum moisture content for compacting subbase material during placement operations.

 When a compacted subbase course is shown to be 6" thick or less, place material in a single layer. When shown to be more than 6" thick, place material in equal layers, except no single layer more than 6" or less than 3" in thickness when compacted.

BUILDING SLAB DRAINAGE COURSE:

<u>General</u>: Drainage course consists of placement of drainage fill material, in layers of indicated thickness, over subgrade surface to support concrete building slabs.

 <u>Placing:</u> Place drainage fill material on prepared subgrade in layers of uniform thicknes, conforming to indicated cross-section and thickness. Maintain optimum moisture content for compacting material during placement operations.

When a compacted drainage course is shown to be 6" thick or less, place material in a single layer. When shown to be more than 6" thick, place material in equal layers, except no single layer more than 6" or less than 3" in thickness when compacted.

FIELD QUALITY CONTROL:

<u>Quality Control Testing During Construction</u>: Allow testing service to inspect and approve subgrades and fill layers before further construction work is performed.

Perform field density tests in accordance with ASTM D 1556 (sand cone method), ASTM D 2167 (rubber balloon method), or ASTM D 2922 (nuclear density method), as applicable.

Footing Subgrade: For each strata of soil on which footings

will be placed, conduct at least one test to verify required design bearing capacities. Subsequent verification and approval of each footing subgrade may be based on a visual comparison of each subgrade with related tested strata, when acceptable to Architect.

conduct at least one test per 50 feet of length to verify required design bearing capacities.

Testing will be accomplished by drilling a 1 1/2 inch percussion hole to a depth of 5 feet below proposed bearing

For each strata of rock on which footings will be placed,

elevation. Each hole will be inspected with a hooked probe to insure a minimum of 24 inches of sound rock, free of voids and clay seams.

Paved Areas and Building Slab Subgrade: Make at least one field density test of subgrade for every 2,000 sq. ft. of

 Paved Areas and Building Slab Subgrade: Make at least one field density test of subgrade for every 2,000 sq. ft. of paved area or building slab, but in no case less than 3 tests. In each compacted fill layer, make one field density test for every 2,000 sq. ft. of overlaying building slab or paved area, but in no case less than 3 tests.

Foundation Wall Backfill: Take at least 1 field density test per 50 feet of wall length, at locations and elevations as directed.

If in opinion of Architect/Engineer, based on testing service reports and inspection, subgrade or fills which have been placed are below specified density, provide additional compaction and testing at no additional expense.

MAINTENANCE:

<u>Protection</u> of <u>Graded Areas</u>: Protect newly graded areas from traffic and erosion. Keep free of trash and debris.

Repair and re-establish grades in settled, eroded, and rutted areas too specified tolerances.

 Reconditioning Compacted Areas: Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify surface, re-shape, and compact to required density prior to further construction.

<u>Settling</u>: Where settling is measurable or observable at excavated areas during general project warranty period, remove surface (pavement, lawn or other finish), add backfill material, compact, and replace surface treatment. Restore appearance, quality, and condition of surface or finish to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

Remove excess excavated material, trash, debris and waste materials and dispose of it off Owner's property.

DISPOSAL OF EXCESS AND WASTE MATERIALS:

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END OF SECTION 02200

EARTHWORK

02200 - 13

SECTION 02480 - LANDSCAPE WORK

PART 1 - GENERAL

RELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Special Conditions and Division-1 Specification sections, apply to work of this section.

DESCRIPTION OF WORK:

Extent of landscape development work is shown on drawings and in schedules.

<u>Subgrade</u> <u>Elevations</u>: Excavation, filling and grading required to establish elevations shown on drawings are not specified in this section. Refer to earthwork sections.

QUALITY ASSURANCE:

<u>Subcontract</u> landscape work to a single firm specializing in landscape work.

Source Quality Control:

<u>General</u>: Ship landscape materials with certificates of inspection required by governing authorities. Comply with regulations applicable to landscape materials.

<u>Do not make substitutions</u>: If specified landscape material is not obtainable, submit proof of non-availability to Architect, together with proposal for use of equivalent material.

Analysis and Standards: Package standard products with manufacturer's certified analysis. For other materials, provide analysis by recognized laboratory made in accordance with methods established by the Association of Official Agriculture Chemists, wherever applicable.

Topsoil: Before delivery of topsoil, furnish Architect, at no charge, with soil analysis and reports on existing topsoil conditions at site prepared by the University of Kentucky, Agricultural Extension Service. Report and analysis shall include specific soil amendments, fertilizer recommendations and application rates as required to improve soil condition. Provide additional analysis and reports for each separate source of topsoil.

Trees, Shrubs and Plants: Provide trees, shrubs and plants of quantity, size, genus, species and variety shown and scheduled for landscape work and complying with recommendations and requirements of ANSI Z60.1 "American Standard for Nursery Stock". Provide healthy, vigorous stock, grown in recognized nursery in accordance with good horticultural practice and free of disease, insects, eggs, larvae and defects such as knots, sun-scald, injuries, abrasions, or disfigurement.

<u>Label</u> each tree and shrub with securely attached waterproof tag bearing legible designation of botanical and common name.

Where formal arrangements or consecutive order of trees or shrubs are shown, select stock for uniform height and spread, and label with number to assure symmetry in planting.

<u>Inspection</u>: The Architect may inspect trees and shrubs either at place of growth or at site before planting, for compliance with requirements for genus, species, variety, size and quality. Architect retains right to further inspect trees and shrubs for size and condition of balls and root systems, insects, injuries and latent defects, and to reject unsatisfactory or defective material at any time during progress of work. Remove rejected trees or shrubs immediately from project site.

SUBMITTALS:

<u>Certification:</u> Submit certificates of inspection as required by governmental authorities. Submit manufacturer's or vendors certified analysis for soil amendments and fertilizer materials. Submit other data substantiating that materials comply with specified requirements. Submit topsoil analysis report from Extension Service.

Planting Schedule: Submit proposed planting schedule, indicating dates for each type of landscape work during normal seasons for such work in area of site. Correlate with specified maintenance periods to provide maintenance from date of substantial completion. Once accepted, revise dates only as approved in writing, after documentation of reason for delays.

<u>Maintenance</u> <u>Instructions</u>: Submit typewritten instructions recommending procedures to be established by Owner for maintenance of landscape work for one full year. Submit prior to expiration of required maintenance period(s).

DELIVERY, STORAGE AND HANDLING:

<u>Packaged Materials:</u> Deliver packaged materials in containers showing weight, analysis and name of manufacturer. Protect materials from deterioration during delivery, and while stored

1 at site.
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<u>Sod</u>: Time delivery so that sod will be placed within 24 hours after stripping. Protect sod against drying and breaking of rolled strips.

Trees and Shrubs: Provide freshly dug trees and shrubs. Do not prune prior to delivery unless otherwise approved by Architect. Do not bend or bind-tie trees or shrubs in such manner as to damage bark, break branches or destroy natural shape. Provide protective covering during delivery. Do not drop balled and burlapped stock during delivery.

<u>Deliver trees</u> and <u>shrubs</u> after preparations for planting have been completed and plant immediately. If planting is delayed more than 6 hours after delivery, set trees and shrubs in shade, protect from weather and mechanical damage, and keep roots moist by covering with mulch, burlap or other acceptable means of retaining moisture.

Do not remove container grown stock from containers until planting time.

JOB CONDITIONS:

<u>Proceed with and complete</u> landscape work as rapidly as portions of site become available, working within seasonal limitations for each kind of landscape work required.

<u>Utilities:</u> Determine location of underground utilities and perform work in a manner which will avoid possible damage. Hand excavate, as required. Maintain grade stakes set by others until removal is mutually agreed upon by parties concerned.

Excavation: When conditions detrimental to plant growth are encountered, such as rubble fill, adverse drainage conditions, or obstructions, notify Architect before planting.

<u>Planting</u> <u>Time</u>: Plant or install materials during normal planting seasons for each type of landscape work required. Correlate planting with specified maintenance periods to provide maintenance from date of substantial completion.

Coordination with Lawns: Plant trees and shrubs after final grades are established and prior to planting of lawns, unless otherwise acceptable to Architect. If planting of trees and shrubs occurs after lawn work, protect lawn areas and promptly repair damage to lawns resulting from planting operations.

SPECIAL PROJECT WARRANTY:

54 Warranty lawns through specified lawn maintenance period, and

until final acceptance.

Warranty trees and shrubs, for a period of one year, or one full growing season, whichever is longer, after date of substantial completion, against defects including death and unsatisfactory growth, except for defects resulting from neglect by Owner, abuse or damage by others, or unusual phenomena or incidents which are beyond Landscape Installer's control. The growing season is defined as beginning May 1st and ending September 15th.

Remove and replace trees, shrubs, or other plants found to be dead or in unhealthy condition during warranty period. Make replacements during growth season following end of warranty period. Replace trees and shrubs which are in doubtful condition end of warranty period; unless, in opinion of Architect, it is advisable to extend warranty period for a full growing season.

Another inspection will be conducted at end of extended warranty period, if any, to determine acceptance or rejection. Only one replacement (per tree, shrub or plant) will be required at end of warranty period, except for losses or replacements due to failure to comply with specified requirements.

PART 2 - PRODUCTS

TOPSOIL:

Topsoil for landscape work is not available at site and must be furnished as specified.

 Provide new topsoil which is fertile, friable, natural loam, surface soil, reasonably free of subsoil, clay lumps, brush, weeds and other litter, and free of roots, stumps, stones larger than 2" in any dimension, and other extraneous or toxic matter harmful to plant growth.

 Obtain topsoil from local sources or from areas having similar soil characteristics to that found at project site. Obtain topsoil only from naturally, well-drained sites where topsoil occurs in a depth of not less than 4"; do not obtain from bogs or marshes.

SOIL AMENDMENTS:

<u>Lime</u>: Natural dolomitic limestone containing not less than 85% of total carbonates with a minimum of 30% magnesium carbonates, ground so that not less than 90% passes a 10-mesh sieve and not

ţ.,

1 less than 50% passes a 100-mesh sieve.

<u>Aluminum</u> <u>Sulfate</u>: Commercial grade.

<u>Sphagnum Peat Moss</u>: Decomposed vegetable matter, natural, brown, clean, low in content of mineral and wood material, mildly acid and granulated or shredded..

Bonemeal: Commercial, raw, finely ground; 4% nitrogen and 20% phosphoric acid.

<u>Superphosphate</u>: Soluble mixture of treated minerals; 20% available phosphoric acid.

Sand: Clean, washed sand, free of toxic materials.

<u>Mulch</u>: No. 4 grade "Solite" expanded shale lightweight aggregate as manufactured by Kentucky Solite Corporation, Louisville, Kentucky, manufacturer's standard color.

<u>Commercial</u> <u>Fertilizer</u>: Complete fertilizer of neutral character, with some elements derived from organic sources and containing following percentages of available plant nutrients:

For ground covers, provide fertilizer with not less than 5% total nitrogen, 10% available phosphoric acid and 5% soluble potash.

For trees and shrubs, provide fertilizer planting tablets, pellets, or packets containing prolonged-release nitrogen, derived from urea-formaldehyde may be utilized. Tablets, pellets, or packets shall be at least of a strength of 16-8-5. The amount of available nitrogen, phosphorus, or potash, may be increased slightly to meet the standard manufactured products available.

For lawns, provide fertilizer with percentage of nitrogen required to provide not less than 10% tested nitrogen and not less than 10% phosphoric acid and 10% potassium. Provide nitrogen in a form that will be available to lawn during initial period of growth; at least 50% of nitrogen to be organic form.

Herbicide: Provide approved commercial grade pre-emergent herbicide certified safe for plants specified in the Plant List.

Water: Provide water at Contractor's expense sufficient to meet the needs of work of this Section and adequate to irrigate the lawns and plantings until acceptance.

PLANT MATERIALS:

Quality: Provide trees, shrubs, and other plants of size, genus, species and variety shown and scheduled for landscape work and complying with recommendations and requirements of ANSI Z60.1 "American Standard for Nursery Stock".

<u>Deciduous</u> <u>Trees</u>: Provide trees of height and caliper scheduled or shown and with branching configuration recommended by ANSI Z60.1 for type and species required. Provide single stem trees except where special forms are shown or listed.

Provide balled and burlapped (B&B) deciduous trees.

<u>Deciduous Shrubs:</u> Provide shrubs of the height shown or listed and with not less than minimum number of canes required by ANSI Z60.1 for type and height of shrub required.

Provide balled and burlapped (B&B) deciduous shrubs.

 Container grown deciduous shrubs will be acceptable in lieu of balled and burlapped deciduous shrubs subject to specified limitations for container grown stock.

Coniferous and Broadleafed Evergreens: Provide evergreens of sizes shown or listed. Dimensions indicate minimum spread for spreading an semi-spreading type evergreens and height for other types, such as globe, dwarf, cone, pyramidal, broad up-right, and columnar. Provide normal quality evergreens with well-balanced form complying with requirements for other size relationships to the primary dimension shown.

Provide balled and burlapped (B&B) evergreens.

Container grown evergreens will be acceptable subject to specified limitations for container grown stock.

GRASS MATERIALS:

<u>Sod</u>: Provide strongly rooted sod, not less than 2 years old and free of weeds and undesirable native grasses and machine cut to pad thickness of 3/4", (\pm 1/4"), excluding top growth and thatch. Provide only sod capable of vigorous growth and development when planted (viable, not dormant).

 Provide sod of uniform pad sizes with maximum 5% deviation in either length or width. Broken pads or pads with uneven ends will not be acceptable. Sod pads incapable of supporting their own weight when suspended vertically with a firm grasp on upper 10% will be rejected.

Provide sod composed principally of the following:

Type A - Kentucky Bluegrass (Poa pratensis).

Type B - Adventure Tall Fescue (Festuca anindinacea "Adventure").

GROUND COVER:

Provide plants established and well-rooted in removable containers or integral peat pots and with not less than minimum number and length of runners required by ANSI Z60.1 for the pot size shown or listed.

MISCELLANEOUS LANDSCAPE MATERIALS:

Aluminum Edging: Aluminum edging of size shown on drawings fabricated in 16 foot sections, as manufactured by Permaloc, Kalamazoo, Michigan, or approved equal. Provide manufacturer's standard aluminum stakes and splicers 16" long. Finish edging sections and stakes with manufacturer's black anodized finish.

<u>Wrapping</u>: Tree-wrap tape not less than 4" wide, designed to prevent bore damage and winter freezing.

 Stakes and Guys: Provide heavy duty "T" section steel fence posts 7 feet long for tree staking. Stakes will be the property of the landscape contractor and remain in place for a minimum of 2 growing seasons. Owner will not be held responsible for loss of stakes by vandals. Provide wood warning flags consisting of 2"x4"x3/8" CDX plywood painted white and attached to guy wire with zinc coated eye hooks. Provide wire ties and guys of 2-strand, twisted, pliable galvanized iron wire not lighter than 12 ga. with zinc-coated turnbuckles. Provide not less than 1/2" diameter rubber hose, cut to required lengths and of uniform color, material and size to protect tree trunks from damage by wires.

Anti-Dessicant: Emulsion type, film-forming agent designed to permit transpiration but retard excessive loss of moisture from plants. Deliver in manufacturer's fully identified containers and mix in accordance with manufacturer's instructions.

<u>Plastic Sheet</u>: Black, weather-resistant polyethylene sheeting complying with FS L-P-512, Type III, 0.008" (8-mils) thick.

<u>Filtration/Separation</u> <u>Fabric</u>: Water permeable filtration fabric of fiberglass or polypropylene fabric.

<u>Wrapping</u>: Tree-wrap tape not less than 4" wide, designed to prevent bore damage and winter freezing.

PART 3 - EXECUTION

PREPARATION:

<u>Layout individual</u> tree and shrub locations and areas for multiple plantings. Stake locations and outline areas and secure Architect's acceptance before start of planting work. Make minor adjustments as may be requested.

Preparation of Planting Soil:

Before mixing, clean topsoil of roots, plants, sods, stones, clay lumps, and other extraneous materials harmful or toxic to plant growth.

<u>Mix specified soil amendments</u> and fertilizers with topsoil at rates specified by the soil analysis and report and/or as here specified. Delay mixing of fertilizer if planting will not follow placing of planting soil within a few days.

"Schedule of Planting Soil Mixture Requirements" is attached at end of this section.

For pit and trench type backfill, mix planting soil prior to backfilling, and stockpile at site.

For planting beds and lawns, mix planting soil either prior to planting or apply on surface of topsoil and mix thoroughly before planting.

Mix lime with dry soil prior to mixing of fertilizer.

Prevent lime from contacting roots of acid-loving plants.

 Apply phosphoric acid fertilizer (other than that constituting a portion of complete fertilizers) directly to subgrade before applying planting soil and tilling.

Preparation for Planting Lawns:

<u>Loosen subgrade of lawn areas</u> to a minimum depth of 4". Remove stones over 1-1/2" in any dimension and sticks, roots, rubbish and other extraneous matter. Limit preparation to areas which will be planted promptly after preparation.

<u>Spread top soil</u> to minimum depth required to meet lines, grades and elevations shown, after light rolling and natural settlement. Add specified soil amendments and mix thoroughly into upper 4" of topsoil.

Place approximately 1/2 of total amount of top soil required. Work into top of loosened subgrade to create a transition layer and then place remainder of planting soil. Add specified soil amendments and mix thoroughly into upper 4" of

3.8

topsoil.

<u>Preparation of Unchanged Grades</u>: Where lawns are to be planted in areas that have not been altered or disturbed by excavating, grading, or stripping operations, prepare soil for lawn planting as follows: Till to a depth of not less than 6"; apply soil amendments and initial fertilizers as specified; remove high areas and fill in depressions; till soil to a homogenous mixture of fine texture, free of lumps, clods, stones, roots and other extraneous matter.

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Prior to preparation of unchanged areas, remove existing grass, vegetation and turf. Dispose of such material outside of Owner's property; do not turn over into soil being prepared for lawns.

Allow for sod thickness in areas to be sodded.

Apply specified commercial fertilizer at rates specified in the soil report and thoroughly mix into upper 2" of topsoil. Delay application of fertilizer if lawn planting will not follow within a few days.

Fine grade lawn areas to smooth, even surface with loose, uniformly fine texture. Roll, rake and drag lawn areas, remove ridges and fill depressions, as required to meet finish grades. Limit fine grading to areas which can be planted immediately after grading.

Moisten prepared lawn areas before planting if soil is dry. Water thoroughly and allow surface moisture to dry before planting lawns. Do not create a muddy soil condition.

Restore lawn areas to specified condition if eroded or otherwise disturbed after fine grading and prior to planting.

Preparation of Planting Beds:

Loosen subgrade of planting bed areas to a minimum depth of 6" using a cultimulcher or similar equipment. Remove stones over 1-1/2" in any dimension, and sticks, stones, rubbish and other extraneous matter.

 Spread planting soil mixture to minimum depth required to meet lines, grades and elevations shown, after light rolling and natural settlement. Place approximately 1/2 of total amount of planting soil required. Work into top of loosened subgrade to create a transition layer, then place remainder of the planting soil.

Dig beds not less than 8" deep and mix with specified soil amendments and fertilizers.

2 Remo

Remove 8" to 10" of soil and replace with prepared planting soil mixture.

Excavation for Trees and Shrubs:

Excavate pits, beds and trenches, with vertical sides and with bottom of excavation slightly raised at center to provide proper drainage. Loosen hard subsoil in bottom of excavation.

For bare root trees and shrubs, make excavations at least 1'-0" wider than root spread and deep enough to allow for setting of roots on a layer of compacted backfill and with collar set at same grade as in nursery, but 1" below finished grade at site.

Allow for 9" setting layer of planting soil mixture.

For balled and burlapped (B&B trees and shrubs), make excavations at least half again as wide as the ball diameter and equal to the ball depth, plus following allowance for setting of ball on a layer of compacted backfill:

Allow for 3" setting layer of planting soil mixture.

For container grown stock, excavate as specified for balled and burlapped stock, adjusted to size of container width and depth.

<u>Dispose</u> of subsoil removed from planting excavations. Do not mix with planting soil or use as backfill.

Fill excavations for trees and shrubs with water and allow to percolate out before planting.

PLANTING:

Planting Trees and Shrubs:

Set balled and burlapped (B&B) stock on layer of compacted planting soil mixture, plumb and in center of pit or trench with top of ball at same elevation as adjacent finished landscape grades. Remove burlap from sides of balls; retain on bottoms. When set, place additional backfill around base and sides of ball, and work each layer to settle backfill and eliminate voids and air pockets. When excavation is approximately 2/3-full, water thoroughly before placing remainder of backfill. Repeat watering until no more is absorbed. Water again after placing final layer of backfill.

Set container grown stock as specified for balled and burlapped

stock, except carefully remove containers prior to backfilling and handle so as not to damage root balls.

Dish top of backfill to allow for mulching.

Mulch pits, trenches and planted areas. Provide not less than following thickness of mulch and work into top of backfill and finish level with adjacent finish grades.

Provide 2" thickness of mulch.

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 Apply anti-dessicant using power spray to provide an adequate film over trunks, branches, stems, twigs and foliage.

If deciduous trees or shrubs are moved in full-leaf, spray with anti-dessicant at nursery before moving and again 2 weeks after planting.

Prune, thin out and shape trees and shrubs in accordance with standard horticultural practice. Prune trees to retain required height and spread. Unless otherwise directed by Architect, do not cut tree leaders, and remove only injured or dead branches from flowering trees, if any. Prune shrubs to retain natural character.

Remove and replace excessively pruned or misformed stock resulting from improper pruning.

Wrap tree trunks of 2" caliper and larger. Start at ground and cover trunk to height of first branches and securely attach. Inspect tree trunks for injury, improper pruning and insect infestation and take corrective measures before wrapping.

Guy and stake trees immediately after planting, as indicated.

SODDING NEW LAWNS:

Lay sod within 24 hours from time of stripping. Do not plant dormant sod or if ground is frozen.

Lay sod to form a solid mass with tightly fitted joints. Butt ends and sides of sod strips; do not overlap. Stagger strips to offset joints in adjacent courses. Work from boards to avoid damage to subgrade or sod. Tamp or roll lightly to ensure contact with subgrade. Work sifted soil into minor cracks between pieces of sod; remove excess to avoid smothering of adjacent grass.

Anchor sod on slopes with wood pegs to prevent slippage.

<u>Water sod</u> thoroughly with a fine spray immediately after planting.

Reconditioning Existing Lawns:

Recondition existing lawn areas damaged by Contractor's operations including storage of materials and equipment and movement of vehicles. Also recondition existing lawn areas where minor regrading is required.

 <u>Provide fertilizer</u>, seed or sod and soil amendments as specified for new lawns and as required to provide a satisfactorily reconditioned lawn. Provide new topsoil as required to fill low spots and meet new finish grades.

<u>Cultivate</u> <u>bare</u> <u>and</u> <u>compacted</u> areas thoroughly to provide a satisfactory, planting bed.

 Remove diseased and unsatisfactory lawn areas; do not bury into soil. Remove topsoil containing foreign materials resulting from Contractor's operations including oil drippings, stone, gravel and other loose building materials.

Where substantial lawn remains (but is thin), mow, rake, aerate if compacted, fill low spots, remove humps and cultivate soil, fertilize, and seed. Remove weeds before seeding or if extensive, apply selective chemical weed killers as required. Apply a seedbed mulch, if required, to maintain moist condition.

<u>Water newly planted areas</u> and keep moist until new grass is established.

Planting Ground Cover:

Space plants as shown or scheduled.

 <u>Dig holes</u> large enough to allow for spreading of roots and backfill with planting soil. Work soil around roots to eliminate air pockets and leave a slight saucer indentation around plants to hold water. Water thoroughly after planting, taking care not to cover crowns of plants with wet soils.

Mulch areas between ground cover plants; place not less than 2" thick.

Miscellaneous Landscape Work:

<u>Install aluminum edging</u> where shown. Anchor with manufacturer's standard stakes spaced not more than 3' o.c., taking care not to damage anodized finish.

Place permanent <u>mulch</u> <u>beds</u> where shown. Compact soil subgrades before placing gravel.

Place filtration/separation fabric and pin in place as specified by manufacturer over compacted subgrade prior to placing mulch.

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MAINTENANCE:

8 9 10 Begin maintenance immediately after planting.

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Maintain trees, shrubs and other plants until final acceptance but in no case less than following period:

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30 days after substantial completion of planting.

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Maintain trees, shrubs and other plants by pruning, cultivating and weeding as required for healthy growth. Restore planting Tighten and repair stake and guy supports and reset trees and shrubs to proper grades or vertical position as Restore or replace damaged wrappings. required to keep trees and shrubs free of insects and disease.

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Maintain lawns for not less than the period stated below, and longer as required to establish an acceptable lawn.

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Sodded lawns, not less than 30 days after substantial completion.

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Maintain lawns by watering, fertilizing, weeding, trimming, and other operations such as rolling, regrading and replanting as required to establish a smooth, acceptable lawn, free of eroded or bare areas.

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CLEANUP AND PROTECTION:

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During landscape work, keep pavements clean and work area in an orderly condition.

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Protect landscape work and materials from damage due to landscape operations, operations by other contractors and trades and trespassers. Maintain protection during installation and maintenance periods. Treat, repair or replace damaged landscape work as directed.

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INSPECTION AND ACCEPTANCE:

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is completed, including maintenance, landscape work Architect will, upon request, make an inspection to determine 52 acceptability.

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When inspected landscape work does not comply with requirements,



replace rejected work and continue specified maintenance until reinspected by Architect and found to be acceptable. Remove rejected plants and materials promptly from project site.

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END OF SECTION 02480

SECTION 02513 - BITUMINOUS CONCRETE PAVING

PART 1 - GENERAL

RELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Special Conditions and Division-1 Specification sections, apply to work of this section.

DESCRIPTION OF WORK:

<u>Extent</u> of asphalt concrete paving work is shown on drawings, and includes correction of existing pavement subgrade and/or subbase course failures.

Extent of paving striping is shown on the drawings.

Prepared aggregate subbase is specified in earthwork sections.

SUBMITTALS:

<u>Material</u> <u>Certificates</u>: Provide copies of materials certificates signed by material producer and Contractor, certifying that each material item complies with, or exceeds, specified requirements.

JOB CONDITIONS:

Weather Limitations: Apply prime and tack coats when ambient temperature is above 50 deg. F. (10 deg. C), and when temperature has not been below 35 deg. F. (1 deg. C) for 12 hours immediately prior to application. Do not apply when base is wet or contains an excess of moisture.

Construct asphalt concrete surface course when atmospheric temperature is above 40 deg. F. (4 deg. C), and when base is dry. Base course may be placed when air temperature is above 30 deg. F. (-1 deg. C) and rising.

Grade Control: Establish and maintain required lines and elevations.

PART 2 - PRODUCTS

MATERIALS:

1 <u>General</u>: Use locally available materials and graduations which 2 exhibit a satisfactory record of previous installations.
3

Bituminous Concrete Base: Bituminous concrete base conforming to Kentucky Department of Highways "Standard Specifications for Road and Bridge Construction", 1985, Section 402.

Bituminous Concrete Surface: One course of Class A bituminous concrete surface conforming to Kentucky Department of Highways "Standard Specifications for Road and Bridge Construction", 1985, Section 402.

<u>Prime Coat</u>: Cut-back asphalt type; MC-30, MC-70, Primer L or RT-2 conforming to Kentucky Department of Highways "Standard Specifications for Road and Bridge Construction", 1985, Section 407.

<u>Tack Coat</u>: Emulsified asphalt, SS-1, SS-1h, CSS-1 or CSS-1h, conforming to Kentucky Department of Highways "Standard Specifications for Road and Bridge Construction", 1983, Section 407.

ASPHALT-AGGREGATE MIXTURE:

Provide asphalt-aggregate mixture in conformance with the provisions of Section 401.02 of the Kentucky Department of Highways "Standard Specifications for Road and Bridge Construction, 1985".

PART 3 - EXECUTION

SURFACE PREPARATION:

Remove loose material from compacted subbase surface immediately before applying prime coat.

Proof roll prepared subbase surface to check for unstable areas and areas requiring additional compaction.

Notify Contractor of unsatisfactory conditions. Do not begin paving work until deficient subbase areas have been corrected and are ready to receive paving.

<u>Prime Coat</u>: Apply at rate of 0.20 to 0.50 gal. per sq. yd., over-compacted subgrade. Apply material to penetrate and seal, but not flood, surface. Cure and dry as long as necessary to attain penetration and evaporation of volatile.

<u>Tack Coat:</u> Apply to contact surfaces of previously constructed asphalt or portland cement concrete and surfaces abutting or projecting into bituminous concrete pavement. Distribute at rate

of 0.05 to 0.15 gal. per sq. yd. of surface.

Allow to dry until at proper condition to receive paving.

PLACING MIX:

General: Place bituminous concrete mixture on prepared surface, spread and strike-off. Spread mixture at minimum temperature of 225 deg. F. (107 deg. C.). Place inaccessible and small areas by hand. Place each course to required grade, cross-section, and compacted thickness.

<u>Paver Placing</u>: Place in strips not less than 10' wide, unless otherwise acceptable to Architect. After first strip has been placed and rolled, place succeeding strips and extend rolling to overlap previous strips. Complete base course for a section before placing surface course.

Joints: Make joints between old and new pavements, or between successive days' work to ensure continuous bond between adjoining work. Construct joints to have same texture, density and smoothness as other sections of asphalt concrete course. Clean contact surfaces and apply tack coat.

ROLLING:

General: Begin rolling when mixture will bear roller weight without excessive displacement.

Compact mixture with hot hand tampers or vibrating plate compactors in areas inaccessible to rollers.

Breakdown Rolling: Accomplish breakdown or initial rolling immediately following rolling of joints and outside edge. Check surface after breakdown rolling, and repair displaced areas by loosening and filling, if required, with hot material.

<u>Second Rolling</u>: Follow breakdown rolling as soon as possible, while mixture is hot. Continue second rolling until mixture has been thoroughly compacted.

Finish Rolling: Perform finish rolling while mixture is still warm enough for removal of roller marks. Continue rolling until roller marks are eliminated and course has attained maximum density.

Patching: Remove and replace paving areas mixed with foreign materials and defective areas. Cut-out such area and fill with fresh, hot asphalt concrete. Compact by rolling to maximum surface density and smoothness.

Protection: After final rolling, do not permit vehicular traffic

in pavement until it has cooled and hardened.

Erect barricades to protect paving from traffic until mixture
has cooled enough not to become marked.

FIELD QUALITY CONTROL:

<u>General</u>: Test in-place asphalt concrete courses for compliance with requirements for thickness and surface smoothness. Repair or remove and replace unacceptable paving as directed by Architect.

Thickness: In-place compacted thickness will not be acceptable if exceeding following allowable variation from required thickness:

Binder Course: 1/2", plus or minus.

Surface Course: 1/4", plus or minus.

Surface Smoothness: Test finished surface of each asphalt concrete course for smoothness, using 10' straightedge applied parallel with, and at right angles to centerline of paved area. Surfaces will not be acceptable if exceeding the following tolerances for smoothness.

Binder Course Surface: 1/4".

Wearing Course Surface: 3/16".

Check surface areas at intervals as directed by Architect.

END OF SECTION 02513

SECTION 02514 - PORTLAND CEMENT CONCRETE PAVING

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PART 1 - GENERAL

RELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Special Conditions and Division-1 Specification sections, apply to work specified in this section.

DESCRIPTION OF WORK:

16 Extent of portland cement concrete paving is shown on drawings, 17 including curbs, gutters, walkways, steps, and pavement.

Prepared subbase is specified in "Earthwork" section.

Concrete and related materials are specified in Division 3.

Joint fillers and sealers are specified in Division 7.

Handrails are specified in Division 5.

QUALITY ASSURANCE:

Codes and Standards: Comply with local governing regulations if
more stringent than herein specified.

SUBMITTALS:

Furnish samples, manufacturer's product data, test reports, and materials certifications as required in referenced sections for concrete and joint fillers and sealers.

JOB CONDITIONS:

Traffic Control: Maintain access for vehicular and pedestrian traffic as required for other construction activities.

Utilize flagmen, barricades, warning signs and warning lights as required.

PART 2 - PRODUCTS

MATERIALS:

Steel, wood, or other suitable material of size and strength to resist movement during concrete placement and to retain horizontal and vertical alignment until removal. straight forms, free of distortion and defects.

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Use flexible spring steel forms or laminated boards to form radius bends as required.

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Coat forms with a non-staining form release agent that will not discolor or deface surface of concrete.

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Welded Wire Mesh: Welded plain cold-drawn steel wire fabric, ASTM A 185.

14 15 16

Furnish in flat sheets, not rolls, unless acceptable to Architect.

17 18 19

Reinforcing Bars: Deformed steel bars, ASTM A 615, Grade 40.

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Joint Dowel Bars: Plain steel bars, ASTM A 615, Grade 40. Cut bars true to length with ends square and free of burrs.

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Metal Expansion Caps: Furnish for one end of each dowel bar in expansion joints. Design caps with one end closed and a minimum length of 3" to allow bar movement of not less than 1", unless otherwise indicated.

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> Concrete Materials: Comply with requirements of applicable Division 3 sections for concrete materials, admixtures, bonding materials, curing materials, and others as required.

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Comply with requirements Expansion Joint Materials: applicable Division 7 sections for preformed expansion joint fillers and sealers.

<u>Liquid-Membrane Forming Curing Compound:</u> Complying with ASTM C 309, Type I, Class A unless other type acceptable to Architect. Moisture loss not more than 0.55 gr./sg. cm. when applied at 200 sq. ft./qal.

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Products: Subject to compliance with requirements, provide one of the following:

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"A-H 3 Way Sealer"; Anti-Hydro Waterproofing Co.
"Clear Seal"; A.C. Horn.
"Ecocure"; Euclid Chemical Co.
"Hardtop"; Gifford-Hill.
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"J-20 Acrylic Cure"; Dayton Superior. "Klearseal"; Seton Industries.

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"Kure-N-Seal"; Sonneborn-Contech.

53 54 "L&M Cure"; L & M Construction Chemicals.

"LR-152"; Protex Industries.

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"Masterseal"; Master Builders.
 1
             "Polyclear"; Upco Chemical/USM Corp. "Sealkure"; Toch Div. - Carboline.
 2
 3
             "Spartan-Cote"; The Burke Co.
 4
             "Sure Cure"; Kaufman Products Inc.
 5
 6
    Bonding Compound: Polyvinyl acetate or acrylic base, rewettable
 7
 8
     type.
 9
         Products: Subject to compliance with requirements, provide
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11
         one of the following:
12
             "Acrylic Bondcrete"; The Burke Co.
13
             "EucoWeld"; Euclid Chemical Co.
14
             "Everbond"; L & M Construction Co.
15
             "Hornweld"; A.C. Horn.
16
             "J-40 Bonding Agent"; Dayton Superior Corp.
17
             "Sonocrete"; Sonneborn-Contech.
18
             "Weldcrete"; Larsen Products.
19
20
     Epoxy Adhesive: ASTM C 881, two component material suitable for
21
     use on dry or damp surfaces. Provide material "Type", "Grade",
22
     and "Class" to suit project requirements.
23
24
         Products: Subject to compliance with requirements, provide
25
26
         one of the following:
27
             "Epoxtite"; A.C. Horn.
28
             "Edoco 2118 Epoxy Adhesive"; Edoco Technical Prod.
29
             "Silkadur Hi-Mod"; Sika Chemical Corp.
30
             "Euco Epoxy 463 or 615"; Euclid Chemical Co. "Patch and Bond Epoxy"; The Burke Co.
31
32
33
             "Sure-Poxy"; Kaufman Products Inc.
34
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36
     CONCRETE MIX, DESIGN AND TESTING:
37
     Comply with requirements of applicable Division-3 sections for
38
     concrete mix design, sampling and testing, and quality control,
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40
     and as herein specified.
41
     Design mix to produce normal-weight concrete consisting of portland cement, aggregate, water-reducing or high-range water-
42
43
     reducing admixture (super-plasticizer), air-entraining admixture
44
     and water to produce the following properties:
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4000 psi, minimum at 28 days, unless Compressive Strength: otherwise indicated.

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8" for concrete containing HRWR admixture Slump Range: (super-plasticizer); 3" for other concrete.

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Air Content: 4% to 7%.

Water - Cement Ratio: 0.45

PART 3 - EXECUTION

SURFACE PREPARATION:

Remove loose material from compacted subbase surface immediately before placing concrete.

Proof-roll prepared subbase surface to check for unstable areas and need for additional compaction. Do not begin paving work until such conditions have been corrected and are ready to receive paving.

FORM CONSTRUCTION:

Set forms to required grades and lines, rigidly braced and secured. Install sufficient quantity of forms to allow continuous progress of work and so that forms can remain in place at least 24 hours after concrete placement.

Check completed formwork for grade and alignment to following tolerances:

Top of forms not more than 1/8" in 10'.

Vertical face on longitudinal axis, not more than 1/4" in

Clean forms after each use, and coat with form release agent as often as required to ensure separation from concrete without damage.

REINFORCEMENT:

Locate, place and support reinforcement as in Division-3 sections, unless otherwise indicated.

CONCRETE PLACEMENT:

General: Comply with requirements of Division-3 sections for mixing and placing concrete, and as herein specified.

Do not place concrete until subbase and forms have been checked for line and grade. Moisten subbase if required to provide a uniform dampened condition at time concrete is placed. Do not place concrete around manholes or other structures until they are at required finish elevation and alignment.

Place concrete using methods which prevent segregation of mix. Consolidate concrete along face of forms and adjacent to transverse joints with internal vibrator. Keep vibrator away from joint assemblies, reinforcement, or side forms. Use only square-faced shovels for hand-spreading and consolidation. Consolidate with care to prevent dislocation of reinforcing, dowels, and joint devices.

Use bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surface.

Deposit and spread concrete in a continuous operation between transverse joints, as far as possible. If interrupted for more than 1/2-hour, place a construction joint.

When adjacent pavement lanes are placed in separate pours, do not operate equipment on concrete until pavement has attained sufficient strength to carry loads without injury.

<u>Curbs</u> <u>and</u> <u>Gutters</u>: Automatic machine may be used for curb and gutter placement at Contractor's option. If machine placement is to be used, submit revised mix design and laboratory test results which meet or exceed minimums specified. Machine placement must produce curbs and gutters to required cross-section, lines, grades, finish, and jointing as specified for formed concrete. If results are not acceptable, remove and replace with formed concrete as specified.

JOINTS:

 General: Construct expansion, weakened-plane (contraction), and construction joints true-to-line with face perpendicular to surface of concrete. Construct transverse joints at right angles to the centerline, unless otherwise indicated.

When joining existing structures, place transverse joints to align with previously placed joints, unless otherwise indicated.

<u>Weakened-Plane (Contraction)</u> <u>Joints:</u> Provide weakened- plane (contraction) joints, sectioning concrete into areas as shown on drawings. Construct weakened-plane joints for a depth equal to at least 1/4 concrete thickness, as follows:

<u>Tooled Joints:</u> Form weakened-plane joints in fresh concrete by grooving top portion with a recommended cutting tool and finishing edges with a jointer.

<u>Sawed Joints</u>: Form weakened-plane joints using powered saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut joints into hardened concrete as soon as surface will not be torn, abraded, or otherwise damaged by cutting action.

Construction Joints: Place construction joints at end of

placements and at locations where placement operations are stopped for a period of more than 1/2-hour, except where such placements terminate at expansion joints.

Construct joints as shown or, if not shown, use standard metal keyway-section forms.

Where load transfer-slip dowel devices are used, install so that one end of each dowel bar is free to move.

Expansion Joints: Provide premolded joint filler for expansion joints abutting concrete curbs, catch basins, manholes, inlets, structures, walks and other fixed objects, unless otherwise indicated.

Extend joint fillers full-width and depth of joint, and not less than 1/2" or more than 1" below finished surface where joint sealer is indicated. If no joint sealer, place top of joint filler flush with finished concrete surface.

Furnish joint fillers in one-piece lengths for full width being placed, wherever possible. Where more than one length is required, lace or clip joint filler sections together.

Protect top edge of joint filler during concrete placement with a metal cap or other temporary material. Remove protection after concrete has been placed on both sides of joint.

<u>Fillers</u> and <u>Sealants</u>: Comply with the requirements of applicable Division-7 sections for preparation of joints, materials, installation, and performance.

CONCRETE FINISHING:

After striking-off and consolidating concrete, smooth surface by screeding and floating. Use hand methods only where mechanical floating is not possible. Adjust floating to compact surface and produce uniform texture.

After floating, test surface for trueness with a 10' straightedge. Distribute concrete as required to remove surface irregularities, and refloat repaired areas to provide a continuous smooth finish.

Work edges of slabs, gutters, back top edge of curb, and formed joints with an edging tool, and round to 1/2" radius, unless otherwise indicated. Eliminate tool marks on concrete surface.

After completion of floating and troweling when excess moisture or surface sheen has disappeared, complete surface finishing, as follows:

Broom finish, by drawing a fine-hair broom across concrete

surface, perpendicular to line of traffic. Repeat operation if required to provide a fine line texture acceptable to Architect.

On inclined slab surfaces, provide a coarse, non-slip finish by scoring surface with a stiff-bristled broom, perpendicular to line of traffic.

Do not remove forms for 24 hours after concrete has been placed. After form removal, clean ends of joints and point-up any minor honeycombed areas. Remove and replace areas or sections with major defects, as directed by Architect.

CURING:

<u>Protect</u> <u>and</u> <u>cure</u> finished concrete paving, complying with applicable requirements of Division 3 sections. Use membrane-forming curing and sealing compound or approved moist-curing methods.

Anti-Spalling Treatment: A second coat of curing and sealing compound may be used or an anti-spalling compound applied over concrete cured by continuous moist curing methods. Apply compounds to concrete surfaces no sooner than 28 days after placement, to clean, dry concrete free of oil, dirt, and other foreign material. Apply curing and sealing compound at a maximum coverage rate of 300 sq. ft./gallon. Apply anti-spalling compound in two sprayed applications. First application at rate of 40 sq. yds. per gal; second application, 60 sq. yds. per gallon. Allow complete drying between applications.

REPAIRS AND PROTECTIONS:

Repair or replace broken or defective concrete, as directed by Architect.

<u>Drill test cores</u> where directed by Architect, when necessary to determine magnitude of cracks or defective areas. Fill drilled core holes in satisfactory pavement areas with portland cement concrete bonded to pavement with epoxy adhesive.

<u>Protect</u> concrete from damage until acceptance of work. Exclude traffic from pavement for at least 14 days after placement. When construction traffic is permitted, maintain pavement as clean as possible by removing surface stains and spillage of materials as they occur.

Sweep concrete pavement and wash free of stains, discolorations, dirt and other foreign material just prior to final inspection.

END OF SECTION 02514

SECTION 02515 - UNIT PAVERS

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PART 1 - GENERAL

RELATED DOCUMENTS:

 Drawings and general provisions of Contract, including General and Special Conditions and Division-1 Specification sections, apply to work of this section.

DESCRIPTION OF WORK:

Extent of unit pavers is indicated on the drawings.

Types of unit pavers and applications include the following.

Concrete pavers, ungrouted mortarless applications.

QUALITY ASSURANCE:

 <u>Installer Qualifications</u>: Engage an installer who has successfully completed within the last 3 years at least 3 unit paver applications similar in type and size to that of this project and who will assign mechanics from these earlier applications to this project, of which one will serve as lead mechanic.

<u>Do not change</u> source of brands for paver units during progress of work.

SUBMITTALS:

 <u>Product</u> <u>Data</u>: Submit manufacturer's technical data for each manufactured product, including certification that each product complies with specified requirements.

<u>Samples</u> <u>for Verification Purposes</u>: Submit samples made up of actual unit pavers for each type, color and texture required. Include in each set of samples the full range of exposed color and texture to be expected in the completed work.

DELIVERY, STORAGE AND HANDLING:

<u>Protect</u> <u>unit</u> <u>pavers</u> during storage and construction against wetting by rain, snow or ground water and against soilage or intermixture with earth or other types of materials.

-

PROJECT CONDITIONS:

Cold Weather Protection:

Frozen Materials: Do not use frozen materials or materials mixed or coated with ice or frost.

Frozen Work: Do not build on frozen subgrade or setting beds. Remove and replace unit paver work damaged by frost or freezing.

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PART 2 - PRODUCTS

UNIT PAVERS:

Concrete Pavers: Solid units in sizes and shapes indicated, with a minimum compressive strength of 5,000 p.s.i., maximum absorption of 5% and maximum tolerance of 1/16" in any direction.

Color and Texture: Match Architect's sample.

Manufacturer: Subject to compliance with requirements, provide products of one of the following: At the option of the Contractor, the Contractor may elect to utilize locally produced precast concrete paving units provided they meet the minimum specifications, herein.

Concrete Pavers:

Hastings Pavement Co. Hanover Prest Paving Co.

PART 3 - EXECUTION

INSTALLATION, GENERAL:

 Do not use unit pavers with chips, cracks, voids, discolorations or other defects which might be visible or cause staining in finished work.

<u>Set unit pavers</u>, level, and firmly bedded on compacted subgrade, in patterns shown and with uniform joints of width indicated.

After placement, carefully backfill with topsoil as indicated on the drawings. Coordinate placement of backfill and sodwork with Landscape Contractor.

REPAIR, POINTING, CLEANING AND PROTECTION:

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Remove and replace unit pavers which are loose, chipped, broken, stained or otherwise damaged, or if units do not match adjoining units as intended. Provide new units to match adjoining units and install in same manner as original units, with same joint treatment to eliminate evidence of replacement.

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Cleaning: Remove dirt from exposed surfaces, wash and scrub clean.

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Provide final protection and mantain conditions in a manner acceptable to Installer, which ensures unit paver work being without damage or deterioration at time of substantial completion.

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19 END OF SECTION 02515

SECTION 02700 - SITE IMPROVEMENTS

PART 1 - GENERAL

RELATED DOCUMENTS:

 Drawings and general provisions of the Contract, including General and Special Conditions and Division-1 Specification sections, apply to work specified in this section.

DESCRIPTION OF WORK:

 Extent of site improvement work is shown on the drawings. Work included under this section includes all site improvement work in connection with the completed site development. Items include, but are not necessarily limited to the following:

Modular Precast Concrete Retaining Walls.

Precast Concrete Retaining Walls.

Exterior Benches.

Exterior Trash Receptacles.

Handicapped Parking Signs.

Traffic Signs.

SUBMITTALS:

Furnish test reports as required in referenced sections for concrete and provide shop drawings for benches, trash receptacles, signage, and modular retaining wall units. Furnish color samples for bench color and modular retaining wall units.'

JOB CONDITIONS:

Coordinate carefully the work specified in this section with that of other trades in connection with the provisions of openings, setting of anchoring devices, or mechanical or electrical work to be built into or concealed by site improvements and that of other trades.

PART 2 - PRODUCTS

MATERIALS:

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General: Materials and workmanship required for site improvements work specified hereunder shall conform to similar work requirements for included in the building as specified under construction other sections of specifications. Applicable references include, but are not necessarily limited to the following:

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Earthwork, including excavation and backfill - Section 02200.

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Concrete work, including forms, reinforcement, concrete, finishes, etc.. - Division 3.

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Painting is specified in Section 09900.

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Structural steel work is specified in Section 05120.

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Architectural Precast is specified in Division 3.

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Foundation Drainage is specified in Section 02710.

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PART 3 - EXECUTION

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EXTERIOR BENCHES:

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General: Furnish and install three (3) at exterior locations where shown on the Drawings. Verify final locations in the field with Architect.

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Benches shall consist of a straight run of 3 units each of Landscape Forms, Inc., Model 35 LXG-F, with type XE support.

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Provide manufacturer's standard bright red finish.

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Install benches in strict accordance with manufacturer's instructions and as detailed on the Drawings.

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MODULAR PRECAST RETAINING WALL:

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General: Provide and install modular precast concrete retaining wall units at locations shown and as detailed on the Drawings.

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Provide standard "Mini Loffel" units as manufactured by Paver Systems, Inc. or "Multi Wall" units as manufactured by Interpave Corporation. Unit color shall match color of building architectural precast concrete.

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Prepare subgrade in conformance with applicable provisions of Section 02200, Earthwork.

Firmly bed bottom course of units on compacted subgrade, and provide perforated drain tile and drainage fill as indicated. Place all units level and plumb, carefully backfilling each unit with topsoil as each course of units is placed. Do not utilize cracked or broken units.

PRECAST CONCRETE RETAINING WALL:

General: Construct precast concrete retaining walls at exterior locations where shown and as detailed on the drawings.

Excavate for footings to dimensions shown and prepare subgrade in accordance with applicable requirements of Section 02200.

Concrete footing shall bear in earth, with bottom of footing a minimum of 2'-6" below finish grade.

Properly brace sign panels to maintain alignment during placing of concrete grout.

Top of wall shall be level and conform to grade elevations shown.

Architectural precast work shall comply with applicable requirements Division 3 for similar work.

Provide color, aggregate and finish to match building precast.

Provide and install perforated drain tile, drainage fill, and backfill in accordance with the applicable provisions of Section 02710, Foundation Drainage, and Section 02200, Earthwork.

HANDICAPPED PARKING SIGNS:

General: Provide and install handicapped parking signs and supports at locations shown and as detailed on the drawings.

Supports shall be $2"x2" \times 11$ gauge galvanized steel tubing at length shown, with capped upper end, and shall be drilled for bolt attachment at signs.

Finish posts with one (1) coat of primer and two (2) coats of gloss white enamel. Primer shall be "Dap Galva-Grip" or "Degreco #561".

Set tubular steel supports in concrete footings, 6" above bottoms of footings, bevel tops of footings to 1" above finish grade at support, and trowel smooth.

52 Standard aluminum sign plates shall be at size and layout shown 53 on the drawings, and shall be similar to Model PHP75 as 54 manufactured by the Supersine Company. 1
2 Install signs using galvanized steel, round-head bolts of proper
3 size. Nick threads to prevent removal of signs.
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6 TRAFFIC SIGNS:

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General: Provide and install traffic signs and supports where shown and as detailed on the drawings.

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Supports shall be 2"x2"x11 gauge galvanized steel tubing at length shown, with capped upper end, and shall be drilled for bolt attachment at signs.

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Set tubular steel supports in concrete footings, 6" above bottoms of footings, bevel tops of footings to 1" above finish grade at support, and trowel smooth.

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Standard aluminum sign plates shall be at size and layout shown on the drawings. Finishes and colors shall be of reflex reflective material complying with the applicable portions of Section 830, Kentucky Department of Transportation Standard Specifications for Road and Bridge Construction.

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END OF SECTION 02700

SECTION 02710 - FOUNDATION DRAINAGE

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PART 1 - GENERAL

RELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Special Conditions and Division-1 Specification sections, apply to work specified in this section.

DESCRIPTION OF WORK:

Extent of foundation drainage system work is shown on drawings.

Foundation drainage work includes the following:

Footing drainage system.

SUBMITTALS:

Certification: Submit Certification signed by Contractor and foundation drainage system Installer that installed materials conform to specified requirements and system was successfully checked and tested prior to covering with filtering and drainage fill.

PART 2 - PRODUCTS

DRAINAGE PIPE AND FITTINGS:

 Furnish drainage pipe of one of the following materials complete with bends, reducers, adapters, couplings, collars, and joint materials. Provide non perforated piping to outfall connections and perforated pipe adjacent to foundation walls, as indicated.

Clay Drain Tile: ASTM C 4, "Standard-Quality".

Concrete Drain Tile: ASTM C 412, "Standard Quality".

<u>Perforated Clay Pipe:</u> ASTM C 700, "Standard-Strength", unglazed.

Perforated Concrete Pipe: ASTM C 444, Type 1, and applicable requirements of ASTM C 14, Class 2.

SOIL MATERIALS:

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compacting to a dense composite.

Drainage Fill: Evenly graded mixture of natural or crushed gravel, or crushed stone, and natural sand with 100% passing a 1/2" sieve and 0-5% passing a No. 50 sieve.

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53 54 Filtering Material: Evenly graded mixture of natural or crushed gravel, or crushed stone, and natural sand, with 100% passing a 1-1/2" sieve and 0-5% passing a No. 50 sieve.

PART 3 - EXECUTION

Impervious Fill:

INSTALLATION: Impervious Fill at Footings: After concrete footings have been

Clayey gravel and sand mixture capable of

cured and forms removed, place impervious fill material on subgrade adjacent to bottom of footing. Place and compact impervious fill to dimensions indicated or, if not indicated, not less than 6" deep and 12" wide.

Filtering Material: Place supporting layer of filtering material over compacted subgrade where drainage pipe is to be laid to depth indicated or, if not indicated, to a compacted depth of not less than 4".

After testing drain lines, place additional filtering material to a 4" depth around sides and top of drains.

Laying Drain Pipe: Lay drain pipe solidly bedded in filtering Provide full bearing for each pipe section throughout its length, to true grades and alignment, and continuous slope in direction of flow.

<u>Lay perforated</u> <u>pipe</u> with perforations down and joints tightly closed in accordance with pipe manufacturers recommendations. Provide collars and couplings as required.

Provide recesses in excavation bottom to receive bells for drain pipe having bell and spigot ends. Lay pipe with bells facing up slope with spigot end entered fully into adjacent bell. Seal joint in accordance with local practices having jurisdiction.

Testing Drain Lines: Test or check lines before backfilling to assure free flow. Remove obstructions, replace damaged components, and retest system until satisfactory.

Drainage Fill: Place drainage fill over drain lines after satisfactory testing and covering of drain lines with filtering material. Completely cover drain lines to a width of at least 6" on each side and above top of pipe to within 12" of finish grade. Place fill material in layers not exceeding 3" in loose depth and compact each layer placed.

<u>Fill to Grade</u>: Apply impervious fill material over compacted drainage fill at footing drains, placing material in layers not exceeding 6" in loose depth and thoroughly compacting each layer. Carry impervious fill to indicated finish elevations and slope away from building perimeter.

END OF SECTION 02710

SECTION 02720 - STORM SEWAGE SYSTEMS

PART 1 - GENERAL

RELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Special Conditions and Division-1 Specification sections, apply to work of this section.

DESCRIPTION OF WORK:

Extent of storm sewage systems work is indicated on drawings and schedules, and by requirements of this section.

Refer to Division-2 section "Earthwork" for excavation and backfill required for storm sewage systems.

Comply with Division-3 sections for concrete work required for storm sewage systems.

QUALITY ASSURANCE:

 Manufacturer's Qualifications: Firms regularly engaged in manufacture of storm sewage system's products of types, materials, and sizes required, whose products have been in satisfactory use in similar service for not less than 5 years.

<u>Installer's Qualifications</u>: Firm with at least 3 years of successful installation experience on projects with storm sewage work similar to that required for project.

Codes and Standards:

<u>Plumbing Code Compliance</u>: Comply with applicable portions of Kentucky Plumbing Code pertaining to selection, installation, and testing of storm sewage system's materials and products.

SUBMITTALS:

<u>Product Data:</u> Submit manufacturer's technical product data and installation instructions for storm sewage system materials and products.

Shop Drawings: Submit shop drawings for storm sewage systems, showing details of underground precast concrete structures, frames and grates, and manhole steps.

<u>Record Drawings</u>: At project closeout, submit record drawings of installed storm sewage piping and products, in accordance with requirements of Division 1.

Maintenance Data: Submit maintenance data and parts lists for storm sewage system materials and products. Include this data, product data, shop drawings, and record drawings in maintenance manual; in accordance with requirements of Division 1.

PART 2 - PRODUCTS

PIPES AND PIPE FITTINGS:

 <u>General</u>: Provide pipes, as indicated on the Drawings, of the following materials, of weight/class indicated. Provide pipe fittings and accessories of same material and weight/class as pipes, with joining method as indicated.

Reinforced Concrete Pipe: ASTM C 76, Class III unless otherwise indicated.

<u>Fittings</u>: Reinforced concrete, same strength as adjoining pipe, tongue-and-groove gasketed joints complying with ASTM C 443.

<u>Cast Iron Soil Pipe</u>: ASTM A 74, hub and spigot ends, service weight unless otherwise indicated.

<u>Fittings</u>: Cast-iron hub and spigot complying with ASTM A 74; lead/oakum caulked joints, or compression joints with rubber gaskets complying with ASTM C 564.

STORM SEWER MANHOLES:

General: Provide precast reinforced concrete storm sewer manholes as indicated, complying with ASTM C 478.

<u>Top</u>: Precast concrete, with concentric cone, eccentric cone, or flat slab type top, as indicated.

 Base: Cast in place concrete as indicated or at Contractor's option, precast concrete, with base riser section and separate base slab, or base riser section with integral floor, may be utilized. For cast in place concrete utilize concrete which will attain a 28 day compressive strength of 2,800 p.s.i.

Steps: Ductile-iron, Neenah R 1980 E or approved equal, integrally cast into manhole sidewalls.

Frame and Cover: Ductile-iron, Neenah R 1100 with Type B lid,

1 HOE MC 350, or approved equal, heavy-duty, indented top design, 2 with lettering cast into top reading "STORM SEWER".

Pipe Connections: Resilient, complying with ASTM C 923.

CATCH BASINS:

General: Provide precast reinforced concrete catch basins as indicated.

Basin: Precast reinforced concrete, 36" diameter, flat slab top, base riser section with integral floor.

<u>Steps</u>: Ductile-iron Neenah R 1980E or approved equal, integrally cast into catch basin sidewalls. Provide only where catch basin depth exceeds 48 inches.

Frame and Grate: Ductile-iron, Neenah R 2100 with Type B grate, HOE MCB 350 with CV grate, or approved equal, heavy-duty.

Pipe Connectors: Resilient, complying with ASTM C 923.

CURB INLETS:

General: Provide curb inlets as indicated.

<u>Basin</u>: Cast in place concrete or at Contractors option, a precast reinforced concrete basin similar to "cloud" Type F curb box may be utilized. Use concrete which will attain a minimum 28 day compressive strength of 3,000 p.s.i.

Frame and Grate: Ductile-iron, heavy duty, HOE KY 465 or approved equal.

Pipe Connectors: Resilient, complying with ASTM C923.

TRENCH DRAIN SYSTEM:

General: Provide trench drain system as indicated, with cast-in-place basin and gratings constructed of cast-iron.

<u>Basin</u>: Cast-in-place concrete as detailed, provide concrete which will obtain a minimum compressive strength at 28 days of 4000 psi.

Grates: Neenah R4990, with Type X and Type "A" grate frame and bolted down covers or approved equal. Cast-iron, heavy-duty, designed to set on channel top without rocking or rattling.

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PLANTER AND SURFACE INLETS:

General: Provide planter drains and surface inlets as indicated.

<u>Surface Inlet</u>: Polished bronze gratings with cast iron bottom and secured grate, similar to "Zurn" Model Z-520 with 10" diameter grate and vandal proof screws.

<u>Planter Drain:</u> Polished bronze dome with cast iron bottom, similar to "Zurn" Model Z352, 6" diameter planting area drain.

PART 3 - EXECUTION

INSTALLATION OF PIPE AND PIPE FITTINGS:

General: Install piping in accordance with governing authorities having jurisdiction, except where more stringent requirements are indicated.

Utilities Contractor to make roof drain connections to storm sewers.

Inspect piping before installation to detect apparent defects.
Mark defective materials with white paint and promptly remove
from site.

Lay piping beginning at low point of system, true to grades and alignment indicated, with unbroken continuity of invert.

Place bell ends or groove ends of piping facing upstream.

<u>Install</u> <u>gaskets</u> in accordance with manufacturer's recommendations for use of lubricants, cements, and other special installation requirements.

<u>Cast-Iron</u> <u>Soil</u> <u>Pipe:</u> Install in accordance with applicable provisions of CISPI "Cast Iron Soil Pipie and Fittings Handbook".

<u>Concrete Pipe:</u> Install in accordance with applicable provisions of ACPA "Concrete Pipe Installation Manual".

<u>Cleaning Piping:</u> Clean interior of piping of dirt and other superfluous material as work progresses. Maintain swab or drag in line and pull past each joint as it is completed.

In large, accessible piping, brushes and brooms may be used for cleaning.

Place plugs in ends of uncompleted conduit at end of day or

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Flush lines between manholes if required to remove collected debris.

Joint Adaptors: Make joints between different types of pipe with standard manufactured adapters and fittings intended for that purpose.

Closing Abandoned Utilities: Close open ends of abandoned underground utilities which are indicated to remain in place. Provide sufficiently strong closures to withstand hydro-static or earth pressure which may result after ends of abandoned utilities have been closed.

Close open ends of concrete or masonry utilities with not less than 8" thick brick masonry bulkheads.

Close open ends of piping with threaded metal caps, plastic plugs, or other acceptable methods suitable for size and type of materials being closed. Wood plugs are not acceptable.

Interior Inspection: Inspect piping to determine whether line displacement or other damage has occurred.

Make inspections after lines between manholes, or manhole locations, have been installed and approximately 2' of backfill is in place, and again at completion of project.

If inspection indicated poor alignment, debris, displaced pipe, infiltration or other defects, correct such defects, and reinspect.

PRECAST CONCRETE MANHOLES:

General: Place precast concrete sections as indicated. Set tops of frames and covers flush with finish surface.

Install in accordance with ASTM C 891.

Construct manhole flow channels of concrete, smoothly finished and to semi-circular section conforming to the inside diameters of the connecting sewers. Make changes in size and grade gradually, and changes in direction by true curves. Provide channels for all connecting sewers to manhole.

Provide rubber joint gasket complying with ASTM C 443 at joints of sections.

CATCH BASINS:

General: Construct catch basins to sizes and shapes indicated.

Set frames and grates to elevations indicated.

TRENCH DRAIN SYSTEM:

General: Construct to size and shapes indicated.

10 <u>Set frames</u> and grates to elevations indicated.

SURFACE INLETS AND PLANTER DRAINS:

General: Place frame and grate and construct concrete collar surrounding frame as shown on drawings. Coordinate placement of surface inlets to insure inlets fit within paving grid where applicable. Adjust grate as required to exactly match finish grade.

TAP CONNECTIONS:

Make connections to existing piping and underground structures, so that finished work will conform as nearly as practicable to requirements specified for new work.

For branch connections from side into existing 24" or larger piping, or to underground structures, cut opening into unit sufficiently large to allow 3" of concrete to be packed around entering connections. Cut ends of connection passing through pipe or structure wall to conform to shape of and be flush with inside wall, unless otherwise indicated. On outside of pipe or structure wall, encase entering connection in 6" of concrete for minimum length of 12" to provide additional support or collar from connection to undisturbed ground.

Provide concrete which will attain minimum 28-day compressive strength of 3000 psi, unless otherwise indicated.

Use epoxy bonding compound as interface between new and existing concrete and piping materials.

 Take care while making tap connections to prevent concrete or debris from entering existing piping or structure. Remove debris, concrete, or other extraneous material which may accumulate.

BACKFILLING:

General: Conduct backfill operations of open-cut trenches

closely following laying, jointing, and bedding of pipe, and after initial inspection and testing are completed.

To minimize local area traffic interruptions, allow no more

than 100' between pipe laying and point of complete

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FIELD QUALITY CONTROL:

backfilling.

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<u>Testing</u>: Perform testing of completed piping in accordance with local authorities having jurisdiction.

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END OF SECTION 02720.

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SECTION 03310 - CONCRETE WORK

PART 1 - GENERAL

RELATED DOCUMENTS:

 Drawings and general provisions of Contract, including General and Special Conditions and Division-1 Specification sections, apply to work of this section.

SUMMARY:

Extent of concrete work shown on drawings.

Concrete paving and walks are specified in Division 2.

Precast concrete is specified in other Division-3 sections.

Special concrete finishes and concrete floor toppings are specified in other Division-3 sections.

SUBMITTALS:

<u>Product Data:</u> Submit data for proprietary materials and items, including reinforcement and forming accessories, admixtures, patching compounds, waterstops, joint systems, curing compounds, and others as requested by Architect.

Shop Drawings; Reinforcement: Submit original shop drawings prepared by registered Professional Engineer for fabrication, bending, and placement of concrete reinforcement. Comply with ACI 315 "Manual of Standard Practice for Detailing Reinforced Concrete Structures" showing bar schedules, stirrup spacing, diagrams of bent bars, arrangement of concrete reinforcement. Include special reinforcement required for openings through concrete structures.

<u>Laboratory Test Reports</u>: Submit laboratory test reports for concrete materials and mix design test.

Material Certificates: Provide materials certificates in lieu materials laboratory when permitted test reports Architect. Material certificates shall be signed manufacturer and Contractor, certifying that each material item complies with, or exceeds, specified requirements. certification from admixture manufacturers that chloride content complies with specification requirements.

QUALITY ASSURANCE:

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<u>Codes and Standards</u>: Comply with provisions of following codes, specifications, and standards, except where more stringent requirements are shown or specified:

ACI 301 "Specifications for Structural Concrete for Buildings".

ACI 318 "Building Code Requirements for Reinforced Concrete."

Concrete Reinforcing Steel Institute, (CRSI) "Manual of Standard Practice".

<u>Concrete</u> <u>Testing</u> <u>Service</u>: Engage a testing laboratory acceptable to Architect to perform material evaluation tests and to design concrete mixes.

<u>Materials and installed work</u> may require testing and retesting at anytime during progress of work. Tests, including retesting of rejected materials for installed work, shall be done at Contractor's expense.

PROJECT CONDITIONS:

<u>Protection</u> of <u>Footings</u> <u>Against Freezing</u>: Cover completed work at footing level with sufficient temporary or permanent cover as required to protect footings and adjacent subgrade against possibility of freezing; maintain cover for time period as necessary.

<u>Protect</u> adjacent finish materials against spatter during concrete placement.

PART 2 - PRODUCTS

FORM MATERIALS:

Forms for Exposed Finish Concrete: Plywood, metal, metal-framed plywood faced, or other acceptable panel-type materials, to provide continuous, straight, smooth, exposed surfaces. Furnish in largest practicable sizes to minimize number of joints and to conform to joint system shown on drawings.

<u>Use plywood</u> complying with U.S. Product Standard PS-1 "B-B (Concrete Form) Plywood", Class I, Exterior Grade or better, mill-oiled and edge-sealed, with each piece bearing legible inspection trademark.

Forms for Unexposed Finish Concrete: Plywood, lumber, metal, or other acceptable material. Provide lumber dressed on at least 2

edges and one side for tight fit.

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Form for Exposed Underside of Pedestrian Walkway Floor Slab and Roof Slab: Forms shall be molded fiberglass. Sizes shall be as shown on drawings.

Forms for Textured Finish Concrete: Units of face design, size, arrangement and configuration to match Architect's control sample. Provide solid backing and form supports to ensure stability of textured form liners.

Forms for Cylindrical Columns and Supports: Metal, fiberglass reinforced plastic, or paper or fiber tubes. Construct paper or fiber tubes of laminated plies using water-resistant adhesive with wax-impregnated exterior for weather and moisture protection. Provide units with sufficient wall thickness to resist loads imposed by wet concrete without deformation.

<u>Form Coatings</u>: Provide commercial formulation form-coating compounds that will not bond with, stain nor adversely affect concrete surfaces, and will not impair subsequent treatments of concrete surfaces.

Forms Ties: Factory-fabricated, adjustable-length, removable or snapoff metal form ties, designed to prevent form deflection and to prevent spalling concrete upon removal. Provide units which will leave no metal closer than 1-1/2" to surface.

Provide ties which, when removed, will leave holes not larger than 1" diameter in concrete surface.

REINFORCING MATERIALS:

Reinforcing Bars: ASTM A 615, Grade 60, deformed.

Steel Wire: ASTM A 82, plain, cold-drawn steel.

Welded Wire Fabric: ASTM A 185, welded steel wire fabric.

<u>Supports</u> <u>for Reinforcement:</u> Bolsters, chairs, spacers and other devices for spacing, supporting and fastening reinforcing bars and welded wire fabric in place. Use wire bar type supports complying with CRSI specifications.

For <u>slabs-on-grade</u>, use supports with sand plates or horizontal runners where base material will not support chair legs.

For exposed-to-view concrete surfaces, where legs of supports are in contact with forms, provide supports with legs which are plastic protected (CRSI, Class I) or stainless steel

protected (CRSI, Class 2).

CONCRETE MATERIALS:

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Portland Cement: ASTM C 150, Type I.

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Use one brand of cement throughout project, unless otherwise acceptable to Architect.

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Normal Weight Aggregates: ASTM C 33, and as herein specified. Provide aggregates from a single source for exposed concrete.

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Water: Drinkable.

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Air-Entraining Admixture: ASTM C 260, certified by manufacturer to be compatible with other required admixtures.

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Available Products: Subject to compliance with requirements, products which may be incorporated in the work include, but are not limited to, the following:

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"Air-Mix": Euclid Chemical Co.

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"Air-Tite"; Gifford-Hill/American Admixtures.
"Darex AEA" or "Daravair"; W.R. Grace.

"Edoco 2001 or 2002"; Edoco Technical Products.

"MB-VR or MB-AE"; Master Builders. "Sika Aer"; Sika Corp.

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Water-Reducing Admixture: ASTM C 494, Type A, and containing not more than 0.1 percent chloride ions.

Available Products: Subject to compliance with requirements, products which may be incorporated in the work include, but are not limited to, the following:

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"Chemtard"; Chem-Masters Corp.

"Eucon WR-75"; Euclid Chemical Co.

"Plastocrete 160;" Sika Chemical Corp.

"Pozzolith Normal"; Master Builders.

"Pro-Kete-N"; Protex Industries, Inc.

"PSI N"; Gifford-Hill/American Admixtures

"WRDA Hycol"; W.R. Grace.

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High-Range Water-Reducing Admixture (Super Plasticizer): 494, Type F or Type G and containing not more than 0.1 percent chloride ions.

CONCRETE WORK

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Available Products: Subject to compliance with requirements, products which may be incorporated in the work include, but are not limited to, the following:

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"Eucon 37"; Euclid Chemical Co. "Mighty 150"; ICI Americas Corp.

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"PSI Super"; Gifford-Hill.
"PSP"; Protex Industries Inc.
"Rheobuild"; Master Builders.
"Sikament"; Sika Chemical Corp.
"Super P"; Anti-Hydro.
"WRDA 19" or "Duracem"; W.R. Grace.
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Water Reducing, Non-Chloride Accelerator Admixture: ASTM C 494, Type E, and containing not more than 0.1 percent chloride ions.

<u>Available Products</u>: Subject to compliance with requirements, products which may be incorporated in the work include, but are not limited to, the following:

"Accelguard 80"; Euclid Chemical Co.
"Gilco Accelerator"; Gifford-Hill/American Admixtures
"Pozzolith High Early"; Master Builders.

<u>Water-Reducing</u>, <u>Retarding</u> <u>Admixture</u>: ASTM C 494, Type D, and contain not more than 0.1 percent chloride ions.

<u>Available Products:</u> Subject to compliance with requirements, products which may be incorporated in the work include, but are not limited to, the following:

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"Daratard"; W.R. Grace.
"Edoco 20006"; Edoco Technical Products.
"Eucon Retarder 75"; Euclid Chemical Co.
"Plastiment"; Sika Chemical Co.
"Pozzolith Retarder"; Master Builders.
"Protard"; Protex Industries, Inc.
"PSI R"; Gifford-Hill/American Admixtures.
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<u>Prohibited Admixtures:</u> Calcium chloride thyocyanates or admixtures containing more than 0.1 percent chloride ions are not permitted.

<u>Fibrous</u> <u>Reinforcement</u>: Collated, fibrillated, polypropylene fibers for secondary reinforcement of concrete slabs.

<u>Available Products</u>: Subject to compliance with requirements, products which may be incorporated in the work include, but are not limited to, the following:

"Fibermesh"; Fibermesh, Inc. "Forta CR"; Forta Corp.

RELATED MATERIALS:

Reglets: Where resilient or elastomeric sheet flashing or bituminous membranes are terminated in reglets, provide reglets of not less than 26 gage galvanized sheet steel. Fill reglet or cover face opening to prevent intrusion of concrete or debris.

<u>Waterstops</u>: Provide flat, dumbbell type or centerbulb type waterstops at construction joints and other joints as indicated. Size to suit joints.

Rubber Waterstops:

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 <u>Available Manufacturers</u>: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include; but are not limited to, the following:

Edoco Technical Products. Progress Unlimited. The Burke Co. Williams Products.

Polyvinyl Chloride Waterstops:

<u>Available Manufacturers</u>: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include; but are not limited to, the following:

AFCO Products.
Edoco Technical Products.
Greenstreet Plastic Products.
Harbour Town Products.
Progress Unlimited.
Schliegel Corp.
The Burke Co.
Vinylex Corp.
W.R. Meadows.

Granular Base: Evenly graded mixture of fine and coarse aggregates to provide, when compacted, a smooth and even surface below slabs on grade.

<u>Vapor Retarder</u>: Provide vapor retarder cover over prepared base material where indicated below slabs on grade. Use only materials which are resistant to decay when tested in accordance with ASTM E 154, as follows:

Polyethylene sheet not less than 8 mils thick.

Non-Shrink Grout: CRD-C 621, factory pre-mixed grout.

<u>Available Products</u>: Subject to compliance with requirements, products which may be incorporated in the work include, but are not limited to, the following:

Non-metallic

"Crystex" L & M Cons. Chemical Co.

CONCRETE WORK

408 "Euco-NS"; Euclid Chemical Co. 1 "Five Star Grout"; U.S. Grout Corp. 2 "Horngrout"; A.C. Horn, Inc. "Set Grout"; Master Builders. 3 4 "Sonogrout"; Sonneborn-Rexnord. 5 "Supreme"; Gifford-Hill/American Admixtures. 6 "Sure-Grip Grout", Dayton Superior Corp. 7 8 Chemical Hardener: Colorless aqueous solution containing a 9 blend of magnesium flousilicate and zinc flousilicate combined 10 with a wetting agent, containing not less than 2 lbs. of 11 flousilicates per gal. 12 13 Products: Subject to compliance with requirements, provide 14 one of the following: 15 16 "Burk-O-Lith"; The Burke Co. 17 "Lapidolith"; Sonneborne-Rexnord. 18 "Saniseal"; Master Builders. 19 "Surfhard"; Euclid Chemical Co. 20 21 Non-slip Aggregate Finish: Provide fused aluminum oxide grits, 22 or crushed emery, as abrasive aggregate for non-slip finish with 23 emery aggregate containing not less than 40 percent aluminum 24 oxide and not less than 25 percent ferric oxide. Use material 25 that is factory-graded, packaged, rust-proof and non-glazing, 26 and is unaffected by freezing, moisture, and cleaning materials. 27 28 Moisture-Retaining Cover: One of the following, complying with 29 30 ASTM C 171. 31 32 Waterproof paper. 33 34 Polyethylene film. 35 Polyethylene-coated burlap. 36 37 Liquid Membrane-Forming Curing Compound: Liquid type membrane-38 forming curing compound complying with ASTM C 309, Type I, Class 39 A. Moisture loss not more than 0.055 gr./sq. cm. when applied at 40 41 200 sq. ft./gal. 42 Available Products: Subject to compliance with requirements, 43 products which may be incorporated in the work include, but 44 45 are not limited to, the following: 46 47 "A-H 3 Way Sealer"; Anti-Hydro Waterproofing Co. "Clear Seal"; A.C. Horn, Inc. 48 49

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"A-H 3 Way Sealer"; Anti-Hydro Waterproofing Co
"Clear Seal"; A.C. Horn, Inc.
"Ecocure"; Euclid Chemical Co.
"Hardtop"; Gifford-Hill.
"J-20 Acrylic Cure"; Dayton Superior.
"Klearseal"; Setcon Industries.
"Kure-N-Seal"; Sonneborn-Rexnord.
"L&M Cure"; L & M Construction Chemicals.
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"LR-152"; Protex Industries.
             "Masterseal"; Master Builders.
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             "Polyclear"; Upco Chemical/USM Corp.
"Sealco 309"; Gifford-Hill/American Admixtures.
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             "Sealkure"; Toch Div. - Carboline.
 6
             "Spartan-Cote"; The Burke Co.
 7
     Underlayment Compound: Freeflowing, self-leveling,
                                                                     pumpable
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     cementitious base compound.
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         Available Products: Subject to compliance with requirements,
         products which may be incorporated in the work include, but
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         are not limited to, to the following:
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             "ACD Pourable Underlayment"; ACD International, Inc.
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             "Flo-Top"; Euclid Chemical Co.
"Thoro Underlayment Self-Leveling";
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                                                              Thoro
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                                                                       System
                Products.
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    Bonding Compound: Polyvinyl acetate or acrylic base.
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         Available Products: Subject to compliance with requirements,
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         products which may be incorporated in the work include, but
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         are not limited to, to the following:
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         Polyvinyl Acetate (Interior Only):
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             "Euco Weld"; Euclid Chemical Co.
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             "Weldcrete"; Larsen Products Corp.
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         Acrylic or Styrene Butadiene:
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             "Acrylic Bondcrete"; The Burke Co.
             "Daraweld C"; W.R. Grace
"Everbond"; L & M Construction Chemicals.
"Hornweld"; A.C. Horn, Inc.
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             "J-40 Bonding Agent"; Dayton Superior Corp.
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             "SBR Latex"; Euclid Chemical Co. "Sonocrete"; Sonneborn-Rexnord.
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     Epoxy Adhesive: ASTM C 881, two component material suitable for
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     use on dry or damp surfaces. Provide material "Type", "Grade",
     and "Class" to suit project requirements.
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Products: Subject to compliance with requirements, provide one of the following:

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"Concresive 1001"; Adhesive Engineering Co.
"Edoco 2118 Epoxy Adhesive"; Edoco Technical Prod.
"Epoxtite"; A.C. Horn, Inc.
"Euco Epoxy 452 or 620"; Euclid Chemical Co. "Patch and Bond Epoxy"; The Burke Co.
"Sikadur Hi-Mod"; Sika Chemical Corp.
"Thiopoxy"; W.R. Grace.
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PROPORTIONING AND DESIGN OF MIXES:

Prepare design mixes for each type and strength of concrete by either laboratory trial batch or field experience methods as specified in ACI 301. If trial batch method used, use an independent testing facility acceptable to Architect for preparing and reporting proposed mix designs. The testing facility shall not be the same as used for field quality control testing.

Submit written reports to Architect and Structural Engineer of each proposed mix for each class of concrete at least 15 days prior to start of work. Do not begin concrete production until mixes have been reviewed by Architect.

 $\underline{\text{Design}}$ $\underline{\text{mixes}}$ to provide normal weight concrete with the following properties, as indicated on drawings and schedules:

4000 psi 28-day compressive strength; W/C ratio, 0.44 maximum (non-air-entrained), 0.35 maximum (air-entrained).

3000 psi 28-day compressive strength; W/C ratio, 0.58 maximum (non-air-entrained), 0.46 maximum (air-entrained).

Adjustment to Concrete Mixes: Mix design adjustments may be requested by Contractor when characteristics of materials, job conditions, weather, test results, or other circumstances warrant; at no additional cost to Owner and as accepted by Architect. Laboratory test data for revised mix design and strength results must be submitted to and accepted by Architect before using in work.

Admixtures:

<u>Use water-reducing admixture</u> or high range water-reducing admixture (super plasticizer) in concrete as required for placement and workability.

<u>Use non-chloride accelerating admixture</u> in concrete slabs placed at ambient temperatures below 50 deg F (10 deg C).

<u>Use high-range water-reducing admixture</u> in pumped concrete, concrete for industrial slabs, architectural concrete, parking structure slabs, concrete required to be watertight, and concrete with water/cement ratios below 0.50.

<u>Use air-entraining admixture</u> in exterior exposed concrete, unless otherwise indicated. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having total air content with a tolerance of plus-orminus 1-1/2 percent within following limits:

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deicer chemicals, or subjected to hydraulic pressure: 6% air.

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Other Concrete: (not exposed to freezing, thawing, or hydraulic pressure): 2 percent to 4 percent air.

Concrete structures and slabs exposed to freezing and thawing

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Use admixtures for water-reducing and set-control in strict compliance with manufacturer's directions.

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Slump Limits: Proportion and design mixes to result in concrete slump at point of placement as follows:

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Ramps slabs, and sloping surfaces: Not more than 3", and not less than 1".

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Reinforced foundation systems: Not less than 1" and not more than 3".

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Concrete containing HRWR admixture (super plasticizer): more than 8" after addition of HRWR to verified 2"-3" slump concrete.

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Other Concrete: Not less than 2" nor more than 5".

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CONCRETE MIXING:

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Job-Site Mixing: Mix materials for concrete in appropriate drum type batch machine mixer. For mixers of one cu. yd., or smaller capacity, continue mixing at least 1-1/2 minutes, but not more than 5 minutes after ingredients are in mixer, before any part of batch is released. For mixers of capacity larger than one cu. yd., increase minimum 1-1/2 minutes of mixing time by 15 seconds for each additional cu. yd., or fraction thereof.

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Provide batch ticket for each batch discharged and used in work, indicating project identification name and number, date, mix type, mix time, quantity, and amount of water introduced.

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Ready-Mix Concrete: Comply with requirements of ASTM C 94, and as herein specified.

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During hot weather, or under conditions contributing to rapid setting of concrete, a shorter mixing time than specified in ASTM C 94 may be required.

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PART 3 - EXECUTION

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GENERAL:

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Coordinate the installation of joint materials and vapor retarders with placement of forms and reinforcing steel.

FORMS:

Design, erect, support, brace and maintain formwork to support vertical and lateral, static, and dynamic loads that might be applied until such loads can be supported by concrete structure. Construct formwork so concrete members and structures are of correct size, shape, alignment, elevation and position. Maintain formwork construction tolerances complying with ACI 347.

Design damage to cast-in-place concrete surfaces and adjacent materials.

Construct forms to sizes shapes, lines and dimensions shown, and to obtain accurate alignment, location, grades, level and plumb work in finished structures. Provide for openings, offsets, sinkages, keyways, recesses, moldings, rustications, reglets, chamfers, blocking, screeds, bulkheads, anchorages and inserts, and other features required in work. Use selected materials to obtain required finishes. Solidly butt joints and provide back-up at joints to prevent leakage of cement paste.

Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush plates or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces where slope is too steep to place concrete with bottom forms only. Kerf wood inserts for forming keyways, reglets, recesses, and the like, to prevent swelling and for easy removal.

<u>Provide temporary openings</u> where interior area of formwork is inaccessible for cleanout, for inspection before concrete placement, and for placement of concrete. Securely brace temporary openings and set tightly to forms to prevent loss of concrete mortar. Locate temporary openings on forms at inconspicuous locations.

<u>Chamfer exposed corners</u> and edges as indicated, using wood, metal, PVC or rubber chamfer strips fabricated to produce uniform smooth lines and tight edge joints.

<u>Provisions</u> <u>for Other Trades</u>: Provide openings in concrete formwork to accommodate work of other trades. Determine size and location of openings, recesses and chases from trades providing such items. Accurately place and securely support items built into forms.

Cleaning and Tightening: Thoroughly clean forms and adjacent

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surfaces to receive concrete. Remove chips, wood, sawdust, dirt or other debris just before concrete is placed. Retightening forms and bracing after concrete placement is required to eliminate mortar leaks and maintain proper alignment.

VAPOR RETARDER INSTALLATION:

Following leveling and tamping of granular base for slabs on grade, place vapor retarder sheeting with longest dimension parallel with direction of pour.

Lap joints 6" and seal with appropriate tape.

After placement of moisture barrier, cover with granular material and compact to depth as shown on drawings.

PLACING REINFORCEMENT:

 Comply with Concrete Reinforcing Steel Institute's recommended practice for "Placing Reinforcing Bars", for details and methods of reinforcement placement and supports, and as herein specified.

Avoid cutting or puncturing vapor retarder during reinforcement placement and concreting operations.

<u>Clean reinforcement</u> of loose rust and mill scale, earth, ice, and other materials which reduce or destroy bond with concrete.

Accurately position, support and secure reinforcement against displacement by formwork, construction, or concrete placement operations. Locate and support reinforcing by metal chairs, runners, bolsters, spacers, and hangers, as required.

<u>Place reinforcement</u> to obtain at least minimum coverages for concrete protection. Arrange, space and securely tie bars and bar supports to hold reinforcement in position during concrete placement operations. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces.

<u>Install welded</u> <u>wire fabric</u> in as long lengths as practicable. Lap adjoining pieces at least one full mesh and lace splices with wire. Offset end laps in adjacent widths to prevent continuous laps in either direction.

JOINTS:

Construction Joints: Locate and install construction joints as indicated, or if not indicated, locate so as not to impair strength and appearance of the structure, as acceptable to Architect.

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walls, slabs and between walls and footings; accepted bulkheads designed for this purpose may be used for slabs.

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52 53 54 Place construction joints perpendicular to main reinforcement. Continue reinforcement across construction joints, except as otherwise indicated. Provide waterstops in construction Waterstops:

Install waterstops to form continuous diaphragm in indicated. Make provisions to support and protect exposed each joint. waterstops during progress of work. Fabricate field joints in accordance manufacturer's with in waterstops instructions.

Provide keyways at least 1-1/2" deep in construction joints in

<u>Isolation Joints in Slabs-on-Ground:</u> Construct isolation joints in slabs-on-ground at points of contact between slabs-on-ground and vertical surfaces, such as column pedestals, foundation walls, grade beams and elsewhere as indicated.

Joint filler and sealant materials are specified in Division-7 sections of these specifications.

Contraction (Control) Joints in Slabs-on-Ground: Construct contraction joints in slabs-on-ground to form panels of patterns as shown. Use saw cuts 1/8" x 1/4 slab depth or inserts 1/4" wide x 1/4 of slab depth, unless otherwise indicated.

inserting premolded plastic, Form contraction joints by hardboard or fiberboard strip into fresh concrete until top surface of strip is flush with slab surface. Tool slab edges round on each side of insert. After concrete has cured, remove inserts and clean groove of loose debris.

Contraction joints in unexposed floor slabs may be formed by saw cuts as soon as possible after slab finishing as may be safely done without dislodging aggregate.

If joint pattern not shown, provide joints not exceeding 15' in either direction and located to conform to bay spacing wherever possible (at column centerlines, half bays, third-bays).

Joint sealant material is specified in Division-7 sections of these specifications.

INSTALLATION OF EMBEDDED ITEMS:

Set and build into work anchorage devices and other embedded items required for other work that is attached to, or supported by, cast-in-place concrete. Use setting drawings, diagrams, instructions and directions provided by suppliers of items to be attached thereto.

<u>Install</u> <u>reglets</u> to receive to top edge of foundation sheet waterproofing, and to receive thru-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, relieving angles, and other conditions.

Edge Forms and Screed Strips for Slabs: Set edge forms or bulkheads and intermediate screed strips for slabs to obtain required elevations and contours in finished slab surface. Provide and secure units sufficiently strong to support types of screed strips by use of strike-off templates or accepted compacting type screeds.

PREPARATION OF FORM SURFACES:

Clean re-used forms of concrete matrix residue, repair and patch as required to return forms to acceptable surface condition.

Coat contact surfaces of forms with a form-coating compound before reinforcement is placed.

 Thin form-coating compounds only with thinning agent of type, and amount, and under conditions of form-coating compound manufacturer's directions. Do not allow excess form-coating material to accumulate in forms or to come into contact with inplace concrete surfaces against which fresh concrete will be placed. Apply in compliance with manufacturer's instructions.

CONCRETE PLACEMENT:

<u>Preplacement Inspection</u>: Before placing concrete, inspect and complete formwork installation, reinforcing steel, and items to be embedded or cast-in. Notify other crafts to permit installation of their work; cooperate with other trades in setting such work. Moisten wood forms immediately before placing concrete where form coatings are not used.

Apply temporary protective covering to lower 2' of finished walls adjacent to poured floor slabs and similar conditions, and guard against spattering during placement.

<u>General</u>: Comply with ACI 304 "Recommended Practice for Measuring, Mixing, Transporting, and Placing Concrete", and as herein specified.

Deposit concrete continuously or in layers of such thickness that no concrete will be placed on concrete which has hardened sufficiently to cause the formation of seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as herein specified. Deposit concrete as nearly as practicable to its final location to avoid segregation.

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<u>Placing Concrete in Forms:</u> Deposit concrete in forms in horizontal layers not deeper than 24" and in a manner to avoid inclined construction joints. Where placement consists of several layers, place each layer while preceding layer is still plastic to avoid cold joints.

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Consolidate placed concrete by mechanical vibrating equipment supplemented by hand-spading, rodding or tamping. Use equipment and procedures for consolidation of concrete in accordance with ACI recommended practices.

<u>Do not use vibrators</u> to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations not farther than visible effectiveness of machine. Place vibrators to rapidly penetrate placed layer and at least 6" into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to set. At each insertion limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing segregation of mix.

<u>Placing Concrete Slabs</u>: Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, until the placing of a panel or section is completed.

<u>Consolidate</u> <u>concrete</u> during placing operations so that concrete is thoroughly worked around reinforcement and other embedded items and into corners.

Bring slab surfaces to correct level with straightedge and strikeoff. Use bull floats or darbies to smooth surface, free of humps or hollows. Do not disturb slab surfaces prior to beginning finishing operations.

Maintain reinforcing in proper position during concrete placement operations.

Cold Weather Placing: Protect concrete work from physical damage or reduced strength which could be caused by frost, freezing actions, or low temperatures, in compliance with ACI 306 and as herein specified.

When air temperature has fallen to or is expected to fall below 40 deg F (4 deg C), uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F (10 deg C), and not more than 80 deg F (27 deg C) at point of placement.

50 <u>Do not use frozen materials</u> or materials containing ice or snow. 51 Do not place concrete on frozen subgrade or on subgrade 52 containing frozen materials.

Do not use calcium chloride, salt and other materials containing

antifreeze agents or chemical accelerators, unless otherwise accepted in mix designs.

<u>Hot Weather Placing:</u> When hot weather conditions exist that would seriously impair quality and strength of concrete, place concrete in compliance with ACI 305 and as herein specified.

cool ingredients before mixing to maintain concrete temperature at time of placement below 90 deg F (32 deg C). Mixing water may be chilled, or chopped ice may be used to control temperature provided water equivalent of ice is calculated to total amount of mixing water. Use of liquid nitrogen to cool concrete is Contractor's option.

Cover reinforcing steel with water-soaked burlap if it becomes too hot, so that steel temperature will not exceed the ambient air temperature immediately before embedment in concrete.

Fog spray forms, reinforcing steel and subgrade just before concrete is placed.

Use water-reducing retarding admixture (Type D) when required by high temperatures, low humidity, or other adverse placing conditions.

FINISH OF FORMED SURFACES:

Rough Form Finish: For formed concrete surfaces not exposed-to-view in the finish work or by other construction, unless otherwise indicated. This is the concrete surface having texture imparted by form facing material used, with tie holes and defective areas repaired and patched and fins and other projections exceeding 1/4" in height rubbed down or chipped off.

Smooth Form Finish: For formed concrete surfaces exposed-to-view, or that are to be covered with a coating material applied directly to concrete, or a covering material applied directly to concrete, such as waterproofing, dampproofing, painting or other similar system. This is as-cast concrete surface obtained with selected form facing material, arranged orderly and symmetrically with a minimum of seams. Repair and patch defective areas with fins or other projections completely removed and smoothed.

Smooth Rubbed Finish: Provide smooth rubbed finish to scheduled concrete surfaces, which have received smooth form finish treatment, not later than one day after form removal.

Moisten concrete surfaces and rub with carborundum brick or other abrasive until a uniform color and texture is produced. Do not apply cement grout other than that created by the rubbing process.

Grout Cleaned Finish: Provide grout cleaned finish to scheduled concrete surfaces which have received smooth form finish treatment.

Combine one part portland cement to 1-1/2 parts fine sand by volume, and mix with water to consistency of thick paint. Proprietary additives may be used at Contractor's option. Blend standard portland cement and white portland cement, amounts determined by trial patches, so that final color of dry grout will match adjacent surfaces.

 Thoroughly wet concrete surfaces and apply grout to coat surfaces and fill small holes. Remove excess grout by scraping and rubbing with clean burlap. Keep damp by fog spray for at least 36 hours after rubbing.

Related Unformed Surfaces: At tops of walls, horizontal offsets and similar unformed surfaces occurring adjacent to formed surfaces, strike-off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

MONOLITHIC SLAB FINISHES:

Scratch Finish: Apply scratch finish to monolithic slab surfaces that are to receive concrete floor topping or mortar setting beds for tile, portland cement terrazzo, and other bonded applied cementitious finish flooring material, and as otherwise indicated.

 After placing slabs, plane surface to tolerances for floor flatness ($F_{\rm F}$) of 15 and floor levelness ($F_{\rm L}$) of 13. Slope surfaces uniformly to drains where required. After leveling, roughen surface before final set, with stiff brushes, brooms or rakes.

Float Finish: Apply float finish to monolithic slab surfaces to receive trowel finish and other finishes as hereinafter specified, and slab surfaces which are to be covered with membrane or elastic waterproofing, membrane or elastic roofing, or sand-bed terrazzo, and as otherwise indicated.

After screeding, consolidating, and leveling concrete slabs, do not work surface until ready for floating. Begin floating when surface water has disappeared or when concrete has stiffened sufficiently to permit operation of power-driven floats, or both. Consolidate surface with power-driven floats, or by handfloating if area is small or inaccessible to power units. Check and level surface plane to tolerances of F_F 18 - F_L 15. Cut down high spots and fill low spots. Uniformly slope surfaces to drains. Immediately after leveling, refloat surface to a uniform, smooth, granular texture.

Trowel Finish: Apply trowel finish to monolithic slab surfaces to be exposed-to-view, and slab surfaces to be covered with resilient flooring, carpet, ceramic or quarry tile, paint, or other thin film finish coating system.

After floating, begin first trowel finish operation using a power-driven trowel. Begin final troweling when surface produces a ringing sound as trowel is moved over surface. Consolidate concrete surface by final hand-troweling operation, free of trowel marks, uniform in texture and appearance, and with surface leveled to tolerances of FF 20 - FL 17. Grind smooth surface defects which would telegraph through applied

floor covering system.

Trowel and Fine Broom Finish: Where ceramic or quarry tile is to be installed with thin-set mortar, apply trowel finish as specified, then immediately follow with slightly scarifying surface by fine brooming.

Non-Slip Broom Finish: Apply non-slip broom finish to exterior concrete platforms, steps and ramps, and elsewhere as indicated.

Immediately after float finishing, slightly roughen concrete surface by brooming with fiber bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.

Chemical-Hardener Finish: Apply chemical-hardener finish to interior concrete floors where indicated. Apply chemical-hardener after complete curing and drying of the concrete surface. Dilute liquid hardener with water (parts of hardener/water as follows), and apply in 3 coats; first coat, 1/3-strength; second coat, 1/2-strength; third coat, 2/3strength. Evenly apply each coat, and allow 24 hours for drying between coats.

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Apply proprietary chemical hardeners, in accordance with manufacturer's printed instructions.

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After final coat of chemical-hardener solution is applied and dried, remove surplus hardener by scrubbing and mopping with water.

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Non-slip Aggregate Finish: Apply non-slip aggregate finish to concrete stair treads, platforms, ramps, sloped walks, and elsewhere as indicated.

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After completion of float finishing, and before starting trowel finish, uniformly spread 25 lbs. of dampened non-slip aggregate per 100 sq. ft. of surface. Tamp aggregate flush with surface using a steel trowel, but do not force below surface. After broadcasting and tamping, apply trowel finishing as herein specified.

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After curing, lightly work surface with a steel wire brush, or an abrasive stone, and water to expose non-slip aggregate.

General: Protect freshly placed concrete from premature drying

and excessive cold or hot temperatures.

Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing. permitting, keep continuously moist for not less than 7 days.

Begin final curing procedures immediately following initial curing and before concrete has dried. Continue final curing for at least 7 days in accordance with ACI 301 procedures. rapid drying at end of final curing period.

Perform curing of concrete by curing and Curing Methods: sealing compound, by moist curing, by moisture-retaining curing, and by combinations thereof, as herein specified.

Provide moisture curing by following methods.

Keep concrete surface continuously wet by covering with water.

Continuous water-fog spray.

CONCRETE CURING AND PROTECTION:

Covering concrete surface with specified absorptive cover, thoroughly saturating cover with water and continuously wet. Place absorptive cover to provide coverage of concrete surfaces and edges, with 4" lap over adjacent absorptive covers.

Provide moisture-cover curing as follows:

Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width with sides and ends lapped at least 3" and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

Provide curing and sealing compound to exposed interior slabs and to exterior slabs, walks, and curbs, as follows:

Apply specified curing and sealing compound to concrete slabs as soon as final finishing operations are complete (within 2 Apply uniformly in continuous operation by powerspray or roller in accordance with manufacturer's directions. Recoat areas subjected to heavy rainfall within 3 hours after Maintain continuity of coating and initial application.

repair damage during curing period.

Do not use membrane curing compounds on surfaces which are to be covered with coating material applied directly to concrete, liquid floor hardener, waterproofing, dampproofing, membrane roofing, flooring (such as ceramic or quarry tile, glue-down carpet), painting, and other coatings and finish materials, unless otherwise acceptable to Architect.

Curing Formed Surfaces: Cure formed concrete surfaces, including undersides of beams, supported slabs and other similar surfaces by moist curing with forms in place for full curing period or until forms are removed. If forms are removed, continue curing by methods specified above, as applicable.

<u>Curing Unformed Surfaces</u>: Cure unformed surfaces, such as slabs, floor topping, and other flat surfaces by application of appropriate curing method.

Final cure concrete surfaces to receive liquid floor hardener or finish flooring by use of moisture-retaining cover, unless otherwise directed.

<u>Sealer and Dustproofer:</u> Apply a second coat of specified curing and sealing compound only to surfaces given a first coat.

SHORES AND SUPPORTS:

Comply with ACI 347 for shoring and reshoring in multistory construction, and as herein specified.

Extend shoring at least 3 floors under floor or roof being placed. Shore floor directly under floor or roof being placed, so that loads from construction above will transfer directly to these shores. Space shoring in stories below this level in such a manner that no floor or member will be excessively loaded or will induce tensile stress in concrete members where no reinforcing steel is provided. Extend shores beyond minimums to ensure proper distribution of loads throughout structure.

Remove shores and reshore in a planned sequence to avoid damage to partially cured concrete. Locate and provide adequate reshoring to safely support work without excessive stress or deflection.

Keep reshores in place a minimum of 15 days after placing upper tier, and longer if required, until concrete has attained its required 28-day strength and heavy loads due to construction operations have been removed.

REMOVAL OF FORMS:

Formwork not supporting weight of concrete, such as sides of beams, walls, columns, and similar parts of the work, may be removed after cumulatively curing at not less than 50 deg F (10 deg C) for 24 hours after placing concrete, provided concrete is sufficiently hard to not be damaged by form removal operations, and provided curing and protection operations are maintained.

Formwork supporting weight of concrete, such as beam soffits, joints, slabs and other structural elements, may not be removed in less than 17 days and until concrete has attained design minimum compressive strength at 28-days. Determine potential compressive strength of in-place concrete by testing field-cured specimens representative of concrete location or members.

Form facing material may be removed 4 days after placement, only if shores and other vertical supports have been arranged to permit removal of form facing material without loosening or disturbing shores and supports.

RE-USE OF FORMS:

Clean and repair surfaces of forms to be re-used in work. Split, frayed, delaminated or otherwise damaged form facing material will not be acceptable for exposed surfaces. Apply new form coating compound as specified for new formwork.

When forms are extended for successive concrete placement, thoroughly clean surfaces, remove fins and laitance, and tighten forms to close joints. Align and secure joint to avoid offsets. Do not use "patched" forms for exposed concrete surfaces, except as acceptable to Architect.

MISCELLANEOUS CONCRETE ITEMS:

Filling-In: Fill-in holes and openings left in concrete structures for passage of work by other trades, unless otherwise shown or directed, after work of other trades is in place. Mix, place and cure concrete as herein specified, to blend with inplace construction. Provide other miscellaneous concrete filling shown or required to complete work.

<u>Curbs</u>: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and steel-troweling surfaces to a hard, dense finish with corners, intersections and terminations slightly rounded.

Equipment Bases and Foundations: Provide machine and equipment bases and foundations, as shown on drawings. Set anchor bolts for machines and equipment to template at correct elevations, complying with certified diagrams or templates of manufacturer furnishing machines and equipment.

Grout base plates and foundations as indicated, using specified Use non-metallic non-shrink grout. grout for exposed conditions, unless otherwise indicated.

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Steel Pan Stairs: Provide concrete fill for steel pan stair treads and landings and associated items. Cast-in safety inserts and accessories as shown on drawings. Screed, tamp, and finish concrete surfaces as scheduled.

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12 13 Reinforced Masonry: Provide concrete grout for reinforced masonry lintels and bond beams where indicated on drawings and as scheduled. Maintain accurate location of reinforcing steel during concrete placement.

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CONCRETE SURFACE REPAIRS:

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Patching Defective Areas: Repair and patch defective areas with immediately after removal mortar acceptable to Architect.

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Cut out honeycomb, rock pockets, voids over 1/4" in any dimension, and holes left by tie rods and bolts, down to solid concrete but, in no case to a depth of less than 1". Make edges of cuts perpendicular to the concrete surface. Thoroughly clean, dampen with water, and brush-coat the area to be patched with specified bonding agent. Place patching mortar after bonding compound has dried.

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For exposed-to-view surfaces, blend white portland cement and standard portland cement so that, when dry, patching mortar will match color surrounding. Provide test areas at inconspicuous location to verify mixture and color match before proceeding with patching. Compact mortar in place and strike-off slightly higher than surrounding surface.

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Repair of Formed Surfaces: Remove and replace concrete having defective surfaces if defects cannot be repaired to satisfaction of Architect. Surface defects, as such, include color and texture irregularities, cracks, spalls, air bubbles, honeycomb, rock pockets; fins and other projections on surface; and stains and other discolorations that cannot be removed by cleaning. Flush out form tie holes, fill with dry pack mortar, or precast cement cone plugs secured in place with bonding agent.

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Repair concealed formed surfaces, where possible, that contain defects that affect the durability of concrete. If defects cannot be repaired, remove and replace concrete.

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Repair of Unformed Surfaces: Test unformed surfaces, such as monolithic slabs, for smoothness and verify surface plane to tolerances specified for each surface and finish. and high areas as herein specified. Test unformed surfaces sloped to drain for trueness of slope, in addition to

smoothness, using a template having required slope.

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Repair finished unformed surfaces that contain defects which affect durability of concrete. Surface defects, as include crazing, cracks in excess of 0.01" wide or which penetrate to reinforcement or completely through non-reinforced sections regardless of width, spalling, pop-outs, honeycomb, rock pockets, and other objectionable conditions.

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Correct high areas in unformed surfaces by grinding, after concrete has cured at least 14 days.

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Correct low areas in unformed surfaces during or immediately after completion of surface finishing operations by cutting out low areas and replacing with fresh concrete. Finish repaired areas to blend into adjacent concrete. Proprietary patching compounds may be used when acceptable to Architect.

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Repair defective areas, except random cracks and single holes not exceeding 1" diameter, by cutting out and replacing with fresh concrete. Remove defective areas to sound concrete with clean, square cuts and expose reinforcing steel with at least 3/4" clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding compound. Mix patching concrete of same materials to provide concrete of same type or class as original concrete. Place, compact and finish to blend with adjacent finished concrete. Cure in the same manner as adjacent concrete.

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Repair isolated random cracks and single holes not over 1" in diameter by dry-pack method. Groove top of cracks and cut-out holes to sound concrete and clean of dust, dirt and loose particles. Dampen cleaned concrete surfaces and apply bonding compound. Mix dry-pack, consisting of one part portland cement to 2-1/2 parts fine aggregate passing a No. 16 mesh sieve, using only enough water as required for handling and placing. Place dry-pack after bonding compound has dried. Compact drypack mixture in place and finish to match adjacent concrete. Keep patched area continuously moist for not less than 72 hours.

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Perform structural repairs with prior approval of Architect or Structural Engineer for method and procedure, using specified epoxy adhesive and mortar.

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Repair methods not specified above may be used, subject to acceptance of Architect.

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Underlayment Application: Leveling of floors for subsequent finishes may be achieved by use of specified underlayment material.

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QUALITY CONTROL TESTING DURING CONSTRUCTION:

The Contractor shall employ a testing laboratory to perform tests and to submit test reports.

Sampling and testing for quality control during placement of concrete may include the following, as directed by Architect.

Sampling Fresh Concrete: ASTM C 172, except modified for slump to comply with ASTM C 94.

Slump: ASTM C 143; one test at point of discharge for each day's pour of each type of concrete; additional tests when concrete consistency seems to have changed.

<u>Air Content</u>: ASTM C 173, volumetric method for lightweight or normal weight concrete; ASTM C 231 pressure method for normal weight concrete; one for each day's pour of each type of air-entrained concrete.

Concrete Temperature: Test hourly when air temperature is 40 deg F (4 deg C) and below, and when 80 deg F (27 deg C) and above; and each time a set of compression test specimens made.

Compression Test Specimen: ASTM C 31; one set of 4 standard cylinders for each compressive strength test, unless otherwise directed. Mold and store cylinders for laboratory cured test specimens except when field-cure test specimens are required.

Compressive Strength Tests: ASTM C 39; one set for each day's pour exceeding 5 cu. yds. plus additional sets for each 50 cu. yds. over and above the first 25 cu. yds. of each concrete class placed in any one day; one specimen tested at 7 days, and two specimens tested at 28 days.

When frequency of testing will provide less than 5 strength tests for a given class of concrete, conduct testing from at least 5 randomly selected batches or from each batch if fewer than 5 are used.

When total quantity of a given class of concrete is less than 50 cu. yds., strength test may be waived by Architect if, in his judgement, adequate evidence of satisfactory strength is provided.

Strength level of concrete will be considered satisfactory if averages of sets of three consecutive strength test results equal or exceed specified compressive strength, and no individual strength test result falls below specified compressive strength by more than 500 psi.

Test results will be reported in writing to Architect, Structural Engineer and Contractor within 24 hours after tests. Reports of compressive strength tests shall contain the project

CONCRETE WORK

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identification name and number, date of concrete placement, name of concrete testing service, concrete type and class, location of concrete batch in structure, design compressive strength at 28 days, concrete mix proportions and materials; compressive breaking strength and type of break for both 7-day tests and 28-day tests.

Nondestructive <u>Testing</u>: Impact hammer, sonoscope, or other nondestructive device may be permitted but shall not be used as the sole basis for acceptance or rejection.

Additional Tests: The testing service will make additional tests of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure, as directed by Architect. Testing service may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42, or by other methods as directed. Contractor shall pay for such tests when unacceptable concrete is verified.

END OF SECTION 03310

1 <u>SECTION 03320 - CONCRETE FLOOR TOPPING</u>
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PART 1 - GENERAL

RELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Special Conditions and Division-1 Specification sections, apply to work of this section.

SUMMARY:

Extent of concrete floor toppings is shown on drawings and in schedules. Included are:

Covered Walkway Heliport Hanger

Types of concrete floor toppings include:

Standard aggregate toppings.

REFERENCES:

Comply with requirements of Section "Concrete Work" and as herein specified.

SUBMITTALS:

Furnish data, samples, laboratory test reports and materials certificates as specified in Section "Concrete Work".

PART 2 - PRODUCTS

CEMENT AND AGGREGATES:

Portland Cement: ASTM C 150, Type I or Type III.

Standard Aggregate: ASTM C 33, and as follows:

Fine aggregate, consisting of sand or crushed stone screenings, clean, hard, free from deleterious matter. Grade by weight to pass sieves as follows:

3/8": 100 percent No. 4: 95-100 percent

No. 8: 80-90 percent No. 16: 50-75 percent No. 30: 30-50 percent No. 50: 10-20 percent No. 100: 2-5 percent

Coarse aggregate consisting of gravel or crushed stone, clean, hard, free from deleterious matter. Grade by weight to pass sieves as follows:

1/2": 100 percent 3/8": 30-50 percent No.4: 0-15 percent No.8: 0-5 percent

<u>Available Manufacturers</u>: Subject to compliance with requirements, manufacturers offering factory pre-mixed topping mixes which may be incorporated in the work include, but are not limited to, the following:

Iron Mountain Trap Rock Co. Master Builders. The Euclid Chemical Co.

TOPPING MIX:

Standard Topping:

Design mix to produce topping material with the following characteristics:

Compressive strength, 3500 psi at 28 days.

Slump; 8" maximum at point of placement for concrete containing high-range water reducing admixture (superplasticizer) and 3" maximum for other concrete.

Maximum W/C ratio; 0.51.

MIXING:

Provide batch type mechanical mixer for mixing topping material at project site. Equip batch mixer with a suitable charging hopper, water storage tank, and a water-measuring device. Use only mixers which are capable of mixing aggregates, cement, and water into a uniform mix within specified time, and of discharging mix without segregation.

Mix each batch of 2 cu. yds, or less for at least 1-1/2 minutes after ingredients are in mixer. Increase mixing time 15 secs. for each additional cu. yd. or fraction thereof.

CONCRETE FLOOR TOPPING

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Ready-mixed topping may be used when acceptable to Architect. When acceptable, furnish ready-mixed topping complying with requirements of ASTM C 94.

PART 3 - EXECUTION

CONDITION OF SURFACES:

Topping Applied to Fresh Concrete: Do not begin placement of topping until water ceases to rise to surface, and water and laitance have been removed from base slab surface.

Topping Applied to Hardened Concrete: Remove dirt, loose material, oil, grease, paint or other contaminants, leaving a clean surface.

When base slab surface unacceptable for good bonding, roughen surface by chipping or scarifying before cleaning.

Prior to placing topping mixture, thoroughly dampen slab surface but do not leave standing water. Over dampened surface, apply specified bonding compound (re-wettable or non-rewettable) or epoxy adhesive. Place topping mix after re-wettable bonding compound has dried or while non-rewettable bonding compound or epoxy adhesive is still tacky.

For reinforced toppings, provide necessary chairs or supports, and maintain position of reinforcing mesh as shown on drawings.

<u>Joints</u>: Mark locations of joints in base slab so that joints in top course will be placed directly over them.

PLACING AND COMPACTING:

 Float Finish: Spread topping mixture evenly over prepared base to the required elevation and strikeoff. Use highway straightedge, bull float, or darby to level surface. After the topping has stiffened sufficiently to permit the operation, and water sheen has disappeared, float the surface at least twice to a uniform sandy texture. Restraighten where necessary with highway straightedge. The surface shall achieve an FF20/FL17 tolerance when tested in accordance with ASTM E 1155. Uniformly slope surface to drains.

Where joints are required, construct to match and coincide with joints in base slab. Provide other joints as shown.

TROWEL FINISH:

After floating, begin first trowel finish operation using power driven trowels. Continue troweling until surface is ready to receive final troweling. Begin final hand-troweling when a ringing sound is produced as trowel is moved over surface.

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Continue final trowel operation to produce finished surface free of trowel marks, uniform in texture and appearance, achieving an F_{F25}/F_{L20} tolerance when tested in accordance with ASTM E 1155.

CURING AND PROTECTION:

Cure and protect topping applications and finishes as specified in Section "Concrete Work."

PERFORMANCES:

Failure of concrete topping to bond to substrate (as evidenced by a hollow sound when tapped), or disintegration or other failure of topping to perform as a floor finish, will be considered failure of materials and workmanship. Repair or replace toppings in areas of such failures, as directed.

END OF SECTION 03320

SECTION 03450 - ARCHITECTURAL PRECAST CONCRETE

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PART 1 - GENERAL

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RELATED DOCUMENTS:

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Drawings and general provisions of Contract, including General and Special Conditions and Division-1 Specification sections, apply to the work of this section.

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SUMMARY:

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Extent of architectural precast concrete work is shown on drawings and in schedules.

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Architectural precast concrete includes the following:

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Plain smooth-faced concrete units.

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Exposed aggregate units (integral, not surface applied aggregate).

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Precast prestressed structural concrete units are specified under another section of Division 3.

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Caulking, sealants, and gaskets are specified in Division 7.

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SUBMITTALS:

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Product Data: Submit fabricator's specifications, data and instructions for manufactured materials and products. mix designs, certifications and laboratory test reports as required.

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Shop Drawings: Submit shop drawings showing information for fabrication and installation of precast concrete Indicate member dimensions and cross-section; fabrication tolerances; location, size an reinforcement, including special reinforcement and type devices necessary for handling and erection.

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Include erection procedure for precast units, sequence of erection, and erection tolerances.

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Show layout, dimensions, and identification of each precast unit corresponding to sequence and procedure of installation.

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Indicate welded connection by AWS standard symbols. inserts, connections, and joints, including accessories and construction at openings in precast units.

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Show caulked joints, including expansion joints ("soft" type) and grouted joints ("rigid" type).

Show location and details of anchorage devices that are to be embedded in other construction.

Indicate protective finishes for metal items including connectors.

Show details of quarry tile inserts.

Provide complete design calculations prepared by a registered engineer, licensed in State where project is erected.

Submit samples approximately 12" \times 12" \times 2" to illustrate quality, color, and texture of surface finish.

Submit samples of cast-in gaskets, anchorages, and other attachments and accessories as requested by Architect.

Prepare full-size sample of each type (spandrel panel, column cover, etc.) architectural precast concrete unit for Architect's inspection at production plant or on site prior to start of installation work, and after Architect review of finish samples. Acceptable full-size samples may be incorporated installation.

Provide one Mock-Up panel which includes exposure of precast finishes. Mock-up to be 2'x4' minimum size..

QUALITY ASSURANCE:

Codes and Standards: Comply with provisions of following codes, specifications and standards, except as otherwise indicated:

ACI 318 "Building Code Requirements for Reinforced Concrete".

Concrete Reinforcing Steel Institute, "Manual of Standard Practice".

Prestressed Concrete Institute MNL 117, "Manual for Quality Control for Plants and Production of Architectural Precast Concrete Products".

American Welding Society D1.4, "Structural Welding Code -Reinforcing Steel."

Firms which have a minimum of 5 Fabricator Qualifications: years successful experience in the fabrication of architectural precast concrete units, similar to units required for this project, will be acceptable. Fabricator must have sufficient production capacity to produce, transport, and deliver required

units without causing delay in the work.

<u>Fabrication</u> <u>Qualifications:</u> Produce precast concrete units at fabricating plant engaged primarily in manufacturing of similar units, unless plant fabrication or delivery to site is impractical.

If units are not produced at precast concrete fabricating plant, maintain procedures and conditions for quality control equivalent to plant production.

<u>Design Requirement:</u>. The supplier shall provide complete design calculations and drawing prepared by a professional engineer registered in Kentucky. The panels shall be designed for a 80 mile per hour wind in accordance with Kentucky Building Code.

<u>Design modifications</u> may be made only as necessary to meet field conditions and to ensure proper fitting of the work, and only as acceptable to Architect. Maintain general design concept shown without increasing or decreasing sizes of members or altering profiles and alignment shown. Provide complete design calculations and drawings prepared by a professional engineer registered in State where project is located.

Qualifications of Erector: Minimum of 5 years successful experience in the erection of architectural precast concrete units, similar to units required for this project.

DELIVERY, STORAGE AND HANDLING:

Deliver precast concrete units to project site in such quantities and at such times to assure continuity of installation. Store units at project site to prevent cracking, distortion, warping, staining, or other physical damage and so that markings are visible. Lift and support units only at designated lifting or supporting points as shown on final shop drawings.

PART 2 - PRODUCTS

FORMWORK:

<u>Provide</u> <u>forms</u> and, where required, form facing materials of metal, plastic, wood, or other acceptable material that is non-reactive with concrete and will produce required finish surfaces.

Accurately construct forms, mortar-tight, and of sufficient strength to withstand pressures due to concrete placing operations, temperature changes and, when prestressed pretensioning and detensioning operations. Maintain form work

to provide completed precast concrete units of shapes, lines and dimensions indicated, within specified fabrication tolerances.

Unless forms for plant-manufactured prestressed concrete units are stripped prior to detensioning, design forms so that stresses are not induced in precast units due to deformation of concrete under prestress or to movement during detensioning.

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REINFORCING MATERIALS:

Reinforcing Bars: ASTM A 615, Grade 60, deformed.

<u>Low-Alloy Steel Reinforcing Bars: ASTM A 706.</u>

Steel Wire: ASTM A 82, plain, cold-drawn, steel.

Welded Wire Fabric: ASTM A 185.

Welded Deformed Steel Wire Fabric: ASTM A 497.

<u>Supports</u> <u>for Reinforcement</u>: Provide supports for reinforcement including bolsters, chairs, spacers and other devices for spacing, supporting and fastening reinforcing.

For exposed-to-view concrete surfaces, where legs of supports are in contact with forms, provide supports with legs which are plastic protected (CRSI, Class 1) or stainless steel protected (CRSI, Class 2).

CONCRETE MATERIALS:

Portland Cement: ASTM C 150, Type I or Type III.

 Use only one brand, type, and source of supply of cement throughout the project, unless otherwise acceptable to Architect.

<u>Use "buff" color</u> portland cement for facing concrete mix to match Architect's control sample.

Standard "gray" portland cement may be used for non-exposed back-up concrete.

 Coarse Aggregate for Facing Mixes: ASTM C 33 for "Severe Weathering Region"; hard, durable, carefully selected and graded; free of material causing staining or reacting with cement and with less than 5% magnesium sulfate soundness loss unless at least 5 years historical experience indicates satisfactory durability.

Use aggregate from same source as those used in Architect's

control sample.

Fine Aggregate for Facing Mixes: ASTM C 33; manufactured sand same material as coarse aggregate, unless otherwise acceptable to Architect.

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Drinkable, free from foreign materials in amounts harmful to concrete and embedded steel.

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Air-Entraining Admixture: ASTM C 260.

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Water-Reducing Retarding, Accelerating Admixtures: ASTM C 494, Type as selected by Fabricator and containing not more than 0.1% chloride ions.

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CONNECTION MATERIALS:

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Steel Plates: Structural quality, hot-rolled carbon steel, ASTM A 283, Grade C.

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Steel Shapes: ASTM A 36.

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Stainless Steel Shapes: AISI Type 302/304.

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Anchor Bolts: ASTM A 307, low-carbon steel bolts, regular hexagon nuts and carbon steel washers.

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Electrodes for Welding: Comply with AWS Code.

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Finish of Steel Units: Exposed units hot-dip galvanized after fabrication, ASTM A 153; inserts cast into precast units hot-dip galvanized, electro-galvanized or cadmium coated, others shop painted with rust-inhibitive primer.

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GROUT MATERIALS:

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40 41 Cement Grout: Portland cement, ASTM C 150, Type I, and clean, natural sand, ASTM C 404. Mix at ratio of 1.0 part cement to 3.0 parts sand, by volume, with minimum water required for placement and hydration.

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Non-Metallic Shrinkage-Resistant Grout: Pre-mixed, metallic, non-corrosive, non-staining product selected silica sands, portland cement, shrinkage compensating agents, plasticizing and water reducing agents, complying with CRD-C621.

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Products: Subject to compliance with requirements, provide one of the following:

Crystex; L&M Construction Chemicals. Euco N.S.; Euclid Chemical Co. Five Star Grout; U.S. Grout Corp. Masterflow 713; Master Builders. Propak; Protex Industries, Inc. Upcon; Upco Chem. Div., USM Corp.

Quarry Tile Accent Inserts:

Tile Size: 3 7/8" x 8"
Lock Back

Tile Color: Canyon Red by American Olean or exact color match.

PROPORTIONING AND DESIGN OF MIXES:

Prepare design mixes for each type of concrete required.

Design mixes may be prepared by independent testing facility or by qualified precast manufacturing plant personnel, at precast fabricator's option.

<u>Proportion</u> <u>mixes</u> by either laboratory trial batch or field experience methods, using materials to be employed on the project for each type of concrete required, complying with ACI 318.

<u>Integral Facing and Backup Mix:</u> Standard-weight concrete consisting of specified portland cement, aggregates, admixtures, and water to produce the following properties:

Compressive Strength: 5,000 psi minimum at 28 days.

Total Air Content: Not less than 4% nor more than 6%.

<u>Water Absorption</u>: Not to exceed 5% to 6% by weight; except between 3% to 4% for sloping surfaces (sills), for improved weathering staining resistance.

<u>Submit written reports</u> to Architect of proposed mix for each type of concrete at least 15 days prior to start of precast unit production. Do not begin concrete production until mixes and evaluations have been reviewed by Architect.

Adjustment to Concrete Mixes: Mix design adjustments may be requested when characteristics of materials, job conditions, weather, test results, or other circumstances warrant. Laboratory test data for revised mix designs and strength results must be submitted to and accepted by Architect before using in the work.

Admixtures: Use air-entraining admixture in strict compliance

with manufacturer's directions. Admixtures to increase cement dispersion, or provide increased workability for low-slump · concrete, may be used subject to Architect's acceptance.

Use amounts as recommended by admixture manufacturer for climatic conditions prevailing at time of placing. Adjust quantities of admixtures as required to maintain control.

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FABRICATION:

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General: Fabricate precast concrete units complying with manufacturing and testing procedures, quality control recommendations, and following dimensional tolerances, unless otherwise indicated.

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The minimum reinforcement in all panels five (5) inches thick and thicker shall be 0.10% of cross sectional area of panel in each face. Additional reinforcement may be required for handling, beam action, and wind loads. each face.

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<u>Dimensional Tolerances of Finished Units:</u> Overall height and width measured at face adjacent to mold at time of casting:

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10' or under: plus or minus 1/8".

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10' to 20': plus 1/8", minus 3/16".

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20' to 30': plus 1/8", minus 1/4".

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Each additional 10': plus or minus 1/16" per 10'.

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Angular deviation of plane of side mold: 1/32" per 3" depth, or 1/16" total, whichever is greater.

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Openings within one unit: plus or minus 1/4", except plus or minus 1/8" for windows and door frames.

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Out of square (differences in length of two diagonal measurements): 1/8" per 6' or 1/4" total, whichever is greater.

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Thickness: minus 1/8", plus 1/4".

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Tolerances of other dimensions not otherwise indicated: numerically greater of plus or minus 1/16" per 10', or plus or minus 1/8".

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Position Tolerances: For cast-in items measured from datum line locations as shown on reviewed shop drawings:

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Anchors and inserts: within 3/8" of centerline location.

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Blockouts and reinforcements: within 1/4" of position shown on shop drawings, where such positions have structural implications or affect concrete cover; otherwise within plus or minus 1/2".

Fabricate units straight, smooth, and true to size and shape, with exposed edges and corners precise and square unless otherwise indicated.

Precast units which are warped, cracked, broken, spalled, stained, or otherwise defective will not be acceptable.

Expansion Joints: Free of grout, mortar, or other obstructions to expansive movement, with expansion joint filler where indicated.

Provide reglets, slots, holes, inserts, and Built-In Items: other accessories in units to receive windows, cramps, dowels, reglets, waterstops, flashings, quarry tile, and other similar work as indicated.

Provide inserts and cast into units, for anchorages attachment of loose hardware as required.

Provide loose steel plates, clip angles, seat Anchorages: angles, anchors, dowels, cramps, hangers, and other miscellaneous steel shapes not provided by other trades, necessary for securing precast units to supporting and adjacent members.

Surface Finish: Fabricate precast units and provide exposed surface finishes as follows:

Abrasive blast finish, using abrasive grit, equipment application techniques and cleaning to expose aggregate and surrounding matrix surfaces, to match Architect's control sample.

As-cast or float finish for unexposed surfaces.

PART 3 - EXECUTION

INSTALLATION:

General: Deliver anchorage items which are to be embedded in other construction before start of such work. Provide setting diagrams, templates, instructions and directions as required for installation.

Do not install precast units until concrete has attained its design compressive strength.

<u>Install</u> <u>precast</u> <u>concrete</u> members plumb, level, and in alignment within PCI MNL-117 specified limits of erection tolerances. Provide temporary supports and bracing as required to maintain position, stability and alignment as members are being permanently connected.

Maintain horizontal and vertical joint alignment and uniform joint width as erection progresses.

 Accessories: Install clips, hangers, and other accessories required for erection of precast units to supporting members and back-up materials.

Anchor units in final position by bolting, welding, grouting, or as otherwise indicated. Remove temporary shims, wedges, and spacers as soon as possible after anchoring is completed.

At bolted connections use lock washers or other acceptable means to prevent loosening of nuts.

At welded connections apply rust-inhibitive coating on damaged areas, same as shop-applied material. Use galvanizing repair coating on galvanized surfaces.

Cleaning: Clean exposed facings to remove dirt and stains which may be on units after erection and completion of joint treatments. Wash and rinse in accordance with precast manufacturer's recommendations. Protect other work from damage due to cleaning operations. Do not use cleaning materials or processes which could change the character of exposed concrete finishes.

ERECTION TOLERANCES:

<u>Warpage</u>: Fabricate and install wall panels so that each panel after erection complies with following dimensional requirements:

Bowing (concave or convex) of any part of a flat surface not to exceed length of bow/360, with a maximum of 3/4" up to 30'.

Maximum warpage of one corner out of plane of other three, the greater of 1/16" per foot distance from nearest adjacent corner, or 1/8".

<u>Tolerances for Location of Precast Units:</u> Fabricate and erect precast units so that joints between panels meet the following:

Face width of joints: plus or minus 3/16".

Joint taper: 1/40" per foot length, with maximum length of tapering in one direction of 10'.

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END OF SECTION 03450

Step in face: 1/4".

Jog in alignment of edge: 1/4".

Alignment for exterior panels is outside face.

Variation from plumb: plus or minus 1/2" in any 40' run.

Variation from level: plus or minus 1/2" in any 40' run.

PERFORMANCE REQUIREMENTS:

Conduct inspections, perform testing, and make repairs replace unsatisfactory precast units as required.

Limitations as to amount of patching which will be permitted is subject to acceptance of Architect.

In addition to above, in-place precast units may be rejected for any one of the following:

Exceeding specified installation tolerances.

Damaged during construction operations.

which Exposed-to-view surfaces develop surface finish deficiencies.

Other defects as listed in PCI MNL-117.

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SECTION 03455 - LIGHTWEIGHT PRECAST CONCRETE PANELS

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PART 1 - GENERAL

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RELATED DOCUMENTS:

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Drawings and general provisions of the Contract, including General and Special Conditions and Division-1 Specification sections, apply to the work of this section.

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DESCRIPTION OF WORK:

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The extent of Precast Lightweight Concrete Panel work is shown on the drawings and, for the purposes of this specification, is defined as Glass Fiber Reinforced Concrete (GFRC), using Portland glass fibers. GFRC panels shall be designed to the profiles shown on the drawings with a surface texture and color matching existing, adjacent precast concrete wall panel construction.

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Precast GFRC panel work includes, but is not limited to, the following:

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Lightgage metal structural framing assembly required for support and installation of units.

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Anchorage to lightgage metal structural framing assembly and anchorage of framing assembly to supporting construction, including furnishing of related inserts.

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Sealant for joints between units.

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Related Work Specified Elsewhere:

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Installing embedded inserts in supporting construction for anchorage of GFRC units.

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Thermal building insulation on indoor side of GFRC units is specified under Section 07200 Insulation..

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QUALITY ASSURANCE:

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Referenced Standards: Meet requirements of the following except to extent more detailed or stringent requirements are indicated by the Contract Documents, including requirements of this Section and of governing codes and regulations:

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AISC - Specification for the Design of Cold Formed Steel Structural Members.

AWS D 1.1 - Structural Welding Code.

PCI - Recommended Practice for Glass Fiber Reinforced Concrete Panels.

Specification Sections: 07900 Joint Sealers

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Single Responsibility: Glass Fiber Reinforced Concrete Panel work shall be performed by a single manufacturer having undivided responsibility for providing the complete work including design, fabrication, and erection.

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Manufacturer shall have at least 5 years certifiable experience in the design, fabrication and installation of precast concrete work required for the project.

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Produce precast units at fabricating plant engaged primarily in manufacturing of units similar to those required for project.

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Welding Qualifications:

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Qualify welding processes and welding operators in accordance with the AWS - Standard Qualification Procedure.

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Provide certification that welders to be employed on work have satisfactorily passed AWS qualification tests within previous 12 months.

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Design Basis:

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General: Precast lightweight concrete panel descriptions and requirements indicated by the contract documents establish basic visual concept, dimensions and modules of unit profiles of precast units, function and like requirements. limitations, the precast units shall meet visual concept, design criteria and like requirements indicated, including components not indicated but necessary for function and performance, and shall be complete work. Perform whatever modification or additions necessary to meet requirements and coordinate the work.

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Certification: Precast lightweight concrete work shall be designed, certified, reviewed and inspected by precast concrete manufacturer's qualified and Kentucky registered professional structural engineer.

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Design Criteria:

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Design shall include all loads, code required live loads, equipment loads, wind loads and bracing camber, shrinkage, deflections, temperature variations, expansion requirements, equipment vibration and foundation differential settlement.

<u>Wind Load</u>: Minimum design wind pressure, both positive and negative, acting normal to plane of the precast units, shall be a uniform pressure of 40 psf.

<u>Dead Load</u>: Dead load shall be the actual weight to materials supported by the precast units.

<u>Deflection</u>: When subjected to specified wind load and dead load, deflection of any element in the system shall not exceed L/360.

<u>Distortion</u>: Precast units shall not warp, cup or distort as a result of differential indoor and outdoor temperatures or concentrated temperatures.

Anchorage:

 Loadings: When required, inserts for anchorage of precast units to supporting structure shall be designed for the loads specified and shall take into consideration the following:

Allowable material stress for the insert material and the structural concrete as indicated by PCI cited GFRC Panel Recommended Practice.

In determining forces imposed on the insert, the combination of laods imposing the greatest force shall be determined for each component and used in its design.

In determining forces imposed on the concrete, the required ultimate strength shall be as determined by PCI Cited Standard.

Allowances for increase in stress due to wind forces shall be used where applicable.

Tolerances: Design precast units to accommodate a plus or minus one inch variation in relation to the theoretical building and component lines.

Exposed Surface Finish: Match comparable existing architectural concrete surfaces with abrasive blast finish as acceptable to the Architect. Characteristics of exposed concrete surfaces shall include general appearance, texture and color.

Allowable Tolerances:

<u>Fabricated Dimensional Tolerances:</u> Fabricate precast units to comply with the following tolerances:

Thickness: Minus 1/8", plus 1/4".

Squareness: Not more than 1/8" in 6 ft. out of square as

PRECAST LIGHTWEIGHT CONCRETE PANELS

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 measured on the diagonal.

Location of Anchors and Inserts: Within 3/8" of indicated centerline.

Blockouts: Within 1/4" of the indicated position.

Tolerances on Any <u>Dimension Not Otherwise Indicated</u>: The numerically greater of plus or minus 1/16" per 10 ft. or plus or minus 1/8".

Location of Openings: Plus or minus 1/4", except plus or minus 1/8" for windows and door frames.

<u>Installed</u> <u>Dimensional Tolerances</u>: Install precast units without exceeding the following tolerances:

<u>Variations</u> <u>from</u> <u>Plumb</u>: 1/4" in any 20 ft. run or storey height and 1/2" total in any 40 ft. or more.

<u>Variations from Level or Elevation</u>: 1/4" in any 20 ft. run and 1/2" in any 40 ft. run and total plus or minus 1/2" at any location.

<u>Variation from Position in Plan</u>: Plus or minus 1/2" maximum at any location.

Offsets in Alignment of Adjacent Members at any Joints: 1/16" in any 10 ft. run and 1/4" maximum.

Quality Control:

General: All materials, fabrication and construction will be subject to inspection by the Testing Laboratory employed by the Owner. These inspections shall not relieve the Contractor from obligation of providing materials and construction conforming to requirements of the Contract Documents. Promptly correct any deficiencies. Maintain control measures for all materials and construction whether inspected or not.

Installed Units: In-place precast units may be rejected for any
one of the following:

Exceeding the specified fabrication or installation tolerances.

Damaged during construction operations.

Exposed-to-view surfaces which develop surface finish deficiencies.

Other defects as specified or which are not acceptable to the Architect.

SUBMITTALS:

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<u>Product Data</u>: Submit manufacturer's specifications, data and installation instructions for proprietary manufactured materials and products. Include manufacturer's laboratory test reports substantiating that materials and products meet the specified requirements.

Shop Drawings:

 Submit shop drawings for the fabrication and installation of precast lightweight concrete panel work. Indicate dimensions and cross-section; location, size and type of precast unit, including lightgage metal framing and precast panels, including special reinforcement and lifting devices necessary for handling and erection. Indicate welded connections by AWS standard symbols. Detail inserts, connections and joint, including accessories and construction at openings in precast units. Show joinery techniques and materials, including fasteners and sealants.

Indicate layout, dimensions and identification of each precast unit corresponding to sequence and procedure of installation. Show layout of adjacent building construction correctly dimensioned.

Indicate the location and details of anchorage devices that are to be embedded in other construction. Furnish templates if required for accurate placement.

Identify all sealants by product name and application location.

Structural Calculations:

Submit structural calculations for precast concrete work prepared in accordance with good and prudent structural theory and current design practice and in accordance with the rules of AISC, AIAI, PCI, and ACI. Submittals will be for information only.

 Calculations shall include all designs for precast lightweight concrete panel work, including criteria, specified in PARAGRAPH - DESIGN CRITERIA of this Section, anchors, concrete inserts, and resultant reactions at each connection point to supporting structure.

48 Calculations shall be certified and sealed by a Kentucky 49 registered professional structural engineer. Meet requirements 50 of PARAGRAPH - DESIGN BASIS of this section.

Samples:

Submit 3 sets of samples approximately 12" x 12" x 1" to

illustrate the quality, color and texture of each surface finish. Samples shall show extreme limits of quality, color and texture variations, and severity of surface distortions. Color, sheen, texture and surface distortion range of production precast concrete shall be in accordance with the accepted samples.

Submit samples of cast-in anchorages and other accessories as requested by the Architect.

Provide one full-size sample of each required precast unit to the project site prior to start of installation work and after Architect's review of 12" square samples. Acceptable samples may be incorporated in the construction.

Architect's review of samples will be for color, texture, and general provisions only. Compliance with all other requirements is the exclusive responsibility of the Contractor.

Laboratory Test Reports: Submit certified testing laboratory test reports for precast concrete. Architect's review will be for information only. Production of precast units to comply with specified requirements is precast concrete manufacturer's responsibility.

Material Compliance Certificates: Provide material compliance certificates for precast concrete. Compliance certificates shall be signed by the precast concrete manufacturer and Contractor, certifying that the precast concrete complies with or exceeds the specified requirements.

Welding Qualifications: Submit qualifications for welding processes and welding operators to be employed on the work having met qualification requirements specified in Article - Quality Assurance of this section. Include any limitations to qualifications.

PRODUCT HANDLING:

Delivery:

Shop Assembly: Preassemble precast concrete units in shop to greatest extent possible to minimize field assembly. Clearly mark units for assembly and coordinated installation.

<u>Protective Coverings</u>: Provide protective covering for materials and components in a manner which will prevent damage or contamination, distortion, breakage, or structural weakening. Clearly mark units for coordinated installation.

Built-In Items: Promptly deliver accessories to be built-in supporting construction. Furnish final reviewed setting drawings, diagrams, templates and instructions for installation

of built-in items.

Storage: Store materials and components in a manner which will prevent surface damage or contamination, distortion, breakage, straining or other structural weakening or damage.

<u>Handling</u>: Lift and support units at the designated lift or supporting points as shown on final reviewed shop drawings.

JOB CONDITIONS:

Contractor shall conduct a pre-Pre-Installation Meeting: installation meeting at the project site prior to delivery of products to review conditions associated with performing the precast concrete work. Meeting shall include review of conditions, construction environmental conditions and coordination required for proper installation in areas to receive precast concrete. Participants in meeting shall include the Architect, manufacturer's representative, installer of precast concrete and installers of related work. Proceed with the installation only when everyone concerned agrees that the required conditions can be properly maintained.

<u>Coordination</u>: Coordinate erection of precast concrete with requirements of the supporting construction, and connections to supporting construction for support and anchorage of construction work.

GUARANTEE:

<u>General</u>: Guarantee precast lightweight concrete work meeting provisions of the Conditions of the Contract, except guarantee shall include the additional provisions of this Article.

 Coverage: Defective materials and workmanship shall include abnormal deterioration, aging or weathering of the work; leakage of water, structural failure of components resulting from exposure to pressures and forces up to specified limits, and failure of the work to fulfill other specified performance requirements. The guarantee does not include damage caused by vandalism or natural conditions exceeding the performance requirements. However, the guarantee does include failure of defects for which the causes cannot be determined. Guarantee shall be signed by the Contractor and precast Concrete manufacturer.

Time Period: Extend guarantee time period to 2 years.

PART 2 - PRODUCTS:

ACCEPTABLE MANUFACTURERS:

Bluegrass Art Cast, Inc., Lexington, KY

GFRC, Inc., Lincoln, NE 2.23

Pre-Fab Panelwall, Inc., Cincinnati, OH

Spancrete Industries, Inc., Waukesha, WI

MATERIALS AND COMPONENTS:

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14 Portland Cement: ASTM C150-81, Type I or III, buff color to
15 match existing construction, alkali content, max. 0.6% or
16 certify that no alkali reactivity is produced with the proposed
17 cement-aggregate combinations. (ASTM C 227) use same brand,

type, and source of supply throughout.

Mixing Water: Drinkable, tasteless, odorless.

Aggregate: ASTM C 33-81 for normal weight concrete, gravel, or crushed stone matching aggregate of existing construction. Artificial or natural sand with a history of successful use in GFRC production. Material: Melvin Limestone.

Admixtures: Conforming to ASTM C 260-77, ASTM C 494-80 type A.

Glass Fiber: Fibers specifically designed to be compatible with the fiber.

Lightgage Metal Members:

<u>Description</u>: Deep leg runner track, studs, channels and bent plate meeting requirements of ASTM A570, Grade 50 (40,000 psi minimum yield strength) Coat Designation G90 (galvanized), 16 ga minimum prior to galvanizing.

Acceptable Manufacturers:

Inryco

Keene Corp.

United States Steel Corp.

Wheeling Corrugating Company

CONNECTION MATERIALS:

Sprayed in Anchors: Stainless Steel ASTM A 666, Type 304, Grade A.

Steel Shapes, Bars and Plates: ASTM A36.

1 Anchor Bolts: ASTM A307, low-carbon steel bolts, heavy hexagon nuts and steel washers.

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<u>Finish</u> of <u>steel units</u>: Exposed units galvanized per ASTM A153; others painted with rust-inhibitive primer to provide for corrosion resistance.

<u>Accessories</u>: Provide clips, hangers, inserts, recesses and other accessories required for installation of precast concrete units and for support of subsequent construction or finishes.

ACCESSORY MATERIALS:

Galvanize Repair Paint:

17 <u>Description</u>: High zinc-dust content paint for repair or touch-18 up of galvanized steel.

Acceptable Products:

ZRC Chemical Products Co.: Z.R.C. Cold Galvanizing Compound.

<u>Sealant</u>: Tow component polyurethane meeting requirements of SECTION - SEALANTS.

FABRICATION:

General: Fabricate precast units complying with manufacturing and testing procedures, quality control recommendations and dimensional tolerances.

 <u>Characteristics</u>: Fabricate units straight smooth and true to size and shape, with exposed edges and corners precise and square unless otherwise indicated. Precast units which are warped, cracked, broken, spalled, stained or otherwise defective will not be acceptable.

<u>Built-In</u> <u>Items</u>: Provide reglets, slots, holes and other accessories in units to receive cramps, dowels, flashings and other similar work as indicated. Install built-in items meeting product manufacturer's instructions.

Anchorage Devices: Provide all loose steel plates, clip angles, seat angles, anchors, dowels, cramps, hangers and other miscellaneous steel shapes which are necessary for securing precast concrete to supporting construction and adjacent members. Items shall be either of corrosion resistant materials or of carbon steel which after fabrication shall be coated to provide for corrosion resistance.

Openings: Cast in holes for openings larger than 10" diameter

or 10" square in accordance with final reviewed shop drawings.

Smaller holes will be field cut by trades requiring them.

 Place Glass Fiber Reinforced Concrete in a continuous operation to prevent formation of seams or planes of weakness in precast units.

<u>Identification</u>: Provide permanent marking to identify pick-up points and orientation in structure, complying with markings indicated on final shop drawings. Imprint date of casting on each precast unit on a surface which will not show in finished structure.j

<u>Finish of Formed Surfaces</u>: Provide finishes for formed surfaces of precast concrete meeting requirements specified in PARAGRAPH - DESCRIPTION.

 Finish of Unformed Surfaces: Apply trowel finish to unformed surfaces unless otherwise indicated. Consolidate concrete, bring to proper level with a straightedge, float, and trowel to a smooth, uniform finish.

PART 3 - EXECUTION:

INSPECTION:

 Examine all parts of the supporting structure and the conditions under which the precast work is to be installed, and remedy conditions detrimental to the proper and timely completion of work. Do not proceed with the installation until unsatisfactory conditions have been corrected.

INSTALLATION:

General: Install precast units in accordance with final shop drawings, plumb, level, and in alignment within the specified limits of erection tolerances. Provide temporary supports and bracking as required to maintain position, stability, and alignment as members are being permanently connected. Maintain horizontal and vertical joint alignment and uniform joint width as erection progresses.

Lightgage Metal Framing:

Install lightgage metal framing meeting requirements of AISI - Specification for Cold Formed Structural Members.

Provide double studs at all panels vertical joints. Provide studs to provide structural backing at all inside and outside panel corners and at interior and exterior corner panel joints.

Provide horizontal bridging in all stud wall framing at centers recommended by cold formed structural member manufacturer but in no case at centers more than 4'-0".

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Provide channel track around all four side panel cutouts larger than 2'-0" x 2'-0". Run jack studs over and under panel openings attached to openings perimeter track.

Frame both sides of building expansion joints with separate studs on each side of joint. Do not bridge the joint with components of the stud system.

Attach lightgage metal framing to building frame by welding or bolting.

Make all studs continuous from bottom runner to top track. Splices in axially loaded exterior studs will not be allowed.

<u>Accessories</u>: Install clips, hangers and other accessories required for erection of precast units to supporting member and back up materials.

Anchoring: Anchor units in final position by bolting, welding or as otherwise shown on Drawings. Remove temporary shims, wedges and spacers as soon as possible after anchoring is completed.

Welding: Perform all welding in compliance with AWS D1.1 and D12.1, as applicable, including qualification of welders.

Protect units from damage by field welding or cutting operations and provide non-combustible shields as required.

Repair damaged metal surfaces by cleaning and applying a coat of liquid galvanizing repair paint to galvanized surfaces and compatible primer to painted surfaces.

<u>Powder-Actuated</u> <u>Fasteners</u>: Do not use powder-actuated fasteners.

Make adjustments as required to maintain accurate face joint dimensions:

At bolted connections use lock washers or other acceptable means to prevent loosening of nuts. Welding is not acceptable.

At welded connections apply rust-inhibitive coating on damaged areas, same as shop-applied material. Use galvanizing repair paint on galvanized surfaces.

Seal joints between concrete units, and between concrete units and adjacent construction with sealant. In addition, seal joints exposed to interior side of completed building. Meet

requirements of SECTION - SEALANTS.

Cleaning: Clean exposed facings to remove dirt and stains which may be on units after erection and completion of joint treatments. Wash and rinse in accordance with precast manufacturers recommendations. Protect other work from damage due to cleaning operations. Do not use cleaning materials or processes which could change the character of the exposed concrete finishes.

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PLANT QUALITY CONTROL:

General: The Owner may employ a separate Testing Laboratory to evaluate precast concrete manufacturer's quality control inspection and testing methods.

<u>Defective</u> <u>Work:</u> Precast concrete units which do not conform to specified requirements, including strength, tolerances, and finishes, shall be replaced with precast concrete units that meet the requirements.

ADJUSTMENTS AND CLEANING:

Patching: The type and quantity of patching which will be acceptable is subject to review by the Architect.

Repair: Repair of minor damage to precast concrete will be allowed if, in the opinion of the Architect, repairs do not reduce the performance of the material, and if repairs can be demonstrated to be imperceptible in the completed work.

<u>Protection</u>: Advise Contractor of required procedures for protection of the precast polymer concrete work during remainder of construction period.

END OF SECTION 03455

SECTION 03520 - LIGHTWEIGHT INSULATING CONCRETE

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PART 1 - GENERAL

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RELATED DOCUMENTS:

 Drawings and general provisions of Contract, including General and Special Conditions and Division-1 Specification sections, apply to work of this Section.

SUMMARY:

Extent of lightweight insulating concrete is shown on drawings.

SUBMITTALS:

<u>Product</u> <u>Data</u>: Submit manufacturer's literature describing products and methods of mixing and application instructions.

<u>Certificates</u>: Submit test reports certified by an independent testing laboratory stating that materials and mix intended to be used meet specified requirements.

QUALITY ASSURANCE:

<u>Insulating Concrete Supplier:</u> Regularly engaged in production of lightweight insulating concrete.

<u>Insulating Concrete Applicator</u>: Regularly engaged and properly equipped for application of lightweight insulating concrete, and as acceptable by aggregate producer.

DELIVERY, STORAGE AND HANDLING:

<u>Deliver</u> materials in manufacturer's original undamaged packages or acceptable bulk containers.

Store packaged materials to protect them from elements or physical damage.

Do not use cement which shows indications of moisture damage, caking, or other signs of deterioration.

JOB CONDITIONS:

53 Do not place lightweight insulating concrete when ambient

temperature is below freezing (32 deg.F, 0 deg.C).

When air temperature has fallen or is expected to fall below 40 deg.F (4 deg.C), heat water to a maximum 120 deg.F (48 deg.C) before mixing to attain concrete at point of placement with temperature of 50 deg.F (10 deg.C) min. and 80 deg.F (27 deg.C) max.

Do not place lightweight insulating concrete on surfaces which are covered with standing water, snow, or ice.

PART 2 - PRODUCTS

MATERIALS:

Portland Cement: ASTM C 150, Type I or Type III.

Aggregate: ASTM C 332, Group I.

Water: Clean, potable.

Air Entraining Admixture: ASTM C 260.

Control Joint Filler: ASTM C 612, Class 2, glass fiber type.

Reinforcing Mesh: Welded wire fabric, ASTM A 185, galvanized.

<u>Insulation</u> <u>Board</u>: Rigid polystyrene boards or formed units with minimum density of 1 pcf complying with ASTM C 578. Provide units with venting holes which approximate 3% of board gross surface area.

DESIGN MIX:

Design lightweight insulating concrete mix to produce the following minimum physical properties.

Wet Density at Point of Placement: 40.5 pcf, plus-or-minus 2.0 pcf, when tested in accordance with ASTM C 138.

Oven Dry Density: 26 pcf, plus-or-minus 2 pcf, when tested in accordance with ASTM C 495.

Compressive Strength: Minimum 140 psi, when tested in accordance with ASTM C 495.

Do not exceed maximum air content recommended by aggregate manufacturer.

Use minimum amount of water necessary to produce a workable mix.

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PART 3 - EXECUTION

PREPARATION:

<u>Control</u> <u>Joints</u>: Install control joints at perimeter of roof deck and at junctures with vertical surfaces, including curbs, walls, and vents, for full depth of insulating concrete.

<u>Provide 1"</u> wide expansion joint material for roof areas with dimensions up to 100 ft. in length; 1-1/2" thick for roof areas exceeding 100 ft.

Reinforcing Mesh: Place reinforcing mesh at right angles to structural supports; end laps at least 6" and no side laps. Cut to fit around roof openings and projections. Terminate mesh at control joints.

INSTALLATION:

Place lightweight insulating concrete in accordance with manufacturer's instructions, using equipment and procedures to avoid segregation of mix and loss of air content. Deposit and screed in a continuous operation until an entire panel or section of roof area is completed. Do not vibrate or work mix except for screeding or floating. Place lightweight insulating concrete to depths and slopes as shown on drawings. Leave top surface in acceptable condition to receive subsequent roofing application.

Begin curing operations immediately after placement, and air cure for not less than 3 days in accordance with manufacturer's recommendations.

<u>Provide</u> temporary protection of removable waterproof covering to prevent direct exposure to moisture if roofing application is not started immediately after completion of curing.

FIELD QUALITY CONTROL:

Engage an independent testing laboratory acceptable to Architect to take samples and conduct tests to evaluate lightweight insulating concrete. Do not use same testing service which provided initial mix designs.

 $\underline{\text{Take}}$ samples in accordance with ASTM C 172, except as modified by ASTM C 495.

Determine wet density in accordance with ASTM C 138.

Determine compressive strength and oven dry density in accordance with ASTM C 495. Make at least 6 molds during each placement.

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Report test results to Architect, Contractor, and lightweight insulating concrete producer within 24 hours of completion of each test.

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DEFECTIVE WORK:

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Refinish or remove and replace lightweight insulating concrete surfaces which are too rough to receive finish roofing, or where physical properties do not meet specified requirements, as determined by Architect.

END OF SECTION 03520

SECTION 04200 - UNIT MASONRY

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PART 1 - GENERAL

RELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Special Conditions and Division-1 Specification sections, apply to work of this section.

DESCRIPTION OF WORK:

Extent of each type of masonry work is indicated on drawings and schedule.

Types of masonry work required include:

Concrete unit masonry.

Brick paving is specified in Division-2 section "Unit Pavers".

QUALITY ASSURANCE:

Fire Performance Characteristics: Where indicated, provide materials and construction which are identical to those of assemblies whose fire endurance has been determined by testing in compliance with ASTM E 119 by a recognized testing and inspecting organization or by another means, as acceptable to authority having jurisdiction.

 Single Source Responsibility for Masonry Units: Obtain exposed masonry units of uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from one manufacturer for each different product required for each continuous surface or visually related surfaces.

 Single Source Responsibility for Mortar Materials: Obtain mortar ingredients of uniform quality, including color for exposed masonry, from one manufacturer for each cementitious component and from one source and producer for each aggregate.

SUBMITTALS:

<u>Product Data</u>: Submit manufacturer's product data for each type of masonry unit, accessory, and other manufactured products, including certifications that each type complies with specified requirements.

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DELIVERY, STORAGE, AND HANDLING:

<u>Deliver masonry materials</u> to project in undamaged condition.

Store and handle masonry units to prevent their deterioration or damage due to moisture, temperature changes, contaminants, corrosion or other causes.

 <u>Limit moisture absorption</u> of concrete masonry units during delivery and until time of installation to the maximum percentage specified for Type I units for the average annual relative humidity as reported by the U.S. Weather Bureau Station nearest project site.

Store cementitious materials off the ground, under cover and in dry location.

Store aggregates where grading and other required characteristics can be maintained.

Store masonry accessories including metal items to prevent deterioration by corrosion and accumulation of dirt.

PROJECT CONDITIONS:

<u>Protection of Work:</u> During erection, cover top of walls with heavy waterproof sheeting at end of each day's work. Cover partially completed structures when work is not in progress.

Extend cover a minimum of 24 inches down both sides and hold cover securely in place.

Do not apply uniform floor or roof loading for at least 12 hours after building masonry walls or columns.

<u>Do not apply concentrated loads</u> for at least 3 days after building masonry walls or columns.

<u>Staining</u>: Prevent grout or mortar or soil from staining the face of masonry to be left exposed or painted. Remove immediately grout or mortar in contact with such masonry.

<u>Protect</u> <u>base</u> of walls from rain-splashed mud and mortar splatter by means of coverings spread on ground and over wall surface.

Protect sills, ledges and projections from droppings of mortar.

Cold Weather Protection:

Do not lay masonry units which are wet or frozen.

Remove any ice or snow formed on masonry bed by carefully applying heat until top surface is dry to the touch. Remove masonry damaged by freezing conditions. Perform the following construction procedures while the work is Temperature ranges indicated below apply to air progressing. temperatures existing at time of installation except for grout. For grout, temperature ranges apply to anticipated minimum night In heating mortar and grout materials, maintain temperatures. mixing temperature selected within 10 deg. F (6 deg. C).

40 deg. F (4 deg. C) to 32 deg. F (0 deg. C):

Mortar: Heat mixing water to produce mortar temperature between 40 deg. F (4 deg. C) and 120 deg. F (49 deg. C).

Grout: Follow normal masonry procedures.

32 deg. F (0 deg. C) to 25 deg. F (-4 deg. C):

Mortar: Heat mixing water and sand to produce mortar temperatures between 40 deg. F (4 deg. C) and 120 deg. F (49 deg. C); maintain temperature of mortar on boards above freezing.

Grout: Heat grout materials to 90 deg. F (32 deg. C) to produce inplace grout temperature of 70 deg. F (21 deg. C) at end of work day.

25 deg. F (-4 deg. C) to 20 deg. F (-7 deg. C):

Mortar: Heat mixing water and sand to produce mortar temperatures between 40 deg. F (4 deg. C) and 120 deg. F (49 deg. C); maintain temperature of mortar on boards above freezing.

Grout: Heat grout materials to 90 deg. F (32 deg. C) to produce inplace grout temperature of 70 deg. F (21 deg. C) at end of work day.

Heat: both sides of walls under construction using
salamanders or other heat sources.

<u>Use windbreaks</u> or enclosures when wind is in excess of 15 mph.

20 deg. F (-7 deg. C) and below:

Mortar: Heat mixing water and sand to produce mortar temperatures between 40 deg. F (4 deg. C) and 120 deg. F (49 deg. C).

deq. C) at end of work day.

24 hours after laying units.

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Do not heat water for mortar and grout to above 160 deq. F (71 deg. C).

Grout: Heat grout materials to 90 deg. F (32 deg. C)

to produce inplace grout temperature of 70 deg. F (21

Masonry Units: Heat masonry units so that they are

Provide enclosure and auxiliary heat to maintain an air temperature of at least 40 deg. F (4 deg. C) for

Protect completed masonry and masonry not being worked on in the following manner. Temperature ranges indicated apply to mean daily air temperatures except for grouted masonry. For grouted masonry temperature ranges apply to anticipated minimum night temperatures.

above 20 deg. F (-7 deg. C) at time of laying.

40 deg. F (4 deg. C) to 32 deg. F (0 deg. C):

Protect masonry from rain or snow for at least 24 hours by covering with weather-resistive membrane.

32 deg. F (0 deg. C) to 25 deg. F (-4 deg. C):

Completely cover masonry with weather-resistive membrane for at least 24 hours.

25 deg. F (-4 deg. C) to 20 deg. F (-7 deg. C):

Completely cover masonry with weather-resistive insulating blankets or similar protection for at least 24 hours, 48 hours for grouted masonry.

20 deg. (-7 deg.) and below:

Except as otherwise indicated, maintain masonry temperature above 32 deg. F (0 deg. C) for 24 hours using enclosures and supplementary heat, electric heating blankets, infrared lamps or other methods proven to be satisfactory. For grouted masonry maintain heated enclosure to 40 deg. F (4 deg. C) for 48 hours.

CONCRETE MASONRY UNITS:

PART 2 - PRODUCTS

Comply referenced standards other and

requirements indicated below applicable to each form of concrete masonry unit required.

<u>Provide</u> <u>special</u> <u>shapes</u> where required for lintels, corners, jambs, sash, control joints, headers, bonding and other special conditions.

Provide bullnose units for outside corners unless otherwise indicated.

<u>Concrete</u> <u>Block</u>: Provide units complying with characteristics indicated below for Grade, Type, face size, exposed face and, under each form included, for weight classification.

Grade N.

<u>Size</u>: Manufacturer's standard units with nominal face dimensions of 16" long x 8" high (15-5/8" x 7-5/8" actual) x thicknesses indicated.

Type I, moisture-controlled units.

Exposed Faces: Manufacturer's standard color and texture, unless otherwise indicated.

Where special finishes are indicated, provide units with exposed faces of the following general description matching color and texture of Architect's sample.

Standard aggregate, ground finish.

Where special patterns are indicated, provide units with exposed faces matching color, texture and pattern of Architect's sample.

Hollow Loadbearing Block: ASTM C 90 and as follows:

Weight Classification: Lightweight.

Solid Loadbearing Block: ASTM C 145 and as follows:

Weight Classification: Lightweight.

Concrete Building Brick: Provide units complying with ASTM C 55 and characteristics indicated below for grade, type, size and weight classification.

Grade: Same as indicated for concrete block.

Type: Same as indicated for concrete block.

Size: As indicated.

Non-Modular Standard: 2-1/4" x 3-3/4" x 8".

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Weight Classification: Lightweight.

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MORTAR AND GROUT MATERIALS:

Portland Cement: ASTM C 150, Type I, except Type III may be used for cold weather construction. Provide natural color or white cement as required to produce required mortar color.

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Hydrated Lime: ASTM C 207, Type S.

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Aggregate for Mortar: ASTM C 144, except for joints less than 1/4" use aggregate graded with 100% passing the No. 16 sieve.

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Aggregate for Grout: ASTM C 404.

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Water: Clean and potable.

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JOINT REINFORCMENT, TIES AND ANCHORING DEVICES:

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Comply with requirements indicated below for basic materials and with requirements indicated under each form of joint reinforcement, tie and anchor for size and other characteristics:

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Zinc-Coated (galvanized) Steel Wire: ASTM A 82 for uncoated wire and with ASTM C 641 for zinc coating of class indicated below:

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Class 3 (0.80 oz. per sq. ft. of wire surface).

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Application: Use for masonry not exposed to exterior or earth.

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Hot-Dip Galvanized Steel Wire: ASTM A 82 for uncoated wire and with ASTM A 123, Class B-2 (1.5 oz. per sq. ft. of wire surface) for zinc coating applied after prefabrication into units.

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Austenitic Stainless Steel Wire: ASTM A 580, AISI Type 304 (UNS S30400) alloy.

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Application: Use for masonry exposed to exterior and in contact with earth.

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Zinc-Coated (Galvanized) Steel Sheet: Carbon steel with zinc coating complying with ASTM A 525, Coating Designation G90.

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Application: Use for dovetail slots and where indicated.

Hot-Dip Galvanized Carbon Steel Sheet: ASTM A 366, Class 2 or ASTM A 635; hot dip galvanized after fabrication to comply with ASTM A 153; Class B.

Application: Use for anchors.

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<u>Joint Reinforcement</u>: Provide welded-wire units prefabricated with deformed continuous side rods and plain cross rods into straight lengths of not less than 10', with prefabricated corner and tee units, and complying with requirements indicated below:

<u>Width</u>: Fabricate joint reinforcement in units with widths of approximately 2" less than nominal width of walls and partitions as required to provide mortar coverage of not less than 5/8" on joint faces exposed to exterior and 1/2" elsewhere.

Wire Size for Side Rods: 0.1483" diameter.

Wire Size for Cross Rods: 0.1483" diameter.

For <u>single-wythe masonry</u> provide type as follows with single pair of side rods:

Truss design with perpendicular cross rods spaced not more than 16" o.c.

For <u>multi-wythe</u> <u>masonry</u> provide type as follows:

Truss design with diagonal cross rods spaced not more than 16" o.c. and number of side rods as follows:

Number of Side Rods for Composite Construction: One side rod for each face shell of concrete masonry back-up and one rod for brick wythe.

Number of Side Rods for Multiple-Wythe Concrete Masonry:
One side rod for each face shell of concrete masonry back-up and of concrete masonry facing wythe.

Tab design with single pair of side rods and rectangular boxtype cross ties spaced not more than 16" o.c.; with side rods spaced for embedment within each face shell of back-up wythe and ties extended to within 1" of exterior face of facing wythe.

Bent-Wire Ties: Provide individual prefabricated bent-wire units complying with requirements indicated below:

Wire Size: 0.25" diameter.

<u>Length</u>: Provide units of length indicated but not less than that required for embedment into each wythe of 1.5" for solid

units and for embedment of tie end into face shells of hollow units, with not less than 5/8" mortar cover on exterior face joints, 1/2" elsewhere.

Tie Shape for Hollow Masonry Units Laid with Cells Vertical: Rectangular with ends welded close and not less than 2" wide.

Tie Shape for Solid Masonry Unit Construction: Z-shaped ties with ends bent 90 deg. to provide hooks not less than 2" long.

Type for Masonry Where Coursing Between Wythes Align: Unit ties bent from one piece of wire.

Type for Masonry Where Coursing Between Wythes Does Not Align: Adjustable ties composed of two parts, one with a pintle, the other with an eye.

Flexible Anchors: Where flexible anchors are indicated for connecting masonry to structural framework, provide 2-piece anchors as described below which permit vertical or horizontal differential movement between wall and framework parallel to, but resist tension and compression forces perpendicular to, plane of wall.

For anchorage to concrete framework, provide manufacturer's standard anchors with dovetail anchor section formed from 0.1046" (12 gage) thick sheet metal and triangular-shaped wire tie section sized to extend within 1" of masonry face.

For anchorage to steel framework provide manufacturer's standard anchors with crimped 1/4" diameter wire anchor section for welding to steel and triangular-shaped wire tie section sized to extend within 1" of masonry face.

Wire Size: 0.25" diameter.

Masonry Veneer Anchors: Two-piece assemblies which permit vertical or horizontal differential movement between wall and framework parallel to, but resist tension and compression forces perpendicular to, plane of wall; consisting of wire tie section and metal anchor section for attachment over sheathing to metal studs and complying with the following requirements.

Wire Size: 0.25" diameter.

Wire Tie Shape: Rectangular.

Wire Tie Length: As required to extend within 1" of masonry veneer face.

<u>Unit Type Masonry Inserts in Concrete:</u> Furnish cast iron or malleable iron inserts of type and size indicated.

<u>Dovetail Slots</u>: Furnish dovetail slots, with filler strips, of slot size indicated, fabricated from 0.0336" (22 gage) sheet metal.

Anchor Bolts: Provide steel bolts with hex nuts and flat washers complying with ASTM A 307, Grade A, hot-dip galvanized to comply with ASTM C 153, Class C, in sizes and configurations indicated.

<u>Available</u> <u>Manufacturers</u>: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following:

AA Wire Products Co.

Dur-O-Wall, Inc. Heckman Building Products, Inc.

Hohmann & Barnard, Inc.

Masonry Reinforcing Corp. of America.

National Wire Products Corp.

MISCELLANEOUS MASONRY ACCESSORIES:

Reinforcing Bars: Deformed steel, ASTM A 615, Grade 60 for bars No. 3 to No. 18.

Non-Metallic Expansion Joint Strips: Premolded, flexible cellular neoprene rubber filler strips complying with ASTM D 1056, Grade RE41E1, capable of compression up to 35%, of width and thickness indicated.

<u>Premolded</u> <u>Control</u> <u>Joint Strips</u>: Material as indicated below, designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.

Styrene-butadiene rubber compound complying with ASTM D 2000, Designation 2AA-805.

Bond Breaker Strips: Asphalt-saturated organic roofing felt complying with ASTM D 226, Type I (No. 15 asphalt felt).

MASONRY CLEANERS:

<u>Job-Mixed Detergent Solution</u>: Solution of trisodium phosphate (1/2 cup dry measure) and laundry detergent (1/2 cup dry measure) dissolved in one gallon of water.

MORTAR AND GROUT MIXES:

General: Do not add admixtures including coloring pigments,

air-entraining agents, accelerators, retarders, water repellant agents, anti-freeze compounds or other admixtures, unless otherwise indicated.

Do not use calcium chloride in mortar or grout.

<u>Mixing</u>: Combine and thoroughly mix cementitious, water and aggregates in a mechanical batch mixer; comply with referenced ASTM standards for mixing time and water content.

Mortar for Unit Masonry: Comply with ASTM C 270, Proportion Specification, for types of mortar required, unless otherwise indicated.

Limit cementitious materials in mortar to portland cement-

 $\underline{\text{Use}}\ \underline{\text{Type}}\ \underline{\text{M}}\ \underline{\text{mortar}}$ for masonry below grade and in contact with earth, and where indicated.

Use Type S mortar for reinforced masonry and where indicated.

<u>Use Type N mortar</u> for exterior, above-grade loadbearing and non-loadbearing walls; for interior loadbearing walls; and for other applications where another type is not indicated.

Grout for Unit Masonry: Comply with ASTM C 476 for grout for use in construction of reinforced and nonreinforced unit masonry. Use grout of consistency indicated or if not otherwise indicated, of consistency (fine or coarse) at time of placement which will completely fill all spaces intended to receive grout.

 $\underline{\text{Use }}$ $\underline{\text{fine }}$ $\underline{\text{grout}}$ in $\underline{\text{grout }}$ spaces less than 2" in horizontal direction, unless otherwise indicated.

<u>Use coarse grout</u> in grout spaces 2" or more in least horizontal dimension, unless otherwise indicated.

PART 3 - EXECUTION

INSTALLATION, GENERAL:

Do not wet concrete masonry units.

<u>Cleaning Reinforcing:</u> Before placing, remove loose rust, ice and other coatings from reinforcing.

 Thickness: Build cavity and composite walls, floors and other masonry construction to the full thickness shown. Build single-wythe walls (if any) to the actual thickness of the masonry units, using units of nominal thickness indicated.

Build chases and recesses as shown or required for the work of other trades. Provide not less than 8" of masonry between chase or recess and jamb of openings, and between adjacent chases and recesses.

<u>Leave openings for equipment</u> to be installed before completion of masonry work. After installation of equipment, complete masonry work to match work immediately adjacent to the opening.

<u>Cut masonry units</u> using motor-driven saws to provide clean, sharp, unchipped edges. Cut units as required to provide continuous pattern and to fit adjoining work. Use full-size units without cutting where possible.

Use dry cutting saws to cut concrete masonry units.

CONSTRUCTION TOLERANCES:

Variation from Plumb: For vertical lines and surfaces of columns, walls and arrises do not exceed 1/4" in 10', or 3/8" in a story height not to exceed 20', nor 1/2" in 40' or more. For external corners, expansion joints, control joints and other conspicuous lines, do not exceed 1/4" in any story or 20' maximum, nor 1/2" in 40' or more. For vertical alignment of head joints do not exceed plus or minus 1/4" in 10', 1/2" maximum.

 <u>Variation</u> from Level: For bed joints and lines of exposed lintels, sills, parapets, horizontal grooves and other conspicuous lines, do not exceed 1/4" in any bay or 20' maximum, nor 1/2" in 40' or more. For top surface of bearing walls do not exceed 1/8" between adjacent floor elements in 10' or 1/16" within width of a single unit.

<u>Variation of Linear Building Line</u>: For position shown in plain and related portion of columns, walls and partitions, do not exceed 1/2" in any bay or 20' maximum, nor 3/4" in 40' or more.

<u>Variation in Cross-Sectional Dimensions</u>: For columns and thickness of walls, from dimensions shown, do not exceed minus 1/4" nor plus 1/2".

<u>Variation</u> in <u>Mortar</u> <u>Joint Thickness</u>: Do not exceed bed joint thickness indicated by more than plus or minus 1/8", with a maximum thickness limited to 1/2". Do not exceed head joint thickness indicated by more than plus or minus 1/8".

LAYING MASONRY WALLS:

53 <u>Layout walls in advance</u> for accurate spacing of surface bond patterns with uniform joint widths and to accurately locate

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opening, movement-type joints, returns and offsets. Avoid the use of less-than-half-size units at corners, jambs and wherever possible at other locations.

<u>Lay-up</u> walls to comply with specified construction tolerances, with courses accurately spaced and coordinated with other work.

Pattern Bond: Lay exposed masonry in the bond pattern shown or, if not shown, lay in running bond with vertical joint in each course centered on units in courses above and below. Lay concealed masonry with all units in a wythe in running bond or bonded by lapping not less than 2". Bond and interlock each course of each wythe at corners. Do not use units with less than nominal 4" horizontal face dimensions at corners or jambs.

Stopping and Resuming Work: Rack back 1/2-unit length in each course; do not tooth. Clean exposed surfaces of set masonry, wet units lightly (if required) and remove loose masonry units and mortar prior to laying fresh masonry.

<u>Built-in Work:</u> As the work progresses, build-in items specified under this and other sections of these specifications. Fill in solidly with masonry around built-in items.

Fill space between hollow metal frames and masonry solidly with mortar, unless otherwise indicated.

At exterior frames insert extruded polystyrene board insulation around perimeter of frame in thickness indicated but not less than 3/4" to act as a thermal break between frame and masonry.

Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath in the joint below and rod mortar or grout into core.

Fill cores in hollow masonry units with grout 3 courses (24") under bearing plates, beams, lintels, posts and similar items, unless otherwise indicated.

MORTAR BEDDING AND JOINTING:

Lay solid brick-size masonry units with completely filled bed and head joint; butter ends with sufficient mortar to fill head joints and shove into place. Do not slush head joints.

Lay hollow concrete masonry units with full mortar coverage on horizontal and vertical face shells. Bed webs in mortar in starting course on footings and in all courses of piers, columns and pilasters, and where adjacent to cells or cavities to be reinforced or filled with concrete or grout. For starting course on footings where cells are not grouted, spread out full mortar bed including areas under cells.

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Maintain joint widths shown, except for minor variations required to maintain bond alignment. If not shown, lay walls with 3/8" joints.

Cut joints flush for masonry walls which are to be concealed or to be covered by other materials, unless otherwise indicated.

Tool exposed joints slightly concave using a jointer larger than joint thickness, unless otherwise indicated.

Remove masonry units disturbed after laying; clean and reset in fresh mortar. Do not pound corners or jambs to shift adjacent stretcher units which have been set in position. If adjustments are required, remove units, clean off mortar and reset in fresh mortar.

After each course is laid, fill in vertical Collar Joints: longitudinal joint between wythes solidly and with mortar for the following masonry work:

All exterior walls, except cavity walls, and interior walls and partitions.

STRUCTURAL BONDING OF MULTI-WYTHE MASONRY:

Use individual metal ties installed in horizontal joints to bond wythes together. Provide ties as shown, but not less than one metal tie for 4 sq. ft. of wall area spaced not to exceed 24" o.c. horizontally and vertically. Stagger ties in alternate courses. Provide additional ties within 1' - 0" of all openings and space not more than 3'-0" apart around perimeter openings. At intersecting and abutting walls, provide ties at no more than 24" o.c. vertically.

<u>Use continuous horizontal joint reinforcement</u> installed horizontal mortar joints for bond tie between wythes. at not more than 16" o.c. vertically.

Use either of the structural bonding systems specified above.

Corners: Provide interlocking masonry unit bond in each course at corners, unless otherwise shown.

For horizontally reinforced masonry, provide continuity at corners with prefabricated "L" units, in addition to masonry bonding.

Intersecting and Abutting Walls: Unless vertical expansion or control joints are shown at juncture, provide same type of bonding specified for structural bonding between wythes and space as follows:

Provide individual metal ties at not more than 24" o.c. vertically.

Provide continuity with horizontal joint reinforcement using prefabricated "T" units.

Intersecting Load-bearing Walls: If carried up separately, block or tooth vertical joint with 8" maximum offsets and provide rigid steel anchors spaced not more than 4'-0" o.c. vertically, or omit blocking and provide rigid steel anchors at not more than 2'-0" o.c. vertically. Form anchors of galvanized steel not less than 1-1/2" x 1/4" x 2'-0" long with ends turned up not less than 2" or with cross-pins. If used with hollow masonry units, embed ends in mortar-filled cores.

Non-bearing Interior Partitions: Build full height of story to underside of solid floor or roof structure above, unless otherwise shown.

Wedge non-bearing partitions against above with small pieces of tile, slate or metal. Fill joint with mortar after dead load deflection of structure above approaches final position.

CAVITY WALLS:

Keep cavity clean of mortar droppings and other materials during construction. Strike joints facing cavity flush.

 $\underline{\text{Tie}}$ exterior wythe to back-up with individual metal ties spaced not more than 18" o.c. vertically and 24" o.c. horizontally. Stagger alternate courses.

<u>Tie exterior wythe to back-up</u> with continuous horizontal joint reinforcing, installed in mortar joints at not more than 16" o.c. vertically.

HORIZONTAL JOINT REINFORCEMENT:

General: Provide continuous horizontal joint reinforcement as indicated. Install longitudinal side rods in mortar for their entire length with a minimum cover of 5/8" exterior side of walls, 1/2" elsewhere. Lap reinforcing a minimum of 6".

<u>Cut or interrupt</u> joint reinforcement at control and expansion joints, unless otherwise indicated.

Reinforce walls with continuous horizontal joint reinforcing unless specifically noted to be omitted.

Provide continuity at corners and wall intersections by use of prefabricated "L" and "T" sections. Cut and bend reinforcement units as directed by manufacturer for continuity at returns,

offsets, column fireproofing, pipe enclosures and other special conditions.

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Space continuous horizontal reinforcement as follows:

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For single-wythe walls, space reinforcement at 16" o.c. vertically, unless otherwise indicated.

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For parapets, space reinforcement at 8" o.c. vertically, unless otherwise indicated.

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masonry openings greater than 1'-0" wide, with Reinforce horizontal joint reinforcement placed in 2 horizontal joints approximately 8" apart, immediately above the lintel and apart, immediately above the lintel and immediately below the sill. Extend reinforcement a minimum of 2'-0" beyond jambs of the opening except at control joints.

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addition to wall reinforcement, provide additional reinforcement at openings as required to comply with the above.

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ANCHORING MASONRY WORK:

25 26 General: Provide anchor devices of type indicated.

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Anchor masonry to structural members where masonry abuts or faces structural members to comply with the following:

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Provide an open space not less than 1" in width between masonry and structural member, unless otherwise indicated. Keep open space free of mortar or other rigid materials.

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Anchor masonry to structural members with flexible anchors embedded in masonry joints and attached to structure.

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Space anchors as indicated, but not more than 24" o.c. vertically and 36" o.c. horizontally.

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Anchor single wythe masonry veneer to metal studs with masonry veneer anchors to comply with the following requirements:

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Fasten each anchor section through sheathing to metal studs with 2 metal fasteners of type indicated.

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Embed tie section in masonry joints. Provide not less than 1" air space between back of masonry veneer wythe and face of sheathing.

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Locate anchor section relative to course in which tie section is embedded to allow maximum vertical differential movement of tie up and down.

Space anchors as indicated but not more than 16" o.c.

vertically and 24" o.c. horizontally. Install additional anchors within 1'-0" of openings and at intervals around perimeter not exceeding 3'-0".

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CONTROL AND EXPANSION JOINTS:

General: Provide vertical and horizontal expansion, control and isolation joints in masonry where shown. Build-in related items as the masonry work progresses.

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Build flanges of metal expansion strips into masonry. Lap each joint 4" in direction of water flow. Seal joints below grade and at junctures with horizontal expansion joints, if any.

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Build flanges of factory-fabricated expansion joint units into masonry. See Division-7 section "Elastic Expansion Joints".

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Build-in non-metallic joint filler where indicated.

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Build in horizontal pressure relieving joints where indicated; construct joints by either leaving an air space or inserting non-metallic compressible joint filler of width required to permit installation of sealant and backer rod.

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Locate horizontal pressure relieving joints beneath shelf angles supporting masonry veneer and attached to structure behind masonry veneer.

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LINTELS:

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Install steel lintels where indicated.

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Provide masonry lintels where shown and wherever openings of more than 1'-0" for brick size units and 2'-0" for block size units are shown without structural steel or other supporting lintels. Provide precast or formed-in-place masonry lintels. precast lintels before handling installation. and Temporarily support formed-in-place lintels.

For hollow concrete masonry unit walls, use specially formed U-shaped lintel units with reinforcement bars placed as shown filled with coarse grout.

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Provide minimum bearing of 8" at each jamb, unless otherwise indicated.

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FIELD QUALITY CONTROL:

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Contractor shall employ, at his own expense, a testing laboratory experienced in performing types of masonry field quality control tests for masonry indicated. Comply with

requirements for qualification and acceptance of testing laboratory specified in Part 1 for preconstruction testing service.

Unit Test Method:

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Concrete Masonry Unit Tests: For each type, class and grade of concrete masonry unit indicated, test units by method of sampling and testing of ASTM C 140.

Mortar Tests: For each type indicated, test mortar by methods of sampling and testing of ASTM C 780. Conduct tests no less frequently than that required to evaluate mortar used to install each increment of masonry units indicated above from which samples are taken for testing.

 Report test results in writing and in form specified under each test method, to Architect and Contractor, on same day tests are made.

Evaluation of Quality Control Tests: Masonry work, in absence of other indications of noncompliance with requirements, will be considered satisfactory if results from construction quality control tests comply with minimum requirements indicated.

REPAIR, POINTING, AND CLEANING:

 Remove and replace masonry units which are loose, chipped, broken, stained or otherwise damaged, or if units do not match adjoining units as intended. Provide new units to match adjoining units and install in fresh mortar or grout, pointed to eliminate evidence of replacement.

 <u>Pointing</u>: During the tooling of joints, enlarge any voids or holes, except weep holes, and completely fill with mortar. Point-up all joints including corners, openings and adjacent work to provide a neat, uniform appearance, prepared for application of sealants.

<u>Final Cleaning:</u> After mortar is thoroughly set and cured, clean masonry as follows:

Remove large mortar particles by hand with wooden paddles and non-metallic scrape hoes or chisels.

<u>Protect adjacent stone</u> and non-masonry surfaces from contact with cleaner by covering them with liquid strippable masking agent, polyethylene film or waterproof masking tape.

Saturate wall surfaces with water prior to application of cleaners; remove cleaners promptly by rinsing thoroughly with

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END OF SECTION 04200

clear water.

Use bucket and brush hand cleaning method described in BIA "Technical Note No. 20 Revised" to clean brick masonry made from clay or shale, except use masonry cleaner indicated below.

Detergent.

Clean concrete unit masonry to comply with masonry manufacturer's directions and applicable to NCMA "Tek" bulletins.

Protection: Provide final protection and maintain conditions in

a manner acceptable to Installer, which ensures unit masonry work being without damage and deterioration at time of

substantial completion.

SECTION 04400 - STONEWORK

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PART 1 - GENERAL

RELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Special Conditions and Division-1 Specification sections, apply to work of this section.

SUMMARY:

Extent of stonework is indicated on drawings and schedules.

Types of stonework in this section include:

Honed Granite Panels

<u>Installation</u> of <u>preset</u> concrete <u>inserts</u> for stonework are specified in Division-3 section "Concrete Work".

SYSTEM DESCRIPTION:

 General: Fabricate and install stonework to withstand normal loads from wind, gravity, movement of building structure, and thermally induced movement, as well as to resist deterioration under conditions of normal use including exposure to weather, without failure.

<u>Provide</u> <u>stonework</u> which is designed, fabricated and installed based on the following safety factors applied to minimum physical properties of stone indicated:

Safety Factor for Granite: 3. Safety Factor for Limestone: 8.

Provide hand-set stone anchoring system which results in attachments developing the capability to sustain the following forces generated by the supported element (individual member or assembly) acting separately, based on the yield strength of the material:

 A total force of 4 times the dead weight of the element supported, applied vertically downward through the element's center of gravity, combined with loads caused by thermal movements.

A total force of 2 times the dead weight of the element applied horizontally outward through the center of gravity of the element, combined with loads caused by thermal movements.

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Provide stone veneer system in form of hand-set stone complying with the following minimum performance requirements:

<u>Structural</u> <u>Performance</u>: Design, engineer, fabricate and install stone veneer system to withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:

Wind Loads: Comply with the following requirements:

Effective wind pressures (velocity pressure) for establishing design wind pressures per ANSI A58.1 and test wind pressures for structural, air infiltration, and water penetration performances per AAMA 501 shall be not less than the following:

Uniform pressure of 30 lbf per sq. ft., acting inwards or outwards.

Normal thermal movement is defined as that resulting from an ambient temperature range of 120 deg. F (67 deg. C). Base design calculations on actual surface temperatures of materials due to both solar heat gain and night time sky heat loss.

Horizontal Building Movement (Interstory Drift): Allow for maximum horizontal building movement equal to the quotient resulting from dividing floor-to-floor height at any floor by 400.

Attachments: Attach stone veneer system to the building structure in a manner that results in attachments developing the capability to sustain the following forces generated by the supported element (individual member or assembly) acting separately, based on the yield strength of the material:

A total force of 4 times the dead weight of the element supported, applied vertically downward through the element's center of gravity, combined with loads caused by thermal movements.

A total force of 2 times the dead weight of the element applied horizontally outward through the center of gravity of the element, combined with loads caused by thermal movements.

Redundancy: Provide redundant load paths so that failure of a single fastener, anchor, support or framing member does not result in dislocation of a supported element or any other supporting member or component.

<u>Provisions</u> <u>for Fabrication and Erection Tolerances</u>: Design, detail and fabricate connections of stone veneer system to the building's structural frame so that allowance is made for

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 not only fabrication and erection tolerances but also structural deflections from loads and other causes.

<u>Concrete</u> structural fabrication and erection tolerances are specified in Division-3 section "Concrete Work".

<u>Design</u> <u>criteria</u> for maximum vertical structural deflection of structural members supporting stone veneer system after latter's installation is 1/4".

<u>Leakage Resistance, Water and Air:</u> Engineer, fabricate and install stone veneer system to resist permanently the following:

Water Penetration: No uncontrolled water penetration, as defined in AAMA 501.3, at a minimum differential pressure of 20 percent of design wind load but not less than 6.24 nor more than 12 lbf per sq. ft., as measured by testing mock-up per ASTM E 331.

<u>Control of Corrosion</u>: Prevent galvanic and other forms of corrosion by insulating metals and other materials from direct contact with non-compatible materials.

SUBMITTALS:

<u>Product</u> <u>Data</u>: Submit manufacturer's technical data for each type of stone, stonework accessory, and other manufactured product required.

Shop Drawings: Submit cutting and setting drawings indicating sizes, dimensions, sections and profiles of stones; arrangement and provisions for jointing, supporting, anchoring, and bonding stonework; and details showing relationship with, attachment to, and reception of, related work.

Include large scale details of honed granite panels and trim.

Samples: Submit the following samples:

Stone samples in form of sets for each color, grade, finish, type and variety of stone required and consisting of stones not less than 12" square. Include 2 or more stones in each set of samples showing the full range of variations in appearance characteristics to be expected in completed work.

Samples required for honed granite panels only.

<u>Colored pointing mortar and grout samples</u> for each color required showing full range of exposed color and texture to be expected in completed work.

Sealant samples for each type and color of joint sealant

required.

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QUALITY ASSURANCE:

Single Source Responsibility for Stone: Obtain each color, grade, finish, type and variety of stone from a single quarry with resources to provide materials of consistent quality in appearance and physical properties, including the capacity to cut and finish material without delaying the progress of the work.

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Single Source Responsibility for Mortar Materials: mortar ingredients of uniform quality and from one manufacturer for each cementitious and admixture component and from one source or producer for each aggregate.

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Single Source Responsibility for other Materials: Obtain each type of stone accessory, sealants and other materials from one manufacturer for each product.

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Installer Qualifications: an Installer who Engage successfully completed stonework similar in material, design and extent to that indicated for this project. Submit list of completed project; include project names, addresses, and names of Architects and Owners.

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Field-Constructed Mock-Up: Prepare mock-ups for the following types of stonework. Purpose of mock-ups is further verification of selections made for color and finish under sample submittals and establishing standard of quality for aesthetic effects expected in completed Work. Build mock-ups to comply with following requirements:

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Locate mock-ups on site where indicated or, if not indicated, as directed by Architect.

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Build mock-ups for the following types of stonework:

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exterior granite-faced masonry wall, approximately 6' long by 4' high.

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Typical granite-veneer pedestrian walkway column.

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Wall panel on honed granite wall panel with adjacent exposed aggregate concrete approximately 4'x4'.

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Retain mock-ups during construction as standard for judging completed stonework. When directed, demolish mock-ups and remove from site.

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DELIVERY, STORAGE AND HANDLING:

Deliver masonry materials to project in undamaged condition.

<u>Deliver</u> <u>sealants</u> to project site in original unopened containers with labels informing about manufacturer, product name and designation, color, expiration period for use, pot life, curing time and mixing instructions for multicomponent materials.

Store and handle stone and related materials to prevent their deterioration or damage due to moisture, temperature changes, contaminants, corrosion, breakage, chipping, or other causes.

Do not use pinch or wrecking bars.

Lift with wide-belt type slings where possible; do not use wire rope or ropes containing tar or other substances which might cause staining. If required to move stone, use wood rollers with cushions at end of wood slides.

Store stone on wood skids or pallets, covered with non-staining waterproof membrane. Place and stack skids and stones distribute weight evenly and to prevent breakage or cracking of stones.

<u>Protect stored</u> <u>stone</u> from weather with waterproof, non-staining covers or enclosures, but allow air to circulate around stones.

Store cementitious materials off the ground, under cover and in dry location.

PROJECT CONDITIONS:

 Protect stonework during erection as follows:

Cover top of walls with non-staining waterproof sheeting at end of each day's work. Cover partially completed structures when work is not in progress. Extend cover a minimum of 24" down both sides and hold securely in place.

<u>Prevent staining</u> of stone from mortar, grout, sealants and other sources. Immediately remove such materials from stone without damage to latter.

<u>Protect</u> <u>base</u> of walls from rain-splashed mud and mortar splatter by means of coverings spread on ground and over wall surface.

Protect sills, ledges and projections from droppings of mortar and sealants.

Cold Weather Protection: Comply with the following

requirements:

 Remove ice or snow formed on stonework beds by carefully applying heat until top surface is dry to the touch.

Remove stonework damaged by freezing conditions.

Perform the following construction procedures while stonework
is progressing:

Temperature ranges indicated apply to air temperatures existing at time of installation.

In heating mortar materials, maintain mixing temperatures selected within 10 deg. F (6 deg. C); do not heat water for mortar to above 160 deg. F (71 deg. C).

Mortar: At 40 deg. F (4.4 deg. C) and below, product mortar temperatures between 40 deg. F (4.4 deg. C) and 120 deg. F (49 deg. C) by heating mixing water and, at temperatures of 32 deg. F (0 deg. C) and below, sand as well. Always maintain temperature of mortar on boards above freezing.

At 25 deg F (-4 deg. C) to 20 deg. F (-7 deg. C), heat both sides of walls under construction using salamanders or other heat sources and use windbreaks or enclosures when wind is in excess of 15 mph.

At 20 deg. F (-7 deg. C) and below, provide enclosure and auxiliary heat to maintain an air temperature of at least 40 deg. F (4.4 deg. C) for 24 hours after setting stonework and heat stones so that they are above 20 deg. F (-7 deg. C) at time of installation.

Protect completed stonework and stonework in progress to comply with the following requirements:

Temperature ranges indicated apply to mean daily air temperatures existing at time of installation.

At 40 deg F (4.4 deg. C) to 32 deg. F (0 deg. C), protect stonework from rain or snow at least 24 hours by covering with non-staining weather-resistive membrane.

At 32 deg F (0 deg. C) to 25 deg. F (-4 deg. C), cover stonework completely with non-staining weather resisting membrane.

At 25 deg F (-4 deg. C) to 20 deg. F (-7 deg. C), cover stonework completely with non-staining weather-resistive insulating blankets or similar protection for at least 24 hours.

At 20 deg F (-7 deg. C) and below maintain stonework temperatures above 32 deg. F (0 deg. C) for 24 hours using enclosures and supplementary heat, electric heating blankets, infrared lamps or other equally effective and proven methods.

Environmental Conditions for Sealants: Do not proceed with installation of sealants when ambient and substrate temperatures are outside the limits permitted by sealant manufacturer or below 40 deg. F (4.4 deg. C) or when joint substrates are wet due to rain, frost, condensation or other causes.

PART 2 - PRODUCTS

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MATERIALS, GENERAL:

Comply with referenced standards and other requirements indicated applicable to each type of material required.

<u>Provide matched blocks</u> from a single quarry for each type, variety, color and quality of stone required. Extract blocks from a single bed of quarry stratum, especially reserved for Project, unless stones from randomly selected blocks are acceptable to Architect for aesthetic effect.

Require Fabricator to supervise quarrying of stone to ensure that as-quarried block orientations yield finished stone with required characteristics.

Make quarried block available for inspection by Architect, if latter so requests.

GRANITE:

Granite Building Stone Standard: ASTM C 615.

Association Standard: "Specifications for Building Granite" of National Building Granite Quarries Association, Inc. (NBGQA).

Finish of Exterior Granite Veneer Panels: As follows:

Match Architect's honed sample.

Finish of Ashlar Pattern Granite Stonework: As follows:

Match existing exterior granite veneer.

Match Architect's sample for color, grain, and other characteristics relating to aesthetic effects.

STONEWORK

04400 - 7

Available Types and Sources: Granites which may be incorporated in the work include, but are not limited to, the following:

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MORTAR AND GROUT MATERIALS:

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ASTM C 150, Type I, except Type III may be Portland Cement: used for cold weather construction. Provide grey or white cement as needed to produce mortar color required.

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Hydrated Lime: ASTM C 207. Type S.

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Aggregate: ASTM C 144; and as indicated below.

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For joints narrower than 1/4" use aggregate graded with 100 percent passing the No. 8 sieve and 95 percent the No. 16 sieve;

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For pointing mortar use aggregate graded with 100 percent passing the No. 16 sieve.

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Colored Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compound for use in mortar mixes. pigments with record of satisfactory performance in stone mortars.

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Available Products: Subject to compliance with requirements, colored mortar pigments which may be incorporated in the work include, but not limited to, the following:

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"SGS Mortar Colors"; Solomon Grind-Chem Services, Inc. Sonobrite; Sonneborn B.P. Div., Rexnord Chemical Products, Inc.

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"True Tone Mortar Colors"; Davis Colors, a subsidiary of Rockwood Industries.

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Water: Clean, non-alkaline and potable.

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Coat, and Latex Additive for Setting Bed, Bond Grout: Manufacturer's standard formulation containing type of latex indicated below but not containing a retarder, designated by manufacturer for use with thick-bed mortar, bond coat and grout applications based on successful installations.

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> Latex Type: Styrene butadiene rubber in factory prediluted form.

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STONE ANCHORS AND ATTACHMENTS:

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Provide anchors and attachments of type and size required to

support stonework fabricated from the following metals for conditions and anchors indicated below:

Stainless Steel, AISI Type 304, for anchors in direct contact with stone.

-- <u>Cast or malleable iron</u> for adjustable inserts embedded in concrete and not in direct contact with stone.

Hot-Dip Galvanized Steel as follows:

For anchor bolts, nuts and washers not in direct contact with stone; comply with ASTM A 307, Grade A, for material and ASTM C 153, Class C, for galvanizing.

For steel plates, shapes and bars not in direct contact with stone; comply with ASTM A 36 for materials and ASTM A 123 for galvanizing.

STONE ACCESSORIES:

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 <u>Setting</u> <u>Buttons</u>: Lead of resilient plastic buttons, nonstaining to stone, sized to suit joint thicknesses and bed depths of stonework involved without intruding into required depths of joint sealants or causing third-side adhesion between sealant and setting button.

Concealed Sheet Metal Flashing: Fabricated from stainless steel complying with requirements specified in Division-7 Section "Flashing and Sheet Metal", in thicknesses indicated but not less than 0.015" thick.

<u>Plastic</u> <u>Tubing</u>: Medium density polyethylene, outside diameter of 1/4" and of length required to extend between exterior face of stone and cavity behind.

ELASTOMERIC SEALANTS:

Sealant Products: Provide manufacturer's standard chemically curing, elastomeric sealants which are compatible with joint fillers, joint substrates and other related materials and comply with requirements of Division-7 Section "Joint Sealers" for products corresponding to those indicated below:

Sealant for Joints in Vertical Surfaces of Stonework:

Multi-Part Nonsag Urethane Sealant, or Two-Part Nonsag Low-Modulus Urethane Sealant.

Sealant for Joints in Horizontal Surfaces of Stonework:

STONEWORK

04400 - 9

Two-Part Pourable Urethane Sealant.

Colors: Provide color of exposed sealants to comply with the following requirement:

Match color of Architect's sample.

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MORTAR AND GROUT MIXES:

Do not add admixtures including coloring pigments, air-entraining agents, accelerators, retarders, water repellent agents, anti-freeze compounds, or calcium chloride, unless otherwise indicated.

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Combine and thoroughly mix cementitious materials, Mixing: water and aggregates in a mechanical batch mixer; comply with referenced ASTM standards for mixing time and water content, unless otherwise indicated.

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270, Proportion Comply with ASTM C Setting Mortar: Specification, for types of mortars and applications required below, unless otherwise indicated:

24 25 26

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Set granite with Type S mortar.

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Provide pointing mortar mixed to Pointing Mortar: Architect's sample and complying with requirements indicated above for setting mortar including type and the following:

30 31 32

Select and proportion Colored Pigmented Pointing Mortar: pigments with other ingredients to produce color required. Do not exceed pigment-to-cement ration of 1-to-10, by weight.

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STONE FABRICATION:

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Fabricate stonework in sizes and shapes required to comply with requirements indicated, including details Drawings and final shop drawings.

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For granite comply with recommendations of National Building Granite Quarries Association, Inc (NBGQA) as published in "Specifications for Architectural Granite."

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Cut and drill sinkages and holes in stones for anchors, fasteners, supports and lifting devices as indicated or needed to set stonework securely in place; shape beds to fit supports.

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Cut stones to produce pieces of thickness, size and shape indicated or required and within fabrication tolerances recommended by applicable stone association or, if none, stone

source, for faces, edges, beds, and backs.

Control depth of stones and back-check to maintain manimum clearances indicated between backs of stones and surfaces or projections of structural members, fireproofing (if any), back-up walls and other work behind stones.

<u>Dress</u> joints (bed and vertical) straight and at 90 degree angle to face, unless otherwise indicated.

Quirk-miter corners, unless otherwise indicated; provide for cramp anchorage in top and bottom bed joints of corner pieces.

<u>Cut</u> stones to produce joints of uniform width and in locations indicated.

Joint Width: Match existing in Ashlar Pattern.

<u>Clean sawn backs</u> of stones to remove rust stains and free iron particles.

<u>Contiguous Work:</u> Provide chases, reveals, reglets, openings and similar features as required to accommodate contiguous Work.

Fabricate molded work, including washes and drips, to produce stone shapes having a uniform profile throughout their entire length and with precisely formed arrises slightly eased to prevent snipping, and matched at joints between units.

Finish exposed faces and edges of stones to comply with requirements indicated for finish under each type and application of stone required and to match approved samples and field-constructed mock-ups.

<u>Carefully inspect finished stones</u> at fabrication plant for compliance with requirements relative to qualities of appearance, material and fabrication; replace defective stones with ones that do comply.

Grade and mark stones for overall uniform appearance when assembled in place. Natural variations in appearance are acceptable if installed stones match range in colors and other appearance characteristics represented in approved samples and field-constructed mock-ups.

PART 3 - EXECUTION

EXAMINATION:

Require Installer to examine surfaces to receive stonework and conditions under which stonework will be installed and to report

STONEWORK

in writing any conditions which are not in compliance with requirements. Do not proceed with installation until surfaces and conditions comply with requirements indicated in specifications or elsewhere for execution of other work which affects stonework.

PREPARATION:

Advise Installers of other work about specific requirements relating to placement of inserts, flashing reglets and similar items which will be used by Stonework Installer for anchoring, supporting and flashing of stonework. Furnish Installers of other work with drawings or templates showing locations of these items.

<u>Clean stone</u> <u>surfaces</u> which have become dirty or stained prior to setting to remove soil, stains and foreign materials. Clean stones by thoroughly scrubbing stones with fiber brushes followed by a thorough drenching with clear water. Use only mild cleaning compounds that contain no caustic or harsh filler or abrasives.

SETTING STONE, GENERAL:

Execute stonework by skilled mechanics, and employ skilled stone fitters at the site to do necessary field cutting as stones are set.

Use power saws to cut stones; for exposed edges, produce edges which are cut straight and true.

Contiguous Work: Provide chases, reveals, reglets, openings and other spaces as indicated for accommodating contiguous work. Close-up openings in stonework after other work is in place with stonework which matches that already set.

<u>Set stones</u> to comply with requirements indicated on drawings and final shop drawings. Install anchors, supports, fasteners and other attachments indicated or necessary to secure stonework in place. Shim and adjust anchors, supports and accessories to set stones accurately in locations indicated with uniform joints of widths indicated and with edges and faces aligned according to established relationships and indicated tolerances.

<u>Construction</u> <u>Tolerances</u>: Set stones to comply with the following tolerances:

<u>Variation from Plumb</u>: For lines and surfaces of columns, walls and arrises, do not exceed 1/4" in 10', 3/8" in a story height or 20' maximum, nor 1/2" in 40' or more. For external corners, expansion joints and other conspicuous lines, do not exceed 1/4" in any story or 20' maximum, nor 1/2" in 40' or

more. 2

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<u>Variation</u> <u>from Level</u>: For grades indicated for exposed lintels, sills, parapets, horizontal grooves and other conspicuous lines, do not exceed 1/2" in any bay or 20' maximum, nor 3/4" in 40' or more.

<u>Variation of Linear Building Line:</u> For position shown in plan and related portion of columns, walls and partitions, do not exceed 1/2" in any bay or 20' maximum, nor 3/4" in 40' or more.

Variation in Cross-Sectional Dimensions: For columns and thickness of walls from dimensions indicated, do not exceed minus 1/4", nor plus 1/2".

Provide expansion joints, control joints and pressure relieving joints of widths and at locations indicated.

Sealing expansion and other joints is specified in Division-7 Section "Joint Sealers".

Do not fill with mortar.

SETTING STONEWORK WITH MORTAR:

Wet stones which are dry at time of setting by drenching or sponging them with water.

Set stones in full bed of mortar with vertical joints slushed full, unless otherwise indicated.

Place setting buttons of adequate size, in sufficient quantity, and of same thickness as indicated joint width, to prevent mortar from squeezing out and to maintain uniform joint widths. Hold buttons at least one joint width back from face of stones.

Do not set heavy stones or projecting courses until mortar in courses below has hardened sufficiently to resist being squeezed out of joint.

Fill anchor holes with mortar.

Support projecting stones by props or anchors until wall above is set.

Embed ends of lugged sills in mortar; leave balance of joint open until final pointing.

Set the following stonework with unfilled vertical joints for installation of joint sealants:

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Granite Panels. Cornices. Copings.

Rake out mortar from joints to depths equal to 2-1/2 times their widths but not less than 1/2" nor less than that required to exposed sound mortar for joints pointed with mortar, or to provide sufficient depth for sealant backing for joints pointed with sealants.

Prepare stone joint surfaces for pointing with mortar by removing dust and mortar particles. Where setting mortar was removed to depths greater than surrounding areas, apply first layer of pointing mortar in layers not greater than 3/8" until a uniform depth is formed; compact each layer thoroughly and allow to become thumbprint hard before applying next layer.

<u>Point stone joints</u> by placing pointing mortar in 3 layers with each of first and second layers filling approximately two-fifths of joint depth and third layer remaining one-fifth. Fully compact each layer and allow to become thumbprint hard before applying next layer.

Tool joints with a round joiner having a diameter 1/8" larger than width of joint, when pointing mortar is thumbprint hard.

INSTALLATION OF JOINT SEALANTS:

<u>Prepare joints</u> and apply sealants of type and at locations indicated to comply with applicable requirements of Division-7 Section "Joint Sealers".

FIELD QUALITY CONTROL:

<u>Field Testing Service</u>: Contractor shall pay a qualified independent testing laboratory to perform field quality control testing.

Test each type and variety of stone for compliance with physical property requirements of referenced ASTM standard specifications. Conduct tests using specimens randomly selected from, and representative of, installed to the extent indicated below:

Conduct tests no less frequently than that required to provide test specimens from each 10,000 sq. ft. of exposed stonework required in the Work.

Report test results in writing and in form specified under ASTM test method, to Architect and Contractor, on same day tests are made.

 ADJUSTING AND CLEANING:

Remove and replace stonework of the following description:

Broken, chipped, stained or otherwise damaged stones.

Defective joints.

Stones and joints not matching approved samples and fieldconstructed mock-ups.

Stonework not complying with other requirements indicated.

Replace in manner which results in stonework matching approved samples and field-constructed mock-ups, complying with other requirements and showing no evidence of replacement.

Clean stonework not less than 6 days after completion of work, using clean water and stiff bristle fiber brushes. Do not use wire brushes, acid-type cleaning agents, cleaning compounds with caustic or harsh fillers, or other materials or methods which could damage stone.

PROTECTION:

Provide final protection and maintain conditions in a manner acceptable to Fabricator and Installer, which ensures stonework being without damage or deterioration at time of substantial completion.

END OF SECTION 04400

SECTION 04510 - STONE PATCHING AND REPAIR

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PART

GENERAL 1

RELATED DOCUMENTS:

8 Drawings and general provisions of Contract, including General 9 and Special Conditions and Division-l Specification sections, 10 apply to work of this section. 11 12

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WORK: DESCRIPTION OF

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Extent of stone patching and repair work is indicated on drawings and in schedules.

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Stone patching and repair work includes the following:

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Patch and repair of existing limestone wall panels.

22 23

Patch and repair of existing ashlar pattern walls.

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Repairing damaged masonry.

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Masonry construction is specified in other Division-4 sections.

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Joint sealers are specified in a Division-7 section.

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QUALITY ASSURANCE:

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SUBMITTALS:

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Submit written program for each Program: Patch and Repair phase of patch and repair process including protection of surrounding materials on building and site during operations. Describe in detail materials, methods and equipment to be used for each phase of patch and repair work.

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If alternative methods and materials to those indicated are proposed for any phase of restoration work, provide written description, including evidence of successful use on other, comparable projects, and program of testing to demonstrate effectiveness for use on this project.

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Submit, for verification purposes, samples of the Samples: following:

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Each new exposed masonry material to be used for replacing existing materials. Include in each set of samples the full range of colors, colors and textures to be expected in

completed work.

For stone provide samples not less than 12" x 12" in size.

Each type mortar for pointing and masonry rebuilding and repair, in form of 6" long by 1/2" wide sample strips of mortar set in aluminum or plastic channels.

Each type of chemical cleaning material.

Each type of adhesive.

Each type of anchor.

DELIVERY, STORAGE AND HANDLING:

<u>Deliver</u> other <u>materials</u> to site in manufacturer's original and unopened containers and packaging, bearing labels as to type and names of products and manufacturers.

Protect grout, mortar and other materials from deterioration by moisture and temperature. Store in a dry location or in waterproof containers. Keep containers tightly closed and away from open flames. Protect liquid components from freezing. Comply with manufacturer's recommendations for minimum and maximum temperature requirements for storage.

PROJECT CONDITIONS:

<u>Clean limestone surfaces</u> only when air temperatures are 40 deg.F (4 deg.C) and above and will remain so until masonry has dried out, but for not less than 7 days after completion of cleaning.

<u>Do not repoint mortar joints</u> or repair masonry unless air temperatures are between 40 deg.F (4 deg.C) and 80 deg.F (27 deg.C) and will remain so for at least 48 hours after completion of work.

<u>Prevent grout or mortar</u> used in repointing and repair work from staining face of surrounding masonry and other surfaces. Remove immediately grout and mortar in contact with exposed masonry and other surfaces.

Protect sills, ledges and projections from mortar droppings.

SEQUENCING/SCHEDULING:

Perform patch and repair work in the following sequence:

Cut, patch, and repair existing limestone and granite, 1 including replacing existing stone with new materials. 2 3

Rake-out existing mortar from joints to be repointed.

Clean existing limestone surfaces.

Point existing mortar joints of stone indicated to be repaired.

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PART 2 - PRODUCTS

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MASONRY MATERIALS:

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Stone: Provide natural building stone of type (classification) and with color, and surface texture to match Architect's sample. Match existing stones in size and shape.

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MORTAR MATERIALS:

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Portland Cement: ASTM C 150, Type I.

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Hydrated Lime: ASTM C 207, Type S.

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Aggregate for Mortar: ASTM C 144, unless otherwise indicated.

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Colored Mortar Pigment: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes. Use only pigments with record of satisfactory performance in masonry mortars.

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Water: Clean, free of oils, acids, alkalis and organic matter.

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CLEANING MATERIALS AND EQUIPMENT:

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Clean, potable, free of oils, acids, Cleaning: for alkalis, salts, and organic matter.

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Heat water to temperature of 140 deg.F-180 deg.F Water: Warm (60 deg.C-82 deg.C).

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Brushes: Fiber bristle only.

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Two-Part Limestone Cleaner: Manufacturer's standard two-part 50 system consisting of alkaline cleaner for prewash and acidic 51 cleaner for afterwash.

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<u>Available</u> <u>Products</u>: Subject to compliance with requirements, products which may be incorporated in the work include, but are not limited to, the following:

"Diedrich Limestone Cleaner Prerinse and Afterrinse"; Deidrich Chemicals.

"Sure Klean Limestone Prewash and Afterwash", ProSoCo, Inc.

<u>Liquid</u> <u>Strippable</u> <u>Masking Agent</u>: Manufacturer's standard liquid, film forming, strippable masking material for protecting glass, metal and polished stone surfaces from damaging effect of acidic and alkaline masonry cleaners.

Available Products: Subject to compliance with requirements, products which may be incorporated in the work included, but are not limited to, the following:

"Diedrich Acid Guard"; Diedrich Chemicals.

"Sure Klean Acid Stop"; ProSoCo, Inc.

MISCELLANEOUS MATERIALS:

 Stone-to-Stone Adhesive: Two-part polyester resin stone adhesive with a 15-30 minute cure at 70 deg.F (21 deg.C), in formulation (knife or flowing grade) recommended by adhesive manufacturer for type of stone repair indicated, and in color indicated or, if not otherwise indicated, as selected by Architect from tinted or standard colors available from adhesive manufacturer.

Product: Subject to compliance with requirements, provide "Akemi" adhesives distributed by Wood and Stone, Inc., 7567 Gary Road, Manassas, VA 22110.

Mortar-to-Stone Adhesive: High modulus, high strength, moisture insensitive epoxy adhesive with a pot life of 30 minutes at 40 deg.F (4 deg.C).

<u>Product</u>: Subject to compliance with requirements, provide "Sikadur Hi-Mod Epoxy, Sikastix 370"; Sika Chemical Corporation.

Stone Anchors: Type and size indicated or, if not indicated, to match existing in size and type. Fabricate anchors and dowels from AISI Type 302/304 stainless steel.

MORTAR MIXES:

General:

STONE PATCHING AND REPAIR

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Measurement and Mixing: Measure cementitious and aggregate material in a dry condition by volume or equivalent weight. not measure by shovel, use known measure. Mix materials in a clean mechanical batch mixer.

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Mixing Pointing Mortar: Thoroughly mix cementitious and aggregate materials together before adding any water. mix again adding only enough water to produce a damp, unworkable mix which will retain its form when pressed into a ball. Maintain mortar in this dampened condition for 1-to-2 hours. Add remaining water in small portions until mortar of desired consistency is reached. Use mortar within 30 minutes of final mixing; do not retemper or use partially hardened material.

Colored Mortar: Produce mortar of color required by use of selected ingredients. Do not adjust proportions without Architect's approval.

Where colored mortar pigments are Color Pigmented Mortar: indicated do not exceed pigment-to-cement ratio of 1-to-10. by weight.

Do not use admixtures of any kind in mortar, unless otherwise indicated.

Mortar Proportions:

Grout: ASTM C 476.

Pointing Mortar for Stone: One part white portland cement, 1 part lime, 6 parts colored mortar aggregate.

Rebuilding Mortar: Same as pointing mortar.

Patching Mortar for Stone: Provide mix composed of white and gray cement combined with lime and selected aggregates to produce color matching color of existing stone. Proportion mix with 2 parts cement, 2 parts lime and 6 parts aggregate.

CHEMICAL CLEANING SOLUTIONS:

General: Unless otherwise indicated, dilute chemical cleaning materials with water to produce solutions of concentration indicated but not greater than that recommended by chemical cleaner manufacturer.

Alkaline Cleaner for Prewash of Limestone: In concentration recommended by chemical cleaner manufacturer.

Use alkaline cleaner only on calcite limestone as prewash.

. In concentration

<u>Acid Cleaner for Afterwash of Limestone:</u> In concentration recommended by chemical cleaner manufacturer.

Use above type only on calcite limestone as afterwash.

Chemical Paint Remover: In concentration recommended by chemical cleaner manufacturer.

PART 3 - EXECUTION

PREPARATION:

 General: Comply with recommendations of manufacturers of chemical cleaners for protecting building surfaces against damage from exposure to their products.

Protect persons, motor vehicles, surrounding surfaces of building whose masonry surfaces are being restored, building site, and surrounding buildings from injury resulting from masonry restoration work.

<u>Prevent chemical cleaning</u> solutions from coming into contact with pedestrians, motor vehicles, landscaping, buildings and other surfaces which could be injured by such contact.

Do not clean masonry during winds of sufficient force to spread cleaning solutions to unprotected surfaces.

<u>Dispose</u> of <u>run-off</u> from cleaning operations by legal means and in manner which prevents soil erosion, undermining of paving and foundations, damage to landscaping, and water penetration into building interiors.

Erect temporary protection covers over pedestrian walkways and at points of entrance and exit for persons and vehicles which must remain in operation during course of masonry restoration work.

Protect glass, unpainted metal trim and polished stone from contact with acidic chemical cleaners by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape. Apply masking agent to comply with manufacturer's recommendations. Do not apply liquid masking agent to painted or porous surfaces.

<u>Protect unpainted metal</u> from contact with alkali chemical cleaners by covering them either with liquid strippable masking agent or polyethylene film and waterproof masking tape.

STONE PATCHING AND REPAIR

04510 - 6

CLEANING EXISTING MASONRY, GENERAL:

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Proceed with cleaning in an orderly manner; work from top to bottom of each scaffold width and from one end of each elevation to the other.

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Use only those cleaning methods indicated for each masonry material and location.

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Perform each cleaning method indicated in a manner which results in uniform coverage of all surfaces, including corners, moldings, interstices and which produces an even effect without streaking or damage to masonry surfaces.

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Rinse off chemical residue and soil by working upwards from bottom to top of each treated area at each stage or scaffold setting.

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Chemical Cleaner Application Methods:

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General: Apply chemical cleaners to masonry surfaces to comply with chemical manufacturer's recommendations using brush or spray application methods, at Contractor's option, otherwise indicated. Do not allow chemicals to remain on surface for periods longer than that indicated or recommended by manufacturer.

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Apply to pressures not exceeding 50 psi, Spray Application: unless otherwise indicated.

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Chemical Cleaners: Do not apply chemical Reapplication of cleaners to same masonry surfaces more than twice. additional cleaning is required use steam wash.

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CLEANING STONEWORK:

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At locations Chemical Cleaning of Limestone: Two-Part indicated, clean limestone surfaces with two-part systems using chemical cleaners of dilution indicated, applied as follows:

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Prewet stone with warm water applied by low pressure spray.

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Apply alkaline cleaner for prewash to stone by brush or roller. Let cleaner remain on surface for period recommended by cleaner manufacturer, unless otherwise indicated.

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Rinse stone with warm water to remove chemicals and soil, applied by medium pressure spray.

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Apply acidic cleaner for afterwash to stone while it is still wet using low pressure spray equipment or deep nap roller or soft fibered brush. Let cleaner remain on surface for period

recommended by cleaner manufacturer, unless otherwise indicated.

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Rinse stone with warm water to remove chemicals and soil, applied by medium pressure spray.

STONE REMOVAL AND REPLACEMENT:

<u>Carefully remove</u> by <u>hand</u> at locations indicated any stone which has deteriorated, shifted, or is damaged beyond repair.

Remove mortar, loose particles and other debris from salvaged stone and stone surrounding removed units in preparation for resetting.

 Replace removed stone with salvaged stone, where possible, or with new stone matching existing, including size. Butter vertical joints for full width before setting and set units in full bed of mortar, unless otherwise indicated.

Tool joints after setting to match joints of surrounding stone.

STONE PATCHING:

Remove loose particles, soil, debris, oil and other contaminants from existing stone units at locations indicated by cleaning with stiff brush.

Brush coat stone surfaces with mortar-to-stone adhesive to comply with manufacturer's directions.

<u>Place patching mortar</u> in layers no thicker than 2". Roughen surface of each layer to provide key for next.

Keep each layer damp for 72 hours or until mortar has set.

<u>Unacceptable patches</u> are defined as those with hairline cracks or showing separation form stone at edges. Remove patches and refill to provide patches free of those defects.

FINAL CLEANING:

After mortar has fully hardened, thoroughly clean exposed masonry surfaces of excess mortar and foreign matter using stiff nylon or bristle brushes and clean water, spray applied at low pressure.

Use of metal scrapers or brushes will not be permitted.

Use of acid or alkali cleaning agents will not be permitted.

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END OF SECTION 04500

SECTION 05120 - STRUCTURAL STEEL

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PART 1 - GENERAL

RELATED DOCUMENTS:

 Drawings and general provisions of Contract, including General and Special Conditions and Division-1 Specification sections, apply to work of this section.

SUMMARY:

Extent of structural steel work is shown on drawings, including schedules, notes and details to show size and location of members, typical connections, and type of steel required.

 Structural steel is that work defined in American Institute of Steel Construction (AISC) "Code of Standard Practice" and as otherwise shown on drawings.

Miscellaneous Metal Fabrications are specified elsewhere in Division 5.

Refer to Division 3 for anchor bolt installation in concrete; Division 4 for masonry.

SUBMITTALS:

<u>Product</u> <u>Data</u>: Submit producer's or manufacturer's specifications and installation instructions for following products. Include laboratory test reports and other data to show compliance with specifications (including specified standards).

Structural steel (each type), including certified copies of mill reports covering chemical and physical properties.

High-strength bolts (each type), including nuts and washers.

Structural steel primer paint.

Shrinkage-resistant grout.

Shop Drawings: Submit shop drawings, including complete details and schedules for fabrication and assembly of structural steel members, procedures and diagrams.

Include details of cuts, connections, camber, holes, and other pertinent data. Indicate welds by standard AWS A2.1 and A2.4 symbols, and show size, length, and type of each weld.

Provide setting drawings, templates, and directions for installation of anchor bolts and other anchorages to be installed as work of this section.

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Test Reports: Submit copies of reports of tests conducted on shop and field bolted and welded connections. Include data on type(s) of tests conducted and test results.

QUALITY ASSURANCE:

<u>Codes</u> <u>and Standards</u>: Comply with provisions of following, except as otherwise indicated:

AISC "Code of Standard Practice for Steel Buildings and Bridges".

Paragraph 4.2.1 of the above code is hereby modified by deletion of the following sentence: "This approval constitutes the owner's acceptance of all responsibility for the design adequacy of any connections designed by the fabricator as a part of his preparation of these shop drawings".

AISC "Specifications for the Design, Fabrication, and Erection of Structural Steel for Buildings", including the "Commentary" and Supplements thereto as issued.

AISC "Specifications for Architecturally Exposed Structural AISC "Specifications for Structural Joints using ASTM A 325 or A 490 Bolts" approved by the Research Council on Riveted and Bolted Structural Joints of the Engineering Foundation.

American Welding Society (AWS) D1.1 "Structural Welding Code - Steel".

ASTM A 6 "General Requirements for Delivery of Rolled Steel Plates, Shapes, Sheet Piling and Bars for Structural Use".

<u>Qualifications for Welding Work:</u> Qualify welding processes and welding operators in accordance with AWS "Standard Qualification Procedure".

Provide certification that welders to be employed in work have satisfactorily passed AWS qualification tests.

If recertification of welders is required, retesting will be Contractor's responsibility.

DELIVERY, STORAGE AND HANDLING:

Deliver materials to side at such intervals to insure

uninterrupted progress of work.

<u>Deliver anchor bolts</u> and anchorage devices, which are to be embedded in cast-in-place concrete or masonry, in ample time to not to delay work.

Store materials to permit easy access for inspection and identification. Keep steel members off ground, using pallets, platforms, or other supports. Protect steel members and packaged materials from erosion and deterioration.

Do not store materials on structure in a manner that might cause distortion or damage to members or supporting structures. Repair or replace damaged materials or structures as directed.

PART 2 - PRODUCTS

MATERIALS:

Metal Surfaces, General: For fabrication of work which will be exposed to view, use only materials which are smooth and free of surface blemishes including pitting, rust and scale seam marks, roller marks, rolled trade names and roughness. Remove such blemishes by grinding, or by welding and grinding, prior to cleaning, treating and application of surface finishes.

Structural Steel Shapes, Plates and Bars: ASTM A 36.

Cold-Formed Steel Tubing: ASTM A 500, Grade B.

Steel Pipe: ASTM A 53, Type E or S, Grade B; or ASTM A 501.

Finish: Black, except where indicated to be galvanized.

Anchor Bolts: ASTM A 307, nonheaded type unless otherwise indicated.

<u>Unfinished</u> <u>Threaded</u> <u>Fasteners</u>: ASTM A 307, Grade A, regular low-carbon steel bolts and nuts.

Provide hexagonal heads and nuts for all connections.

<u>High-Strength</u> <u>Threaded</u> <u>Fasteners</u>: Heavy hexagon structural bolts, heavy hexagon nuts, and hardened washers, as follows:

Quenched and tempered medium-carbon steel bolts, nuts and washers, complying with ASTM A 325.

<u>Direct tension indicator</u> <u>washers</u> may be used at Contractor's option.

STRUCTURAL STEEL

containing

Pre-mixed,

Structural Steel Primer Paint: Red lead-iron oxide, oil alkyd;

selected silica sands, portland cement, shrinkage compensating agents, plasticizing and water reducing agents, complying with

Available Products: Subject to compliance with requirements,

products which may be incorporated in the work include, but

Shop Fabrication and Assembly: Fabricate and assemble

structural assemblies in shop to greatest extent possible. Fabricate items of structural steel in accordance with AISC

Specifications and as indicated on final shop drawings. Provide

Properly mark and match-mark materials for field assembly.

Fabricate for delivery sequence which will expedite erection and

Electrodes for Welding: Comply with AWS Code.

Non-metallic Shrinkage-Resistant Grout:

are not limited to, the following:

Euco N.S.; Euclid Chemical Co.

Masterflow 713; Master Builders

Propak; Protex Industries, Inc.

camber in structural members where indicated.

Five Star Grout; U.S. Grout Corp.

Upcon; Upco Chem. Div., USM Corp.

Set Non-Shrink; Set Products, Inc.

Crystex; L&M Construction Chemicals

metallic, non-corrosive, non-staining product

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TT-P-86, Type II.

CE-CRD-C621.

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minimize field handling of materials. 37 Where finishing is required, complete assembly, including

FABRICATION:

40 welding of units, before start of finishing operations. Provide

finish surfaces of members exposed in final structure free of 42 markings, burrs, and other defects. 43

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High-Strength

threaded fasteners in accordance with AISC "Specifications for

Bolt field connections, except where welded connections or other

Connections: Weld or bolt shop connections, as indicated.

connections are indicated.

Provide high-strength threaded fasteners for all bolted connections, except where unfinished bolts are indicated.

Bolted Construction:

Install high-strength

05120 - 4

1 Structural Joints using ASTM A 325 or A 490 Bolts" (RCRBSJ).

<u>Welded Construction</u>: Comply with AWS Code for procedures, appearance and quality of welds, and methods used in correcting welding work.

Assemble and weld built-up sections by methods which will produce true alignment of axes without warp.

Holes for Other Work: Provide holes required for securing other work to structural steel framing, and for passage of other work through steel framing members, as shown on final shop drawings.

Provide threaded nuts welded to framing, and other specialty items as indicated to receive other work.

Cut, drill, or punch holes perpendicular to metal surfaces. Do not flame cut holes or enlarge holes by burning. Drill holes in bearing plates.

SHOP PAINTING:

 General: Shop paint structural steel, except those members or portions of members to be embedded in concrete or mortar. Paint embedded steel which is partially exposed on exposed portions and initial 2" of embedded areas only.

Do not paint surfaces which are to be welded.

Do not paint surfaces which are scheduled to receive sprayedon fireproofing.

Apply 2 coats of paint to surfaces which are inaccessible after assembly or erection. Change color of second coat to distinguish it from first.

<u>Surface Preparation</u>: After inspection and before shipping, clean steelwork to be painted. Remove loose rust, loose mill scale, and spatter, slag or flux deposits. Clean steel in accordance with Steel Structures Painting Council (SSPC) as follows:

SP-7 "Brush-Off Blast Cleaning".

<u>Painting</u>: Provide a one-coat shop applied paint system complying with Steel Structures Painting Council (SSPC)-Paint System Guide No. 7.00.

PART 3 - EXECUTION

STRUCTURAL STEEL

INSPECTION:

ERECTION:

Temporary Shoring and Bracing: Provide temporary shoring and bracing members with connections of sufficient strength to bear imposed loads. Remove temporary members and connections when permanent members are in place and final connections are made. Provide temporary guy lines to achieve proper alignment of structures as erection proceeds.

<u>Setting Bases and Bearing Plates:</u> Clean concrete and masonry bearing surfaces of bond-reducing materials and roughen to improve bond to surfaces. Clean bottom surface of base and bearing plates.

Set loose and attached base plates and bearing plates for structural members on wedges or other adjusting devices.

<u>Tighten anchor bolts</u> after supported members have been positioned and plumbed. Do not remove wedges or shims, but if protruding, cut off flush with edge of base or bearing plate prior to packing with grout.

<u>Pack grout</u> solidly between bearing surfaces and bases or plates to ensure that no voids remain. Finish exposed surfaces, protect installed materials, and allow to cure.

For proprietary grout materials, comply with manufacturer's instructions.

 Field Assembly: Set structural frames accurately to lines and elevations indicated. Align and adjust various members forming a part of a complete frame or structure before permanently fastening. Clean bearing surfaces and other surfaces which will be in permanent contact before assembly. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.

Level and plumb individual members of structure within specified AISC tolerances.

Establish required leveling and plumbing measurements on mean operating temperature of structure. Make allowances for difference between temperature at time of erection and mean temperature at which structure will be when completed and in service.

Splice members only where indicated and accepted on shop drawings.

Erection Bolts: On exposed welded construction, remove erection bolts, fill holes with plug welds and grind smooth at exposed

surfaces.

Comply with AISC Specifications for bearing, adequacy of temporary connections, alignment, and removal of paint on surfaces adjacent to field welds.

Do not enlarge unfair holes in members by burning or by use of drift pins, except in secondary bracing members. Ream holes that must be enlarged to admit bolts.

 Gas Cutting: Do not use gas cutting torches in field for correcting fabrication errors in primary structural framing. Cutting will be permitted only on secondary members which are not under stress, as acceptable to Architect. Finish gas-cut sections equal to a sheared appearance when permitted.

 Touch-Up Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint. Apply paint to exposed areas using same material as used for shop painting.

Apply by brush or spray to provide a minimum dry film thickness of 1.5 mils.

QUALITY CONTROL:

Engage an independent testing and inspection agency to inspect high-strength bolted connections and welded connections and to perform tests and prepare test reports.

Testing agency shall conduct and interpret tests and state in each report whether test specimens comply with requirements, and specifically state any deviations therefrom.

Provide access for testing agency to places where structural steel work is being fabricated or produced so that required inspection and testing can be accomplished.

Testing agency may inspect structural steel at plant before shipment; however, Architect reserves right, at any time before final acceptance, to reject material not complying with specified requirements.

Correct deficiencies in structural steel work which inspections and laboratory test reports have indicated to be not in compliance with requirements. Perform additional tests, at Contractor's expense, as may be necessary to reconfirm any non-compliance of original work, and as may be necessary to show compliance of corrected work.

Shop Bolted Connections: Inspect or test in accordance with AISC specifications.

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1 Shop Welding: Inspect and test during fabrication of structural 2 3 steel assemblies, as follows: 4 Certify welders and conduct inspections and tests 5 6 required. Record types and locations of defects found in 7 work. Record work required and performed to correct 8 deficiencies. 9 10 Perform visual inspection of all welds. 11 Perform tests of welds as follows. Inspection procedures 12 listed are to be used at Contractor's option. 13 14 15 Radiographic Inspection: ASTM E 94 and ASTM E 142; minimum quality level "2-2T". 16 17 18 <u>Ultrasonic Inspection: ASTM E 164.</u> 19 20 Field Bolted Connections: Inspect in accordance with AISC 21 specifications. 22 23 Field Welding: Inspect and test during erection of structural 24 steel as follows: 25 Certify welders and conduct inspections and tests 26 required. Record types and locations of defects found in 27 Record work required and performed to correct 28 work. 29 deficiencies. 30 31 Perform visual inspection of all welds. 32 33 Perform tests of welds as follows: 34 35 36

Radiographic Inspection: ASTM E 94 and ASTM E 142; minimum quality level "2-2T".

Ultrasonic Inspection: ASTM E 164.

END OF SECTION 05120

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SECTION 05300 - METAL DECKING

PART 1 - GENERAL

RELATED DOCUMENTS:

 Drawings and general provisions of Contract, including General and Special Conditions and Division-1 Specification sections apply to work of this section.

SUMMARY:

Extent of metal decking is indicated on drawings, including basic layout and type of deck units required.

SUBMITTALS:

Product Data: Submit manufacturer's specifications and installation instructions for each type of decking and Include manufacturer's certification as may be accessories. required to show compliance with these specifications.

Shop Drawings: Submit detailed drawings showing layout and types of deck panels, anchorage details, and conditions requiring closure panels, supplementary framing, sump pans, cant strips, cut openings, special jointing or other accessories.

Insurance Certification: Assist Owner in preparation and submittal of roof installation acceptance certification as may be necessary in connection with fire and extended coverage insurance.

QUALITY ASSURANCE:

Codes and Standards: Comply with provisions of the following codes and standards, except as otherwise indicated or specified:

 AISI "Specification for the Design of Cold-Formed Steel Structural Members".

AWS D1.3 "Structural Welding Code - Sheet Steel".

SDI "Design Manual for Floor Decks and Roof Decks".

Qualification of Field Welding: Qualify welding processes and welding operators in accordance with "Welder Qualification" procedures of AWS D1.1.

Welded decking in place is subject to inspection and testing.

Expense of removing and replacing portions of decking for testing purposes will be borne by Owner if welds are found to be satisfactory. Remove work found to be defective and replace with new acceptable work.

FM Listing: Provide metal roof deck units which have been evaluated by Factory Mutual System and are listed in "Factory Mutual Approved Guide" for "Class I" fire rated construction.

PART 2 - PRODUCTS

MANUFACTURERS:

Available Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following:

Metal Roof Deck Units:

Bowman/E.G. Smith, Div. Cyclops Corp. Consolidated Systems, Inc. Epic Metals Corp.
Mac-Fab Products, Inc. Roll Form Products, Inc. United Steel Deck, Inc. Vulcraft/Div. Nucor Corp. United Steel Deck, Inc.

Wolverine Deck Co.

Wheeling Corrugating Co.

MATERIALS:

Steel for Galvanized Metal Deck Units: ASTM A 446, Grade A.

Sheet Metal Accessories: ASTM A 526, commercial quality, galvanized.

Galvanizing: ASTM A 525, G90.

Galvanizing Repair Paint: High zinc-dust content paint for repair of damaged galvanized surfaces complying with Military Specifications MIL-P-21035 (Ships).

FABRICATION:

General: Form deck units in lengths to span 3 or more supports, with flush, telescoped or nested 2" laps at ends and interlocking or nested side laps, unless otherwise indicated.

Roof Deck Units: Provide deck configurations complying with SDI "Roof Deck Specifications", of metal thickness, depth and width as shown on the drawings.

Roof Sump Pans: Fabricate from single piece of 0.071" min. (14 gage) galvanized sheet steel with level bottoms and sloping sides to direct water flow to drain, unless otherwise shown. Provide sump pans of adequate size to receive roof drains and with bearing flanges not less than 3" wide. Recess pans not less than 1-1/2" below roof deck surface, unless otherwise shown or required by deck configuration. Holes for drains will be cut in the field.

PART 3 - EXECUTION

INSTALLATION:

 <u>General</u>: Install deck units and accessories in accordance with manufacturer's recommendations and final shop drawings, and as specified herein.

Place deck units on supporting steel framework and adjust to final position with ends accurately aligned and bearing on supporting members before being permanently fastened. Do not stretch or contract side lap interlocks.

Place deck units in straight alignment for entire length of run of cells and with close alignment between cells at ends of abutting units.

Coordinate and cooperate with structural steel erector in locating decking bundles to prevent overloading of structural members.

Fastening Deck Units:

Fasten 3" deep roof deck units to steel supporting members by not less than 5/8" diameter fusion welds or elongated welds of equal strength, spaced not more than 8" o.c. at every support, and at closer spacing where required for lateral force resistance. In addition, secure deck to each supporting member in ribs where side laps occur.

Comply with AWS requirements and procedures for manual shielded metal arc welding, appearance and quality of welds, and methods used in correcting welding work.

Use welding washers to secure deck to supporting members where recommended by deck manufacturer.

Fasten side laps of adjacent deck units between supports, at intervals not exceeding 36" o.c.

<u>Uplift Loading</u>: Install and anchor roof deck units to resist gross uplift loading of 45 lbs. per sq. ft. at eave overhang and 30 lbs. per sq. ft. for other roof areas.

<u>Cutting and Fitting:</u> Cut and neatly fit deck units and accessories around other work projecting through or adjacent to the decking, as shown.

Reinforcement at Openings: Provide additional metal reinforcement and closure pieces as required for strength, continuity of decking and support of other work shown.

Hanger Slots or Clips: Provide UL approved punched hanger slots between cells or flutes of lower element where deck units are to receive hangers for support of ceiling construction, air ducts, diffusers, or lighting fixtures.

Locate slots or clips at not more than 14" o.c. in both directions, not over 9" from walls at ends, and not more than 12" from walls at sides, unless otherwise shown.

Provide manufacturer's standard hanger attachment devices.

Roof Sump Pans: Place over openings provided in roof decking and weld to top decking surface. Space welds not more than 12" o.c. with at least one weld at each corner. Cut opening in roof sump bottom to accommodate drain size indicated.

Touch-Up Painting:

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Touch-up galvanized surfaces with galvanizing repair paint applied in accordance with manufacturer's instructions.

END OF SECTION 05300

SECTION 05500 - METAL FABRICATIONS

PART 1 - GENERAL

RELATED DOCUMENTS:

 Drawings and general provisions of Contract, including General and Special Conditions and Division-1 Specification sections, apply to work of this section.

DESCRIPTION OF WORK:

<u>Definition</u>: Metal fabrications include items made from iron and steel shapes, plates, bars, strips, tubes, pipes and castings which are not a part of structural steel or other metal systems specified elsewhere.

Extent of metal fabrications is indicated on drawings and schedules.

Types of work in this section include metal fabrications for:

Rough hardware.

Stainless steel anchors and assemblies.

Ladders.

Ship's ladders.

Nosings.

Loose bearing and leveling plates.

Loose steel lintels.

Miscellaneous framing, supports and embeds.

Miscellaneous steel trim.

Metal bar gratings.

Architectural aluminum grille work.

Monorail for Hangar

Pipe Bollards

Steel pipe railings.

Metal stairs.

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512 is specified in another section within Structural steel Division-5.

SYSTEM PERFORMANCES:

Provide assemblies which. Structural Performances: installed, comply with the following minimum requirements for structural performance, unless otherwise indicated.

Capable o<u>f</u> Steel Stairs: of and Platforms withstanding a uniform load of 100 lbf per sq. ft. or a concentrated load of 300 lbf so located as to produce maximum stress conditions.

withstanding the of Handrails and Toprails: Capable following loads applied as indicated when tested per ASTM E 935.

Concentrated loads of 200 lbf applied at any point in any direction.

50 lbf linear ft. load of per Uniform vertical horizontal both and in simultaneously directions.

Concentrated and uniform loads above need not be assumed to act concurrently.

QUALITY ASSURANCE:

Preassemble items in shop to greatest extent Shop Assembly: possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

SUBMITTALS:

Submit manufacturer's specifications, anchor Product Data: details and installation instructions for products used in miscellaneous metal fabrications, including paint products and grout.

Submit shop drawings for fabrication and Shop Drawings: erection of miscellaneous metal fabrications. Include plans, elevations and details of sections and connections. anchorage and accessory items. Provide templates for anchor and bolt installation by others.

Where materials or fabrications are indicated to comply with

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certain requirements for design loadings include structural computations, material properties and other information needed for structural analysis.

Samples: Submit 2 sets of representative samples of materials and finished products as may be requested by Architect.

PART 2 - PRODUCTS

MATERIALS:

Ferrous Metals:

Metal Surfaces, General: For fabrication of miscellaneous metal work which will be exposed to view, use only materials which are smooth and free of surface blemishes including pitting, seam marks, roller marks, rolled trade names and roughness.

Steel Plates, Shapes and Bars: ASTM A 36.

Steel Bar Grating: ASTM A 569 or ASTM A 36.

Steel Tubing: Cold formed, ASTM A 500; or hot rolled, ASTM A

Structural Steel Sheet: Hot-rolled, ASTM A 570; or cold-rolled ASTM A 611, Class 1; of grade required for design loading.

Galvanized Structural Steel Sheet: ASTM A 446, of grade required for design loading. Coating designation as indicated, or if not indicated, G90.

Steel Pipe: ASTM A 53; Type and grade (if applicable) as selected by fabricator and as required for design loading; black finish unless galvanizing is indicated; standard weight (schedule 40), unless otherwise indicated.

Gray Iron Castings: ASTM A 48, Class 30.

Malleable Iron Castings: ASTM A 47, grade as selected by fabricator.

Brackets, Flanges and Anchors: Cast or formed metal of the same type material and finish as supported rails, unless otherwise indicated.

Concrete Inserts: Threaded or wedge type; galvanized ferrous castings, either malleable iron, ASTM A 47, or cast steel, ASTM A 27. Provide bolts, washers and shims as required, hot-dip galvanized, ASTM A 153.

Aluminum Metals:

Aluminum Grillework: ASTM B 221, Alloy 6063-T5.

Fasteners for Aluminum Grillework: Use fasteners made of same basic metal as fastened metal except use galvanized fasteners complying with ASTM A 153 for exterior aluminum units, unless otherwise indicated. Do not use metals which are corrosive or incompatible with metals joined.

Grout:

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Non-Shrink Non-Metallic Grout: Pre-mixed, factory-packaged, non-staining, non-corrosive, non-gaseous grout complying with CE CRD-C621. Provide grout specifically recommended by manufacturer for interior and exterior applications of type specified in this section.

Fasteners:

General: Provide zinc-coated fasteners for exterior use or where built into exterior walls. Select fasteners for the type, grade and class required.

Bolts and Nuts: Regular hexagon head type, ASTM A 307, Grade A.

Lag Bolts: Square head type, FS FF-B-561.

Machine Screws: Cadmium plated steel, FS FF-S-92.

Wood Screws: Flat head carbon steel, FS FF-S-111.

Plain Washers: Round, carbon steel, FS FF-W-92.

Masonry Anchorage Devices: Expansion shields, FS FF-S-325.

Toggle Bolts: Tumble-wing type, FS FF-B-588, type, class and style as required.

Lock Washers: Helical spring type carbon steel, FS FF-W-84.

Paint:

Shop Primer for Ferrous Metal: Fast-curing< lead-free, abrasion- resistant, rust-inhibitive primer selected for compatibility with substrates and with types of alkyd-type finish paint systems indicated, and for capability to provide a sound foundation for field-applied topcoats despite prolonged exposure; complying with performance requirements only of FS TT-P-86, Types I, II, and III.

52 <u>Galvanizing Repair Paint</u>: High zinc dust content paint for 53 regalvanizing welds in galvanized steel, complying with the

Military Specifications MIL-P-21035 (Ships) or SSPC-Paint-20.

Concrete Fill:

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 Concrete Materials and Properties: Comply with requirements of Division-3 section "Concrete Work" for normal weight, ready-mix concrete with minimum 28-day compressive strength of 2500 psi, 440 lbs. cement per cu. ft. minimum and W/C ratio of 0.65 maximum, unless higher strengths indicated.

FABRICATION, GENERAL:

<u>Workmanship</u>: Use materials of size and thickness indicated or, if not indicated, as required to produce strength and durability in finished product for use intended. Work to dimensions indicated or accepted on shop drawings, using proven details of fabrication and support. Use type of materials indicated or specified for various components of work.

Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges. Ease exposed edges to a radius of approximately 1/32" unless otherwise indicated. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.

<u>Weld corners and seams</u> continuously, complying with AWS recommendations. At exposed connections, grind exposed welds smooth and flush to match and blend with adjoining surfaces.

Form exposed connections with hairline joints, flush and smooth, using concealed fasteners wherever possible. Use exposed fasteners of type indicated or, if not indicated, Phillips flathead (countersunk) screws or bolts.

<u>Provide for anchorage</u> of type indicated, coordinated with supporting structure. Fabricate and space anchoring devices to provide adequate support for intended use.

Cut, reinforce, drill and tap miscellaneous metal work as indicated to receive finish hardware and similar items.

Galvanizing: Provide a zinc coating for those items indicated
or specified to be galvanized, as follows:

ASTM A 153 for galvanizing iron and steel hardware.

ASTM A 123 for galvanizing rolled, pressed and forged steel shapes, plates, bars and strip 1/8" thick and heavier.

ASTM A 386 for galvanizing assembled steel products.

Fabricate joints which will be exposed to weather in a manner to

exclude water or provide weep holes where water may accumulate.

Shop Painting:

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Apply shop primer to surfaces of metal fabrications except those which are galvanized or as indicated to be embedded in concrete or masonry, unless otherwise indicated, and in compliance with requirements of SSPC-PA1 "Paint Application Specification No. 1" for shop painting.

Stripe paint all edges, corners, crevices, bolts, welds and sharp edges.

<u>Surface Preparation</u>: Prepare ferrous metal surfaces to comply wit minimum requirements indicated below for SSPC surface preparation specifications and environmental exposure conditions of installed metal fabrications:

Exteriors (SSPC Zone 1B): SSPC-SP6 "Commercial Blast Cleaning".

Interiors (SSPC Zone 1A): SSPC-SP3 "Power Tool Cleaning".

ROUGH HARDWARE:

Furnish bent or otherwise custom fabricated bolts, plates, anchors, hangers, dowels and other miscellaneous steel and iron shapes as required for framing and supporting woodwork, and for anchoring or securing woodwork to concrete or other structures. Straight bolts and other stock rough hardware items are specified in Division-6 sections.

<u>Fabricate</u> <u>items</u> to sizes, shapes and dimensions required. Furnish malleable iron washers for heads and nuts which bear on wood structural connections; elsewhere, furnish steel washers.

STAINLESS STEEL ANCHORS AND INSERTS:

Furnish and install the stainless steel anchors and assemblies as indicated and detailed on the drawings for use as helicopter tie-downs.

LADDERS:

Fabricate ladders for the locations shown, with dimensions, spacings, details and anchorages as indicated. Comply with the requirements of ANSI A14.3, unless otherwise indicated.

Unless otherwise indicated, provide 1/2" x 2-1/2" continuous structural steel flat bar side rails with eased edges, spaced 18" apart.

Provide 3/4" diameter solid structural steel bar rungs, spaced 12" o.c.

Fit rungs in centerline of side rails, plug weld and grind smooth on outer rail faces.

Support each ladder at top and bottom and at intermediate points spaced not more than 5'-0" o.c. Use welded or bolted steel brackets, designed for adequate support and anchorage, and to hold the ladder clear of the wall surface with a minimum of 7" clearance from wall to centerline of rungs. Extend rails 42" above top rung, and return rails to wall or structure unless other secure handholds are provided. If the adjacent structure does not extend above the top rung, goose-neck the extended rails back to the structure to provide secure ladder access.

<u>Provide</u> non-slip surface on the top of each rung, either by coating the rung with aluminum oxide granules set in epoxy resin adhesive, or by using a type of manufactured rung which is filled with aluminum oxide grout.

<u>Provide ship's ladders</u> where indicated. Fabricate of open type construction with structural steel channel or steel plate stringers, pipe handrails, and open steel grating treads, unless otherwise indicated. Provide all necessary brackets and fittings for installation.

Galvanize all ladders, brackets and fasteners.

NOSINGS:

<u>Provide curb nosings</u> fabricated of structural steel shapes as indicated, of all welded construction with mitered corners and continuously welded joints. Provide anchors welded to nosings for embedding in concrete or masonry construction, spaced not more than 6" from each curb end, 6" from corners and 24" o.c., unless otherwise indicated.

Galvanize nosings.

LOOSE BEARING AND LEVELING PLATES:

<u>Provide loose bearing and leveling plates</u> for steel items bearing on masonry or concrete construction, made flat, free from warps or twists, and of required thickness and bearing area. Drill plates to receive anchor bolts and for grouting as required. Galvanize after fabrication.

LOOSE STEEL LINTELS:

Provide loose structural steel lintels for openings and recesses in masonry walls and partitions as shown. Weld adjoining members together to form a single unit where indicated. Provide not less than 8" bearing at each side of openings, unless otherwise indicated.

Galvanize loose steel lintels to be installed in exterior walls.

MISCELLANEOUS FRAMING AND SUPPORTS:

 <u>Provide miscellaneous steel</u> <u>framing</u> and supports which are not a part of structural steel framework, as required to complete work.

Fabricate miscellaneous units to sizes, shapes and profiles indicated or, if not indicated, of required dimensions to receive adjacent other work to be retained by framing. Except as otherwise indicated, fabricate from structural steel shapes, plates and steel bars, of welded construction using mitered joints for field connection. Cut, drill and tap units to receive hardware and similar items.

Equip units with integrally welded anchors for casting into concrete or building into masonry. Furnish inserts if units must be installed after concrete is placed.

Except as otherwise indicated, space anchors 24" o.c. and provide minimum anchor units of 1-1/4" x 1/4" x 8" steel straps.

Galvanize miscellaneous frames and supports where indicated.

MISCELLANEOUS STEEL TRIM:

<u>Provide</u> shapes and sizes for profiles shown. Unless otherwise indicated, fabricate units from structural steel shapes, plates and steel bars, with continuously welded joints and smooth exposed edges. Use concealed field splices wherever possible. Provide cutouts, fittings and anchorages as required for coordination of assembly and installation with other work.

Galvanize miscellaneous steel trim where indicated.

METAL BAR GRATING:

Provide metal bar gratings using bars of type, material, sizes, spacing and construction indicated, or if not indicated, to support design loadings indicated. Comply with "Standard Specifications for Metal Bar Grating and Metal Bar Grating Treads" and NAAMM "Metal Bar Grating Manual".

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Material: Steel.

Type: Welded.

Cross Bars: Rectangular.

and equal Provide true alignment spacing of rectangular cross bars by notching bearing bars prior to welding.

Traffic Surface: Serrated.

Steel Finish: Hot-dip galvanized with a coating weight of not less than 1.5 oz. per sq. ft. of coated surface.

Provide removable grating sections with banding bars attached by welding to entire perimeter of each section. Include clips and fasteners of type indicated, or if not indicated, as recommended by manufacturer, for attachment to support.

Provide not less than 4 saddleclips for each section, with each clip designed and fabricated to fit over 2 bearing bars.

Furnish threaded bolts with nuts and washers for each clip required.

Furnish toe plates for attachment in field.

Fabricate cutouts in grating sections for penetration indicated. Arrange layout of cutouts to permit grating removal without disturbing items penetrating gratings.

Edge band openings in grating which interrupt 4 or more bearing bars with bars of same size and material as bearing bars.

Do not notch bearing bars at supports to maintain elevation.

ARCHITECTURAL ALUMINUM GRILLEWORK:

Provide aluminum grillework for loading dock coiling material, style, size, thickness, weight, and type indicated, or if not indicated, as recommended by manufacturer for indicated applications and design loadings.

Aluminum Finish: Match anodized finish of louvers and vents - Section 10200.

Cut, drill, and fit grillework sections in shop to maximum extent possible.

Fabricate cutouts in grillework sections for penetrations of sizes and at locations indicated. Cut openings neatly and

accurately to size; edge-band openings with bars having a thickness not less than overall grillework thickness at contact points.

Cut, drill, and fit as required for installation.

Fit exposed connections accurately together to form tight hairline joints.

STEEL PIPE RAILINGS AND HANDRAILS:

 Fabricate steel pipe railings and handrails to design, dimensions, and details indicated. Provide railings and handrails members formed of pipe of sizes and wall thickness indicated, but not less than that required to support design loading.

<u>Interconnect</u> <u>railing</u> and handrail members by welding with internal connectors, unless otherwise indicated.

At tee and cross intersections provide coped joints.

At bends interconnect pipe by means of prefabricated elbow fittings or flush radius bends, as applicable, of radii indicated.

At elbow bends provide mitered joints.

Form simple and compound curves by bending pipe in jigs to produce uniform curvature for each repetitive configuration required; maintain cylindrical cross-section of pipe throughout entire bend without buckling, twisting or otherwise deforming exposed surfaces of pipe.

Provide wall returns at ends of wall-mounted handrails, except where otherwise indicated.

Close exposed ends of pipe by welding 3/16" thick steel plate in place or by use of prefabricated fittings.

Toe Boards: Where indicated, provide toeboards at railings around openings and at the edge of open-sided floors and platforms. Fabricate to dimensions and details indicated, or if not indicated, use a 4" high x 1/8" plate welded to, and centered between, each railing post.

Brackets, Flanges, Fittings and Anchors: Provide wall brackets, end closures, flanges, miscellaneous fittings and anchors for interconnections of pipe and attachment of railings and handrials to other work. Furnish inserts and other anchorage devices for connecting railings and handrails to concrete or masonry work.

 For railing posts set in concrete provide sleeves of galvanized steel pipe not less than 6" long and with an inside diameter not less than 1/2" greater than the outside diameter of pipe. Provide steel plate closure welded to bottom of sleeve and of width and length not less than 1" greater than outside diameter of sleeve.

Provide friction fit, removable covers designed to keep sleeves clean and hold top edge of sleeve 1/2" below finished surface of concrete.

<u>Galvanize</u> exterior steel railings, and interior steel railings where shown, including pipe, fittings, brackets, fasteners and other ferrous components. Provide black steel pipe for interior railings not indicated otherwise.

STEEL FRAMED STAIRS:

General: Construct stairs to conform to sizes and arrangements indicated; join pieces together by welding unless otherwise indicated. Provide complete stair assemblies including metal framing, hangers, columns, railings, newels, balusters, struts, clips, brackets, bearing plates and other components necessary for the support of stairs and platforms and as required to anchor and contain the stairs on the supporting structure.

Stair Framing: Fabricate stringers of structural steel channels, or plates, or a combination thereof, as indicated. Provide closures for exposed ends of stringers. Construct platforms of structural steel channel headers and miscellaneous framing members as indicated. Bolt or weld headers to strings and newels and framing members to strings and headers; fabricate and join so that bolts, if used, do not appear on finish surfaces.

Metal Pan Risers, Subtreads, and Subplatforms: Shape metal pans for risers and subtreads to conform to configuration shown. Provide thicknesses of structural steel sheet for metal pans indicated but not less than that required to support total design loading.

Form metal pans of cold-rolled carbon steel sheet unless otherwise indicated.

Form metal pans of galvanized carbon steel sheet, where indicated.

<u>Directly weld</u> risers and subtreads to stringers, locate welds on side of metal pans to be concealed by concrete fill.

<u>Provide</u> <u>subplatforms</u> of configuration and construction indicated, or if not indicated, of same metal as risers and

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subtreads and in thicknesses required to support design loading. Attach subplatform to platform framing members with welds.

Stair Railings and Handrails: Comply with applicable requirements specified elsewhere in this section for steel pipe railings and handrails, and as follows:

Connect railing posts to stair framing by direct welding, unless otherwise indicated.

Pipe Bollards: Provide 4" diameter standard steel pipe for bollards as indicated on drawings. Top of bollards to be 3'-6" above top of concrete slab. Set in concrete 12" diameter and 2'-0" deep. Fill pipe with concrete and round top. Provide 5/8" galvanized steel eye bolts welded to pipe at 3'-0" above top of slab. See drawings.

Monorail for Hangar: Provide steel monorail with all fasteners and attachements as detailed on the drawings.

PART 3 - EXECUTION

PREPARATION:

Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication, where possible. Do not delay job progress; allow for trimming and fitting where taking field measurements before fabrication might delay work.

Coordinate and furnish anchorages, setting drawings, diagrams, templates, instructions, and directions for installation of anchorages, such as concrete inserts, sleeves, anchor bolts and miscellaneous items having integral anchors, which are to be embedded in concrete or masonry construction. Coordinate delivery of such items to project site.

INSTALLATION:

General:

Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing miscellaneous metal fabrications to in-place construction; including threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts, wood screws and other connectors as required.

<u>Cutting</u>, <u>Fitting</u> <u>and</u> <u>Placement</u>: Perform cutting, drilling and fitting required for installation of miscellaneous metal fabrications. Set work accurately in location, alignment and

elevation, plumb, level, true and free of rack, measured from established lines and levels. Provide temporary bracing or anchors in formwork for items which are to be built into concrete, masonry or similar construction.

Fit exposed connections accurately together to form tight hairline joints. Weld connections which are not to be left as exposed joints, but cannot be shop welded because of shipping size limitations. Grind exposed joints smooth and touch-up shop paint coat. Do not weld, cut or abrade the surfaces of exterior units which have been hot-dip galvanized after fabrication, and are intended for bolted or screwed field connections.

Field Welding: Comply with AWS Code for procedures of manual shielded metal-arc welding, appearance and quality of welds made, and methods used in correcting welding work.

<u>Setting Loose Plates</u>: Clean concrete and masonry bearing surfaces of any bond-reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of bearing plates.

Set loose leveling and bearing plates on wedges, or other adjustable devices. After the bearing members have been positioned and plumbed, tighten the anchor bolts. Do not remove wedges or shims, but if protruding, cut-off flush with the edge of the bearing plate before packing with grout. Use metallic non-shrink grout in concealed locations where not exposed to moisture; use non-metallic non-shrink grout in exposed locations, unless otherwise indicated.

Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

Bar Gratings:

 Comply with Recommendations of NAAMM Metal Bar Grating Manual for installation of gratings, including installation clearances and standard anchoring details.

<u>Secure</u> removable units to supporting members with type and size clips and fasteners indicated, or if not indicated as recommended by grating manufacturer for type of installation conditions shown.

<u>Secure non-removable units</u> to supporting members by welding where both materials are the same, otherwise fasten by bolting as indicated above.

Attach toe plates to gratings by welding, at locations indicated.

Architectural Aluminum Grillework:

Comply with manufacturer's instructions for installation of

grillework; unless otherwise indicated.

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<u>Place units</u> with the long direction of rectangular-shaped openings parallel with direction of span.

Attach aluminum units to steel supporting members by bolting at 6" intervals.

<u>Butt</u> <u>edges</u> parallel to long way of rectangle and weld at everey second bond point. Place individual grillework sections so that rectangles of one pices are aligned with those of adjacent sections.

Steel Pipe Railings and Handrails:

Adjust railings prior to anchoring to ensure matching alignment at abutting joints. Space posts at spacing indicated, or if not indicated, as required by design loadings. Plumb posts in each direction. Secure posts and railing ends to building construction as follows.

Anchor posts in concrete by means of pipe sleeves preset and anchored into concrete. After posts have been inserted into sleeves, fill annular space between post and sleeve solid with non-shrink, non-metallic grout, mixed and placed to comply with grout manufacturer's directions.

Anchor posts to steel with steel oval flanges, angle type or floor type as required by conditions, welded to posts and bolted to steel supporting members.

Secure handrails to wall with wall brackets and end fittings. Provide bracket with not less than 1 1/2" clearance from inside face of handrail and finished wall surface. Locate brackets as indicated or, if not indicated, at spacing required for design loading. Secure wall brackets and wall return fittings to building construction as follows:

<u>Use type of bracket</u> with flange tapped for concealed anchorage to threaded hanger bolt.

For concrete and solid masonry anchorage, use drilled-in expansion shield and either concealed hanger bolt or exposed lag bolt, as applicable.

For hollow masonry anchorage, use toggle bolts having square heads.

For stud partitions use lag bolts set into wood backing between studs. Coordinate with stud installations for accurate location of backing members.

Expansion Joints: Provide expansion joints at locations

indicated, or if not indicated, at intervals not to exceed 40 feet. Provide slip joint with internal sleeve extending 2" beyond joint on either side; fasten internal sleeve securely to one side; locate joint within 6" of posts.

ADJUST AND CLEAN:

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Touch-Up Painting: Cleaning and touch-up painting of field welds, bolted connections and abraded areas of the shop paint on miscellaneous metal is specified in Division 9 of these specifications.

For galvanized surfaces: Clean field welds, bolted connections and abraded areas and apply galvanizing repair paint to comply with ASTM A 780.

END OF SECTION 05500

SECTION 05520 - HANDRAILS AND RAILINGS

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PART 1 - GENERAL

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RELATED DOCUMENTS:

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Drawings and general provisions of Contract, including General and Special Conditions and Division-1 Specification sections, apply to work of this section.

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SUMMARY:

Extent of handrails and railings is indicated on drawings and includes miscellaneous handrails and railing svstems included in other sections of these specifications.

Types of handrails and railing systems required in this section include:

Coated aluminum pipe handrails and railing systems.

Steel pipe handrails and railing systems are specified in another Division-5 section, "Metal Fabrications".

Products furnished but not installed under this section include inserts and anchors preset in masonry and concrete for anchorage of handrails and railing systems.

DEFINITIONS:

Definitions in ASTM E 985 for railing-related terms apply to this section.

SYSTEM DESCRIPTION:

Structural Performance of Handrails and Railing Systems: Design, engineer, fabricate, and install handrails and railing systems to withstand the following structural loads without exceeding the allowable design working stress of the materials for handrails, railing systems, anchors, and connections. Apply each load to produce the maximum stress in each of the respective components comprising handrails and railing systems.

Top Rail of Guardrail Systems: Capable of withstanding the following loads applied as indicated:

Concentrated load of 300 lbf applied at any point nonconcurrently, vertically downward or horizontally.

<u>Uniform</u> <u>load</u> of 100 lbf per linear ft. applied nonconcurrently, vertically downward or horizontally.

Concentrated and uniform loads above need not be assumed to act concurrently.

Handrails Not Serving as Top Rails: Capable of withstanding the following loads applied as indicated:

Concentrated <u>load</u> of 200 lbf applied at any point nonconcurrently, vertically downward or horizontally.

<u>Uniform load</u> of 50 lbf per linear foot applied nonconcurrently, vertically downward or horizontally.

Concentrated and uniform loads above need not be assumed to act concurrently.

<u>Infill Area of Guardrail Systems:</u> Capable of withstanding a horizontal concentrated load of 200 lbf applied to one sq. ft. at any point in the system including panels, intermediate rails balusters, or other elements composing the infill area.

Above <u>load</u> need not be assumed to act concurrently with uniform horizontal loads on top rails of railing systems in determining stress on guard.

SUBMITTALS:

<u>Product Data:</u> Manufacturer's technical data for products and processes used in handrails and railing systems, including finishes and grout.

Shop Drawings: Show details of fabrication and installation for each type and material of handrail and railing system required including plans, elevations, sections, profiles of rails, fittings, connections, and anchors.

Provide templates for anchor and bolt installation by others.

Include structural computations evidencing compliance of handrails and railing systems with design loadings indicated.

<u>Samples</u>: Prepare samples of each type of metal finish required on metal of same thickness and alloy indicated for final work. Where finish involves normal color and texture variations, include sample sets composed of two or more units showing limits of such variations expected in completed work.

QUALITY ASSURANCE:

 METALS:

<u>Single Source Responsibility:</u> Obtain handrails and railing systems of each type and material from a single manufacturer.

<u>Design Responsibility:</u> Engage a qualified professional engineer to prepare or supervise the preparation of structural computations for handrails and railing systems to determine compliance with structural performance requirements indicated.

Engineer Qualifications: A professional engineer who is licensed to practice in jurisdiction where Project is located and who is experienced in providing structural engineering services of the kind required for work of this section.

STORAGE:

Store handrails and railing systems in clean, dry location, away from uncured concrete and masonry, protected against damage of any kind. Cover with waterproof paper, tarpaulin, or polyethylene sheeting; allow for air circulation inside the covering.

PART 2 - PRODUCTS

MANUFACTURERS:

Manufacturer: Subject to compliance with requirements, provide handrails and railing systems of one of the following:

Coated Aluminum Pipe Railing System Manufacturers:

L & J Specialty Corporation Poma Corporation TSCO International, Tube Specialties Co., Inc. Zephyr Metalcraft

General: Comply with standards indicated for forms and types of metals indicated or required for handrail and railing system components.

<u>Aluminum</u>: Provide alloy and temper recommended by aluminum producer or finisher for type of use and finish indicated, and with not less than the strength and durability properties of the alloy and temper designated below for each aluminum form required.

Extruded Bar and Shape: ASTM B 221, 6063-T6.

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Drawn Seamless Tube: ASTM B 483, 6063-T832.

Plate and Sheet: ASTM B 209, 6061-T6.

Die and Hand Forgings: ASTM B 247, 6061-T6.

Castings: ASTM B 26, 356-T6.

MISCELLANEOUS MATERIALS:

Welding Electrodes and Filler Metal: Provide type and alloy of filler metal and electrodes as recommended by producer of metal to be welded, complying with applicable AWS specifications, and as required for color match, strength and compatibility in fabricated items.

<u>Fasteners</u>: Use fasteners of same basic metal as the fastened metal, unless otherwise indicated. Do not use metals which are corrosive or incompatible with materials joined.

<u>Provide concealed fasteners</u> for interconnection of handrail and railing components and for their attachment to other work, except where otherwise indicated.

Anchors and Inserts: Provide anchors of type, size, and material required for type of loading and installation condition shown, as recommended by manufacturer, unless otherwise indicated. Use non-ferrous metal of hot-dipped galvanized anchors and inserts for exterior locations and elsewhere as required for corrosion resistance. Use toothed steel or expansion bolt devices for drilled-in-place anchors.

Bituminous Paint: SSPC-Paint 12 (cold-applied asphalt mastic).

FABRICATION:

General: Fabricate handrails and railing systems to design, dimensions and details shown. Provide handrail and railing members in sizes and profiles indicated, with supporting posts and brackets of size and spacing shown, but not less than required to comply with requirements indicated for structural performance.

 Shop Assembly: Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

Nonwelded Connections: Fabricate railing systems and handrails for interconnection of members by means of railing

manufacturer's standard concealed mechanical fasteners and fittings unless otherwise indicated. Fabricate members and fittings to produce flush, smooth, rigid, hairline joints.

Fabricate splice joints for field connection using epoxy structural adhesive where this represents manufacturer's standard splicing method.

Form changes in direction of railing members by bending members, insertion of prefabricated elbow fittings, radius bends, or by mitering.

Form simple and compound curves by bending members in jigs to produce uniform curvature for each repetitive configuration required; maintain profile of member throughout entire bend without buckling, twisting or otherwise deforming exposed surfaces of handrail and railing components.

For handrails and railing systems with nonwelded connections which are exposed to exterior or to moisture from condensation or other sources, provide weepholes or other means for evacuation of entrapped water in hollow sections of railing members.

Brackets, Flanges, Fittings and Anchors: Provide manufacturer's standard wall brackets, flanges, miscellaneous fittings and anchors for interconnection of handrail and railing members to other work, unless otherwise indicated.

Furnish inserts and other anchorage devices for connecting handrails and railing systems to concrete or masonry work. Fabricate anchorage devices which are capable of withstanding loadings imposed by handrails and railing systems. Coordinate anchorage devices with supporting structure.

For railing posts set in concrete provide preset sleeves of steel, not less than 6" long and inside dimensions not less than 1/2" greater than outside dimensions of post, with steel plate forming bottom closure.

METAL FINISHES, GENERAL:

Comply with NAAMM "Metal Finishes Manual" for recommendations and designations of finishes, except as otherwise indicated.

ALUMINUM FINISHES:

 High Performance Organic Coating: AA-C12C42R1x (cleaned with inhibited chemicals, conversion coated with acid-chromate-fluoride-phosphate treatment, and painted with organic coating specified below). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin

manufacturer's instructions.

Fluorocarbon Coating: Manufacturer's standard multicoat thermo-cured system, composed of specially formulated primer and fluorocarbon topcoats; complying with AAMA 605.2.

Color and Sheen: Match Architect's sample.

PART 3 - EXECUTION

PREPARATION:

Coordinate setting drawings, diagrams, templates, instructions, and directions for installation of anchorages, such as sleeves, concrete inserts, anchor bolts and miscellaneous items having integral anchors, which are to be embedded in concrete as masonry construction. Coordinate delivery of such items to project site.

<u>Field Measurements:</u> Take field measurements prior to fabrication.

INSTALLATION, GENERAL:

Fit exposed connections accurately together to form tight, hairline joints.

Perform cutting, drilling and fitting required for installation of handrails and railing systems. Set work accurately in location, alignment and elevation, plumb, level, true and free of rack, measured from established lines and levels. Do not weld, cut or abrade surfaces of handrails and railing components which have been coated or finished after fabrication, and are intended for field connection by mechanical means without further cutting or fitting.

Corrosion Protection: Coat concealed surfaces of aluminum, which will be in contact with grout, concrete, masonry, wood, or dissimilar metals, with a heavy coat of bituminous paint or zinc chromate primer.

Adjust handrails and railing systems prior to anchoring to ensure matching alignment at abutting joints. Space posts at intervals indicated but not less than that required by design loadings.

ANCHORING POSTS:

Concrete-Anchored Posts in Sleeves: Insert posts in preset sleeves cast into concrete and fill annular space between posts and sleeve solid with nonshrink, nonmetallic grout, mixed and placed to comply with grout manufacturer's directions.

Anchor posts to metal surfaces with manufacturer's standard fittings designed for this purpose, unless otherwise indicated.

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RAILING CONNECTIONS:

Nonwelded Connections: Use manufacturer's standard mechanical or adhesive joints for permanently connecting railing components. Use wood blocks and padding to prevent damage to railing members and fittings. Seal recessed holes of exposed locking screws using plastic filler cement colored to match finish of handrails and railing systems.

Welded Connections: Use fully welded joints for permanently connecting railing components by welding. Cope or butt components to provide 100 percent contact or use manufacturer's standard fittings designed for this purpose. Fill and grind smooth any welded connections prior to finishing.

ANCHORING RAILING ENDS:

Anchor railing ends into concrete or masonry with manufacturer's standard fittings designed for this purpose, unless otherwise indicated.

 Anchor railing ends to metal surfaces with manufacturer's standard fittings using concealed fasteners, unless otherwise indicated.

ADJUSTING:

Touch-Up Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with same material.

PROTECTION:

<u>Protect finishes</u> of railing systems and handrails from damage during construction period by use of temporary protective coverings approved by railing manufacturer. Remove protective covering at time of Substantial Completion.

Restore <u>finishes</u> damaged during installation and construction period so that no evidence remains of correction work. Return items which cannot be refinished in the field to the shop; make

required alterations and refinish entire unit, or provide new units as required.

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END OF SECTION 05520

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PART 1 - GENERAL

SECTION 06100 - ROUGH CARPENTRY

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RELATED DOCUMENTS:

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10 11 Drawings and general provisions of Contract, including General and Special Conditions and Division-1 Specification sections, apply to work of this section.

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SUMMARY:

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Types of work in this section include rough carpentry for:

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Rooftop equipment bases and support curbs.

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Wood grounds, nailers and blocking.

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Wood furring.

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DEFINITIONS:

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Rough carpentry includes carpentry work not specified as part of other sections and which is generally not exposed, except as otherwise indicated.

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SUBMITTALS:

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Wood Treatment Data: Submit chemical treatment manufacturer's instructions for handling, storing, installation and finishing of treated material.

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For each type specified, include Preservative Treatment: certification by treating plant stating type of preservative used, and pressure process amount net perservative retained and conformance with applicable standards.

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For water-borne treatment, include statement that moisture content of treated materials was reduced to levels indicated prior to shipment to project site.

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Fire-Retardant Treatment: Include certification by treating plant that treated material complies with specified standard and other requirements.

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PRODUCT HANDLING:

Delivery and Storage: Keep materials under cover and dry. Protect against exposure to weather and contact with damp or wet surfaces. Stack lumber as well as plywood and other panels; provide for air circulation within and around stacks and under temporary coverings including polyethylene and similar materials.

PROJECT CONDITIONS:

 Coordination: Fit carpentry work to other work; scribe and cope as required for accurate fit. Correlate location of furring, nailers, blocking, grounds and similar supports to allow attachment of other work.

PART 2 - PRODUCTS

LUMBER, GENERAL:

Lumber Standards: Manufacture lumber to comply with PS 20 "American Softwood Lumber Standard" and with applicable grading rules of inspection agencies certified by American Lumber Standards Committee's (ALSC) Board of Review.

<u>Inspection Agencies</u>: Inspection agencies and the abbreviations used to reference with lumber grades and species include the following:

RIS - Redwood Inspection Service.

NLGA - National Lumber Grades Authority (Canadian).

SPIB - Southern Pine Inspection Bureau. WWPA - Western Wood Products Association.

 Grade Stamps: Factory-mark each piece of lumber with grade stamp of inspection agency evidencing compliance with grading rule requirements and identifying grading agency, grade, species, moisture content at time of surfacing, and mill.

Nominal <u>sizes</u> are indicated, except as shown by detail dimensions. Provide actual sizes as required by PS 20, for moisture content specified for each use.

Provide dressed lumber, S4S, unless otherwise indicated.

<u>Provide</u> <u>seasoned</u> <u>lumber</u> with 19 percent maximum moisture content at time of dressing and shipment for sizes 2" or less in nominal thickness, unless otherwise indicated.

DIMENSION LUMBER:

 For light framing (2" to 4" thick, 2" to 4" wide), provide the following grade and species:

Construction grade.

Any species of specified grade.

For structural light framing (2" to 4" thick, 2" to 4" wide), provide the following grade and species:

Select structural grade.

Any species of specified grade.

For structural framing (2" to 4" thick, 5" and wider), provide the following grade and species:

Select Structural grade.

Any species of specified grade.

BOARDS:

Concealed Boards: Where boards will be concealed by other work, provide lumber of 19 percent maximum moisture content (S-DRY) and of following species and grade:

Redwood Construction Common per RIS rules, Southern Pine No. 2 Boards per SPIB rules, or any species graded Construction Boards per WWPA rules.

MISCELLANEOUS LUMBER:

Provide wood for support or attachment of other work including rooftop equipment curbs and support bases, cant strips, bucks, nailers, blocking, furring, grounds, stripping and similar members. Provide lumber of sizes indicated, worked into shapes shown, and as follows:

Moisture content: 19 percent maximum for lumber items not specified to receive wood preservative treatment.

Grade: Standard Grade light framing size lumber of any species or board size lumber as required. No. 3 Common or Standard grade boards per WWPA rules or No. 3 boards per SPIB rules.

CONSTRUCTION PANELS:

Construction Panel Standards: Comply with PS 1 "U.S. Product Standard for Construction and Industrial Plywood" for plywood panels and, for products not manufactured under PS 1 provisions,

with American Plywood Associates (APA) "Performance Standard and Policies for Structural-Use Panels", Form No. E445.

Trademark: Factory-mark each construction panel with APA trademark evidencing compliance with grade requirements.

Concealed APA Performance-Rated Panels: Where construction panels will be used for the following concealed types of applications, provide APA Performance-Rated Panels complying with requirements indicated for grade designation, span rating, exposure durability classification, edge detail (where applicable) and thickness.

Wall Sheathing: APA RATED SHEATHING.

Exposure Durability Classification: EXPOSURE 1.

Span Rating: As required to suit stud spacing
indicated.

<u>Plywood Backing Panels:</u> For mounting electrical or telephone equipment, provide fire-retardant treated plywood panels with grade designation, APA C-D PLUGGED INT with exterior glue, in thickness indicated, or, if not otherwise indicated, not less than 15/32".

MISCELLANEOUS MATERIALS:

 Fasteners and Anchorages: Provide size, type, material and finish as indicated and as recommended by applicable standards, complying with applicable Federal Specifications for nails, staples, screws, bolts, nuts, washers and anchoring devices. Provide metal hangers and framing anchors of the size and type recommended by the manufacturer for each use including recommended nails.

Where rough carpentry work is exposed to weather, in ground contact, or in area of high relative humidity, provide fasteners and anchorages with a hot-dip zinc coating (ASTM A 153).

Building Paper: ASTM D 226, Type I; asphalt saturated felt, non-perforated, 15-1b. type.

WOOD TREATMENT BY PRESSURE PROCESS:

Preservative Treatment: Where lumber or plywood is indicated as "Trt-Wd" or "Treated," or is specified herein to be treated, comply with applicable requirements of AWPA Standards C2 (Lumber) and C9 (Plywood) and of AWPB Standards listed below. Mark each treated item with the AWPB Quality Mark Requirements.

Pressure-treat above-ground items with water-borne preservatives to comply with AWPB LP-2. After treatment, kiln-dry lumber and plywood to a maximum moisture content, respectively, of 19 percent and 15 percent. Treat indicated items and the following:

Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers and waterproofing.

Wood sills, sleepers, blocking, furring, stripping and similar concealed members in contact with masonry or concrete.

Wood framing members less than 18" above grade.

Wood floor plates installed over concrete slabs directly in contact with earth.

Pressure-treat the following with water-borne preservatives for ground contact use complying with AWPB LP-22:

Wood members in contact with ground.
Wood members in contact with fresh water.

Complete fabrication of treated items prior to treatment, where possible. If cut after treatment, coat cut surfaces with heavy brush coat of same chemical used for treatment and to comply with AWPA M4. Inspect each piece of lumber or plywood after drying and discard damaged or defective pieces.

Fire Retardant Treatment: Where fire-retardant treated wood ("FRTW") is indicated.

<u>Interior Type A:</u> Use fire-retardent treated wood for interior applications.

Exterior Type: Use where "FRTW" wood is indicated for exterior, exposed applications.

Inspect each piece of treated lumber or plywood after drying
and discard damaged or defective pieces.

PART 3 - EXECUTION

INSTALLATION, GENERAL:

Discard units of material with defects which might impair quality of work, and units which are too small to use in fabricating work with minimum joints or optimum joint arrangement.

Set carpentry work to required levels and lines, with members plumb and true to line and cut and fitted.

<u>Securely attach carpentry work</u> to substrate by anchoring and fastening as shown and as required by recognized standards.

Countersink nail heads on exposed carpentry work and fill holes.

<u>Use common wire nails</u>, except as otherwise indicated. Use finishing nails for finish work. Select fasteners of size that will not penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting of wood; predrill as required.

WOOD GROUNDS, NAILERS, BLOCKING AND SLEEPERS:

<u>Provide wherever shown</u> and where required for screeding or attachment of other work. Form to shapes as shown and cut as required for true line and level of work to be attached. Coordinate location with other work involved.

Attach to substrates as required to support applied loading. Countersink bolts and nuts flush with surfaces, unless otherwise indicated. Build into masonry during installation of masonry work. Where possible, anchor to formwork before concrete placement.

WOOD FURRING:

<u>Install plumb and level</u> with closure strips at edges and openings. Shim with wood as required for tolerance of finished work.

<u>Firestop</u> <u>furred</u> <u>spaces</u> on walls at each floor level and at ceiling line of top story, with wood blocking or noncombustible materials, accurately fitted to close furred spaces.

Furring to Receive Plywood Paneling: Unless otherwise indicated, provide 1" x 3" furring at 2' o.c., horizontally and vertically. Select furring for freedom from knots capable of producing bent-over nails and resulting damage to paneling.

END OF SECTION 06100

SECTION 06400 - ARCHITECTURAL WOODWORK PART 1 - GENERAL RELATED DOCUMENTS: Drawings and general provisions of Contract, including General and Special Conditions and Division-1 Specification sections, apply to work of this section. DESCRIPTION OF WORK: Extent of each type of architectural woodwork is indicated on drawings and in schedules. Types of architectural woodwork include the following: Architectural cabinets including: Laminate clad millwork. Laminate clad cabinets. Laminate clad nurses work station. Countertops. Custom stainless steel countertops and sinks. Writing shelves. Fixed and adjustable shelving. Cabinet hardware and accessory materials. Sliding glass (pass-through) doors. Closet and utility shelving. Exposed coat rod and hangers. Wood doors are specified within Division 8. Manufactured metal cabinet and casework of custom or stock

design , (laboratory & medical) is specified within Division 12.

QUALITY ASSURANCE:

AWI Quality Standard: Comply with applicable requirements of "Architectural Woodwork Quality Standards" published by the Architectural Woodwork Institute (AWI), except as otherwise indicated.

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<u>Installer Qualifications</u>: Arrange for installation of architectural woodwork by a firm which can demonstrate successful experience in installing architectural woodwork items similar in type and quality to those required for this project.

SUBMITTALS:

<u>Wood Treatment Data</u>: Submit chemical treatment manufacturer's instructions for handling, storing, installation, and finish of treated material.

Fire-Retardant Treatment: Include certification by treating plant that treated materials comply with requirements.

<u>Quality</u> <u>Certification</u>: Submit woodwork Manufacturer's (Fabricator's) certification, stating that fabricated woodwork complies with quality grades and other requirements indicated.

Shop Drawings: Submit shop drawings showing location of each item, dimensioned plans and elevations, large scale details, attachment devices and other components.

Samples: Submit the following samples:

Plastic laminate, 8" x 10" for each type, color, pattern and surface finish.

Exposed cabinet hardware, one unit of each type and finish.

DELIVERY, STORAGE AND HANDLING:

<u>Protect woodwork</u> during transit, delivery, storage and handling to prevent damage, soiling and deterioration.

<u>Do not deliver</u> woodwork, until painting, wet work, grinding and similar operations which could damage, soil or deteriorate woodwork have been completed in installation areas. If, due to unforeseen circumstances, woodwork must be stored in other than installation areas, store only in areas meeting requirements specified for installation areas.

PROJECT CONDITIONS:

Conditioning: Woodwork Manufacturer and Installer shall advise Contractor of temperature and humidity requirements for woodwork installation and storage areas. Do not install woodwork until required temperature and relative humidity have been stabilized

and will be maintained in installation areas.

Maintain temperature and humidity in installation area as required to maintain moisture content of installed woodwork within a 1.0 percent tolerance of optimum moisture content, from date of installation through remainder of construction period. Require Woodwork Manufacturer to establish optimum moisture content and required temperature and humidity condition.

PART 2 - PRODUCTS

ACCEPTABLE MANUFACTURERS:

Manufacturer: Subject to compliance with requirements, provide high pressure decorative laminates of one of the following:

Formica Corp.

Micarta Div., Westinghouse ELectric Corp.

Nevamar Corp.

Ralph Wilson Plastics Co.

FABRICATION, GENERAL:

<u>Wood Moisture Content</u>: Comply with requirements of referenced quality standard for moisture content of lumber at time of fabrication and for relative humidity conditions in the installation areas.

<u>Fabricate</u> <u>woodwork</u> to dimensions, profiles, and details indicated with openings and mortises precut, where possible, to receive hardware and other items and work.

Ease edges to a 1/16" radius, for corners of cabinets and edges of solid wood (lumber) members less than 1" in nominal thickness, 1/8" radius for edges of rails and similar members over 1" in nominal thickness.

Interior Wood for Transparent Finish:

Solid Wood: Rift Sawn White Oak

Complete fabrication, assembly, finishing, hardware application, and other work before shipment to project site to maximum extent possible. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.

Pre-Cut Openings: Fabricate architectural woodwork with pre-cut openings, where possible, to receive hardware, appliances, plumbing fixtures, electrical work and similar items. Locate openings accurately and use templates or roughing-in diagrams

for proper size and shape. Smooth edges of cutoffs and, where located in countertops and similar exposures seal edges of cutouts with a water-resistant coating.

Measurements: Before proceeding with fabrication of woodwork required to be fitted to other construction, obtain field measurements and verify dimensions and shop drawing details as required for accurate fit.

FIRE-RETARDANT MATERIALS:

Where <u>fire-retardant treated lumber</u> is indicated, provide materials which are pressure impregnated with fire-retardant chemicals and comply with the following requirements:

<u>Fire-Retardant</u> <u>Chemicals</u>: Use chemicals of type and for applications indicated which do not bleed-through or otherwise adversely affect finishes. Do not use colorant in solution to distinguish treated lumber from untreated lumber.

Organic Resin Type: Organic resin solution, relatively insoluble in water, thermally set in wood by kiln drying.

Available Products: Subject to compliance with requirements, products which may be incorporated in the work include, but are not limited to, the following:

"NCX"; Koppers Co., Inc.

Low Hygroscopic Type: Halogen and sulfate-free solution intended for interior applications not exposed to relative humidities in excess of 95%; with treated material having an equilibrium moisture content of not over 28% per ASTM D 3201 at 92 +2% relative humidity.

<u>Available Products:</u> Subject to compliance with requirements, products which may be incorporated in the work include, but are not limited to, the following:

"Dricon"; Koppers Co., Inc.
"Flameproof LHC"; Osmose Wood Preserving Co. of America, Inc.

Fire Performance Characteristics: Provide materials which are identical to those tested per ASTM methods and time periods indicated, are marked and listed for fire performance characteristics by Underwriters Laboratories, Inc. or other testing and inspecting agency acceptable to authorities having jurisdiction, and comply with the following requirements:

Mill lumber after treatment, within limits set for wood

removal which does not affect listed fire performance characteristics, using a woodworking plant certified by testing and inspecting agency.

Marking: Identify treated lumber with separable paper classification marking of inspecting and testing agency, unless otherwise indicated.

<u>Surface</u> <u>Burning</u> <u>Characteristics</u>: Not exceeding values indicated below, tested per ASTM E 84 for 30 minutes with no evidence of significant combustion.

Flame Spread: 25.
Smoke Developed: 50.

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<u>Kiln-dry woodwork</u> after treatment to levels required for non-fire-retardant treated woodwork materials. Maintain moisture content required by kiln drying, before and after treatment.

<u>Discard treated lumber</u> which does not comply with requirements of referenced woodworking standard. Do not use twisted, warped, bowed, discolored, or otherwise damaged or defective lumber.

<u>For fire-retardant plywood</u> as indicated, provide panels with fire-retardant chemicals incorporated at time of manufacture to achieve surface-burning characteristics of 20 for flame spread and 25 for smoke developed when tested in accordance with ASTM E 84

ARCHITECTURAL CABINETS, LAMINATE CLAD:

Quality Standard: Comply with AWI Section 400 and its Division 400B.

Laminate Clad Cabinets: Comply with the following requirements:

Grade: Premium.

Type of Cabinet Construction: Flush overlay. Particleboard is not permitted.

Laminate Cladding: High pressure decorative laminate complying with NEMA LD 3 and as follows:

<u>Colors, Patterns</u> <u>and</u> <u>Finishes</u>: As indicated or, if not otherwise indicated, as selected by Architect from laminate manufacturers' standard products in the following categories:

Solid colors.

Laminate Grade for Exposed Surfaces: Provide laminate 1 cladding complying with the following requirements for type 2 3 of surface and grade. 4 5 GP-50 (0.050" Horizontal Surfaces Other Than Tops: 6 nominal thickness). 7 8 Postformed Surfaces: PF-42 (0.042" nominal thickness). 9 Vertical Surfaces: GP-50 (0.050" nominal thickness). 10 11 Edges: GP-28 (0.028" nominal thickness). 12 13 <u>Semi-Exposed</u> <u>Surfaces</u>: Provide surface material indicated 14 15 below: 16 17 High pressure laminate, GP-28. 18 19 Provide dust panels of 1/4" plywood or tempered hardboard above compartments and drawers except where located directly under 20 21 tops. 22 23 Standing and Running Trim 24 25 Grade: Custom 26 27 28 CABINET HARDWARE AND ACCESSORY MATERIALS: 29 30 Provide cabinet hardware and accessory materials General: 31 associated with architectural cabinets, except for items which are specified in Division-8 section "Finish Hardware". 32 33 Hardware Standard: Comply with ANSI/BHMA A156.9 "American 34 National Standard for Cabinet Hardware" for items indicated by 35 reference to BHMA numbers or referenced to this standard. 36 37 38 Quality Level: Type 2 (Institutional) 39 40 Cabinet Door Hardware: Provide hinges, catches and pulls of 41 types indicated, to accommodate each door size and style. 42 43 Hinge: Self-closing, concealed pivots. 44 Catches: Heavy-duty, magnetic. 45 Pulls: Wire pulls, bright chrome finish. 46 47 Sliding Glass Door Hardware: Provide sets of type indicated, 48 including pulls, to accommodate each pair of sliding doors. 49 Provide rolling type sets, except where sliding types are 50 51 indicated. 52 53 Drawer Hardware: Provide slides and pulls of types indicated,

to properly accommodate each drawer size and style.

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Equip each drawer with side-mounted, full extension, ball-bearing, nylon roller drawer slides with load capacity of 75 lbs. per pair.

<u>Locks</u>: Where indicated, provide standard pin-type or disc-type (5 pins or discs) tumbler locks, keyed individually except as otherwise indicated.

<u>Shelf Supports:</u> Where shelving is indicated as "adjustable", provide slotted-type standards and brackets of type needed to support shelves with uniform 40-lb per square ft. loading.

<u>Closet Bars:</u> Telescoping steel or brass tubing, with forged end brackets; size and wall thickness as required to support full continuous hanging of clothing. Provide for enclosed closets only.

Hardware Finishes: Comply with BHMA 1301 for finishes indicated by BHMA Code Numbers or if not otherwise indicated, provide finishes complying with requirements indicated below:

For exposed hardware comply with requirements indicated for finish and base indicated by BHMA Code Number below:

630 (Satin stainless steel).

For concealed hardware provide manufacturer's standard finish which complies with product class requirements of ANSI/3HMA A156.9.

Clear Tempered Float Glass for Doors: FS DD-G-1403, grade B, style I, type I, quality q3, class 1; manufactured by horizontal (roller hearth) process; 1/4" thick, unless otherwise indicated.

MISCELLANEOUS ACCESSORIES:

Piano Hinge: Continuous length piano hinge, stainless steel,
type 302, 2" width. Provide countersunk fasteners as
required. Provide hinge as manufactured by Stanley or equal.

<u>Plexiglass</u> <u>Dividers</u>: Provide 1/8" thick plexiglass dividers at custom millwork indicated on drawings. Ease exposed edge of plexiglass entire thickness.

ARCHITECTURAL CABINET TOPS:

Quality Standard: Comply with AWI Section 400 and its Division 400C.

laminate

following

from

the

Type of Top: High Pressure Decorative Laminate:

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Grade: Premium.

Laminate Cladding for Horizontal Surface: High pressure decorative laminate complying with NEMA LD 3 and as follows:

Colors, Patterns, and Finishes: As indicated or, if not

indicated, as selected

10 11 12 manufacturer's standard products in categories:

Solid colors.

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Grade: GP-50 (0.050" nominal thickness).

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Edge Treatment: Same as laminate cladding on horizontal surface.

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CUSTOM STAINLESS STEEL COUNTERTOPS AND SINKS:

Provide sink, countertop and backsplash as single integral unit fabricated of 14 gauge, Type 304, all exposed surfaces satin finish. Reinforce as required with 14 gauge 1-1/4" x 3" channels. Provide channel rim design, 1" wide at top, 1-1/2" apron and 1" turnunder. Provide backsplash and rim intersections with top with 1/4" radius for horizontal and vertical corners. Provide sink bowls with 1-3/4" integrally and seamlessly welded into top. Overlapping or soldered edges are not permitted. Underside ;of sin, bowls shall be sound deadened. Coordinate with mechanical plumbing drawings for fixture and drain types. Refer to drawings for Underside ; of sin, bowls sink bowl and countertop sizes. Provide, where indicated, pitched countertop drainboard toward sink. Provide necessary fasteners and anchors for securing top to wall and base Provide units as manufactured by Elkay Manufacturing cabinets. Submit manufacturers shop drawings Co., or approved equal. indicating dimensions and installation procedure.

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CLOSET AND UTILITY SHELVING:

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Quality Standard: Comply with AWI Section 600.

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<u>Shelving for Opaque Finish</u>: Comply with the following requirements:

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Grade: Custom.

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<u>Shelving Material</u>: Lumber, any closed-grain hardwood listed in referenced woodworking standard, or,

Birch faced veneer core plywood.

CLOSET AND UTILITY SHELVING HARDWARE:

Adjustable Shelf Standards and Related Supports: Provide standards and supports of type indicated which comply with ANSI/BHMA A156.9.

<u>Vertical Slotted Type:</u> Vertical slots spaced 2" on center, 7/8" wide x 11/16" high x length indicated, BHMA No. B84102, zinc-plated steel.

Shelf Brackets: Size required to support shelving widths indicated, BHMA No. B84112, zinc-plated steel.

<u>Clothes</u> <u>Poles</u> <u>and</u> <u>Supports</u>: Provide steel pipe or tubing cut to lengths required, with standard wrought steel flanges (one with open top).

Size: 1.660" O.D., 0.14" wall thickness (1-1/2").

Finish: Satin chrome plated, BHMA 652.

Center Brackets: Combination shelf and closet pole support wrought steel with manufacturer's standard enamel finish; complying with ANSI A156.16, Type B84051.

EXPOSED COAT AND HANGERS

Provide coat rod constructed of galvanized steel core unit covered with outer tubing of solid nylon. Color as selected by Architect from manufacturer's standard selection. provide coat rod with removable end caps by concealed pin.

Provide coat hanger with closed ring to fit onto coat rod and having a swivel feature that permits rotating of coat hanger at 90 degrees set points. Quantity as noted on drawings. Coat hanger construction shall be of galvanized steel core with outer coating of solid nylon. Color as selected by Architect from manufacturer's standard selection.

Provide coat rods and coat hangers as manufactured by HEWI, Inc., Allendale, New Jersey or approved equal.

FASTENERS AND ANCHORS:

Screws: Select material, type, size and finish required for each use. Comply with FS FF-S-111 for applicable requirements.

<u>Nails</u>: Select material, type, size and finish required for each use. Comply with FS FF-N-105 for applicable requirements.

B. Correction of wording, Page 8, Line 18. Cut and dress salvaged stone as necessary for reinstallation at new locations. Butter vertical joints for full width before setting and set units in full bed of mortar, unless otherwise indicated.

Section 06400 Architectural Woodwork

The fold down grab bar not specified, this involves 32 Ict patient rooms. Insert at Page 9, Line 47 the following:

Fold Down Grab Bar: Provide fold down grab bar with spring assisted up and down movement, locked in the up position by turning left or right. Grab bar constructed of corrosion resistant steel insert covered with color impregnated nylon, 1-5/16" diameter. Provide fastening base by same manufacturer for support of fold down grab bar. Color shall be selected by Architect from manufacturers standard selections.

Provide fold down grab bars of varying depths for installation next to swing out toilet cabinet by Division 15 Contractor. If swing out toilet cabinet is recessed within wall, provide fold down grab of 23-5/8" dimension from front to back. If swing out toilet is mounted against wall with end exposed, provide 32-7/8" dimension from front to back. Locate on wall next to swing out toilet cabinet closest to the toilet side cabinet.

Provide fold down grab bar as manufactured by HEWI, Inc., Allendale, New Jersey, or approved equal.

You indicated on your bid proposal that you were supplying K.V. brand. If the model you are offering does not meet the above specifications, their cost should provide a partial offset of the cost of a bar that meets these specifications.

(5) Section/11600 Laboratory Equipment

A. Equipment E-5 is listed in specifications as a flush sink. This needs to be changed to an ice-machine. The ice-machine required has the following specifications:

Scotsman Model AF325 Flaker with storage bin or equal. Storage bin, stainless steel lined, minimum 140 pound capacity with cord, plug and condensate drain line, 120 AC. Provide for our review and approval, a proposal to delete the flush sink and add the ice-machine. The flush sink and its related costs included in your bid should be used as an offset to the cost of the ice-machine and its associated installation costs.

Submit - Mike

Mike Jundare bank

ÆWI[®]

Bathroom Support Systems - Foilet Area

All PRICES shown are list.
PRICES are subject to change without notice.
PRICES do not include federal, state or local taxes.

Item Number Overall Dimensions	Specification	
33.3081.60 41546* 125	HEWI Support with Fold-Up Feature ¹⁾ Nylon (Ultramid); diameter 33 mm (15/16"); with corrosion resistant steel insert; spring assisted up and down movement; locked in the up position by turning left or right; adequate wall blocking required; supplied with screw inserts and socket head bolts	
2394° 600	Ordering Information Item Number: Color:	
	Instructions should be followed for proper installation	
33.3081.80 41946 125 173 600 3276 835	HEWI Support with Fold-Up Feature') Nylon (Ultramid); diameter 33 mm (15/16"); with corrosion resistant steel insert; spring assisted up and down movement; locked in the up position by turning left or right; adequate wall blocking required; supplied with screw inserts and socket head bolts Ordering Information Item Number: Color: Instructions should be followed for proper installation	
33.3081 WP 4196* 125 12 W* 318	HEW! Fastening Base Corrosion resistant cast metal coated in black of white with nylon cover cap; 318 mm x 125 mm (12½" x 415/16") X 5-rhm (11/16") thick; for mounting of HEW! supports with fold-up feature 33.3081, adequate wall blocking required; fastening hardware for wood included Ordering Information Item Number: Color:	
	(F+X/A-55) color	

NOTE: Inch measurements are approximate; mm (Millimeter) are exact.

1) Custom sizes available

Select material, type, size and finish required by each substrate for secure anchorage. Provide non-ferrous metal hot-dip galvanized anchors and inserts for installations elsewhere and required for as Provide toothed steel or lead expansion bolt resistance. devices for drilled-in-place anchors. Furnish inserts and anchors, as required, to be set into concrete or masonry work for subsequent woodwork anchorage.

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PART 3 - EXECUTION

PREPARATION:

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<u>Condition woodwork</u> to average prevailing humidity conditions in installation areas prior to installing.

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Pre-Installation Meeting: Meet at project site prior delivery of architectural woodwork and review coordination and environmental controls required for proper installation and ambient conditioning in areas to receive work. Include in Contractor; the Architect and other Representatives (if any); Installers of architectural woodwork, plastering, such as other finishes, mechanical work and electrical work; and firms or persons responsible for continued operation (whether temporary permanent) of HVAC system as required to maintain temperature and humidity conditions. Proceed with woodwork installation only when everyone concerned agrees that required ambient conditions can be maintained.

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<u>Deliver concrete inserts</u> and similar anchoring devices to be built into substrates, well in advance of time substrates are to be built.

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<u>Prior to installation</u> of architectural woodwork, examine shop fabricated work for completion, and complete work as required, including back priming and removal of packing.

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INSTALLATION:

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47 48 Install woodwork plumb, level, true and straight with no distortions. Shim as required using concealed shims. Install to a tolerance of 1/8" in 8'-0" for plumb and level (including tops); and with no variations in flushness of adjoining surfaces.

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51 <u>Scribe and cut</u> work to fit adjoining work, and refinish cut surfaces or repair damaged finish at cuts.

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Anchor woodwork to anchors or blocking built-in or directly

attached to substrates. Secure to grounds, stripping and blocking with countersunk, concealed fasteners and blind nailing as required for a complete installation. Except where prefinished matching fasteners heads are required, use fine finishing nails for exposing nailing, countersunk and filled flush with woodwork, and matching final finish where transparent finish is indicated.

<u>Cabinets</u>: Install without distortion so that doors and drawers fit openings properly and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete the installation of hardware and accessory items as indicated. Maintain veneer sequence matching (if any) of cabinets with transparent finish.

Tops and Sills: Anchor securely to base units and other support systems as indicated.

<u>Wood Storage</u> <u>Shelving</u>: Complete the assembly of units and install in the areas indicated, including hardware and accessories as indicated.

ADJUSTMENT, CLEANING, FINISHING AND PROTECTION:

Repair damaged and defective woodwork where possible to eliminate defects functionally and visually; where not possible to repair replace woodwork. Adjust joinery for uniform appearance.

Clean, lubricate and adjust hardware.

<u>Clean woodwork</u> on exposed and semi-exposed surfaces. Touch-up shop-applied finishes to restore damaged or soiled areas.

Complete the finishing work specified as work of this section, to whatever extent not completed at shop or prior to installation of woodwork.

Provide final protection and maintain conditions, in a manner acceptable to Fabricator and Installer, which ensures architectural woodwork being without damage or deterioration at time of substantial completion.

END OF SECTION 06400

SECTION 07120 - FLUID-APPLIED WATERPROOFING

PART 1 - GENERAL

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RELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Special Conditions and Division-1 Specification sections, apply to work of this section.

DESCRIPTION OF WORK:

Extent of each type of fluid-applied waterproofing work isindicated on drawings.

Type of fluid applied waterproofing required for project include the following:

2-part urethane-based type.

QUALITY ASSURANCE:

<u>Installer Qualifications</u>: A firm which has specialized in installation of types of waterproofing required for project for not less than 3 years and which is acceptable to manufacturer(s) of primary materials.

 Assign work closely associated with waterproofing, including (but not limited to) waterproofing accessories, flashings used in conjunction with waterproofing, expansion joints in membrane, insulation and protection course on membrane, to installer of waterproofing, for undivided responsibility.

Source Quality Control: Obtain primary waterproof materials of each type required from single manufacturer with not less than 3 years of successful experience in supplying principal materials for fluid-applied waterproofing work. Provide secondary materials only as recommended by manufacturer of primary materials.

<u>Pre-Application Conference</u>: Approximately two weeks prior to scheduled commencement of fluid-applied waterproofing installation, meet at project site with Installer, installers of deck or substrate construction to receive work, installers of other work in and around waterproofing work which must precede, follow or penetrate waterproofing work (including mechanical work if any), Architect, Owner, and waterproofing material manufacturer's representative. Record (Contractor) discussions of conference, together with decisions and agreements (or

disagreements) reached. Furnish copy of record to each party attending. Review methods and procedures related to work, including but not necessarily limited to the following:

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Tour jobsite areas to be waterproofed. Inspect and discuss condition of substrate, drains, curbs, penetrations and other preparatory work performed by other trades.

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Review waterproofing requirements (drawings, specifications and other contract documents).

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Review required submittals, both completed and yet to be completed.

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Review and finalize construction schedule related waterproofing work and verify availability of materials, Installer's personnel, equipment and facilities needed to make progress and avoid delays.

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required inspection, testing, and certifying Review procedures.

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SUBMITTALS:

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specifications, Submit manufacturer's Data: Product installation instructions, and general recommendations for each waterproofing material required. Include data substantiating that materials comply with requirements.

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JOB CONDITIONS:

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Proceed with work of this section only after Substrate: substrate construction and penetrating work have been completed.

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Weather: Proceed with work of this section only when existing and forecasted weather conditions will permit work to be performed in accordance with manufacturer's recommendations.

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PART 2 - PRODUCTS

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MATERIALS:

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General Compatibility: Provide products which are recommended fully compatible with indicated manufacturer to be substrates, including modification by bituminous additives (asphalt or coal tar as needed) and similar proven compounding provisions.

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<u>Urethane-Based</u>, <u>2-Part Waterproofing</u>: Polyurethane rubber-based two-component liquid membrane material, self-bonding to normal

substrates, compounded specifically for application method to be used (by hand or spray) and for slope of substrate indicated. Provide membrane with not less than 92% solids in uncured blend, tested by manufacturer to comply with requirements of ASTM C 836.

<u>Products</u>: Subject to compliance with requirements, provide one of the following:

Duralastic; Dural International Corp.
Isoflex 550 SP; Peterson Elastomers, Inc.
LM-60; Gaco Western, Inc.
Sure-Seal Liquiseal; Carlisle Tire & Rubber Co.
Vulkem 222; Mameco International.

Miscellaneous Materials:

<u>Primer/Filler/Sealer:</u> As recommended by manufacturer of fluidapplied waterproofing compound and as indicated.

Flashings, Cant Strips and Accessories: As recommended by manufacturer of waterproofing compound and as indicated.

<u>Protection</u> <u>Course</u>: Premolded 1/8" thick, semi-rigid board consisting of mineral-stabilized asphalt core sandwiched between layers of asphalt-saturated felt, surface-coated with asphalt and sealed to core under heat and pressure, and provided with polyethylene film facings.

<u>Products</u>: Subject to compliance with requirements, provide one of the following:

Backerboard #501-A; J & P Petroleum Prod. Elastibord; Celotex Corp. PC-2 Protection Course; W.R. Meadows, Inc. Protection Course II; Sonneborn Bldg. Products. Protection Sheet; Pecora Corp. Tremboard; Tremco.

PART 3 - EXECUTION

PREPARATION OF SUBSTRATE:

<u>Clean</u> <u>substrate</u> of projections and substances detrimental to work; comply with instructions of prime materials manufacturer.

<u>Install cant strips</u> and similar accessories as shown and as recommended by prime materials manufacturer even though not shown.

Fill voids, seal joints, and apply bond breakers as recommended

by prime materials manufacturer, with particular attention at construction joints.

<u>Prime</u> <u>substrate</u> as recommended (and only if recommended) by prime materials manufacturer.

Mask off adjoining surfaces not to receive fluid-applied waterproofing to effectively prevent spillage or overspray of liquid materials outside membrane area.

INSTALLATION:

 General: Comply with manufacturer's instructions, except where more stringent requirements are shown or specified, and except where project conditions require extra precautions or provisions to ensure satisfactory performance of work.

Mix separately packaged components in accordance with manufacturer's instructions.

Apply uniform coating of waterproofing to substrate and adjoining surfaces indicated to receive membrane.

Apply coating either by hand or by machine spray, complying with manufacturer's recommendations regarding horizontal and vertical surfaces.

Provide 60-mil (average) coating, with no variations below 50-mil thickness.

Install sheet-type flashings and joint covers where shown and as recommended by prime materials manufacturer. Except as otherwise shown, extend flashings onto perpendicular surfaces and other work penetrating substrate to not less than 4" beyond finished surface to be applied over waterproofing.

Protection Course:

<u>Install protection</u> <u>course</u> on cured membrane (after testing, if required) without delay, so that period of membrane exposure will be minimized.

On vertical surfaces comply with waterproofing manufacturer's recommendations for adhesion of protection course to membrane.

PERFORMANCE REQUIREMENTS:

It is required that fluid-applied waterproofing membrane be watertight and not deteriorate in excess of limitations published by manufacturer.

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<u>In-Place Testing:</u> Before completed membranes on horizontal surfaces are covered by protection course or other work, test for leaks with 2" depth of water maintained for 24 hours. Repair any leaks revealed by examination of substructure, and repeat test until no leakage is observed.

END OF SECTION 07120

SECTION 07175 - WATER REPELLENTS

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PART 1 - GENERAL

RELATED DOCUMENTS:

 Drawings and general provisions of Contract, including General and Special Conditions and Division-1 specification sections, apply to work of this section.

DESCRIPTION OF WORK:

Extent of surfaces to receive water repellent is indicated by provisions of this section.

Following applications of water repellent are required:

Exterior precast concrete surfaces.

Interior precast concrete surfaces.

All exposed concrete surfaces of covered walkway.

Helipad surface and helicopter hangar floor.

QUALITY ASSURANCE:

Application: A firm with not less than 3 years of successful experience in application of water repellents of types required on substrates similar to those of this project.

Project Mock-Up: Apply water repellent to mock-up, either partial or full coverage as directed, before proceeding with installation. Comply with installation requirements of this section.

SUBMITTALS:

Product Data: Submit manufacturer's specifications, installation instructions, and general recommendations for water repellents. Include data substantiating that materials are recommended by manufacturer for applications indicated and comply with requirements.

JOB CONDITIONS:

Weather and Substrate Conditions: Do not proceed with

application of water repellent (except with written recommendation of manufacturer), when ambient temperature is less than 50°F (10°C), or when substrate surfaces have cured for less than a period of 2 months; when rain or temperatures below 40°F (4°C), are predicted for a period of 24 hours, or earlier than 3 days after surfaces became wet; when substrate is frozen; at surface temperature of less than 40°F (4°C).

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PART 2 - PRODUCTS

CONTRACTOR OPTIONS:

General: At Contractor's option, provide one of the following products and include manufacturer's certification to effect that product complies with or exceeds required performances as indicated for generic types:

Clear Double 7; Hydrozo Coatings Co. Chem-Trete BSM; Dynamit Nobel of America, Inc. Sure-Klean Weather Seal 224; ProSoCo, Inc. Rainstopper Clear; Textured Coatings of America, Inc. Prim-a-pell 200; Chemprobe Corp.

PART 3 - EXECUTION

PREPARATION:

<u>Clean substrate</u> of substances which might interfere with penetration/adhesion of water repellents. Test for moisture content, in accordance with repellent manufacturer's instructions, to ensure that surface is sufficiently dry.

<u>Coordination with Sealants</u>: Where feasible, delay application of water repellents until installation of sealants has been completed in joints adjoining surfaces to be coated with repellent.

Protect adjoining work, including sealant bond surfaces, from spillage or blow-over of water repellent. Cover adjoining and nearby surfaces of aluminum and glass where there is possibility of water repellent being deposited on surfaces. Cover live plant materials with drop cloths. Clean water repellent from adjoining surfaces immediately after spillage. Comply with manufacturer's recommendations for cleaning.

INSTALLATION:

Apply a heavy saturation spray coating of water repellent on

surfaces indicated for treatment using low pressure spray equipment. Comply with manufacturer's instructions and recommendations, using airless spraying procedure unless otherwise indicated.

<u>Precast Work:</u> At Contractor's option, first application of water repellent on precast concrete units may be completed prior to installation of units. Mask sealant-bond surfaces to prevent migration of water repellent onto joint surfaces.

Apply a second saturation spray coating, repeating first application. Comply with manufacturer's instructions for limitations on drying time between coats and after rainstorm wetting of surfaces between coats. Consult manufacturer's technical representative if printed recommendations are not applicable to project conditions.

END OF SECTION 07175

SECTION 07200 - INSULATION

PART

As clarification for rigid insulation installed at back face of precast concrete panels with Z-furring. The Contractor for this specification section will not provide and install the insulation for this work.

RELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Special Conditions and Division-1 Specification sections, apply to work of this section.

DESCRIPTION OF WORK:

Extent of insulation work is shown on drawings and indicated by provisions of this section.

Applications of insulation specified in this section include the following:

Insulation under slabs-on-grade.

Foundation wall insulation (supporting backfill).

Safing Insulation.

Board-type building insulation, concealed.

Blanket-type building insulation, foiled, faced, and unfaced.

Roof insulation is specified in the Division-7 section in which other roofing products, including roofing membrane is covered, or in Division 3 under Lightweight Insulating Concrete.

<u>Sound</u> <u>attenuation</u> <u>blankets</u> installed as part of metal-framed gypsum drywall assemblies are specified in Division-9 section "Gypsum Drywall".

QUALITY ASSURANCE:

 Thermal Resistivity: Where thermal resistivity properties of insulation materials are designated by r-values they represent the rate of heat flow through a homogenous material exactly 1" thick, measured by test method included in referenced material standard or otherwise indicated. They are expressed by the temperature difference in degrees F between the two exposed faces required to cause one BTU to flow through one square foot per hour at mean temperatures indicated.

Fire Performance Characteristics: Provide insulation materials which are identical to those whose fire performance characteristics, as listed for each material or assembly of which insulation is a part, have been determined by testing, per methods indicated below, by UL or other testing and inspecting agency acceptable to authorities having jurisdiction.

Surface Burning Characteristics: ASTM E 84.

Fire Resistance Ratings: ASTM E 119.

Combustion Characteristics: ASTM E 136.

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SUBMITTALS:

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Product Data: Submit manufacturer's product literature and installation instructions for each type of insulation and vapor retarder material required.

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Certified Test Reports: With product data, submit copies of certified test reports showing compliance with specified performance values, including r-values (aged values for plastic insulations), densities, compression strengths, fire performance characteristics, perm ratings, water absorption ratings and similar properties.

DELIVERY, STORAGE, AND HANDLING:

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Protect insulations from physical damage General Protection: and from becoming wet, soiled, or covered with ice or snow. Comply with manufacturer's recommendations for handling, storage and protection during installation.

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Protection for Plastic Insulation:

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Do not expose to sunlight, except to extent necessary for period of installation and concealment.

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Protect against ignition at all times. Do not deliver plastic insulating materials to project site ahead of installation time.

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Complete installation and concealment of plastic materials as rapidly as possible in each area of work.

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PART 2 - PRODUCTS

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ACCEPTABLE MANUFACTURERS:

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Manufacturers: Subject to compliance with requirements, provide products of one of the following:

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Manufacturers of Extruded Polystyrene Board Insulation:

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Amoco Foam Products Co. Dow Chemical U.S.A.

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07200 - 2

Minnesota Diversified Products, Inc. UC Industries.

Manufacturers of Glass Fiber Insulation:

CertainTeed Corp. Knauf Fiber Glass GbmH.

Manville Corp.

Owens-Corning Fiberglas Corp.

Manufacturers of Semi-Refractory Fiber Insulation:

Manville Corp.

 United States Gypsum Co.

Manufacturers of Loose Granular Vermiculite Insulation:

Construction Products Div., W.R. Grace & Co. Producer Members of Vermiculite Association, Inc.

INSULATING MATERIALS:

<u>General</u>: Provide insulating materials which comply with requirements indicated for materials, compliance with referenced standards, and other characteristics.

<u>Preformed Units:</u> Sizes to fit applications indicated, selected from manufacturer's standard thicknesses, widths and lengths.

Extruded Polystyrene Board Insulation: Rigid, cellular thermal insulation with closed-cells and integral high density skin, formed by the expansion of polystyrene base resin in an extrusion process to comply with ASTM C 578 for Type indicated; with 5-year aged r-values of 5.4 and 5 at 40 and 75 deg. F (4.4 and 23.9 deg.C), respectively; and as follows:

 Type IV, 1.6 lb./cu. ft. min. density, unless otherwise indicated.

<u>Surface</u> <u>Burning</u> <u>Characteristics</u>: Maximum flame spread and smoke developed values of 5 and 165, respectively.

Semi-Refractory Fiber Board Safing Insulation: Semi-rigid boards designed for use as a fire stop at openings between edge of slab and exterior wall panels, produced by combining semi-refractory mineral fiber manufactured from slag with thermosetting resin binders to comply with ASTM C 612, Class 1 and 2; nominal density of 4.0 lbs. per cu. ft.; passing ASTM E 136 for combustion characteristics; r-value of 4.0 at 75 deg.F (23.9 deg.C).

Unfaced Mineral Fiber Blanket/Batt Insulation: Thermal

insulation produced by combining mineral fibers of type described below with thermosetting resins to comply with ASTM C 665 for Type I (blankets without membrane facing); and as follows:

<u>Mineral Fiber Type:</u> Fibers manufactured from glass or slag.

<u>Combustion Characteristics</u>: Passes ASTM E 136 test.

<u>Surface Burning Characteristics:</u> Maximum flame spread and smoke developed values of 25 and 50, respectively.

Faced Mineral Fiber Blanket/Batt Insulation: Thermal insulation produced by combining mineral fibers of type described below with thermosetting resins to comply with ASTM C 665 for Type III, Class A (blankets with reflective vapor-retarder membrane facing with flame spread of 25 or less); foil-scrim-kraft vapor-retarder membrane on one face, respectively; and as follows:

Mineral Fiber Type: Fibers manufactured from glass or slag.

Combustion Characteristics: Unfaced blanket/batt passes ASTM E 136 test.

Surface Burning Characteristics: Maximum flame spread and smoke developed values of 25 and 50, respectively.

AUXILIARY INSULATING MATERIALS:

Adhesive for Bonding Insulation: Type recommended by insulation manufacturer, and complying with requirements for fire performance characteristics.

Mechanical Anchors: Type and size indicated or, if not indicated, as recommended by insulation manufacturer for type of application and condition of substrate.

Mastic Sealer: Type recommended by insulation manufacturer for bonding edge joints between units and filling voids in work.

<u>Protection</u> <u>Board</u>: Premolded, semi-rigid asphalt/fiber composition board, 1/4" thick, formed under heat and pressure, standard sizes.

<u>Crack Sealer for Board Insulation:</u> Provide polymeric insulating foam in aerosol dispenser designed for filling voids in board insulation.

<u>Product:</u> Subject to compliance with requirements, provide "Polycel 100" by Construction Products Div., W.R. Grace & Co.

PART 3 - EXECUTION

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INSPECTION AND PREPARATION:

Require Installer to examine substrates and conditions under which insulation work is to be performed. A satisfactory substrate is one that complies with requirements of the section in which substrate and related work is specified. Obtain Installer's written report listing conditions detrimental to performance of work in this section. Do not proceed with installation of insulation until unsatisfactory conditions have been corrected.

<u>Clean substrates</u> of substances harmful to insulations or vapor retarders, including removal of projections which might puncture vapor retarders.

INSTALLATION, GENERAL:

Comply with manufacturer's instructions for particular conditions of installation in each case. If printed instructions are not available or do not apply to project conditions, consult manufacturer's technical representative for specific recommendations before proceeding with work.

Extend insulation full thickness as shown over entire area to be insulated. Cut and fit tightly around obstructions, and fill voids with insulation. Remove projections which interfere with placement.

Apply a single layer of insulation of required thickness, unless otherwise shown or required to make up total thickness.

INSTALLATION OF PERIMETER AND UNDER-SLAB INSULATION:

On vertical surfaces, set units in adhesive applied in accordance with manufacturer's instructions. Use type of adhesive recommended by manufacturer of insulation.

<u>Protect insulation</u> on vertical surfaces (from damage during backfilling) by application of protection board. Set in adhesive in accordance with recommendations of manufacturer of insulation.

INSTALLATION OF GENERAL BUILDING INSULATION:

Apply insulation units to substrate by method indicated, complying with manufacturer's recommendations. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.

<u>Seal joints</u> <u>between closed-cell</u> (non-breathing) insulation units by applying mastic or sealant to edges of each unit to form a tight seal as units are shoved into place. Fill voids in completed installation with mastic or sealant.

<u>Set reflective foil-faced units</u> accurately with air space in front of foil as shown. Provide not less than 0.75" air space where possible.

PROTECTION:

 General: Protect installed insulation and vapor retarders from harmful weather exposures and from possible physical abuses, where possible by nondelayed installation of concealing work or, where that is not possible, by temporary covering or enclosure.

END OF SECTION 07200

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SECTION 07241 - EXTERIOR FINISH SYSTEMS

PART 1 - GENERAL

RELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Special Conditions and Division-1 Specification sections, apply to work of this section.

SUMMARY:

Extent of exterior finish systems is indicated on drawings.

<u>Types</u> of exterior finish system applications in this section include the following:

Applications over existing concrete block surfaces.

<u>Sealing joints</u> in system with elastomeric joint sealants is specified in Division-7 section "Joint Sealers".

DEFINITIONS:

Exterior finish system refers to an exterior assembly composed of an outer layer forming the protective finish coating. Designations below for the class and type of exterior finish system specified in this section are based on those developed by the Exterior Insulation Manufacturers Association (EIMA).

 $\underline{\text{Class}}$ $\underline{\text{PB}}$ $\underline{\text{Type}}$ $\underline{\text{A}}$ designates a polymer-based protective finish coating (Class PB), externally reinforced (Type A).

 $\underline{\text{System}}$ in this section refers to Class PB Type A exterior finish systems

System manufacturer refers to the manufacturer of the exterior finish system.

SYSTEM DESCRIPTION:

Provide system complying with the following performance requirements:

Bond Integrity: Free from bond failure within system components or between system and supporting wall

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construction, resulting from exposure to fire, wind loads, weather, or other in-service conditions.

<u>weathertightness</u>: Resistant to water penetration from exterior into system and assemblies behind it or through them into interior of building which results in deterioration of thermal-insulating effectiveness or other degradation of system and assemblies behind system including substrates, supporting wall construction, and interior finish.

Fire Performance Characteristics: Provide materials and construction which are identical to those tested for the following fire performance characteristics, per test method indicated below, by UL or other testing and inspecting agencies acceptable to authorities having jurisdiction:

<u>Surface Burning Characteristics</u>: Flame spread rating of 25 or less per ASTM E 84 for protective finish coats, when each is tested individually.

SUBMITTALS:

<u>Product Data</u>: Manufacturer's technical data for each component of exterior finish system.

Samples for Initial Selection Purposes: Manufacturer's standard color charts and small scale samples indicating textural choices available.

Samples for Verification Purposes: Samples, 2' square, for each finish, color, and texture indicated; prepare samples using same tools and techniques intended for actual work.

<u>Installer</u> certificates signed by manufacturer certifying that Installers comply with specified requirements.

Test reports for system from a qualified independent testing laboratory certifying and interpreting test results relative to system's compliance with requirements for fire performance characteristics, bond integrity, and material properties.

Research reports or evaluation reports of the model code organization acceptable to authorities having jurisdiction which evidence system's compliance with building code in effect for project.

QUALITY ASSURANCE:

Manufacturer Qualifications: Firm regularly engaged in manufacturing products for system indicated and with at least 5

years successful experience in applications similar to that required for this Project.

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<u>Installer Qualifications</u>: Engage an Installer that is certified in writing by system manufacturer as qualified for installation of systems indicated.

<u>Single Source Responsibility:</u> Obtain materials for system from either a single manufacturer of from manufacturers approved by the system manufacturer as compatible with other system components.

<u>Pre-Installation</u> <u>Conference</u>: Conduct conference at Project site for purposes of ensuring coordinated and timely execution of work of this section; comply with Division-1 requirements.

DELIVERY, STORAGE AND HANDLING:

<u>Deliver products</u> in original, unopened packages with manufacturer's labels identifying products legible and intact.

Store materials inside and under cover; keep them dry, protected from the weather, direct sunlight, surface contamination, aging, corrosion, damaging temperatures, damage from construction traffic and other causes.

PROJECT CONDITIONS:

Environmental Conditions: Do not install system when ambient outdoor temperatures are 40 deg. F (4 deg C) and falling unless temporary protection and heat is provided to maintain ambient temperatures above 40 deg F (4 deg C) during installation of wet materials and for 24 hours after installation or longer to allow them to become thoroughly dry and weather resistant.

SEQUENCING AND SCHEDULING:

<u>Sequence installation</u> of system with related work specified in other sections to ensure that wall assemblies, including flashing, trim, and joint sealers, are protected against damage from weather, aging, corrosion, or other causes.

PART 2 - PRODUCTS

MANUFACTURERS:

Manufacturers: Subject to compliance with requirements, provide Class PB Type A of one of the following:

Archi/Tech Concepts, Inc. Dryvit System, Inc. ISPO, Inc. Sto Industries, Inc.

MATERIALS:

Compatibility: Provide adhesive, board insulation, reinforcing fabrics, base and finish coat materials, sealants, and accessories which are compatible with one another and approved for use by system manufacturer.

Provide colors and textures of protective coating to comply with following requirements:

Match Architect's sample.

<u>Surface</u> <u>Sealer</u>: System manufacturer's standard adhesion intermediary designed to improve bond between substrate of type indicated and adhesive for application of insulation.

Reinforcing Fabric: Balanced, alkali-resistant open weave glass fiber fabric treated for compatibility with other system materials; made from continuous multi-end strands with tensile strength of not less than 120 lbs. and 140 lbs. in warp and fill directions, respectively, per ASTM D 1682 and complying with ASTM D 578 and the following requirements:

Weight of Standard Weight Reinforcing Fabric: Not less than 5.5 oz. per sq. yd.

Weight of Heavy Weight Resistant Reinforcing Fabric: Not less than 21 oz. per sq. yd.

Base Coat Materials: System manufacturer's standard, job-mixed formulation of portland cement complying with ASTM C 150, Type I, white or natural color; and system manufacturer's standard polymer-based adhesive designed for use indicated.

<u>Finish Coat Materials</u>: System manufacturer's standard mixture complying with the following requirements for material composition and method of combining materials:

<u>Factory-mixed</u> <u>formulation</u> of polymer emulsion admixture, color-fast mineral pigments, sound stone particles, and fillers.

Water: Clean and potable.

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MIXING:

General: Comply with system manufacturer's requirements for combining and mixing materials. Do not introduce admixtures, water, or other materials except as approved by system manufacturer. Mix materials in clean containers. Use materials within time period specified by system manufacturer or discard.

PART 3 - EXECUTION

EXAMINATION:

 Examine substrates, with Installer present, to determine if they are in satisfactory condition for installation of system. Do not proceed with installation of system until unsatisfactory conditions have been corrected.

PREPARATION:

 <u>Protect contiguous work</u> from moisture deterioration and soiling resulting from application of systems. Provide temporary covering and other protection needed to prevent spattering of exterior finish coating on other work.

<u>Protect</u> <u>system</u>, substrates, and wall construction behind them from inclement weather during installation. Prevent infiltration of moisture behind system and deterioration of substrates.

<u>Substrate Preparation</u>: Prepare and clean substrates to comply with system manufacture's requirement to obtain optimum bond between substrate and finish.

Apply surface-sealer over substrates where required by system manufacturer for improving adhesion.

INSTALLATION:

<u>General</u>: Comply with system manufacturer's current published instructions for installation of system as applicable to each type of substrate indicated.

Apply base coat to exposed surfaces of existing surface in minimum thickness specified by system manufacturer.

Fully embed reinforcing fabric of weight indicated below in wet base coat to produce wrinkle-free installation with fabric continuous at corners and lapped or otherwise treated at joints to comply with system manufacturer's requirements.

Fabric Weight: Standard, unless otherwise indicated.

<u>Double Layer Application</u>: Where indicated, apply a second base coat and second layer of reinforcing fabric of weight indicated below, in same manner as first application. Do not apply until first base coat has cured.

Fabric Weight: Heavy.

Apply finish coat over dry base coat in thickness required by system manufacturer to produce a uniform finish of texture and color matching approved sample.

CLEANING AND PROTECTION:

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Remove temporary covering and protection of other work. Promptly remove protective coatings from window and door frames, and any other surfaces outside areas indicated to receive protective coating.

Provide final protection and maintain conditions, in a manner acceptable to Installer and system manufacturer, which ensures system being without damage or deterioration at time of Substantial Completion.

END OF SECTION 07241

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SECTION 07250 - SPRAYED-ON FIREPROOFING

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PART 1 - GENERAL

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RELATED DOCUMENTS:

 Drawings and general provision of Contract, including General and Special Conditions and Division-1 Specification sections, apply to work of this section.

DESCRIPTION OF WORK:

 <u>Extent</u> of sprayed-on fireproofing is indicated on drawings and by provisions of this section.

<u>Definitions</u>: The following definitions apply to this section.

 Concealed sprayed-on fireproofing refers to applications where sprayed-on materials are applied to surfaces which will be concealed from view behind other construction when the Work is completed.

Gypsum board-based fireproofing is specified in Division-9 sections.

Board-type fireproofing is specified in Division-7 section.

QUALITY ASSURANCE:

Single Source Responsibility: Obtain sprayed-on fireproofing materials from a single manufacturer for each different product required.

Fire Performance Characteristics: Provide materials and construction which are identical to those tested for the following fire performance characteristics, according to test method indicated, by UL or other testing and inspecting agency acceptable to authorities having jurisdiction.

Fire Resistance Ratings: As indicated by reference to design designation in UL "Fire Resistance Directory" for fire-rated assemblies in which sprayed-on fireproofing serves as direct-applied protection, tested per ASTM E 119.

<u>Surface</u> <u>Burning</u> <u>Characteristics</u>: As indicated for each sprayed-on fireproofing product required, tested per ASTM E 84 and listed in UL "Building Materials Directory".

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SUBMITTALS:

<u>Product Data:</u> Submit manufacturer's product data for each sprayed-on fireproofing product indicated.

<u>Test Reports:</u> Submit the following test reports:

<u>Certified</u> <u>test results</u> from an independent testing laboratory indicating compliance of sprayed-on fireproofing products with performance requirements indicated, including asbestos content where applicable.

Test results of in-place performance as required under Part 3 of this section for field-quality control.

Certificates: Submit the following certificates:

Where primers are applied to steel in shop or field, submit statement from primer manufacturers, certifying that primers are compatible with sprayed-on fireproofing and will not impair its performance under fire exposure for applications indicated, as proved by ASTM E 119 test. Include test and other data as evidence; distribute data to sprayed-on fireproofing manufacturer.

Acceptance of steel primers by sprayed-on fireproofing manufacturer, based on data submitted by primer manufacturer.

<u>Sprayed-on</u> <u>fireproofing</u> <u>manufacturers'</u> certification that their products comply with specification requirements and are suitable for the use indicated.

DELIVERY, STORAGE, AND HANDLING:

Deliver products to project site in original, unopened packages with manufacturers' labels identifying products legible and intact. Include on labels names of products and manufacturers, date of manufacture and shelf life, where applicable. Also include UL labels for fire-resistance ratings applicable to project.

<u>Use materials with limited shelf life</u> within period indicated. Remove from project site and discard any materials whose shelf life has expired.

Store materials inside, under cover, above ground and in a manner to keep them dry until ready to use. Remove from project site and discard any materials that have been exposed to moisture or have otherwise deteriorated.

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PROJECT CONDITIONS:

Environmental Conditions: Do install sprayed-on not fireproofing when ambient or substrate temperatures are 40 deg.F (4.4 deg.C) and falling, unless temporary protection and heat can be provided to maintain temperatures of both at or above this temperature level for 24 hours before, during and for 24 hours after application of sprayed fireproofing. spray fireproofing by means of natural or, where this forced inadequate, of air circulation during and application until it dries thoroughly.

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SEQUENCING:

<u>Sequence</u> and <u>coordinate</u> <u>application</u> of sprayed-on fireproofing with other, related work specified in other sections to comply with the following requirements:

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Prevent deterioration of sprayed-on fireproofing for interior applications due to exposure to unfavorable environmental conditions.

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Avoid unnecessary exposure of sprayed-on fireproofing to abrasion and other damage likely to occur during construction operations subsequent to its application.

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Ensure that sprayed-fireproofing is installed prior to installation of enclosing or concealing work, with sufficient time allowed for inspection, testing and correction of defective fireproofing.

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PART 2 - PRODUCTS

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CONCEALED SPRAYED-ON FIREPROOFING MATERIALS:

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General: For concealed applications of sprayed-on fireproofing provide manufacturer's standard products complying with requirements indicated below for material composition and physical properties representative for installed products.

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Material Composition: As indicated below:

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<u>Cementitious Fireproofing</u>: Factory-mixed dry formulation of inorganic binders and lightweight mineral aggregates mixed with water at project site to form a slurry for pumping and for dispersal by compressed air introduced at spray nozzle.

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Physical Properties: Minimum values, unless otherwise indicated, measured per standard test methods referenced with each property, as follows:

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Bond Strength: 80 lbf. per sq. ft. per ASTM E 736.

Compressive Strength: 3.47 lbf. per sq. in. per ASTM E 761.

No evidence of corrosion per ASTM E Corrosion Resistance: 937.

Deflection: No cracking, spalling, delamination or the like per ASTM E 759.

No cracking, spalling, Effect of Impact on Bonding: delamination or the like per ASTM E 760.

Air Erosion: Maximum weight loss of 0.025 grams per sq. ft. per ASTM E 859.

Dry Density: Values for average and individual densities as required for fire-resistance ratings indicated, per ASTM E 605.

Hardness: 0.50" max. penetration per ASTM C 569.

Surface Burning Characteristics: Maximum flame spread and smoke developed values of 10 and 0, respectively.

Available Products: Subject to compliance with requirements, products which may be incorporated in the work include, but are not limited to, the following:

Cementitious Fireproofing:

"Monokote"; Grace Construction Products Div., W.R. & Co.

AUXILIARY FIREPROOFING MATERIALS:

Provide auxiliary fireproofing materials which are compatible with sprayed-on fireproofing products and substrates, approved for use indicated by manufacturer of sprayed-on fireproofing, and which have been approved by UL or other acceptable testing and inspecting agency for use in fireresistance rated designs indicated.

Substrate Primers: Type approved by manufacturer of sprayed-on fireproofing for substrate and for conditions of exposure indicated.

Fireproofing: Adhesive for Bonding recommended by Type manufacturer of sprayed-on fireproofing manufacturer.

Veneer Plastic Topcoat: Factory-mixed formulation of a latexmodified, inorganic, veneer plaster recommended for application over cementitious and portland cement-mineral aggregate fireproofing products by manufacturer of latter products.

<u>Product</u>: Subject to compliance with requirements, provide "Topkrete Overcoat" by Construction Products Div., W.R. Grace & Co.

PART 3 - EXECUTION

INSPECTION:

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Require Installer to examine substrates to determine if they are in satisfactory condition to receive sprayed-on fireproofing. A satisfactory substrate is defined as follows:

Substrate complies with requirements of the section in which the substrate and related work is specified and is free of oil, grease, rolling compounds, incompatible primers, loose mill scale, dirt or other foreign substances capable of impairing bond of fireproofing with substrate under conditions of normal use or fire exposure.

Objects which will penetrate fireproofing, including clips, hangers, support sleeves and similar items have been securely attached to substrates.

<u>Substrates</u> are <u>not</u> <u>obstructed</u> by ducts, piping, equipment and other suspended construction that could interfere with application of fireproofing.

For metal roofing decking substrates, application of roofing has been completed and roof traffic is prohibited during application of fireproofing and until it has dried.

 For steel or other substrates suspected of being coated with oil, rolling compounds or other substances not readily identifiable but potentially capable of impairing bond, conduct tests recommended by fireproofing manufacturer to determine their presence and effect on adhesion of fireproofing.

<u>Do not proceed</u> with installation of fireproofing until unsatisfactory conditions have been corrected.

PREPARATION:

<u>Clean</u> <u>substrates</u> of substances which could impair bond of fireproofing, including oil, grease, rolling compounds, incompatible primers, and loose mill scale.

Cover other work which might be damaged by fall-out or overspray

of fireproofing materials during application. Provide temporary enclosure as required to confine spraying operations, protect the environment, and to ensure adequate ambient conditions for temperature and ventilation.

INSTALLATION:

General: Comply with fireproofing manufacturer's instructions for mixing materials, for application procedures and for types of equipment used to convey and spray-on fireproofing materials; as applicable to the particular conditions of installation and as required to achieve fire-resistance ratings indicated.

<u>Coat</u> <u>substrates</u> with adhesive prior to application of fireproofing where required to achieve fire-resistance rating or recommended by fireproofing manufacturer for material and application indicated.

Extend fireproofing full thickness over entire area of each substrate to be protected. Unless otherwise recommended by fireproofing manufacturer, install body of fireproof covering in a single course.

Apply fireproofing in thicknesses and densities indicated but not less than that required to achieve fire resistance ratings designated for each condition, unless greater thicknesses and densities are indicated.

For steel beams and bracing provide a thickness of not less than 1".

For metal floor or roof decks provide a thickness of not less than 1/2".

Apply fireproofing materials by sprayed-on method to maximum extent possible. Following spraying operation in each area, complete the coverage by trowel application or other placement method acceptable to manufacturer.

Apply topcoat to concealed fireproofing where indicated.

FIELD QUALITY CONTROL:

Testing Laboratory: Contractor shall employ and pay an independent testing laboratory experienced in the testing of sprayed-on fireproofing and acceptable to Architect, to perform field quality control testing.

Extent and Testing Methodology: Arrange for testing of completed fireproofing in successive stages in areas of extent described below; do not proceed with fireproofing of next area until test results for previously completed work evidence

compliance with requirements.

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Extent of Each Test Area: Not greater than one floor or 10,000 sq. ft., whichever produces the greatest number of test areas.

<u>Within each area</u>, testing laboratory shall randomly select a typical bay, and test each fireproofed structural element within it for thickness and density per ASTM E 605.

Testing Laboratory shall report test results promptly and in writing to Contractor, Construction Manager, and Architect.

Repair or replace fireproofing within areas where test results indicate fireproofing does not comply with requirements.

CLEANING, REPAIR AND PROTECTION:

<u>Cleaning</u>: Immediately upon completion of spraying operations in each containable area of project, remove over-spray and fall-out of materials from surfaces of other work and clean exposed surfaces to remove evidence of soiling.

<u>Cure exposed cementitious fireproofing materials</u> in compliance with fireproofing manufacturers recommendations to prevent premature drying.

 <u>Protect fireproofing</u> according to advice of fireproofing manufacturer and Installer from damage resulting from construction operations or other causes so that fireproofing will be without damage or deterioration at time of substantial completion.

Coordinate installation of fireproofing with other work in order to minimize the need for other trades to cut or remove fireproofing. As other trades successively complete installation of their work, maintain protection of structure afforded by fireproofing by patching any areas which have been removed or damaged prior to concealment of fireproofing by other work.

Repair or replace work which has not been successfully protected.

END OF SECTION 07250

SECTION 07410 - PREFORMED ROOFING

PART 1 - GENERAL

RELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Special Conditions and Division-1 Specification sections, apply to work of this section.

DESCRIPTION OF WORK:

Extent of each type of preformed roofing and siding is indicated on the drawings and by provisions of this section. Preformed roofing/siding is hereby defined to include panels which are structurally capable of spanning between supports spaced as indicated.

Types of panels required include the following:

Formed sheet panels, intended for clipped-seam installation.

QUALITY ASSURANCE:

<u>Performance</u> <u>Test</u> <u>Standards</u>: Provide preformed panel systems which have been pretested and certified by manufacturer to provide specified resistance to air and water infiltration and structural deflection and failure when installed as indicated and when tested in accordance with AAMA 501, "Methods of Test for Metal Curtain Walls".

<u>Field Measurements:</u> Where possible, prior to fabrication of prefabricated panels, take field measurements of structure or substrates to receive panel system. Allow for trimming panel units where final dimensions cannot be established prior to fabrication.

SUBMITTALS:

<u>Product</u> <u>Data</u>: Submit manufacturer's product specifications, standard details, certified product test results, installation instructions and general recommendations, as applicable to materials and finishes for each component and for total system of preformed panels.

Samples: Submit 2 samples 12" square, of each exposed finish material.

Shop Drawings: Submit small-scale layouts of panels on walls and roofs, and large-scale details of edge conditions, joints, corners, custom profiles, supports, anchorages, trim, flashings, closures, and special details. Distinguish between factory and field assembly work.

<u>Warranty</u>: Manufacturer's 10 year warranty on exterior finish and color stability

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PART 2 - PRODUCTS

ACCEPTABLE MANUFACTURERS:

 <u>Manufacturer</u>: Subject to compliance with requirements, provide preformed roofing and siding products by one of the following:

Aluminum Roofing:

Alumax
Copper Sales
Engineered Components, Inc.
Fashlon, Inc.
MM Systems Corp.
Peterson Aluminum Corp.

SHEET MATERIALS:

<u>Aluminum Sheets</u>: ASTM B 209; alloy, temper and mill finish as recommended by panel manufacturer.

<u>Cladding:</u> Except as otherwise indicated, where aluminum sheets are exterior exposed without applied coatings, provide special aluminum alloy-clad sheet known as "Alclad".

METAL FINISHES:

 General: Apply coatings either before or after forming and fabricating panels, as required by coating process and as required for maximum coating performance capability. Protect coating promptly after application and cure, by application of strippable film or removable adhesive cover, and retain until installation has been completed. Provide colors or color matches as indicated or, if not otherwise indicated, as selected by Architect from manufacturer's standard colors.

Flouropolymer Coating: Full-strength 70% "Kynar 500" coating baked-on for 15 minutes at 450 degrees F (232 degrees C), in a dry film thickness of 1.0 mils, 30% reflective gloss (ASTM D 523), over 0.3 mil baked-on epoxy primer.

<u>Durability</u>: Provide coating which has been field tested under normal range of weathering conditions for minimum of 20 years without significant peel, blister, flake, chip, crack or check in finish, and without chalking in excess of 8 (ASTM D 659), and without fading in excess of 5 NBS units.

Color: Match Architect's sample.

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MISCELLANEOUS MATERIALS:

<u>Fasteners</u>: Manufacturer's standard noncorrosive types, with exterior heads gasketted.

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indicated of work another Accessories: Except as as required for specification section, provide components system, complete roofing/siding including trim, copings, fascias, gravel stops, mullions, sills, corner units, ridge closures, clips, seam covers, battens, flashings, gutters, louvers, sealants, gaskets, fillers, closure strips and similar items. Match materials/ finishes of preformed panels.

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Bituminous Coating: Cold-applied asphalt mastic, SSPC paint 12, compounded for 15-mil dry film thickness per coat.

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PANEL FABRICATION; PERFORMANCES:

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General: Fabricate and finish panels and accessories at the factory to greatest extent possible, by manufacturer's standard procedures and processes, and as required to fulfill indicated performance requirements which have been demonstrated by factory testing. Comply with indicated profiles and dimensional requirements, and with structural requirements.

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Metal Gages: Thicknesses required for structural performances, but not less than manufacturer's recommended minimums for profiles and applications indicated, and not less than 0.032" for exterior panels.

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Required Performances: Fabricate panels and other components of roof system for the following installed-as-indicated performances:

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Roof Loading: 75 lbs. per sq. ft. inward; 15 lbs. per sq. ft. outward.

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Water Penetration: No significant, uncontrolled leakage at
4 lbs. per sq. ft. pressure with spray test.

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Air <u>Infiltration</u>: 0.02 cfm per sq. ft. for gross roof areas, with 4 lbs. per sq. ft. differential pressure.

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Apply bituminous coating or other permanent separation materials

on concealed panel surfaces where panels would otherwise be in direct contact with substrate materials which are noncompatible or could result in corrosion or deterioration of either material or finishes.

<u>Condensation</u>: Fabricate panels for control of condensation, including proper inclusion of seals and provisions for breathing, venting, weeping and draining.

PART 3 - EXECUTION

INSTALLATION:

General: Comply with panel fabricator's and material manufacturers' instructions and recommendations for installation, as applicable to project conditions and supporting substrates. Anchor panels and other components of the work securely in place, with provisions for thermal/structural movement.

Install panels with exposed standing seam clip fasteners, prefinished to match panel finishes.

Installation Tolerances: Shim and align panel units within installed tolerance of 1/4: in 20'-0" on level/plumb/slope and location/line as indicated, and within 1/8" offset of adjoining faces and of alignment of matching profiles.

<u>Joint Sealers</u>: Install gaskets, joint fillers and sealants where indicated and where required for weatherproof performance of panel systems. Provide types of gaskets and sealants/fillers indicated or, if not otherwise indicated, types recommended by panel manufacturer.

Refer to other sections of these specifications for product and installation requirements applicable to indicated joint sealers.

<u>Joint Sealers</u>: Refer to other sections of these specifications for post-installation requirements on joint sealers; not work of this section.

CLEANING AND PROTECTION:

<u>Damaged Units:</u> Replace panels and other components of the work which have been damaged or have deteriorated beyond successful repair by means of finish touch-up or similar minor repair procedures.

53 <u>Cleaning:</u> Remove temporary protective coverings and strippable 54 films (if any) as each panel is installed. Upon completion of



panel installation, clean finished surfaces as recommended by panel manufacturer, and maintain in a clean condition during construction.

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END OF SECTION 07410

SECTION 07530 - FLEXIBLE SHEET ROOFING SYSTEM

PART 1 - GENERAL

RELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Special Conditions and Division-1 Specification sections, apply to work of this section.

DESCRIPTION OF WORK:

Extent of flexible sheet roofing is indicated on drawings and is hereby defined to include non-traffic-bearing sheet membrane system intended for weather exposure as primary roofing. Similar membranes concealed by a wearing surface are excluded by definition and, if required, are specified elsewhere in Division 7 as waterproofing.

Types of roofing systems specified in this section utilizing flexible sheet roofing membranes include the following:

Loosely laid and ballasted systems.

Flexible sheet roofing membranes include the following:

Ethylene propylene diene monomer (EPDM)

Roof insulation related to flexible sheet roofing is specified in this section.

QUALITY ASSURANCE:

<u>Manufacturer</u>: Obtain primary flexible sheet roofing from a single manufacturer. Provide secondary materials as recommended by manufacturer of primary materials.

<u>Installer:</u> A firm with not less than 3 years of successful experience in installation of roofing systems similar to those required for this project and which is acceptable to or licensed by manufacturer of primary roofing materials.

Assign work closely associated with flexible sheet roofing, including (but not limited to) vapor barriers, insulation, flashing and counterflashing, expansion joints, and joint sealers, to Installer of flexible sheet roofing.

<u>Pre-Roofing Conference:</u> Prior to installation of roofing and associated work, meet at project site, or other mutually agreed

location, with Installer, roofing manufacturer, installers of related work, and other entities concerned with roofing performance, including (where applicable) Owner's insurer, test agencies, governing authorities, Architect, and Owner. Record discussions and agreements and furnish copy to each participant. Provide at least 72 hours advance notice to participants prior to convening pre-roofing conference.

Insurance Certification: Assist Owner in preparation and submittal of roof installation acceptance certification necessary in connection with fire and extended coverage insurance on roofing and associated work.

<u>UL Listing</u>: Provide labeled materials which have been tested and listed by UL in "Building Materials Directory" for application indicated, with "Class A" rated materials/system for roof slopes shown:

Thermal Resistance: Where thermal resistance properties of insulating materials are designated by R-values they represent the rate of heat flow through a material of thickness indicated, measured by test method included in referenced material standard or otherwise indicated. They are expressed by the temperature difference in degrees F between the two exposed faces required to cause one BTU to flow through one square foot per hour at mean temperatures indicated.

 Fire Performance Characteristics: Provide insulation materials which are identical to those whose fire performance characteristics, as listed for each material or assembly of which insulation is a part, have been determined by testing, per methods indicated below, by UL or other testing and inspecting agency acceptable to authorities having jurisdiction:

Surface Burning Characteristics: ASTM E 84.

Fire Resistance Ratings: ASTM E 119.

Combustibility Characteristics: ASTM E 136.

SUBMITTALS:

<u>Product Data:</u> Submit specifications, installation instructions and general recommendations from manufacturers of flexible sheet roofing system materials, for types of roofing required. Include data substantiating that materials comply with requirements.

Samples: Submit 12" square samples of finished roofing sheets, including "T-shaped" side/end-lap seam.

Submit 12" square samples of interlocking ballast block.

Submit 12" square samples of required insulation.

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Shop Drawings: Submit complete shop drawings showing roof configuration and sheet layout, details at perimeter, and special conditions.

Indicate layout of tapered insulation materials.

<u>Pre-Roofing Conference</u>: Submit copies of pre-roofing conference records.

JOB CONDITIONS:

<u>Weather:</u> Proceed with roofing work when existing and forecasted weather conditions permit work to be performed in accordance with manufacturers' recommendations and warranty requirements.

SPECIAL PROJECT WARRANTY:

Provide written warranty, signed by Manufacturer of primary roofing materials and his authorized Installer, agreeing to replace/repair defective materials and workmanship. Repairs and replacements required because of events beyond Contractor's/Installer's/Manufacturer's control (and which exceed performance requirements) shall be completed by Contractor/Installer and paid for by Owner.

Warranty period is 10 years after date of substantial completion.

PART 2 - PRODUCTS

GENERAL:

 <u>Performance</u>: Provide roofing materials recognized to be of generic type indicated and tested to show compliance with indicated performances, or provide other similar materials certified in writing by manufacturer to be equal or better than specified in every significant respect, and acceptable to Architect.

<u>Compatibility</u>: Provide products which are recommended by manufacturers to be fully compatible with indicated substrates, or provide separation materials as required to eliminate contact between incompatible materials.

EPDM FSR MEMBRANE:

Ethylene propylene diene monomers formed into uniform, flexible

sheets, complying with the following:

Tensile Strength (ASTM D 412): 1400 psi.

Ultimate Elongation (ASTM D 412): 300%.

Brittleness Temperature (ASTM D 746): -75 deg.F (-59 deg.C).

Tear Resistance (ASTM D 624): 125 lbs. per lin. inch.

Resistance to Ozone Aging (ASTM D 1149): No cracks after 168 hours exposure of 50% elongated samples at 104 deg.F (40 deg.C) and 100 pphm ozone.

Resistance to Heat Aging (ASTM D 573): Maximum reduction in elongation of 30% maximum loss of tensile strength of 15% (168 hours at 240 deg.F (116 deg.C).

Thickness: 60 mils, nominal.

Exposed Face Color: Manufacturer's standard

Loose-Laid and Ballasted EPDM Membrane:

Manufacturers: Subject to compliance with requirements, provide products of one of the following:

Carlisle Syntec Systems

Celotex Corp.

Dunlop Construction Products, Inc.

Firestone Building Products Co.

Gates Engineering Co. Inc.

Goodyear Tire & Rubber Co. Kelly Energy Systems, Inc.

Kendall Co.

MISCELLANEOUS MATERIALS FOR FSR:

<u>Sheet Seaming System:</u> Manufacturer's standard materials for sealing lapped joints, including edge sealer to cover exposed spliced edges as recommended by manufacturer of FSR system.

Cant Strips, Tapered Edge Strips and Flashing Accessories:
Types recommended by manufacturer of FSR material, provided at locations indicated and at locations recommended by mfr., including adhesive tapes, flashing cements, and sealants.

Slip Sheet: Type recommended by manufacturer of FSR material for protection of membrane from incompatible substrates.

Block Surface Ballast: Interlocking Lightweight Concrete Ballast block specifically designed for ballasting loose laid

roofing systems. The blocks shall be approximately 12" x 12" x 2" in size and shall be beveled on parallel edges and shall have 3 major drainage channels with one transverse channel on the bottom. Include all necessary accessories for complete installation.

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Include coloring pigments, integral water repellents, and other suitable additives conforming to applicable ASTM standards.

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Physical Properties: Weight 11.5 psf

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Max. Water Absorption: 17 lbs./cu. ft.

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Color: To be selected by Architect.

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Aggregate Surface Ballast: Washed, rounded, riverbed gravel or other acceptable smooth-faced stone ranging in size from 3/4" to 1-1/2" in diameter, which will withstand weather exposure without significant deterioration.

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INSULATING MATERIALS:

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materials with General: Provide insulating to comply indicated for materials and compliance with requirements referenced standards; in sizes to fit applications indicated, selected from manufacturer's standard thicknesses, widths and lengths.

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Extruded Polystyrene Board Insulation: Rigid, cellular thermal insulation with closed cells and integral high density skin, formed by the expansion of polystyrene base resin in an extrusion process to comply with ASTM C 578 for Type indicated; with 5-year aged r-values of 5.4 and 5 at 40 and 75 deg.F (4.4 and 23.9 deg.C), respectively, and as follows:

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Type IV, 1.6 lb./cu. ft. min. density, on areas other than heliport.

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Type V, 3.0 lb./cu. ft. min. density under heliport landing areas and where otherwise indicated.

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Provide tapered boards where indicated for sloping to drain; fabricate with taper of 1/4" per ft. in the 24" dimension.

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MISCELLANEOUS INSULATION MATERIALS:

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Adhesive for Bonding Insulation: Type recommended by insulation manufacturer and complying with fire resistance requirements.

1 <u>Mastic Sealer:</u> Type recommended by insulation manufacturer for bonding edge joints and filling voids.

Mechanical Anchors: As recommended by insulation manufacturer for deck type, and complying with fire and insurance rating requirements.

MISCELLANEOUS ROOFING ACCESSORIES:

<u>Flashing Materials:</u> Manufacturer's standard system compatible with flexible sheet membrane.

<u>Walkway</u> <u>Protection</u>: Prefabricated concrete pavers containing no asphalt or coal-tar derivatives, suitable for use without cracking or breaking.

PART 3 - EXECUTION -

PREPARATION OF SUBSTRATE:

General: Comply with manufacturer's instructions for preparation of substrate to receive FSR system.

<u>Clean</u> <u>substrate</u> of dust, debris, and other substances detrimental to FSR system work. Remove sharp projections.

Install cant strips, flashings, and accessory items as shown, and as recommended by manufacturer even though not shown.

<u>Prevent compounds</u> from entering and clogging drains and conductors, and from spilling or migrating onto surfaces of other work.

INSTALLATION:

General: Comply with manufacturer's instructions, except where more stringent requirements are indicated.

INSULATION INSTALLATION:

General: Extend insulation fill thickness as a single layer, in two layers, or in multiple layers over entire surface to be insulated, cutting and fitting tightly around obstructions. Form cant strips, crickets, saddles, and tapered areas with additional material as shown and as required for proper drainage of membrane.

Stagger all joints in one direction for each course. For

multiple layers, stagger joints both directions between courses.

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Do not install more insulation each day than can be covered with membrane before end of day and before start of inclement weather.

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Set units in adhesive, applied in accordance with requirements of applicable fire and insurance ratings.

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Secure roof insulation to substrate with mechanical anchors of type and spacing indicated; but in no case provide less than one anchor per 4 square feet of surface area, or less anchorage than required by FM "Loss Prevention Data Sheet 1-28".

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FSR MEMBRANE INSTALLATION:

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General: Start installation only in presence of manufacturer's technical representative.

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Install membrane by unrolling Loose-Laid and Ballasted FSR: over prepared substrate, nailing only at perimeter and at roofing penetrations. Lap adjoining sheets as recommended by FSR manufacturer and bond as recommended by manufacturer, covering top edges of each sheet at seams with uniform fillet of sealant if recommended by manufacturer. Install flashings and counterflashings as shown and as recommended by manufacturer. Apply ballast course in uniform thickness at rate of 10 to 12 per square foot, spreading with care to minimize lbs. possibility of damage to membrane.

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Install interlocking block ballast in Block Surface Ballast: strict accordance with the manufacturer's instructions over the prepared FSR roof.

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Walkway Protection: Install paver units at locations shown and where required for access to roof-mounted equipment. protection boards carefully to avoid damage to membrane, laying over an additional layer of roof membrane material, loosely applied, for additional protection.

END OF SECTION 07530

SECTION 07600 - FLASHING AND SHEET METAL

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PART 1 - GENERAL

RELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Special Conditions and Division-1 Specification sections, apply to work of this section.

DESCRIPTION OF WORK:

Extent of each type of flashing and sheet metal work is indicated on drawings and by provisions of this section.

Types of work specified in this section include the following:

Metal wall flashing and expansion joints.

Gutters and downspouts (rain drainage).

Exposed metal trim/fascia units.

Miscellaneous sheet metal accessories.

Elastic flashing.

Roofing accessories which are installed integral with roofing membrane are specified in roofing system sections as roofing work.

Roof accessory units of premanufactured, set-on type are specified in Division-7 section "Roof Accessories".

SUBMITTALS:

<u>Product Data; Flashing, Sheet Metal, Accessories:</u> Submit manufacturer's product data, installation instructions and general recommendations for each specified sheet material and fabricated product.

 Shop Drawings; Flashing, Sheet Metal, Accessories: Submit shop drawings showing layout, joining, profiles, and anchorages of fabricated work, including major counter flashings, trim/fascia units, gutters, downspouts, and expansion joint systems; layouts at 1/4" scale, details at 3" scale.

JOB CONDITIONS:

Coordinate work of this section with interfacing and adjoining work for proper sequencing of each installation. Ensure best possible weather resistance and durability of the work and protection of materials and finishes.

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PART 2 - PRODUCTS

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FLASHING AND SHEET METAL MATERIALS:

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Sheet Metal Flashing/Trim:

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Copper: ASTM B 370, cold-rolled except where soft temper is required for forming; 16 oz (0.0216" thick) except as otherwise indicated.

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Aluminum: ASTM B 209, alloy 3003, temper H14, AA-C22A41 clear anodized finish; 0.032" thick (20 gage) except as otherwise indicated.

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Finish: Match finish of Preformed : Roofing; Section 07410.

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Extruded Aluminum: Manufacturer's standard extrusions of sizes and profiles indicated, 6063-T52, 0.08" minimum thickness for primary legs of extrusions.

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Finish: Match finishof Preformed Roofing; Section 07410.

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Miscellaneous Materials and Accessories:

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Solder: For use with steel or copper, provide 50 - 50 tin/lead solder (ASTM B 32), with rosin flux.

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Same metal as flashing/sheet metal or, Fasteners: other noncorrosive metal as recommended by sheet manufacturer. finish of exposed heads with material being fastened.

Bituminous Coating: FS TT-C-494 or SSPC - Paint 12, solvent type bituminous mastic, nominally free of sulfur, compounded for 15-mil dry film thickness per coat.

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Mastic Sealant: Polyisobutylene; nonhardening, nonskinning, nondrying, nonmigrating sealant.

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Elastomeric Sealant: Generic type recommended by manufacturer of metal and fabricator of components being sealed; comply with FS TT-S-0027, TT-S-00230, or TT-S-001543.

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Epoxy Seam Sealer: 2-part noncorrosive metal seam cementing 51 recommended by metal manufacturer exterior/interior nonmoving joints including riveted joints. 52

Adhesives: Type recommended by flashing sheet manufacturer for waterproof/weather-resistant seaming and adhesive application of flashing sheet.

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Paper Slip Sheet: 5-lb rosin-sized building paper.

<u>Polyethylene</u> <u>Underlayment</u>: 6-mil carbonated polyethylene film; FS L-P-512.

Reglets: Metal or plastic units of the type and profile indicated, compatible with flashing indicated, noncorrosive.

<u>Metal Accessories</u>: Provide sheet metal clips, straps, anchoring devices and similar accessory units as required for installation of work, matching or compatible with material being installed, noncorrosive, size and gage required for performance.

<u>Cast-Iron</u> <u>Drainage</u> <u>Boots</u>: Grey iron castings of size and pattern indicated, ASTM A 48, bituminous shop coated.

<u>Gutter</u> <u>and</u> <u>Conductor-Head</u> <u>Guards</u>: 20-gage bronze or nonmagnetic stainless steel mesh or fabricated units, with selvaged edges and noncorrosive fasteners. Select materials for compatibility with gutters and downspouts.

Elastic Flashing Filler: Closed-cell polyethylene or other soft closed-cell material recommended by elastic flashing manufacturer as filler under flashing loops to ensure movement with minimum stress on flashing sheet.

Roofing Cement: ASTM D 2822, asphaltic.

FABRICATED UNITS:

 General Metal Fabrication: Shop-fabricate work to greatest extent possible. Comply with details shown, and with applicable requirements of SMACNA "Architectural Sheet Metal Manual" and other recognized industry practices. Fabricate for waterproof and weather-resistant performance; with expansion provisions for running work, sufficient to permanently prevent leakage, damage or deterioration of the work. Form work to fit substrates. with material manufacturer instructions recommendations for forming material. Form exposed sheet metal work without excessive oil-canning, buckling and tool marks, true to line and levels indicated, with exposed edges folded back to form hems.

<u>Seams</u>: Fabricate nonmoving seams in sheet metal with flat-lock seams. For metal other than aluminum, tin edges to be seamed, form seams, and solder. Form aluminum seams with epoxy seam sealer; rivet joints for additional strength where required.

Expansion Provisions: Where lapped or bayonet-type expansion provisions in work cannot be used, or would not be sufficiently water/weatherproof, form expansion joints of intermeshing hooked flanges, not less than 1" deep, filled with mastic sealant (concealed within joints).

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<u>Sealant Joints</u>: Where movable, non-expansion type joints are indicated or required for proper performance of work, form metal to provide for proper installation of elastomeric sealant, in compliance with SMACNA standards.

<u>Separations</u>: Provide for separation of metal from noncompatible metal or corrosive substrates by coating concealed surfaces at locations of contact, with bituminous coating or other permanent separation as recommended by manufacturer/fabricator.

Aluminum Extrusion Units: Fabricate extruded aluminum running units with formed or extruded aluminum joint covers, for installation behind main members where possible. Fabricate mitered and welded corner units.

Special Finish, Rain Drainage: Match finish of Preformed Roofing, Section 07410, on sheet metal rain drainage units (gutters, downspouts, and similar exposed units).

PART 3 - EXECUTION

INSTALLATION REQUIREMENTS:

 General: Except as otherwise indicated, comply with manufacturer's installation instructions and recommendations, and with SMACNA "Architectural Sheet Metal Manual". Anchor units of work securely in place by methods indicated, providing for thermal expansion of metal units; conceal fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints and seams which will be permanently watertight and weatherproof.

<u>Underlayment</u>: Where stainless steel or aluminum is to be installed directly on cementitious or wood substrates, install a slip sheet of red rosin paper and a course of polyethylene underlayment.

Bed flanges of work in a thick coat of bituminous roofing cement where required for waterproof perfopolyethylene underlayment.

<u>Install reglets</u> to receive counter-flashing in manner and by methods indicated. Where shown in concrete, furnish reglets to trades of concrete work for installation as work of Division 3 sections. Where shown in masonry, furnish reglets to trades of masonry work, for installation as work of Division-4 sections.

<u>Install counter-flashing</u> in reglets, either by snap-in seal arrangement, or by wedging in place for anchorage and filling reglet with mastic or elastomeric sealant, as indicated and depending on degree of sealant exposure.

Nail flanges of expansion joint units to curb nailers, at maximum spacing of 6". Fabricate seams at joints between units with minimum 3" overlap, to form a continuous waterproof system.

<u>Install continuous gutter guards</u> on gutters, arranged as hinged units to swing open for cleaning gutters. Install beehive type strainer-guard at conductor heads, removable for cleaning downspouts.

CLEANING AND PROTECTION:

<u>Clean</u> <u>exposed</u> <u>metal</u> surfaces, removing substances which might cause corrosion of metal or deterioration of finishes.

<u>Protection</u>: Installer shall advise Contractor of required procedures for surveillance and protection of flashings and sheet metal work during construction, to ensure that work will be without damage or deterioration, other than natural weathering, at time of substantial completion.

END OF SECTION 07600

SECTION 07620 - METAL COPINGS

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PART 1 - GENERAL

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RELATED DOCUMENTS:

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Drawings and general provisions of Contract, including General and Special Conditions and Division-1 Specification sections, apply to work of this section.

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DESCRIPTION OF WORK:

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> Extent of metal copings is indicated on drawings and provisions of this section.

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Types of work specified in this section include:

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Aluminum copings.

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Sheet metal and flashings not part of coping systems included in this section are specified in another Division-7 section.

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QUALITY ASSURANCE:

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Provide products which comply with Industry Standards: applicable requirements of SMACNA "Architectural Sheet Metal Manual", except as otherwise indicated.

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SUBMITTALS:

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Product Data: Submit manufacturer's technical product data, installation instructions and general recommendations for each fascia and coping product required. Include data substantiating that materials and performance comply with requirements.

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Samples:

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For initial selection of colors submit manufacturer's color charts consisting of small sections of the same metal to be used in the work which have been finished to indicate the full range and quality of standard colors or color ranges and of standard textures available.

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49 For verification purposes submit completely finished samples for 50 each type of coping and finish required. Where normal color and texture variations are to be expected, include 2 or more units in each set of samples showing limits of such variations. Provide samples of the following sizes:

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Copings: 8" long.

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JOB CONDITIONS:

Coordinate work of this section with adjoining work for proper sequencing of each installation to ensure best possible weather resistance and protection of materials and finishes against damage.

PART 2 - PRODUCTS

MATERIALS:

Aluminum Materials:

Aluminum Sheet: Alloy and temper recommended by manufacturer for use intended and as required for proper application of finish indicated but with not less than the strength and durability properties specified in ASTM B 209 for 5005-H15.

Miscellaneous Materials:

<u>Concealed Fasteners:</u> Same metal as item fastened or other noncorrosive metal as recommended by manufacturer.

Mastic Sealant: Polyisobutylene; non-hardening, nonskinning, nondrying, nonmigrating sealant.

Foam Rubber Seal: Manufacturer's standard foam.

Adhesives: Type recommended by manufacturer for substrate and project conditions, and formulated to withstand min. 60 psf uplift force.

FABRICATION, GENERAL:

<u>Provide</u> <u>copings</u> which are designed and fabricated to fit applications indicated and to perform optimally with respect to weather resistance, water tightness, durability, strength, and uniform appearance.

Expansion provisions: Fabricate copings to allow controlled expansion in running lengths not only for movement of metal components in relationship to one another but also to adjoining dissimilar materials, including flashing and roofing membrane materials, in a manner which is sufficient to prevent water leakage, deformation or damage.

ALUMINUM COPINGS:

· 33

Interlocking Multi-Part Coping System: Provide manufacturer's standard system consisting of coping formed from aluminum sheet to profile and of thickness indicated, zinc-coated steel anchor plate or cleat located at coping joint, and formed aluminum gutter chair or gutter/splice plate or compression pad/gutter; with prefabricated inside and outside corners, miters welded before finishing; without exposed fasteners.

Thickness of Coping: 0.063".

Products: Subject to compliance with requirements, provide
one of the following:

Permasnap Coping; W. P. Hickman Co. Snap-Lok Coping; MM Systems Corp.

ALUMINUM FINISHES:

General: Comply with NAAMM "Metal Finishes Manual" for finish designations and application recommendations, except as otherwise indicated. For components which are assembled or welded in factory, apply finish after fabrication is completed.

Provide colors or color to match Architect's samples.

<u>High Performance Coating:</u> AA-C12C42R1x (cleaned with inhibitive chemicals, conversion coated with an acid-chromate-fluoride-phosphate treatment and painted with organic coating specified below). Apply in strict compliance with coating and resin manufacturer's instructions using a licensed applicator.

Fluorocarbon Coating: Inhibitive thermo-cured primer, 0.2 min. mil. dry film thickness, and thermo-cured fluorocarbon coating containing "Kynar 500" resin, 1.0 mil. min. dry film thickness.

PART 3 - EXECUTION

INSTALLATION:

General: Comply with manufacturer's written installation instructions and recommendations. Coordinate with installation of roof deck and other substrates to receive work of this section, with vapor retarders, roof insulation, roofing membrane, flashing, and wall construction; as required to ensure that each element of the work performs properly, and that combined elements are waterproof and weathertight. Anchor products included in this section securely to structural

substrates, adequate to withstand lateral and thermal stresses as well as inward and outward loading pressures.

<u>Isolation</u>: Where metal surfaces of units are installed in contact with dissimilar metal or corrosive substrates, including wood, apply bituminous coating on concealed metal surfaces, or provide other permanent separation as recommended by aluminum producer.

CLEANING AND PROTECTION:

<u>Clean</u> exposed metal surfaces in accordance with manufacturer's instructions. Touch-up damaged metal coatings.

<u>Protection</u>: Provide protective measures as required to ensure that work of this section will be without damage or deterioration at time of substantial completion.

END OF SECTION 07620

SECTION 07700 - ROOF SPECIALTIES AND ACCESSORIES

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PART 1 - GENERAL

RELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Special Conditions and Division-1 Specification sections, apply to work of this section.

DESCRIPTION OF WORK:

<u>Extent</u> and locations of roof accessories is indicated on the drawings and by provisions of this section.

Types of units specified in this section include the following:

Aluminum framed skylight units.

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Roof hatches.

Prefabricated curb-set roof expansion joints.

Refer to roofing system sections of these specifications for roofing accessories to be built into roofing system (not work of this section).

SUBMITTALS:

Product Data; Roof Accessories: Submit manufacturer's technical product data, rough-in diagrams, details, installation instructions and general product recommendations.

Shop Drawings: Submit shop drawings for fabrication and erection of the skylight assemblies. Show finishes, anchorage expansion joints for accessory items. Architect's review will be for conformance with general design only. Structural engineering and compliance with other requirements shall be the responsibility of the Contractor.

Skylight Systems Guarantee: Submit 2 copies of written guarantee signed by the Manufacturer, installer, and Contractor, agreeing to replace aluminum skylight units which fail in materials or workmanship, which shall include (but are not limited to) excessive leakage or air infiltration, excessive deflections, deterioration of metal in excess of normal weathering, and defects in accessories, weatherstripping, and other components of the work.

Coordination Drawings: Submit coordination drawings for items

interfacing with or supporting mechanical or electrical equipment, ductwork, piping, or conduit. Indicate dimensions and locations of items provided under this section, together with relationships and methods of attachment to adjacent construction and to mechanical/electrical items.

QUALITY ASSURANCE:

Manufacturer's and Fabricator's Qualifications:

Material and products shall be manufactured by a company continuously and regularly employed in the manufacture of similar materials, and for a period of at least 3 consecutive years; and which can show evidence of these materials being satisfactorily used on products of similar size and type within such period.

Erection shall be by the manufacturer or their agent which has been in the business of regularly erecting similar materials for at least 3 consectutive years; and can show evidence of satisfactory completion of similar projects.

Skylight Performance Requirements:

 <u>Water Penetration</u>: Design, fabricate, assemble and erect the assemblies, and their connection to other work so as to be free of water penetration. Water penetration is defined as the uncontrolled penetration of water (not including condensation) to the interior of the building through this work.

 Thermal Movement: Design skylight system to provide for such expansion and contraction as will be caused by surface temperature differences of 200 degrees F. without causing buckling, failure of seals, undue stress on structural elements, damaging loads on fasteners, deflection exceeding 1/175 of the clear span, reduction of performance or other detrimental effects.

 It shall be the responsibility of the manufacturer to analyze the structural requirements of the aluminum framing shown and design his members to meet the structural requirements of these specifications.

Standards: Comply with SMACNA "Architectural Sheet Metal Manual" details for fabrication of units, including flanges and cap-flashing to coordinate with type of roofing indicated. Comply with "NRCA Roofing and Waterproofing Manual" details for installation of units.

PART 2 - PRODUCTS

1 GENERAL PRODUCT REQUIREMENTS:

<u>Provide manufacturers' standard units</u>, modified as necessary to comply with requirements. Shop fabricate each unit to greatest extent possible.

MATERIALS, GENERAL:

Aluminum Sheet: ASTM B 209, alloy 3003, temper as required for forming and performance; AA-C22A41 clear anodized finish, except mill finish prepared for painting where indicated for field painting.

 Extruded Aluminum: Manufacturer's standard extrusions of sizes and general profiles indicated, alloy 6063-T52; 0.078" minimum thicknesses for primary framing and curb member legs, 0.062" for secondary legs; AA-C22A41 clear anodized finish on exposed members, except as otherwise indicated.

<u>Insulation</u>: Manufacturer's standard rigid or semi-rigid board of glass fiber of thicknesses indicated.

<u>Wood Nailers:</u> Softwood lumber, fire retardant treated, and pressure treated with water-borne preservatives for above-ground use, complying with AWPB LP-2; not less than 1-1/2" thick.

<u>Fasteners</u>: Same metal as metals being fastened, or nonmagnetic stainless steel or other noncorrosive metal as recommended by manufacturer. Match finish of exposed fasteners with finish of material being fastened.

Where removal of exterior exposed fasteners affords access to building, provide nonremovable fastener heads.

Gaskets: Tubular or fingered design of neoprene or polyvinyl chloride, or block design of sponge neoprene.

<u>Bituminous</u> <u>Coating</u>: FS TT-C-494 or SSPC-Paint 12, solvent type bituminous mastic, nominally free of sulfur, compounded for 15-mil dry film thickness per coating.

<u>Mastic Sealant</u>: Polyisobutylene; nonhardening, nonskinning, nondrying, nonmigrating sealant.

Elastomeric Sealant: Generic type recommended by unit manufacturer, which is compatible with joint surfaces; comply with FS TT-S-00227-E, TT-S-00230C, or TT-S-001543A.

Roofing Cement: ASTM D 2822, asphaltic.

ALUMINUM FRAMED SKYLIGHT UNITS:

Glass: Refer to Glass and Glazing, Section 08800.

Extruded Aluminum: Of sizes and profiles indicated, or if not indicated, as required. Finish to match adjacent aluminum framing system. See Section 08410.

Construction:

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Skylights shall be constructed using the puttyless glazing system, employing all extruded aluminum members. Assemblies shall have expansion joints located as required. Insofar as practicable, fitting and assembly of the work shall be done in the manufacturer's shop. Work which cannot be permanently shop assembled shall be completely assembled, marked, and disassembled before shipment to the job site to assure proper assembly in the field.

Rafters shall be of extruded aluminum and designed for E.P.D.M. glazing gaskets. Rafter shall have the condensation gutters as a portion of the extrusions.

Waterproofing shall be accomplished by means of continuous E.P.D.M. glazing gaskets applied above and below the glass. E.P.D.M. spacers shall be used at all extrusions for glass separation. At no point shall glass come in contact with metal parts of the assemblies.

The assemblies shall have weep holes located at the lower portion of the extruded aluminum curb for drainage of condensation to the exterior.

General: Complete the cutting, fitting, forming, drilling, and grinding of all metal work prior to cleaning, finishing, treatment, and application of coatings.

Weld by methods recommended by the AWS to avoid dicoloration at welds. Grind exposed welds smooth and restore mechanical finish.

Conceal fasteners wherever possible, except as otherwise shown.

Fit and assemble the assemblies at the shop. Disassemble only as required for shipment and erection. Maintain true continuity of line and accurate relation of planes and angles. Provide secure attachment and support at mechanical joints, with hairline fit of contacting members.

Separate dissimilar metals with bituminous paint or preformed separators which will prevent corrosion. Separate metal surfaces at moving joints with plastic inserts or other non-abrasive concealed inserts which will permanently prevent "freeze-up" of the joint.

<u>Condensation</u> <u>Control</u>: Fabricate units with integral internal gutters and nonclogging weeps, for permanent control of condensation on inside of domes.

<u>Manufacturer</u>: Subject to compliance with requirements, provide prefabricated plastic skylight units by one of the following:

Bohem Manufacturing Co., Inc.; Burlington, NJ Penco Skylights, Inc. Louisville, KY Wasco Products, Inc.; Sanford, ME

PREFABRICATED ROOF HATCHES:

General: Fabricate units of sizes shown, single-leaf type unless otherwise indicated, for 40 lbs. per sq. ft. external loading and 20 lbs. per sq. ft. internal loading pressure. Frame with 9" high integral-curb double-wall construction with 1-1/2" insulation, cant strips and cap flashing (roofing counter-flashing), with welded or sealed mechanical corner joints. Provide double-wall cover (lid) construction with 1" insulation core. Equip units with complete hardware set including hold-open devices, interior padlock hasps, and both interior and exterior latch handles. Provide gasketing. Fabricate units of following materials:

Materials: Aluminum, sheets and extrusions.

Sloping Roofs: Where slope of roof deck exceeds 1/4" per ft., fabricate hatch curbs with height tapered to match slope, to result in level installation of tops of units.

Manufacturer: Subject to compliance with requirements, provide prefabricated roof hatch units by one of the following:

Bilco Co.; New Haven, CT
Bohem Skylites, Inc.; Burlington, NJ
Hillsdale Industries, Inc.; Knoxville, TN
Naturalite, Inc.; Garland, TX
Milcor Inc.; Lima, OH
Wasco Products, Inc.; Sanford, ME

PREFABRICATED CURB-SET EXPANSION JOINTS:

General: Provide extruded aluminum expansion joint units designed for installation on raised curbs. Equip with curb cap, cap flashing (to receive roofing counter-flashing) and with waterproof bellows of 30-60-mil elastic flashing sheet of neoprene, EPDM, butyl rubber, or chlorinated polyethylene. Provide mineral-fiber insulation, concealed under curb cap between curbs; to form a waterproof, airtight, insulated expansion joint system.

Provide units of manufacturer's standard lengths; in styles required for roof-to-roof, roof-to-wall, and wall-to-wall applications as indicated; complete with prefabricated corner and intersection units as required; equipped with special field-splice provisions to ensure permanent continuous waterproof installation of expansion joint system.

<u>Available</u> <u>Manufacturers</u>: Subject to compliance with requirements, manufacturers offering curb-set expansion joint units which may be incorporated in the work include, but are not limited to, the following:

Afco Products, Inc.; Somerville, MA BF Goodrich Company; Akron, OH W.P. Hickman Company; Asheville, NC Manville Roofing Systems Div.; Denver, CO York Manufacturing, Inc.; Sanford, ME

PART 3 - EXECUTION

INSTALLATION:

General: Comply with manufacturer's instructions and recommendations. Coordinate with installation of roof deck and other substrates to receive accessory units, and vapor barriers, roof insulation, roofing and flashing; as required to ensure that each element of the work performs properly, and that combined elements are waterproof and weathertight. Anchor units securely to supporting structural substrates, adequate to withstand lateral and thermal stresses as well as inward and outward loading pressures.

<u>Isolation</u>: Where metal surfaces of units are to be installed in contact with noncompatible metal or corrosive substrates, including wood, apply bituminous coating on concealed metal surfaces, or provide other permanent separation.

Flange Seals: Except as otherwise indicated, set flanges of accessory units in a thick bed of roofing cement, to form a seal.

Cap Flashing: Where cap flashing is required as component of accessory, install to provide adequate waterproof overlap with roofing or roof flashing (as counter flashing). Seal with thick bead of mastic sealant, except where overlap is indicated to be left open for ventilation.

Operational Units: Test operate units with operable components. Clean and lubricate joints and hardware. Adjust for proper operation.

Clean and polish plastic skylight units, inside and out, not

more than 5 days prior to date of substantial completion.

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Clean exposed metal and plastic surfaces in accordance with manufacturer's instructions. Touch up damaged metal coatings.

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END OF SECTION 07700

CLEANING AND PROTECTION:

SECTION 07900 - JOINT SEALERS

PART 1 - GENERAL

RELATED DOCUMENTS:

 Drawings and general provisions of Contract, including General and Special Conditions and Division-1 Specification sections, apply to work of this section.

DESCRIPTION OF WORK:

Extent of each form and type of joint sealer is indicated on drawings.

Refer to Division-9 Section "Tile" for joint sealers in tile work; not work of this section.

Refer to Division-8 sections for glazing requirements; not work of this section.

Refer to Division-15 and 16 sections for joint sealers in mechanical and electrical work; not work of this section.

SYSTEM PERFORMANCES:

Provide joints sealers that have been produced and installed to establish and maintain watertight and airtight continuous seals.

QUALITY ASSURANCE:

<u>Installer Qualifications</u>: Engage an Installer who has successfully completed within the last 3 years at least 3 joint sealer applications similar in type and size to that of this project and who will assign mechanics from these earlier applications to this project, of which one will serve as lead mechanic.

Single Source Responsibility for Joint Sealer Materials: Obtain joint sealer materials from a single manufacturer for each different product required.

Preconstruction Joint Sealer-Substrate Tests: Submit substrate materials representative of actual joint surfaces to be sealed to manufacturer of joint sealer products for laboratory testing of sealants for adhesion to primed and unprimed substrates and for compatibility with secondary seals, if required, as indicated below:

<u>Use test methods</u> standard with manufacturer to determine if priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealers to joint substrates under environmental conditions that will exist during actual installation.

<u>Preconstruction</u> <u>Field</u> <u>Tests</u>: Prior to installation of joint sealants, field-test their adhesion to joint substrates as follows:

<u>Install joint sealants</u> in 5-feet joint lengths using same materials and methods required for completed work. Allow sealants to cure before testing. Test adhesion to joint substrates by manually trying to pull joint sealant out of joint.

Locate test joints where indicated or, if not indicated, as directed by Architect.

Perform field tests for each application indicated below:

Each type of elastomeric sealant and joint substrate application indicated.

Each type of non-elastomeric sealant and joint substrate indicated.

Perform tests in Architect's presence.

<u>Field-Constructed Mock-Ups:</u> Prior to installation of joint sealers, apply elastomeric sealants to the following selected building joints as indicated below for further verification of colors selected from sample submittals and to represent completed work for qualities of appearance, materials and application:

Joints in field-constructed mock-ups of assemblies specified in other sections which are indicated to receive elastomeric joint sealants as work of this section.

Retain mock-ups during construction as standard for judging completed work.

SUBMITTALS:

<u>Product</u> <u>Data</u>: Submit manufacturer's technical data for each joint sealer product required, including instructions for joint preparation and joint sealer application.

<u>Samples for Initial Selection Purposes</u>: Submit manufacturer's standard bead samples consisting of strips of actual products showing full range of colors available, for each product exposed

to view.

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9 10 Samples for Verification Purposes: Submit samples of each type and color of joint sealer required. Install joint sealer samples in 1/2" wide joints formed between two 6" long strips matching the appearance of exposed surfaces of material adjacent to joint sealers in the work.

Test Reports: Submit the following test reports:

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Preconstruction joint sealer-substrate test results including recommendations of joint sealer manufacturer for joint preparation and application of joint sealers applicable to project conditions.

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<u>Preconstruction</u> <u>field</u> <u>test</u> <u>results</u> reported by Installer indicating which products and joint preparation methods demonstrated acceptable adhesion to joint substrates.

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Submit certificates from manufacturers of joint Certificates: sealers attesting that their products comply with specification requirements and are suitable for the use indicated.

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DELIVERY, STORAGE, AND HANDLING:

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29 30 Deliver materials to project site in original unopened containers or bundles with labels informing about manufacturer, product name and designation, color, expiration period for use, life, curing time and mixing instructions multicomponent materials.

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Store and handle materials to prevent their deterioration or damage due to moisture, temperature change, contaminants, or other causes.

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PROJECT CONDITIONS:

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Environmental Conditions: Do not proceed with installation of joint sealers under the following conditions:

41 42 43

When ambient and substrate temperature conditions are outside the limits permitted by joint sealer manufacturer or below 40°F (4.4°C).

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wet due to When joint substrates are rain, frost, condensation or other causes.

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Joint Width Conditions: Do not proceed with installation of joint sealers when joint widths are less than allowed by joint sealer manufacturer for application indicated.

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PART 2 - PRODUCTS

MATERIALS, GENERAL:

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Compatibility: Provide joint sealers, joint fillers and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by testing and field experience.

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Provide color of exposed joint sealer indicated or, if otherwise selected Architect indicated, as by manufacturer's standard colors.

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ELASTOMERIC JOINT SEALANTS:

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Elastomeric Sealant Standard: Provide manufacturer's standard chemically curing, elastomeric sealant of base polymer indicated which complies with ASTM C 920 requirements, including those for Type, Grade, Class and Uses.

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One-Part Mildéw-Resistant Silicone Sealant: Type S; Grade NS; Class 25; Uses NT, G, A, and, as applicable to nonporous joint substrates indicated, O; formulated with furgicide for sealing interior joints with nonporous substrates around ceramic tile, showers, sinks and plumbing fixtures.

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Multi-Part Nonsag Urethane Sealant: Type M, Grade NS, Class 25, and complying with the following requirements for uses:

31 32 33

Uses NT, M, G, A and, as applicable to joint substrates indicated, O.

34 35 36

Two-Part Nonsag Urethane Sealant for Use T: Type M, Grade NS; Class 25; Uses T, M, A and, as applicable to joint substrates indicated, O.

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One-Part Pourable Urethane Sealant: Type S; Grade P; Class 25; Uses T, M and, as applicable to joint substrate indicated, O.

41 42 43

Subject to compliance with requirements, Available Products: products which may be incorporated in the work include, but are not limited to, the following:

44 45 46

One-Part Mildew-Resistant Silicone Sealant:

47 48

"Dow-Corning 786"; Dow Corning Corp.

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"SCS 1702"; General Electric Co.

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"863 #345 White"; Pecora Corp. "Proglaze White"; Tremco Corp.

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Multi-Part Nonsag Urethane Sealant for Uses NT, M, G, A, and
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        0:
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        "Chem-Calk 500"; Bostik Construction Products Div.
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        "Dynatrol II"; Pecora Corp.
 5
        "Sikaflex 2c NS"; Sika Corp.
 6
         "Sonolastic NP 2"; Sonneborn Building Products Div., Rexnord
 7
        Chem. Prod. Inc.
 8
 9
        Two-Part Nonsag Urethane Sealant for Use T:
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        "Dynatred"; Pecora Corp.
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14
        One-Part, Pourable, Urethane Sealant:
15
         "Vulkem 45"; Mameco International, Inc.
16
         "NR-201 Urexpan"; Pecora Corp.
"Sonolastic SL-1"; Sonneborn B.P.Div., Rexnord Chem Prod. Inc.
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    MISCELLANEOUS JOINT SEALANTS:
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                                              Joints:
                                                          Manufacturer's
23
    Acoustical
                  Sealant for
                                 Concealed
    standard, nondrying, nonhardening, nonskinning, gunnable, synthetic rubber sealant recommended
                                                             nonstaining,
24
                                                            for sealing
25
     interior concealed joints to reduce transmission of airborne
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27
    sound.
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    Available Products: Subject to compliance with requirements,
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    products which may be incorporated in the work include, but are
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    not limited to, the following:
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         Acoustical Sealants for Concealed Joints:
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         "BA-98"; Pecora Corp.
         "Tremco Acoustical Sealant"; Tremco, Inc.
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    JOINT SEALANTS FOR PAVING:
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     Two-Part Jet-Fuel-Resistant Cold-Applied Sealant: Manufacturer's
41
     standard, pourable, chemically-curing, elastomeric
42
     complying with FS SS-S-200 and of the following formulation for
43
44
     base polymer.
45
                     Subject to compliance with requirements, provide
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         Products:
         one of the following:
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             Two-Part Jet-Fuel-Resistant Cold-Applied Sealant:
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             "Vulkem 202"; Mameco International, Inc.
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"Gardox"; W.R. Meadows, Inc.

"Urexpan NR-300"; Pecora Corp.

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Hot-Poured Elastomeric Sealant for Concrete and Asphalt Pavements: Manufacturer's standard sealant for concrete and asphalt pavement joints complying with ASTM D 3405.

FIRE-RESISTANT JOINT SEALERS:

General: Provide manufacturer's standard sealant and accessory materials with fire-resistance rating indicated which are identical to those of assemblies whose fire endurance has been determined by testing per ASTM E 814 by Underwriters Laboratory, Inc. or other testing and inspecting agency acceptable to authorities having jurisdiction.

One-Part Fire-Stopping Sealant: One part elastomeric sealant formulated for use as part of a through-penetration fire-stop system for sealing openings around cables, conduit, pipes and similar penetrations through walls and floors.

<u>Products:</u> Subject to compliance with requirements, provide one of the following:

One-Part Fire-Stopping Sealant:

"Dow Corning Fire Stop Sealant"; Dow Corning Corp.
"3M Fire Barrier Caulk CP25"; Electrical Products Div./3M.

JOINT FILLERS FOR CONCRETE PAVING:

General: Provide joint fillers of thickness and widths indicated.

<u>Self-Expanding Cork Joint Filler:</u> Preformed strips complying with ASTM D 1752 for Type III.

JOINT SEALANT BACKING:

General: Provide sealant backings of material and type which are non-staining; are compatible with joint substrates, sealants, primers and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

 <u>Plastic Foam Joint Fillers</u>: Preformed, compressible, resilient, non-waxing, non-extruding strips of plastic foam of material indicated below, and of size, shape and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

Either flexible, open cell polyurethane foam or non-gassing,

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closed-cell polyethylene foam, unless otherwise indicated, subject to approval of sealant manufacturer.

Elastomeric Tubing Joint-Fillers: Neoprene, butyl or EPDM tubing complying with ASTM D 1056, nonabsorbent to water and gas, capable of remaining resilient at temperatures down to -26°F (-15°C). Provide products with low compression set and of size and shape to provide a secondary seal, to control sealant depth and otherwise contribute to optimum sealant performance.

Bond-Breaker Tape: Polyethlene tape or other plastic tape as recommended by sealant manufacturer for preventing bond between sealant and joint filler or other materials at back (3rd) surface of joint. Provide self-adhesive tape where applicable.

MISCELLANEOUS MATERIALS:

<u>Primer</u>: Provide type recommended by joint sealer manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint sealer substrate and field tests.

 <u>Cleaners</u> <u>for Nonporous Surfaces</u>: Provide non-staining, chemical cleaner of type acceptable to manufacturer of sealant and sealant backing materials which are not harmful to substrates and adjacent nonporous materials.

Masking Tape: Provide non-staining, non-absorbent type compatible with joint sealants and to surfaces adjacent to joints.

Accessory materials for Fire-Stopping Sealants: Provide forming, joint-fillers, packing and other accessory materials required for installation of fire-stopping sealants as applicable to installation conditions indicated.

PART 3 - EXECUTION

INSPECTION:

 Require Installer to inspect joints indicated to receive joint sealers for compliance with requirements for joint configurations, installation tolerances and other conditions affecting joint sealer performance. Obtain Installer's written report listing any conditions detrimental to performance of joint sealer work. Do not allow joint sealer to proceed until unsatisfactory conditions have been corrected.

PREPARATION:

Surface Cleaning of Joints: Clean out joints immediately before installing joint sealers to comply with recommendations of joint sealer manufacturers and the following requirements:

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Remove all foreign material from joint substrates which could interfere with adhesion of joint sealer, including dust; paints, except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer; oil; grease; waterproofing; water repellants; water; surface dirt and frost.

Clean concrete, masonry, unglazed surfaces of ceramic tile and similar porous joint substrate surfaces, by brushing, grinding, blast cleaning, mechanical abrading, acid washing or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealers. Remove loose particles remaining from above cleaning operations by vacuuming or blowing out joints with oilfree compressed air.

Remove laitance and form release agents from concrete.

Clean metal, glass, porcelain enamel, glazed surfaces of ceramic tile and other nonporous surfaces by chemical cleaners or other means which are not harmful to substrates or leave residues capable of interfering with adhesion of joint sealers.

 Joint Priming: Prime joint substrates where indicated or where recommended by joint sealer manufacturer based on preconstruction joint sealer-substrate tests or prior experience. Apply primer to comply with joint sealer manufacturer's recommendations. Confine primers to areas of joint sealer bond, do not allow spillage or migration onto adjoining surfaces.

 Masking Tape: Use masking tape where required to prevent contact of sealant with adjoining surfaces which otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

INSTALLATION OF JOINT SEALERS:

General: Comply with joint sealer manufacturers' printed installation instructions applicable to products and applications indicated, except where more stringent requirements apply.

<u>Elastomeric</u> <u>Sealant</u> <u>Installation</u> <u>Standard</u>: Comply with recommendations of ASTM C 962 for use of joint sealants as applicable to materials, applications and conditions indicated.

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<u>Acoustical Sealant Application Standard</u>: Comply with recommendations of ASTM C 919 for use of joint sealants in acoustical applications as applicable to materials, applications and conditions indicated.

<u>Installation of Sealant Backings</u>: Install sealant backings to comply with the following requirements:

 <u>Install joint-fillers</u> of type indicated to provide support of sealants during application and at position required to produce the cross-sectional shapes and depths of installed sealants relative to joint widths which allow optimum sealant movement capability.

Do not leave gaps between ends of joint-fillers.

Do not stretch, twist, puncture or tear joint fillers.

Remove absorbent joint-fillers which have become wet prior to sealant application and replace with dry material.

<u>Install bond breaker tape</u> between sealants and joint-fillers, compression seals or back of joints where required to prevent thirdside adhesion of sealant to back of joint.

Installation of Sealants: Install sealants by proven techniques that result in sealants directly contacting and fully wetting joint substrates, completely filling recesses provided for each joint configuration and providing uniform, cross-sectional shapes and depths relative to joint widths which allow optimum sealant movement capability.

 Tooling of Nonsag Sealants: Immediately after sealant application and prior to time skinning or curing begins, tool sealants to form smooth, uniform beads of configuration indicated, to eliminate air pockets and to ensure contact and adhesion of sealant with sides of joint. Remove excess sealants from surfaces adjacent to joint. Do not use tooling agents which discolor sealants or adjacent surfaces or are not approved by sealant manufacturer.

Concave joint configuration per Figure 6A in ASTM C 962, unless otherwise indicated.

Recessed joint configuration per Figure 6C in ASTM C 962, of recess depth and at locations indicated.

Installation of Preformed Hollow Neoprene Gaskets: Install gaskets, with minimum number of end joints, in joint recesses with edges free of spalls and sides straight and parallel, both within tolerances specified by gasket manufacturer. Apply manufacturer's recommended adhesive to joint substrates immediately prior to installing gaskets. For straight sections

provide gaskets in continuous lengths; where changes in direction occur, adhesively splice gaskets together to provide watertight joint. Recess gasket below adjoining joint surfaces by 1/8" to 1/4".

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<u>Installation</u> of <u>Fire-Stopping</u> <u>Sealant</u>: Install sealant, including—forming, packing and other accessory materials to fill openings around mechanical and electrical services penetrating floors and walls to provide fire-stops with fire resistance ratings indicated for floor or wall assembly in which penetration occurs.

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PROTECTION AND CLEANING:

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Protect joint sealers during and after curing period from contact with contaminating substances or from damage resulting from construction operations or other causes so that they are deterioration or damage at time of without substantial despite completion. If, such protection, damage deterioration occurs, cut out and remove deteriorated joint sealers immediately and reseal joints with new materials to produce joint sealer installations with repaired areas indistinguishable from original work.

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<u>Clean off excess sealants</u> or sealant smears adjacent to joints as work progresses by methods and with cleaning materials approved by manufacturers of joint sealers and of products in which joints occur.

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END OF SECTION 07900

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SECTION 08110 - STEEL DOORS AND FRAMES

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PART 1 - GENERAL

RELATED DOCUMENTS:

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Drawings and general provisions of Contract, including General and Special Conditions and Division-1 Specification sections, apply to work of this section.

DESCRIPTION OF WORK:

Extent of standard steel doors and frames is indicated and scheduled on drawings.

Builder's hardware is specified elsewhere in Division-8.

Building in of anchors and grouting of frames in masonry construction is specified in Division 4.

"Grouting of frames is specified in section 09250, Gypsum Drywall". (A-2)

QUALITY ASSURANCE:

<u>Provide doors</u> and <u>frames</u> complying with Steel Door Institute "Recommended Specifications: Standard Steel Doors and Frames" (SDI-100) and as herein specified.

Fire-Rated Door Assemblies: Where fire-rated doors assemblies are indicated or required, provide fire-rated door and frame assemblies that comply with NFPA 80 "Standard for Fire Doors and Windows", and have been tested, listed and labeled in accordance with ASTM E 152 "Standard Methods of Fire Tests of Door Assemblies" by a nationally recognized independent testing and inspection agency acceptable to authorities having jurisdiction.

Oversize Fire-Rated Door Assemblies: For door assemblies required to be fire-rated and exceeding sizes of tested assemblies, provide certificate or label from an approved independent testing and inspection agency, indicating that door and frame assembly conforms to the requirements of design, materials and construction as established by individual listings for tested assemblies.

 Temperature Rise Rating: At stairwell enclosures, provide doors which have Temperature Rise Rating of 450° F (232° C) maximum in 30 minutes of fire exposure.

SUBMITTALS:

<u>Product</u> <u>Data</u>: Submit manufacturer's technical product data substantiating that products comply with requirements.

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Shop Drawings: Submit for fabrication and installation of steel doors and frames. Include details of each frame type, elevations of door design types, conditions at openings, details of construction, location and installation requirements of finish hardware and reinforcements, and details of joints and connections. Show anchorage and accessory items.

Provide schedule of doors and frames using same reference numbers for details and openings as those on contract drawings.

Indicate coordination of glazing frames and stops with glass and glazing requirements.

Label Construction Certification: For door assemblies required to be fire-rated and exceeding sizes of tested assemblies, submit manufacturer's certification for that each door and frame assembly has been constructed to conform to design, materials and construction equivalent to requirements for labeled construction.

DELIVERY, STORAGE AND HANDLING:

<u>Deliver</u> hollow metal work cartoned or crated to provide protection during transit and job storage. Provide additional sealed plastic wrapping for factory-finished doors.

<u>Inspect</u> metal work upon delivery for damage. Minor damages may be repaired provided refinished items are equal in all respects to new work and acceptable to Architect; otherwise, remove and replace damaged items as directed.

Store doors and frames at building site under cover. Place units on minimum 4" high wood blocking. Avoid use of non-vented plastic or canvas shelters which could create humidity chamber. If cardboard wrapper on door becomes wet, remove carton immediately. Provide 1/4" spaces between stacked doors to promote air circulation.

PART 2 - PRODUCTS

ACCEPTABLE MANUFACTURERS:

Manufacturer: Subject to compliance with requirements, provide steel doors and frames by one of the following:

Steel Doors and Frames, (General):

Ceco Corp.
Copco Door Co.
Curries Mfg., Inc.
Fenestra Corp.
Mesker Industries, Inc.
Pioneer Blders. Products Corp./Div. CORE Industries,
Inc.
Steelcraft/Div. American Standard Co.
Republic Builders Products Corp./Subs. Republic Steel.

Thermal Rated Steel Door and Frame Assemblies:

Ceco Corp.
Copco Door Co.
Curries Mfg., Inc.
Fenestra Corp.
Mesker Industries, Inc.
Pioneeer Blders. Products Corp/Div. Core Industries,
Inc.

22 MATERIALS:

Hot-Rolled Steel Sheets and Strip: Commercial quality carbon steel, pickled and oiled, complying with ASTM A 569 and ASTM A 568.

Cold-Rolled Steel Sheets: Commercial quality carbon steel, complying with ASTM A 366 and ASTM A 568.

Galvanized Steel Sheets: Zinc-coated carbon steel sheets of commercial quality, complying with ASTM A 526, with ASTM A 525, G60 zinc coating, mill phosphatized.

Supports and Anchors: Fabricate of not less than 18-gage galvanized sheet steel. Provide 14 gage hot shaped channels, 3 per jamb, at door frames installed at drywall/metal stud partitions.

<u>Inserts, Bolts and Fasteners:</u> Manufacturer's standard units, except hot-dip galvanize items to be built into exterior walls, complying with ASTM A 153, Class C or D as applicable.

Shop Applied Paint:

<u>Primer:</u> Rust-inhibitive enamel or paint, either air-drying or baking, suitable as a base for specified finish paints.

FABRICATION, GENERAL:

52 <u>Fabricate steel door</u> and frame units to be rigid, neat in 53 appearance and free from defects, warp or buckle. Wherever practicable, fit and assemble units in manufacturer's plant.

Clearly identify work that cannot be permanently factory-assembled before shipment, to assure proper assembly at project site. Comply with SDI-100 requirements as follows.

<u>Interior</u> and <u>Exterior</u> <u>Doors</u>: SDI-100, Grade III, extra heavy-duty, Model 2, minimum 16-gage faces.

Fabricate exposed faces of doors and panels, including stiles and rails of nonflush units, from only cold-rolled steel.

<u>Fabricate</u> <u>frames</u>, concealed stiffeners, reinforcement, edge channels, louvers and moldings from either cold-rolled or hot-rolled steel (at fabricator's option).

Fabricate exterior doors, panels, and frames from galvanized sheet steel. Close top and bottom edges of exterior doors as integral part of door construction or by addition of minumum 16-gage inverted steel channels.

Exposed Fasteners: Unless otherwise indicated, provide countersunk flat Phillips heads for exposed screws and bolts.

<u>Thermal-Rated (Insulating) Assemblies:</u>

At exterior locations and elsewhere as shown or scheduled, provide doors which have been fabricated as thermal insulating door and frame assemblies and tested in accordance with ASTM C 236.

Unless otherwise indicated, provide thermal-rated assemblies with U factor of 0.24 Btu($/hr \times ft^2 \times degrees F$) or better.

Finish Hardware Preparation: Prepare doors and frames to receive mortised and concealed finish hardware in accordance with final Finish Hardware Schedule and templates provided by hardware supplier. Comply with applicable requirements of ANSI A115 series specifications for door and frame preparation for hardware.

Reinforce doors and frames to receive surface-applied hardware. Drilling and tapping for surface-applied finish hardware may be done at project site.

<u>Locate finish</u> <u>hardware</u> as shown on final shop drawings or, if not indicated, in accordance with "Recommended Locations for Builder's Hardware," published by Door and Hardware Institute.

Shop Painting:

Clean, treat, and paint exposed surfaces of steel door and frame units, including galvanized surfaces.

STEEL DOORS AND FRAMES

1 <u>Clean steel surfaces</u> of mill scale, rust, oil, grease, dirt, and other foreign materials before application of paint.
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Apply shop coat of prime paint of even consistency to provide a uniformly finished surface ready to receive finish paint.

STANDARD STEEL DOORS:

<u>Provide</u> <u>metal</u> <u>doors</u> of types and styles indicated on drawings or schedules.

STANDARD STEEL FRAMES:

Provide metal frames for doors, transoms, sidelights, borrowed lights, and other openings, of types and styles as shown on drawings and schedules. Conceal fastenings, unless otherwise indicated. Fabricate frames of minimum 14-gage cold-rolled furniture steel.

<u>Fabricate</u> <u>frames</u> with mitered corners, welded construction for exterior and interior applications.

Provide "Hospital" Shop Frames.

Form exterior frames of hot-dip galvanized steel.

<u>Door Silencers</u>: Except on weatherstripped frames, drill stops to receive 3 silencers on strike jambs of single-swing frames and 2 silencers on heads of double-swing frames.

<u>Plaster Guards</u>: Provide 26-gage steel plaster guards or mortar boxes, welded to frame, at back of finish hardware cutouts where mortar or other materials might obstruct hardware operation and to close off interior of openings.

PART 3 - EXECUTION

INSTALLATION:

<u>General</u>: Install standard steel doors, frames, and accessories in accordance with final shop drawings, manufacturer's data, and as herein specified.

<u>Placing Frames:</u> Comply with provisions of SDI-105 "Recommended Erection Instructions For Steel Frames", unless otherwise indicated.

Except for frames located at in-place concrete or masonry and at drywall installations, place frames prior to construction

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of enclosing walls and ceilings. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is completed, remove temporary braces and spreaders leaving surfaces smooth and undamaged.

In masonry construction, locate 3 wall anchors per jamb at hinge and strike levels.

At in-place concrete or masonry construction, set frames and secure to adjacent construction with machine screws and masonry anchorage devices.

Install fire-rated frames in accordance with NFPA Std. No. 80.

<u>In metal stud partitions</u>, install at least 3 wall anchors per jamb at hinge and strike levels. In closed steel stud partitions, attach wall anchors to studs with tapping screws.

Door Installation:

Fit hollow metal doors accurately in frames, within clearances specified in SDI-100.

Place fire-rated doors with clearances as specified in NFPA Standard No. 80.

ADJUST AND CLEAN:

<u>Prime Coat</u> <u>Touch-up</u>: Immediately after erection, sand smooth any rusted or damaged areas of prime coat and apply touch-up of compatible air-drying primer.

<u>Protection</u> <u>Removal</u>: Immediately prior to final inspection, remove protective plastic wrappings from prefinished doors.

<u>Final Adjustments</u>: Check and readjust operating finish hardware items, leaving steel doors and frames undamaged and in complete and proper operating condition.

END OF SECTION 08110

SECTION 08211 - FLUSH WOOD DOORS

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PART 1 - GENERAL

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RELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Special Conditions and Division-1 Specification sections, apply to of this section.

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SUMMARY:

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Extent and location of each type of flush wood door is indicated on drawings and in schedules.

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Types of doors required include the following:

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Solid core flush wood doors with wood veneer faces.

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Metal door frames for flush wood doors are specified in another Division-8 section.

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<u>Lead-Lined</u> <u>doors</u> are specified in Division-13 section "X-Ray Protection".

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SUBMITTALS:

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Product Data: Door manufacturer's technical data for each type of door, including details of core and edge construction, trim for openings and louvers, and factory-finishing specifications.

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QUALITY ASSURANCE:

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Quality Standards: Comply with the following standards:

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NWWDA Quality Standard: I.S.1 "Industry Standard for Wood Flush Doors", of National Wood Window and Door Association (NWWDA).

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"Architectural Woodwork Quality AWI Quality Standards: Standards", including Section 1300 "Architectural Flush Doors", of Architectural Woodwork Institute (AWI) for grade of door, core construction, finish and other requirements exceeding those of NWWDS quality standard.

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NWWDA Quality Marking: Mark each wood door with NWWDA Wood Flush Door Certification Hallmark certifying compliance with applicable requirements of NWWDA I.S. 1 Series.

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For manufacturers not participating in NWWDA Hallmark Program, a certification of compliance may be substituted for marking of individual doors.

 Fire-Rated <u>Wood Doors</u>: Provide wood doors which are identical in materials and construction to units tested in door and frame assemblies per ASTM E 152 and which are labeled and listed for ratings indicated by UL, Warnock Hersey or other testing and inspection agency acceptable to authorities having jurisdiction.

Oversize Fire-Rated Wood Doors: For door assemblies exceeding sizes of tested assemblies, provide manufacturer's certificate in stating that doors conform to all standard construction requirements of tested and labeled fire door assemblies except as to size.

Manufacturer: Obtain doors from a single manufacturer.

PRODUCT DELIVERY, STORAGE, AND HANDLING:

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 <u>Protect</u> <u>doors</u> during transit, storage and handling to prevent damage, soiling and deterioration. Comply with requirements of referenced standards and recommendations of NWWDA pamphlet "How to Store, Handle, Finish, Install, and Maintain Wood Doors", as well as with manufacturer's instructions.

Identify each door with individual opening numbers which correlate with designation system used on shop drawings for door, frames and hardware, using temporary, removable or concealed markings.

PROJECT CONDITIONS:

Conditioning: Do not deliver or install doors until conditions for temperature and relative humidity have been stabilized and will be maintained in storage and installation areas during remainder of construction period to comply with the following requirements applicable to project's geographical location:

Referenced AWI quality standard including Section 100-S-3 "Moisture Content".

Referenced AWI quality standard including Section 100-S-3 "Moisture Content".

WARRANTY:

General: Warranties shall be in addition to, and not a limitation of, other rights the Owner may have under the Contract Documents.

<u>Door Manufacturer's Warranty:</u> Submit written agreement on door manufacturer's standard form signed by Manufacturer, Installer and Contractor, agreeing to repair or replace defective doors which have warped (bow, cup or twist) or that show telegraphing of core construction in face veneers, or do not conform to tolerance limitations of referenced quality standards.

Solid Core Interior Doors:

Life of installation.

Contractor's Responsibilities: Replace or refinish doors where Contractor's work contributed to rejection or to voiding of manufacturer's warranty.

PART 2 - PRODUCTS

MANUFACTURERS:

 Manufacturer: Subject to compliance with requirements, provide products of one of the following.

Solid Core Doors with Wood Veneer Faces:

Algoma Hardwoods, Inc.

Cal-Wood Door Div., Timberland Industries, Inc.

Chappell Door Company.

Doors, Incorporated.

Eggers Industries, Architectural Door Division.

Gay Doors, Inc.

Glen-Mar Door Mfg. Co.

Graham Manufacturing Corp.

Mohawk Flush Doors, Inc.

INTERIOR FLUSH WOOD DOORS:

<u>Solid Core Doors for Transparent Finish:</u> Comply with the following requirements:

Faces: Red Oak, plain sliced.

AWI Grade: Premium.

Construction: SLC-5 or SLC-7 (Glued block core, 5- or 7ply). Provide solid wood hardware blocking.

<u>Fire-Rated Solid Core Doors:</u> Comply with the following requirements:

Faces and AWI Grade: Provide faces and grade to match non-rated

doors in same area of building, unless otherwise indicated.

<u>Construction</u>: Manufacturer's standard core construction as required to provide fire-resistance rating indicated. Provide solid wood hardware blocking.

<u>Pairs</u>: Furnish formed steel edges and astragals for pairs of fire-rated doors, unless otherwise indicated.

Provide fire-rated pairs with fire-retardant stiles which are labeled and listed for kinds of applications indicated without formed steel edges and astragals.

LIGHT FRAMES:

<u>Wood Beads for Light Openings in Fire Doors:</u> Manufacturer's standard fire-rated wood-veneer beads matching veneer species of door faces.

FABRICATION:

<u>Fabricate</u> <u>flush wood doors</u> to produce doors complying with following requirements:

In sizes indicated for job-site fitting.

<u>Metal Astragals</u>: Premachine astragals and formed steel edges for hardware where required for pairs of fire-rated doors.

Openings: Cut and trim openings through doors to comply with applicable requirements of referenced standards for kind(s) of doors required.

<u>Light Openings</u>: Trim openings with moldings of material and profile indicated.

SHOP-PRIMING:

Transparent Finish: Shop seal faces and edges of doors for transparent finish with stain (if required) and other required pretreatments and first coat of finish as specified in the following:

Division-9 section "Painting".

PART 3 - EXECUTION

EXAMINATION:

Examine installed door frames prior to hanging door:

Verify that frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with plumb jambs and level heads.

Reject doors with defects.

Do not proceed with installation until unsatisfactory conditions have been corrected.

INSTALLATION:

Hardware: For installation see Division-8 "Finish Hardware"
section of these specifications.

Manufacturer's Instructions: Install wood doors to comply with manufacturer's instructions and of referenced AWI standard and as indicated.

<u>Install fire-rated doors</u> in corresponding fire-rated frames in accordance with requirements of NFPA No. 80.

 Job-Fit Doors: Align and fit doors in frames with uniform clearances and bevels as indicated below; do not trim stiles and rails in excess of limits set by manufacturer or permitted with fire-rated doors. Machine doors for hardware. Seal cut surfaces after fitting and machining.

Fitting Clearances for Non-Rated Doors: Provide 1/8" at jambs and heads; 1/16" per leaf at meeting stiles for pairs of doors; and 1/8" from bottom of door to top of decorative floor finish or covering. Where threshold is shown or scheduled, provide 1/4" clearance from bottom of door to top of threshold.

Fitting Clearances for Fire-Rated Doors: Comply with NFPA

Bevel non-rated doors 1/8" in 2" at lock and hinge edges.

Bevel fire-rated doors 1/8" in 2" in lock edge; trim stiles and rails only to extent permitted by labeling agency.

<u>Field-Finished</u> <u>Doors</u>: Refer to the following for finishing requirements:
Division-9 section "Painting".

Division-9 Section "Painting".

ADJUSTING AND PROTECTION:

Operation: Rehang or replace doors which do not swing or operate freely.

<u>Finished Doors:</u> Refinish or replace doors damaged during installation.

<u>Protect doors</u> as recommended by door manufacturer to assure that wood doors will be without damage or deterioration at time of Substantial Completion.

END OF SECTION 08211

SECTION 08305 - ACCESS DOORS

PART 1 - GENERAL

RELATED DOCUMENTS:

 Drawings and general provisions of Contract, including General and Special Conditions and Division-1 Specification sections, apply to work of this section.

SUMMARY:

Extent, location, and size of each type of access door required are indicated on drawings.

Building-in of anchors and grouting of frames set in masonry construction is specified in Division 4.

Roof hatches are specified in Division 7.

Chute doors are specified in chute assemblies in Division 11.

SUBMITTALS:

<u>Product Data:</u> Submit manufacturer's technical data and installation instructions for each type of access door assembly, including setting drawings, templates, instructions and directions for installation of anchorage devices.

Include complete schedule, including types, general locations, sizes, floor, wall and ceiling construction details, finishes, latching or locking provisions, and other data pertinent to installation.

<u>Verification</u>: Obtain specific locations and sizes for required access doors from trades requiring access to concealed equipment, and indicate on submittal schedule.

<u>Special Size Access Doors:</u> Use where required or requested; indicate on schedule.

QUALITY ASSURANCE:

 Fire-Resistance Ratings: Wherever a fire-resistance classification is indicated, provide access door assembly with panel door, frame, hinge, and latch from manufacturers listed in Underwriters Laboratories, Inc.; "Building Materials Directory" for rating shown.

ACCESS DOORS

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Provide UL label on each fire-rated access door.

 <u>Size Variations</u>: Obtain Architect's acceptance of manufacturer's standard size units which may vary slightly from sizes indicated.

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<u>Coordination</u>: Furnish inserts and anchoring devices which must be built into other work for installation of access doors. Coordinate delivery with other work to avoid delay.

PART 2 - PRODUCTS

MANUFACTURERS:

Manufacturers: Subject to compliance with requirements, provide access doors by one of the following:

Bar-Co., Inc. Bilco Co.

J.L. Industries

Karp Associates, Inc.

Milcor Div.; Inryco, Inc.

Nystrom, Inc.

MATERIALS AND FABRICATION:

General: Furnish each access door assembly manufactured as an integral unit, complete with all parts and ready for installation.

<u>Steel Access Doors and Frames</u>: Fabricate units of continuous welded steel construction, unless otherwise indicated. Grind welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of type required to secure access panels to types of support shown.

Frames: Fabricate from 14-gage steel.

For gypsum drywall or gypsum plaster, furnish perforated frames with drywall bead.

For installation in masonry construction, furnish frames with adjustable metal masonry anchors.

<u>Flush Panel Doors:</u> Fabricate from not less than 14-gage sheet steel, with concealed spring hinges or concealed continuous piano hinge set to open 175 degrees. Finish with manufacturer's factory-applied prime paint.

For fire-rated units, provide manufacturer's standard insulated flush panel/doors, with continuous piano hinge and self-closing mechanism.

 Locking Devices: Furnish flush, screwdriver-operated cam locks of number required to hold door in flush, smooth plane when closed.

PART 3 - EXECUTION

INSTALLATION:

Comply with manufacturer's instructions for installation of access doors.

Coordinate installation with work of other trades.

<u>Set frames</u> accurately in position and securely attach to supports with face panels plumb or level in relation to adjacent finish surfaces.

ADJUST AND CLEAN:

Adjust hardware and panels after installation for proper operation.

Remove and replace panels or frames which are warped, bowed or otherwise damaged.

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END OF SECTION 08305

SECTION 08311 - ICU SLIDING GLASS DOORS

PART 1 - GENERAL

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RELATED DOCUMENTS:

 Drawings and general provisions of Contract, including General and Special Conditions and Division-1 Specification sections, apply to work of this section.

DESCRIPTION OF WORK:

Extent of each type of sliding glass door is indicated on drawings and includes:

Manual sliding entrance units including all accessories and anchors, etc.

All warning and safety devices.

 Install, conneciton, adjustment, testing, and all work required for complete working door systems; except as expressly excluded in the next paragraph.

Glazing: Refer to "Glass and Glazing" section for glazing requirements for sliding glass doors, including those specified to be factory preglazed.

QUALITY ASSURANCE:

Standards: Except as otherwise indicated, requirements for aluminum sliding glass doors and terminology and standards of performance and fabrication workmanship are those specified in AAMA 402.9 and applicable general recommendations published by AAMA, NAAMM, and AA.

<u>Single Source Responsibility:</u> Provide sliding glass doors produced by a single fabricator who is capable of showing prior successful production of units similar to those required.

Performance and Testing:

Except as otherwise indicated, comply with air infiltration test, water resistance tests, and applicable load tests specified in AAMA 402.9 for each type and classification of aluminum sliding door unit required.

<u>Provide</u> <u>certification</u> by manufacturer where standard door units comply with requirements and have been tested in accordance with specified tests; otherwise, perform required tests through a

recognized testing laboratory or agency and provide certified test results.

SUBMITTALS:

<u>Product</u> <u>Data</u>: Submit manufacturer's specifications, standard details, and installation recommendations for each type of sliding glass door unit required.

Include manufacturer's certified test report, indicating that each type of unit has been tested and complies with performance requirements.

Shop Drawings: Submit shop drawings, including wall elevations, typical unit elevations, and full-size details of typical composite members and glazing details.

<u>Samples</u>: Submit samples of each required finish, on 12" long typical door member.

SPECIAL PROJECT WARRANTY:

Submit 2 copies of written warranty signed by Manufacturer, Installer, and Contractor, agreeing to replace sliding glass door units which fail in materials or workmanship within 3 years of acceptance. Failure of materials or workmanship shall include (but not be limited to) excessive leakage or air infiltration, excessive deflections, faulty operation of movable panels, deterioration of finish or construction in excess of normal weathering, and defects in hardware, weatherstripping, and other components of the work.

PART 2 - PRODUCTS

ACCEPTABLE MANUFACTURERS:

 Manufacturer: Subject to compliance with requirements, provide products of one of the following:

ICU Aluminum Sliding Glass Doors:

Gyro-Tech, Inc. Keane-Monroe Corp. Stanley Magic-Door Division

MATERIALS:

Aluminum Extrusions: Alloy and temper recommended by manufacturer for strength, corrosion resistance, and application

of required finish, but not less than 22,000 psi ultimate tensile strength and not less than 0.125" thickness at any location for main frame and panel members.

<u>Fasteners</u>: Aluminum, non-magnetic stainless steel, or other materials warranted by manufacturer to be noncorrosive and compatible with aluminum components of sliding door units.

Do not use exposed fasteners except where unavoidable for application of hardware. Match finish of adjoining metal.

<u>Provide</u> <u>Phillips</u> <u>flat-head</u> <u>machine</u> <u>screws</u> for exposed fasteners.

<u>Sill Configuration</u>: No threshold or track across door opening. Provide surface-mounted roller guide track system at sidelights.

<u>Hardware</u>: Provide hardware items necessary to properly operate, tightly close doors. Do not use aluminum in frictional contact with metal.

Where exposed, provide white bronze, cast or wrought aluminum, solid white-metal with special-coating finish, or non-magnetic stainless steel.

Provide special hospital type pull grips.

Glass and Glazing Materials: Provide safety glazing materials which comply with ANSI 297.1 and with the requirements of "Glass and Glazing" section of these specifications.

FABRICATION:

General: Provide manufacturer's standard fabrication and accessories which comply with indicated standards and are reglazable without dismantling of panel framing. Include complete system for assembly of components and anchorage of door units, and prepare panels for glazing and provide stops, except where factory preglazing is indicated.

<u>Sizes</u> and <u>Profiles</u>: Required sizes for door units and profile requirements are indicated on drawings. Variable dimensions are indicated, together with maximum and minimum dimensions as required to coordinate with other work.

<u>Details</u> shown are based upon standard details of one or more manufacturers. It is intended that similar details by other manufacturers listed will be acceptable, provided they comply with size requirements, profile limitations, and performance standards as indicated or specified.

Coordination of Fabrication: Where possible, check actual door openings in construction by accurate field measurement before

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fabrication, and show recorded mesurements on final shop drawings. However, do not delay construction progress; where necessary, proceed with fabrication without field measurements and coordinate tolerances to ensure proper fit of door units.

Sliding door leaves and sidelite panels shall be of tie rod construction, the full length of the top and bottom rials. glazing stops shall be square edge snap-on type, and contain continuous pre-loaded vinyl glazing bead with no exposed fasteners. Manual sliding entrance doors and sidelites shall be equipped with center muntin bar. Minimum door component dimensions, including glazing stops, shall be: stiles = 2-1/2", top rail = 3-1/2", bottom rail = 4", center muntin = 5". Minimum wall thickness of door components shall be .125".

Sliding door leaves shall be equipped with a panic breakaway device, where noted, concealed within the top of the door. Recessed pulls shall be provided on one side of the opening.

 Each sliding door shall be suspended from a pair of heavy duty steel roller assemblies. The roller assembly shall be 2-7/8" min. diameter with special polyurethane facing, turning on ball bearings for long wear and quiet operation. The track assembly shall be 1/2" min. diameter steel dowel in one continuous piece per sliding door leaf and replaceable without removing the sliding door. The bottom guide for the sliding leaf shall be recessed into the bottom of the adjacent sidelite panel. The guide assembly shall consist of a rubber tire, w/ball-bearings, on the sidelite, engaged into a inverted, recessed channel to the bottom rail of the door. There shall be no floor mounted thresholds, guide tracks, or other door components, for the full width of the opening between jambs, including under the sidelites. Floor finish shall be continuous and un-interrupted for the entire width of the opening with all doors and sidelites in the emergency break away position.

 Assembly: Assemble components into complete weathertight door units with flush, rigid, hairline joints. Mill, cope, butt, and miter joints necessary, and secure by mechanical devices or by other means to ensure permanently watertight joints. Provide at least 2 corrosion resistant pre-lubricated or self-lubricating rollers for each sliding panel, of sufficient capacity to assure easy, quiet, and smooth operation.

Glazing: Where installation will permit, preglaze door units at shop prior to installation. Comply with requirements of "Glass and Glazing" section and standards cited.

OPERATION:

 In normal operation, the sidelites shall be in the closed position and the center panel shall slide to one side (see drawings for direction), providing a minimum 42" clear opening.

pressure is applied in that direction.

The sidelite panels shall be held in the normally closed position by a concealed adjustable catch assembly. Both sidelites and sliding door shall breakaway into the room when

Aluminum Door Finishes: Unless otherwise indicated, provide the

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FINISHES:

following finish on exposed aluminum in door units: 11 12

Special Coating:

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15 Fluoroploymer Coating: Provide the manufacturer's special pigmented 2-coat baked system of 33 percent thermoplastic 16 polymer of vinylidine fluoride (59 percent florine by weight), 17 1.2 mils dry film thickness, medium gloss at 60 deg. in 18 accordance with ASTM D 523. Match the Architect's color sample. 19 20 Comply with requirements of AAMA 605.2.

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PART 3 - EXECUTION

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INSTALLATION:

installations.

fixed panels securely.

with other materials.

Comply with manufacturer's instructions and recommendations for 28 installation of door units, hardware, accessories, and other 29 30 components of work.

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ADJUST AND CLEAN:

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Adjust operating panels and hardware to provide tight fit at contact points and at weatherstripping, for smooth operation and weathertight closure.

Set sill members and other frame members in bed of compound or

with joint fillers and gaskets complying with requirements of "sealants" section of these specifications for weathertight

Set units plumb, level and true to line, without warp or rack of frames or panels. Provide proper support, and anchor frames and

sources of corrosion or electrolytic action at points of contact

Separate aluminum and other corrodible metal surfaces

Adjust doors and sidelites for proper operation at the time of installation.

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Re-adjust doors and sidelites for proper operation after glazing operations are complete.

Return to the site prior to final inspection and make any needed adjustments to insure that all doors and sidelites operate properly.

<u>Clean prefinished door</u> and frame surfaces promptly after installation, exercising care to avoid damage to coatings. Clean glass surfaces after installation, complying with requirements of "Glass and Glazing" section for cleaning and maintenance.

<u>Institute protection</u> required through remainder of construction period, to ensure that sliding glass door units will be without damage or deterioration (other than normal weathering) at time of acceptance.

END OF SECTION 08311

SECTION 08330 - OVERHEAD COILING DOORS

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PART 1 - GENERAL

RELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Special Conditions and Division-1 Specification sections, apply to work of this section.

DESCRIPTION OF WORK:

Extent of overhead coiling doors is shown on the drawings.

Provide complete operating door assemblies including door curtains, guides, counterbalance mechanism, hardware, operators and installation accessories.

Field painting is specified in Division-9.

<u>Electrical connection</u> for powered operators and accessories are specified in Division-16.

QUALITY ASSURANCE:

Furnish each overhead coiling door as a complete unit produced by one manufacturer, including hardware, accessories, mounting and installation components.

Unless otherwise acceptable to Architect, furnish overhead coiling door units by one manufacturer for entire project.

 <u>Insert and Anchorages</u>: Furnish inserts and anchoring devices which must be set in concrete or built into masonry for the installation of the units. Provide setting drawings, templates, instructions and directions for installation of anchorage devices. Coordinate delivery with other work to avoid delay.

See concrete and masonry sections of these specifications for installation of inserts and anchorage devices.

<u>Wind Loading:</u> Design and reinforce overhead coiling doors to withstand a 30 lb. per sq. ft. wind loading pressure unless otherwise indicated.

SUBMITTALS:

<u>Product Data:</u> Submit manufacturer's product data, roughing-in diagrams, and installation instructions for each type and size

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of overhead coiling door. Provide operating instructions and maintenance information, and complete information describing fire release system including electrical rough-in instructions.

Shop Drawings: Submit shop drawings for special components and installations which are not fully dimensioned or detailed on manufacturers data sheets.

PART 2 - PRODUCTS

ACCEPTABLE MANUFACTURERS:

Manufacturer: Subject to compliance with requirements, provide products of one of the following:

Apton Door, Div. of the Union Corp.

Atlas Door Corp.

The Cookson Co.

Cornell Iron Works Inc.

Dynamic Closures Corp.

Kinnear Div., Harsco Corp.

Mahon Rolling Door Div., RCM Corp.

North American Door, Div. of Jim Walters.

Overhead Door Corp.

Southwestern Steel Rolling Door Co.

J. G. Wilson Corp.

Windsor Door Co., Div. Ceco Corp.

DOOR CURTAIN MATERIALS AND CONSTRUCTION:

<u>Door Curtain</u>: Fabricate overhead coiling door curtain of double insulated interlocking slats designed to withstand required wind loading, of continuous length for width of door without splices. Unless otherwise indicated, provide slats of material gage recommended by door manufacturer for size and type of door required, and as follows:

 <u>Steel Door Curtain Slats</u>: Structural quality, cold-rolled galvanized steel sheets complying with ASTM A 446, Grade A, with G90 zinc coating, complying with ASTM A 525, and phosphate treated before fabrication.

Furnish manufacturer's standard "flat-face" slats.

Insulation: 3/4" Polyurethane

Endlocks: Malleable iron castings galvanized after fabrication, secured to curtain slats with galvanized rivets. Provide locks on alternate curtain slats for curtain alignment and resistance against lateral movement.

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<u>Windlocks</u>: Malleable iron castings secured to curtain slats with galvanized rivets. Unless otherwise recommended by door manufacturer, provide windlocks on doors exceeding 16' wide. Space windlocks approximately 24" o.c. on both edges of curtain.

Bottom Bar: Consisting of 2 angles, each not less than 1-1/2" x 1-1/2" x 1/8" thick, either galvanized or stainless steel or aluminum extrusions to suit type of curtain slats.

<u>Curtain Jamb Guides</u>: Fabricate curtain jamb guides of steel angles, or channels and angles with sufficient depth and strength to retain curtain loading. Build-up units with minimum 3/16" thick steel sections, galvanized after fabrication. Slot bolt holes for track adjustment.

 Secure continuous wall angle to wall framing by 3/8" minimum bolts at not more than 30" o.c., unless closer spacing recommended by door manufacturer. Extend wall angles above door opening head to support coil brackets, unless otherwise indicated. Place anchor bolts on exterior wall guides so they are concealed when door is in closed position. Provide removable stops on guides to prevent over-travel of curtain, and continuous bar for holding windlocks.

 <u>Weather Seals:</u> Provide vinyl or neoprene weatherstripping for exterior exposed doors except where otherwise indicated. At door heads, use 1/8" thick continuous sheet secured to inside of curtain coil hood. At door jambs, use 1/8" thick continuous trip secured to exterior side of jamb guide.

COUNTERBALANCING MECHANISM:

Counterbalance doors by means of adjustable steel helical torsion spring, mounted around a steel shaft and mounted in a spring barrel and connected to the door curtain with the required barrel rings. Use grease-sealed bearings or self-lubricating graphite bearings for rotating members.

 Counterbalance Barrel: Fabricate spring barrel of hot-formed structural quality carbon steel, welded or seamless pipe, of sufficient diameter and wall thickness to support roll-up of curtain without distortion of slats and limit barrel deflection to not more than 0.03" per ft. of span under full load.

Provide spring balance of one or more oil-tempered, heat-treated steel helical torsion springs. Size springs to counterbalance weight of curtain, with uniform adjustment accessible from outside barrel. Provide cast steel barrel plugs to secure ends of springs to barrel and shaft.

 Fabricate torsion rod for counterbalance shaft of case-hardened steel, of required size to hold fixed spring ends and carry torsional load.

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PAINTING:

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54 Door Operator Type:

limit-switch

auxiliary operator.

OVERHEAD COILING DOORS

Provide wall or bracket-mounted door

affecting

Provide mounting brackets of manufacturer's standard design, either cast iron or cold-rolled steel plate with bell mouth guide groove for curtain.

Form to entirely enclose coiled curtain and operating Hood: mechanism at opening head, and act as weather seal. Contour to suit end brackets to which hood is attached. Roll and reinforce top and bottom edges for stiffness. Provide closed ends for surface-mounted hoods, and any portion of between-jamb mounting projecting beyond wall face. Provide intermediate support brackets as required to prevent sag.

Fabricate steel hoods for doors of not less than 24 gage hotdip galvanized steel sheet with G 90 zinc coating, complying with ASTM A 525. Phosphate treat before fabrication.

Shop clean and prime ferrous metal surfaces, exposed and unexposed, except faying and lubricated surfaces and galvanized metal, with door manufacturer's standard rust inhibitive primer.

Shop clean and prime ferrous metal and galvanized surfaces, exposed and unexposed, except faying and lubricated surfaces, with door manufacturer's standard rust inhibitive primer.

Finish Paint: Provide baked-enamel finish. Color to match Architect's sample.

ELECTRIC DOOR OPERATORS:

General: Furnish electric door operator assembly of size and capacity recommended and provided by door manufacturer; complete with electric motor and factory-prewired motor controls, gear reduction unit, solenoid operated brake, remote stations, control devices, conduit and wiring from controls to motor and central stations, and accessories required for proper operation.

Provide hand-operated disconnect or mechanism a automatically engaging a sprocket and chain operator and releasing brake for emergency manual operation. disconnect and operator so they are accessible from floor level. Include interlock device to automatically prevent motor from operating when emergency operator is engaged.

Design operator so that motor may be removed without disturbing

adjustment and without

operator units consisting of electric motor, worm gear drive from motor to reduction gear box, chain or worm gear drive from reduction box to gear wheel mounted on counterbalance shaft, and a disconnect-release for manual operation. Provide motor and disconnect-release for manual operation. Provide motor and drive assembly of horsepower and design as determined by door manufacturer for size of door required.

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Electric Motors: Provide high-starting torque, reversible, constant duty, Class A insulated electric motors with overload protection, sized to move door in either direction, from any position, at not less than 2/3' nor more than 1' per second.

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Coordinate wiring requirements and current characteristics of motors with building electrical system.

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Furnish open-drip-proof type motor and controller with NEMA Type I enclosure.

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Furnish totally enclosed, nonventilated type motors, fitted with plugged drain, and controller with NEMA Type 4 enclosure, for exterior applications and where indicated.

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Provide momentary-contact, 3-button Remote Control Station: control station with push button controls labeled "open", "close" and "stop".

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Provide interior units, full-guarded, surface-mounted, heavyduty, with general purpose NEMA Type 1 enclosure.

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34 35 Automatic Reversing Control: Furnish each door with automatic safety switch, extending full width of door bottom, and located within neoprene or rubber astragal mounted to bottom door rail. Contact with switch before fully closing will immediately stop downward travel and reverse direction to fully opened position. Connect to control circuit through retracting safety cord and reel, or self-coiling cable.

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Provide electrically actuated automatic bottom bar.

PART 3 - EXECUTION

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INSTALLATION:

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Install door and operating equipment complete with necessary hardware, jamb and head mold strips, anchors, inserts, hangers, and equipment supports in accordance with final shop drawings, manufacturer's instructions, and as specified herein.

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Upon completion of installation including work by other trades, lubricate, test and adjust doors to operate easily, free from warp, twist or distortion and fitting weathertight for entire

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perimeter.

END OF SECTION 08330

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SECTION 08350 - FOLDING DOORS AND PARTITIONS

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PART 1 - GENERAL

RELATED DOCUMENTS:

 Drawings and general provisions of Contract, including General and Special Conditions and Division-1 Specification sections, apply to work of this section.

DESCRIPTION OF WORK:

<u>Extent</u> of folding doors and partitions is indicated on drawings and in schedules. Types of folding doors and partitions required include the following:

Fabric folding partitions

QUALITY ASSURANCE:

<u>Installer Qualifications:</u> Firm with not less than 3 years of successful experience in installation of units similar to those required for this project and which is acceptable to or licensed by manufacturer of folding doors and partitions.

Sound Transmission Classification (STC): Where shown, provide folding partition units capable of achieving STC rating of 36 minimum, when tested in accordance with procedures of ASTM E90.

Flame Spread Rating: Use only facing materials which have a Flame Spread Rating of 25 or less when tested in accordance with ASTM E84.

SUBMITTALS:

<u>Product Data:</u> Submit manufacturer's technical product data and installation instructions for each type of folding door and partition.

Shop Drawings: Submit shop drawings for fabrication and erection, including plans, elevations, large scale details, anchorages, and accessory items. Provide location template drawings for items supported or anchored to permanent construction, if required.

51 <u>Samples</u>: Submit full range of samples for color and texture 52 selection, 2 verification samples, 6" x 6", of each color and 53 finish selected.

laboratories for the following:

Certifications:

STC Rating.

Flame Spread Classification.

PART 2 - PRODUCTS

ACCEPTABLE MANUFACTURERS:

<u>Manufacturer</u>: Subject to compliance with requirements, provide products of one of the following:

Suibmit certifications by independent testing

Holcomb and Hoke Mfg. Co., Inc.

Hough Mfg. Co.

Modernfold Div./American Standard Co.

FABRIC FOLDING DOORS AND PARTITIONS:

General Description: Top supported, manually-operated full pantograph or "X"-accordion type fold, fabric covered panels with automatic air release venting for ease of operation.

Folding Mechanism: Not less than 16-gage galvanized or cadmium plated steel hinge plates with nonremovable case-hardened steel recommended by manufacturer, connected vertically by welded steel rods.

<u>Lead Posts and Jamb Posts</u>: Not less than 18-gage steel for units up to 10' high, and not less than 14-gage steel for units over 10' high, formed to provide rigidity and light seal at supporting construction.

<u>Carriers</u>: 4-wheel carriers at lead post and 2-wheel carrers at intermediate spacing as necessary for size and weight of partition, to assure secure, easy, and quiet operation.

All Units: ball bearing wheels with nylon tread and steel shafts.

 Outer Covering: Single-ply vinyl coated cotton drill or glass fabric or laminated covering which is flame-resistant and peel, craze, crack, and fade-resistant. Attach covering to support frame in concealed manner at sufficient intervals to prevent sagging and separation and to permit on-site removal and repair. Locate vertical seams in valleys, and provide turned hems at top and bottom of fabric.

Acoustical Construction: Manufacturer's standard construction

to meet STC rating indicated. Include perimeter seal sweep strips for each side, top and bottom, providing continuous contact with head and sill surfaces for positive light and sound seal. Provide manufacturers standard male-and-female sound and light seal at lead and back jamb posts.

Tracks: Manufacturer's standard extruded aluminum or steel track with factory-applied corrosion-resistant finish. Provide size of track to properly support operation without damage to track, folding unit, or adjacent surfaces.

Provide center stop for bi-parting partitions.

Provide track switches as shown on drawings.

Provide galvanized sheet steel or aluminum subchannel for forming pocket for recessed suspension track.

 Provide metal ceiling contact guard to protect finish ceiling surface from damage by moving perimeter seals. Finish to match other exposed metal.

<u>Hardware</u>: Manufacturer's standard heavy duty manual operated metal pulls and latches in anodized aluminum, white bronze, stainless steel in satin finish, or brass or steel in dull chromium finish.

Provide latch operable from both sides of closed partition.

Provide non-ferrous jamb strip for single-operating partitions, to assure tight closure by engaging rubber bumper on lead post.

Provide center-meeting molding or strike for bi-parting partitions.

Provide pendant pull near top of lead post in addition to standard pull for units over 9' high.

Provide foot bolts on lead post where indicated. Secure to post to avoid interference with seals.

PART 3 - EXECUTION

INSTALLATION:

 General: Comply with manufacturer's recommended installation procedures, unless more stringent requirements are indicated elsewhere. Drill and tap as necessary and securely anchor track and accessories in accurate location. Install track in lengths as long as practicable, with flush, hairline joints.

<u>Standard</u> <u>Clearances</u>: Install units which are not acoustically rated to meet the following:

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Floor: 1/4" to 5/8" max. (above floor finish).

Vertical Joints: Flush, light-tight.

Acoustical Units: Install units with STC rating so that seals are in contact with entire perimeter when unit is in closed position, forming completely light-tight barrier.

ADJUSTMENTS:

 Adjust units as necessary to assure smooth, quiet operation without warping or binding. Check and readjust operating hardware so that latches engage accurately to assure smooth, quiet operation and binding.

END OF SECTION 08350

SECTION 08410 - ALUMINUM ENTRANCES AND STOREFRONTS

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PART 1 - GENERAL

RELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Special Conditions and Division-1 Specification sections, apply to work of this section.

SUMMARY:

<u>Extent</u> of aluminum entrances and storefronts is indicated on drawings and schedules.

Aluminum entrances and storefront types required for the project include:

Storefront type framing system.

Glazing: Refer to "Glass and Glazing" section of Division 8 for glazing requirements for aluminum entrances and storefronts, including doors specified to be factory-preglazed.

Aluminum Framed Skylight Systems are specified in Section 07700 - Roof Specialties and Accessories.

Automatic entrance doors are specified elsewhere in Division 8.

Slope Glazed Framing systems are specified elsewhere in Division 8.

<u>Lock cylinders</u> are specified in the Section 08710 - Finish Hardware.

SYSTEM DESCRIPTION:

<u>Performance Requirements:</u> Provide aluminum entrance and storefront assemblies that comply with specified performance characteristics. Each system shall be tested by a recognized testing laboratory or agency in accordance with specified test methods. Provide certified test results.

Thermal Movement: Provide systems capable of withstanding thermal movements resulting from an ambient temperature range of 120 deg. F (67 deg. C), that could cause a metal surface temperature range of 180 deg. F (100 deg. C) within the framing system.

Wind Loading: Provide assemblies capable of withstanding a uniform test pressure of 20 psf inward and 20 psf outward when tested in accordance with ASTM E 330.

Fixed Framing Transmission Characteristics: Provide aluminum

entrance and storefront framing system that complies with

requirements indicated for transmission characteristics.

 Air Infiltration: Provide framing system with an air infiltration rate of not more than 0.06 CFM per sq. ft. of fixed area (excluding operable door edges) when tested in accordance with ASTM E 283 at an inward test pressure

<u>Water Penetration</u>: Provide framing system with no water penetration (excluding operable door edges) as defined in the test method when tested in accordance with ASTM E 331 at an inward test pressure differential of 6.24 lbf. per sq. ft.

 Condensation Resistance: Where framing systems are "thermal-break" construction, provide units tested for thermal performance in accordance with AAMA 1502 showing condensation resistance factor (CRF) of not less than 45.

Thermal Transmittance: Provide framing systems that have an overall U-value of not more than 0.65 BTU/(hr. x sq. ft. x deg. F) at 15 mph exterior wind velocity when tested in accordance with AAMA 1503.

SUBMITTALS:

<u>Product Data:</u> Submit manufacturer's product specifications, technical product data, standard details, and installation recommendations for each type of entrance and storefront product required. Include the following information:

Fabrication methods.

differential of 6.24 psf.

Finishing.

Hardware.

Accessories.

Shop Drawings: Submit shop drawings for fabrication and installation of entrances and storefronts, including the following:

Elevations.

Detail sections of typical composite members.

Hardware, mounting heights.

Anchorages and reinforcements.

Expansion provisions.

Glazing details.

<u>Certification</u>: Provide certified test results showing that entrance and storefront systems have been tested by a recognized testing laboratory or agency and comply with specified performance characteristics.

QUALITY ASSURANCE:

<u>Single Source</u> Responsibility: Provide entrance and storefront produced by a single manufacturer capable of showing prior production of units similar to those required.

Manufacturer's Qualifications: Provide entrances and storefront produced by a single manufacturer with not less than 5 years successful experience in the fabrication of assemblies of the type and quality required.

<u>Installer's Qualifications</u>: Entrances and storefront shall be installed by a firm that has not less than 5-years successful experience in the installation of systems similar to those required.

<u>Design</u> <u>Criteria</u>: Drawings are based on one manufacturer's entrance and storefront system. Another manufacturer's system of a similar and equivalent nature will be acceptable when, in the Architect's sole judgement, differences do not materially detract from the design concept or intended performance.

PROJECT CONDITIONS:

Field Measurements: Check openings by field measurement before fabrication to ensure proper fitting of work; show measurements on final shop drawings. Coordinate fabrication schedule with construction progress to avoid delay in the work. Where necessary, proceed with fabrication without field measurement, and coordinate fabrication tolerances to ensure proper fit.

WARRANTY:

Special Product Warranty: Submit a written warranty, executed by the Contractor, Installer and Manufacturer, agreeing to repair or replace units (including reglazing) which fail in materials or workmanship within the specified warranty period. Failures include, but are not necessarily limited to structural failures including excessive deflection, excessive leakage or air infiltration, faulty operation, and deterioration of metals, metal finishes and other materials beyond normal weathering. This warranty shall be in addition to and not a limitation of other rights the Owner may have against the Contractor under the Contract Documents.

Warranty period for aluminum entrances and storefront is 3

years after the date of substantial completion.

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PART 2 - PRODUCTS

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MANUFACTURERS:

Subject to compliance with requirements, provide Manufacturer: products of one of the following:

Hordis Brothers, Pennsauken, NJ Kawneer Company, Inc., Norcross, GA Wausau Metals, Wausau, WI

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MATERIALS:

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Aluminum Members: Provide alloy and temper recommended by the manufacturer for strength, corrosion resistance, and application of required finish; comply with ASTM B 221 for extrusions and ASTM B 209 for sheet or plate.

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Fasteners: Provide fasteners of aluminum, nonmagnetic stainless steel, or other materials warranted by the manufacturer to be noncorrosive and compatible with aluminum components, hardware, anchors and other components.

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Where fasteners screw-anchor into aluminum Reinforcement: less than 0.125" thick, reinforce the interior with aluminum or nonmagnetic stainless steel to receive screw threads, or provide standard noncorrosive pressed-in splined grommet nuts.

Except where unavoidable for application Exposed Fasteners: for hardware, do not use exposed fasteners. application of hardware, use fasteners that match the finish of member or hardware being fastened.

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> Provide Phillips flat-head machine screws for exposed fasteners.

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Concealed Flashing: Provide 26 gage minimum dead-soft stainless steel, or 0.026" minimum extruded aluminum of alloy and type by manufacturer for selected compatibility with other components.

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Brackets and Reinforcements: Where feasible, provide highaluminum brackets and reinforcements; otherwise provide nonmagnetic stainless steel or hot-dip galvanized steel complying with ASTM A 386.

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Concrete/Masonry Inserts: Provide concrete and masonry inserts fabricated from cast-iron, malleable iron, or hot-dip galvanized

steel complying with ASTM A 386.

Compression Weatherstripping: Provide the manufacturer's standard replaceable compressible weatherstripping gaskets of molded neoprene complying with ASTM D 2000 or molded PVC complying with ASTM D 2287.

<u>Glass and Glazing Materials</u>: Glass and glazing materials shall comply with requirements of "Glass and Glazing" section of these specifications.

Glazing Panels: Provide the manufacturer's flush-laminated panels of thickness indicated, fabricated with resin-impregnated Kraft paper honeycomb or rigid closed-cell urethane core, laminated with waterproof glue between two sheets of aluminum.

COMPONENTS:

 Storefront Framing System: Provide inside-outside matched resilient flush-glazed storefront framing system with provisions for glass replacement. Shop-fabricate and preassemble frame components where possible.

Thermal-Break Construction: Fabricate storefront framing system with integrally concealed, low conductance thermal barrier, located between exterior materials and exposed interior members to eliminate direct metal-to-metal contact. Use manufacturer's standard construction that has been in use for similar projects for period of not less than 3 years.

FABRICATION:

General: Sizes of frame units, and profile requirements, are indicated on drawings. Variable dimensions are indicated, with maximum and minimum dimensions required to achieve design requirements and coordination with other work.

<u>Prefabrication</u>: Before shipment to the project site, complete fabrication, assembly, finishing, and other work to the greatest extent possible. Disassemble components only as necessary for shipment and installation.

Do not drill and tap for surface-mounted hardware items until time of installation of project site.

<u>Perform fabrication</u> operations, including cutting, fitting, forming, drilling and grinding of metal work to prevent damage to exposed finish surfaces. For hardware, perform these operations prior to application of finishes.

<u>Welding</u>: Comply with AWS recommendations; grind exposed welds smooth and restore mechanical finish.

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Reinforcing: Install reinforcing as required for hardware and necessary for performance requirements, sag resistance and rigidity.

Dissimilar Metals: Separate dissimilar metals with zinc

chromate primer, bituminous paint, or other separator that will prevent corrosion.

 <u>Continuity</u>: Maintain accurate relation of planes and angles, with hairline fit of contacting members.

<u>Uniformity of Finish:</u> Abutting extruded aluminum members shall not have an integral color or texture variation greater than half the range indicated in the sample pair submittal.

Fasteners: Conceal fasteners wherever possible.

FINISHES:

Color Anodized Finish: Provide NAAMM AA-M12C22A41/A44, Class I (non-specular as fabricated mechanical finish; chemical etch, medium matte; minimum thickness 0.7 mil) integrally or electrolytically deposited colored anodic coating.

<u>Color</u>: Provide color matching Architect's dark bronze sample.

PART 3 - EXECUTION

INSTALLATION:

Comply with manufacturer's instructions and recommendations for installation.

<u>Set units plumb</u>, level, and true to line, without warp or rack of framing members, doors, or panels. Provide proper support and anchor securely in place.

Separate aluminum and other corrodible metal surfaces from sources of corrosion of electrolytic action at points of contact with other materials. Comply with requirements specified under paragraph "Dissimilar Materials" in the Appendix to AAMA 101-85.

<u>Drill and tap</u> frames and doors and apply surface-mounted hardware items. Comply with hardware manufacturer's instructions and template requirements. Use concealed fasteners wherever possible.

<u>Set sill members</u> and other members in bed of sealant as indicated, or with joint fillers or gaskets as indicated to provide weathertight construction. Comply with requirements of Division 7 for sealant, fillers, and gaskets.

Refer to "Glass and Glazing" section of Division 8 for installation of glass and other panels indicated to be glazed into doors and framing, and not preglazed by manufacturer.

ADJUSTING:

Adjust operating hardware to function properly, for smooth operation without binding, and for weathertight closure.

CLEANING:

<u>Clean</u> the <u>completed</u> <u>system</u>, inside and out, promptly after installation, exercising care to avoid damage to coatings.

Clean glass surfaces after installation, complying with requirements contained in the "Glass and Glazing" section for cleaning and maintenance. Remove excess glazing and sealant compounds, dirt and other substances from aluminum surfaces.

PROTECTION:

<u>Institute protective measures</u> required throughout the remainder of the construction period to ensure that aluminum entrances and storefronts will be without damage or deterioration, other than normal weathering, at time of acceptance.

END OF SECTION 08410

SECTION 08460 - AUTOMATIC ENTRANCE DOORS

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PART 1 - GENERAL

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RELATED DOCUMENTS:

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Drawings and general provisions of Contract, including General and Special Conditions and Division-1 Specification sections, apply to work of this section.

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SUMMARY:

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Extent and configuration of automatic entrance doors is indicated on drawings and schedules and includes:

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Automatic sliding entrance doors, including all accessories controls, switches, and anchors, etc.

21 22 Key switches with removable core GGMK lock cylinders.

Remote control equipment for designated doors.

23 24 All warning and safety devices.

25 26 All actuating devices, mats, press plates, motion detectors. Installation, connection, adjustment, testing, and all work required for complete working door systems.

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Types of automatic entrance door include operations the following:

29 30 31

Single sliding. Bi-parting sliding.

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Glass and glazing is specified elsewhere in Division-8.

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Electrical connections are specified in Division 16.

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SYSTEM DESCRIPTION:

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44 45 Performance Requirements: Provide exterior automatic entrance door assemblies that have been designed and fabricated to comply with performance requirements specified. Each system shall be tested by a recognized testing laboratory or agency accordance with specified test methods. Provide certified test results.

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Provide systems capable of withstanding Thermal Movement: thermal movements resulting from an ambient temperature range of 120 deg. F (67 deg. C).

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Provide assemblies capable of withstanding a Wind Loading: uniform test pressure of 20 psf inward and 20 psf outward when tested in accordance with ASTM E 330.

Transmission Characteristics: Provide automatic entrance doors with jamb and head frames that have air infiltration rate per linear foot of perimeter crack of operating panels of not more than 11 CFM when tested in accordance with ASTM E 283 at an inward pressure differential of 1.567 psf.

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SUBMITTALS:

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Product Data: Submit manufacturer's product data, standard details, and installation recommendations for each type of automatic entrance door required. Include the following:

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Fabrication methods.

Finishing.

Hardware and operators.

Roughing-in and wiring diagrams.

Parts lists.

Accessories and other components.

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Shop Drawings: Submit large scale shop drawings for fabrication and installation of automatic entrance doors and associated components not included in manufacturer's product data. the following:

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Elevations.

Hardware.

Anchors and reinforcements.

Expansion provisions.

Glazing details.

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Templates and Diagrams: Furnish templates, diagrams and other data to fabricators and installers of related work, as necessary for coordination of the automatic entrance door installation.

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Samples: Submit samples of each required aluminum finish, on 12" long sections of extrusions and 6" squares of sheet/plate. Where color and texture variations are anticipated, include 2 or more units in each set of samples indicating the limits of variations.

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Maintenance Data: Submit manufacturer's maintenance and service data, including the name, address and telephone number of the nearest authorized service representative.

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Certification: Provide certified test results showing that the automatic entrance door systems have been tested by a recognized testing laboratory or agency and comply with specified performance characteristics.

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QUALITY ASSURANCE:

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<u>Single Source</u> <u>Responsibility</u>: Provide automatic entrance doors produced by a single manufacturer capable of showing prior production of doors similar to those required.

Manufacturer's Qualifications: Provide automatic entrance doors produced by a single manufacturer with not less than 5 years successful experience in the fabrication of doors of the type and quality required.

<u>Installer's Qualifications</u>: Engage an Installer who is an authorized representative of the automatic entrance door manufacturer for both the installation and maintenance of the type of units required for the project.

Experience: The installer shall have not less than 3 years experience in the installation and service of the automatic entrance door assemblies manufactured for this project.

<u>Maintenance</u> <u>Proximity</u>: The installer shall maintain offices and repair or service facilities not more than 2 hours normal travel time from the project site.

<u>Design Criteria</u>: The drawings indicate spacing of members, sizes, profiles and dimensions required. Minor deviations will be accepted in order to utilize manufacturer's standard products when, in the Architect's sole judgement, such deviations do not materially detract from design concept or intended performance.

BHMA Standard: Automatic entrance doors shall comply with applicable requirements of ANSI A156.10 (BHMA 1601), Power Operated Pedestrian Door Standard.

<u>UL Standard:</u> Powered door operators shall comply with UL 325, Electric Door, Drapery, Gate, Louver and Window Operators and Systems.

Emergency Exit Doors: Automatic entrance doors serving as a required means of egress shall comply with requirements of authorities having jurisdiction. Provide manufacturer's certification that doors comply with these requirements.

PROJECT CONDITIONS:

 Field Measurements: Check openings by field measurement before fabrication to ensure proper fitting of work; show measurements on final shop drawings. Coordinate fabrication schedule with construction progress to avoid delay of work. Where necessary, proceed with fabrication without measurements, and coordinate fabrication tolerances to ensure proper fit.

PART 2 - PRODUCTS

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MANUFACTURERS:

Manufacturer: Subject to compliance with requirements, provide automatic entrance doors of one of the following:

Electro-Mechanical Operated Sliding Units:

Besam Inc.

Dor-O-Matic Division of Republic Industries, Inc.

Gyro-Tech, Inc.

Horton Automatics Division of Overhead Door Corp.

Keane Monroe Corp.

Stanley Magic-Door Division of the Stanley Works.

MATERIALS:

Aluminum Extrusions: Provide alloy and temper recommended by the producer or finisher for type of use and finish indicated, and with not less than the strength and durability properties specified in ASTM B 221 for 6063-T5. Provide main extrusions of not less than 0.125" wall thickness.

Provide extruded glazing stops and other applied trim extrusions with minimum wall thickness of 0.062".

 <u>Aluminum</u> <u>Sheets</u>: Provide alloy and temper recommended by the producer or finisher for type of use and finish indicated, and with not less than the strength and durability properties specified in ASTM B 209 for 5005-H15.

<u>Fasteners</u>: Provide aluminum, nonmagnetic stainless steel, or other noncorrosive metal fasteners compatible with aluminum components, hardware, anchors and other items being fastened.

Exposed Fasteners: Except where unavoidable for application of hardware, do not use exposed fasteners. For the application of hardware, use fasteners that match the finish of the member or hardware being fastened.

For exposed fasteners provide Phillips flat-head screws with finish matching item fastened.

 <u>Steel Reinforcement and Brackets:</u> Provide manufacturer's standard steel reinforcement and brackets with 2.0 oz. hot-dip zinc coating complying with ASTM A 123. Apply after fabrication.

Sliding Weatherstripping: Provide replaceable weatherstripping of wool, polypropylene or nylon woven pile, with nylon fabric and aluminum strip backing. Sliding weatherstripping includes

stripping at jamb rails, head rails and meeting rails, wherever there is no stop or lap to receive compression weatherstripping.

 <u>Sealants</u> and <u>Gaskets</u>: Use sealants and gaskets in fabrication, assembly and installation of the work, that are recommended and guaranteed by manufacturer to remain permanently elastic, non-shrinking, and nonmigrating.

Refer to Division-7 sections for sealants and gaskets required for installation of door units at the project site.

Glazing Materials: Refer to other Division-8 sections for gaskets and sealants required for glass installation at the project site.

HARDWARE:

<u>Provide</u> the <u>door</u> <u>manufacturer's</u> <u>standard</u> heavy-duty hardware units as indicated, scheduled or required for operation of each door, including the following items, of sizes, number, and type recommended by the manufacturer for service indicated.

<u>Deadlock</u>: Provide hookbolt deadlocks for sliding entrance doors accepting standard mortise cylinder.

Provide two-point latching action with deadbolt into stile of opposing sliding panel and bottom bolt into threshold.

<u>Install</u> <u>hardware</u>, except surface-mounted hardware, at the fabrication plant. Remove only as required for final finishing operation, and for delivery and installation of the work at the project site.

DOOR OPERATORS:

<u>Capacity</u>: Provide operators of the size recommended by the manufacturer for door size, weight, and movement, for condition of exposure, and for long-term maintenance-free operation under normal traffic load for the type of occupancy indicated.

Exposed Housing: Provide extruded or formed aluminum housing for operators, minimum 0.062" thick, with fasteners concealed when door is in the closed position. Provide access for maintenance.

Adjustment Features: Provide operators that are fully adjustable without removal of the doors. Provide adjustment for opening, closing and checking speeds, as well as length of time door remains open.

Electro-Mechanical Operators for Sliding Doors: Provide self-contained, concealed overhead electro-mechanical drive unit,

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with power opening and either power or spring closing, and checking for both opening and closing cycles. Provide connections for power and control wiring. Provide safety release clutch for obstructed closing. Provide for easy manual sliding when power is off.

Operator Action: Provide operator action as indicated by door symbol on the drawings.

Provide emergency breakaway swing feature.

DOOR OPERATOR CONTROL SYSTEMS:

Floor Mat Control Panels: Provide floor mat control panels intended for either sliding or single-acting swing door control, with "Opening" section and "Safety" section switches. Provide mat of sizes indicated, but not smaller than required by ANSI A156.10. Provide pressure switches for low-voltage control wiring.

<u>Mat</u>: Provide the manufacturer's standard 1/2" thick sythetic rubber or flexible plastic floor mat in safety ribbed surface pattern, color as selected by the Architect.

Recessed Mat Frame: Provide extruded aluminum mat frame recessed to fit flush with the floor; provide the manufacturer's standard concealed anchorage.

Micro-wave Scanner Motion Detecting Control System: Provide self-contained motion-detecting control system composed of micro-wave scanner sensing device to activate door operator and horizontal photo-cell beam across door opening to prevent door from closing until door is clear of traffic. Sensing device shall be adjustable to provide detection patterns and sensitivity equivalent to those required for mats. Provide housing for sensing device finished to match finish of doors and frames.

Install scanners on both interior and exterior of each automatic sliding entrance door.

Infra-red Motion Detecting Control System: Provide self-contained motion-detecting control system composed of an infra-red sensing device to activate door operator and horizontal photo-cell beam across door opening to prevent door from closing until door is clear of traffic. Sensing device shall be adjustable to provide detection patterns and sensitivity equivalent to those required for mats. Provide housing for sensing device finished to match finish of doors and frames.

Install scanners on both interior and exterior of each automatic sliding entrance door.

Electrical Interlocks: Wherever feasible, provide electrical interlocks to prevent operation of the unit when operation of the door is prevented by lock and latch or door bolts, unless units are equipped with self-protected devices or circuits.

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The opening cycle of sliding doors shall be initiated by motion detector or press plate switches (as specified in section 2.2.8). Door shall hold-open for field adjustable time delay period. If a person or object is in the closing path of the doors, the closing cycle will not commence or the doors will reverse to the full open position. Doors and sidelites, where indicated on the plans by a dotted line, shall breakaway in the direction of egress for emergency use.

Door #2 shall be operated remotely from Nurses Station HAE016 and when in the closed position shall be electrically locked to prevent forced entry.

Door #4 shall have a wall-mounted mode selector switch to disable outside actuator devices during secure hours. During secure hours, doors shall be electrically locked to prevent forced entry.

Door #5 shall have a desk mounted remote control/mode selector station at HAE001A. During secure mode all actuating devices, except inside jamb switch and remote control are disabled and doors are electrically locked to prevent forced entry.

Doors #4, 23, 4004, 4005 shall have redundant actuating systems.

Door #4004 shall be normally secure, all hours, from the Hospital side to prevent unauthorized personnel from gaining access to the heliport.

All doors shall be equipped with off/on/hold-open switches. Switches shall be accessible, but not exposed. On secure doors, switch shall be located so as not to compromise security.

All doors shall be designed, equipped, and installed in such a manner as to never compromise occupant safety or interfere with necessary hospital operations.

Sliding Door Opening Width Control Switch: Provide a two-position switch which, in the normal position, allows sliding doors to travel to full opening width and, in the alternate position, reduces the opening to a selected partial opening width.

ACTUATION:

<u>Wall Mounted Press Plates:</u> Wall mounted press plates shall be

4-1/2" x 4-1/2" wrought stainless steel back plate with 4" x 4" wrought stainless steel touch pad. Edges of both plates shall be rolled to return to the wall. Flat plates with sharp or square edges will not be allowed. Press plates shall mount in a single gang box. Projection shall not exceed 5/8". Where indicated, in section 2.2.8, wall press plates shall be flush type (projection 1/8" or less). Backplate shall be 4-1/2" x 4-1/2" stainless steel and touch pad shall be 2" x 3" black anodized aluminum.

Jamb Mounted Press Plates: Jamb mounted press plates shall be 1-3/4" x 4-1/2" (max) stainless steel backplate with square pushbutton.

Push Button Keypad: Keypad shall be 12 button, field programmalbe, flush mounted with brushed aluminum trim plate. Red and green LED's shall be provided on the keypad to indicated door status (secure/insecure). Unit shall provide up to 95,000 user programmable operate codes with power failure protection to retain memory. Output shall be SPST, 4 amp, momentary.

Remote Controls: Provide desk mounted slope front controls for doors specified to have remote control.

Mode Switches: At Door #4, provide a wall mounted keyswitch to change the door actuating devices to secure mode.

At Door #5, provide a desk mounted slope front key switch to change the door actuating devices to secure mode.

All keyswitches shall be equipped with Yale removeable core, 7-pin masterkeyed cylinders.

SCHEDULE OF ACTUATING DEVICES

37	DOOR #	OUTSIDE	INSIDE ACTUATING DEVICE
38			
39	2	remote control	1 - wall press pl
40	3	K-M 830 sensor	K-M 890
41	4	K-M 830 & jamb press pl	K-M 890 & wall press pl
42	5	K-M 890	K-M 830 & jamb press pl
43	23	K-M 890 & wall press pl	K-M 890 & jamb press pl
44			
45	2005	1-flush wall press pl	1 - wall press pl
46	2050	2-wall press pl	recessed floor mat
47			
48	4004	K-M 890 & jamb press pl	1 - push-button keypad
49	4005	K-M 890 & jamb press pl	
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ACCESSORIES:

4 Sill Configuration at Sliding Entrance Doors: Provide sill

members and bottom guide system of configuration indicated.

Provide threshold across door opening and pin guide track system at sidelights for exterior doors.

Provide recessed pin guide track system at sidelights, and no threshold across the door opening for interior doors.

FABRICATION:

 General: Sizes of door and frame units, and profile indicated on the drawings. Variable requirements, are dimensions are indicated with maximum and minimum dimensions required to achieve design requirements and coordination with other work.

<u>Prefabrication</u>: Provide automatic entrance doors as prefabricated packaged units complete with doors, sidelights, frames, transoms where indicated, door operators and related components, hardware and accessories. Complete fabrication, assembly, finishing, hardware applications and other work before shipment to project site.

Preglaze door and frame units to greatest extent possible, in coordination with installation and hardware requirements.

Do not drill and tap for surface-mounted hardware items until time of installation at project site.

Perform fabrication operations, including cutting, fitting, forming, drilling and grinding of metal work in manner which prevents damage to exposed finish surfaces. For hardware, perform these operations prior to application of finishes.

<u>Welding:</u> Comply with AWS recommendations; grind exposed welds smooth and restore mechanical finish.

Reinforce the work as necessary for performance requirements, and for support to the structure. Separate metal surfaces at moving joints with nonmetallic separators to prevent "freeze-up" of joints.

<u>Dissimilar Materials</u>: Separate dissimilar metals with zinc chromate primer, bituminous paint, or other separator that will prevent corrosion.

Maintain continuity of line and accurate relation of planes and angles. Provide secure attachment and support at mechanical joints, with hairline fit of contacting members.

<u>Uniformity of Finish:</u> Abutting extruded aluminum members shall not have an integral color or texture variation greater

4-1/2" x 4-1/2" wrought stainless steel back plate with 4" x 4" wrought stainless steel touch pad. Edges of both plates shall be rolled to return to the wall. Flat plates with sharp or square edges will not be allowed. Press plates shall mount in a single gang box. Projection shall not exceed 5/8". Where indicated, in section 2.2.8, wall press plates shall be flush type (projection 1/8" or less). Backplate shall be 4-1/2" x 4-1/2" stainless steel and touch pad shall be 2" x 3" black anodized aluminum.

<u>Jamb Mounted Press Plates:</u> Jamb mounted press plates shall be 1-3/4" x 4-1/2" (max) stainless steel backplate with square pushbutton.

Push Button Keypad: Keypad shall be 12 button, field programmalbe, flush mounted with brushed aluminum trim plate. Red and green LED's shall be provided on the keypad to indicated door status (secure/insecure). Unit shall provide up to 95,000 user programmable operate codes with power failure protection to retain memory. Output shall be SPST, 4 amp, momentary.

Remote Controls: Provide desk mounted slope front controls for doors specified to have remote control.

Mode Switches: At Door #4, provide a wall mounted keyswitch to change the door actuating devices to secure mode.

At Door #5, provide a desk mounted slope front key switch to change the door actuating devices to secure mode.

All keyswitches shall be equipped with Yale removeable core, 7-pin masterkeyed cylinders.

SCHEDULE OF ACTUATING DEVICES

37	DOOR #	OUTSIDE	INSIDE ACTUATING DEVICE
38			
39	2	remote control	1 - wall press pl
40	3	K-M 830 sensor	K-M 890
41	4	K-M 830 & jamb press pl	K-M 890 & wall press pl
42	5	K-M 890	K-M 830 & jamb press pl
43	23	K-M 890 & wall press pl	K-M 890 & jamb press pl
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45	2005	1-flush wall press pl	1 - wall press pl
46	2050	2-wall press pl	recessed floor mat
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48	4004	K-M 890 & jamb press pl	1 - push-button keypad
49	4005		K-M 890 & jamb press pl
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ACCESSORIES:

Sill Configuration at Sliding Entrance Doors: Provide sill

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members and bottom guide system of configuration indicated.

Provide threshold across door opening and pin guide track system at sidelights for exterior doors.

Provide recessed pin guide track system at sidelights, and no threshold across the door opening for interior doors.

FABRICATION:

door General: Sizes of and frame units, and profile requirements, are indicated on the drawings. Variable dimensions are indicated with maximum and minimum dimensions required to achieve design requirements and coordination with other work.

Prefabrication: Provide automatic entrance doors as prefabricated packaged units complete with doors, sidelights, frames, transoms where indicated, door operators and related components, hardware and accessories. Complete fabrication, assembly, finishing, hardware applications and other work before shipment to project site.

Preglaze door and frame units to greatest extent possible, in coordination with installation and hardware requirements.

Do not drill and tap for surface-mounted hardware items until time of installation at project site.

Perform fabrication operations, including cutting, fitting, forming, drilling and grinding of metal work in manner which prevents damage to exposed finish surfaces. For hardware, perform these operations prior to application of finishes.

Comply with AWS recommendations; grind exposed welds Welding: smooth and restore mechanical finish.

Reinforce the work as necessary for performance requirements, and for support to the structure. Separate metal surfaces at moving joints with nonmetallic separators to prevent "freeze-up" of joints.

Dissimilar Materials: Separate dissimilar metals with zinc chromate primer, bituminous paint, or other separator that will prevent corrosion.

Maintain continuity of line and accurate relation of planes and angles. Provide secure attachment and support at mechanical joints, with hairline fit of contacting members.

Uniformity of Finish: Abutting extruded aluminum members shall not have an integral color or texture variation greater

than half the range indicated in the sample pair submittal.

Fasteners: Conceal fasteners wherever possible.

Weatherstripping: Where exterior door stiles or head rails do not close against fixed stops equipped with compression weatherstripping, provide sliding weatherstripping, retained in an adjustable strip in a mortise centered in the edge of the door.

Aluminum Door, Sidelight and Transom Framing:

Fabricate tubular and channel frame assemblies in configuration indicated, with welded or mechanical joints in accordance with manufacturer's standards. Provide concealed fasteners wherever possible. Reinforce internally with steel shapes as indicated, or as necessary to support the required loads.

Provide glazing systems for frames to receive lights and for replacement of glass, but for non-removal of glass from the exterior.

Provide type and profile of glazing system indicated, to receive glazing materials indicated.

Fabricate frame assemblies for exterior walls with flashing and weeps to drain penetrating moisture to the exterior. Provide anchorage and alignment brackets for concealed support of assembly from the building structure. Allow for thermal expansion of exterior units.

Doors and sidelites shall be constructed of extruded aluminum tubular sections with tie-rod construction and reinforced and welded corner connections. All doors and sidelites shall be equipped with a center muntin bar. Glazing stops shall be square edge snap-on type, and contain continuous pre-loaded vinyl glazing bead with no exposed fasteners. Sidelites at Door #4 shall be flush aluminum, 1-3/4" thick, panels. Minimum dimensions, including glazing stops shall be: stiles = 2-1/2", top rail = 3-1/2", bottom rail = 4" and center muntin = 7". Minimum wall thickness of door components shall be .125". Each sliding door leaf shall be supported on a minimum of four (4) ball-bearing rollers on an anti-friction track.

Unless specifically detailed, door guide tracks or thresholds shall not extend thru the door opening. At entrance and vestibule doors provide a door mounted nylon brush door bottom equal to a National Guard 601DkB.

Header section shall be extruded aluminum, with sectional removeable service covers. All controls, switches, adjustments, power supplies, motors, and drive components shall be concealed in the head section.

Sliding door drive system shall be power-open/power-close, utilizing a continuous drive industrial D.C. motor and linear actuator. Provide infinite speed adjustment, separate backcheck and latch speeds, and adjustable opening/closing force. doors shall be installed and adjusted so as to comply with ANSI A156.19-1984.//

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FINISHES:

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Color Anodized Finish: Provide NAAMM AA-M12C22A41/44, Class I (non-specular as fabricated mechanical finish; chemical matte; minimum thickness 0.7 mil) integrally electrolytically deposited colored anodic coating.

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Color: Provide color matching Architect's sample.

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*Transom-Mounted Automatic Door Operators: Automatic door operators shall be self-contained transom-mounted electro-hydraulic units. Operators shall function like a normal hydraulic door closer (including separate sweep speed, latch speed, backcheck force and backcheck position controls) when used manually, and shall bear a "UL" fire listing when used on fire rated doors. Operators shall be adjustable for opening speed and force and shall be installed and adjusted so as to comply with ANSI 156.19-1984. All swing doors with automatic operators must be useable non-automatically by pedestrian traffic, like a normal closer controlled door.

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Mounting location and arm configuration: Push Side Mtd. w/regular arm, DR #117, 121, 2041, 2066 Pull Side Mtd w/slide arm. DR #21, 1008, 1076 Pull Side Mtd. w/parallel arm,......DR #112, 2030, 2113 Double Egress w/regular & slide arm, DR #1051, 1087, 2058, 2106, 2111

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See plan for type, quantity and location of actuating switches. Wall mounted press plates shall be flush type (projection 1/4" or less), 4 1/2" x 4 1/2" stainless steel with 2: x 3" black anodized aluminum touch pad. Ceiling pull cord switches shall be heavy duty industrial type, with steel lever arm and NEMA 12 housing. Provide a pull cord w/wooden handle.

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Operators for fire-rated doors shall have controls w/power supply that will unlock, in sequence, the fire-rated exit devices and after 1/2 sec. automatically open the doors. The operator shall be inter-faced with the fire alarm system so that during a fire alarm the doors cannot be operated automatically.

ers and frame

Doors #2066 & 2106 shall be sequenced operation as follows: When the press plate on the approach side of DR #2106 is pressed, DR 2106 opens immediately; after a field adjustable time delay (1-10 secs) DR #2066 opens. Both doors reclose automatically after their individually adjustable hold-open time delay expires.

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The supplier shall employ factory trained technicians to install, adjust and maintain the door operators. Primary power circuits and press plate rough-in are by the electrical contractor, all other work required to make a complete operating system, is by this

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safety, and for a weathertight closure. Lubricate hardware, operating equipment and other moving parts.

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CLEANING:

<u>Clean glass and aluminum surfaces</u> promptly after installation. Remove excess glazing and sealant compounds, dirt and other substances. Exercise care to avoid damage to coatings.

Comply with requirements contained in the "Glass and Glazing" section for cleaning and maintenance of glass.

PROTECTION:

Institute protective measures required throughout the remainder of the construction period to ensure that automatic entrance doors will be without damage or deterioration, other than normal weathering, at the time of substantial completion.

END OF SECTION 08460

SECTION 08520 - ALUMINUM WINDOWS

PART 1 - GENERAL

RELATED DOCUMENTS:

 Drawings and general provisions of the Contract, including General and Special Conditions and Division-1 Specification sections, apply to the work of this section.

SUMMARY:

Extent of each type, grade and performance class of aluminum window units required is indicated on the drawings.

Aluminum window units required are heavy commercial grade of the performance class indicated.

The scope of this section shall include all exterior butt-window (both strip windows and punched openings) system. As integral components within this system, the Contractor shall also include all operable awning windows with hardware and accessories complete and all interior blinds and access sash necessary to house these blinds.

Types of aluminum window units required include the following:

 Awning windows.

Casement windows (Interior only).

Fixed windows.

Butt glazed window system.

Applications of aluminum windows on the project include individual units set in conventional wall construction.

Applications of aluminum windows on the project include units in continuous horizontal runs with backset mullions.

DEFINITIONS:

 <u>Performance</u> <u>class</u> <u>number</u> included as a part of the window designation system is the actual design pressure in pounds per sq. ft. used to determine the structural test pressure and water test pressure.

Structural test pressure, windload test, is equivalent to 150 percent of the design pressure.

<u>Water leakage resistance test pressure</u> is equivalent to 15 percent of the design pressure with 2.86 psf as a minimum.

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SYSTEM DESCRIPTION:

Design Requirements: Comply with air infiltration. penetration and structural performance requirements indicated in AAMA 101-85 for the type, grade and performance class of window units required.

12 13 Optional Performance Class Requirements: Where the required design pressure exceeds the minimum for the specified window grade, comply with requirements of AAMA 101-85, Section 3, "Optional Performance Classes" for higher than minimum performance class.

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Heights of window units, above grade at the window centerline, can be determined from the drawings. Consult with the Architect for clarification needed to required loading and test pressures.

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Design wind velocity at the project site is 70 mph.

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Testing: Test each type and size of required window unit through a recognized testing laboratory or agency, in accordance with ASTM E 330 for structural performance, with ASTM E 283 for air infiltration and with both ASTM E 331 and ASTM E 547 for water penetration. Provide certified test results.

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Structural Performance: Provide units with no failure or permanent deflection for a positive (inward) and negative (outward) test pressure of 50 lbf/sq. ft.

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Air Infiltration: Provide units with an air infiltration rate of not more than 0.37 cfm/ft. of operable sash joint for an inward test pressure of 6.24 lbf/sq. ft.

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Water Penetration: Provide units with no water penetration as defined in the test method at an inward test pressure of 3.00 lbf/sq. ft.

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10.00 (A-1) Condensation Resistance: Where window units are indicated to be of "thermal-break construction", provide units which have been tested for thermal performance in accordance with AAMA 1502 showing at condensation resistance factor (CRF) of 45.

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Sound Insulation Construction: Fabricate aluminum window units that have been certified to provide a sound transmission class (STC) rating of at least 40 when tested in accordance with ASTM E 90 and classified according to ASTM E 413.

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SUBMITTALS:

Shop Drawings: Submit shop drawings for each type of window including information not fully detailed in the manufacturer's standard product data and the following:

Elevations of continuous work at 1/4" scale.

Typical unit elevations at 3/4" scale.

Full size section details of every typical composite member. Anchors.

Hardware.

Operators.

Accessories.

Glazing details.

<u>Product</u> <u>Data</u>: Submit manufacturer's product specifications, technical product data, recommendations and standard details for each type of aluminum window unit required. Include the following information:

Fabrication methods.

Finishing.

Hardware.

Accessories.

Samples: Submit samples of the specified finish on 12" lengths of window members.

The Architect reserves the right to require additional samples, which show fabrication techniques and workmanship, and design of hardware and accessories.

Certification: Provide certification by the manufacturer showing that each type, grade and size of window unit complies with requirements where the manufacturer's standard window units have been tested in accordance with specified tests and meet performance requirements specified. Where such testing has not been accomplished, perform required tests through a recognized testing laboratory or agency and provide certified test results.

QUALITY ASSURANCE:

Standards: Requirements for aluminum windows, terminology and standards of performance, and fabrication workmanship are those specified and recommended in AAMA 101-85 and applicable general recommendation published by AAMA and AA.

<u>Single Source Responsibility:</u> Provide aluminum windows produced by a single manufacturer capable of showing prior production of units similar to those required.

Design Criteria: Drawings indicate sizes, profiles and dimensional requirements of aluminum windows. Window units having minor deviations from indicated dimensions and profiles may be accepted, subject to the Architect's approval, provided

such deviations do not materially detract from the design concept or intended performance.

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PROJECT CONDITIONS:

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Field Measurements: Where possible, check actual window openings in construction work by accurate field measurement before fabrication; show recorded measurements on final shop Coordinate fabrication schedule with construction progress as directed by the Contractor to avoid delay of work. Where necessary, proceed with fabrication without measurements, and coordinate fabrication tolerances to ensure proper fit of window units.

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WARRANTY:

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Special Project Warranty: Submit a written warranty, executed by the Contractor, Installer and aluminum window manufacturer, agreeing to repair or replace aluminum window units which fail in materials or workmanship within the specified warranty Failures include, but are not necessarily limited to period. structural failures including excessive deflection, excessive leakage or air infiltration, faulty operation of sash and hardware, and deterioration of metals, metal finishes and other materials beyond normal weathering. This warranty shall be in addition to and not a limitation of other rights the Owner may have against the Contractor under the Contract Documents.

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Warranty period for aluminum windows is 3 years after the date of substantial completion.

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PART 2 - PRODUCTS

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MANUFACTURERS:

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Manufacturers: Subject to compliance with requirements, provide products of one of the following:

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All Windows:

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Kawneer Co., Norcross, GA Hordis Brothers, Pennsauken, NJ Wausau Metals, Wausau, WI

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MATERIALS:

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Aluminum Extrusions: Provide alloy and temper recommended by the window manufacturer for the strength, corrosion-resistance, and application of required finish, but not less than 22,000 psi ultimate tensile strength and not less than 0.062" thickness at any location for main frame and sash members.

Fasteners: Provide aluminum, non-magnetic stainless steel, epoxy adhesive, or other materials warranted by the manufacturer to be non-corrosive and compatible with aluminum window members, trim, hardware, anchors and other components of window units.

Reinforcement: Where fasteners screw-anchor into aluminum less than 0.125" thick, reinforce interior with aluminum or non-magnetic stainless steel to receive screw threads, or provide standard non-corrosive pressed-in splined grommet nuts.

Exposed Fasteners: Except where unavoidable for application of hardware, do not use exposed fasteners. For application of hardware, use fasteners that match the finish of the member or hardware being fastened, as appropriate.

 Anchors, Clips and Window Accessories: Fabricate anchors, clips and window accessories of aluminum, non-magnetic stainless steel or hot-dip zinc coated steel or iron complying with the requirements of ASTM A 386; provide sufficient strength to withstand design pressure indicated.

Compression Type Glazing Strips and Weatherstripping: Unless otherwise indicated, and at the manufacturer's option, provide compressible stripping for glazing and weatherstripping such as molded EPDM or neoprene gaskets complying with AAMA SG-1 or with ASTM D 2000 Designation 2BC415 to 3BC620, or molded PVC gaskets complying with ASTM D 2287, or molded expanded EPDM or neoprene gaskets complying with ASTM C 509, Grade 4.

Sealant: For sealants required within fabricated window units, provide type recommended by the manufacturer for joint size and movement. Sealant shall remain permanently elastic, non-shrinking, and non-migrating. Comply with Division-7 "Joint Sealants" section of these specifications for selection and installation of sealants.

WINDOW GRADES AND PERFORMANCE CLASSIFICATION:

Heavy Commercial Windows: Provide window units complying with requirements of AAMA Grade and Performance Class HC40.

WINDOW TYPES:

General: The following paragraphs define the operating arrangement for the types of sash required in window units and specify minimum provisions for each type. The drawings indicate which panels of each window unit are operable sash and which are

fixed.

 Awning windows are window units containing one or more swingout, top-hinged or projected sash, arranged in a vertical stack within a common frame and operated by a common control device that swings the bottom edges of ventilators outward. The control device shall operate ventilators simultaneously, securely closing them at both jambs without use of additional manually-controlled locking devices. Sash operation shall permit inside cleaning of outside glass faces.

<u>Casement windows</u> are window units containing ventilators that project outward from the plane of the frame and are side hinged or pivoted at the jambs and swing about the vertical axis. Provide sash operation that provides access for cleaning.

<u>Fixed windows</u> are window units consisting of a glazed frame installed into one opening and are not operable.

Butt-Glazed Windows are windows set in continuous horizontal runs with all vertical joints butt-glazed. Frames support the head and sill. Vertical mullions are set behind the glass.

HARDWARE:

General: Except to the extent that more specific or stringent requirements are indicated, provide the manufacturer's standard hardware fabricated from aluminum, stainless steel, or other corrosion-resistant material compatible with aluminum and of sufficient strength to perform the function for which it is intended.

Four-bar friction hinges for casement windows shall comply with the requirements of AAMA 904.1.

<u>Friction Shoes</u>: Provide friction shoes of nylon or other non-abrasive, non-staining, non-corrosive, durable material.

Window Types:

Awning Windows: Provide the following equipment and operating hardware:

Multi-tubular frame and ventilator sections shall have mitered corners reinforced with extruded keys (corner blocks) pneumatically crimped and epoxy "cold welded". All joints shall be sealed weathertight. Reversed frame section joints shall be milled and joined by pneumatically crimped and cold welded gussets (1800 keys). Railbars and muntins shall be mechanically fastened and sealed to abutting sections. Mullions, where required, shall incorporate a thermal barrier and withstand area windloads.

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Ventilator sections shall be double weatherstripped with extruded, closed cell, 70 durometer, dense neoprene (per ASTM C509) interlocked into the exterior and interior by dovetail grooves extruded into the ventilator sections.

The windows shall accommodate either exterior or interior bead glazing up to and including 1" glass, panels or louvers without special glazing beads. Glazing beads are the snap-in type not less than .050" and are not to bridge the thermal barrier. All glazing sections shall have a clear glazing leg height of not less than 3/4".

Projecting type ventilators shall be fitted with cast nickel/bronze (white bronze) cam locking handles with surface-mounted strikes for outward projecting ventilators. Die-cast cam handles are not acceptable.

Operating Device: Combination lever handle and cam-type lock.

<u>Pivots</u>: Balance-support arms with sliding pivots attached to the vertical slide bars (2 per sash).

25 NTMUC Casement Windows: Provide the following equipment and operating hardware:
26 operating hardware:

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Each 4-0 x 4-0 casement shall have a minimum of two cam locks located on the opening vertical rail. Out-swinging delet and inswinging casements shall be fitted with a white bronze cam locking handle and Anderbag FA 33 SS Series friction adjusters.

Lock: Lift type cam action lock.

Operating Device: Combination lever handle and cam-type latch.

Hinges: Concealed 4-bar friction type hinges with adjustable slide shoe (2 per sash).

Limit Device: Stay bar with an adjustable hold-open device.

<u>Integral Venetial Blinds</u>: At designed vision lites, contractor shall provide integral blind unit for the purposes of sun control. Blinds shall be contained inside the window system by means of an interior access vision sash.

Slats on blinds shall run in a horizontal position and be 22MM in width. Slats shall be made of spring tempered aluminum alloy.

Operator shall be a specifically constructed permanent magnet capable of moving the blind assembly from a closed position in one direction to a closed position in the opposite direction, and capable of raising and lowering the blinds.

The tapes shall be constructed of knitted polyester yarn.

Color shall be selected by Architect from manufacturer's standards.

Butt-Glazed Window System:

Butt-glazed window wall system shall be approximately 2"x4-1/2" (minor dimensional variance from manufactures is allowed for.)

All exterior-exposed aluminum sections (head, sill, and jamb) shall contain an effective 1/4" poured-in-place urethane thermal barrier, resulting in a thoroughly thermally-broken system. The total system condensation resistance factor (C.R.F.) shall be 61.

The sound transmission of the entire system (aluminum and glass) shall be rated at a 36 S.T.C. level.

Butt-glazed window wall system shall be unitized in nature. structural wet seals are to be applied in a controlled environment to minimize any job site contaminants interfering with the proper adhesion of this crucial seal.

sealant manufacturer shall be asked to approve in writing the glass type and the aluminum finish for proper adhesion characteristics to the silicone used.

Splice joints shall be thoroughly sealed where required. All perimeter fasteners shall be completely sealed. Perimeter caulking shall be performed by the window installer to focus all liabilities.

Neoprene gaskets used shall be to manufacturer's specifications.

Vertical Mullions, if required, shall be completely on the interior side of glass and shall be of minimum required dimensions and shall not penetrate the glass surface.

ACCESSORIES:

General: Except to the extent that more specific or stringent requirements are indicated, provide the manufacturer's standard accessories that comply with indicated standards.

Aluminum Break Metal Closure Strips: Provide break-metal closure strips as required to close off space between window vertical mullions and ends or sides of adjacent wall construction. Finish of break-metal to match adjacent window finish.

Aluminum Window Sills: Provide aluminum break-metal window sills where shown or indicated. Finish shall match adjacent window finish.

FABRICATION:

General: Except to the extent that more specific or stringent requirements are indicated, provide manufacturer's standard fabrication that complies with indicated standards and that produces units that are reglazable without dismantling sash framing. Include a complete system for assembly of components and anchorage of window units, and prepare sash for glazing except where preglazing at the factory is indicated.

<u>Sizes</u> and <u>Profiles</u>: Required sizes for window units and profile requirements are indicated on the drawings. Variable dimensions are indicated along with maximum and minimum dimensions as required to achieve design requirements and coordination with other work.

Details shown are based upon standard details by one or more manufacturers. Similar details by other manufacturers will be acceptable, provided they comply with size requirements, minimum/maximum profile requirements, and performance standards as indicated or specified.

Thermal-Break Construction: Fabricate aluminum window units with an integrally concealed low conductance thermal barrier, located between exterior materials and window members exposed on the interior, in a manner that eliminates direct metal-to-metal contact. Provide thermal-break construction which has been in use for not less than 3 years, has been tested to demonstrate resistance to thermal conductance and condensation, and has been tested to show adequate strength and security of glass retention.

Provide hardware with low conductivity or non-metallic material for hardware bridging thermal breaks at frame or vent sash.

<u>Provide</u> <u>weepholes</u> and internal water passages to conduct infiltrating water to the exterior.

 <u>Provide</u> <u>subframes</u> with anchors for window units where shown, of profile and dimensions indicated but not less than 0.062" thick extruded aluminum. Miter or cope corners, and weld and dress smooth with concealed mechanical joint fasteners. Finish to match window units.

<u>Provide mullions</u> and cover plates as shown, matching window units, complete with anchors for support to structure and installation of window units. Allow for erection tolerances and provide for movement of window units due to thermal expansion and building deflections, in the manner indicated.

Glazing Stops: Provide screw-applied or snap-on glazing stops, coordinated with glass selection and glazing system indicated. Finish glazing stops to match window units.

<u>Preglazing Fabrication:</u> Preglaze window units at the factory where possible and practical for applications indicated. Comply with glass and glazing requirements of the "Glass and Glazing" sections of these specifications, and AAMA 101-85.

FINISHES:

<u>Colored Anodized Finish</u>: NAAMM AA-C22A42/44, Class I (minimum thickness of 0.7 mils), integral or electrolytically deposited color anodized finish as follows:

Provide color matching the Architect's dark bronze sample.

PART 3 - EXECUTION

INSPECTION:

<u>Inspect</u> openings before beginning installation. Verify that rough or masonry opening is correct and the sill plate is level.

Masonry surfaces shall be visibly dry and free of excess mortar, sand and other construction debris.

Metal surfaces shall be dry, clean, free of grease, oil, dirt, rust and corrosion, and welding slag, without sharp edges or offsets at joints.

INSTALLATION:

Comply with manufacturer's specifications and recommendations for installation of window units, hardware, operators, and other components of the work.

<u>Set units plumb</u>, level, and true to line, without warp or rack of frames or sash. Provide proper support and anchor securely in place.

Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials by complying with the requirements specified under paragraph "Dissimilar Materials" in the Appendix to AAMA 101-85.

<u>Set sill members</u> and other members in a bed of compound or with joint fillers or gaskets, as shown, to provide weathertight construction. Refer to the "Joint Sealer" sections of Division-7 for compounds, fillers, and gaskets to be installed concurrently with window units. Coordinate installation with wall flashings and other components of the work.

REWORK OF EXISTING HOSPITAL CAFETERIA WINDOWS:

During the course of construction, certain existing windows in the existing cafeteria will require removal to accommodate construction and then eventual replacement. The Contractor shall perform all of this work, including any necessary replacement or adjustment to put the windows in good operational order.

FIELD QUALITY CONTROL:

Conduct on-site tests for air and water infiltration with the window manufacturer's representative present. The Architect will select units to be tested. Tests not meeting specified requirements and units having similar deficiencies shall be corrected at no cost to the Owner. Testing shall be performed by an accredited testing agency selected by the Architect.

ALUMINUM WINDOWS

<u>Air Infiltration Tests</u>: Conduct tests in accordance with the requirements of ASTM E 783. Allowable infiltration shall not exceed 1.5 times the amount indicated.

<u>Water Resistance Tests</u>: Conduct tests in accordance with the requirements of AAMA 501.3. No water leakage is permitted.

ADJUSTING:

Adjust operating sash and hardware to provide a tight fit at contact points and at weatherstripping, for smooth operation and a weathertight closure.

CLEANING:

<u>Clean aluminum</u> <u>surfaces</u> promptly after installation of windows. Exercise care to avoid damage to protective coatings and finishes. Remove excess glazing and sealant compounds, dirt and other substances. Lubricate hardware and other moving parts.

<u>Clean glass</u> of preglazed units promptly after installation of windows; comply with requirements of the "Glass and Glazing" section for cleaning and maintenance.

PROTECTION:

<u>Initiate</u> and <u>maintain</u> protection and other precautions required through the remainder of the construction period, to ensure that, except for normal weathering, window units will be free of damage or deterioration at the time of substantial completion.

END OF SECTION 08520

SECTION 08710 - FINISH HARDWARE

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PART 1 - GENERAL

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RELATED DOCUMENTS:

10 11 12 Drawings and general provisions of Contract, including General and Special Conditions and Division-1 Specification sections, apply to the work of this section.

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DESCRIPTION OF WORK:

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"Builders' Hardware" includes items Definition: commercially as builders hardware which are required for swing, sliding and folding doors, except special types of unique and non-matching hardware specified in the same section as the door and door frame.

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Extent of finish hardware required is indicated on drawings and in schedules.

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Types of finish hardware required include the following:

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Hinges Pivots Lock cylinders and keys

Lock and latch sets

Bolts 31 32

Exit devices Push/pull units

Closers

Overhead holders

Miscellaneous door control devices

36 Door trim units 37 Protection plates 38

Weatherstripping for exterior doors

Astragals or meeting seals on pairs of doors

Thresholds

Security products

Key control system

Access control system.

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Silencers included integral with hollow metal frames are specified with door frames elsewhere in Division-8.

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Weatherstripping included integral with hollow metal frames are specified with door frames elsewhere in Division-8.

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Thresholds for aluminum entrance doors are specified with entrance doors elsewhere in Division-8.

Expansion joints acting as thresholds are specified in Division5.

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Automatic Door-Openers are specified elsewhere in Division-8.

QUALITY ASSURANCE:

<u>Manufacturer</u>: Obtain each type of hardware (latch and lock sets, hinges, closers, etc.) from only one manufacturer, although several may be indicated as offering products complying with requirements.

 Supplier: A recognized architectural finish hardware supplier, with warehousing facilities, who has been furnishing hardware in the project's vicinity for a period of not less than 2 years, and who is, or who employs an experienced architectural consultant who is available, at reasonable times during the course of the work, for consultation about project's hardware requirements, to Owner, Architect and Contractor.

Fire-Rated Openings: Provide hardware for fire-rated openings in compliance with NFPA Standard No. 80 and local building code requirements. Provide only hardware which has been tested and listed by UL or FM for types and sizes of doors required and complies with requirements of door and door frame labels.

SUBMITTALS:

<u>Product</u> <u>Data</u>: Submit manufacturers technical product data for each item of hardware in accordance with Division-1 section "Submittals". Include whatever information may be necessary to show compliance with requirements, and include instructions for installation and for maintenance of operating parts and finish.

 <u>Hardware Schedule</u>: Submit final hardware schedule in manner indicated below. Coordinate hardware with doors, frames and related work to ensure proper size, thickness, hand, function and finish of hardware.

<u>Final Hardware Schedule Content:</u> Based on finish hardware indicated, organize hardware schedule into "hardware sets" indicating complete designations of every item required for each door or opening. Include the following information:

Type, style, function, size and finish of each hardware item.

Name and manufacturer of each item.

Fastenings and other pertinent information.

Location of hardware set cross-referenced to indications

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PRODUCT HANDLING:

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on Drawings both on floor plans and in door and frame schedule.

Explanation of all abbreviations, symbols, codes, etc. contained in schedule.

Mounting locations for hardware.

Door and frame sizes and materials.

Keying information.

Submittal Sequence: Submit schedule at earliest possible date particularly where acceptance of hardware schedule must precede fabrication of other work (e.g., hollow metal frames) which is critical in the project construction schedule. Include with schedule the product data, samples, shop drawings of other work affected by finish hardware, and other information essential to the coordinated review of hardware schedule.

Schedule: Submit separate detailed Keying schedule clearly how the Owner's final instructions on indicating keying of locks has been fulfilled.

Samples: Prior to submittal of the final hardware schedule and prior to final ordering of finish hardware, submit one sample of each type of exposed hardware unit, finished as required, and tagged with full description for coordination with schedule.

Samples will be returned to the supplier. Units which are acceptable and remain undamaged through submittal, review and field comparison procedures may, after final check of operation, be used in the work, within limitations of keying coordination requirements.

Furnish hardware templates to each fabricator of Templates: doors, frames and other work to be factory-prepared for the installation of hardware. Upon request, check shop drawings of such other work, to confirm that adequate provisions are made for proper location and installation of hardware.

Tag each item or package separately, with identification related

to final hardware schedule, and include basic installation instructions with each item or package.

Packaging of hardware, on a set by set basis, is responsibility of supplier. As material is received by hardware supplier from various manufacturers, sort and repackage in containers clearly marked with appropriate hardware set number to match set numbers of approved hardware schedule. Two or more identical sets may be packed in same container.

Inventory hardware jointly with representatives of the hardware supplier and the hardware installer until each is satisfied that the count is correct.

<u>Deliver</u> individually packaged hardware items at the proper times to the proper locations (shop or project site) for installation.

<u>Provide</u> <u>secure lock-up</u> for hardware delivered to the project, but not yet installed. Control handling and installation of hardware items which are not immediately replaceable, so that completion of the work will not be delayed by hardware losses, both before and after installation.

PART 2 - PRODUCTS

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SCHEDULED HARDWARE:

Requirements for design, grade, function, finish, size and other distinctive qualities of each type of finish hardware is indicated in the Finish Hardware Data Sheet and Hardware Schedule at the end of this section. Products are identified by using hardware designation numbers of the following.

Manufacturer's product designations: One or more manufacturers are listed for each hardware type required. An asterisk (*) after a manufacturer's name indicates whose product designation is used in the Hardware Schedule for purposes of establishing minimum requirements. Provide either the product designated, or, where more than one manufacturer is listed, the comparable product of one of the other manufacturers which comply with requirements including those specified elsewhere in this section.

MATERIALS AND FABRICATION:

General:

Materials and products specified herein are deemed equally acceptable. To simplify hardware schedule, however, only one manufacturer's product is listed in hardware sets. In each case, product of manufacturer first named in specification is used in schedule. Where specific products of each manufacturer are not identified by series or catalog number, most comparable item of considered equal of product identified. Where only a series of a manufacturer is named, other characteristics such as function shall be the same as for product specifically identified.

Hand of door: Drawings show direction of slide, swing or hand of each door leaf. Furnish each item of hardware for proper

installation and operation of door movement as shown.

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Base Metals: Produce hardware units of basic metal and forming method indicated, using manufacturer's standard metal alloy, composition, temper and hardness, but in no case of lesser (commercially recognized) quality than specified for the applicable hardware units by applicable ANSI A156 series standard for each type hardware item and with ANSI A156.18 for finish designations indicated. Do not furnish "optional" materials or forming methods for those indicated, except as otherwise specified.

<u>Fasteners:</u> Provide hardware manufactured to conform to published templates, generally prepared for machine screw installation. Do not provide hardware which has been prepared for self-tapping sheet metal screws, except as specifically indicated.

 Furnish screws for installation, with each hardware item. Provide Phillips flat-head screws except as otherwise indicated. Finish exposed (exposed under any condition) screws to match hardware finish or, if exposed in surfaces of other work, to match finish of such other work as closely as possible, including "prepared for paint" in surfaces to receive painted finish.

 <u>Provide concealed fasteners</u> for hardware units which are exposed when door is closed, except to extent no standard units of the type specified are available with concealed fasteners. Do not use thru-bolts for installation where bolt head or nut on the opposite face is exposed in other work, except where it is not feasible to adequately reinforce the work. In such cases, provide sleeves for each thru-bolt or use sex screw fasteners.

Tools and Maintenance Instructions for Maintenance: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of finish hardware.

Keying:

All locksets shall be keyed to existing 7 pin removable core system. Hardware supplier shall supply construction cores for all cylinders. Permanent cores shall be delivered to using agency. The hardware consultant shall consult the using agency for keying instructions. All keying shall be done at the factory.

All permanent keys and all key blanks shall be stamped with 1/8" letters - "DO NOT DUPLICATE".

 All keys shall be factory stamped with 1/8" numbers as directed. The using agency will supply numbering when the hardware schedule and keying schedule are approved.

All construction keys to be stamped "CONSTRUCTION KEY".

Furnish six (6) great-great-grand-master keys. Each lock shall have six (6) change keys. Furnish six (6) each, master, grand master, and great grand master keys per set. Furnish fifty (50) key blanks per key section used. Furnish—six (6) control keys for construction cores. Furnish twelve (12) control keys for permanent cores. Deliver all permanent keys and control keys to the using agency. Furnish to the medical center, at no charge, a factory registered bitting list.

Hinges:

Hinges shall be five-knuckle construction. Hinges for exterior doors shall be solid bronze with non-removable pins, in the finish specified. Hinges for interior doors shall be steel, plated in the finish specified. Oil impregnated bearings are not an acceptable substitute for ball-bearings. All hinges shall be 4-1/2" x 4-1/2" x .134" unless otherwise specified.

Pivots:

Pivots for non-label openings shall be fenced bronze with plated finish as indicated. Pivots shall have ball and needle bearings with 3/4" offset. Pivots shall support a door weight of 400 pounds per set. Pivots for label openings shall be malleable iron and shall support a door weight of 350 pounds per set.

Locksets:

All knob locks shall be mortise or cylindrical type as indicated. Lock bodies and lock trim shall be by same manufacturer. Backset on all knob locks and dead locks shall be 2-3/4". All dead locks shall have 1" throw bolts and be equipped with armor fronts. Rose 2-1/4" diameter, with self-aligning thru bolted fully concealed attachment. Trim for lever mortise lock to be carmel "CRR". Trim for knob mortise locks to be Escutcheon X GF Knob.

Closers: (A-2)

Door closers shall be full rack and pinion type. Closers shall be surface mounted and shall project less than three (3) inches from surface of door or frame. Equip closers with two (2) keyoperated regulating valves for individual control of both closing and latching speeds. Regulating valves shall be accessible from top of closer only and shall be completely unobtrusive. Closer shall have a minimum of 15% door closing power adjustment and adjustable back check. Enclose closers in a cover of aluminum metal. Mount closers without use of brackets or other obstructions in door opening. Closers on all exterior outswinging doors and others as scheduled shall be parallel arm installation. Closer bodies and/or closer feet to

be mounted on surface of doors shall be supplied with thru-bolts and grommet nuts.

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Holders:

5 Overhead door holders and shock absorbers shall be applied to 6 top rail of door with sex bolts, and shall not project more than 7 1-1/8". Case shall be extruded bronze alloy, with an encased 8 shock absorber and hold-open action that automatically engages 9 and releases door. Sliding member in channel shall have 10 accessible adjustment screw to regulate hold-open tension. 11

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Door release units shall be integral closing type. shall be activated by fire alarm system. Conceal all wiring. Attach holder to door by means of thru bolts. Wiring and transformer are specified in Division 16.

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Push and Pull Plates:

19 Push and pull plates shall be 0.50" minimum thickness. Mount 20 all pull units with oval head thru sex bolts. 21

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Push plates and pulls shall be solid bronze. All edges shall be beveled or rounded. Minimum thickness is .050". Sizes and designs are indicated in the hardware sets. Protective plates shall be two inches (2) less than door width.

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Push plates shall be 3-1/2" x 15" of .050" minimum thickness.

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Protective Plates:

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Kick armor and mop plates shall be height listed in schedule and width of 2" less than single door width or 1" less than width of each leaf on pairs of doors. Plates shall be 32D stainless steel beveled three sides.

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Door edge guard shall be .050" stainless steel, mortise type. Accurately break to door bevel. Notch edge guard wherever it overlaps hinges and latches. Hardware supplier shall ship door edges to door manufacturer for factory installation. Specification Section 08211 (A-2)

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wood Thresholds:

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Thresholds - provide (aluminum) thresholds where scheduled with machine screws, lead expansion shields, and R.C.E. feature.

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Door Stops:

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Provide door stops wherever necessary to prevent door or hardware from striking an adjacent partition or obstruction. Provide wall type whenever possible. All door stops and holders shall have machine screws and lead expansion shields. Provide stops at carpeted areas with 1/2" spacers.

Silencers:

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Provide GJ-64 Silencers for all hollow metal frames. doors shall have three (3) silencers. Double doors shall have two (2) silencers.

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Key Control System:

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Provide a complete key control system 3 ea. P-100 key boards.

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Manufacturers:

Door Holders

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Numbers given in schedule are of the following manufacturers:

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15	PRODUCT	MFG. SPECIFIED	ACCEPTABLE
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17			W 100 00 00 00 00 00 00 00 00 00 00 00 00
18	Hinges	Hager*	McKinney; Stanley
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20	Pivots	Rixson*	
21			
22	Locks	Yale*	
23			
24	Deadlocks	Yale*	
25			
26	Automatic Flush Bolts	Door Control, Inc.*	
27			
28	Mortise Bolts	Ives	Baldwin, Cipco

29 30 Closers Norton*

Glynn Johnson*

Chec-Mate; Ives; Reese

33 34 35

31 32

Electro-Magnetic Holders Norton*

36 37

Exit Devices Von Duprin*

38 39 40

Coordinators Door Control, Inc.* Ives

41 42 Push & Pull Plates, Bars Brookline* Baldwin, Builders Brass: Cipco

43 44

Kickplates, Mop and Armor

45 Plates 46

Brookline*

Stanley*

Baldwin; Cipco

Door Edges Brookline*

48 49 50

47

Thresholds National Guard*

Reese; Von Duprin; Zero

51 52 Weatherstripping

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54 Lightproofing National Guard*

Pemko; Zero

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Cipco; Glynn Johnson; Greenleaf; Sargent

Key Control System

Door Stops

HARDWARE FINISHES:

Provide matching finishes for hardware units at each door or the greatest extent possible, and except opening, to otherwise indicated. Reduce differences in color and textures as much as commercially possible where the base metal or metal forming process is different for individual units of hardware exposed at the same door or opening. In general, match items to the manufacturer's standard finish for the latch and lock set (or push-pull units if no latch-lock sets) for color and texture.

Provide quality of finish, including thickness of plating or coating (if any), composition, hardness and other qualities complying with manufacturer's standards, but in no case less than specified for the applicable units of hardware by referenced standards.

The designations used in schedules and elsewhere to indicate the industry-recognized standard finishes are commercial finishes, except as otherwise noted.

Rust-Resistant Finish: For iron and steel base metal, required for exterior work and in areas shown as "High Humidity" areas (and also when designated with the suffix -RR), provide 0.2 mil thick copper coating on base metal before applying brass, bronze, nickel or chromium plated finishes.

Hardware Finishes shall be as follows:

US26D - Hinges, Locks, Stops, and Bolts.

US32D - Protective Plates.

Aluminum - Door Closers.

US26D - Exit Devices.

US32D - Push, Pulls.

PART 3 - EXECUTION

INSTALLATION:

Mount hardware units at heights indicated in "Recommended Locations for Builders Hardware for Custom Steel Doors and Frames" by the Door and Hardware Institute, except as specifically indicated or required to comply with governing regulations and except as otherwise directed by Architect.

<u>Install each hardware item</u> in compliance with the manufacturer's instructions and recommendations. Wherever cutting and fitting is required to install hardware onto or into surfaces which are later to be painted or finished in another way, coordinate removal, storage and reinstallation or application of surface protections with finishing work specified in the Division-9 sections. Do not install surface-mounted items until finishes have been completed on the substrate.

 <u>Set units level</u>, plumb and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.

<u>Drill and countersink</u> units which are not factory-prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.

<u>Set thresholds</u> for exterior doors in full bed of butyl-rubber or polyisobutylene mastic sealant.

ADJUST AND CLEAN:

Adjust and check each operating item of hardware and each door, to ensure proper operation or function of every unit. Replace units which cannot be adjusted to operate freely and smoothly as intended for the application made.

Clean adjacent surfaces soiled by hardware installation.

Final Adjustment: Wherever hardware installation is made more than one month prior to acceptance or occupancy of a space or area, return to the work during the week prior to acceptance or occupancy, and make final check and adjustment of all hardware items in such space or area. Clean operating items as necessary to restore proper function and finish of hardware and doors. Adjust door control devices to compensate for final operation of heating and ventilating equipment.

<u>Instruct Owner's Personnel</u> in proper adjustment and maintenance of hardware and hardware finishes, during the final adjustment of hardware.

Continued Maintenance Service: Approximately six months after the acceptance of hardware in each area, the Installer, accompanied by the representative of the latch and lock manufacturer, shall return to the project and re-adjust every item of hardware to restore proper function of doors and

```
Consult with and instruct Owner's personnel in
 1
    hardware.
    recommended additions to the maintenance procedures. Replace hardware items which have deteriorated or failed due to faulty
 2
 4
    design, materials or installation of hardware units.
                                                               Prepare a
 5
    written report of current and predictable
                                                         problems (of
    substantial nature) in the performance of the hardware.
 7
 8
 9
    HARDWARE
                       SETS:
10
11
    HARDWARE SET 1
12
13
    1 SET
               PIVOT SET
                                    195 X 3/4 OFFSET
14
    1 EACH
               MONITOR PIVOT
                                    CS-M19 X 3/4 OFFSET
15
    1 EACH
                                    1196 X 7 PIN X 1765 RING
               CYLINDER
16
                                    (FOR CD FEATURE)
17
18
    1 EACH
               EXIT DEVICE
                                    CD99-E0
19
    1 EACH
               KICKPLATE
20
    1 EACH
               CLOSER
                                    6750BF SERIES
               THRESHOLD
21
    1 EACH
                                    896V RCE
22
    1 SET
               WEATHERSTRIPPING
                                    PF181
23
24
    NOTE:
               Monitor pivot to be connected to security system.
25
26
    HARDWARE SET 2
27
28
    1 EACH
               CYLINDER
                                    1196 X 7 PIN
29
30
    NOTE:
               All other Hardware provided by aluminum door supplier.
31
               Automatic door operator see section 08460.
32
33
    HARDWARE SET 3
34
                                    195 X 3/4 OFFSET
35
    1 SET
               PIVOT SET
36
    1 EACH
               MONITOR PIVOT
                                    CS-M19 X 3/4 OFFSET
37
    1 EACH
                                    1196 X 7 PIN XC 1765 RING
               CYLINDER
38
                                    (FOR CD FEATURE)
39
               EXIT DEVICE
                                    CD99-E0
    1 EACH
                                    8"
40
    1 EACH
               KICKPLATE
41
    1 EACH
               CLOSER
                                    6750BF SERIES
42
    1 EACH
               THRESHOLD
                                    896V RCE
43
    1 SET
               WEATHERSTRIP
                                    PF181
44
45
    NOTE:
              Monitor pivot to be connected to security system.
46
47
    HARDWARE SET 4
48
49
    1 SET
               PIVOT SET
                                    195 X 3/4 OFFSET
50
    1 EACH
                                    CS-M19 X 3/4 OFFSET
               MONITOR PIVOT
```

51

52

1 EACH

CYLINDER

1196 X 7 PIN X 1765 RING

(FOR CD FEATURE)

```
633
     HARDWARE SET 4 (CONT)
 1
 2
 3
     1 EACH
               EXIT DEVICE
                                     CD99-E0
 4
   1 EACH
               KICKPLATE
 5
     1 EACH
               CLOSER
                                     6750BF SERIES
 6
     1 EACH
               THRESHOLD
                                     896V RCE
 7
     1 SET
               WEATHERSTRIP
                                    PF181
 8
 9
     NOTE:
               Monitor pivot to be connected to security system.
10
11
     HARDWARE SET 5
12
13
     2 EACH
               HINGE
                                    BB1279
14
     1 EACH
               MONITOR HINGE
                                    BB1279 EMN
15
     1 EACH
               LOCKSET
                                    CE ECS X GF KNOB X 8708 X GGMK
16
     1 EACH
               KICKPLATE
17
     1 EACH
               CLOSER
                                    7700 SERIES
18
     1 EACH
               THRESHOLD
                                    425
19
     1 EACH
               DOOR SWEEP
                                    FS102A
20
     1 SET
               WEATHER STRIPPING
                                    FS120N
21
22
    NOTE:
               Monitor hinge to be connected to security system.
23
24
    HARDWARE SET 6
25
26
     1 SET
                                    195 X 3/4 OFFSET
               PIVOT SET
27
    1 EACH
               MONITOR PIVOT
                                    CS-M19 X 3/4 OFFSET
28
    1 EACH
               CYLINDER
                                    1193 X 7 PIN X GGMK
    1 EACH
29
               CYLINDER
                                    1196 X 7 PIN
30
    1 EACH
               EXIT DEVICE
                                    CD99 NL
                                    8"
31
    1 EACH
               KICKPLATE
32
    1 EACH
               CLOSER
                                    6850TBF SERIES
33
     1 EACH
               THRESHOLD
                                    896V RCE
34
    1 SET
               WEATHERSTRIP
                                    PF181
35
36
    NOTE:
               Monitor pivot to be connected to security system.
37
38
    HARDWARE SET 7
39
40
    2 EACH
               MONITOR HINGE
                                    BB1199 EMN 5 X 4 1/2
41
    6 EACH
               HINGE
                                    BB1199 NRP
42
    1 EACH
               LOCKSET
                                    CE ESC X GF KNOB X-8705 X GGMK X
43
                                    KNURLED KNOB
44
    1 EACH
               DUSTPROOF STRIKE
                                    3910 NFP
45
    2 EACH
               FLUSHBOLT
                                    3917 X 1(24") 1(12")
    2 EACH
46
               OVERHEAD HOLDER
                                    GJ70M SERIES
47
    1 EACH
               THRESHOLD
                                    884V RCE
48
    1 SET
               WEATHERSTRIP
                                    PF181
49
50
    NOTE:
               Monitor hinges to be connected to security system.
```

				F
1	HZ	ARDWARE	SET 8	63
2	~		*****	DD4450 F W 4 4 40
3		EACH	HINGE	BB1168 5 X 4 1/2
4	•	EACH	LOCKSET	CE ESC X GF KNOB X 8760 X GGMK X KNURLED KNOB
5 6	1	EACH	KICKPLATE	8"
7		EACH	CLOSER	7700 SERIES
8		EACH	STOP	1213 ES
9				
10	HZ	ARDWARE	SET 9	
11				
12	6	EACH	HINGE	BB1168
13	2	EACH	EXIT DEVICE	9947TP-F-BE
14		EACH	MOP PLATE	4"
15		EACH	KICKPLATE	8"
16		EACH	CLOSER	PA7700 SERIES
17	2	EACH	ELECTROMAGNET	
18			DOOR HOLDER	FM998 X 120V AC
19			40	
20	HA	ARDWARE	SET 10	
21 22	6	EACH	HINGE	BB1168 5 X 4 1/2
23		EACH	EXIT DEVICE	9947TP-F-BE
24		EACH	ARMOR PLATE	40"
25		EACH	MOP PLATE	4"
26			CLOSER	PA7700 SERIES
27		EACH	STOP	1276 CCS
28	_			
29	$\mathbf{H}^{\mathbf{Z}}$	ARDWARE	SET 11	
30				
31	6	EACH	HINGE	BB1168 5 X 4 1/2
32	1	EACH	LOCKSET	CE ESC X GF KNOB X 8722 X GGMK X
33				KNURLED KNOB
34	1	EACH	DUST PROOF STRIKE	3910
35		EACH	FLUSHBOLT	3917 X 12"
36	2	EACH	DUST PROOF STRIKE	80
37	1	SET	AUTOMATIC BOLT	845
38		EACH	DOOR EDGE	1907 CFH X 40"
39		EACH	DOOR EDGE	1908 CFL X 40"
40		EACH	ARMOR PLATE	40"
41		EACH	MOP PLATE	4"
42		EACH	CLOSER	PA7700 SERIES
43	ł	EACH	COORDINATOR	600 SERIES X 2/601AB CLOSER
44 45	2	EA CIT	cmon	MOUNTING BLOCKS 1276 CCS
46	4	EACH	STOP	1276 CCS
47	147	ARDWARE	दश्म 12	
48	111	TUNITAL	DM # 16	
49	3	EACH	HINGE	BB1168
50		EACH	PASSAGE SET	CE ESC X GF KNOB X 8701
51		EACH	MOP PLATE	4"
52		EACH	KICKPLATE	8"
53	i	EACH	CLOSER	7700 SERIES
54	i	EACH	STOP	1213 ES

```
691
 1
     HARDWARE SET 13
 2
 3
     3 EACH
                HINGE
                                      BB1279
 4
     1 EACH
                LOCKSET
                                      CE ECS X GF KNOB X 8760 X GGMK X
 5
                                      KNURLED KNOB
 6
     1 EACH
                MOP PLATE
                                      8"
 7
     1 EACH
                KICKPLATE
 8
      EACH
                CLOSER
                                      7700 SERIES
 9
     1 EACH
                STOP
                                      1276 CCS
10
11
     HARDWARE SET 14
12
13
     6 EACH
                HINGE
                                      BB1168 5 X 4 1/2
     2 EACH
                EXIT DEVICE
14
                                      9947TP-F-BE
                                      40"
15
     2 EACH
                ARMOR PLATE
     2 EACH
                MOP PLATE
                                      4"
16
17
     2 EACH
                ELEC.
                                      PA7700PT SERIES X 120V AC
18
                CLOSER/HOLDER
19
20
    HARDWARE SET 15
21
22
     1 SET
                PIVOT SET
                                      195 X 3/4 OFFEST
23
      SET
     1
                PIVOT SET
                                      195 X 3/4 OFFSET
24
     1 EACH
                PIVOT
                                      M19 X 3/4 OFFSET
25
     1 EACH
                PIVOT
                                      M19 X 3/4 OFFSET
26
                                      1902 X 40" CUT FOR PIVOTS
     2 EACH
                DOOR EDGE
27
                                      1904 X 40"
     2 EACH
               DOOR EDGE
                                      40"
28
     2 EACH
                ARMOR PLATE
                                      4 "
29
    2 EACH
               MOP PLATE
30
     2 EACH
               PULL PLATE
                                      52A
31
    2
      EACH
               PUSH PLATE
                                      54
32
    1 EACH
               AUTOMATIC OPERATORS SEE SPECIFICATION
    2 EACH
33
                STOP
                                      1276 CCS
34
35
    HARDWARE SET 16
36
37
    3 EACH
               HINGE
                                     BB1279
38
    1 EACH
               LOCKSET
                                     CE ESC X GF KNOB X 8722 X GGMK
                                     4"
39
    2 EACH
               MOP PLATE
40
    1 EACH
               STOP
                                      1276 CCS
41
42
    HARDWARE SET 17
43
44
    3 EACH
               HINGE
                                     BB168 5 X 4 1/2
45
    1 EACH
               LOCKSET
                                     CE ESC X GF KNOB X 8760-2 X GGMK
46
    1 EACH
                                     40"
               ARMOR PLATE
                                     4"
47
      EACH
               MOP PLATE
48
    1 EACH
               STOP
                                     1276 CCS
49
```

```
HARDWARE SET 18
1
2
                                    BB1279
 3
    3 EACH
               HINGE
               PRIVACY SET
                                   CRR8702FL
    1 EACH
 4
                                    4 11
 5
    2 EACH
              MOP PLATE
                                    1276 CCS
               STOP
 6
    1 EACH
 7
    HARDWARE SET 19
 8
 9
                                    216
10
    3 EACH
               INVISIBLE HINGE
                                    315 X GGMK X (OMIT THUMB TURN)
               DEADLOCK
11
    1 EACH
                                    4"(INSTALL ON HAE002 SIDE OF DOOR)
    1 EACH
               MOP PLATE
12
                                    52A
    1 EACH
               PULL PLATE
13
14
             No Hardware on HAE004 side of door.
15
    NOTE:
16
    HARDWARE SET 20
17
18
                                    BB1279
19
    3 EACH
               HINGE
    1 EACH
               LOCKSET
                                    CE ECS X GF KNOB X 8708 X GGMK
20
                                    4"
               MOP PLATE
21
    2 EACH
                                    1276 CCS
    1 EACH
               STOP
22
23
    HARDWARE SET 20A
24
25
                                    BB1279
26
    3 EACH
               HINGE
                                    CE ECS X GF KNOB X 8708 X GGMK
27
    1 EACH
               LOCKSET
    1 EACH
               MOP PLATE
28
                                    8"
               KICK PLATE
29
    1 EACH
                                    7700 SERIES
    1 EACH
               CLOSER
30
               ELECTROMAGNET
31
    1 EACH
                                    FM998 X 120V AC
32
               DOOR HOLDER
                                    1276 CCS
33
    1 EACH
               STOP
34
    HARDWARE SET 21
35
36
                                    BB1279
    3 EACH
               HINGE
37
                                    CE ESC X GF KNOB X 8722 X GGMK
38
    1 EACH
               LOCKSET
                                  1902 X 40" CUT FOR HINGES
39
    1 EACH
               DOOR EDGE
                                  1904 X 40" CUT FOR LOCK
               DOOR EDGE
40
    1 EACH
                                   40"
               ARMOR PLATE
41
    1 EACH
                                    4"
               MOP PLATE
42
    1 EACH
                                    7700 SERIES
               CLOSER
43
    1 EACH
                                    1276 CCS
44
    1 EACH
               STOP
```

```
€93
     HARDWARE SET 22
 1
 2
                                      BB1168 5 X 4 1/2
 3
     6 EACH
                HINGE
                                      1902 X 40" CUT FOR HINGES
 4
     2 EACH
                DOOR EDGE
                                      1904 X 40"
 5
     2 EACH
                DOOR EDGE
                                      40"
 6
     2 EACH
                ARMOR PLATE
                                      4"
 7
     2 EACH
                MOP PLATE
     2 EACH
                PULL PLATE
                                      52A
 8
     2 EACH
 9
                PUSH PLATE
                                      54
                                      PA7700H SERIES
10
     2 EACH
                CLOSER
11
     2 EACH
                STOP
                                      1276 CCS
12
13
     HARDWARE SET 23
14
15
                HINGE
                                      BB1168 5 X 4 1/2
     3 EACH
                                      314 1/4 ST X GGMK
16
     1 EACH
                DEADLOCK
17
     1 EACH
                ROLLER LATCH
                                      GJ30
                                      1902 X 40" CUT FOR HINGES
                DOOR EDGE
18
     1 EACH
                                      1904 X 40"
19
     1 EACH
                DOOR EDGE
                                      40"
     1 EACH
                ARMOR PLATE
20
                                      4"
     1 EACH
                MOP PLATE
21
                ARM PULL
                                      791
22
     2 EACH
23
     1 EACH
                DOOR HOLDER
                                      GJ320 SERIES
24
25
     HARDWARE SET 24
26
27
                                      BB1279
     3 EACH
               HINGE
28
                                      CE ESC X GF KNOB X 8701
     1 EACH
               PASSAGE SET
                                      4"
29
     2 EACH
               MOP PLATE
30
     1 EACH
                STOP
                                      1276 CCS
31
32
    HARDWARE SET 25
33
34
     3 EACH
               HINGE
                                      BB1168 5 X 4 1/2
                                      40"
     1 EACH
35
                ARMOR PLATE
                                      4"
36
      EACH
               MOP PLATE
37
     1 EACH
               PULL PLATE
                                      52A
38
     1 EACH
               PUSH PLATE
                                      54
                                      7700 SERIES
39
     1
      EACH
                CLOSER
40
     1 EACH
               DOOR STOP
                                      1211ES
41
42
    HARDWARE SET 26
43
                                      BB1168 5 X 4 1/2
44
    3 EACH
               HINGE
45
               LOCKSET
                                      CE ESC X GF KNOB X 8722 X GGMK
     1 EACH
                                      40"
     1 EACH
               ARMOR PLATE
46
                                      4"
47
               MOP PLATE
     1 EACH
                                      7700 SERIES
48
      EACH
               CLOSER
    1
49
      EACH
                STOP
                                      1276 CCS
50
```

			TORISMI NAMES			P.	CO
1	H	ARDWARE	SET 27		•		694
2 3 4 5 6 7 8 9 10	2 2 2 2 2 2	EACH EACH EACH EACH EACH EACH EACH EACH	HINGE DOOR EDGE DOOR EDGE ARMOR PLATE MOP PLATE PULL PLATE PUSH PLATE CLOSER STOP	BB1168 5 X 4 1/2 1902 X 40" CUT FOR 1904 X 40" 40" 4" 52A 54 PA7700H SERIES 1276 CCS	HINGES		
12 13	H	ARDWARE	SET 28				
14 15 16 17 18	3 1 1 1	EACH EACH EACH EACH	HINGE LOCKSET KICKPLATE CLOSER STOP	BB1279 CE ECS X GF KNOB X 8" 7700 SERIES 1276 CCS	8708 X	GGMK	
20 21	H	ARDWARE	SET 29				
22 23 24	1	EACH EACH	HINGE PRIVACY SET	BB1279 CE ESC X GF KNOB X	8702		
25 26 27	1	EACH EACH EACH	MOP PLATE KICKPLATE CLOSER	4" 8" PA770 SERIES			
28 29	1	EACH	STOP	1276 CCS			
30 31	H	ARDWARE	SET 30				
32		EACH	HINGE	BB1279	0700 **	COUR	
33 34 35 36		EACH EACH	LOCKSET STOP	CE ECS X GF KNOB X 1276 CCS	8708 X	GGMK	-
37 38	H	ARDWARE	SET 31				
39 40 41 42	1	EACH EACH	HINGE LOCKSET STOP	BB1279 CE ESC X GF KNOB X 1276 CCS	8722 X	GGMK	
43 44	H	ARDWARE	SET 32				
45 46		EACH EACH	HINGE LOCKSET	BB1279 CE ESC X GF KNOB X	8722 X	GGMK	
47 48 49	H	ARDWARE	SET 33				
50		EACH		BB1279			
51 52	1	EACH	PRIVACY SET	CE ESC X GF KNOB X		3 OTDE	OF
52 53		EACH		4" (INSTALL ON RM DOOR)	HAEU39	A SIDE	OF.
54 55	1	EACH	STOP	1276 CCS			

```
1
     HARDWARE SET 34
 2
 3
     3 EACH
                HINGE
                                      BB1279
 4
     1 EACH
                                      314 1/4 ST X GGMK
                DEADLOCK
 5
                                      4"
     1
       EACH
                MOP PLATE
 6
       EACH
                PULL PLATE
                                      52A
     1
 7
       EACH
                PUSH PLATE
                                      54
 8
       EACH
                KICKPLATE
       EACH
 9
                CLOSER
                                      7500BF SERIES
10
       EACH
                STOP
                                      1276 CCS
11
12
     HARDWARE SET 35
13
14
     3 EACH
                HINGE
                                      BB1279
15
     1 EACH
                LOCKSET
                                                     KNOB X 8722 GGMK X
                                      CE ESC X GF
16
                                      KNURLED KNOB
17
       EACH
                MOP PLATE
                                     8"
18
     1 EACH
                KICKPLATE
19
       EACH
                CLOSER
                                      7700 SERIES
20
     1 EACH
                STOP
                                      1276 CCS
21
22
     HARDWARE SET 36
23
24
     6 EACH
                HINGE
                                     BB1168 5 X 4 1/2
25
     1 EACH
                LOCKSET
                                      CE ESC X GF KNOB X
                                                              8722
26
                                      KNURLED KNOB
27
     2 EACH
               MOP PLATE
                                      4"
                                      8"
28
     2 EACH
               KICKPLATE
29
     2 EACH
               CLOSER
                                     PA7700 SERIES
30
     2 EACH
                STOP
                                      1276 CCS
31
32
    HARDWARE SET 37
33
34
     6 EACH
               HINGE
                                     BB1168 5 X 4 1/2
35
     1 EACH
               DEADLOCK
                                     314 1/4 ST X GGMK
36
     1 EACH
               ROLLER LATCH
                                     GJ30
37
    1
      EACH
               FLUSH BOLT
                                     3917 X 12"
                                     1902 X 40" CUT FOR HINGES
38
     2 EACH
               DOOR EDGE
39
    2 EACH
               DOOR EDGE
                                     1904 X 40"
                                     40"
40
    1 EACH
               ARMOR PLATE
41
    2 EACH
               MOP PLATE
                                     4"
42
                                      4"
    1 EACH
               MOP PLATE
43
    2 EACH
               ARM PULL
                                     791
44
    1 EACH
                                     GJ320 SERIES (FOR 4'-0" LEAF)
               DOOR HOLDER
45
    1 EACH
               STOP
                                     1276 CCS (FOR 1'-0" LEAF)
46
47
    HARDWARE SET 38
48
49
    3 EACH
               HINGE
                                     BB1279
50
    1
      EACH
               LOCKSET
                                     CE ESC X GF KNOB X 8722 X GGMK
51
               MOP PLATE
    2 EACH
               STOP
52
    1 EACH
                                     1213 ES
53
```

```
HARDWARE SET 39
1
2
                                    L147 X 3/4 OFFSET (FOR 1'-0" LEAF)
3
    1 EACH
               PIVOT ·
                                    L27 X 3/4 OFFSET X C.C.
 4
    1 EACH
               FLOOR CLOSER
                                    ML19 X 3/4 OFFSET (1 EACH FOR 1'-
               PIVOT
    2 EACH
 5
                                    O" LEAF)
 6
                                    315-LL X GGMK
               DEADLOCK
7
    1 EACH
                                    3922 X 8" (TO BE MOUNTED WITH SEX
               SURFACE BOLT
    2 EACH
 8
                                    BOLTS WITH LEAD-LINED HEADS)
 9
                                    1902 X CUT FOR PIVOT
               DOOR EDGE
10
    2 EACH
                                    1904 X 40"
11
    2 EACH
               DOOR EDGE
                                    40"
    1 EACH
               ARMOR PLATE
12
                                    4" (FOR 1'-0" LEAF)
    2 EACH
               MOP PLATE
13
                                    411
    1 EACH
               MOP PLATE
14
                                    1276 CCS
               STOP
15
    2 EACH
16
    HARDWARE SET 40
17
18
                                    L27 X 3/4 OFFSET X C.C.
19
    1 EACH
               FLOOR CLOSER
                                    ML19 X 3/4 OFFSET
20
    1 EACH
               PIVOT
                                    LL CE ESC X GF KNOB X 8722 X GGMK
    1 EACH
               LOCKSET
21
               MOP PLATE
                                    4"
22
    1 EACH
                                    8"
               KICKPLATE
23
    1 EACH
                                    1276 CCS
    1 EACH
               STOP
24
25
26
    HARDWARE SET 41
27
                                    BB1168 5 X 4 1/2
    6 EACH
28
               HINGE
                                    CE ESC X GF KNOB X 8722 X GGMK
29
    1 EACH
               LOCKSET
                                     3910
               DUST-PROOF STRIKE
30
    1 EACH
                                     3917 X 12"
31
    2 EACH
               FLUSHBOLT
                                    1902 X 40" CUT FOR HINGES
    2 EACH
               DOOR EDGE
32
                                     1904 X 40"
33
    2 EACH
               DOOR EDGE
                                     40"
34
    1 EACH
               ARMOR PLATE
                                     4" (FOR 1'-0" LEAF)
               MOP PLATE
35
    2 EACH
                                    411
     1 EACH
               MOP PLATE
36
                                     1276 CCS
     2 EACH
               STOP
37
38
39
    HARDWARE SET 42
40
41
               HINGE
                                     BB1168
     3 EACH
                                     CE ESC X GF KNOB X 8760 GGMK X
               LOCKSET
42
     1 EACH
                                     KNURLED KNOB
43
               ARMOR PLATE
                                     40"
44
     1 EACH
                                     41
     1 EACH
45
               MOP PLATE
                                     7700 SERIES
46
     1 EACH
               CLOSER
                                     1213 ES
47
     1 EACH
               STOP
48
```

```
€97
 1
     HARDWARE SET 43
 2
 3
     3 EACH
                HINGE
                                     BB1168
 4
     1 EACH
                LOCKSET
                                      CE ESC X GF KNOB X 8722 X GGMK X
 5
                                     KNURLED KNOB
 6
     1 EACH
                DOOR EDGE
                                     1907 CFH X 40"
 7
     1 EACH
                DOOR EDGE
                                     1908 CFL X 40"
 8
                                      40"
     1 EACH
                ARMOR PLATE
                                     4"
 9
     1 EACH
                MOP PLATE
     1 EACH
10
                CLOSER
                                     7700 SERIES
11
     1 EACH
                STOP
                                     1276 CCS
12
13
     HARDWARE SET 44
14
15
     3 EACH
                                                          8122
                HINGE
                                     BB1279
                                     CE ESC X GF KNOB X CONK X GGMK
16
     1 EACH
                LOCKSET
                                     4 "
17
                MOP PLATE
     1 EACH
18
     1 EACH
                STOP
                                     1276 CCS
19
20
     HARDWARE SET 45
21
22
     3 EACH
                HINGE
                                     BB1168 5 X 4 1/2
23
     1 EACH
               PASSAGE SET
                                     CE ESC X GF KNOB X 8701
24
     1 EACH
               MOP PLATE
                                     4"
                                     8"
25
     1 EACH
               KICK PLATE
26
     1 EACH
               CLOSER
                                     PA7700 SERIES
27
     1 EACH
                STOP
                                     1276 CCS
28
29
     HARDWARE SET 46
30
31
     6 EACH
               HINGE
                                     BB1168 5 X 4 1/2
32
                                     CE ESC X GF KNOB X 8722 X GGMK X
     1 EACH
               LOCKSET
33
                                     KNURLED KNOB
34
     1 EACH
               DUST-PROOF STRIKE
                                     80
35
     1 SET
               AUTOMATIC BOLT
                                     845
36
     2 EACH
               ARMOR PLATE
                                     40"
                                     4"
37
     2 EACH
               MOP PLATE
38
     2 EACH
               CLOSER
                                     PA7700 SERIES
39
     1 EACH
               COORDINATOR
                                           SERIES
                                                     X
                                                         2/601AB
                                                                    CLOSER
40
                                     MOUNTING BLOCKS
41
               STOP
     2 EACH
                                     1276 CCS
42
43
    HARDWARE SET 47
44
45
     3 EACH
               HINGE
                                     BB1279
46
     1 EACH
                                     CE ESC X GF KNOB X 8722 X GGMK X
               LOCKSET
47
                                     KNURLED KNOB
48
     1 EACH
               KICKPLATE
49
     1 EACH
               CLOSER
                                     PA7700 SERIES
50
     1 EACH
               STOP
                                     1276 CCS
51
```

```
1
    HARDWARE SET 48
 2
 3
     2 SET
               PIVOT SET
                                     195 X 3/4 OFFSET
 4
    -8 EACH
                                     BB1168 5 X 4 1/2
               HINGE
 5
                                     M19 X 3/4 OFFSET
     2 EACH
                PIVOT
 6
                                     M19 X RH X US26D
     2 EACH
               PIVOT
 7
                                     315 X GGMK
     1 EACH
               DEADLOCK
 8
                                     3910
     1 EACH
               DUST-PROOF STRIKE
 9
                                     3917 X 1(24") 1(12")
     2 EACH
               FLUSHBOLT
                                     40"
10
     2 EACH
               ARMOR PLATE
11
     2 EACH
               PULL PLATE
                                      52A
12
     2 EACH
               PUSH PLATE
                                      54
13
     2 EACH
               AUTOMATIC OPERATORS SEE SPECIFICATIONS
14
     2 EACH
               STOP
                                     1213 ES
15
16
    HARDWARE SET 49
17
18
    8 EACH
               HINGE
                                     BB1168 5 X 4 1/2
19
     1 EACH
               DEADLOCK
                                      314 1/4 ST X GGMK
20
    1 EACH
               DUST-PROOF STRIKE
                                     3910
                                     3917 X 1(24") 1(12")
21
     2 EACH
               FLUSHBOLT
                                     40"
22
    2 EACH
               ARMOR PLATE
23
    2 EACH
               PULL PLATE
                                     52A
24
     2 EACH
               PUSH PLATE
                                     54
25
     2 EACH
               CLOSER
                                     PA7700 SERIES
26
    2 EACH
               STOP/HOLDER
                                     F9X
27
28
    HARDWARE SET 50
29
30
    3 EACH
               HINGE
                                     BB1168
31
    1 EACH
               LOCKSET
                                     CE ESC X GF KNOB X 8722 X GGMK X
32
                                     KNURLED KNOB
33
    1 EACH
               ARMOR PLATE
                                     40"
34
    1 EACH
                                     4"
               MOP PLATE
35
    1 EACH
               CLOSER
                                     PA7700 SERIES
36
    1 EACH
               STOP
                                     1213 ES
37
38
    HARDWARE SET 51
39
40
    1 EACH
               ELECTRIC PIVOT
                                     E-M19U X 3/4 OFFSET
41
    1 EACH
               ELECTRIC PIVOT
                                     E-M19U X 3/4 OFFSET
42
    1 EACH
               PIVOT
                                     F117 1/2 X 3/4 OFFSET
               PIVOT
43
    1 EACH
                                     F117 1/2 X 3/4 OFFSET
44
    2 EACH
                                     1193 X 7 PIN X GGMK
               CYLINDER
45
    2 EACH
               EXIT DEVICE
                                     EL9947TP-F
                                     40"
46
    2 EACH
               ARMOR PLATE
47
    2 EACH
                                     4"
               MOP PLATE
48
    2 EACH
               AUTOMATIC OPERATORS SEE SPECIFICATIONS
49
     2 EACH
               STOP
                                     1276 CCS
50
```

```
1
     HARDWARE SET 52
 2
 3
     6 EACH
                HINGE
                                      BB1279
       EACH
                LOCKSET
                                      CE ESC X GF KNOB X 8705 X GGMK X
 5
                                      KNURLED KNOB
 6
       EACH
                DUST-PROOF STRIKE
                                      80
 7
                                      845
     1
       SET
                AUTOMATIC BOLT
 8
                                      40"
     2
      EACH
                ARMOR PLATE
                                      4"
 9
     2 EACH
                MOP PLATE
10
     1 EACH
                COORDINATOR WITH
                                      600 X 2/601AB CLOSER MOUNTING
11
                BRACKETS
                                      BRACKETS
12
     2 EACH
                STOP
                                      1276 CCS
13
14
     HARDWARE SET 53
15
16
     3 EACH
                HINGE
                                      BB1279
     1 EACH
17
                                      CE ESC X GF KNOB X 8705 X GGMK X
                LOCKSET
18
                                      KNURLED KNOB
                                      811
19
       EACH
                KICKPLATE
20
       EACH
                CLOSER
                                      7700 SERIES
21
       EACH
                STOP
                                      1276 CCS
22
23
     HARDWARE SET 54
24
25
     6 EACH
                HINGE
                                      BB1279
26
       EACH
                LOCKSET
                                      CE ESC X GF KNOB X 8708 X GGMK
27
       EACH
                DUST-PROOF STRIKE
                                      3910
28
     2 EACH
                FLUSHBOLT
                                      3917 X 12"
29
     2
      EACH
                ARMOR PLATE
                                      40"
30
     2 EACH
                                      4"
                MOP PLATE
31
     2 EACH
                STOP
                                      1276 CCS
32
33
     HARDWARE SET 55
34
35
     6 EACH
                HINGE
                                      BB1168 5 X 4 1/2
36
     2 EACH
                ARMOR PLATE
                                      40"
37
     2 EACH
                                      4"
               MOP PLATE
38
     2 EACH
               PULL PLATE
                                      52A
39
     2 EACH
                PUSH PLATE
                                      54
40
     2 EACH
                CLOSER
                                      PA7700 SERIES
41
     2 EACH
                STOP
                                      1276 CCS
42
43
    HARDWARE SET 56
44
45
     6 EACH
               HINGE
                                      BB1168 5 X 4 1/2
46
    1 EACH
                                      CE ESC X GF KNOB X 8722 X GGMK X
               LOCKSET
47
                                      KNURLED KNOB
48
      EACH
               DUST-PROOF STRIKE
                                      80
49
    1 SET
               AUTOMATIC BOLT
                                      845
50
    2 EACH
               DOOR EDGE
                                      1907 CFH X 40"
51
    2 EACH
               DOOR EDGE
                                      1908 CFL X 40"
52
    2 EACH
               ARMOR PLATE
                                      40"
53
    2 EACH
               MOP PLATE
                                      4"
54
    2 EACH
               CLOSER
                                      7700 SERIES
55
      EACH
               COORDINATOR
                                      600 SERIES
```

```
1
    HARDWARE SET 56 (CONT)
 2
 3
                                     1276 CCS
    2 EACH
               STOP
 4
 5
    HARDWARE SET 57
 6
 7
    6 EACH
               HINGE
                                     BB1168
 8
    2 EACH
               EXIT DEVICE
                                     9947TP-F-BE
9
                                     40"
    2 EACH
               ARMOR PLATE
                                     4"
10
    2 EACH
               MOP PLATE
    2 EACH
                                     PA7700 SERIES
11
               CLOSER
12
    2 EACH
               STOP
                                     1276 CCS
13
14
    HARDWARE SET 58
15
16
    3 EACH
                                     BB1168 5 X 4 1/2
               HINGE
                                     CE ESC X GF KNOB X 8722 X GGMK
17
    1 EACH
               LOCKSET
                                     1276 CCS
18
    2 EACH
               STOP
19
20
    HARDWARE SET 59
21
22
    6 EACH
               HINGE
                                     BB1168 5 X 4 1/2
23
    2 EACH
               ARMOR PLATE
                                     40"
                                     4"
24
    2 EACH
               MOP PLATE
25
    2 EACH
               PULL PLATE
                                     52A
               PUSH PLATE
26
    2 EACH
                                     54
27
               AUTOMATIC OPERATORS SEE SPECIFICATIONS
    1 EACH
                                     1276 CCS
28
    1 EACH
               STOP
29
30
    HARDWARE SET 60
31
32
    3 EACH
               HINGE
                                     BB1279
    1 EACH
33
               MOP PLATE
                                     54
34
    1 EACH
               PUSH PLATE
35
               ARM PULL
                                     791
    1 EACH
                                     8"
36
    1 EACH
               KICKPLATE
37
    1 EACH
               CLOSER
                                     PA7700 SERIES
38
    1 EACH
               DOOR HOLDER
                                     GJ320 SERIES
39
40
    HARDWARE SET 61
41
42
    3 EACH
               HINGE
                                     BB1279
43
    1 EACH
               PUSH/PULL LATCH
                                     1380 X 7" BS X ASA STRIKE
                                     40"
44
    1 EACH
               ARMOR PLATE
                                     4"
45
    1 EACH
               MOP PLATE
46
    1 EACH
               CLOSER
                                     PA7700 SERIES
47
    1 EACH
               DOOR HOLDER
                                     GJ320 SERIES
48
49
    HARDWARE SET 62
50
51
                                     BB1279
    3 EACH
               HINGE
                                     1380 X 7" BS X ASA STRIKE
52
    1 EACH
               PUSH/PULL LATCH
                                     4"
53
    1 EACH
               MOP PLATE
                                     8"
54
    1 EACH
               KICKPLATE
55
    1 EACH
               CLOSER
                                     7700 SERIES
```

```
Delete) 1. 701
 1
     HARDWARE SET 62 (CONT)
 2
                CONCEALED -
     1 EACH
                                      3-031 SERIES
 4
                OVERHEAD STOP
 5
     1 EACH
                DOOR HOLDER
                                     GJ320 SERIES
 6
 7
     HARDWARE SET 63
 8
 9
     3 EACH
                HINGE
                                     BB1279
10
     1 EACH
                PRIVACY SET
                                     CE ESC X GF KNOB X 8702
                                      4"
11
     1 EACH
                MOP PLATE
12
     1 EACH
                STOP
                                     1276 CCS
13
14
     HARDWARE SET 64
15
16
     3 EACH
               HINGE
                                     BB1279
17
     1 EACH
               LOCKSET
                                     CE ESC X GF KNOB X 8722 X GGMK
18
     1 EACH
                                      4" (TO BE INSTALLED ON HAC185 SIDE
               MOP PLATE
19
                                     OF DOOR)
20
     1 EACH
               STOP
                                     1276 CCS
21
22
     NOTE:
               Mop plate to be installed on push side of door unless
23
               otherwise indicated.
24
     HARDWARE SET 65
25
26
27
     3 EACH
               HINGE
                                     BB1168
28
     1 EACH
               MOP PLATE
29
     1 EACH
               PULL PLATE
                                     52A
30
     1 EACH
               PUSH PLATE
                                     54
                                     8"
31
     1 EACH
               KICKPLATE
32
     1 EACH
               CLOSER
                                     PA7700 SERIES
33
               STOP
     1 EACH
                                     1276 CCS
34
35
    HARDWARE SET 66
36
37
     3 EACH
               HINGE
                                     BB1279
38
    L EACH
               PUSH/PULL LATCH
                                     1380 X 7" BS X ASA STRIKE
39
     1 EACH
               DEADLOCK
                                     315 X GGMK
40
     1 EACH
               DOOR EDGE
                                     1902 X 40" CUT FOR HINGES
41
                                     1904 X 40"
     1 EACH
               DOOR EDGE
42
                                     40"
     1 EACH
               ARMOR PLATE
43
     1 EACH
               MOP PLATE
                                     4"
44
     1 EACH
               CLOSER
                                     7700 SERIES
45
    1 EACH
               STOP
                                     1276 CCS
46
47
    HARDWARE SET 67
48
49
    3 EACH
               HINGE
                                     BB1168 5 X 4 1/2
50
    1 EACH
               LOCKSET
                                     CE ESC X GF KNOB X 8722 X GGMK
51
    1 EACH
                                     1902 X 40" CUT FOR HINGES
               DOOR EDGE
52
                                     1904 X 40" X CUT FOR LOCK
    1 EACH
               DOOR EDGE
53
    1 EACH
               ARMOR PLATE
                                     40"
                                     4"
               MOP PLATE°
54
    1 EACH
55
    1 EACH
               STOP
                                     1276
```

```
1
 2
    HARDWARE SET 68
 3
                                     BB1168 5 X 4 1/2
 4
    6 EACH
               HINGE
                                     1902 X 40" CUT FOR HINGES
 5
    2 EACH
               DOOR EDGE
                                     1904 X 40"
 6
    2 EACH
               DOOR EDGE
                                     40"
 7
    2 EACH
               ARMOR PLATE
                                     4"
 8
    2 EACH
               MOP PLATE
                                     52A
 9
    2 EACH
               PULL PLATE
10
    2 EACH
               PUSH PLATE
                                     54
11
    2 EACH
               CLOSER
                                     PA7700 SERIES
12
    2 EACH
               MAGNET DR. HOLDER
                                     FM998 X 120V AC
                                     1276 CCS
13
    2 EACH
               STOP
14
15
    HARDWARE SET 69
16
17
    3 EACH
               HINGE
                                     BB1279
18
    1 EACH
               PASSAGE SET
                                     CE ESC X GF KNOB X 8701
                                     4"
19
    1 EACH
               MOP PLATE
                                     8"
20
    1 EACH
               KICKPLATE
                                     7700 SERIES
21
    1 EACH
               CLOSER
                                     1276 CCS
22
    1 EACH
               STOP
23
24
    HARDWARE SET 70
25
26
    6 EACH
               HINGE
                                     BB1279
27
                                     CE ESC X GF KNOB X 8722 X GGMK
    1 EACH
               LOCKSET
28
    1 EACH
               DUSTPROOF STRIKE
                                     3910
                                     3915 X 12"
29
    2 EACH
               FLUSHBOLT
                                     1902 X 40" CUT FOR HINGES
30
    2 EACH
               DOOR EDGE
                                     1904 X 40" 1 (CUT FOR LOCK)
31
    2 EACH
               DOOR EDGE
                                     36"
32
    2 EACH
               ARMOR PLATE
                                     40"
33
    2 EACH
               ARMOR PLATE
                                     4"
34
    2 EACH
               MOP PLATE
    1 EACH
               STOP
                                     1213 ES
35
               STOP
                                     1276 CCS
36
    1 EACH
37
38
    HARDWARE SET 71
39
               HINGE
                                     BB1279
40
    3 EACH
41
    1 EACH
                                     CE ESC X GF KNOB X 8722 X GGMK
               LOCKSET
                                     1902 X 40" CUT FOR HINGES
42
    1 EACH
               DOOR EDGE
                                     1904 X 40" CUT FOR LOCK
43
    1 EACH
               DOOR EDGE
                                     40"
44
               ARMOR PLATE
    1 EACH
45
                                     4"
    1 EACH
               MOP PLATE
46
    1 EACH
               STOP
                                     1276 CCS
47
    HARDWARE SET 72
48
49
50
    3 EACH
               HINGE
                                     BB1279
51
    1 EACH
               LOCKSET
                                     CE ESC X GF KNOB X 8722 X GGMK X
52
                                     KNURLED KNOB
                                     7700SERIES
53
               CLOSER
    1 EACH
                                     4"
               MOP PLATE
54
    1 EACH
                                     1904 X 40" CUT FOR LOCK
55
     1 EACH
               DOOR EDGE
```

```
703
 1
    HARDWARE SET 72 (CONT)
 2
                        1902 X 40" CUT FOR HINGES
 3
    1 EACH
              DOOR EDGE
                                   1276 CCS
    1 EACH
              STOP
    HARDWARE SET 73
 7
                                   BB1168 5 X 4 1/2
              HINGE
 8
    3 EACH
                                   1902 X 40" CUT FOR HINGES
              DOOR EDGE
9
    2 EACH
                                   1904 X 40"
10
    2 EACH
                                   40"
              ARMOR PLATE
    2 EACH
11
                                  4"
              MOP PLATE
    2 EACH
12
              PULL PLATE
    2 EACH
                                   52A
13
              PUSH PLATE
    2 EACH
                                   54
14
              AUTOMATIC OPERATORS SEE SPECIFICATION
15
    1 EACH
16
    2 EACH
              STOP
                                  1276 CCS
17
    HARDWARE SET 74
18
19
                                   BB1279
20
    3 EACH
              HINGE
              LOCKSET
                                   CE ESC X GF KNOB X 8722 X GGMK
21
    1 EACH
                                   1902 X 40" CUT FOR HINGES
    1 EACH
              DOOR EDGE
22
                                   1904 X 40" CUT FOR LOCK
              DOOR EDGE
    1 EACH
23
                                   40"
24
    1 EACH
              ARMOR PLATE
                                   4"
25
    1 EACH
              MOP PLATE
                                   7700 SERIES
26
    1 EACH
              CLOSER
                                   1276 CCS
27
    1 EACH
              STOP
28
29
    HARDWARE SET 75
30
                                   BB1168 5 X 4 1/2
31
    6 EACH
              HINGE
                                   1902 X 40" CUT FOR HINGES
32
    2 EACH
              DOOR EDGE
                                   1904 X 40"
33
    2 EACH
              DOOR EDGE
                                   40"
    2 EACH
              ARMOR PLATE
34
                                   411
              MOP PLATE
35
    2 EACH
    2 EACH
              PULL PLATE
                                   52A
36
    2 EACH
              PUSH PLATE
37
                                   54
38
    2 EACH
              CLOSER
                                   PA7700 SERIES
    2 EACH
              STOP
                                   1276 CCS
39
40
41
    HARDWARE SET 76
42
                                   BB1168 5 X 4 1/2
43
    3 EACH
              HINGE
                                   CE ESC X GF KNOB X 8722 X GGMK X
44
    1 EACH
              LOCKSET
45
                                   KNURLED KNOB
                                   4"
46
    1 EACH
              MOP PLATE
                                   8"
47
    1 EACH
              KICKPLATE
                                   PA7700 SERIES
48
    1 EACH
              CLOSER
49
              STOP
                                   1276 CCS
    1 EACH
```

```
HARDWARE SET 77
 1
                                                                  704
 2
                                     BB1199 NRP
               HINGE
 3
    3 EACH
 4
    1 EACH
               LOCKSET
                                     CE ESC X GF KNOB X 8760-2 X GGMK X
 5
                                     KNURLED KNOB
 6
               DOOR HOLDER
                                     GJ70M SERIES
    1 EACH
 7
    1 EACH
                                     894V
               THRESHOLD
                                     PF181
 8
               WEATHERSTRIP
    1 SET
 9
    HARDWARE SET 78
10
11
12
    3 EACH
               HINGE
                                     BB1168
13
    1 EACH
               LOCKSET
                                     CE ESC X GF KNOB X 8760 X GGMK X
14
                                     KNURLED KNOB
                                     137N X HINGE SIDE
               WEATHERSTRIP
15
    1 PCS.
                                     138N X HEAD
16
    1 EACH
               SOUND PROOFING
                                     138N X LOCK SIDE
               SOUND SEAL
17
    1 EACH
               AUTO DOOR BOTTOM
                                     420
18
    1 EACH
19
20
    HARDWARE SET 79
21
                                     BB1168 5 X 4 1/2
22
    3 EACH
               HINGE
                                     CE ECS X GF KNOB X 8708 X GGMK
23
    1 EACH
               LOCKSET
24
               MOP PLATE
    1 EACH
                                     8"
    1 EACH
25
               KICKPLATE
                                     PA7700 SERIES
26
               CLOSER
    1 EACH
                                     1276 CCS
27
    1 EACH
               STOP
28
29
    HARDWARE SET 80
30
31
                                     BB1168 5 X 4 1/2
    3 EACH
               HINGE
                                     CE ECS X GF KNOB X 8708 X GGMK
32
    1 EACH
               LOCKSET
                                     4"
               MOP PLATE
33
    1 EACH
                                     8"
    1 EACH
34
               KICKPLATE
                                     PA7700 SERIES
35
    1 EACH
               CLOSER
36
    1 EACH
               STOP
                                     1276 CCS
37
38
    HARDWARE SET 81
39
                                     BB1279
40
    6 EACH
               HINGE
41
    1 EACH
               DUST PROOF STRIKE
                                     3310
42
    2 EACH
               FLUSHBOLT
                                     3917 X (12")
43
                                     4"
     2 EACH
               MOP PLATE
                                     1276 CCS
44
     2 EACH
               STOP
                                     CE ESC X GF KNOB X 8708 X GGMK
               Lockset
45
     1 EACH
    HARDWARE SET 82
46
47
48
     3 EACH
               HINGE
                                     BB1168 5 X 4 1/2
49
               ROLLER LATCH
                                     GJ30
     1 EACH
    1 EACH
                                     1902 X 40" CUT FOR HINGES
50
               DOOR EDGE
                                     1904 X 40"
51
               DOOR EDGE
     1 EACH
                                     40"
               ARMOR PLATE
52
     1 EACH
                                     4"
53
     1 EACH
               MOP PLATE
               ARM PULL
54
    2 EACH
                                     791
                                     GJ320 SERIES
55
               DOOR HOLDER
     1 EACH
```

```
HARDWARE SET 83
 2
                                    E-M19U X 3/4 OFFSET
 4
    1 EACH
               ELECTRIC PIVOT
 5
               ELECTRIC PIVOT
                                    E-M19U X 3/4 OFFSET
    1 EACH
 6
    1 EACH
               PIVOT
                                    F117 1/2 X 3/4 OFFSET
 7
    1 EACH
               PIVOT
                                    F117 1/2 X 3/4 OFFSET
 8
    2 EACH
               EXIT DEVICE
                                    EL9947TP-F-BE
 9
    2 EACH
               ARMOR PLATE
                                     40"
                                     4"
10
    2 EACH
               MOP PLATE
               AUTOMATIC OPERATORS SEE SPECIFICATION
11
    1 EACH
                                     1276 CCS
12
     1 EACH
               STOP
13
    HARDWARE SET 84
14
15
    6 EACH
               HINGE
                                    BB1168 5 X 4 1/2
16
17
    1 EACH
               DEADLOCK
                                    315 X GGMK
18
    1 EACH
               DUSTPROOF STRIKE
                                    3910
    2 EACH
                                    3917 X 12"
19
               FLUSHBOLT
                                    40"
20
    2 EACH
               ARMOR PLATE
                                    4"
21
    2 EACH
               MOP PLATE
    2 EACH
                                    52A
22
               PULL PLATE
               PUSH PLATE
23
    2 EACH
                                    54
               AUTOMATIC OPERATORS SEE SPECIFICATION
24
    1 EACH
25
    1 EACH
               STOP
                                    1213 ES
26
               STOP
                                    1276 CCS
    1 EACH
27
28
    HARDWARE SET 85
29
30
    3 EACH
               HINGE
                                    BB1168 5 X 4 1/2
                                    1380 X 7" BS X ASA STRIKE
31
    1 EACH
               PUSH/PULL LATCH
32
    1 EACH
               DEADLOCK
                                    315 X GGMK
                                    1902 X 40" CUT FOR HINGES
33
               DOOR EDGE
    1 EACH
                                    1904 X 40"
34
    1 EACH
               DOOR EDGE
                                    40"
35
    1 EACH
               ARMOR PLATE
                                    4"
36
    1 EACH
               MOP PLATE
37
    1 EACH
               CLOSER
                                    7700 SERIES
38
    1 EACH
               STOP
                                    1213 ES
39
    HARDWARE SET 86
40
41
42
    3 EACH
               HINGE
                                    BB1279
43
                                    315 X GGMK
    1 EACH
               DEADLOCK
44
    1 EACH
               FLUSH CUP PULL
                                    780
45
    HARDWARE SET 87
46
47
               FLOOR CLOSER
48
                                    30 NHO X CEMENT CASE
    1 EACH
                                    RF315 X GGMK
49
    1 EACH
               DEADLOCK
50
                                    54
    2 EACH
               PUSH PLATE
                                    8"
51
    2 EACH
               KICKPLATE
52
                                    1213 ES
    1 EACH
               STOP
53
    1 EACH
               STOP
                                    1276 CCS
54
```

```
1
    HARDWARE SET 88
 2
                                      BB1279
 3
    3 EACH
               HINGE
 4
                                      315 X GGMK
    1 EACH
               DEADLOCK
                                      4"
 5
    1 EACH
               MOP PLATE
 6
               PUSH PLATE
                                      54
    1 EACH
 7
                                      791
    1 EACH
               ARM PULL
                                     8"
 8
    1 EACH
               KICKPLATE
                                      1276 CCS
 9
    1 EACH
                STOP
10
    HARDWARE SET 89
11
12
13
    6 EACH
               HINGE
                                      BB1279
    1 EACH
               LOCKSET
                                      CE ESC X GF KNOB X 8722 X GGMK
14
                                      3917 X 12"
15
     1 EACH
                FLUSHBOLT
                                      4"
               MOP PLATE
16
     4 EACH
                                      1276 CCS (FOR ACTIVE LEAF)
                STOP
17
     1 EACH
18
    HARDWARE SET 90
19
20
21
                                      BB1168 5 X 4 1/2
     3 EACH
                HINGE
                                      CE ECS X GF KNOB X 8708 X GGMK
22
     I EACH
                LOCKSET
                                      1902 X 40" CUT FOR HINGES
23
     1 EACH
                DOOR EDGE
                                      1904 X 40" CUT FOR LOCK
24
                DOOR EDGE
     1 EACH
                                      40"
25
     1 EACH
                ARMOR PLATE
                                      4"
26
     1 EACH
                MOP PLATE
     1 EACH
                                      PA7700 SERIES
27
                CLOSER
                ELECTROMAGNET
28
     1 EACH
29
                DOOR HOLDER
                                      FM998 X 120V AC
30
    HARDWARE SET 91
31
32
                                      E-M19U X 3/4 OFFSET
33
     1 EACH
                ELECTRIC PIVOT
                                      F117 1/2 X 3/4 OFFSET
     1 EACH
                PIVOT
34
                                      EL99TP-F-BE
35
     1 EACH
                EXIT DEVICE
                                      1902 X 36" CUT FOR PIVOT
36
     1 EACH
                DOOR EDGE
                                      1904 X 40"
                DOOR EDGE
37
     1 EACH
                                      36"
38
     1 EACH
                ARMOR PLATE
                                      4"
39
     1 EACH
                MOP PLATE
40
                AUTOMATIC OPERATORS SEE SPECIFICATION
     1 EACH
                                      1213 ES
                STOP
41
     1 EACH
42
    HARDWARE SET 92
43
44
                                      BB1168 5 X 4 1/2
45
     3 EACH
                HINGE
46
                                      315 X GGMK
     1 EACH
                DEADLOCK
                                      1902 X 40" CUT FOR HINGES
47
     1 EACH
                DOOR EDGE
                                      1904 X 40"
                DOOR EDGE
48
     1 EACH
                                      40"
49
     1 EACH
                ARMOR PLATE
                                      4 <sup>11</sup>
50
     1 EACH
                MOP PLATE
                                      52A
51
     1 EACH
                PULL PLATE
                PUSH PLATE
                                      54
52
     1 EACH
                                      7700 SERIES
53
     1 EACH
                CLOSER
54
     1 EACH
                ELECTROMAGNET
                                      FM998 X 120V AC
55
                DOOR HOLDER
```

```
707
 1
    HARDWARE SET 92 (CONT)
 2
 3
     1 EACH
               STOP
                                     1276 CCS
    HARDWARE SET 93
                                     1250
               SPRING HINGE
 7
     2 EACH
 8
     1 EACH
               RIM NIGHTLATCH
                                     042 X GGMK
 9
               FLUSH CUP PULL
                                     780
     1 EACH
10
11
    HARDWARE SET 94
12
13
    3 EACH
               HINGE
                                     BB1279
14
     1 EACH
               LOCKSET
                                     CE ESC X GF KNOB X 8722 X GGMK
                                      4"
15
     1 EACH
               MOP PLATE
                                     8"
16
    1 EACH
               KICKPLATE
                                     7700 SERIES
17
    1 EACH
               CLOSER
               LIGHT PROOFING
18
    1 EACH
                                     120NS
19
    1 EACH
               AUTO DOOR BOTTOM
                                     420
20
21
    HARDWARE SET 95
22
               HINGE
23
    3 EACH
                                     BB1279
24
                                     CE ESC X GF KNOB X 8722 X GGMK
    1 EACH
               LOCKSET
                                     4"
25
    1 EACH
               MOP PLATE
                                     8"
26
    1 EACH
               KICKPLATE
               CLOSER
27
    1 EACH
                                     7700 SERIES
28
    1 EACH
               STOP
                                     1276 CCS
29
30
    HARDWARE SET 96
31
32
                                     BB1279
    6 EACH
               HINGE
                                     9947TP-F-BE
33
    2 EACH
               EXIT DEVICE
                                     36"
34
    2 EACH
               ARMOR PLATE
                                     4"
35
    2 EACH
               MOP PLATE
36
    2 EACH
               ELEC. CLOSER/HOLDER PA7700PT SERIES X 120V AC
37
38
    HARDWARE SET 97
39
40
    6 EACH
               HINGE
                                     BB1279
41
    1 EACH
               LOCKSET
                                     CE ESC X GF KNOB X 8722 X GGMK
42
    1 EACH
                                     3910
               DUSTPROOF STRIKE
                                     3917 X (12")
43
    2 EACH
               FLUSHBOLT
                                     1902 X 40" CUT HINGES
44
    2 EACH
               DOOR EDGE
                                     1904 x 40" CUT FOR LOCKSET
45
    2 EACH
               DOOR EDGE
                                     40"
46
    1 EACH
               ARMOR PLATE
                                     4" (FOR 1'-0" LEAF)
47
    2 EACH
               MOP PLATE
                                     4"
48
    1 EACH
               MOP PLATE
49
    1 EACH
               CLOSER
                                     PA 7700 SERIES
50
    2 EACH
               STOP
                                     1276 CCS
```

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1.08
 1
    HARDWARE SET 98
 2
                                     BB1279
               HINGE
 3
    6 EACH
                                     CE ESC X GF KNOB X 8722 X GGMK
 4
    1 EACH
               LOCKSET
 5
    1 EACH
               DUSTPROOF STRIKE
                                     3910
    2 EACH
               FLUSHBOLT
                                     3917 X (12")
 6
                                     1902 X 40" CUT FOR HINGES
 7
               DOOR EDGE
    2 EACH
                                     1904 X 40" CUT FOR LOCKSET
    2 EACH
               DOOR EDGE
 8
                                     40"
 9
    2 EACH
               ARMOR PLATE
                                     4" (FOR 1'-0" LEAF)
               MOP PLATE
10
    2 EACH
                                     4"
    1 EACH
               MOP PLATE
11
                                     1276 CCS
12
    2 EACH
               STOP
13
14
    HARDWARE SET 99
15
                                     BB1168
    3 EACH
               HINGE
16
                                     CE ESC X GF KNOB X 8722 X GGMK
    1 EACH
               LOCKSET
17
                                     1902 X 40" CUT FOR HINGES
18
    1 EACH
               DOOR EDGE
                                     1904 X 40" CUT FOR LOCK
19
    1 EACH
               DOOR EDGE
                                     40"
20
    1 EACH
               ARMOR PLATE
                                    4"
    1 EACH
21
               MOP PLATE
                                     1213 ES
22
    1 EACH
               STOP
23
24
    HARDWARE SET 100
25
               HINGE
                                     BB1279
26
    6 EACH
                                     9947TP-F-BE
               EXIT DEVICE
27
    2 EACH
                                     40"
28
    2 EACH
               ARMOR PLATE
                                     4"
29
    2 EACH
               MOP PLATE
               CLOSER
                                     PA7700 SERIES
30
    2 EACH
                                     1276 CCS
               STOP
31
     2 EACH
32
    HARDWARE SET 101
33
34
                                     BB1279
35
     6 EACH
               HINGE
                                     1902 X 40" CUT FOR HINGES
36
     2 EACH
               DOOR EDGE
                                     1904 X 40"
     2 EACH
               DOOR EDGE
37
                                     40"
38
     2 EACH
               ARMOR PLATE
                                     4 "
               MOP PLATE
39
     2 EACH
                                     52A
40
     2 EACH
               PULL PLATE
41
     2 EACH
               PUSH PLATE
                                     54
               ELEC. CLOSER/HOLDER PA7700PT SERIES X 120V AC
42
     2 EACH
                STOP
                                     1276
43
     2 EACH
44
    HARDWARE SET 102
45
46
                                     BB1279
47
     3 EACH
               HINGE
                                     CE ESC X GF KNOB X 8722 X GGMK X
48
     1 EACH
               LOCKSET
49
                                     KNURLED KNOB
                                     4"
               MOP PLATE
50
     1 EACH
                                     8"
51
     1 EACH
               KICKPLATE
                                     PA7700 SERIES
                CLOSER
52
     1 EACH
                                     1276 CCS
53
     1 EACH
                STOP
```



HARDWARE SET 107

6 ea. Hinges BB 1168 CE ESC x GF Knob x 8722 GGMK Lockset 1 ea. Flush Bolts 2 ea. 3917 x 12" **Dust Proof Strike** 1 ea. 3910

Closers PA 7700 Series 2 ea.

8" Kickplates 2 ea.

1276 CCS 2 ea. Stop

HARDWARE SET 108

BB 1279 Hinges 6 ea. 1193 x 7 pin x 1765 Ring (for door leaf swing from Cylinder 1 ea.

corridor #6004 & 6008)

9947 TP-F (for door leaf swing from corridor #6004 Exit Devices 1 ea.

& 6008)

Exit Devices 9947 TP-F-BE (for door leaf swing into corridor 1 ea.

#6004 & 6008)

Armor Plate 36" 2 ea. 4" Mop Plate 2 ea.

PA 7700 PT Series x 120 VAC Elec. Closer/Holder Zea.

268 (Locknetics) (for door leaf swing into corridor Mag. Lock 1 ea.

#6004 & 6008)

Power Supply 560-70 (Locknetics) (for mag lock) 1 ea.

Key Operated Switches 2 ea.

1196 x 7 pin x 1765 Ring (for key switches) 2 ea. Cylinder

Note: Mag. Lock to be interfaced with fire alram system. --

CLOSUR lea. PA 7700 HARDWARE SET 109 FM 998

3 ea. Hinges **BB 1279**

CE ESC x GF Knob x 8722 GGMK Lockset 1 ea.

7700 PT Seriesx 120 VAC Elec. Closer/Holder 1 ea.

8 Kickplate 1 ea. 4"

Mop Plate 1 ea. 1213 ES Stop 1 ea.

1	HARDWARE	SET 103	20:
2			
3	3 EACH	HINGE	BB1199 NRP
4	1 EACH	LOCKSET	CE ESC X GF KNOB X 8705 X GGMK
5	1 EACH	KICKPLATE	8"
6	1 EACH	CLOSER	6750 SERIES
7	1 EACH	THRESHOLD	894V
8	1 SET	WEATHERSTRIP	PF181
9			
10	HARDWARE	SET 104	
11			
12	3 EACH	HINGE	BB1279
13	1 EACH	LOCKSET	CE ESC X GF KNOB X 8722 X GGMK
14	1 EACH	MOP PLATE	4"
15	1 EACH	KICKPLATE	8"
16	1 EACH	CLOSER	PA7700 SERIES
17 18	1 EACH	STOP	1276 CCS
19	HARDWARE	SET 105	
20			774.070
21	3 EACH	HINGE	BB1 279
22 23	1 EACH 1 EACH	LOCKSET MOP PLATE	CE ESC X GF KNOB X 8722 X GGMK
24	1 EACH	KICKPLATE	8"
			,
25 26	1 EACH	CLOSER	7700 SERIES 1276 CCS
26 27	1 EACH	STOP	1276 CCS
28	HARDWARE	SET 106	
29	2 03 011	HTNGE	DD1 270
30	3 EACH	HINGE	BB1279 CE ESC X GF KNOB X 8701
31 32	1 EACH	PASSAGE SET	4"
	1 EACH	MOP PLATE	8"
33	1 EACH	KICKPLATE	5 T V
34	1 EACH	CLOSER	PA7700 SERIES
35 36	1 EACH	STOP	1276 CCS
37 38			
39	END OF SI	ECTION 08710	

SECTION 08800 - GLASS AND GLAZING

PART 1 - GENERAL

RELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Special Conditions and Division-1 Specification sections, apply to work of this section.

SUMMARY:

Extent of glass and glazing work is indicated on drawings and schedules.

Types of work in this section include glass and glazing for:

Mirror Glass.

Window units, not indicated as "preglazed".

Glazed curtain wall.

Structural glazed curtain wall, except as otherwise indicated.

Storefront construction.

Entrances and other doors, not indicated as "preglazed".

Skylight units, not indicated as "preglazed".

Sloped glazing systems.

 <u>Structural</u> <u>and</u> <u>weatherseal</u> <u>sealants</u> for structural glazed curtain wall are specified in Division-8 section "Slope Glazed Framing Systems".

SYSTEM DESCRIPTION:

Provide glass and glazing that has been produced, fabricated and installed to withstand normal thermal movement, wind loading and impact loading (where applicable), without failure including loss or breakage of glass, failure of sealants or gaskets to remain watertight and airtight, deterioration of glass and glazing materials and other defects in the work.

Normal thermal movement is defined as that resulting from an ambient temperature range of 120 deg. F (67 deg. C) and from a consequent temperature range within glass and glass framing

members of 180 deg. F (100 deg. C).

Deterioration of insulating glass is defined as failure of hermetic seal due to other causes than breakage which results in intrusion of dirt or moisture, internal condensation or fogging, deterioration of protected internal glass coating, if any, resulting from seal failure, and any other visual evidence of seal failure or performance.

<u>Deterioration</u> of laminated glass is defined the development of manufacturing defects including edge separation or delamination which materially obstructs vision through glass.

<u>Deterioration</u> of coated glass is defined as the development of manufacturing defects including peeling, cracking or other indications of deterioration in metallic coating due to normal conditions of use.

SUBMITTALS:

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Submit manufacturer's technical data for each Product Data: glazing material and fabrication glass product required, including installation and maintenance instructions.

Samples: Submit, for verification purposes, 12" square samples of each type of glass indicated except for clear single pane units, and 12" long samples of each color required (except black) for each type of sealant or gasket exposed to view. Install sealant or gasket sample between two strips of material representative of adjoining framing system in color.

<u>Certificate</u>: Submit certificates from respective manufacturers attesting that glass and glazing materials furnished for project comply with requirements.

Separate certification will not be required for glazing materials bearing manufacturer's permanent labels designating type and thickness of glass, provided labels represent a quality control program involving a recognized certification agency or independent testing laboratory acceptable to authorities having jurisdiction.

Compatibility and Adhesion Test Report: Submit statement from sealant manufacturer indicating that glass and glazing materials have been tested for compatibility and adhesion with glazing sealants and interpreting test results relative to material performance, including recommendations for primers and substrate preparation needed to obtain adhesion.

QUALITY ASSURANCE:

Glazing Standards: Comply with recommendations of Flat Glass Marketing Association (FMGA) "Glazing Manual" and "Sealant Manual" except where more stringent requirements are indicated. Refer to those publications for definitions of glass and glazing terms not otherwise defined in this section or other referenced standards.

<u>Safety Glazing Standard</u>: Where safety glass is indicated or required by authorities having jurisdiction, provide type of products indicated which comply with ANSI Z97.1 and testing requirements of 16 CFR Part 1201 for category II materials.

Subject to compliance with requirements, provide safety glass permanently marked with certification label of Safety Glazing Certification Council (SGCC) or other certification agency acceptable to authorities having jurisdiction.

Fire Resistance Rated Wire Glass: Provide wire glass products that are identical to those tested per ASTM E 163 (UL 9) and are labeled and listed by UL or other testing and inspecting agency acceptable to authorities having jurisdiction.

<u>Insulating Glass Certification Program</u>: Provide insulating glass units permanently marked either on spacers or at least one component pane of units with appropriate certification label of inspecting and testing organization indicated below:

Insulating Glass Certification Council (IGCC).

Field-Constructed Mock-Up: Prepare mock-ups for the following types of glass in locations directed by Architect. Construct mock-ups to match glazing systems required for project, including typical pane size, framing system, and glazing materials and methods. Obtain Architect's acceptance of visual qualities before proceeding with the work. Retain mock-ups in undisturbed condition during construction as a standard for judging completed work.

Laminated glass.

Insulating glass of each type.

Single Source Responsibility For Glass: To ensure consistent quality of appearance and performance, provide materials produced by a single manufacturer or fabricator for each kind and condition of glass indicated and composed of primary glass obtained from a single source for each type and class required.

Preconstruction Compatibility and Adhesion Testing: Submit samples of all glass, gaskets, glazing accessories, and glass framing members proposed for use in contact with, or proximity of, glazing sealants, to sealant manufacturer for compatibility and adhesion testing in accordance with sealant manufacturer's standard testing methods and the following requirements:

Submit not less than 9 pieces of each type and finish of glass framing member and of each type, class, kind, condition, and form (monolithic, laminated, insulating units) of glass for adhesion testing and one sample of substrates (gaskets, setting blocks and spacers) for compatibility testing.

Schedule sufficient time for testing and analysis of results to prevent delay in the progress of the Work.

<u>Investigate</u> materials failing compatibility or adhesion tests and obtain sealant manufacturer's written recommendations for corrective measures, including use of specially formulated primers.

DELIVERY, STORAGE, AND HANDLING:

Protect glass and glazing materials during delivery, storage and handling to comply with manufacturer's directions and as required to prevent edge damage to glass, and damage to glass and glazing materials from effects of moisture including condensation, of temperature changes, of direct exposure to sun, and from other causes.

Where insulating glass units will be exposed to substantial altitude changes, avoid hermetic seal ruptures by complying with insulating glass fabricator's recommendations for venting and sealing.

PROJECT CONDITIONS:

Environmental Conditions: Do not proceed with glazing when ambient and substrate temperature conditions are outside the limits permitted by glazing material manufacturer or when joint substrates are wet due to rain, frost, condensation or other causes.

Install liquid sealants at ambient and substrate temperatures above 40 deg. F (4.4 deg. C).

WARRANTY:

General: Warranties shall be in addition to, and not a limitation of, other rights the Owner may have under the Contract Documents.

Manufacturer's Special Project Warranty on Laminated Glass: Provide written warranty signed by manufacturer of laminated glass agreeing to furnish f.o.b. point of manufacture, freight allowed project site, within specified warranty period indicated

below, replacements for those laminated glass units which develop manufacturing defects. Manufacturing defects are defined as edge separation or delamination which materially obstructs vision through glass.

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Warranty Period: Manufacturer's standard but not less than 4 years after date of substantial completion.

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16 17 Manufacturer's Special Project Warranty on Coated Provide written warranty signed by manufacturer of Products: coated glass agreeing to furnish f.o.b. point of manufacture, freight allowed project site, within specified warranty period indicated below, replacements for those coated glass units which develop manufacturing defects. Manufacturing defects are defined as peeling, cracking or deterioration in metallic coating due to normal conditions and not due to handling or installation or cleaning practices contrary to manufacturer's published instructions.

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Warranty Period: Manufacturer's standard but not less than 5 years after date of substantial completion.

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Manufacturer's Special Project Warranty on Insulating Glass: Provide written warranty signed by manufacturer of insulating glass agreeing to furnish f.o.b. point of manufacture, freight allowed project site, within specified warranty period indicated below, replacements for those insulating glass units developing manufacturing defects. Manufacturing defects are defined as failure or hermetic seal of air space (beyond that due to glass breakage) as evidenced by intrusion of dirt or moisture, internal condensation or fogging, deterioration of protected internal glass coatings, if any, and other visual indications of performance; provided the manufacturer's seal failure or instructions handling, installing, protecting for maintaining units have been complied with during the warranty period.

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Warranty Period: Manufacturer's standard but not less than 10 years after date of substantial completion.

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PART 2 - PRODUCTS

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MANUFACTURERS:

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Manufacturers: Subject to compliance with requirements, provide products of one of the following:

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Manufacturers of Clear and Tinted Float Glass:

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AFG Industries, Inc. Ford Glass Division.

53 Guardian Industries Corp.

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LOF Glass, Inc.

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1 PPG Industries, Inc.
2 Saint-Gobain/Euroglass.
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Manufacturers of Wire Glass:

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AFG Industries, Inc. Guardian Industries Corp. Hordis Brothers, Inc.

8 Hordis 9 Pilkin

Pilkington Sales (North America) Limited.

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Manufacturers of Heat-Treated Glass:

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AFG Industries, Inc. Ford Glass Division. Guardian Industries Corp. Hordis Brothers, Inc. LOF Glass, Inc. PPG Industries, Inc.

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Manufacturers of Coated Glass:

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24

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Ford Glass Division.
Guardian Industries Corp.
Hordis Brothers, Inc.
LOF Glass, Inc.
PPG Industries, Inc.

26 27 28

Manufacturers of Laminated Glass:

29 30 31

Ford Glass Division. Guardian Industries Corp. Hordis Brothers, Inc. PPG Industries, Inc.

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32

Manufacturers of Insulating Glass:

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AFG Industries, Inc. Ford Glass Division. Guardian Industries Corp. Hordis Brothers, Inc. PPG Industries, Inc.

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GLASS PRODUCTS, GENERAL:

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47 48 Primary Glass Standard: Provide primary glass which complies with ASTM C 1036 requirements, including those indicated by reference to type, class, quality, and if applicable, form, finish, mesh and pattern.

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Heat-Treated Glass Standard: Provide heat-treated glass which complies with ASTM C 1048 requirements, including those indicated by reference to kind, condition, type, quality, class, and, if applicable, form, finish, and pattern.

Fabricate glass to sizes required for glazing openings Sizes: indicated, with edge clearances and tolerances complying with recommendations of glass manufacturer. Provide thicknesses indicated or, if not otherwise indicated, as recommended by glass manufacturer for application indicated.

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PRIMARY GLASS PRODUCTS:

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Clear Float Glass: Type I, (transparent glass, flat), Class 1, Quality q3 (glazing select).

15 16 Refer to coated glass product requirements for tint and performance characteristics of coated tinted glass for single glazing relative to visible light transmittance, U-values, shading coefficient and visible reflectance.

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21 22 Refer to requirements for sealed insulating glass units for performance characteristics of assembled units composed of tinted glass, coated or uncoated, relative to visible light transmittance, U-values, shading coefficient and visible reflectance.

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Mirror Glass: 1/4" quality q2 clear float glass; full silver coating, copper coating, and organic coating.

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Wired Glass: Type II (patterned and wired glass, flat), Class 1 (translucent), Quality q8 (glazing); complying with ANSI Z97.1; 1/4" thick; of form and mesh pattern indicated below:

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Polished Wire Glass: Form 1 (wired, polished both sides), Mesh m2 (square).

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HEAT-TREATED GLASS PRODUCTS:

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Manufacture heat-treated glass as Manufacturing Process: follows:

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(tong-held) or horizontal (roller By vertical process, at manufacturer's option, except provide horizontal process where indicated as "tongless" or "free of tong marks".

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Uncoated Clear Heat-Treated Float Glass: Condition A (uncoated surfaces), Type I (transparent glass, flat), Class 1 (clear), Quality q3 (glazing select), kind as indicated below.

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Kind FT (fully tempered) where indicated.

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Uncoated Tinted Heat-Treated Float Glass: Condition A (uncoated surfaces), Type I (transparent glass, flat), Class 2 (tinted

heat absorbing and light reducing), Quality q3 (glazing select), with tint color and performance characteristics for 1/4" thick glass matching those indicated for non-heat-treated tinted float glass; kind as indicated below:

Kind FT (fully tempered) where indicated.

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LAMINATED GLASS PRODUCTS:

General: Refer to primary and heat-treated glass requirements relating to properties of uncoated glasses making up laminated glass products.

<u>Plastic Interlayer:</u> Provide glass fabricator's standard polyvinyl butyral interlayer for laminating panes of glass, with a proved record of showing no tendency to bubble, discolor or lose physical or mechanical properties after laminating and installation, in clear or colors and of thickness indicated.

Available Products: Subject to compliance with requirements, products which may be incorporated in the work include, but are not limited to, the following:

"Saflex"; Monsanto Co.

"Butacite"; E.I. DuPont De Nemours & Co., Inc.

<u>Laminating Process</u>: Fabricate laminated glass using laminator's standard heat-plus-pressure process to produce glass free from foreign substances and air/glass pockets.

<u>Laminated</u> <u>Sloped Glass</u>: Two panes of glass of equal thickness, laminated together with a 0.60" thick plastic interlayer and complying with requirements indicated below:

Glass Characteristics: Float glass, complying with requirements for class, tint, kind and thickness of each pane (ply) indicated below:

Class 1 - clear for inner pane only.

Class 2, bronze tint, outer pane only.

Kind FT (fully-tempered).

Thickness: 1/4".

Color of Plastic Interlayer: Clear.

SEALED INSULATING GLASS UNITS:

General: Provide preassembled units consisting of organically

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sealed panes of glass enclosing a hermetically sealed dehydrated air space and complying with ASTM E 774 for performance classification indicated as well as with other requirements specified for glass characteristics, air space, sealing system, sealant, spacer material, corner design and dessicant. For properties of individual glass panes making up units, 7_refer to product requirements specified elsewhere in this section applicable to types, classes, kinds and conditions of glass products indicated.

Provide heat-treated panes of kind and at locations indicated or, if not indicated, provide heat-strengthened panes where recommended by manufacturer for application indicated and tempered where indicated or where safety glass is designated or required.

Performance characteristics designated for coated insulating glass are nominal values based on manufacturer's published test data for units with 1/4" thick panes of glass and 1/2" thick air space.

Note: Some units, as indicated, require 2" air space.

U-values indicated are expressed in the number of Btu's per hour per sq. ft. per degree F difference.

Performance Classification per ASTM E 774: Class A.

Thickness of Each Pane: As indicated.

Air Space Thickness: As indicated.

Dual seal; primary System: Sealing polyisobutylene, secondary sealant; manufacturer's standard.

Spacer Material: Aluminum, color matched.

Dessicant: Manufacturer's standard; either molecular sieve or silica gel or blend of both.

Manufacturer's standard corner Construction: Corner construction.

Manufacturer's standard units Uncoated Insulating Glass Units: complying with the following requirements:

Exterior Pane: Tinted float glass.

Kind FT (fully tempered).

Interior Pane of Glass: Clear float glass.

Kind FT (fully tempered).

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<u>Performance</u> <u>Characteristics</u>: Visible light transmittance of 46-47 percent, summer daytime U-value of 0.56-0.57, winter nighttime U-value of 0.49, shading coefficient of 0.56-0.58 and outdoor reflectance of 9 percent.

 <u>Vacuum-Deposited Insulating Glass Units:</u> Manufacturer's standard units with one pane of glass coated with a durable metallic or metallic oxide coating, of color and on surface indicated, by manufacturer's standard deposition process, and complying with the following requirements:

Exterior Pane: Tinted float glass, coated on second surface.

Tint: Bronze.

Kind FT (fully tempered).

Interior Pane: Clear float glass, uncoated.

Kind FT (fully tempered).

Coating Color: Silver.

Performance Characteristics: Visible light transmittance of 13 percent, summer daytime U-value of 0.54, winter nighttime U-value of 0.45, shading coefficient of 0.27 and outdoor reflectance of 9 percent.

Architect's Sample: Match the characteristics of "Solarban" 565-20 Bronze Glass as manufactured by PPG.

Sloped Insulating Glass Units: Provide manufacturer's standard insulating units with interior pane of clear laminated sloped glass and with exterior pane complying with requirements indicated below:

Kind FT (fully tempered) tinted float glass.

 Insulating Spandrel Glass: Manufacturer's standard units with Kind HS (heat strengthened) exterior pane and location of reflective coating matching that of coated insulating glass units for type, class and coating characteristics, and with interior pane complying with the following additional requirements:

 <u>Ceramic-Coated Heat-Treated Spandrel Glass</u>: Condition B (spandrel glass, one surface ceramic coated), Kind HS (heat strengthened), Type I (transparent glass, flat), Class 1 (clear), Quality q3 (glazing select), and complying with the following requirements:

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Color: Match Architect's sample.

Location of Ceramic Coating: Third surface of insulating spandrel unit.

Location of Ceramic Coating: Fourth surface of insulating spandrel unit.

ELASTOMERIC GLAZING SEALANTS AND PREFORMED GLAZING TAPES:

General: Provide products of type indicated and complying with the following requirements:

Compatibility: Select glazing sealants and tapes of proven compatibility with other materials with which they will come into contact, including glass products, seals of insulating glass units, and glazing channel substrates, under conditions of installation and service, as demonstrated by testing and field experience.

Comply with recommendations of sealant and Suitability: glass manufacturers for selection of glazing sealants and tapes which have performance characteristics suitable for conditions of indicated and applications installation.

Provide manufacturer's Standard: Elastomeric Sealant standard chemically curing, elastomeric sealant of base which complies with 920 ASTM indicated requirements, including those for Type, Grade, Class and Uses.

Provide color of exposed sealants indicated or, if not otherwise indicated, as selected by Architect from manufacturer's standard colors.

One-Part Non-Acid-Curing Silicone Glazing Sealant: Type S; Grade NS, Glass 25; Uses NT, G, A, and, as applicable to uses indicated, O; and complying with the following requirements for modulus and additional joint movement capability.

Tensile strength of not less than 45 nor Medium Modulus: more than 75 psi at 100 percent elongation when tested per ASTM D 412 after 14 days at 77 deg. F (20 deg. C) and 50 percent relative humidity.

Additional capability, when tested per ASTM C 719 for adhesion and cohesion under maximum cyclic movement, to withstand the following percentage increase and decrease of joint width, as measured at time of application, and remain in compliance with other requirements of ASTM C 920.

40 percent.

Butyl-Polyisobutylene Glazing Tape: Preformed Provide manufacturer's standard solvent-free butyl-polyisobutylene formulation with a solids content of 100 percent; complying with AAMA A 804.1; in extruded tape form; non-staining and non-migrating in contact with nonporous surfaces; packaged on rolls with a release paper on one side; with or without continuous spacer rod as recommended by manufacturers of tape and glass for application indicated.

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Products: Subject to compliance with requirements, provide one of the following:

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One-Part Non-Acid Curing Medium- Modulus Silicone Glazing Sealant:

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"Dow-Corning 795"; Dow Corning Corp.
"Silpruf"; General Electric Corp.
"Gesil"; General Electric Corp.
"Spectrum 2"; Tremco, Inc.
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Preformed Butyl- Polyisobutylene Glazing Tape Without Spacer Rod:

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"Chem-Tape 40"; Bostik Construction Products Div.
"Extru-Seal"; Pecora Corp.
"PTI 303"; Glazing Tape; Protective Treatments, Inc.
"Tremco 440 Tape"; Tremco Inc.
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Preformed Butyl-Polyisobutylene Glazing Tape With Spacer Rod:

31 "Chem-Tape 60"; Bostik Construction Products Div. 32 33 "Shim-Seal"; Pecora Corp. 34 "PTI 303" Shim Tape; Protective Treatments, Inc. 35 "Pre-shimmed Tremco 440 Tape"; Tremco Inc.

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GLAZING GASKETS:

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Lock-Strip Gaskets: Neoprene extrusions of size and shape indicated, fabricated into frames with molded corner units and zipper lock strips, complying with ASTM C 542; black.

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Dense Elastomeric Compression Seal Gaskets: Molded or extruded gaskets of material indicated below, complying with ASTM C 864, of profile and hardness required to maintain watertight seal:

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Neoprene.
EPDM.
Thermoplastic polyolefin rubber.
Any material indicated above.
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Cellular Elastomeric Preformed Gaskets: Extruded or molded closed cell, integral-skinned neoprene of profile and hardness

required to maintain watertight seal; complying with ASTM C 509, Type II; black.

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Manufacturers: Subject to compliance with requirements, provide products of one of the following:

Manufacturers of Lock-Strip Gaskets:

Cadillac Rubber & Plastics, Inc. Maloney Precision Products Co. The Standard Products Co.

Manufacturers of Preformed Gaskets:

D.S. Brown Co.

Maloney Precision Products Co. Tremco.

MISCELLANEOUS GLAZING MATERIAL:

Compatibility: Provide materials with proven record of compatibility with surfaces contacted in installation.

Cleaners, Primers, and Sealers: Type recommended by sealant or gasket manufacturer.

<u>Setting Blocks</u>: Neoprene, EPDM or silicone blocks as required for compatibility with glazing sealants, 80 to 90 Shore A durometer hardness.

<u>Spacers</u>: Neoprene, EPDM or silicone blocks, or continuous extrusions, as required for compatibility with glazing sealant, of size, shape and hardness recommended by glass and sealant manufacturers for application indicated.

Edge Blocks: Neoprene, EPDM or silicone blocks as required for compatibility with glazing sealant, of size and hardness required to limit lateral movement (side-walking) of glass.

Compressible Filler Rods: Closed-cell or waterproof-jacketed rod stock of synthetic rubber or plastic foam, flexible and resilient, with 5-10 psi compression strength for 25 percent deflection.

PART 3 - EXECUTION

EXAMINATION:

Require Glazier to inspect work of glass framing erector for compliance with manufacturing and installation tolerances, including those for size, squareness, offsets at corners; for

presence and functioning of weep system; for existence of minimum required face or edge clearances; and for effective sealing of joinery. Obtain Glazier's written report listing conditions detrimental to performance of glazing work. Do not allow glazing work to proceed until unsatisfactory conditions have been corrected.

PREPARATION:

<u>Pre-Installation Meeting:</u> At Contractor's direction, Glazier, sealant and gasket manufacturers' technical representatives, glass framing erector and other trades whose work affects glass and glazing shall meet at project site to review procedures and time schedule proposed for glazing and coordination with other work.

<u>Clean glazing channels</u> and other framing members to receive glass, immediately before glazing. Remove coatings which are not firmly bonded to substrates. Remove lacquer from metal surfaces where elastomeric sealants are indicated for use.

GLAZING, GENERAL:

<u>Comply with combined printed recommendations</u> of glass manufacturers, of manufacturers of sealants, gaskets and other glazing materials, except where more stringent requirements are indicated, including those of referenced glazing standards.

Glazing channel dimensions as indicated in details are intended to provide for necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances. Adjust as required by job conditions at time of installation.

Protect glass from edge damage during handling and installation; use a rolling block in rotating glass units to prevent damage to glass corners. Do not impact glass with metal framing. Use suction cups to shift glass units within openings; do not raise or drift glass with a pry bar. Rotate glass with flares or bevels along one horizontal edge which would occur in vicinity of setting blocks so that these are located at top of opening. Remove from project and dispose of glass units with edge damage or other imperfections of kind that, when installed, weakens glass and impairs performance and appearance.

Apply primers to joint surfaces where required for adhesion of sealants, as determined by proconstruction sealant-substrate testing.

GLAZING:

<u>Install</u> <u>setting</u> <u>blocks</u> of proper size in sill rabbet, located one quarter of glass width from each corner, but with edge nearest corner not closer than 6" from corner unless otherwise required. Set blocks in thin course of sealant which is acceptable for heel bead use.

Provide spacers inside and out, of correct size and spacing to preserve required face clearances, for glass sizes larger than 50 united inches (length plus height), except where gaskets or glazing tapes with continuous spacer rods are used for glazing. Provide 1/8" minimum bite of spacers on glass and use thickness equal to sealant width, except with sealant tape use thickness slightly less than final compressed thickness of tape.

<u>Provide</u> <u>edge</u> <u>blocking</u> to comply with requirements of referenced glazing standard, except where otherwise required by glass unit manufacturer.

Set units of glass in each series with uniformity of pattern, draw, bow and similar characteristics.

Provide compressible filler rods or equivalent back-up material, as recommended by sealant and glass manufacturers, to prevent sealant from extruding into glass channel weep systems and from adhering to joints back surface as well as to control depth of sealant for optimum performance, unless otherwise indicated.

Force sealants into glazing channels to eliminate voids and to ensure complete "wetting" or bond of sealant to glass and channel surfaces.

Tool exposed surfaces of sealants to provide a substantial "wash" away from glass. Install pressurized tapes and gaskets to protrude slightly out of channel, so as to eliminate dirt and moisture pockets.

Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage to ensure that gasket will not "walk" out when installation is subjected to movement.

Miter cut wedge-shaped gaskets at corners and install gaskets in manner recommended by gasket manufacturer to prevent pull away at corners; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

PROTECTION AND CLEANING:

Protect exterior glass from breakage immediately upon installation by use of crossed streamers attached to framing and held away from glass. Do not apply markers to surfaces of glass. Remove nonpermanent labels and clean surfaces.

Protect glass from contact with contaminating substances resulting from construction operations. If, despite such protection, contaminating substances do come into contact with glass, remove immediately by method recommended by glass manufacturer.

Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less often than once a month, for build-up of dirt, scum, alkali deposits or staining. When examination reveals presence of these forms of residue, remove by method recommended by glass manufacturer.

Remove and replace glass which is broken, chipped, cracked, abraded or damaged in other ways during construction period, including natural causes, accidents and vandalism.

Wash glass on both faces not more than 4 days prior to date scheduled for inspections intended to establish date of substantial completion in each area of project. Wash glass by method recommended by glass manufacturer.

END OF SECTION 08800

SECTION 08910 - SLOPE GLAZED FRAMING SYSTEMS

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PART 1 - GENERAL

RELATED DOCUMENTS:

 Drawings and general provisions of Contract, including General and Special Conditions and Division-1 Specification sections, apply to work of this section.

DESCRIPTION OF WORK:

The extent of slope glazed framing work is indicated on the drawings and schedules.

Types of slope glazed framing required includes the following:

Metal stick-framed systems with interior and exterior exposed metal framing.

Primary Locations: Heliport Entrance Vestibule and Emergency drive-in canopy.

Primary System Expanse: Single-story and multi-bay.

Primary components of slope glazed framing work include the
following, including work cross-referenced to other
specification sections for requirements:

Aluminum curtain wall framing system.

Glass and glazing work refer to "Glass and Glazing" section.

Nonglass panels incorporated in the framing system.

Sills and similar border and filler items indicated as integral components of the curtain wall system.

Joint sealer work that is associated with components of the framing system; refer to "Joint Sealers" section.

Anchorage, shims, fasteners, accessories and support brackets for components of the framing system.

Entrance and Storefront Work: Refer to Division-8 section "Aluminum Entrances and Storefronts" for requirements; entrance and storefront work is not included in this section.

<u>Aluminum Framed Skylight Systems</u> are specified under Section 07700 - Roofing Specialties and Accessories.

SYSTEM PERFORMANCE REQUIREMENTS:

Load-bearing Strength (Wind Resistance): Provide the manufacturer's custom system, adapted to the application indicated, which has been tested in accordance with ASTM E 330 to withstand at least a uniform pressure of 25 psf inward and 20 psf outward.

<u>Deflections and Thermal Movements:</u> Provide manufacturer's custom products and system which are capable of withstanding building movements and weather exposures including wind loading, and which are capable of performing within the following limitations:

Normal-to-wall deflection not exceeding 1/200 of the span, except 1/300 for glass supporting members.

<u>Parallel-to-wall</u> <u>deflections</u> not exceeding 75 percent of glass edge clearances.

Thermal movements resulting from an ambient temperature range of 120 deg.F (67 deg.C), which may cause wall framing range of 180 deg.F (100 deg.C).

Leakage Resistance, Water and Air: Provide the manufacturer's custom framing system that has been tested to demonstrate permanent resistance to leakages as follows with a test pressure differential of 20 percent of design loading (excluding operable window or door edge joints, if any):

Air Leakage: Not more than 0.06 cfm per sq. ft. of wall area when tested in accordance with ASTM E 283.

<u>Water Penetration</u>: No uncontrolled leakage when tested in accordance with ASTM E 331.

Condensation Requirements: Provide the manufacturer's improved thermal-break construction which has been tested and certified by the manufacturer, in accordance with AAMA 1502.7, with 0 deg.F (-18 deg.C) outside and 25 percent relative humidity inside, to provide a condensation resistance factor (CRF) of at least 45.

SUBMITTALS:

Shop Drawings: Submit shop drawings showing adaptation of the manufacturer's standard system to the project; include typical unit elevations of 1/2" scale and details at 3" scale, to show dimensioning, member profiles, anchorage system, interface with building construction, and glazing. Indicate the section moduli of wind-load-bearing members, and calculations of stresses and deflections for performance under design loading. Show clearly where and how the manufacturer's system deviates from contract

drawings and these specifications.

<u>Product</u> <u>Data</u>: Submit manufacturer's specifications for materials and fabrication of slope and framing, and instructions and recommendations for installation and maintenance. Include certified test reports showing compliance with requirements where a test method is indicated.

Samples: Submit samples of each type and color of aluminum finish, on 12" long sections of extrusions or formed shapes and on 6" squares of sheet or plate. Include 2 or more samples in each set, showing near-limits of variations, if any, in color and texture of finish.

The Architect reserves the right to require fabrication samples showing the following:

Prime members.
Joinery.
Anchorage.
Expansion provisions.
Glazing and similar details.

Intersections.

Profiles.

QUALITY ASSURANCE:

Material and Products shall be manufactured by a company continuously and regularly employed in the manufacturer of similar materials, for a period of at least five (5) consecutive years; and which can show evidence of these materials being satisfactorily used on projects of similar size and type within such period.

<u>Installer Qualifications</u>: Glazed framing system shall be installed by a firm with not less than 5 years of successful experience in the erection of custom slope glazed framing systems similar to systems required for this project.

The manufacturer shall be responsible for the profiles, configuration, fabrication (and erection) of the slope glazed system as a complete package.

<u>Standards</u>: Comply with applicable provisions of the "Metal Curtain Wall, Window, Store Front and Entrance Guide Specifications Manual" by AAMA.

WARRANTY:

General: Provide written warranty, signed by Contractor and Installer, agreeing to repair or replace defective materials and workmanship of sloped glazed framing work during 5-year warranty

period (see primary components listing in this section).

Defective is defined to include the following:

Excessive deflection Abnormal deterioration.

Abnormal aging.

Abnormal weathering.

Glass breakage.

Failure of operational parts to function normally.

Deterioration or discoloration of finishes.

Failure of the system to meet performance requirements (including structural and infiltration).

Repairs or replacements required because of the following shall be completed by the Contractor/Installer and paid for by the Owner at reasonable prevailing rates mutually agreed upon at the time of such repair or replacement work:

Acts of God exceeding performance requirements.

Vandalism.

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Inadequate maintenance.

Alterations.

Failure of the structure supporting the slope glazed framing work.

Other causes beyond the control of the Manufacturer, Fabricator, Installer or Contractor, as judged by the Architect.

Warranty and enforcement shall not deprive the Owner of other available actions, rights or remedies.

PART 2 - PRODUCTS

ACCEPTABLE MANUFACTURERS:

Manufacturers: Subject to compliance with requirements, provide products of one of the following:

Hordis Brothers, Pennsauken, NJ Kawneer Company, Inc.; Norcross, GA Penco,. Inc. Skylights, Louisville, KY Wausau Metals Corporation; Wausau, WI

MATERIALS AND COMPONENTS:

Aluminum Members: Provide members such as extrusions, formed members, sheet and plate, of the alloy, temper and thickness recommended by the manufacturer to comply with the requirements of ASTM B 221 for extrusions, and ASTM B 209 for sheet or plate.

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<u>Rafters</u> shall be of extruded aluminum and designed for E.P.D.M. glazing gaskets. Rafters shall have the condensation gutters as an integral portion of the extrusions.

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<u>Insulated Panels</u>: Provide manufacturer's laminated aluminum-faced panels of thickness indicated. Unless otherwise indicated, panel shall be flat, with no deviation in any direction exceeding 1/16" in 2'-0" or 1/8" for the entire panel.

Face Sheets: Provide face sheets not less than 0.0249" thick and finished to match curtain wall framing.

Back Sheets: Match face sheets.

Edge Condition: Prepared for glazing into framing and either sealed or vented to the exterior only.

<u>Insulating Core:</u> Provide rigid, closed-cell polystyrene core, either molded bead-board or extruded material, with a "k" value of 0.27.

Glazing Gaskets: Provide manufacturer's sealed-corner pressureglazing or wedge-lock dry glazing system of black, resilient elastomeric glazing gaskets, setting blocks and shims or spacers as required; hardness selected by curtain wall manufacturer.

Gasket Material: As recommended by Manufacturer for intended use.

Glazing sealants and fillers are specified in "Glass and Glazing" sections.

Glass is specified in "Glass and Glazing" sections.

Framing System Gaskets and Joint Fillers: Provide the framing system manufacturer's special permanent type framing system gaskets and joint fillers depending on joint movement and sealing requirements, such as sliding joints, compression joint translation, or non-moving joints.

<u>Sealants</u> and <u>joint</u> <u>fillers</u> are specified in "Joint Sealers" section, both for joints within the slope glazed framing construction and for joints at the interface of slope glazed framing construction with other work.

Brackets and Reinforcements: Where feasible, provide the manufacturer's standard high-strength aluminum units; otherwise provide non-magnetic stainless steel. At the fabricator's option, brackets not exposed to weather or abrasion may be hot-dip galvanized steel complying with requirements of ASTM A 386. Provide non-staining, non-ferrous shims for installation and alignment of slope glazed framing work.

Concealed Flashing: Provide dead-soft 26-gage stainless steel concealed flashing, of type selected for compatibility by the manufacturer.

Fasteners and Accessories: Provide the manufacturer's standard non-corrosive fasteners and accessories that are compatible with materials used in the framing system and with exposed portions that match finish of the framing system. Where movement should be expected, provide slip-joint linings of sheets, pads, shims, or washers of fluorocarbon resin or a similar material recommended by the manufacturer.

Where fasteners anchor into aluminum less than 0.125" thick, provide non-corrosive pressed-in splined grommet nuts or other type reinforcement to receive fastener threads.

Concrete or Masonry Inserts: Provide cast-iron, malleable iron or hot-dip galvanized steel complying with the requirements of ASTM A 386.

FABRICATION:

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General: Fabricate curtain wall system at manufacturer's shop to the fullest extent possible, and prior to application of finishes. otherwise indicated provide concealed Unless fasteners. Make provisions to weep penetrating water and 28 condensation to the exterior.

> Where feasible, install nonglazed panels in prefabricated frames at the manufacturer's shop.

Aluminum stick-type system is an individual-member erection system with deep vertical exterior mullions and matching flat "glazed" insulated spandrel panels. Except for spandrel panels installed during erection, glazing shall be from the inside. Fabricate the system with an integrally concealed resilient thermal break, so that exterior-exposed aluminum does not contact interior exposed aluminum or other work, and with no metal fasteners or accessories bridging the break.

Slope Glazed Wall Systems: Includes two separate and distinct types. The entrance canopy at the emergency room consists of round horizontal tube members fabricated to seal and support the sloped glass sections and vertical framing members under the horizontal tubes for structural support. The other slope glazed system is the entrance vestibule areas at the heliport deck. This system incorporates typical "greenhouse" framing support systems.

FINISHES:

Special Coating:

Comply with requirements of AAMA 605.2.

PART 3 - EXECUTION

Fluoropolymer Coating:

PREPARATION:

Furnish inserts at proper times for setting in concrete formwork, masonry, and similar work indicated to support slope glazed framing work.

pigmented 2-coat baked system of 33 percent thermoplastic

polymer of vinylidine fluoride (59 percent flourine by weight), total of 3 mils dry film thickness, medium gloss at 60 deg. in accordance with ASTM D 523. Match the Architect's color sample.

Provide the manufacturer's

Installer must examine the areas and conditions under which skylights and associated items are to be installed and notify the Contrator, in writing, of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected.

INSTALLATION:

 Comply with manufacturer's instructions for protection, handling and installation of fabricated system components, with particular care and attention to preservation of applied finishes. Discard or remove and replace damaged members.

Anchor components securely in place in the manner indicated, shimming and allowing for movement resulting from changes in thermal conditions. Provide separators and isolators to prevent corrosion and electrolytic deterioration and to prevent "freeze-up" of moving joints.

Glazing is specified in "Glass and Glazing" sections.

<u>Sealants</u> and <u>joint</u> <u>fillers</u> are specified in "Joint Sealers" sections.

Erection Tolerances: Install curtain wall components plumb, level, accurately aligned and accurately located in reference to column lines and floor levels. Adjust work to conform to the following tolerances:

Plumb: 1/8" in 10'; 1/4" in 40'.

Level: 1/8" in 20'; 1/4" in 40'.

Alignment: Limit offset of member alignment to 1/16" where

surfaces are flush or less than 1/2" out of flush, and separated by less than 2" by a reveal or protruding work; otherwise limit offsets to 1/8".

Location: 3/8" maximum deviation from measured theoretical location of any member at any location.

CLEANING:

<u>Clean the completed system</u>, inside and out, promptly after erection and installation of glass and sealants allowing for nominal curing of liquid sealants. The framing system installer shall advise the Contractor of proper and adequate procedures for protection and cleaning during the remainder of the construction period, so that the system will be without damage and deterioration at the time of acceptance.

At the time of substantial completion, clean slope glazed framing system thoroughly and polish glass. Demonstrate proper cleaning methods and materials to the Owner's maintenance personnel.

END OF SECTION 08900

SECTION 09200 - LATH AND PLASTER

PART 1 - GENERAL

RELATED DOCUMENTS:

 Drawings and general provisions of Contract, including General and Special Conditions and Division-1 Specification sections, apply to work of this section.

DESCRIPTION OF WORK:

Types of work includes:

Metal furring and lathing.

Gypsum plastering.

Portland cement plastering.

Veneer Plaster is specified in another section of Division 9.

Metal stud partition systems are specified in another Section of Division 9.

QUALITY ASSURANCE:

<u>Fire-Resistance Rating:</u> Where plastered systems with fire-resistance ratings are indicated, provide materials and installations which are identical with those of applicable assemblies tested per ASTM E 119 by fire testing laboratories acceptable to authorities having jurisdiction.

Provide plaster for fire-resistance rated systems which has same aggregate as specified for non-rated work, unless specified aggregate has not been tested by accepted fire testing laboratories.

Coordination of Work: Coordinate layout and installation of suspension system components for suspended ceilings with other work supported by, or penetrating through, ceiling.

SUBMITTALS:

Product Data: Submit manufacturer's product data for cementitious materials, lath, metal support components, and accessories.

<u>Material</u> <u>Certificates</u>: Submit producer's certificate for each kind of plaster aggregate indicated evidencing that materials comply with requirements.

DELIVERY, STORAGE, AND HANDLING:

Deliver materials in original packages, containers or bundles bearing brand name and identification of manufacturer.

 Store materials inside, under cover and in manner to keep them dry, protected from weather, direct sunlight, surface contamination, aging, corrosion, and damage from construction traffic and other causes. Neatly stack gypsum lath flat to prevent deformation.

<u>Handle gypsum</u> <u>lath</u> to prevent damage to edges, ends or surfaces. Protect metal corner beads and trim from being bent or damaged.

PROJECT CONDITIONS:

<u>Environmental</u> <u>Requirements, General</u>: Comply with requirements of referenced plaster application standards and recommendations of plaster manufacturer for environmental conditions before, during, and after application of plaster.

 Cold Weather Protection: When ambient outdoor temperatures are below 55 degrees F (13 degrees C), maintain continuous uniform temperature of not less than 55 degrees F (13 degrees C) nor more than 70 degrees F (21 degrees C) for not less than 1 week prior to beginning plaster application, during its application, and until plaster is dry but for not less than one week after application is complete. Distribute heat evenly; prevent concentrated or uneven heat from contacting plaster near heat source.

<u>Ventilation</u>: Ventilate building spaces as required to remove water in excess of that required for hydration of plaster. Begin ventilation immediately after plaster is applied and continue until it sets.

<u>Protect contiguous work</u> from soiling, spattering, moisture deterioration and other harmful effects which might result from plastering.

PART 2 - PRODUCTS

ACCEPTABLE MANUFACTURERS

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Subject to compliance with requirements, provide
 1
    Manufacturer:
    products of one of the following:
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        Manufacturers of Metal Supports:
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        Allied Structural Industries, Inc.
 7
        Bostwick Steel Framing Co.
 8
        Chicago Metallic Corp.
 9
        Dale Industries, Inc.
        Gold Bond Building Products Div., National Gypsum Co.
10
        Milcor Division; Inryco, Inc.
11
        Marino Industries.
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        United States Gypsum Co.
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        Manufacturers of Expanded Metal Lath:
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        Bostwick Steel Framing Co.
        Chapman Industries.
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        Gold Bond Building Products Div., National Gypsum Co.
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        Milcor Division; Inryco, Inc.
        United States Gypsum Co.
21
        Western Metal Lath Co.
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23
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        Manufacturers of Accessories:
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        Fry Reglet Corp.
        Gold Bond Building Products Div., National Gypsum Co.
27
28
        Keene Corp.
        Milcor Division; Inryco, Inc.
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        MM Systems Corp.
        Plastic Components, Inc.
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        United States Gypsum Co.
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        Western Metal Lath Co.
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        Manufacturers of Gypsum Lath and Plasters:
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        Gold Bond Building Products Div., National Gypsum Co.
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        United States Gypsum Co.
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    METAL SUPPORTS FOR SUSPENDED AND FURRED CEILINGS:
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                 Size metal ceiling supports to comply with the
43
    General:
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     following, unless otherwise indicated.
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        Portland Cement Plaster Installation: ANSI A42.3.
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     Wire for Hangers and Ties: ASTM C 641, Class 1 zinc coating,
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49
     soft temper.
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    Rod Hangers: Mild steel, zinc or cadmium coated.
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                     Mild steel, zinc or cadmium coated or protected
     Flat Hangers:
     with rust inhibitive paint.
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Cold-rolled steel, 0.0598" min, thickness of base metal (uncoated), allowable bending stress of 18,000 psi, protected with rust inhibitive paint or galvanizing complying with ASTM A 525 for G60 coating designation, and as follows:

7

Carrying Channels: 1-1/2" deep x 7/16" wide flanges, 475 1bs. per 1000' painted, 508 lbs. per 1000' galvanized.

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Furring Channels: 3/4" deep x 7/16" wide flanges, 300 lbs. per 100' painted, 316 lbs. per 1000' galvanized.

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Provide galvanized channels for exterior installations.

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Hanger Anchorage Devices: Screws, cast-in-place concrete inserts other devices appropriate for anchorage to the form of structural framing indicated and whose suitability for use intended has been proven through standard construction practices or certified test data.

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Size devices to develop full strength of hanger but not less than 3 times calculated hanger loading, except size direct pull-out concrete inserts for 5 x calculated hanger loading.

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LATH:

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Expanded Metal Lath: Fabricate expanded metal lath from uncoated or zinc-coated (galvanized) steel sheet to produce lath complying with ASTM C 847 for type, configuration and other characteristics indicated below, with uncoated steel sheet painted after fabrication into lath.

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Diamond Mesh Lath: Comply with the following requirements:

34 35

Configuration: Self-furring.

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Weight: 3.4 lbs. per sq. yd.

39 40

Rib Lath: Comply with the following requirements:

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Configuration: Flat, rib depth of not over 1/8".

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Weight: 3.4 lbs. per sq. yd.

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PLASTER ACCESSORIES FOR GYPSUM PLASTER:

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Comply with material provisions of ASTM C 841; coordinate depth of accessories with thicknesses and number of plaster coats required.

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Metal Corner Beads: Type as indicated below, fabricated from

1 2 3 zinc-coated (galvanized) steel.

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Small nose with expanded flanges, unless otherwise Type: indicated

5 6 Type: Type:

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Strip Reinforcement:

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coats required.

Small nose with perforated flanges, for use on curved

Small nose with expanded flanges reinforced by

stiffening rib, for use on columns and finishing masonry corners.

Smooth edge strips of expanded metal lath fabricated from uncoated or zinc-coated (galvanized) steel sheet, with uncoated steel painted after fabrication; in the following forms:

Cornerite: Strips prevent lengthwise in center for internal plaster angles not otherwise reinforced by metal lath lapped or carried around.

Stripite: Flat strips for reinforcing joints in gypsum lath, non-metallic bases, and between dissimilar plaster bases.

Casing Beads: Square-edged style, with short or expanded flanges to suit kinds of plaster bases indicated; of the following material:

Material: Zinc-coated (galvanized) steel.

Square-edged style, fabricated from Curved Casing Beads: aluminum coated with clear plastic, preformed into curve of radius indicated.

Control Joints: Prefabricate, of material and type indicated below:

Material: Zinc-coated (galvanized) steel.

Pair of casing beads with back flanges Two-Piece Type: formed to provide slip-joint action, adjustable for joint widths from 1/8" to 5/8".

Provide removable protective tape on plaster face of control joints.

PLASTER ACCESSORIES FOR PORTLAND CEMENT PLASTER:

Comply with material provisions of ANSI A42.3; coordinate depth of accessories with thicknesses and number of

Metal Corner Reinforcement: Expanded large mesh diamond mesh

lath fabricated from zinc-alloy or welded wire mesh fabricated from 0.0475" diameter zinc-coated (galvanized) wire, and specially formed to reinforce external corners of portland cement plaster on exterior exposures while allowing full plaster encasement.

Metal Corner Beads: Small nose corner beads fabricated from zinc alloy, with expanded flanges of large mesh diamond lath to allow full encasement by plaster.

<u>Casing Beads</u>: Square-edged style, with expanded flanges and removable protective tape, of the following material:

Material: Zinc-coated (galvanized) steel.

<u>Control</u> <u>Joints</u>: Prefabricate, of material and type indicated below:

Material: Zinc-coated (galvanized) steel.

Two-Piece Type: Pair of casing beads with back flanges formed to provide slip-joint action, adjustable for joint widths from 1/8" to 5/8".

GYPSUM PLASTER MATERIALS:

Base Coat Plasters: ASTM C 28, types as indicated below:

High strength gypsum neat plaster with a minimum average dry compressive strength of 2,800 psi per ASTM C 472 for a mix of 100 lbs. plaster and 2 cu. ft. of sand.

Finish Coat Plasters: Types as indicated below.

Gypsum Keene's cement, ASTM C 61.

Finishing Hydrated Limes: ASTM C 206, type as indicated below:

Type S: Special hydrated lime for finishing purposes.

Aggregates for Base Coat Plasters: ASTM C 35, types as indicated below:

Sand aggregate, unless otherwise indicated.

Aggregates for Finish Coat Plaster with Floated Finish: ASTM C 35; graded per ASTM C 842, type ad indicated below.

Sand aggregate.

<u>Products</u>: Subject to compliance with requirements, provide one of the following:

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52 53 Gypsum Ready-mixed Base Coat Plasters:

Gysolite; Gold Bond Building Products Div., National Gypsum Structo-Lite; United States Sypsum Co.

Gypsum Keene's Cement:

Red Top Keene's Cement; United States Gypsum Co.

Finishing Hydrated Limes, Type S:

Ivory Finish Lime; United States Gypsum Co. Snowdrift Finish Lime; United States Gypsum Co.

PORTLAND CEMENT PLASTER MATERIALS:

Base Coat Cements: Type as indicated below:

Portland Cement, ASTM C 150, Type I or III.

Finish Coat Cement: Type as indicated below:

Portland cement, ASTM C 150, Type I, white.

Factory-Prepared Finish Coat: Manufacturer's standard product requiring addition of water only; white in color unless otherwise indicated.

Subject to compliance with requirements, provide Oriental Exterior Finish Stucco manufactured by United States Gypsum Co., or similar product using silica sand and white portland cement.

Lime: Special hydrated lime for finishing purposes, ASTM C 206, Type S, or special hydrated lime for masonry purposes, ASTM C 207, Type S.

Sand Aggregate for Base Coats: ASTM C 897.

Aggregate for Finish Coats: ASTM C 897 and as indicated below.

Manufactured or natural sand, white in color.

Fiber for Base Coat: Alkaline-resistant glass fibers, 1/2" long, free of contaminates, manufactured for use in portland cement plaster.

Subject to compliance with requirements, provide Product: Dur-O-Fiber AR Glass manufactured by Dur-O-Wal. Inc.

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MISCELLANEOUS MATERIALS:

<u>Water for Mixing and Finishing Plaster:</u> Drinkable, free of substances capable of affecting plaster set or of damaging plaster, lath or accessories.

Bonding Compound for Gypsum Plaster: ASTM C 631.

Bonding Agent for Portland Cement Plaster: ASTM C 932.

<u>Acoustical</u> <u>Sealant</u>: ASTM C 919, non-oxidizing, skinning paintable types for exposed applications; non-drying, non-hardening, non-skinning type for concealed applications.

Sound Attenuation Blankets: FS HH-I-521, Type I; semi-rigid mineral fiber blanket without membrane, Class 25 flame spread, thicknesses as indicated.

Thermal Insulation: FS HH-I-521, Type I except for identification marking paragraph 3.7.1; semi-rigid mineral fiber blanket without membrane; Class 25 flame spread; v-value of 4.17; designed for use with Z-furring members; of thickness and widths to fill completely void formed by Z-furring members.

GYPSUM PLASTER MIXES AND COMPOSITIONS:

<u>Plaster Base Coat Compositions</u>: Comply with ASTM C 842 and manufacturer's directions for gypsum plaster base coat proportions which correspond to application methods and plaster bases indicated below:

Three-Coat Work Over Metal Lath: Base coats, as indicated below:

Scratch Coat: High strength gypsum gauging plaster with job-mixed sand.

Brown Coat: High strength gypsum gauging plaster with job-mixed sand.

<u>Two-Coat</u> <u>Work</u> <u>Over</u> <u>Concrete</u>: Base coats of gypsum neat plaster with job-mixed sand.

<u>Finish Coats</u>: Proportion materials for finish coats to comply with ASTM C 842 for each type of finish coat and texture indicated.

Troweled Finishes: Finish coat as indicated below.

Gypsum Keene's Cement: Proportion as indicated below:

2 parts plaster to 1 part lime.

PORTLAND CEMENT PLASTER MIXES AND COMPOSITIONS:

<u>General</u>: Comply with ASTM C 926 for portland cement plaster base and finish coat mixes as applicable to plaster bases, materials and other requirements as indicated.

Portland Cement Plaster Base Coat Mixes and Compositions: Proportion materials for respective base coats in parts by volume for cementitious materials and in parts by volume persum of cementitious materials for aggregates to comply with the following requirements for each method of application and plaster base indicated. Adjust mix proportions below within limits specified to attain workability.

Three-Coat Work Over Metal Lath: Base coats as indicated below:

Scratch Coat: 1 part portland cement, 3/4 to 1-1/2 parts lime, 2-1/2 to 4 parts sand.

Brown Coat: 1 part portland cement, 3/4-1-1/2 parts

Fiber Content: Add fiber to mixes above to comply with fiber manufacturer's directions but not to exceed 2 lbs. per cu. ft. of cementitious materials. Reduce aggregate quantities accordingly to maintain workability.

Job-Mixed Portland Cement Plaster Finish Coats: Proportion materials for finish coats in parts by volume for cementitious materials and parts by volume per sum of cementitious materials for aggregates to comply with the following requirements:

1 part portland cement, 3/4 to 1-1/2 parts lime, 3 parts sand.

Factory-Prepared Portland Cement Finish Coats: Add water only; comply with finish coat manufacturer's directions.

MIXING:

Mechanically mix cementitious and aggregate materials for plasters to comply with applicable referenced application standard and with recommendations of plaster manufacturer.

PART 3 - EXECUTION

INSTALLATION OF LATHING AND FURRING, GENERAL:

lime, 3 to 5 parts sand.

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Interior Lathing and Furring Installation Standard: Install lathing and furring materials indicated for gypsum plaster to comply with ASTM C 841.

Portland Cement Plaster Lathing and Furring Installation Install lathing and furring materials indicated for Standard: portland cement plaster to comply with ANSI A42.3.

supplementary framing, blocking, terminations in the work and for support of fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, and similar work to comply with details indicated or if not otherwise indicated, to comply with applicable published recommendations of gypsum plaster manufacturer, or if not available, of "Gypsum Construction Handbook" published by United States Gypsum Co.

Isolation: Where lathing and metal support system abuts building structure horizontally, and where partition/wall work abuts overhead structure, isolate the work from structural movement sufficiently to prevent transfer of loading into work from the building structure. Install slip or cushion type joints to absorb deflections but maintain lateral support.

both sides of control and expansion independently, and do not bridge joints with furring and lathing or accessories.

INSTALLATION OF CEILING SUSPENSION SYSTEMS:

Preparation and Coordination: Coordinate installation of ceiling suspension system with installation of overhead structural systems to ensure that inserts and other structural anchorage provisions have been installed to receive ceiling hangers in a manner that will develop their full strength and at spacings required to support ceiling.

Furnish concrete inserts, and other devices indicated, to other trades for installations well in advance of time needed for coordination with other work.

Hanger Installation: Attach hangers to structure above ceiling to comply with ML/SFA "Specifications for Metal Lathing and Furring" and with referenced standards.

<u>Install ceiling suspension system</u> components of sizes spacings indicated but not in smaller sizes or greater spacings than that required by referenced lathing and furring installation standards.

Wire Hangers: Space 8 gage (0.16" diameter) wire hangers not over 4'-0" o.c. parallel with, and not over 3'-0"

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perpendicular to, direction of carrying channels, unless otherwise indicated, and within 6" of carrying channel ends.

Space carrying channels not over 3'-0" Carrying Channels: o.c. with 4'-0" o.c. hanger spacing.

Furring Channels to Receive Metal Lath: Space furring channels not over 16" o.c. for 3.4 lb. diamond mesh lath or 24" o.c. for 3.4 flat rib lath.

INSTALLATION OF VERTICAL METAL FURRING:

Metal Furring to Receive Metal Lath: Comply with requirements of ML/SFA "Specification for Metal Lathing and Furring" applicable to each installation condition indicated.

Z-Furring with Thermal Insulation: Erect thermal insulation vertically and hold in place with Z-furring members spaced 24" Except at external corners, securely attach narrow flanges of furring members to wall with concrete stub nails or powerdrive fasteners spaced 24" o.c. At external corners, attach wide flange of furring members to wall with short flange extending beyond corner; on adjacent wall surface, screw attach short flange of furring channel to web of attached channel. Start from this furring channel with standard width insulation panel and continue in regular manner. At internal corners, space second member no more than 12" from corner and cut insulation to fit. Until plaster base is installed hold insulation in place with 10" staples fabricated from 18-gage tie wire and inserted through slot in web of member.

METAL LATHING:

<u>Install expanded metal lath</u> for the following applications where plaster base coats are required. Provide appropriate type, configuration and weight of metal lath selected from materials indicated which comply with referenced lathing installation standards.

Suspended and furred ceilings; minimum weight of diamond mesh lath, 3.4 lbs. per sq. yd.

Vertical metal framing and furring.

Ceramic tile setting beds; use diamond mesh lath, 3.4 lbs. per sq. yd.

Monolithic surfaces not complying with requirements of referenced plaster application standards for characteristics which permit direct bond with plaster.

INSTALLATION OF PLASTERING ACCESSORIES:

General: Comply with referenced lathing and furring installation standards for provision and location of plaster accessories of type indicated. Miter or cope accessories at corners; install with tight joints and in alignment. Attach accessories securely to plaster bases to hold accessories in place and alignment during plastering.

Accessories for Gypsum Plaster: Provide the following types to comply with requirements indicated for location:

Corner Beads: Install at external corners.

<u>Casing Beads</u>: Install at terminations of plaster work, except where plaster passes behind and is concealed by other work and where metal screeds, bases or metal frames and act casing beads.

Control Joints: Install at locations indicated, or if not indicated, at spacings and locations required by referenced standard and recommended by plaster manufacturer and approved by Architect.

Accessories for Portland Cement Plaster:

Corner Reinforcement: Install at external corners.

<u>Casing Beads:</u> Install terminations of plaster work unless otherwise indicated.

<u>Control</u> <u>Joints</u>: Install control joints at locations indicated, or if not indicated, at locations complying with the following criteria and approved by Architect.

Where an expansion or control joint occurs in surface of construction directly behind plaster membrane.

Where distance between control joints in plastered surface exceeds the following:

10' in either direction.

Where area within portland cement panels exceed 100 sq. ft.

Where portland cement plaster panel sizes or dimensions change. Extend joints full width or height of plaster membrane.

PLASTER APPLICATION, GENERAL:

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<u>Prepare monolithic surfaces</u> for bonded base coats and use bonding compound or agent to comply with requirements of referenced plaster application standards for conditioning of monolithic surfaces.

<u>Tolerances</u>: Do not deviate more than 1/8" in 10'-0" from a true plane in finished plaster surfaces, as measured by a 10'-0" straightedge placed at any location on surface.

<u>Sequence plaster</u> application with the installation and protection of other work, so that neither will be damaged by the installation of the other.

 <u>Plaster flush with metal frames</u> and other built-in metal items or accessories which act as a plaster ground, unless otherwise indicated. Where plaster is not terminated at metal by casing beads, cut base coat free from metal before plaster sets and groove finish coat at the junctures with metal.

Apply thicknesses and number of coats of plaster as indicated; or as required by referenced standards.

 Concealed Plaster: Where plaster application will be concealed by wood paneling, above suspended ceilings and similar locations, finish-coat may be omitted; where concealed behind cabinets and similar furnishings and equipment, apply finish-coat; where used as a base for adhesive application of tile and similar finishes, omit finish-coat and coordinate thickness with overall dimension as shown, and comply with tolerances specified.

GYPSUM PLASTER APPLICATION:

Number of Coats: Apply gypsum plaster materials, composition, mixes, and finishes indicated to comply with ASTM C 842.

Number of Coats: Apply gypsum plaster, of composition indicated, to comply with the following requirements.

Use three-coat work over the following plaster bases:

Metal lath.

Use two-coat work over the following bases:

 Concrete, cast-in-place or precast when surface condition complies with ASTM C 842 for plaster bonded to solid base.

<u>Finish</u> <u>Coats</u>: Apply finish coats to comply with the following requirements:

Troweled finish for gypsum finish coat plasters, unless otherwise indicated.

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PORTLAND CEMENT PLASTER APPLICATION:

Portland Cement Plaster Application Standard: Apply portland cement plaster materials, compositions, and mixes to comply with ASTM C 926.

Number of Coats: Apply portland cement plaster, of composition indicated, to comply with the following requirements:

10 11 12

Use three-coat work over the following plaster bases:

13

Metal lath.

14 15 16

Finish Coat: Floated finish unless otherwise indicated; match Architect's sample for texture and color.

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Moist cure portland cement plaster base and finish coats to comply with ASTM C 926, including recommendations for time between coats and curing in "Annex A2 Design Considerations".

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CUTTING AND PATCHING (Including Existing Plaster):

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Cut, patch, point-up and repair plaster as necessary to accommodate other work and to restore cracks, dents and imperfections. Repair or replace work to eliminate blisters, buckles, excessive crazing and check cracking, dry-outs, efflorescence, sweat-outs and similar defects, and where bond to the substrate has failed.

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Sand smooth-troweled finishes lightly to remove trowel marks and arises.

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CLEANING AND PROTECTION:

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43 44 Remove temporary protection and enclosure of other work. Promptly remove plaster from door frames, windows, and other surfaces which are not to be plastered. Repair floors, walls and other surfaces which have been stained, marred or otherwise damaged during the plastering work. When plastering work is completed, remove unused materials, containers and equipment and clean floors of plaster debris.

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52 53 Provide final protection and maintain conditions, in a manner suitable to Installer, which ensures plaster work being without damage or deterioration at time of substantial completion.

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END OF SECTION 09200

SECTION 09215 - VENEER PLASTER

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PART 1 - GENERAL

RELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

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DESCRIPTION OF WORK:

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Types of work include:

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Two-component veneer plastering.

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Gypsum base and metal support systems are specified in another section of Division 9.

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Lath and Plaster is specifiled in another section of Division 9.

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QUALITY ASSURANCE:

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Fire Resistance Rating: Where veneer plaster systems with fire resistance ratings are indicated or required to comply with governing regulations, provide materials and installations identical with those of applicable assemblies which have been tested per ASTM E 119 by fire testing laboratories acceptable to authorities having jurisdiction.

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38 39 Provide fire-resistance rated assemblies identical to those indicated by reference to GA File No. in GA "Fire Resistance Design Manual" or to design designations in UL Resistance Directory" or in listing of other testing and agencies acceptable to authorities inspecting jurisdication.

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Gypsum Board Association.

Terminology Standard

GA-505 by Gypsum

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Single Source Responsibility: Obtain veneer plaster products from a single manufacturer, or from manufacturers recommended by the prime manufactured of veneer plaster and gypsum base.

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SUBMITTALS:

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Submit manufacturer's product specifications and Product Data: installation instructions for each component of veneer plaster

SECTION 09250 - GYPSUM DRYWALL

As clarification for rigid insulation installed at back face of precast concrete panels with Z - furring. The Gypsum Drywall Contractor (09250) shall provide and install rigid insulation, referring to specification Section 07200 for Insulation Specification.

RELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Special Conditions and Division-1 Specification sections, apply to work of this section.

(A-Z)

DESCRIPTION OF WORK:

Types of work include:

Gypsum drywall including screw-type metal support system.

Gypsum backing boards for application of other finishes.

Drywall finishing (joint tape-and-compound treatment).

<u>Drywall</u> <u>shaft</u> <u>systems</u> are specified in another Division-9 section.

QUALITY ASSURANCE:

<u>Fire-Resistance</u> <u>Ratings</u>: Where gypsum drywall systems with fire-resistance ratings are indicated, provide materials and installations which are identical with those of applicable assemblies tested per ATM E 119 by fire testing laboratories acceptable to authorities having jurisdiction.

Provide fire-resistance rated assemblies identical to those indicated by reference to GA File Nos. in GA "Fire Resistance Design Manual" or to design designations in UL "Fire Resistance Directory" or in listing of other testing and agencies acceptable to authorities having jurisdication.

Gypsum Board Terminology Standard: GA-505 by Gypsum Association.

<u>Single-Source Responsibility</u>: Obtain gypsum board products from a sngle manufacturer, or from manufacturers recommended by the prime manufacturer of gypsum boards.

SUBMITTALS:

 <u>Product Data</u>: Submit manufacturer's product specifications and installation instructions for each gypsum drywall component, including other data as may be required to show compliance with

these specifications.

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DELIVERY, STORAGE AND HANDLING:

Deliver materials in original packages, containers or bundles bearing brand name and identification of manufacturer or supplier.

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Store materials inside under cover and in manner to keep them dry, protected from weather, direct sunlight, surface contamination, corrosion and damage from construction traffic and other causes. Neatly stack gypsum boards flat to prevent sagging.

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Handle gypsum boards to prevent damage to edges, ends or surfaces. Protect metal corner beads and trim from being bent or damaged.

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PROJECT CONDITIONS:

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Environmental Requirements, General: Comply with requirements of referenced gypsum board application standards recommendations of gypsum board manufacturer, for environmental conditions before, during and after application of gypsum board.

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Cold Weather Protection: When ambient outdoor temperatures are below 55 degrees F (13 degrees C) maintain continuous, uniform, comfortable building working temperatures of not less than 55 degrees F (13 degrees C) for a minimum period of 48 hours prior to, during and following application of gypsum board and joint treatment materials or bonding of adhesives.

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Ventilation: Ventilate building spaces as required to remove water in excess of that required for drying of joint treatment material immediately after its application. Avoid drafts during dry, hot weather to prevent too rapid drying.

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PART 2 - PRODUCTS

ACCEPTABLE MANUFACTURERS:

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Subject to complaince with requirements provide Manufacturer: products of one of the following:

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Metal Support Materials:

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Allied Structural Industries. Bostwick Steel Framing Co.

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Dale Industries, Inc.

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Gold Bond Building Products Siv., National Gypsum Co.

UK HOSPITAL EXPANSION -ADDITION BID PACK 2 - 304.1 1 Milcor Division; Inryco, Inc. 2 Marino Industries 3 United States Gypsum Co. 4 5 Direct Suspension Systems: 6 7 Chicago Metallic Corp. 8 Donn Corporation. 9 National Rolling Mills Co. United States Gypsum Co. 10 11 12 Gypsum Board and Related Products: 13 14 Flintkote Products, Genstar Building Materials Co. 15 Georgia-Pacific Corp. 16 Gold Bond Building Products Div., National Gypsum Co. 17 United States Gypsum Co. 18 19 20 METAL SUPPORT MATERIALS: 21 22 Ceiling Support Materials and Systems: 23 24 General: Size ceiling support components to comply with ASTM C 25 754 unless otherwise indicated. 26 27 Main Runners: Steel channels with rust inhibitive paint finish, 28 hot or cold-rolled. 29 30 Hanger Wire: ASTM A 641, soft, Class 1 galvanized. 31 32 Hanger Rods and Flats: Mild steel with zinc or equally rust 33 inhibitive coating for rods and zinc or rust-inhibitive paint finish for flats. 34 35 36 Angle-Type Hangers: Not less than 7/8" x 7/8" x 16-gage galvanized steel formed angles, with bolted connections and 5/16" diameter bolts. 38 39 40 Hanger Anchorage Devices: 41

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Screws, clips, bolts, cast-in-place concrete inserts or other devices applicable to the indicated method of structural anchorage for ceiling hangers and whose suitability for use intended has been proven through standard construction practices or by certified test data. Size devices for 3 x calculated load supported except size direct pull-out concrete inserts for 5 x calculated loads.

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ASTM C 645; 0.0179" min. thickness of base Furring Members: metal, hat-shaped.

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Where shown as "Resilient", provide manufacturer's special type designed to reduce sound transmission.

1 <u>Furring Members</u>: ASTM C 645; 0.0179" min. thickness of base 2 metal, "C"-shaped studs.

Furring Anchorages: 16-gage galvanized wire ties, manufacturer's standard wire-type clips, bolts, nails or screws as recommended by furring manufacturer and complying with C 754.

<u>Direct Suspension</u> <u>Systems</u>: Manufacturer's standard zinc-coated or painted steel system of furring runners, furring tees, and accessories designed for concealed support of gypsum drywall ceilings; of proper type for use intended.

Wall/Partition Support Materials:

Studs: ASTM C 645; 0.0179" min. thickness of base metal unless otherwise indicated.

Depth of Section: 3-5/8", except as otherwise indicated.

Runners: Match studs; type recommended by stud manufacturer for floor and ceiling support of studs, and for vertical abutment of drywall work at other work.

Furring Members: ASTM C 645; 0.0179" min. thickness of base metal, hat shaped.

Where shown as "Resilient," provide manufacturer's special type designed to reduce sound transmission.

Z-Furring Members: Manufacturer's standard screw-type galvanized steel, zee-shaped furring members; ASTM A 525, G60, 0.0179" min. thickness of base metal; of depth indicated; designed for mechanical attachment of insulation boards or blankets to monolithic concrete and masonry walls.

Fasteners for Furring Members: Type and size recommended by furring manufacturer for substrate and application indicated.

GYPSUM BOARD:

Gypsum Wallboard: ASTM C 36, of types, edge configuration and thickness indicated below; in maximum lengths available to minimize end-to-end butt joints.

Type: Regular, unless otherwise indicated.

 Type: Foil-backed where indicated.

Type: Type X for fire-resistant rated assemblies and where indicated.

Edges: Tapered.

Thickness: 5/8", unless otherwise indicated.

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Gypsum Backing Board for Multi-Layer Applications: ASTM C 442 or, where backing board is not available from manufacturer, gypsum wallboard, ASTM C 36, of type, edge configuration and thickness indicated below; in maximum lengths available to minimize end-to-end joints.

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Type Regular, unless otherwise indicated.

Type: Type X for fire-resistance rated assemblies and where indicated.

Edges: Square, non-tapered; or V-tongue and groove.

Thickness: 5/8", unless otherwise indicated.

<u>Water-Resistant</u> <u>Backing Board</u>: ASTM C 630, with tapered edges and of type and thickness indicated below; in maximum lengths available to minimize end-to-end butt joints.

Type: Regular, unless otherwise indicated.

Type: Type X for fire-resistant rated assemblies and where indicated.

Thickness: 5/8", unless otherwise indicated.

TRIM ACCESSORIES:

General: Provide manufacturer's standard trim accessories of types indicated for drywall work, formed of galvanized steel unless otherwise indicated, with either knurled and perforated or expanded flanges for nailing or stapling, and beaded for concealment of flanges in joint compound. Provide corner beads, L-type edge trim-beads, U-type edge trim-beads, special L-kerf-type edge trim-beads, and one-piece control joint beads.

Semi-Finishing Type: Manufacturer's standard trim units which are not to be finished with joint compound (non-beaded).

<u>Plastic Edge Trim:</u> Manufacturer's standard rigid or semirigid PVC moldings of the semi-finished type, shaped to provide resilient contact of gypsum board edges with other work; friction-fit, or pressure-sensitive adhesive mounting.

<u>H-Molding</u>: Manufacturer's standard extruded aluminum H-molding of height required for board, designed for combination trim and control joint in exterior gypsum board ceiling/soffit work.

JOINT TREATMENT MATERIALS:

General: ASTM C 475; type recommended by the manufacturer for

the application indicated, except as otherwise indicated.

 Joint Tape: Paper reinforcing tape.

Joint Compound: Ready-mixed vinyl-type for interior use.

 Grade: 2 separate grades; one specifically for bedding tapes and filling depressions, and one for topping and sanding.

<u>Joint Compound:</u> On interior work provide chemical-hardening-type for bedding and filling, ready-mixed vinyl-type or vinyl-type powder type for topping.

<u>Water-Resistant</u> <u>Joint</u> <u>Compound</u>: Special water-resistant type for treatment of joints, fastener heads and cut edges of water-resistant backing board.

<u>Product:</u> Subject to compliance with requirements, provide Sheetrock Brand W/R Compound; United States Gypsum Co.

MISCELLANEOUS MATERIALS:

General: Provide auxiliary materials for gypsum drywall work of the type and grade recommended by the manufacturer of the gypsum board.

<u>Laminating Adhesive</u>: Special adhesive or joint compound specifically recommended for laminating gypsum boards.

Gypsum Board Screws: Comply with ASTM C 1002.

Concealed Acoustical Sealant: Nondrying, nonhardening, nonskinning, nonstaining, nonbleeding, gunnable sealant for concealed applications per ASTM C 919.

Exposed Acoustical Sealant: Nonoxidizing, skinnable, paintable, gunnable sealant for exposed applications per ASTM C 919.

Sound Attenuation Blankets: FS HH-I-521, Type I; semi-rigid mineral fiber blanket without membrane, Class 25 flame-spread, thicknesses as indicated.

<u>Water-Resistant</u> <u>Adhesive</u>: Type I organic adhesive for ceramic tile complying with ANSI Al36.1.

Polyethylene Vapor Retarder: A single polyethylene film, 4.0 mils thick, with a vapor rating of 0.20 perms per ASTM E 96.

PART 3 - EXECUTION

PREPARATION FOR METAL SUPPORT SYSTEMS:

<u>Ceiling Anchorages</u>: Coordinate work with structural ceiling work to ensure that inserts and other structural anchorage provisions have been installed to receive ceiling hangers.

Furnish concrete inserts, steel deck hanger clips and similar devices to other trades for installation well in advance of time needed for coordination with other work.

INSTALLATION OF METAL SUPPORT SYSTEMS:

General:

General

Metal Support Installation Standard: Comply with ASTM C 754.

18 <u>Do not bridge</u> building expansion joints with support system, 19 frame both sides of joints with furring and other support as 20 indicated.

Ceiling Support Suspension Systems:

<u>Secure hangers</u> to structural support by connecting directly to structure where possible, otherwise connect to inserts, clips or other anchorage devices or fasteners as indicated.

Space main runners 4'-0" o.c. and space hangers 4'-0" o.c. along runners, except as otherwise shown.

<u>Level main runners</u> to a tolerance of 1/4" in 12'-0", measured both lengthwise on each runner and transversely between parallel runners.

<u>Wire-tie</u> or clip furring members to main runners and to other structural supports as indicated.

<u>Direct-hung Metal Support System:</u> Attach perimeter wall track or angle wherever support system meets vertical surfaces. Mechanically join support members to each other and butt-cut to fit into wall track.

Space furring member 16" o.c., except as otherwise indicated.

Install auxiliary framing at termination of drywall work, and at openings for light fixtures and similar work, as required for support of both the drywall construction and other work indicated for support thereon.

Wall/Partition Support Systems:

52 <u>Install</u> <u>supplementary</u> <u>framing</u>, <u>blocking</u> <u>and</u> <u>bracing</u> at terminations in the work and for support of fixtures, equipment

grab bars, toilet accessories, heavy trim, services, furnishings, and similar work to comply with details indicated or if not otherwise indicated, to comply with applicable published recommendations of gypsum board manufacturer, or if not available, of "Gypsum Construction Handbook" published by United States Gypsum Co.

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Isolate stud system from transfer of structural loading to system, both horizontally and vertically. Provide slip or cushioned type joints to attain lateral support and avoid axial loading.

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Install runner tracks at floors, ceilings and structural walls and columns where gypsum drywall stud system abuts other work, except as otherwise indicated.

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Extend partition stud system through acoustical ceilings and elsewhere as indicated to the structural support or substrate above the ceiling.

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Space studs 16" o.c., unless otherwise indicated.

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Frame door openings to comply with details inicated or if not to comply with applicable published otherwise indicated, recommendations of gypsum board manufacturer, or if available, of "Gypsum Construction Handbook" published by United States Gypsum Co. Attach vertical stude at jambs with screws either directly to frames or to jamb anchor clips on door frames; install runner track section (for jack studs) at head and secure to jamb studs.

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Extend vertical jamb studs through suspended ceilings and attach to underside of floor or roof structure above, unless otherwise indicated.

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"Install cement mortar type grout for all door frames, gypsum based 36 compounds will not be permitted. Insure grout has sufficiently dried before application of $(\mathcal{E}^{\mathcal{D}})$.s drywall board." or if not indicated, in same manner as required for door openings; and install framing below sills of openings to match framing required above door heads.

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Space wall furring members 16" o.c., unless otherwise indicated.

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Erect thermal insulation vertically and hold in place with Zfurring members spaced 24" o.c. Except at exterior corners, securely attach narrow flanges of furring members to wall with concrete stub nails or power-drive fasteners spaced 24" o.c. At exterior corners, attach wide flange of furring members to wall with short flange extending beyond corner; on adjacent wall surface, screw attach short flange of surring channel to web of attached channel. Start from this furring member channel with standard width insulation panel and continue in regular manner. At interior corners, space second member no more than 12" from corner and cut insulation to fit. Until gypsum board is installed hold insulation in place with 10" staples fabricated

1 from 18-gage tie wire and inserted through slot in web of 2 member, or by an equally acceptable method.

<u>Install polyethylene vapor retarder</u> on interior of framing members of exterior insulated walls to comply with ASTM C 755 and with written directions of vapor retarder manufacturer. Seal joints by lapping and bonding with adhesive or vapor retarder tape. Extend coverage to extremities of areas to receive retarders. Seal punctures, tears and penetrations through retarders with vapor retarder tape or strips of vapor retarder material adhesively applied.

GENERAL GYPSUM BOARD INSTALLATION REQUIREMENTS:

Gypsum Board Application and Finishing Standards: ASTM C 840 and GA 216.

 <u>Install sound attenuation blankets</u> as indicated, prior to gypsum board unless readily installed after board has been installed.

Locate exposed end-butt joints as far from center of walls and ceilings as possible, and stagger not less than 1'-0" in alternate courses of board.

<u>Install</u> ceiling boards in the direction and manner which will minimize the number of end-butt joints, and which will avoid end joints in the central area of each ceiling. Stagger end joints at least 1'-0".

<u>Install wall/partition boards</u> vertically to avoid end-butt joints wherever possible. At stairwells and similar high walls, install boards horizontally with end joints staggered over studs.

<u>Install</u> exposed gypsum board with face side out. Do not install imperfect, damaged or damp boards. Butt boards together for a light contact at edges and ends with not more than 1/16" open space between boards. Do not force into place.

Located either edge or end joints over supports, except in horizontal applications or where intermediate supports or gypsum board back-blocking is provided behind end joints. Position boards so that like edges abut, tapered edges against tapered edges and mill-cut or field-cut ends against mill-cut or field cut ends. Do not place tapered edges against cut edges or ends. Stagger vertical joints over different studs on opposite sides of partitions.

Attach gypsum board to supplementary framing and blocking provided for additional support at openings and cutouts.

Form control joints and expansion joints with space between edges of boards, prepared to receive trim accessories.

Cover both faces of steel stud partition framing with gypsum board in concealed spaces (above ceilings, etc.), except in chase walls which are properly braced internally.

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Except where concealed application is required for sound, fire, air or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. area, and may be limited to not less than 75% of full coverage.

<u>Isolate</u> <u>perimeter</u> of non-load-bearing drywall partitions at structural abutments. Provide 1/4" to 1/2" space and trim edge with J-type semi-finishing edge trim. Seal joints with acoustical sealant.

Where sound-rated drywall work is indicated (STC rating), including double-layer work and work on resilient furring, seal the work at perimeters, control and expansion joints, openings and penetrations with a continuous bead of acoustical sealant including a bead at both faces of partitions. Comply with ASTM C 919 and manufacturer's recommendations for location of beads, and close off sound-flanking paths around or through the work, including sealing of partitions above acoustical ceilings.

Space fasteners in gypsum boards in accordance with referenced standards and manufacturer's recommendations, except as otherwise indicated.

METHODS OF GYPSUM DRYWALL APPLICATION:

Single-layer Application: Install gypsum wallboard.

 On ceilings apply gypsum board prior to wall/partition board application to the greatest extent possible.

 On partitions/walls apply gypsum board vertically (parallel), unless otherwise indicated, and provide sheet lengths which will minimize end joints.

 $\underline{\text{On partitions/walls}}$ $\underline{8'-1''}$ or $\underline{\text{less}}$ in height apply gypsum board horizontally (perpendicular); use maximum length sheets possible to minimize end joints.

On Z-furring members apply gypsum board vertically (parallel) with no end joints. Locate edge joints over furring members.

<u>Wall Tile Base:</u> Where drywall is base for thin-set ceramic tile and similar rigid applied wall finishes, install gypsum backing board.

At showers, tubs and similar "wet" areas, install water-resistant backing boards. Apply with un-cut long edge at bottom of work, and space 1/4" above fixture lips. Seal

ends, cut-edges and penetrations of each piece with water-2 resistant adhesive or, where recommended by backing board 3 manufacturer, with water-resistant joint compound. 4

Double-Layer Application: Install gypsum backing board for base layer and exposed gypsum board for face layer.

On ceilings apply base layer prior to base layer application on walls/partitions; apply face layers in same sequence. Offset joints between layers at least 10". Apply base layers at right angles to supports unless otherwise indicated.

partition/walls apply base layer and face layers On vertically (parallel) with joints of base layer over supports and face layer joints offset at least 10" with base layer joints.

On Z-furring members apply base layer vertically (parallel) and face layer either vertically (parallel) or horizontally (perpendicular) with vertical joints offset at least one Locate edge joints of base layer over furring member. furring members.

Single-Layer Fastening Methods: Apply gypsum boards to supports as follows:

Fasten with screws.

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Double-Layer Fastening Methods: Apply base layer of gypsum board and face layer to base layer as follows:

Fasten both base layers and face layers separately to supports with screws.

Direct-Bonding to Substrate: Where gypsum board is indicated to be directly adhered to a substrate (other than studs, joists, furring members or base layer of gypsum board), comply with gypsum board manufacturer's recommendations, and temporarily brace or fasten gypsum board until fastening adhesive has set.

INSTALLATION OF DRYWALL TRIM ACCESSORIES:

General: Where feasible, use the same fasteners to anchor trim accessory flanges as required to fasten gypsum board to the supports. Otherwise, fasten flanges by nailing or stapling in accordance with manufacturer's instructions and recommendations.

Install metal corner beads at external corners of drywall work.

<u>Install metal edge trim</u> whenever edge of gypsum board would otherwise be exposed or semi-exposed, and except where plastic trim is indicated. Provide type with face flange to receive joint compound except where semi-finishing type is indicated.

Install L-type trim where work is tightly abutted to other work, and install special kerf-type where other work is kerfed to receive long leg of L-type trim. Install U-type trim where edge is exposed, revealed, gasketed, or sealant-filled (including expansion joints).

<u>Install</u> semi-finishing trim where indicated, and where exterior gypsum board edges are not covered by applied moldings or indicated to receive trim with face flanges covered with joint compound.

<u>Install plastic edge trim</u> where indicated on wall panels at juncture with ceilings.

Install metal control joint (beaded-type) where indicated.

Install H-molding in exterior gypsum drywall work where control joints are indicated.

FINISHING OF DRYWALL:

General: Apply treatment at gypsum board joints (both directions), flanges of trim accessories, penetrations, fastener heads, surface defects and elsewhere as required to prepare work for decoration. Prefill open joints and rounded or beveled edges, if any, using type of compound recommended by manufacturer.

Apply joint tape at joints between gypsum boards, except where a trim accessory is indicated.

Apply joint compound in 3 coats (not including prefill of openings in base), and sand between last 2 coats and after last coat.

<u>Water-Resistant Gypsum Board Base for Ceramic Tile:</u> Treat joints and fasteners to comply with directions of water-resistant joint compound manufaturer.

In areas to be tiled, treat fastener heads with water-resistant joint compound. Fill tapered edges in gypsum panels with water-resistant joint compound, embed joint tape firmly and wipe off excess compound; follow immediately with a second coat of water-resistant joint compound over taping coat, being careful not to crown the joint. Fold and embed tape in all interior angles to form true angles.

In areas not to be tiled, treat fastener heads and embed tape as indicated above using water-resistant joint compound but finish with 2 coats of joint compound used for regular gypsum board work.

Regular Gypsum Board Base for Ceramic Tile: In areas to be

tiled using organic adhesive, tape joints and apply 4" wide coat of joint compound. (Dry locations only).

<u>Partial Finishing</u>: Omit third coat (if specified) and sanding on concealed drywall work which is indicated for drywall finishing or which requires finishing to achieve fire-resistance rating, sound rating or to act as air or smoke barrier.

Refer to sections on painting, coatings and wall-coverings in Division-9 for decorative finishes to be applied to drywall work.

PROTECTION OF WORK:

 <u>Provide final protection</u> and maintain conditions in a manner suitable to Installer, which ensures gypsum drywall work being without damage or deterioration at time of substantial completion.

END OF SECTION 09250

SECTION 09270 - DRYWALL SHAFT SYSTEMS

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PART - GENERAL

RELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Special Conditions and Division-1 Specification sections, apply to work of this section.

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DESCRIPTION OF WORK:

<u>Definition</u>: Drywall shaft systems include special-purpose assemblies of gypsum boards and metal components designed for erection entirely from room side of shaft (except for application of finish layer on shaft-side, where required) to enclose vertical shafts, stairs, and chases.

Types of drywall shaft englosures include the following:

Service shaft enclosures (for piping, ductwork, air plenums, electrical, and similar services).

Stairwell enclosures.

Chutes (linen, trash and similar uses).

Refer to the Division-9 section on Gypsum Drywall for other drywall work.

Refer to the Division-9 section on Veneer Plaster for treatment of joints in gypsum base and application of plaster finish.

SYSTEM PERFORMANCES:

Fire-Resistance Ratings: Where drywall shaft systems with fire resistance ratings are indicated, provide materials and installations including elevator door and other framing, if any, which are identical with those of applicable assemblies tested per ASTM E 119 by fire testing laboratories acceptable to authorities having jurisdiction.

Provide fire-resistance rated assemblies identical to those indicated by reference to GA File No. in GA 600 "Fire Resistance Design Manual" or to design designations in UL "Fire Resistance Directory" or in listing of other testing and inspecting agencies acceptable to authorities having jurisdiction.

Structural Performance Characteristics: Provide drywall shaft

SECTION 09300 - TILE

PART 1 - GENERAL

RELATED DOCUMENTS:

 Drawings and general provisions of Contract, including General and Special Conditions and Division-1 Specification sections, apply to work of this section.

DESCRIPTION OF WORK:

Definition: Tile includes ceramic surfacing units made from clay or other ceramic materials.

Extent of tile work is indicated on drawings and schedules.

Types of tile work in this section include the following:

Unglazed ceramic mosaic tile.

Glazed wall tile.

Stone thresholds.

Quarry Tile to be inserted in precast concrete as specified in Section "Architectural Precast".

Portland cement scratch coat is specified in another Division-9 section "Lath and Plaster".

Sealing expansion and other joints in tile work with elastomeric joint sealers is specified as work of Division-7 section, "Joint Sealers".

Fluid-Applied Waterproofing is specified in Division 7.

QUALITY ASSURANCE:

Source of Materials: Provide materials obtained from one source for each type and color of tile, grout and setting materials.

SUBMITTALS:

Submit manufacturer's technical information and installation instructions for materials required, except bulk materials.

Shop Drawings: Submit shop drawings indicating tile patterns and locations and widths of control, contraction and expansion joints in tile surfaces.

<u>Samples for Initial Selection Purposes</u>: Submit manufacturer's color charts consisting of actual tiles or sections of tiles showing full range of colors, textures and patterns available for each type of tile indicated. Include samples of grout and accessories involving color selection.

Samples for Verification Purposes: Submit the following:

Samples for each type of tile and for each color and texture required, not less than 12" square, on plywood or hardboard backing and grouted.

Full size samples for each type of trim, accessory and for each color.

6" long samples of stone thresholds.

Samples of metal edge strip.

<u>Certification</u>: Furnish Master Grade Certificates for each shipment and type of tile, signed by manufacturer and Installer.

<u>Certified Test Reports:</u> Submit certified test reports from a qualified independent testing laboratory evidencing compliance of tile and tile setting products with requirements specified based on comprehensive testing of current products. Include in reports testing laboratory's interpretation of test results relative to specified requirements.

DELIVERY, STORAGE, AND HANDLING:

Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Prevent damage or contamination to materials by water, freezing, foreign matter or other causes.

PROJECT CONDITIONS:

<u>Maintain environmental conditions</u> and protect work during and after installation to comply with referenced standards and manufacturer's printed recommendations.

<u>Vent</u> <u>temporary</u> <u>heaters</u> to exterior to prevent damage to tile work from carbon dioxide buildup.

Maintain temperatures at not less than 50° F (10° C) in tiled areas during installation and for 7 days after completion, unless

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higher temperatures are required by referenced installation
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     standard or manufacturer's instructions.
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     PART 2 - PRODUCTS
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     ACCEPTABLE MANUFACTURERS:
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     Manufacturers: Subject to compliance with requirements, provide
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     products of one of the following manufacturers:
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         Manufacturers of Unglazed Ceramic Mosaic Tile:
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         American Olean Tile Co., Inc.
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         Dal-Tile Corp.
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         Mid-State Tile.
         Summitville Tiles, Inc.
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         United States Ceramic Tile Co.
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         Manufacturers of Glazed Wall Tile:
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         American Olean Tile Co., Inc.
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         Dal-Tile Corp.
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         Florida Tile Div., Sikes Corp.
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         Mid-State Tile.
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         Summitville Tiles, Inc.
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         United States Ceramic Tile Co.
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         Manufacturers of Dryset Mortars:
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        American Olean Tile Co., Inc.
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        Boiardi Products Corp.
        Cambridge Tile Mfg. Co.
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        C-Cure Chemical Co., Inc.
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        L & M Surco Mfg., Inc.
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        Laticrete International, Inc.
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        Southern Grouts & Mortars, Inc.
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        Summitville Tiles, Inc.
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        Syracuse Adhesives Co.
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        Manufacturers of Latex-Portland Cement Mortars:
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        American Olean Tile Co., Inc.
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        Boiardi Products Corp.
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        Cambridge Tile Mfg. Co.
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        C-Cure Chemical Co., Inc.
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        L & M Surco Mfg., Inc.
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        Laticrete International, Inc.
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        Southern Grouts & Mortars, Inc.
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        Summitville Tiles, Inc.
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        Syracuse Adhesives Co.
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Manufacturers of Chemical Resistant Furan Grouts:

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Manufacturers of Tile Cleaners:

Hillyard Chemical Co. 47 48

L & M Surco Mfg. Co., Inc.

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PRODUCTS, GENERAL:

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Comply with ANSI ANSI Standard for Ceramic Tile: "American National Standard Specifications for Ceramic Tile" for

types and grades of tile indicated. 1 2 Furnish tile complying with "Standard Grade" requirements 3 4 unless otherwise indicated. 5 ANSI Standard for Tile Installation Materials: Comply with ANSI 6 standard referenced with products and materials indicated for 7 8 setting and grouting. 9 10 Colors, Textures and Patterns: For tile, grout and other products requiring selection of colors, surface textures or other 11 appearance characteristics, provide products to match characteristics indicated or, if not otherwise indicated, as 12 13 selected by Architect from manufacturer's standards. 14 15 Provide tile trim and accessories which match color and 16 17 finish of adjoining flat tile. 18 19 Mounting: Where factory-mounted tile is required provide back-20 or edge-mounted tile assemblies as standard with manufacturer unless another mounting method is indicated. 21 22 23 24 TILE PRODUCTS: 25 26 Unglazed Ceramic Mosaic Tile: Provide factory-mounted flat tile 27 complying with the following requirements: 28 29 Type: Porcelain 30 Without abrasive content except provide 31 Wearing Surface: 32 slip-resistant tile where indicated. 33 Nominal Facial Dimensions: 2" x 2". 34 35 36 Nominal Thickness: 1/4". 37 38 Face: Plain with cushion or square edges. 39 40 Glazed Wall Tile: Provide flat tile complying with the following 41 requirements: 42 43 Nominal Facial Dimensions: 4-1/4" x 4-1/4". 44 45 Nominal Thickness: 5/16". 46 47 Plain with square edge, modified square edge, or 48 cushion edge. 49

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adjoining flat tile and to comply with following requirements:

Trim Units: Provide tile trim units to match characteristics of

Mounting: Factory back-mounted.

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As indicated, coordinated with sizes and coursing of adjoining flat tile, where applicable.

As follows, selected from manufacturer's standard shapes:

Base for Portland Cement Mortar Installations: Coved

Base for Thinset Mortar Installations: Straight.

Wainscot Cap for Portland Cement Mortar Installations: Bullnose cap.

Wainscot Cap for Thinset Mortar Installations: bullnose.

Wainscot Cap for Flush Conditions: Regular flat tile for conditions where tile wainscot is shown flush with wall surface above.

External Corners for Portland Cement Mortar Installations: Bullnose shape with a radius of not less than 3/4" unless otherwise indicated.

Surface Thinset Installations: Corners for External bullnose.

Internal Corners: Field-butted square corners, except use coved base and cap angle pieces designed to member with stretcher shapes.

STONE THRESHOLDS:

General: Provide stone which is uniform in color and finish, fabricated to sizes and profiles indicated or required to provide transition between tile surfaces and adjoining finished floor surfaces.

Marble Thresholds: Provide marble thresholds complying with ASTM C 503 requirements for exterior use and abrasion resistance for uses subject to heavy foot traffic.

Match Architect's sample for color and finish.

SETTING MATERIALS:

Portland Cement Mortar Installation Materials: Provide materials to comply with ANSI A108.1 as required for installation method designated, unless otherwise indicated.

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GROUTING MATERIALS:

Commercial Portland Cement Grout: Provide product complying with

D 226, Type I. Reinforcing Wire Fabric: Galvanized welded wire fabric, 2" x

Cleavage Membrane: Asphalt saturated felt, 15-lb. type, ASTM

2" - WO.3 x WO.3 (16 ASW gage or 0.0625" diam.); comply with ASTM A 185 and ASTM A 82 except for minimum wire size.

Expanded Metal Lath: Provide diamond mesh lath complying with ASTM C 847 for requirements indicated below:

for Base Metal and Finish Interior Applications: Fabricate lath from uncoated or zinc-coated (galvanized) steel sheet, with uncoated steel sheet painted after fabrication into lath.

Configuration Over Studs and Furring:

Configuration Over Solid Surfaces: Self-furring.

Weight: 3.4 lbs. per sq. ft.

Dry-Set Portland Cement Mortar: Provide product complying with ANSI A118.1,

Latex-Portland Cement Mortar: Provide product complying with ANSI A118.4 and the following requirement for composition:

Prepackaged dry mortar mix incorporating dry polymer additive in the form of a re-emulsifiable powder to which only water is added at job site.

Latex additive (water emulsion) of type described below, serving as a replacement for part or all of gauging water, added at job site to prepackaged dry mortar mix supplied or specified by latex manufacturer.

Latex Type: Manufacturer's standard.

Chemical Resistant Epoxy Mortar: Provide product complying with ANSI A118.3 for chemical resistant, water cleanable ceramic tile setting and grouting epoxy.

Provide product with resistance to temperatures up to 300 deg.F (149 deg.C) certified by mortar manufacturer intended use.

Chemical Resistant Furan Mortar: Provide product complying with ANSI A118.5 and with carbon filler unless otherwise indicated.

ANSI A118.6 of color indicated.

<u>Dry-Set Grout:</u> Provide product complying with ANSI A118.6 of color indicated.

<u>Latex-Portland</u> <u>Cement Grout:</u> Provide product complying with ANSI A118.6 for the following composition and of color indicated:

<u>Prepackaged dry grout mix</u> incorporating dry polymer additive in the form of a re-emulsifiable powder to which only water is added at job site.

<u>Latex</u> <u>additive</u> (water emulsion) serving as a replacement for part or all of gauging water, added at job site to prepackaged dry grout mix, with type of latex and dry grout mix complying with requirements indicated below:

Latex Type: Manufacturers standard.

<u>Grout Type:</u> Commercial portland cement grout specified or supplied by latex manufacturer.

Application: Use to grout joints in floor tile, unless otherwise indicated.

Grout Type: Dry-set grout specified or supplied by latex manufacturer. Use latex additive without a retarder with dry-set grout.

<u>Application</u>: Use to grout joints in glazed wall tile unless otherwise indicated.

<u>Chemical Resistant Epoxy Grout:</u> Provide product complying with ANSI A118.3 of color indicated.

Provide product with resistance to temperatures up to 300 deg.F (149 deg.C), certified by grout manufacturer for intended use.

Chemical Resistant Furan Grout: Provide product complying with ANSI A118.5.

MISCELLANEOUS MATERIALS:

Tile Cleaner: Product specifically acceptable to manufacturer of tile and grout manufacturer for application indicated and as recommended by National Tile Promotion Federation, 112 North Alfred St., Alexandria, VA 22134 or Ceramic Tile Institute, 700 N. Virgil Ave., Los Angeles, CA 90029.

MIXING MORTARS AND GROUT:

Mix mortars and grouts to comply with requirements of referenced standards and manufacturers for accurately proportioning of materials, water or additive content, mixing equipment and mixer speeds, mixing containers, mixing time, and other procedures needed to produce mortars and grouts of uniform quality with optimum performance characteristics for application indicated.

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PART 3 - EXECUTION

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EXAMINATION:

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Examine surfaces to receive tile work and conditions under which tile will be installed. Do not proceed with tile work until surfaces and conditions comply with requirements indicated in referenced tile installation standard.

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INSTALLATION, GENERAL:

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ANSI Tile Installation Standard: Comply with applicable parts of ANSI 108 series of tile installation standards included under "American National Standard Specifications for the Installation of Ceramic Tile".

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TCA "Handbook for Ceramic Tile TCA Installation Guidelines: Installation"; comply with TCA installation methods indicated or, if not otherwise indicated, as applicable to installation conditions shown.

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Extend tile work into recesses and under or behind equipment and fixtures, to form a complete covering without interruptions, otherwise shown. work except as Terminate neatly at obstructions, edges and corners without disrupting pattern or joint alignments.

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Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. grind cut edges of tile abutting trim, finish or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures and other penetrations so that plates, collars, or covers overlap tile.

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Jointing Pattern: Unless otherwise shown, lay tile in grid pattern. Align joints when adjoining tiles on floor, base, walls and trim are same size. Layout tile work and center tile fields in both directions in each space or on each wall area. Adjust to minimize tile cutting. Provide uniform joint widths, unless otherwise shown.

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For tile mounted in sheets make joints between tile sheets

same width as joints within tile sheets so that extent of each sheet is not apparent in finished work.

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Lay out tile wainscots to next full tile beyond dimensions indicated.

Expansion Joints: Locate expansion joints and other sealant filled joints, including control, contraction and isolation joints, where indicated. Do not saw cut joints.

Grout tile to comply with the requirements of the following installation standards:

For ceramic tile grouts (sand-portland cement, dry-set, commercial portland cement, and latex-portland cement grouts) comply with ANSI A108.10.

For chemical resistant epoxy grouts comply with ANSI A108.6.

For chemical resistant furan grouts comply with ANSI A108.8.

WATERPROOF MEMBRANE INSTALLATION:

Install waterproof membrane under ceramic tile floor above grade, in accordance with following specifications.

 Entire floor area shall receive a scrape coat of membrane manufactures scratch coat, making certain floor is clean of all dust and dirt prior to scrape coat. Fill uneven areas with Scratch Coat. If a thickness coat is required use latex filler in lieu of scratch coat.

 Apply Waterproof Primer approximately 1/8" thick on area to receive membrane, being certain to work small areas at a time. While Primer is web imbed 40" wide glass fiber fabric into it, being certain Primer fully wets out fabric. Strips of fabric shall overlap each other two to four inches and additional primer shall be added to this excess amount that is worked through fabric to completely cover fabric surface.

After first coat of Primer over fabric has dired, apply a second coat of Waterproof Primer to fill in all pinholes. Inspect to see if any pinholes exist. If pinholes exist apply additional Waterproof Primer to eliminate them.

Where Waterproof Membrane is installed as a cove base be certain to obtain fabric four to seven inches wider than height of base specified. This allows cove membrane to extend out over floor membrane giving more waterproofing. Apply primer to base on floor approximately 1/8" thick with a brush. Imbed fabric into Primer and apply an additional coat of Primer fiberglass to

1 completely cover fiberglass. Fiberglass shall overlap two to
2 four inches at ends.

Allow Primer Membrane coat to dry and apply a second coat of Waterproof Primer. If pinholes still exist apply additional Waterproof Primer to eliminate them.

Where drains are located in room be certain to install Primer Membrane into drain using a similar application method described above.

IMPORTANT: Do not allow traffic on floor during application, and curing of membrane and until floor material is applied over membrane,

Finished Flooring shall be then installed in its normal manner according to manufacturer's recommended methods.

FLOOR INSTALLATION METHODS:

 <u>Ceramic Mosaic</u> <u>Tile</u>: Install tile to comply with requirements indicated below for setting bed methods, TCA installation methods related to types of subfloor construction, and grout types:

Portland Cement Mortar: ANSI A108.1.

Bond Coat: Portland cement paste on plastic bed.

Concrete Subfloors, Interior: TCA F112 (bonded).

Grout: Latex-portland cement.

Concrete Subfloors, Interior: TCA F116.

Stone Thresholds: Install stone thresholds at locations indicated; set in same type of setting bed as abutting field tile unless otherwise indicated.

<u>Set thresholds</u> in latex-portland cement mortar for locations where mortar bed would otherwise be exposed above adjacent non-tile floor finish.

WALL TILE INSTALLATION METHODS:

<u>Install types of tile</u> designated for wall application to comply with requirements indicated below for setting bed methods, TCA installation methods related to subsurface wall conditions, and grout types:

Dry-Set Portland Cement Mortar: ANSI A108.5.

Metal Studs, Interior: TCA W243.

Bathtub Walls, Gypsum Board: TCA B413.

Shower Receptors, Glass Mesh Mortar Units: TCA B415.

Grout: Latex-portland cement.

CLEANING AND PROTECTION:

<u>Cleaning</u>: Upon completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.

 Unglazed tile may be cleaned with acid solution only when permitted by tile and grout manufacturer's printed instructions, but no sooner than 14 days after installation. Protect metal surfaces, cast iron and vitreous plumbing fixtures from effects of acid cleaning. Flush surface with clean water before and after cleaning.

Remove temporary wax coating from quarry tile, using methods recommended by manufacturers of tile and grout.

Finished Tile Work: Leave finished installation clean and free of cracked, chipped, broken, unbonded, or otherwise defective tile work.

 <u>Protection</u>: When recommended by tile manufacturer, apply a protective coat of neutral protective cleaner to completed tile walls and floors. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage and wear.

Prohibit foot and wheel traffic from using tiled floors for at least 7 days after grouting is completed.

Before final inspection, remove protective coverings and rinse neutral cleaner from tile surfaces.

END OF SECTION 09300

SECTION 09400 - TERRAZZO

PART 1 - GENERAL

RELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Special Conditions and Division-1 Specification sections, apply to work of this section.

SUMMARY:

Types of terrazzo include:

Epoxy resin terrazzo.

SUBMITTALS:

<u>Product</u> <u>Data</u>: Manufacturer's technical information and installation instructions for each type of terrazzo, accessory item, and materials.

<u>Certification</u>: Submit suppliers/manufacturers written certification that terrazzo materials meet or exceed specified NTMA properties.

Shop Drawings: Show layout of divider strips, control joint strips and base and border strips.

Show large scale details of precast terrazzo jointing and edge conditions, and showing elevation and plan layouts. Include anchorage and other special features.

<u>Samples</u>: Submit 6" square samples of each pattern, color and type of terrazzo required; minimum 6" long samples of each type accessory item.

<u>Maintenance</u> <u>Instructions</u>: Submit 2 copies of written instructions for recommended periodic maintenance of each type of terrazzo.

QUALITY ASSURANCE:

49 NTMA Standards: Comply with specified provisions and 50 recommendations of National Terrazzo and Mosiac Association, 51 Inc. (NTMA).

Manufacturer's Instructions: In addition to specified

requirements, comply with resin manufacturer's instructions and recommendations for substrate preparation, materials storage mixing and application, finishing, and curing.

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PART 2 - PRODUCTS

THIN-SET TERRAZZO MATERIALS:

Epoxy Resin Terrazzo Matrix: Thermosetting, amine-cured epoxy resin and hardener, mineral filler and color pigment, complying with NTMA "Guide Specification for Epoxy Terrazzo" and as required to match the Architect's sample.

Aggregates: Natural, sound, crushed marble chips, colors selected and graded to match Architect's samples, but with maximum size within limits of workability for terrazzo thickness indicated.

<u>Substrate Primer:</u> Two-component resin or other compound, recommended by matrix manufacturer, to penetrate and seal substrate and provide maximum bond of terrazzo to substrate.

Finishing Grout: Resin or other compound with filler and pigments, as recommended by matrix manufacturer.

TERRAZZO ACCESSORIES:

<u>Divider Strips</u>: Depth and style as required for terrazzo type and thickness. Width, material and color as indicated. Angle or "T"-type for adhesive bonding to substrate.

Unless otherwise indicated, use divider strips with 1/4" wide top, as follows:

White zinc alloy.

Accessory Strips: Match width, material and color of divider strips, unless otherwise indicated. Provide the following types of accessory strips as required for complete installation.

Base bead and cove base dividers.

Channels to receive abrasive inserts.

<u>Control</u> <u>Strips</u>: Double or split units, 1/8" wide, of same material and color as divider strips with 1/8" wide full-depth filler, laminated between the strips.

Filler: Black neoprene.

<u>Divider Strip</u> <u>Adhesive</u>: Trowelable mixture of fine sand and

bonding agent, specially compounded by manufacturer for this use.

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<u>Cleaner</u>: Liquid, neutral chemical cleaner, with Ph factor between 7 and 10, of formulation recommended by sealer manufacturer for type of terrazzo used, and complying with NTMA requirements.

<u>Interior Floor Sealer</u>: Colorless, slip and stain resistant penetrating sealer with Ph factor between 7 and 10, that does affect color or physical properties of terrazzo surface.

PART 3 - EXECUTION

PREPARATION:

Clean and prepare substrate to comply with NTMA specifications for type of terrazzo application indicated. Clean substrate of loose chips and foreign matter. Grind concrete substrate to provide surfaces within tolerances required by NTMA for type of terrazzo application.

INSTALLATION, GENERAL:

For thin-set terrazzo, comply with resin manufacturers recommendations for proportioning mixes, installation of strips, and for placing, curing, grinding, and finishing.

Provide terrazzo bases and thresholds without interruptions of seams, except where divider strips, control joints and expansion joints are indicated. Place and finish terrazzo around obstructions to achieve continuous color, pattern and finish.

<u>Install divider and accessory strips</u> in adhesive setting bed, in accordance with manufacturer's instructions, without voids below strips. Provide mechanical anchorage as required for adequate attachment of strips to substrate.

<u>Provide control joints</u> where indicated by installing angle-type divider strips back-to-back with neoprene rubber filler cemented between strips, flush with finish floor.

<u>Install</u> <u>abrasive</u> <u>inserts</u> in accordance with insert manufacturer's instructions.

THIN-SET TERRAZZO:

52 <u>Comply with NTMA</u> guide specifications previously referenced under "Thin-set Terrazzo Materials" and with matrix

manufacturer's directions for installing and finishing thin-set terrazzo. Match Architect's sample and provide total material thickness indicated.

Exercise extreme care to ensure fluids from grinding operation do not react with divider or control strips to produce a stain on aggregate.

Delay grinding and finishing until heavy trade work is completed and construction traffic through the area is restricted.

CLEANING, SEALING, AND PROTECTION:

<u>Clean terrazzo</u> after installation and finishing operations are completed, complying with sealer manufacturer's instructions.

Apply sealer to cleaned terrazzo surfaces to comply with sealer manufacturer's instructions.

<u>Protect terrazzo</u> from damage and wear during construction operation.

FINAL CLEANING:

Clean terrazzo as recommended by manufacturer of sealer and machine buff if required when building is ready for occupancy.

END OF SECTION 09400

SECTION 09510 - ACOUSTICAL CEILINGS

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PART 1 - GENERAL

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RELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Special Conditions and Division-1 Specification sections, apply to work of this section.

SUMMARY:

Extent of each type of acoustical ceiling is shown and scheduled
on drawings.

Types of acoustical ceilings specified in this section include the following:

Acoustical panel ceilings, exposed suspension.

SUBMITTALS:

 <u>Product</u> <u>Data</u>: Submit manufacturer's technical data for each type of acoustical ceiling unit and suspension system required.

Coordination Drawings: Submit reflected ceiling plans, prepared by Installer for installation purposes, drawn accurately to scale and coordinated with related mechanical, electrical and other work above, penetrating, or connected to acoustical ceiling. Show ceiling suspension members, method of anchorage to building structure of hangers, size and location of initial access modules for acoustical tile ceilings (if any), and ceiling-mounted work including light fixtures, diffusers, grilles, and special moldings.

Scale: 1/8" = 1'-0".

 <u>Samples for Initial Selection Purposes</u>: Submit manufacturers' standard size samples of acoustical units, but not less than 6" square, and of exposed ceiling suspension members including wall and special moldings. Provide samples showing full range of colors, textures and patterns available for each type of component required.

Samples for Verification Purposes: Submit the following:

6" square samples of each acoustical panel type, pattern and color.

Set of 12" long samples of exposed runners and moldings for each color and system type required.

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Set of concealed suspension members.

<u>Certificates</u>: Submit certificates from manufacturers of acoustical ceiling units and suspension systems attesting that their products comply with specification requirements.

QUALITY ASSURANCE:

Fire Performance Characteristics: Provide acoustical ceiling components that are identical to those tested for the following fire performance characteristics, according to ASTM test method indicated, by UL or other testing and inspecting agency acceptable to authorities having jurisdiction. Identify acoustical ceiling components with appropriate marking of applicable testing and inspecting agency.

<u>Surface</u> <u>Burning</u> <u>Characteristics</u>: As follows, tested per ASTM E 84.

Flame Spread: 25 or less.
Smoke Developed: 50 or less.

Fire Resistance Ratings: As indicated by reference to design designation in UL "Fire Resistance Directory" for floor, roof or beam assemblies in which acoustical ceilings function as a fire protective membrane; tested per ASTM E 119. Provide protection materials for lighting fixtures and air ducts to comply with requirements indicated for rated assembly.

Coordination of Work: Coordinate layout and installation of acoustical ceiling units and suspension system components with other work supported by, or penetrating through, ceilings, including light fixtures, HVAC equipment, fire-suppression system components (if any), and partition system (if any).

DELIVERY, STORAGE, AND HANDLING:

<u>Deliver acoustical ceiling units</u> to project site in original, unopened packages and store them in a fully enclosed space where they will be protected against damage from moisture, direct sunlight, surface contamination or other causes.

Before installing acoustical ceiling units, permit them to reach room temperature and a stabilized moisture content.

<u>Handle acoustical ceiling units</u> carefully to avoid chipping edges or damaging units in any way.

PROJECT CONDITIONS:

Space Enclosure: Do not install interior acoustical ceilings until space is enclosed and weatherproof, wet-work in space is completed and nominally dry, work above ceilings is complete, and ambient conditions of temperature and humidity will be continuously maintained at values near those indicated for final occupancy.

EXTRA MATERIALS:

<u>Deliver extra materials</u> to Owner. Furnish extra materials described below matching products installed, packaged with protective covering for storage and identified with appropriate labels.

Acoustical Ceiling Units: Furnish quantity of full size units equal to 3.0% of amount installed.

Exposed Suspension System Components: Furnish quantity of each exposed component equal to 2.0% of amount installed.

PART 2 - PRODUCTS

ACOUSTICAL CEILING UNITS, GENERAL:

Standard for Acoustical Ceiling Units: Provide manufacturer's standard units of configuration indicated which are prepared for mounting method designated and which comply with FS SS-S-118 requirements, including those indicated by reference to type, form, pattern, grade (NRC or NIC' as applicable), light reflectance coefficient (LR), edge detail, and joint detail (if any).

Mounting Method for Measuring NRC: No. 7 (mechanically mounted on special metal support), FS SS-S-118; or Type E-400 mounting as per ASTM E 795.

Sound Attenuation Performance: Provide acoustical ceiling units with ratings for ceiling sound transmission class (STC) of range indicated as determined according to AMA 1-II "Ceiling Sound Transmission Test by Two-Room Method" with ceilings continuous at partitions and supported by a metal suspension system of type appropriate for ceiling unit of configuration indicated (concealed for tile, exposed for panels).

Colors, Textures, and Patterns: Provide products to match appearance characteristics indicated or, if not otherwise indicated, as selected by Architect from manufacturer's standard colors, surface textures, and patterns available for acoustical

ceiling units and exposed metal suspension system members of 2 quality designated. 3 4 5 ACOUSTICAL PANELS: 6 7 Mineral Composition Panels - Nodulated, Cast or Molded; with Standard Washable Painted Finish: 8 Provide Type III, Form 1 9 units per FS SS-S-118 and complying with the following 10 requirements: 11 Fissured Pattern: Manufacturer's standard fissured design; 12 other panel characteristics as follows: 13 14 F-Fissured (A-Z) 15 Designation: 16 17 ACT-1 Acoustone, Finesse; Unites States Gypsum Co.. 18 19 Color: Match Architect's sample; white. 20 21 Grade: NRC 65. 22 23 STC Range: 30-34. 24 25 Edge Detail: Square. 26 Size: 24" x 48" x 3/4". 27 28 29 Textured Heavy Pattern: Manufacturer's standard heavy textured design; other panel characteristics as follows: 30 31 32 Designation: 33 34 ACT-2 Acoustone Glacier; United States Gypsum Co. 35 ACT-3 Acoustone Glacier, Designer Color; 36 States Gypsum Co. 37 38 Match Architect's sample. Color: 39 40 Grade: NRC 65. 41 42 STC Range: 25-29. 43 44 Edge Detail: Reveal. 45 24" x 24" x 3/4". 46 Size:

METAL SUSPENSION SYSTEMS, GENERAL:

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Standard for Metal Suspension Systems: Provide metal suspension systems of type, structural classification and finish indicated which comply with applicable ASTM C 635 requirements.

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Finishes and Colors: Provide manufacturer's standard factoryapplied finish for type of system indicated. For exposed suspension members and accessories with painted finish, provide color indicated or, if not otherwise indicated, as selected by Architect from manufacturer's full range of standard colors. Grid color to match tile color.

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Attachment Devices: Size for 5 times design load indicated in ASTM C 635, Table 1, Direct Hung.

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Concrete Inserts: Inserts formed from hot-dipped galvanized sheet steel and designed for attachment to concrete forms and for embedment in concrete, with holes or loops for attachment at hanger wires.

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> Hanger Wire: Galvanized carbon steel wire, ASTM A 641, soft temper, prestretched, Class 1 coating, sized so that stress at 3-times hanger design loan (ASTM C 635, Table 1, Direct Hung), will be less than yield stress of wire, but provide not less than 12 gage.

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Edge Moldings and Trim: Metal or extruded plastic of types and profiles indicated or, if not indicated, provide manufacturer's standard molding for edges and penetrations of ceiling which fits with type of edge detail and suspension system indicated.

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28 For lay-in panels with reveal edge details, provide stepped edge molding which forms reveal of same depth and width as that formed between edge of panel and floor that formed between edge of panel and flange at exposed suspension member.

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For circular penetrations of ceiling, provide edge moldings fabricated to diameter required to fit penetration exactly.

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For narrow faced suspension systems, provide suspension system manufacturer's standard edge moldings which match width and configuration of exposed runners.

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Hold-Down Clips for Non-Fire-Rated Ceilings: For interior ceilings composed of lay-in panels weighing less than 1 lb. per sq. ft., provide hold-down clips spaced 2'-0" o.c. on all cross tees.

EXPOSED METAL DIRECT-HUNG SUSPENSION SYSTEMS:

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Non-Fire-Resistance-Rated Double Web Steel Suspension System: Manufacturer's standard system roll-formed from prefinished cold-rolled steel sheet with 15/16" wide exposed faces on structural members; other characteristics as follows:

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Structural Classification: Intermediate-Duty System.

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Heavy-Duty System in Operating Rooms capable of 9.34 PSF applied uniform load.

Finish: Painted, match color of acoustical unit.

<u>Manufacturers</u>: Subject to compliance with requirements, provide products of one of the following:

<u>Manufacturers of Non-Fire-Resistance-Rated Double Web Steel</u>
Suspension Systems:

Chicago Metallic Corporation.

Donn Corporation.

Eastern Products Div., Armstrong World Industries, Inc. National Rolling Mills, Inc.

MISCELLANEOUS MATERIALS:

Tile Fasteners: Cadmium plated, type recommended by tile manufacturer, but for not less than 1/2" penetration of substrate.

Acoustical Sealant: Resilient, non-staining, non-shrinking, non-hardening, non-skinning, non-drying, non-sag sealant intended for interior sealing of concealed construction joints.

<u>Products</u>: Subject to compliance with requirements, provide one of the following:

BA-98; Pecora Corp.
Tremco Acoustical Sealant; Tremco.

PART 3 - EXECUTION

PREPARATION:

<u>Coordination</u>: Furnish layouts for inserts, clips, or other supports required to be installed by other trades for support of acoustical ceilings.

Furnish concrete inserts and similar devices to other trades for installation well in advance of time needed for coordination of other work.

Measure each ceiling area and establish layout of acoustical units to balance border widths at opposite edges of each ceiling. Avoid use of less-than-half width units at borders, and comply with reflected ceiling plans wherever possible.

INSTALLATION:

<u>General</u>: Install materials in accordance with manufacturer's printed instructions, and to comply with governing regulations, fire resistance rating requirements as indicated, and CISCA standards applicable to work.

Arrange acoustical units and orient directionally-patterned units (if any) in manner shown by reflected ceiling plans.

Install tile with pattern running in one direction.

Install suspension systems to comply with ASTM C 636, with hangers supported only from building structural members. Locate hangers not less than 6" from each end and spaced 4'-0" along each carrying channel or direct-hung runner, unless otherwise indicated, leveling to tolerance of 1/8" in 12'-0".

<u>Secure</u> wire <u>hangers</u> by looping and wire-tying, either directly to structures or to inserts, eye-screws, or other devices which are secure and appropriate for substrate, and which will not deteriorate or fail with age or elevated temperatures.

Install hangers plumb and free from contact with insulation or other objects within ceiling plenum which are not part of supporting structural or ceiling suspension system. Splay hangers only where required to miss obstructions and offset resulting horizontal force by bracing, countersplaying or other equally effective means.

<u>Install edge moldings</u> of type indicated at perimeter of acoustical ceiling area and at locations where necessary to conceal edges of acoustical units.

<u>Sealant Bed</u>: Apply continuous ribbon of acoustical sealant, concealed on back of vertical leg before installing moldings.

Screw-attach moldings to substrate at intervals not over 16" o.c. and not more than 3" from ends, leveling with ceiling suspension system to tolerance of 1/8" in 12'-0". Miter corners accurately and connect securely.

<u>Install</u> <u>acoustical</u> <u>panels</u> in coordination with suspension system, with edges concealed by support of suspension members. Scribe and cut panels to fit accurately at borders and at penetrations.

<u>Install hold-down clips</u> in areas indicated, and in areas where required by governing regulations or for fire-resistance ratings; space as recommended by panel manufacturer, unless otherwise indicated or required.

09510 - 7

CLEANING:

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Clean exposed surfaces of acoustical ceilings, including trim, edge moldings, and suspension members; comply with manufacturer's instructions for cleaning and touch-up of minor finish damage. Remove and replace work which cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

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END OF SECTION 09510

SECTION 09521 - ACOUSTICAL WALL PANELS

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PART 1 - GENERAL

RELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Special Conditions and Division-1 Specification sections, apply to work of this section.

 $\underline{\underline{Substrates}}$ for acoustical wall panels are being specified under other sections of these specifications.

SUMMARY:

Extent of acoustical wall panels is shown on drawings.

SUBMITTALS:

<u>Product</u> <u>Data</u>: Submit manufacturer's technical data for each type of acoustical wall panel required.

<u>Samples for Initial Selection Purposes</u>: Submit manufacturer's standard size swatches of material indicated as facing for acoustical wall panels showing full range of colors, textures, and patterns available for each type of panel and facing material required.

Samples for Verification Purposes: Submit 12" square samples of each type of acoustical wall panel required and in each color, texture and pattern indicated or selected for facing materials. Include representative samples of installation devices and accessories.

QUALITY ASSURANCE:

 Fire Performance Characteristics: Provide acoustical wall panels, with surface-burning characteristics as indicated below, which have been determined by testing assemblies of identical materials and construction according to ASTM E 84 by a testing organization acceptable to authorities having jurisdiction.

Flame Spread: 25 or less.
Smoke Developed: 450 or less.

PRODUCT HANDLING:

Protect acoustical wall panels from excessive moisture shipment, storage, and handling. Deliver in unopened bundles and store in a dry place with adequate air circulation. Do not deliver material to building until "wet work" such as concrete and plaster have been completed and cured to a condition of equilibrium.

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PROJECT CONDITIONS:

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Do not begin installation until spaces to receive acoustical wall panels have been enclosed and maintained at approximately the same humidity and temperature conditions as planned for occupancy. Maintain temperature and humidity as recommended by panel manufacturer.

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EXTRA MATERIALS:

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Deliver extra materials to Owner. Furnish extra materials described below matching products installed, packaged with protective covering for storage and identified with appropriate labels:

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Acoustical Wall Panels: Furnish quantity of full size units equal to 4.0 percent of the amount installed.

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PART 2 - PRODUCTS

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ACOUSTICAL WALL PANELS, GENERAL:

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Fabricate panels to sizes and configurations indicated; attach facing materials to cores to produce installed panels with visible surfaces fully covered and free from wrinkles, sags, blisters, seams, adhesive or other foreign matter.

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Fabricate back-mounted panels in factory to exact sizes required to fit wall surfaces based on field measurements of completed substrates indicated to receive wall panels.

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Sound Absorption Performance: Provide acoustical wall panels with minimum noise reduction coefficients (NRC) indicated as determined by testing per ASTM C 423 for mounting type specified under individual product requirements.

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Colors, Textures and Patterns: Where manufacturer's standard material is indicated, provide acoustical wall panels faced with material complying manufacturer's with the following requirements:

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<u>Provide color, texture and pattern</u> as selected from manufacturer's full range of standard materials of type indicated.

SPLINE-MOUNTED ACOUSTICAL WALL PANELS:

 <u>Spline-Mounted Acoustical Wall Panels with Perforated Mineral Fiberboard Core: Manufacturer's standard panel construction consisting of facing material laminated to perforated water-felted mineral fiberboard core, with long edges kerfed and rabbeted to receive splines, and complying with the following requirements:</u>

<u>Thickness/NRC</u>: Nominal overall panel thickness of 3/4"/NRC of 0.45-0.55 for Type A (#4) mounting.

Facing Material: Manufacturer's standard perforated vinyl.

Panel Width: 30".

Panel Height: As indicated, fabricated from 9'-0" high units. At countertop, mount above backsplash to underside of ceiling.

Spline-Mounting Accessories: Manufacturer's standard concealed extruded aluminum or plastic connecting splines designed and fabricated from screw attachment to walls, with other moldings and trim for interior and exterior corners as required. Provide panel manufacturer's standard factory-applied finish on exposed items in the following color:

Match color of facing material.

<u>Products</u>: Subject to compliance with requirements, provide one of the following:

<u>Spline-Mounted Acoustical Wall Panels with Perforated Mineral Fiberboard Core:</u>

"Classic Vinyl Soundsoak"; Armstrong World Industries, Inc. "Silent 65" Acoustical Walls; USG Acoustical Products Co.

PART 3 - EXECUTION

INSTALLATION:

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<u>Install acoustical wall panels</u> in locations indicated with vertical surfaces and edges plumb, top edges level, and in alignment with other panels, scribed to fit adjoining work accurately at borders and at penetrations. Comply with panel

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manufacturer's printed instructions for installation of panels using type of mounting accessories indicated or, if none indicated, as recommended by manufacturer.

Cut units to be at least 50 percent of unit width, with facing material extended over cut edge to match uncut edge. Scribe acoustical wall units to fit adjacent work. Butt joints tightly.

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Remove and replace panels which are damaged and are unacceptable to Architect.

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END OF SECTION 09521

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SECTION 09650 - RESILIENT FLOORING

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PART 1 - GENERAL

RELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Special Conditions and Division 1 Specification sections, apply to work of this section.

DESCRIPTION OF WORK:

Extent of resilient flooring and accessories is shown on drawings and in schedules.

QUALITY ASSURANCE:

 Manufacturer: Provide each type of resilient flooring and accessories as produced by a single manufacturer, including recommended primers, adhesives, sealants, and leveling compounds.

<u>Fire Test Performance</u>: Provide resilient flooring which complies with the following fire test performance criteria as determined by an independent testing laboratory acceptable to authorities having jurisdiction.

Critical Radiant Flux (CRF): Not less than the following rating as per ASTM E 648.

0.45 watts per sq. cm.

Flame Spread: Not more than 75 per ASTM E 84.

Smoke Developed: Not more than 450 per ASTM E 84.

Smoke Density: Not more than 450 per ASTM E 662.

<u>Installer's Qualifications</u>: Engage Installer who is certified in writing by resilient flooring manufacturer as qualified for installation of sheet vinyl employing heat welded seams.

SUBMITTALS:

50 <u>Product Data:</u> Submit manufacturer's technical data for each type of resilient flooring and accessory.

Samples for Initial Selection Purposes: Submit manufacturer's

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standard color charts in form of actual sections of resilient flooring, including accessories, showing full range of colors and patterns available, for each type of resilient flooring required.

<u>Samples</u> <u>for Verification Purposes</u>: Submit the following samples of each type, color, and pattern of resilient flooring required, showing full-range of color and pattern variations.

Full size tile samples.

6" x 9" samples of sheet flooring.

2-1/2" long samples of resilient flooring accessories.

Other materials as required.

<u>Certification for Fire Test Performance:</u> Submit certification from independent testing laboratory acceptable to authorities having jurisdiction that resilient flooring complies with fire test performance requirements.

Maintenance Instructions: Submit 2 copies of manufacturer's recommended maintenance practices for each type of resilient flooring and accessory required.

PROJECT CONDITIONS:

Maintain minimum temperature of 65 F (18 C) in spaces to receive resilient flooring for at least 48 hours prior to installation, during installation, and for not less than 48 hours after installation. Store resilient flooring materials in spaces where they will be installed for at least 48 hours before beginning installation. Subsequently, maintain minimum temperature of 55 F (13 C) in areas where work is completed.

Install resilient flooring and accessories after other finishing operations, including painting, have been completed. Do not install resilient flooring over concrete slabs until the latter have been cured and are sufficiently dry to achieve bond with adhesive as determined by manufacturer's recommended bond and moisture test.

PART 2 - PRODUCTS

ACCEPTABLE MANUFACTURERS:

Manufacturers: Subject to compliance with requirements, provide products of one of the following:

Manufacturers of Vinyl Composition Tile:

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1
 2
        Amtico Flooring Div., American Biltrite Inc.
 3
        Armstrong World Industries, Inc.
 4
        Azrock Floor Products Div., Azrock Industries, Inc.
 5
        Kentile Floors, Inc.
 6
        Tarkett Inc.
 7
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        Manufacturers of Filled Vinyl with Fibrous Backing:
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10
        Armstrong World Industries, Inc.
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        Manufacturers of Rubber Sheet Flooring:
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        Flexco Div., Textile Rubber Co.
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        Manufacturers of Vinyl Wall Base:
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18
        Armstrong World Industries, Inc.
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        Azrock Floor Products Div., Azrock Industries, Inc.
20
        Flexco Div., Textile Rubber Co.
21
        Johnson Rubber Co., Inc.
22
        Kentile Floors, Inc.
23
        Mercer Plastics Co., Inc.
24
        Vinyl Plastics, Inc.
25
26
        Manufacturers of Vinyl Treads, Risers and Skirtings:
27
28
        Flexco Div., Textile Rubber Co.
29
        Johnson Rubber Co., Inc.
30
        Mercer Plastics Co., Inc.
31
        R.C. Musson Rubber Co., Inc.
32
        R.C.A. Rubber Co.
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35
    RESILIENT FLOORING COLORS AND PATTERNS:
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37
    Provide color and patterns as indicated, or if not otherwise
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    indicated,
                 as
                      selected by
                                      Architect
                                                  from
                                                         manufacturer's
39
    standards.
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    TILE FLOORING:
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    Vinyl Composition Tile: FS SS-T-312, Type IV; 12" x 12" unless
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45
    otherwise indicated, and as follows:
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        Composition 1 - asbestos-free.
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        Gage: 1/8".
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VINYL SHEET FLOORING:

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Filled Vinyl sheet products are those with a vinyl plastic

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1 wearlayer with descriptive requirements of FS L-F-475 for 2 wearing surface.

Filled Vinyl Sheet with Backing: Provide vinyl sheet with filled vinyl plastic wearlayer and fibrous backing complying with FS L-F-475, Type II, Grade A requirements, with manufacturer's recommended static load limit of 100 psi, and 72" minimum sheet width.

Federal Standard: Comply with FS L-F-475, Type II, Grade A requirements except for overall thickness, backing and dimensional stability requirements.

Static Load Limit: 125 psi minimum as recommended by manufacturer.

Sheet Width: 6'-0" minimum.

Sheet Rubber Flooring: Provide dense homogeneous rubber sheet flooring without backing.

Overall Thickness: 1/8 gauge

Sheet Width: 36 3/4"

Provide integral flash cove base in all areas to receive rubber sheet flooring.

ACCESSORIES:

<u>Vinyl</u> <u>Wall</u> <u>Base</u>: Provide vinyl base complying with FS SS-W-40, Type II, with matching end stops and preformed or molded corner units, and as follows:

<u>Wall Base</u>: Provide base complying with FS SS-W-40; either Type I rubber or Type II vinyl, with matching end stops and preformed or molded corner units, and as follows:

Height: 4" and 6".

Thickness: 1/8" gage.

<u>Style</u>: Standard top-set cove, except where used with carpet tiles.

<u>Style</u>: Straight base without cove. For use with carpet tiles only.

Finish: Matte.

 Resilient Stair Treads: Provide treads where shown, consisting of single-piece units for width of stair treads, or equal-length units if tread width exceeds available manufactured lengths.

1

Provide vinyl stair tread units complying with FS RR-T-650, Type B, sanded backs, style as indicated.

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Thickness: Not less than 3/16" nominal and 1/4" at nosing.

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Nose Design: Class 1 - round nose.

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Resilient Edge Strips: 1/8" thick, homogeneous vinyl or rubber composition, tapered or bullnose edge, color to match flooring, or as selected by Architect from standard colors available; not less than 1" wide.

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Metal Edge Strips: Of width shown and of required thickness to protect exposed edge of resilient flooring. Provide units of maximum available length, to minimize number of joints.

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Extruded aluminum with mill finish, unless Material: otherwise shown.

19 20

Type: Butt type metal edge strips for concealed anchorage.

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Adhesives (Cements): Waterproof, stabilized type as recommended flooring manufacturer to suit material and substrate conditions.

26 27

Concrete Slab Primer: Non-staining type as recommended by flooring manufacturer.

28 29

> Leveling and Patching Compound: Latex types as recommended by flooring manufacturer.

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PART 3 - EXECUTION

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INSPECTION:

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Require Installer to inspect subfloor surfaces to determine that they are satisfactory. A satisfactory subfloor surface is defined as one that is smooth and free from cracks, holes, ridges, coatings preventing adhesive bond, and other defects impairing performance or appearance.

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Perform bond and moisture tests on concrete subfloors determine if surfaces are sufficiently cured and dry as well as to ascertain presence of curing compounds.

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Do not allow resilient flooring work to proceed until subfloor surfaces are satisfactory.

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PREPARATION:

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Prepare subfloor surfaces as follows:

Use leveling and patching compounds as recommended by resilient flooring manufacturer for filling small cracks, holes and depressions in subfloors. The Resilient Flooring installer shall be responsible

for all resilient flooring to match flush with ceramic tile or terrazzo flooring abutments." ent adhesive bond, including curing compounds incompatible with resilient flooring adhesives, paint, oils, waxes and sealers.

Broom clean or vacuum surfaces to be covered, and inspect subfloor.

Apply concrete slab primer, if recommended by flooring manufacturer, prior to application of adhesive. Apply in compliance with manufacturer's directions.

INSTALLATION, GENERAL:

Where movable partitions are shown, install resilient flooring before partitions are erected.

<u>Install resilient</u> <u>flooring</u> using method indicated in strict compliance with manufacturer's printed instructions. Extend flooring into toe spaces, door reveals, and into closets and similar openings.

Scribe, cut, and fit resilient flooring to permanent fixtures, built-in furniture and cabinets, pipes, outlets and permanent columns, walls and partitions.

<u>Maintain</u> <u>reference</u> <u>markers</u>, holes, or openings that are in place or plainly marked for future cutting by repeating on finish flooring as marked on subfloor. Use chalk or other non-permanent marking device.

<u>Install resilient flooring on covers</u> for telephone and electrical ducts, and other such items as occur within finished floor areas. Maintain overall continuity of color and pattern with pieces of flooring installed on these covers. Tightly cement edges to perimeter of floor around covers and to covers.

<u>Tightly cement resilient flooring</u> to subbase without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, or other surface imperfections. Hand roll resilient flooring at perimeter of each covered area to assure adhesion.

INSTALLATION OF TILE FLOORS:

Lay tile from center marks established with principal walls, discounting minor offsets, so that tile at opposite edges of room are of equal width. Adjust as necessary to avoid use of cut widths less than 1/2 tile at room perimeters. Lay tile square to room axis, unless otherwise shown.

Match tiles for color and pattern by using tile from cartons in same sequence as manufactured and packaged if so numbered. Cut tile neatly around all fixtures. Broken, cracked, chipped, or deformed tiles are not acceptable.

Lay tile with grain running in one direction.

Adhere tile flooring to substrates using full spread of adhesive applied in compliance with flooring manufacturer's directions.

INSTALLATION OF SHEET FLOORING:

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49 50 51

52 53 Lay sheet flooring to provide as few seams as possible with economical use of materials. Match edges for color shading and pattern at seams in compliance with manufacturer's recommendations.

Adhere sheet flooring to substrates using method approved by flooring manufacturer for type of sheet flooring and substrate condition indicated.

Use conventional full spread adhesive method unless otherwise indicated.

<u>Use conventional perimeter bonding adhesive</u> procedures where recommended by flooring manufacturer.

Prepare seams in vinyl sheet flooring in accordance with manufacturer's instructions for most inconspicuous appearance, sealing continuously with fluid-applied sealant or adhesive as standard with manufacturer.

Provide integral flash cove base where shown on drawings, including cove support strip and metal top edge strip. Construct coved base in accordance with manufacturer's instructions.

On masonry surfaces or other similar irregular vertical substrates, fill voids between metal top edge strip cove cap and vertical surface with manufacturer's recommended adhesive filler material.

INSTALLATION OF ACCESSORIES:

Apply wall base to walls, columns, pilasters, casework and other

permanent fixtures in rooms or areas where base is required. Install base in lengths as long as practicable, with preformed corner units, or fabricated from base materials with mitered or coped inside corners. Tightly bond base to substrate throughout length of each piece, with continuous contact at horizontal and vertical surfaces.

On masonry surfaces, or other similar irregular substrates, fill voids along top edge of resilient wall base with manufacturer's recommended adhesive filler material.

<u>Place resilient edge</u> <u>strips</u> tightly butted to flooring and secure with adhesive. Install edging strips at edges of flooring which would otherwise be exposed.

Apply overlap metal edge strips where shown on drawings, and after flooring installation. Secure units to substrate with countersunk stainless steel anchors, complying with edge strip manufacturer's recommendations.

Apply resilient accessories to stairs as indicated and in strict accordance with manufacturer's installation instructions.

CLEANING AND PROTECTION:

<u>Perform following operations</u> immediately upon completion of resilient flooring:

Sweep or vacuum floor thoroughly.

<u>Do not wash floor</u> until time period recommended by resilient flooring manufacturer has elapsed to allow resilient flooring to become well-sealed in adhesive.

<u>Damp-mop</u> <u>floor</u> being careful to remove black marks and excessive soil.

Remove any excess adhesive or other surface blemishes, using appropriate cleaner recommended by resilient flooring manufacturers.

Protect <u>flooring</u> against damage during construction period to comply with resilient flooring manufacturer's directions.

Apply protective floor polish to resilient flooring surfaces free from soil, excess adhesive or surface blemishes. Use commercially available metal cross-linked acrylic product acceptable to resilient flooring manufacturer.

 <u>Protect resilient flooring</u> against damage from rolling loads for initial period following installation by covering with plywood or hardboard. Use dollies to move stationary

equipment or furnishings across floors.

<u>Cover resilient flooring</u> with undyed, untreated building paper until inspection for substantial completion.

<u>Clean resilient flooring</u> not more than 4 days prior to date scheduled for inspections intended to establish date of substantial completion in each area of project. Clean resilient flooring by method recommended by resilient flooring manufacturer.

Strip protective floor polish, which was applied after completion of installation, prior to cleaning.

Reapply floor polish after cleaning.

EXTRA STOCK:

Deliver stock of maintenance materials to Owner. Furnish maintenance materials from same manufactured lot as materials installed and enclosed in protective packaging with appropriate identifying labels.

<u>Tile Flooring</u>: Furnish not less than one box for each 50 boxes or fraction thereof, for each type, color, pattern and size installed.

<u>Sheet Flooring:</u> Furnish not less than 5 linear yards for each type, color and pattern installed.

END OF SECTION 09650

SECTION 09680 - CARPETING

PART 1 - GENERAL

RELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Special Conditions and Division-1 Specification sections, apply to work of this section.

SUMMARY:

Extent, location and details of each type of carpeting are indicated on drawings, and in schedules.

Work of this section includes furnishing and installation of carpeting, adhesives and accessories.

Carpet tile is specified elsewhere in Division-9 Section.

DEFINITIONS:

<u>Commercial Carpet</u>: Carpet intended for use in commercial and public spaces, with construction, fire ratings, static control and appearance appropriate for this use.

SUBMITTALS:

 <u>Product Data</u>: Submit manufacturer's product literature and installation instructions for each type of carpeting material and installation accessory required. Include methods of installation for each type of substrate.

Submit written data on physical characteristics, durability, resistance to fading and flame resistance characteristics.

<u>Samples</u> <u>for Initial Selection Purposes</u>: Submit manufacturer's standard size samples and color yarns showing full range of colors, textures and patterns available for each type of carpet required.

Samples for Verification Purposes: Submit the following:

18" square samples of each type of carpet material required.
12" long samples of each type exposed edge stripping and accessory items.

6" square samples of each type of carpet cushion.

Prepare samples from same material to be used for the work.

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QUALITY ASSURANCE:

Manufacturer Qualifications: Firm (material producer) with not less than 3 years of production experience, whose published literature clearly indicates general compliance of products with requirements of this section.

 <u>Installer Qualifications:</u> Firm specializing in carpet installation with not less than 2 years of experience in installation of carpeting similar to that required for this project.

<u>Single Source Responsibility:</u> Provide material produced by a single manufacturer for each carpet type.

TESTING:

<u>Test Reports</u>: Submit certified test reports evidencing compliance with requirements for the following:

Fire performance characteristics.

Physical properties indicated.

Fire Performance Characteristics: Provide carpeting that is identical to that tested for the following fire performance requirements, according to test method indicated, by UL or other testing and inspecting agency acceptable to authorities having jurisdiction.

Flammability: As follows:

Rating: Passing Methenamine Pill Test.

Test Method: ASTM D 2859.

Surface Burning Characteristics: As follows:

Flame Spread: Not more than 25.

Smoke Developed: Not more than 50.

Test Method: ASTM E 84.

Critical Radiant Flux: As follows:

Rating: Not less than 0.45 watts per sq. centimeter.

Test Method: ASTM E 648.

Smoke Density: As follows:

Rating: With flame, 15.4 minimum value. Without flame, 9.1 minimum value.

Test Method: ASTM E 662.

Physical Properties: Provide carpeting that is identical to that tested for the following physical properties, according to the test method indicated.

Static Resistance:

Rating: 1.5 KV when tested at 20% R.H/70 deg F. (at computer areas)

Rating: 3.0 KV when tested at 20% R.H/70 deg F.

Test Method: AATCC 134.

Microbial Resistance:

Rating: Minimum 90% bacterial reduction.

Test Method: AATCC 100.

Rating: Maximum 20% fungal growth.

Test Method: AATCC 30.

Rating: Exhibits no zone of inhibition.

Test Method: AATCC 90.

Certification: Submit manufacturer's certificate stating that materials furnished comply with specified requirements. Include supporting certified laboratory testing data indicating that material meets specified test requirements.

DELIVERY, STORAGE, AND HANDLING:

Deliver materials to project site in original factory wrappings and containers, clearly labeled with identification of manufacturer, brand name, quality or grade, fire hazard classification, and lot number. Store materials in original undamaged packages and containers, inside well-ventilated area protected from weather, moisture, soiling, extreme temperatures, humidity; laid flat, blocked off ground to prevent sagging and warping. Maintain temperature in storage area above 40 degrees Fahrenheit.

Comply with instructions and recommendations of manufacturer for special delivery, storage, and handling requirements.

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SEQUENCING AND SCHEDULING:

Sequence carpet installation with other work to minimize possibility of damage and soiling during remainder of construction period.

WARRANTY:

Special Project Warranty: Submit a written warranty, executed by the Contractor, Installer and the Manufacturer, agreeing to repair or replace carpeting which fails in materials or workmanship within the specified warranty period. This warranty shall be in addition to and not a limitation of other rights the Owner may have against the Contractor under the Contract Documents.

<u>Warranty period</u> is 2 years after the date of substantial completion.

MAINTENANCE:

Maintenance Instructions: Submit manufacturer's printed instructions for maintenance of installed work, including methods and frequency recommended for maintaining optimum condition under anticipated traffic and use conditions. Include precautions against materials and methods which may be detrimental to finishes and performance.

 Replacement Materials: After completion of work, deliver not less than 5% of each type, color, and pattern of carpeting, of exclusive material required to properly installation. Furnish accessory components as required. Furnish replacement materials from same production run as materials installed. Package replacement materials protective covering, identified with appropriate labels.

PART 2 - PRODUCTS

MATERIALS:

Carpet Fiber:

Extra-Large Filament Hollow Soil-Hiding Nylon: Standard extra-large filament nylon fiber with multiple hollow cores, bulked continuous filament (BCF). Antron Precedent by Dupont.

Carpet Construction:

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Fabricate carpet by the construction method indicated on data sheets, using manufacturer's standard process, as recognized in industry.

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Tufted carpet.

Carpet Style:

Cut/loop combination (cut/uncut).

Gauges and Stitches:

Stitches: 4.8 stitches per inch (minimum).

Gauge: 1/8 inch gauge (minimum).

Yarn Description:

 Spun Carpet Yarn: Provide yarn size/twist/plies which result in carpet appearance to match Architect's sample(s) as designated for control/selection of color, pattern, and texture.

Finished Carpet Face Yarn: Provide finished face yarn in size, twist, plies to match Architect's sample(s) designated for control/selection of color, pattern, and texture.

Pile Height: .265 inch

Pile Face Weight: 32 oz.

Pile Density: 4,347 (minimum).

Carpet Color, Pattern, and Texture:

Representative control sample for color, pattern and texture is Lee's Commercial Carpet, New Adventure II.

Provide materials in colors and patterns (if applicable) as selected by Architect from manufacturer's standard colors and patterns.

Dyeing Method: Provide dyed material, as recommended by mill to comply with requirements, including appearance and best possible appearance retention.

Yarn Dyed.

Carpet Backing:

Primary Backing: Provide woven construction or sheet goods, of natural or synthetic fibers or non-woven sheets, as applicable to carpet construction indicated, and as

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appropriate for service and exposures indicated.

Secondary Backing: Provide 6.0 oz. per sq. yd. woven jute carpet backing, or provide 3.5 oz. per sq. yd. woven synthetic fiber carpet backing. Laminate to primary backing with latex or similar adhesive recommended by manufacturer; provide a bond strength of 2 lbs. per in.

Back Coating: Liquid latex or polyurethane coating or manufacturer's similar equivalent coating as required for carpet stability and tuft bind. Unless otherwise indicated, provide tuft bind of not less than 13 lbs. for looped pile.

<u>Tufted</u> <u>Carpet</u>: Provide coating weight of not less than 20 oz. per sq. yd.

Manufacturer: Subject to compliance with requirements, provide products of one of the following:

20 Bigelow-Sanford, Inc.

21 J. & J. Industries

22 Lees Carpet/Division Burlington Industries

23 Mohawk Carpet

24 Stratton Industries

ACCESSORIES:

Carpet Edge Guard, Non-metallic: Extruded or molded heavy-duty vinyl or rubber carpet edge guard of size and profile indicated; minimum 2" wise anchorage flange; colors selected by Architect from standard colors.

Installation Adhesive: Water-resistant, non-staining as recommended by carpet manufacturer, which complies with flammability requirements for installed carpet.

<u>Seaming Carpet</u>: Hot-melt seaming adhesive or similar product recommended by carpet manufacturer, for taping seams and butting cut edges at backing to form secure seams and preventing pile loss at seams.

<u>Miscellaneous Materials</u>: As recommended by manufacturers of carpet, cushions, and other carpeting products; selected by Installer to meet project circumstances and requirements.

PART 3 - EXECUTION

EXAMINATION:

Examine substrates for moisture content and other conditions

under which carpeting is to be installed. Notify contractor in writing of major conditions detrimental to proper completion of the work. Do not proceed until unsatisfactory conditions have been corrected.

PREPARATION:

Repair minor holes, cracks, depressions, and rough areas using material recommended by carpet or adhesive manufacturer.

Clear away debris and scrape up cementitious deposits from

 surfaces to receive carpeting; vacuum clean immediately before installation. Check concrete surfaces to ensure no dusting through installed carpet; apply sealer where required to prevent dusting.

INSTALLATION:

Comply with manufacturer's recommendations for seam locations and direction of carpet; maintain uniformity of carpet location and lay of pile. Follow seaming diagram as submitted and approved. At doors, center seams under doors; do not place seams in traffic direction at doorway.

Extend carpet under open-bottomed obstructions and under removable flanges and furnishings, and into alcoves and closets of each space.

<u>Provide</u> <u>cut-outs</u> where required, and bind cut edges properly where not concealed by protective edge guards or overlapping flanges.

<u>Install carpet edge guard</u> where edge of carpet is exposed; anchor guards to substrate.

Expansion Joints: Do not bridge building expansion joints with continuous carpeting; provide for movement.

Glue-Down Installation:

<u>Fit</u> sections of carpet into each space prior to application of adhesive. Trim edges and butt cuts with seaming cement.

Apply adhesive uniformly to substrate in accordance with manufacturer's instructions. Butt carpet edges tightly together to form seams without gaps. Roll entire carpet area lightly to eliminate air pockets and ensure uniform bond. Remove any adhesive promptly from face of carpet by method which will not damage carpet face.

CLEANING:

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1
     Remove and dispose of debris and unusable scraps. Vacuum carpet
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     using commercial machine with face-beater element.
 3
                                                          Remove spots
     and replace carpet where spots cannot be removed.
                                                            Remove any
 5
     protruding face yarn using sharp scissors.
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    PROTECTION:
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    Provide protective methods and materials needed to ensure that
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     carpeting will be without deterioration or damage at time of
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     substantial completion.
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14
                     Return to installation after approximately 6
    Restretching:
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    months of occupancy and use; restretch carpet in each space,
16
    repair faults in seaming, trim and adjust carpeting at edges.
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18
    CARPET DATA SHEET:
19
20
    Carpet Designation: CPT-A
21
22
    Pile Fiber:
                 Extra large Filament Hollow Soil-Hiding nylon,
23
                 bulked continuous filament. Antron Precendent by
24
                 Dupont.
25
26
    Carpet Construction:
                           Tufted
27
28
    Style: Cut/loop combination (cut/uncut)
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30
    Gauge and Stitches: 4.8 stitches per inch (minimum), 1/8 gauge
31
                        minimum.
32
33
    Yarn Description: Manufacturer's.
34
35
    Thickness, Pile Height:
                             .265"
36
37
    Pile Face Weight: 32 oz.
38
39
    FHA Density: 4,347 (minimum)
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41
    Color/Texture/Pattern:
                             Match Architect's sample. Control
42
                             sample to be Lee's Commercial Carpet,
43
                             New Adventure II.
44
45
    Dye Method: Yarn Dyed.
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47
    Static Resistance: 3.0 KV at 70 deg F, 20% R.H.
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    Microbial Resistance:
                           Greater than 90% reduction (AATCC-100)
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                           Less than 20% growth (AATCC-30), no zone
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Flammability: Critical Radiant Flux: not less than 0.45 watts per square centimeter.

(ATCC-90)

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Primary Backing: Woven natural or synthetic fibers.

Back Coating: Liquid Latex or polyurethane coating.

Second Backing: Woven jute or synthetic fiber.

Tuft Bind: 13 lbs.

END OF SECTION 09680

SECTION 09690 - CARPET TILE

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PART 1 - GENERAL

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RELATED DOCUMENTS:

 Drawings and general provisions of Contract, including General and Special Conditions and Division-1 Specification sections, apply to work of this section.

SUMMARY:

Extent, location and details of each type of carpet, tile are indicated on drawings, carpet data sheets and in schedules.

<u>Work</u> of this section includes all commercial (contract) carpet tile, installation, and accessories.

Carpeting is specified elsewhere in a Division-9 Section.

DEFINITIONS:

<u>Commercial</u> <u>Carpet</u> <u>Tile</u>: Carpet tile intended for use in commercial and public spaces, with construction, fire ratings, static control and appearance appropriate for this use.

SUBMITTALS:

 <u>Product Data:</u> Submit manufacturer's product literature and installation instructions for each type of carpet tile material and installation accessory required. Include methods of installation for each type of substrate.

Submit written data on physical characteristics, durability, and resistance to fading and flame resistance characteristics.

Shop Drawings: Submit shop drawings showing carpet tile layout, clearly indicating carpet tile direction, pattern direction (if applicable), placement of cut tiles, and locations and types of edge strips. Indicate columns, doorways, enclosing walls/partitions, built-in cabinets, and locations where cutouts are required in carpet tile. Show installation details at any special conditions.

Samples for Initial Selection Purposes: Submit manufacturer's standard size samples and color yarns showing full range of

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colors, textures and patterns available for each type of carpet tile required.

Samples for Verification Purposes: Submit the following:

Actual samples of each type of carpet tile pattern module required.

 $6\hspace{-0.8pt}^{\prime\prime}$ long samples of each type exposed edge stripping and accessory item.

Prepare samples from same material to be used for the work.

QUALITY ASSURANCE:

 Manufacturer Qualifications: Firm (material producer) with not less than 3 years of production experience, whose published literature clearly indicates general compliance of products with requirements of this section.

Installer Qualifications: Firm specializing in carpet tile installation with not less than 2 years of experience in installation of carpet tile similar to that required for this project.

<u>Single Source Responsibility:</u> Provide material produced by a single manufacturer for each carpet tile type.

TESTING:

<u>Test Reports</u>: Submit certified test reports evidencing compliance with requirements for the following:

Fire performance characteristics.

Physical properties indicated.

<u>Fire Performance Characteristics</u>: Provide carpet tile that is identical to that tested for the following fire performance requirements, according to test method indicated, by UL or other testing and inspecting agency acceptable to authorities having jurisdiction.

Flammability: As follows:

Rating: Passing Methenamine Pill Test.

Test Method: ASTM D 2859.

Surface Burning Characteristics: As follows:

UK HOSPITAL EXPANSION - ADDITION BID PACK 2 - 304.1 11/87 E23 Flame Spread: Not more than 75. Smoke Developed: Not more than 100. Test Method: ASTM E 84. Critical Radiant Flux: As follows: Rating: Not less than 0.45 watts per sq. centimeter. Test Method: ASTM E 648. Smoke Density: As follows: Rating: With flame, 15.4 minimum value. Without flame, 9.1 minimum value. Test Method: ASTM E 662. Physical Properties: Provide carpet tile that is identical to that tested for the following physical properties, according to the test method indicated. Sound Absorption Characteristics: As follows: Rating: Passing sound absorption coefficient level. Test Method: ASTM C 423. Fade Resistance: As follows: Rating: Maximum grey scale factor of 40 hours. Test Method: AATCC 16E. Static Resistance: Rating: 1.7 KV when tested at 20% R.H./70 deg. F. Test Method: AATCC 134. Microbial Resistance: Rating: Minimum 90% bacterial reduction. Test Method: AATCC 100. Rating: Maximum 20% fungal growth.

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Rating: Exhibits no zone of inhibition.

Test Method: AATCC 30.

Test Method: AATCC 90.

<u>Certification</u>: Submit manufacturer's certificate stating that materials furnished comply with specified requirements.

DELIVERY, STORAGE AND HANDLING:

Deliver materials to project site in original factory wrappings and containers, clearly labeled with identification of manufacturer, brand name, quality or grade, fire hazard classification, and lot number. Store materials in original undamaged packages and containers, inside well-ventilated area protected from weather, moisture, soiling, extreme temperatures, humidity; laid flat, blocked off ground to prevent sagging and warping. Maintain temperature in storage area above 40 degrees Fahrenheit.

Comply with instructions and recommendations of manufacturer for special delivery, storage, and handling requirements.

SEQUENCING AND SCHEDULING:

Sequence carpet tile installation with other work to minimize possibility of damage and soiling during remainder of construction period.

WARRANTY:

Special Project Warranty: Submit a written warranty, executed by the Contractor, Installer and the Manufacturer, agreeing to repair or replace carpet tiling which fails in materials or workmanship within the specified warranty period. This warranty shall be in addition to and not a limitation of other rights the Owner may have against the Contractor under the Contract Documents.

Warranty period is 2 years after the date of substantial completion.

MAINTENANCE:

Maintenance Instructions: Submit manufacturer's printed instructions for maintenance of installed work, including methods and frequency recommended for maintaining optimum condition under anticipated traffic and use conditions. Include precautions against materials and methods which may be detrimental to finishes and performance.

Replacement Materials: After completion of work, deliver not 1 less than 5% of each type, color, and pattern of carpet tiling, 2 3 exclusive of material required to properly 4 installation. Furnish accessory components as required. Furnish replacement materials from same production 5 run as 6 materials Package installed. replacement materials 7 protective covering, identified with appropriate labels.

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PART 2 - PRODUCTS

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MANUFACTURERS:

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Manufacturers: Subject to compliance with requirements, provide carpet tile of one of the following:

Interface

Milliken and Co.

Lees Thermobond HB-Self Lock Tile

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MATERIALS:

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<u>Data</u> <u>Sheets/Schedules</u>: Comply with detailed carpet tile construction and performance requirements for each type of carpet tile as specified by carpet tile data sheets at the end of this section.

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Carpet Fiber Used in Yarn:

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General: Refer to carpet data sheet/schedule for fiber (filament) or fiber blend required for each type of carpet tile.

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Hollow Soil-Hiding Nylon: Standard delustered nylon fiber of standard denier with multiple hollow cores, bulked continuous filament (BCF) unless indicated as "staple".

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Carpet Tile Construction:

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Fabricate carpet by the construction method indicated on data sheets, using manufacturer's standard process, as recognized in industry.

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Fusion-bonded carpet tile face construction.

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Carpet Style:

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Loop pile.

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Gauge or Pitch: Provide gauge or pitch indicated.

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Yarn Description:

Spun Carpet Yarn: Provide yarn size/twist/plies which result in carpet appearance to match Architect's sample(s) as designated for control/selection of color, pattern, and texture.

<u>Finished Carpet Face Yarn:</u> Provide finished face yarn in size, twist, plies to match Architect's samples(s) designated for control/selection of color, pattern, and texture.

Pile Height: Provide thickness indicated on data sheet.

Pile Face Weight: Provide weights indicated on data sheet.

FHA Density: Provide densities indicated on data sheet.

Carpet Color, Pattern, and Texture:

Match Architect's sample(s) as designate for control/selection
of color, pattern and texture.

<u>Provide</u> materials in colors and patterns (if applicable) as selected by Architect from manufacturer's standard colors and patterns.

Dyeing Method: Provide dyed material, as recommended by mill to comply with requirements, including appearance and best possible appearance retention.

Solution dyed.

Yarn dyed.

Carpet Backing:

Primary Backing Structure: Polyurethane coating or manufacturer's similar equivalent coating as required for carpet tile tuft bind. Primary hard backing of polyvinyl chloride, polypropylene or urethane, reinforced with non-dimensional fiberglass; provide primary backing as indicated.

<u>Secondary</u> <u>Backing</u>: Secondary hard backing of polyvinyl chloride, polypropylene or urethane, reinforced with non-dimensional fiberglass, permanently fused to primary backing; provide secondary backing as indicated.

Total Carpet Tile Weight: Provide carpet tile of total weight per sq. yd. as indicated on data sheets.

<u>Carpet Tile Size:</u> Provide finished carpet tile in size indicated in data sheets.

CARPET TILE ACCESSORIES:

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Installation Adhesive: Releasable type adhesive as recommended by carpet tile manufacturer and which complies with flammability requirements for installed carpet tile.

Blue Glue - 3M Company Durabond D-2 Roberts 41-3081 Henry #630 Special Purpose

Carpet Edge Guard, Non-metallic: Extruded or molded heavy-duty vinyl or rubber carpet edge guard of size and profile indicated. with a minimum 2" wide anchorage flange; colors selected by Architect/Designer from among standard colors available within the industry (any manufacturer).

Miscellaneous Materials: As recommended by manufacturer of tile and selected by Installer to meet circumstances and requirements.

PART 3 - EXECUTION

PRE-INSTALLATION REQUIREMENTS:

Store carpet tile modules and adhesive in a heated room at a minimum temperature of 68 deg. F (20 deg. C) at least three days prior to and during installation.

Examine substrates for moisture content to verify a maximum allowable 65 percent Corrective measures are required if moisture content exceeds 65 percent.

Examine substrate for alkalinity. Corrective measures required if pH reading is greater than 10.

Do not proceed until unsatisfactory conditions have been corrected.

Clear away debris and scrape up cementitious deposits from concrete surfaces to receive carpet tile; apply sealer to prevent dusting.

INSTALLATION:

General: Comply with manufacturer's instructions and recommendations for direction of carpet tile; maintain uniformity of carpet tile direction and lay of pile.

CARPET TILE

Extend carpet tile under open-bottomed obstructions and under removable flanges and furnishings, and into alcoves and closets of each space.

Install carpet edge guard where edge of carpet is exposed; anchor guards to substrate.

Install carpet tiles in a temperature of no less than 68 deg F
(20 deg C) using quadrant method of installation.

<u>Determine</u> the center of the room using standard tile laying methods. The center chalk lines, dividing the room into quadrants, should be off-center, if necessary, to ensure that perimeter modules will be half-size or larger.

 On both sides of chalk line, apply a strip of adhesive at least 9" in width, using a twist-textured paint roller. When adhesive is ready, lay modules firmly along these anchor lines. Fill in each quadrant section laying using the "stair step" technique, completing the installation from center to corner of room in each quadrant, then moving to the next quadrant.

In large areas, a control grid of adhesive should be laid every 10', as control of the uniformity of the installation.

As <u>each module</u> is installed, ensure that the installation remains square and conforms to chalk lines.

Adhere perimeter tiles and cut tiles with a full spread of adhesive. Dry fit all cut tiles and apply adhesive to tile back after tile has been cut. In corridor areas, use full tiles down the center and cut perimeter tile borders.

CLEANING:

Remove and dispose of debris, cartons, and unusable tile scraps.

Remove spots and smears of adhesive from carpet surface with approved cleaning agent. Replace any tiles which cannot be cleaned.

<u>Vacuum</u> carpet using commercial machine. Remove any protruding face yarns with sharp scissors.

PROTECTION:

Advise Contractors of protection methods and materials needed to ensure that carpet tiles will be without deterioration or damage at time of substantial completion.

INSPECTION:

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Upon completion of the installation, inspect installation and verify that work is complete, properly installed and acceptable. Remove and replace all work not found acceptable at the Installer's expense and to the satisfaction and acceptance of 3

the Architect.

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1 CARPET TILE DATA SHEET:

 Carpet Tile Designation: CPT-B

Pile Fiber: 100% bulked continuous filament; Antron XL, Anso IV or Zeftron.

Carpet Tile Face

 Construction: Fusion Bonded

Style: Cut Pile Plush

Gauge and Stitches: Manufacturer's

Yarn Description: Manufacturer's

Thickness, Pile Height: .180"

Pile Face Weight: 26 oz./sq. yd. minimum

FHA Density: 5,200 minimum

Color/Texture/Pattern: Match Architects Sample. Control sample to be Interface, Impressions, Style P/2800.

Dye Method: Solution Dyed or Yarn Dyed.

Fade Resistance: 4 for 40 hours (AATCC 16E)

Static Resistance: 1.7 KV

Density Factor: 532,708

Microbial Resistance: Greater than 90% reduction (AATCC-100) Less than 20% growth (AATCC-30), no zone, (AATCC-90).

Flammability: Critical Radiant Flux: not less than 0.45 watts per square centimeter.j

Primary Backing: Polypropylene, PVC or urethane reinforced w/fiberglass.

Secondary Backing: 132 oz. polypropylene, PVC or urethane hardback with glass reinforcement. (For free lay installation).

Total Weight: 158 oz./sq. yd. minimum.

Module Size: 18" x 18"

Tuft Bind: 20 pound

Overrun: 5%

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END OF SECTION 09690

SECTION 09800 - SPECIAL COATINGS

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PART 1 - GENERAL

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SUBMITTALS:

RELATED DOCUMENTS:

Drawings an general provisions of Contract, including General and Special Conditions and Division-1 Specification sections, apply to work of this section.

SUMMARY:

The work includes the application of special coating systems to items and surfaces as scheduled, including surface preparation, prime coats and topcoats.

General painting for the project is specified in another Division-9 section of these specifications.

Extent of special coating work is indicated on the drawings and schedules, and as herein specified.

Types of special coating systems required for the project include:

Special Coatings for Interior Use:

Pigmented aliphatic polyurethane coating. 2-component epoxy emulsion.

DEFINITIONS:

Special coating systems are defined as those types of materials and methods of application requiring more than normal skills and techniques for mixing, handling and application, as specified in the "Painting" section.

The term "special coating systems" as used in this section includes applied materials used in prime, intermediate and finish coats.

The term "exposed surfaces" is defined to include areas visible when permanent or built-in fixtures, convector covers, covers for finned tube radiation, grilles, similar components are in place in areas to be coated. Extend special coatings in these areas as required to maintain the coating system integrityand provide desired protection.

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<u>Product</u> <u>Data:</u> Submit manufacturer's technical information including basic materials analysis and application instructions for each coating material specified.

List each material and cross-reference to the specific coating and finish system and application. Identify each material by the manufacturer's catalog number and general classification.

<u>Samples</u>: Prior to beginning work, Architect will furnish color chips for surfaces to be coated. Use representative colors when preparing samples for review. Submit samples for the Architect's review of color and texture only. Provide a listing of material and application for each coat of each finish sample.

Provide samples of each color and material to be applied, with texture to simulate actual conditions, on representative samples of the actual substrate. Resubmit samples as requested until the required sheen, color and texture is achieved.

Gypsum Board: Provide two 4" square samples for each type of color and finish; define prime and finish coats.

QUALITY ASSURANCE:

<u>Single Source Responsibility:</u> Provide primers and other undercoat material produced by the same manufacturer as the finish coats. Use only thinners approved by the manufacturer, and only within recommended limits.

Coordination of Work: Review other sections of these specifications in which other coatings are to be provided to ensure compatibility of the total coatings systems for various substrates. Upon request, furnish information on the characteristics of specified finish materials, to ensure that compatible prime coats are used.

Notify the Architect of any anticipated problems involved in using the coatings systems as specified.

Field Samples: On actual wall surfaces and other interior and exterior building components, duplicate coating finishes of prepared samples. Provide full-coat finish samples on at least 100 sq. ft. of surface as directed, until required sheet, color, and texture is obtained; simulate finished lighting conditions for review of in-place work.

Final acceptance of colors will be from samples applies on the job.

Material Quality: Provide the best quality grade of the various

types of coatings as regularly manufactured by acceptable coating manufacturers. Materials not displaying manufacturer's identification as a standard, best-grade product will not be acceptable.

<u>Proprietary names</u> used to designate colors or materials are not intended to imply that products of named manufacturers are required to the exclusion of equivalent products of other manufacturers.

DELIVERY, STORAGE AND HANDLING:

<u>Deliver</u> <u>materials</u> to the job site in the manufacturer's original, new, unopened packages and containers bearing manufacturer's name and label and the following information:

Name or title of material.

Federal Specification number, if applicable.

Manufacturer's stock number and date of manufacture.

Manufacturer's name.

Contents by volume, for major pigment and vehicle constituents.

Thinning instructions.

Application instructions.

Color name and number.

Handling instructions and precautions.

Store materials not in actual use in tightly covered containers at a minimum ambient temperature of 45 deg. F (7 deg. C) in a well ventilated area. Maintain containers used in storage of coatings in a clean condition, free of foreign materials and residue.

 Protect from freezing where necessary. Keep storage area neat and orderly. Remove oily rags and waste daily. Take all necessary precautionary measures to ensure that workmen and work areas are adequately protected from fire hazards and health hazards resulting from handling, mixing, and application of stains.

PROJECT CONDITIONS:

Apply coatings only when the temperature of surfaces to be coated and surrounding air temperatures are above 45 deg. F (7 deg. C), unless otherwise permitted by manufacturer's printed instructions.

 Do not apply coatings in snow, rain, fog or mist, or when relative humidity exceeds 85%, or to damp or wet surfaces unless otherwise permitted by manufacturer's printed instructions. Allow wet surfaces to dry thoroughly and attain the temperature and conditions specified before proceeding with or continuing

with the coating operation.

Work may continue during inclement weather only if areas and surfaces to be coated are enclosed and the temperature within the area can be maintained within limits specified by the manufacturer during application and drying periods.

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PART 2 - PRODUCTS

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MANUFACTURERS:

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Manufacturers: Subject to compliance with requirements, provide products of one of the following:

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Devoe and Raynolds Co. (Devoe). Glidden Coatings and Resins. (Glidden). Mameco International, Inc., (Mameco). PPG Industries, Pittsburgh Paints (Pittsburgh) Porter Paints (Porter). Sherwin-Williams Company (S-W).

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Tnemec Company, Inc.

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INTERIOR COATING MATERIALS:

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Intermediate Coats (Undercoats):

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Pigmented Aliphatic Polyurethane Coating: (FS TT-C-542, Type I, Class 2) recommended for use as an intermediate coat over masonry units under a pigmented aliphatic concrete polyurethane enamel finish coat:

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Y-5240/5242 - Chemical-Resistant Epoxy reduced Glidden: 25% with #5568 solvent.

36 37

Mameco: Sanitile C.B. Base. S-W: Hi-Build Aliphatic Polyurethane, B65 Series/B60V2.

38 39 40

Finish Coats:

41 42 43

Pigmented aliphatic polyester polyurethane coating (FS TT-C-542, Type I, Class 2) recommended for use over concrete or wood:

44 45 46

Devoe: 419XX Tru-Thane Aliphatic Polyurethane.

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Y-6151 Clear Glid-Thane One Polyurethane Glidden: recommended by the Coating reduced 10% with solvent manufacturer.

50 51 Mameco: Sanitile 550 Polyester Aliphatic Polyurethane. Hi-Build Aliphatic Polyurethane, B65 Series/B60V2.

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Epoxy emulsion coatings recommended for use over concrete, concrete masonry units or wood:

Pittsburgh: 16-901/16-902 Pitt Glaze II Low Odor High Solids Water Base Acrylic Epoxy Coating - Semi-Gloss. S-W: Water Based Catalyzed Epoxy, B70 Series/B60V15. Tnemec: Series 111 Tneme-Tufcoat.

PART 3 - EXECUTION

INSPECTION:

Starting of coating work will be construed as the Applicator's acceptance of surfaces within any particular area.

PREPARATION:

General:

Remove hardware, hardware accessories, machined surfaces, plates, lighting fixtures, and similar items which are not to be coated, or provide surface-applied protection prior to surface preparation and coating operations. Remove these items if it is necessary for the complete coating of the items and adjacent surfaces. Following completion of coating operations in each space or area, reinstall the items removed, using workmen skilled in the trades involved.

Clean surfaces to be coated before applying coatings or surface treatments. Schedule cleaning and coating application so that dust and other contaminates will not fall on wet, newly coated surfaces.

<u>Surface Preparation</u>: Perform surface preparation and cleaning in compliance with the manufacturer's instructions for the particular substrate conditions, and as herein specified.

Notify the Architect in writing of any anticipated problems in using the specified coating systems with substrates primed or furnished by others.

 <u>Cementitious Surfaces</u>: Prepare cementitious surfaces of gypsum, cement plaster and similar surfaces scheduled to receive special coatings by removing efflorescence, chalk, dust, dirt, grease, oils, and by roughing if required to remove glaze.

Determine alkalinity and moisture content of surfaces to be coated by performing appropriate tests. Do not apply coatings over surfaces where moisture content exceeds that permitted in the manufacturer's printed directions.

Material Preparation: Carefully mix and prepare materials in

compliance with the coating manufacturer's directions.

Do not mix coating materials produced by different manufacturers, unless otherwise permitted by the manufacturer's instructions.

Stir materials before application to produce a mixture of uniform density, and as required during application. Do not stir film, which may form on surfaces, into the material. Remove film and, if necessary, strain the coating material before using.

APPLICATION:

General: Apply special coatings by brush, roller, spray, squeegee, or other applicators in accordance with the manufacturer's directions. Use brushes best suited for the type of material being applied. Use rollers of carpet, velvet back, or high-pile sheep's wool as recommended by the manufacturer for the material and texture required.

Coating colors, surface treatments and finishes are indicated in the "Schedules" of the contract documents.

Provide finish coats that are compatible with the primers used.

The number of coats and coating film thickness required is the same regardless of the application method. Do not apply succeeding coats until the previous coat has cured as recommended by the coating manufacturer. Sand between coating applications where sanding is required to produce an even smooth surface in accordance with the coating manufacturer's directions.

Coat surfaces behind movable equipment and furniture the same as similar exposed surfaces.

Coat the back sides of access panels, removable or hinged covers, and similar hinged items, to match exposed surfaces.

Minimum Coating Thickness: Apply each material at not thinner than the manufacturer's recommended spreading rate. Provide a total dry film thickness of the entire coating system as recommended by the manufacturer.

<u>Prime Coats</u>: Before the application of finish coats, apply a prime coat, as recommended by the coating manufacturer, to material that is required to be painted or finished, and which has not been prime coated by others.

Recoat primed and sealed substrates where there is evidence of suction spots or unsealed areas in the first coat, to

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assure a finish coat with no burn-through or other defects due to insufficient sealing.

<u>Mechanical</u> <u>Applications</u>: Use mechanical methods for coating application when permitted by the coating manufacturer's recommendations, governing ordinances, and trade union regulations.

Wherever spray application is used, apply each coat to provide the equivalent hiding of brush-applied coats. Do not double-back with spray equipment building-up film thickness of 2 coats in one pass, unless recommended by the coating manufacturer.

<u>Completed</u> <u>Work:</u> Match approved samples for color, texture and coverage. Remove, refinish or recoat work not in compliance with specified requirements.

FIELD QUALITY CONTROL:

The Owner reserves the right to invoke the following material testing procedure at any time, and at any number of times during the period when coating operations are being conducted.

The Owner will engage the services of an independent testing laboratory to sample the coating being used. Samples of materials delivered to project site will be taken, identified and sealed, and certified in the presence of the Contractor.

The testing laboratory will perform appropriate tests for any or all of the following characteristics as required by the Owner:

Quantitive materials analysis.

Absorption.

Accelerated weathering. Accelerated yellowness.

Color retention.

Alkali resistance. Mildew resistance.

Mildew resistance. Abrasion resistance.

Apparent reflectivity.

Washability. Dry Opacity.

Recoating. Skinning.

If test results show materials being used do not comply with specified requirements, the Contractor may be directed to stop work, and remove non-complying materials, pay for testing, recoat surfaces coated with rejected materials, or remove rejected materials from previously coated surfaces if, upon recoating with the specified materials, the two coatings

are not compatible.

CLEANING:

<u>Clean-Up</u>: At the end of each work day during progress of work, remove rubbish, empty cans, rags and other discarded materials from the site.

Upon completion of the work, clean window glass and other spattered surfaces. Remove spattered coatings by washing, scraping or other proper methods, using care not to scratch or otherwise damage adjacent finished surfaces.

PROTECTION:

<u>Protect</u> work of other trades, whether to be coated or not, against damage from coating operations. Correct damage by cleaning, repairing or replacing, and recoating as acceptable to the Architect. Leave the work in an undamaged condition.

Provide "Wet Paint" signs as required to protect newly-coated finishes. Remove temporary protective wrappings provided by others for protection of their work, after completion of coating operations.

At completion of the work of other trades, touch-up and restore damaged or defaced coated surfaces.

INTERIOR SPECIAL COATING SCHEDULE:

 General: Provide the following special coating systems for the various substrates as indicated:

Apply additional coats when undercoats or other conditions show through the final coat, until the cured film is of uniform coating finish, color and appearance.

Gypsum Board:

<u>Pigmented</u> <u>Polyurethane</u> <u>Coating</u> <u>System</u>: Provide 1 base coat and 1 finish coat of factory formulated pigmented polyurethane coating (FS TT-C-542, Type II, Class 2).

Base Coat: Polyurethane Enamel base coat or primer. Finish Coat: Polyurethane Enamel finish coat.

Epoxy Emulsion Coatings: Provide 1 coat block filler or epoxy emulsion, as recommended by the coating manufacturer, and 1 finish coat epoxy emulsion.

Filler Coat: Block Filler or Epoxy Emulsion as

recommended by the manufacturer. Finish Coat: Epoxy Emulsion.

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END OF SECTION 09800

SECTION 09900 - PAINTING

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PART 1 - GENERAL

RELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Special Conditions and Division-1 Specification sections, apply to work of this section.

DESCRIPTION OF WORK:

Extent of painting work is indicated on drawings and schedules, and as herein specified.

<u>Work includes</u> painting and finishing of interior and exterior exposed items and surfaces throughout Project, except as otherwise indicated.

Surface preparation, priming and coats of paint specified are in addition to shop-priming and surface treatment specified under other sections of work.

<u>Work includes</u> field painting of exposed bare and covered pipes and ducts (including color coding), and of hangers, exposed steel and iron work, and primed metal surfaces of equipment installed under mechanical and electrical work, except as otherwise indicated.

 "Paint" as used herein means all coating systems materials, including primers, emulsions, enamels, stains, sealers and fillers, and other applied materials whether used as prime, intermediate or finish coats.

 Surfaces to be Painted: Except where natural finish of material is specifically noted as a surface not to be painted, paint exposed surfaces whether or not colors are designated in "schedules". Where items or surfaces are not specifically mentioned, paint the same as similar adjacent materials or areas. If color or finish is not designated, Architect will select these from standard colors or finishes available.

Following categories of work are not included as part of field-applied finish work.

 <u>Pre-Finished Items</u>: Unless otherwise indicated, do not include painting when factory-finishing or installer-finishing is specified for such items as (but not limited to) metal toilet enclosures, prefinished partition systems, acoustic materials, architectural woodwork and casework, elevator entrance doors and frames, elevator equipment, and

finished mechanical and electrical equipment, including fight fixtures, switchgear and distribution cabinets.

Concealed Surfaces: Unless otherwise indicated, painting is not required on surfaces such as walls or ceilings in concealed areas and generally inaccessible areas, foundation spaces, furred areas, utility tunnels, pipe spaces, duct shafts and elevator shafts.

Finished Metal Surfaces: Unless otherwise indicated, metal surfaces of anodized aluminum, stainless steel, chromium plate, copper, bronze and similar finished materials will not require finish painting.

Operating Parts: Unless otherwise indicated, moving parts of operating units, mechanical and electrical parts, such as valve and damper operators, linkages, sinkages, sensing devices, motor and fan shafts will not require finish painting.

Following categories of work are included under other sections of these specifications.

Shop Priming: Unless otherwise specified, shop priming of ferrous metal items is included under various sections for structural steel, metal fabrications, hollow metal work and similar items.

Unless otherwise specified, shop priming of fabricated components such as architectural woodwork, wood casework and shop-fabricated or factory-built mechanical and electrical equipment or accessories is included under other sections of these specifications.

Do not paint over any code-required labels, such as Underwriters' Laboratories and Factory Mutual, or any equipment identification, performance rating, name, or nomenclature plates.

QUALITY ASSURANCE:

 Single Source Responsibility: Provide primers and other undercoat paint produced by same manufacturer as finish coats. Use only thinners approved by paint manufacturer, and use only within recommended limits.

Coordination of Work: Review other sections of these specifications in which prime paints are to be provided to ensure compatibility of total coatings system for various substrates. Upon request from other trades, furnish information or characteristics of finish materials provided for use, to ensure compatible prime coats are used.

PAINTING

SUBMITTALS:

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<u>Product</u> <u>Data</u>: Submit manufacturer's technical information including Paint label analysis and application instructions for each material proposed for use.

<u>Samples</u>: Prior to beginning work, Architect will furnish color chips for surfaces to be painted. Use representative colors when preparing samples for review. Submit samples for Architect's review of color and texture only. Provide a listing of material and application for each coat of each finish sample.

On actual wall surfaces and other exterior and interior building components, duplicate painted finishes of prepared samples. Provide full-coat finish samples on at least 100 sq. ft. of surface, as directed, until required sheen, color and texture is obtained; simulate finished lighting conditions for review of in-place work.

Final acceptance of colors will be from samples applied on the job.

DELIVERY AND STORAGE:

<u>Deliver</u> <u>materials</u> to job site in original, new and unopened packages and containers bearing manufacturer's name and label, and following information:

Name or title of material.

Fed. Spec. number, if applicable.

Manufacturer's stock number and date of manufacture.

Manufacturer's name.

Contents by volume, for major pigment and vehicle constituents.

Thinning instructions.

Application instructions.

Color name and number.

Store materials not in actual use in tightly covered containers. Maintain containers used in storage of paint in a clean condition, free of foreign materials and residue.

Protect from freezing where necessary. Keep storage area neat and orderly. Remove oily rags and waste daily. Take all precautions to ensure that workmen and work areas are adequately protected from fire hazards and health hazards resulting from handling, mixing and application of paints.

JOB CONDITIONS:

Apply water-base paints only when temperature of surfaces to be

painted and surrounding air temperatures are between 50 degrees F (10 degrees C) and 90 degrees F (32 degrees C), unless otherwise permitted by paint manufacturer's printed instructions.

Apply solvent-thinned paints only when temperature of surfaces to be painted and surrounding air temperatures are between 45 degrees F (7 degrees C) and 95 degrees F (35 degrees C), unless otherwise permitted by paint manufacturer's printed instructions.

Do not paint in snow, rain, fog or mist, or when relative humidity exceeds 85%, or to damp or wet surfaces, unless otherwise permitted by paint manufacturer's printed instructions.

Painting may be continued during inclement weather if areas and surfaces to be painted are enclosed and heated within temperature limits specified by paint manufacturer during application and drying periods.

PART 2 - PRODUCTS

ACCEPTABLE MANUFACTURERS:

Manufacturer: Subject to compliance with requirements, provide products of one of the following:

Devoe and Reynolds Co. (Devoe).
Glidden Coatings and Resins, Division of SCM Corporation
(Glidden).
Benjamin Moore and Co. (Moore).
PPG Industries, Pittsburgh Paints (Pittsburgh).

Porter Paints (Porter)
Martin-Senor (M-S)

Pratt and Lambert (P & L).

The Sherwin-Williams Company (S-W).

MATERIALS:

Material Quality: Provide best quality grade of various types of coatings as regularly manufactured by acceptable paint materials manufacturers. Materials not displaying manufacturer's identification as a standard, best-grade product will not be acceptable.

Proprietary names used to designate color or materials are not intended to imply that products of named manufacturers are required to exclusion of equivalent products of other manufacturers.

Federal Specifications establish minimum acceptable quality for paint materials. Provide written certification from paint manufacturer that materials provided meet or exceed these minimums.

Color Pigments: Pure, non-fading, applicable types to suit substrates and service indicated.

Lead content in pigment, if any, is limited to contain not more than 0.06% lead, as lead metal based on the total non-volatile (dry-film) of paint by weight.

PART 3 - EXECUTION

INSPECTION:

Applicator must examine areas and conditions under which painting work is to be applied and notify Contractor in writing of conditions detrimental to proper and timely completion of work. Do not proceed with work until unsatisfactory conditions have been correct in a manner acceptable to Applicator.

Starting of painting work will be construed as Applicator's acceptance of surfaces and conditions within any particular area.

Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions otherwise detrimental to formation of a durable paint film.

SURFACE PREPARATION:

<u>General</u>: Perform preparation and cleaning procedures in accordance with paint manufacturer's instructions and as herein specified, for each particular substrate condition.

 Provide barrier coats over incompatible primers or remove and reprime as required. Notify Architect in writing of any anticipated problems in using the specified coating systems with substrates primed by others.

Remove hardware, hardware accessories, machined surfaces, plates, lighting fixtures, and similar items in place and not to be finish-painted, or provide surface-applied protection prior to surface preparation and painting operations. Remove, if necessary, for complete painting of items and adjacent surfaces. Following completion of painting of each space or area, reinstall removed items.

Clean surfaces to be painted before applying paint or surface treatments. Remove oil and grease prior to mechanical

cleaning. Program cleaning and painting so that contaminants from cleaning process will not fall onto wet, newly-painted surfaces.

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Cementitious Materials: Prepare cementitious surfaces of concrete, concrete block, cement plaster and cement-asbestos board to be painted by removing efflorescence, chalk, dust, dirt, grease, oils, and by roughening as required to remove glaze.

Determine alkalinity and moisture content of surfaces to be painted by performing appropriate tests. If surfaces are found to be sufficiently alkaline to cause blistering and burning of finish paint, correct this condition before application of paint. Do not paint over surfaces where moisture content exceeds that permitted in manufacturer's printed directions.

Clean concrete floor surfaces scheduled to be painted with a commercial solution or muriatic acid, or other etching cleaner. Flush floor with clean water to neutralize acid, and allow to dry before painting.

<u>Wood</u>: Clean wood surfaces to be painted of dirt, oil, or other foreign substances with scrapers, mineral spirits, and sandpaper, as required. Sandpaper smooth those finished surfaces exposed to view, and dust off. Scrape and clean small, dry, seasoned knots any apply a thin coat of white shellac or other recommended knot sealer, before application of priming coat. After priming, fill holes and imperfections in finish surfaces with putty or plastic wood-filler. Sandpaper smooth when dried.

Prime, stain, or seal wood required to be job-painted immediately upon delivery to job. Prime edges, ends, faces, undersides, and backsides of such wood, including cabinets, counters, cases, paneling.

When transparent finish is required, use spar varnish for backpriming.

Backprime paneling on interior partitions only where masonry, plaster, or other wet wall construction occurs on backside.

Seal tops, bottoms, and cut-outs of unprimed wood doors with a heavy coat of varnish or equivalent sealer immediately upon delivery to job.

Ferrous Metals: Clean ferrous surfaces, which are not galvanized or shop-coated, of oil, grease, dirt, loose mill scale and other foreign substances by solvent or mechanical cleaning.

Touch-up shop-applied prime coats wherever damaged or bare,

where required by other sections of these specifications. Clean and touch-up with same type shop primer.

Galvanized Surfaces: Clean free of oil and surface contaminants with non-petroleum based solvent.

MATERIALS PREPARATION:

Mix and prepare painting materials in accordance with manufacturer's directions.

Maintain containers used in mixing and application of paint in a clean condition, free of foreign materials and residue.

Stir materials before application to produce a mixture of uniform density, and stir as required during application. Do not stir surface film into material. Remove film and, if necessary, strain material before using.

APPLICATION:

General: Apply paint in accordance with manufacturer's directions. Use applicators and techniques best suited for substrate and type of material being applied.

Paint colors, surface treatments, and finishes, are indicated in "schedules" of the contract documents.

Provide finish coats which are compatible with prime paints used.

Apply additional coats when undercoats, stains or other conditions show through final coat of paint, until paint film is of uniform finish, color and appearance. Give special attention to insure that surfaces, including edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.

Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Paint surfaces behind permanently-fixed equipment or furniture with prime coat only before final installation of equipment.

Paint interior surfaces of ducts, where visible through registers or grilles, with a flat, non-specular black paint.

Paint back sides of access panels, and removable or hinged covers to match exposed surfaces.

Finish exterior doors on tops, bottoms and side edges same as exterior faces, unless otherwise indicated.

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Sand lightly between each succeeding enamel or varnish coat.

Omit first coat (primer) on metal surfaces which have been shop-primed and touch-up painted, unless otherwise indicated.

Scheduling Painting: Apply first-coat material to surfaces that have been cleaned, pretreated or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.

Allow sufficient time between successive coatings to permit proper drying. Do not recoat until paint has dried to where it feels firms, does not deform or feel sticky under moderate thumb pressure, and application of another coat of paint does not cause lifting or loss of adhesion of the undercoat.

Minimum Coating Thickness: Apply materials at not less than manufacturer's recommended spreading rate, to establish a total dry film thickness as indicated or, if not indicated, recommended by coating manufacturer.

Mechanical and Electrical Work: Painting of mechanical and electrical work is limited to those items exposed to mechanical equipment rooms and in occupied spaces.

Mechanical items to be painted include, but are not limited to, the following:

Piping, pipe hangers, and supports.

Heat exchangers.

Tanks.

Ductwork, insulation.

Motor, mechanical equipment, and supports.

Accessory items.

Electrical items to be painted include, but are not limited to, the following:

Conduit and fittings.

Switchgear.

Prime Coats: Apply prime coat of material which is required to be painted or finished, and which has not been prime coated by others.

Recoat primed and sealed surfaces where there is evidence of suction spots or unsealed areas in first coat, to assure a finish coat with no burn-through or other defects due to

insufficient sealing.

<u>Pigmented (Opaque) Finishes:</u> Completely cover to provide an opaque, smooth surface of uniform finish, color, appearance and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness or other surface imperfections will not be acceptable.

 Transparent (Clear) Finish: Use multiple coats to produce glass-smooth surface film of even luster. Provide a finish free of laps, cloudiness, color irregularity, runs, brush marks, orange peel, nail holes, or other surface imperfections.

Provide satin finish for final coats, unless otherwise indicated.

<u>Completed</u> <u>Work</u>: Match approved samples for color, texture and coverage. Remove, refinish or repaint work not in compliance with specified requirements.

FIELD QUALITY CONTROL:

The right is reserved by Owner to invoke the following material testing procedure at any time, and any number of times during period of field painting:

Engage services of an independent testing laboratory to sample paint being used. Samples of materials delivered to project site will be taken, identified and sealed, and certified in presence of Contractor.

 Testing laboratory will perform appropriate tests for any or all of following characteristics: Abrasion resistance, apparent reflectivity, flexibility, washability, absorption, accelerated weathering, dry opacity, accelerated yellowness, recoating, skinning, color retention, alkali resistance and quantitative materials analysis.

If test results show that material being used does not comply with specified requirements, Contractor may be directed to stop painting work, and remove non-complying paint; pay for testing; repaint surfaces coated with rejected paint; remove rejected paint from previously painted surfaces if, upon repainting with specified paint, the two coatings are non-compatible.

CLEAN-UP AND PROTECTION:

<u>Clean-Up</u>: During progress of work, remove from site discarded paint materials, rubbish, cans and rags at end of each work day.

Upon completion of painting work, clean window glass and other paint spattered surfaces. Remove spattered paint by proper

methods of washing and scraping, using car not to scratch or otherwise damage finished surfaces.

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Protection: Protect work of other trades, whether to be painted or not, against damage by painting and finishing work. Correct any damage by cleaning, repairing or replacing, and repainting, as acceptable to Architect.

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Provide "Wet Paint" signs as required to protect newly-Remove temporary protective wrappings painted finishes. provided by others for protection of their work, after completion of painting operations.

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At completion of work of other trades, touch-up and restore all damaged or defaced painted surfaces.

16 17 18

EXTERIOR PAINT SCHEDULE:

19 20

Provide the following Paint systems for the various substrates, as indicated.

21 22 23

Concrete and Stucco: (Other than concrete masonry units).

24 25

Lusterless (Flat) Acrylic Finish: 2 coats with total dry film thickness not less than 2.5 mils.

26 27 28

First and Second Coats: Acrylic Emulsion (FS TT-P-19).

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Devoe:

15XX Wonder-Shield Exterior Acrylic

Latex

Flat House Paint.

Glidden:

Y3525 Spred Glide-On. Moorglo House and Trim Paint.

34 Moore: 35 Pittsburgh:

6-610 Speedhide Acrylic Latex House Paint.

P & L: S-W:

Pro-Hide Plus Latex House Paint.

Perfect Acrylic Latex Weather

Exterior

Finish.

38 39 40

Concrete Masonry Units:

42 43 44

41

<u>Lusterless (Flat) Acrylic Finish</u>: 2 coats over filler coat with total dry film thickness not less than 2.5 mils, excluding filler coat.

45 46 47

Solvent Thinned Block Filler for Porous Filler Coat: Surfaces (FS TT-F-1098).

48

52901Bloxfil Interior/Exterior Acrylic Devoe:

49 50

Latex Block Filler.

Filler.

51 52

Glidden: Y-5317 Ultra-Hide Acrylic Latex Block

53 54

Moore:

Moore's Waterproofing Masonry Paint.

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1
                               Pro-Mar Block Filler.
            S-W:
 2
 3
            First and Second Finish Coats: Acrylic Emulsion (FS TT-P-
 4
            19).
 5
 6
            Devoe:
                               15XXWonder Shield Exterior AcrylicLatex
 7
                                  Flat House Paint.
 8
            Glidden:
                               Y3525 Spred Glid-On.
 9
                              Moorgard Latex House Paint.
            Moore:
10
            S-W:
                               Weather Perfect Acrylic Latex Flat
11
                                  Exterior Finish.
12
13
    General Painted Wood:
14
15
        Silicone Alkyd Semi-Gloss Finish: 2-Finish coats over primer
16
        with total dry film thickness not less than 3.5 mils.
17
18
            Prime Coat: Exterior Primer Coating (FS TT-P-25).
19
20
            Devoe:
                               1102 All-Weather Alkyd House Paint
21
                                  Primer.
22
            Glidden:
                              Y1951 Spred Gel-Flor Base Coat.
23
            Moore:
                              Moore's Moorewhite Primer.
24
                              6-9 Exterior Wood Primer.
            Pittsburgh:
25
26
            First and Second Finish Coats:
                                               Exterior Silicone Alkyd
27
            Enamel (FS TT-E-490).
28
29
            Devoe:
                              Bar-Ox Silicone Alkyd Gloss.
30
            Glidden:
                              Y-5540 Silicone Alkyd Enamel (Gloss).
31
                              Moore's Polysilicone Enamel.
            Moore:
32
            Pittsburgh:
                              Silicone Alkyd Enamel, Semi-Gloss.
33
34
         Low Luster Finish: 2 Finish coats over primer.
35
            Prime Coat: Exterior Primer Coating (FS TT-P-25).
36
37
38
            Devoe:
                              1102 All-Weather Alkyd House Paint
39
                                 Primer.
40
            Glidden:
                              Y-1951 Spred Gel-Flo Base Coat.
41
            Moore:
                              Moore's Moorwhite Primer.
42
            Pittsburgh:
                              6-9 Speedhide Exterior Wood Primer.
43
            P & L:
                              Permalize Exterior Primer.
44
            S-W:
                              S-W Exterior Wood Primer.
45
46
            First and Second Finish Coats: Acrylic Emulsion 9FS TT-
47
48
49
            Devoe:
                              15XX Wonder-Shield Exterior Acrylic
50
                                 Latex
51
                              Flat House Paint.
52
            Glidden:
                              Y-3600 Spred House Paint.
53
            Moore:
                              Moore's Moorglo Latex House and Trim
54
            Paint.
```

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1
            Pittsburgh:
                              6-610 Line Speedhide Acrylic Latex
2
                                 House
3
                             Paint.
 4
            P & L:
                             Pro-Hide Plus Latex House Paint.
 5
                             S-W Weather-Perfect Acrylic Latex Flat
            S-W:
 6
                                Exterior Finish.
7
8
    Ferrous Metal:
 9
10
        Semi-Gloss Alkyd Enamel: 2 Finish coats over primer.
11
                           Red Lead Pigmented Primer (FS TT-P-86).
12
            Prime Coat:
13
            Primer is not required on items delivered shop primed.
14
15
                              41821 Bar-Ox Red Lead Metal Primer.
            Devoe:
            Glidden:
                             Y-5532 Glid-Guard Red Lead Metal
16
                                 Primer.
17
            Pittsburgh:
                             UC 10424 Red Lead Primer.
18
                             P & L Red Lead Primer.
19
            P & L:
20
21
            First and Second Finish Coats: Semi-Gloss Alkyd Enamel
22
            (FS TT-E-529, Class A).
23
24
            Devoe:
                              1XX All-Weather Exterior Alkyd Gloss
25
                                 House and Trim Paint.
26
            Glidden:
                             Y-4600 Line Spred Lustre.
                              6-90 Speedhide Lo-Sheen Enamel.
27
            Pittsburgh:
28
            P & L:
                             Vitralite Eggshell Enamel.
29
30
    Zinc-Coated Metal:
31
        Semi-Gloss Alkyd Enamel: 2 Finish coats over primer.
32
33
34
            Prime Coat:
                           Red Lead Pigmented Primer (FS TT-P-86).
35
            Primer is not required on items delivered shop primed.
36
37
                              41821 Bar-Ox Red Lead Metal Primer.
            Devoe:
            Glidden:
                             Y-5532 Glid-Guard Red Lead Metal
38
39
                                 Primer.
40
            Pittsburgh:
                             UC 10424 Red Lead Primer.
                             P & L Red Lead Primer.
41
            P & L:
42
43
            First and Second Finish Coats: Semi-Gloss Alkyd Enamel
44
            (FS TT-E-529, Class A).
45
                              1XX All-Weather Exterior Alkyd Gloss
46
          Devoe:
47
                                 House and Trim Paint.
                             Y-4600 Line Spred Lustre.
48
            Glidden:
49
            Pittsburgh:
                              6-90 Speedhide Lo-Sheen Enamel.
                              Vitralite Eggshell Enamel.
50
            P & L:
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52
53
    INTERIOR PAINT SCHEDULE:
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1 2 Provide the following paint systems for the various 3 substrates, as indicated. 4 5 Concrete: 6 7 Semi-Gloss Enamel Finish: 3 Coats with total dry film 8 thickness not less than 3.5 mils. 9 10 First Coat: Interior Flat Latex Base Paint (FS TT-P-29). 11 12 36XX Wonder-TOnes Latex Flat Wall Devoe: 13 Paint. 14 Glidden: Y-5019 Ultra-Hide PVA Primer Sealer. 15 Moore's Latex Quick-Dry Prime Seal. Moore: 16 Pittsburgh: 6-70 Speedhide Latex Flat Wall Paint. 17 P & L: Pro-Hide Plus Latex Flat. 18 S-W: S-W Wall and Wood Primer. 19 20 <u>Second Coat</u>: Interior Enamel Undercoat (FS TT-E-543). 21 22 Devoe: 8801 Velour Alkyd Enamel Undercoat. 23 Moore: Moore's Alkyd Enamel Underbody. 24 Pittsburgh: 6-6 Speedhide Quick-Drying Enamel 25 Undercoater. 26 P & L: Pro-Hide Plus Latex Flat. 27 S-W: S-W Wall and Wood Primer. 28 29 Third Coat: Odorless Interior Semi-Gloss Alkyd Enamel 30 (FS TT-E-509). 31 32 Devoe: 26XX Velour Alkyd Semi-Gloss Enamel. 33 Glidden: Y-4600 Line Spred Lustre Semi-Gloss 34 Enamel. Moore's Satin Impervo Enamel. 35 . Moore: 36 Pittsburgh: 27-109 Wall-Hide Semi-Gloss Enamel. 37 P & L: Pro-Hide Plus Alkyd Semi-Gloss. 38 S-W: S-W Pro-Mar Alkyd Semi-Gloss Enamel. 39 40 41 Concrete Masonry Units: 42

Semi-Gloss Alkyd Enamel Finish: 2 Coats over filled surface with total dry film thickness not less than 3.5 mils, excluding filler coat.

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Filler Coat: Solvent-Thinned Block Filler (FS TT-F-1098). Apply filler coat at a rate to ensure complete coverage with pores filled.

Devoe: 52901 Bloxfil Acrylic Flat Latex Block

Glidden: Y-5317 Line Ultra-Hide Acrylic Block Filler.

Moore's Waterproofing Masonry Paint. 1 Moore: S-W Pro-Mar Block Filler. 2 S-W: 3 4 First Coat: Enamel Undercoater (FS TT-E-543). 5 б 8801 Velour Alkyd Enamel Undercoat. Devoe: 7 Glidden: Y-5019 - PVA Primer. 8 Moore's Alkyd Enamel Underbody. Moore: 9 S-W: S-W Pro-Mar Alkyd Semi-Gloss Enamel. 10 Second Coat: Odorless Interior Alkyd Semi-Gloss Enamel 11 9FS TT-E-509). 12 13 14 26XX Velour Alkyd Semi-Gloss Enamel. Devoe: Y-4600 Line - Spred Lustre. Glidden: 15 Moore's Satin Impervo Enamel. 16 Moore: S-W: S-W Pro-Mar Alkyd Semi-Gloss Enamel. 17 18 19 Interior Polyester Epoxy in Gloss or Semi-Gloss Finish: 3 Coats with total dry film thickness not less than 4.0 mils. 20 21 First Coat: Interior Latex Emulsion (FS TT-P-29). 22 23 24 36XX Wonder-Tones Interior Latex Flat Devoe: Wall 25 Paint. 26 Moore's Regal Wall Satin. 27 Moore: 28 6-70 Speedhide Latex Flat Wall Paint. Pittsburgh: 29 30 Second and Third Coats: Polyester Epoxy (FS TT-C-545). 31 124XX Tru-Glaze 4 Epoxy Gloss. 32 Devoe: 33 Moore: Tile-Like Catalyzed Architectural 34 Coatings. 35 Pittsburgh: 16-610/16-630 Pitt-Glaze High Solids 36 Polyester Epoxy Finish Coatings. 37 38 Gypsum Drywall Systems: 39 40 Odorless Semi-Gloss Alkyd Enamel Finish: 3 coats with total 41 dry film thickness not less than 2.5 mils. 42 43 Interior Latex Base Primer Coat (FS TT-P-First Coat: 44 650). 45 50801 Wonder-Tones Latex Primer and 46 Devoe: 47 Sealer. 48 Glidden: Y-3416 Spred Primer Sealer. Moore's Latex Quick-Dry Prime Seal. 49 Moore: 50 6-2 PPG Quick-Drying Interior Latex Pittsburgh: 51 Primer Sealer. Pro-Hide Plus Latex Primer. P & L: 52 S-W Pro-Mar Latex Wall Primer. 53 S-W:

1 2	Second and Third Alkyd Enamel (FS	
3	Alkyd Bhamel (15	11-1-309/1
4	Devoe:	26XX Velour Alkyd Semi-Gloss Enamel.
	Glidden:	Y-4600 Line - Spred Lustre Semi-Gloss.
5 6 7	Moore:	Moore's Satin Impervo Enamel.
7	Pittsburgh:	27-109 Wall-Hide Semi-Gloss Enamel.
8	P & L:	Pro-Hide Plus Alkyd Semi-Gloss.
9	S-W:	S-W Pro-Mar Alkyd Semi-Gloss Enamel.
10	5-11.	b-w rio-mai winya bemi-dioss mamei.
11	Interior Delvester Fr	poxy in Gloss or Semi-Gloss Finish: 3
		
12	Coats with total dry	film thickness not less than 4.0 mils.
13	That Gate Take	olon Tohan Davileles (DG Mm D 00)
14	First Coat: Inter	rior Latex Emulsion (FS TT-P-29).
15		
16	Devoe:	36XX Wonder-Tones Interior Latex Flat
17		Wall Paint.
18	Moore:	Moore's Regal Wall Satin.
19	Pittsburgh: 6-7	O Speedhide Latex Flat Wall Paint.
20		700 PM - 2 2 2pm - 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
21	Second and Third	Coats: Polyester Epoxy (FS TT-C-545).
22		
23	Devoe:	124XX Tru-Glaze 4 Epoxy Gloss.
24	Moore:	Tile-Like Catalyzed Architectural
25		Coatings.
26	Pittsburgh:	16-610/16-630 Pitt-Glaze High Solids
27		Polyester Epoxy Finish Coatings.
28		Charles and Control of the Control o
29	Plaster:	
30	The district and the state of	
31	Semi-Gloss Enamel Fi	nish: 3 coats with total dry film
32	thickness not less th	
33		
34	First Coat: Inter	cior Flat Latex Base Paint (FS TT-P-29).
35		
36	Devoe:	36XX Wonder-Tones Latex Flat Wall
37	pevoe:	Paint.
	Glidden:	Y-5019 Ultra-Hide PVA Primer Sealer.
38		
39		Moore's Latex Quick-Dry Prime Seal.
40		6-70 Speedhide Latex Flat Wall Paint.
41		Pro-Hide Plus Latex Flat Paint.
42	S-W:	S-W Wall and Wood Primer.
43	Garand Gasha Tah	
44	Second Coat: Inte	erior Enamel Undercoat (FS TT-E-543).
45		
46		8801 Velour Alkyd Enamel Undercoat.
47		Y-4600 Series Spred Lustre Semi-Gloss
48		Enamel.
49		Moore's Alkyd Enamel Underbody.
50		6-6 Speedhide Quick-Drying Enamel
51		Undercoater.
52		Interior Trim Primer.
52 53		Interior Trim Primer. S-W Pro-Mar Alkyd Semi-Gloss.

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Odorless Interior Semi-Gloss Enamel (FS TT-
 1
            Third Coat:
 2
            E-509).
 3
 4
            Devoe:
                              21XX Velour Alkyd Semi-Gloss Enamel.
 5
            Glidden:
                              Y-4600 Line - Spread Lustre Semi-Gloss.
 6
                              Moore's Satin Impervo Enamel.
            Moore:
 7
                              27-109 Wall-Hide Semi-Gloss Enamel.
            Pittsburgh:
 8
            P & L:
                              Pro-Hide Plus Alkyd Semi-Gloss.
 9
            S-W:
                              S-W Pro-Mar Alkyd Semi-Gloss Enamel.
10
11
    Ferrous Metal:
12
13
        Semi-Gloss Enamel Finish:
                                     2 Coats over primer, with total
14
        dry film thickness not less than 2.5 mils.
15
                          Red Lead Base Primer (FS TT-P-86).
16
            Prime Coat:
17
            coat is not required on items delivered shop primed.
18
                              41821 Bar-Ox Red Lead Metal Primer.
19
            Devoe:
                              Y-5532 - Glid-Guard Red Lead Metal
20
            Glidden:
21
                                 Primer.
                              Iron-Clad Retardo Rust Inhibitive
22
            Moore:
23
                                 Paint.
                              U610424 Speedhide Red Lead Primer.
24
            Pittsburgh:
                              P & L Red Lead Primer.
25
            P & L:
                              S-W Kromik Metal Primer.
26
            S-W:
27
                         Interior Enamel Undercoat (FS TT-E-543).
28
            First Coat:
29
30
            Devoe:
                              8801 Velour Alkyd Enamel Undercoat.
            Glidden:
                              Y-4600 Series Spred Lustre Semi-Gloss
31
32
                              Enamel.
                              Moore's Alkyd Enamel Underbody.
33
            Moore:
                              6-6 Speedhide Quick- Drying Enamel
34
            Pittsburgh:
35
                              Undercoater.
                              Interior Trim Primer.
36
            P & L:
37
            S-W:
                              S-W Pro-Mar Alkyd Semi-Gloss.
38
39
            Second Coat: Odorless Interior Semi-Gloss Enamel (FS TT-
40
            E-509).
41
42
            Devoe:
                              26XX Velour Alkyd Semi-Gloss Enamel.
43
            Glidden:
                              Y-4600 Line - Spred Lustre Semi-Gloss.
                              Moore's Satin Impervo Enamel.
44
            Moore:
45
            Pittsburgh:
                          27-109 Wall-Hide Semi-Gloss Enamel.
                              Pro-Hide Plus Alkyd Semi-Gloss Enamel.
46
            P & L:
47
            S-W:
                              S-W Pro Mar Alkyd Semi-Gloss Enamel.
48
49
    Zinc-Coated Metal:
50
51
        Semi-Gloss Finish: 2 Coats over primer, with total dry film
        thickness not less than 2.5 mils.
52
53
```

Zinc-Dust - Zinc Oxide Primer Coating (FS

Prime Coat:

1 2		TT-P-641).	
3		Devoe:	14100 Zinc Dust Primer.
3			The state of the s
4		Glidden:	Y-5229 - Glid-Guard All-Purpose Metal
5 6 7		25 - 200 Page 1950 1950 1950 1950 1950 1950 1950 1950	Primer.
6		Moore:	Iron-Clad Galvanized Metal Primer.
7		Pittsburgh:	6-215/6-216 Speedhide Galvanized Steel
8			Paint
9			Zinc Dust.
10		S-W:	S-W Galvanized Iron Primer.
11			
12		Second Coat: Int	erior Enamel Undercoat (FS TT-E-543).
13			Series (March March 1976) Series (11) (March 1976) Series (March 1976) Series (12) Series (13) (March 1976) Series (13) (
14		Devoe:	8801 Velour Alkyd Enamel Undercoat.
15		Glidden:	Y-4600 Series Spred Lustre Semi-Gloss
16		GIIGGEII.	Enamel.
17		Magnes	
		Moore:	Moore's Alkyd Enamel Underbody.
18		Pittsburgh:	6-6 Speedhide Quick-Drying Enamel
19			Undercoater.
20		S-W:	S-W Pro-Mar Alkyd Semi-Gloss.
21			
22			orless Interior Alkyd Semi-Gloss Enamel
23		(FS TT-P-509).	
24			
25		Devoe:	26XX Velour Alkyd Semi-Gloss Enamel.
26		Glidden:	Y-4600 Line - Spred Lustre Semi-Gloss.
27		Moore:	Moore's Satin Impervo Enamel.
28		Pittsburgh:	27-109 Wall-Hide Semi-Gloss Enamel.
29		S-W:	S-W Pro-Mar Alkyd Semi-Gloss Enamel.
30		D-11.	b-W 110-Mai Minya bemi-01055 Enamet.
31	Painted	Woodwork and Hard	dboard:
32			
33	Sem	i-Gloss Enamel Fir	nish: 3 Coats.
34			
35		First Coat: Inte	rior Enamel Undercoat (FS TT-E-543).
36		TITOC COUC.	rior midmor officeroods (15 11-1-543).
		2	0004 Walana Bland Banash Walanash
37		Devoe:	8801 Velour Alkyd Enamel Undercoat.
38		Glidden:	Y-555-Line - Spred Undercoater.
39		Moore:	Moore's Alkyd Enamel Underbody.
40		Pittsburgh:	6-6 Speedhide Quick-Drying Enamel
41			Undercoater.
42		P & L:	Interior Trim Primer.
43		S-W:	S-W Wall and Wood Primer.
44			
45		Second and Third	Coats: Odorless Interior Semi-Gloss
46		Enamel (FS TT-E-5	
47		,	
48		Devoe:	26XX Velour Alkyd Semi-Gloss Enamel.
49		Glidden:	Y-4600 Line - Spred Lustre Semi-Gloss.
50		Moore:	Moore's Satin Impervo Enamel.
51			27-109 Wall-Hide Semi-Gloss Enamel.
		Pittsburgh:	
52		P & L:	Pro-Hide Plus Alkyd Semi-Gloss Enamel.
53		S-W:	S-W Pro-Mar Alkyd Semi-Gloss Enamel.

Natural Finish Woodwork:

1

2 Rubbed Varnish Finish: 2 Finish coats over shellac plus 3 4 filler on open grain wood. 5 First Coat: Bleached Shellac (FS TT-S-300). 6 7 8 4900 Wonder Woodsealer Quick-Dry Devoe: 9 Sealer. 10 Moore's Benwood Quick-Dry Sanding Moore: 11 Sealer. S-W: S-W Pro-Mar Varnish Sanding Sealer. 12 13 14 Filler Coat on Open Grain Wood: Paste Wood Filler (FS TT-F-336). Wipe before first varnish coat. 15 16 4800 Wonder Woodstain Interior Paste 17 Devoe: Wood 18 Filler. 19 20 Moore's Benwood Paste Wood Filler. Moore: 21 S-W: S-W Sher-Wood Fast-Dry Filler. 22 23 Second and Third Coats: Oil Rubbing Varnish (FS TT-V-24 86). 25 4600 Wonder Wood Satin Alkyd Satin 26 Devoe: Varnish. 27 Moore's Benwood Stain Finish Varnish. 28 Moore: S-W Oil Base Varnish, Gloss. 29 S-W: 30 31 Cotton or Canvas Covering over Insulation: 32 Flat Latex Emulsion "Size": 2 Coats. 33 34 35 First and Second Coats: Interior Flat Latex Base Paint (FS TT-P-29). Add fungcidal agent to render fabric mildew-proof. 36 37 36XX Wonder-Tones Interior Latex Flat 38 Devoe: 39 Wall Paint. Y-3400-Line-Spred Satin. 40 Glidden: Moore's Regal Wall Satin. 41 Moore: 6-70 Speedhide Latex Flat Wall Paint. 42 Pittsburgh: 43 P & L: Pro-Hide Plus Latex Flat Paint. 44 S-W Pro-Mar 400 Latex Wall Paint. S-W:

			 ,	·~
1		TIFICATION SCHEDU		C 59
2		VERSITY OF KENTUC		
4	STANDARD COLO	CODING FOR MECHA	MICAL PIPING	
5	TYPE OF SERVICE	MARKINGS	COLOR	NO.*
7	TIPE OF SERVICE	MARKINGS	COHOR	MO.
8	High Pressure Steam & Return (Over 76 psig)	H.P.S. & H.P.R.	Fire Protection Red	F65R1
10 11	Medium Pressure Steam & Return (21 psig to	M.P.S. & M.P.R.	International Orange	F65E37
12	75 psig)			
13	Low Pressure Steam &	L.P.S. & L.P.R.	Orange	F65E36
14 15	Return(0 psig to 20 ps	sig)		
16	Domestic Cold Water	D.C.W.	Medium Green	F65Y48
17	Domestic Hot Water	D.H.W.	Light Green	F65G39
18	Medium Temperature Hot	M.T.H.W. &	Medium Yellow	F65Y46
19	Water and Return	M.T.H.W.R.		
20	(300F or less)			
21	Walter to any other a walter		7 1 1 1 17 11	765-10
22	Reheat-Supply & Return	R.S. & R.R.	-	F65Y48
23 24	Chill Water-Supply & Return	C.W.S. & C.W.R.	to the same series and the same series are same series are same series and the same series are sam	F65L10
25	Condenser Water-Supply	C.D.W.S. &	Warm Gray	F65A1
26	& Return			
27 28	Natural Gas	Gas	Tartar Red Dark	E65D2
29	Safety Valve Vents	S.V.V.	Light Gray	F65A2
30	Cast Iron-Soil Vents	W. & V.	Black	F65B1
31				
32	Chilled-Hot Water	C.H.W.	Light Gray	F65A2
33	Air (Steel Pipe)	Air	Ligth Gray	F65A2
34	Air (Copper Pipe)	Air	None	
35		***		
36	Vacuum (Copper Pipe)	VAC	None	TC510
37 38	Vacuum (Steel Pipe) Roof Leaders	VAC R.L.	Light Gray Light Gray	F65A2 F65A2
39	ROOI Headers	к.н.	night Gray	FOJAZ
40	Soft Water	S.W.	White	F65W2
41	Demineralized Water	D.W.	None	
42	Distilled Water	Dist. W.	None	
43				
44	Diesel Fuel	D. Fuel	Light Gray	F65A2
45	Nitrogen	Nitrogen	Light Gray	F65A2
46	Elevator Oil Lines	E.O.L.	Light Gray	F65A2
47 48	Muriatic Acid	Mur. Acid	Light Gray	F65A2
49	Sulfuric Acid	Sul. Acid	Light Gray	F65A2
50	Chromate or Cooling	C.T.A.	Light Gray	F65A2
51	Tower Additives			
52				
53	Boiler Treatment	B.T.	Light Gray	F65A2
54	Gasoline	Gasoline	Light Gray	F65A2

4	TWO OF CODUTOR	WARRENGO	COTOD	0ୁଞ୍ଚ
1	TYPE OF SERVICE	MARKINGS	COLOR	NO.*
2				
3	Nitrous Oxide (Copper)	N. Oxide	None	
4				
5	Caustic Soda	C. Soda	Light Gray	F65A2
6	Condensate Pump	Cond. P.D.	Light Gray	F65A2
7	Discharge		-	
8	Sump Pump Discharge	S. Pump Dis.	Light Gray	F65A2
9			3	
10	Oxygen	Oxygen	None	
11	Fire Suppression-	Fire	Fire Protection	F65R1
12	Sprinkler System		Red	2 0 5 2 1 1
13	Ammonia	Ammonia	Rich Brown	F65N11
14	221211-0-12-00			2 002111
15	Glycol Solutions	Glycol	Turquoise	F65L6
16	Freon-R500	Freon R-500	Light Yellow	F65Y48
	The state of the s			**
17	Freon-R502	Freon R-502	Magenta	**
18				

NOTES:

Color and number are from Sherwin Williams Painting Systems Color Selection Guide dated 1975. These paints are Sherwin Williams KEM Lustral.

** Magenta is a Sherwin Williams mix. See the vendors catalog.

Not all "Services" are utilized on this project.

Color Coding will be selected by Architect in Labs.

END OF SECTION 09900

SECTION 09950 - WALL COVERINGS

2 3 4

PART 1 - GENERAL

RELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

DESCRIPTION OF WORK:

Extent of wall coverings required is indicated on drawings and in schedules.

Types of wall covering required include the following:

Vinyl-coated fabric wall covering (VWC).

QUALITY ASSURANCE:

 <u>Manufacturer</u>: Provide each type of wall covering as produced by a single manufacturer, including recommended primers, adhesives, and sealants.

<u>Installer</u>: A firm specializing in wall covering work and with not less than three years of experience in installing wall coverings similar to those required for this project.

Fire Hazard Classification: Provide materials bearing UL label and marking, indicating fire hazard classification of wall covering, as determined by ASTM E 84.

Provide materials with the following fire hazard classifications:

Flame spread not more than 25.

Smoke developed not more than 25.

SUBMITTALS:

<u>Product</u> <u>Data</u>: Submit manufacturer's technical data and installation instructions for each type of wall covering and installation materials.

<u>Samples</u>: Submit full width samples of each type of wall covering, illustrating range of color and pattern variation; submit sets of sample moldings.

<u>Certification</u>: Submit manufacturer's certification that materials furnished comply with requirements specified.

<u>Maintenance</u> <u>Instructions</u>: Submit manufacturer's printed instructions for maintenance of installed work, including precautions for use of cleaning materials which could damage wall covering.

Replacement Materials: After completion of work, deliver to project site not less than 6 linear yards of each type, color, and pattern of wall covering installed. Furnish replacement materials from same production run as materials installed.

DELIVERY AND STORAGE:

General: Comply with instructions and recommendations of manufacturer and as herein specified.

<u>Deliver materials</u> to project site in original packages or containers clearly labeled to identify manufacturer, brand name, quality or grade, and fire hazard classification.

Store materials in original undamaged packages or containers. Do not store rolled goods in upright position. Maintain temperature in storage area above 40 degrees F (4 degrees C).

JOB CONDITIONS:

<u>Maintain</u> <u>constant</u> <u>minimum</u> <u>temperature</u> of 60 degrees F (16 degrees C) at areas of installation for at least 72 hours before and 48 hours after application of materials.

<u>Illuminate</u> areas of installation using building's permanent lighting system; temporary lighting alone will not be acceptable.

PART 2 - PRODUCTS

VINYL WALL COVERING:

 General: Comply with FS CC-W-408 for types required, and comply with requirements specified herein. Provie vinyl wall covering material with suitable backing which has been treated with mildew and germicidal additives.

1 <u>Light Duty (VWC-1)</u>: Type I; total weight not less than 7 oz. per sq. yd.; vinyl coating not less than 5 oz. per sq. yd.

Medium Duty (VWC-2): Type II; total weight not less than 13 oz. per sq. yd., vinyl coating not less than 7 oz. per sq. yd.

Treated Medium Duty (VCW-3): Type II; total weight not less than 13.3 oz. per sq. yd., vinyl coating not less than 10.8 oz. per sq. yd. Treatment of wallcovering with liquid polymer coating for stain and microbial resistance. Treatment of wallcovering shall be 'PreFixx' as manufactured by Diversitech General.

Color/Pattern/Texture: Match Architect's samples.

Manufacturer: Provide vinyl wall covering produced by one of the following:

Key-Duncan Vicrtex Botatex

ACCESSORY ITEMS:

Adhesives: Provide manufacturer's recommended adhesive, primer, and sealer, produced expressly for use with selected wallcovering on substrate as shown on drawings. Provide materials which are mildew-resistant and nonstaining to wallcovering.

Release Coat: Oil base sealer or enamel undercoater for virgin drywall substrates as recommended by wallcovering manufacturer.

Adhesive for molding: Provide contact adhesive recommended by molding manufacturer.

PART 3 - EXECUTION

PREPARATION:

Acclimatize wall covering materials by removing from packaging in area of installation not less than 24 hours before application.

Remove switchplates, wall plates, and surface-mounted fixtures in areas where wall covering is to be applied.

<u>Prime</u> and <u>seal</u> substrates in accordance with wallcovering manufacturer's recommendations for type of substrate. Apply

8-4

surface sealer to gypsum drywall which will permit subsequent removal of wall covering without damage to paper facing.

Test substrates with electronic moisture meter to verify that surfaces to be covered do not exceed 4% moisture content.

INSTALLATION:

8 9

Vinyl Wall Covering:

<u>Place wall covering</u> panels consecutively in order cut from rolls, including filling of spaces above or below openings. Hang by reversing alternate strips except on match patterns.

Apply adhesive to back of wall covering and place in accordance with manufacturer's instructions. Install seams plumb, and at least 6" away from corners. Horizontal seams are not permitted. Overlap seams and double-cut to assure tight closure. Roll, brush, or use broad knife to remove air bubbles, wrinkles, blisters, and other defects. Cut wall covering evenly to edges of outlet boxes or support.

Trim selvages as required to assure color uniformity and pattern match.

Remove excess adhesive along finished seams while it is still wet using warm water and clean sponge, and wipe dry.

Remove excess adhesive promptly from finished seams, using warm water and clean sponge, and wipe dry.

ADJUST AND CLEAN:

Replace removed plates and fixtures; verify cut edges of wall coverings are completely concealed.

Remove <u>surplus</u> <u>materials</u>, rubbish, and debris resulting from wall covering installation upon completion of work, and leave areas of installation in neat, clean condition.

END OF SECTION 09950

SECTION 10100 - CHALKBOARDS AND TACKBOARDS

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PART 1 - GENERAL

5 6

RELATED DOCUMENTS:

7 8 9

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Drawings and general provisions of Contract, including General and Special Conditions and Division-1 Specification sections, apply to work of this section.

11 12 13

DESCRIPTION OF WORK:

14 15 16

Extent of chalkboards and tackboards is indicated on drawings.

17

18 Types of chalkboards and tackboards specified in this section 19 include the following:

20

21 Porcelain enamel chalkboards.

Porcelain enamel marker boards (for liquid chalk). 22

23 Natural cork tackboards.

Tackboard material for direct application to wall substrate 24

25

(without frame). Glass covered natural cork tackboards.

26

27 28

Directories and bulletin boards are included elsewhere Division 10.

30 31 32

29

QUALITY ASSURANCE:

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Manufacturer: Finish all chalkboards and tackboards by a single manufacturer for the entire project.

35 36 37

SUBMITTALS:

38 39 40

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Shop Drawings: Submit shop drawings for each type of chalkboard Include sections of typical trim members and and tackboard. dimensioned elevations. Show anchors, grounds, reinforcement, accessories, layout and installation details.

43 44

Submit manufacturer's technical data Product Data: installation instructions for each material and component part, including data substantiating that materials comply with requirements.

48 49

50 Submit full range of color samples for each type of Samples: chalkboard, tackboard, trim and accessory required. Provide 12" square samples of sheet materials and 12" lengths of trim 51 52 53 members for color verification after selections have been made.

Submit the manufacturer's certification that Certification: materials furnished for the project comply with the specified requirements.

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3 4

SPECIAL PROJECT WARRANTY:

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Chalkboards Porcelain Enamel Warranty: Furnish the manufacturer's written warranty, agreeing to replace, for the lifetime of the building, porcelain enamel chalkboards which do not retain their original writing and erasing qualities, become slick and shiny, or exhibit crazing, cracking or flaking; provided manufacturer's instructions with regard to handling, installation, protection and maintenance have been followed. Replacement is limited to material replacement only; labor for removal and reinstallation in not included.

PART 2 - PRODUCTS

21 22 23

ACCEPTABLE MANUFACTURERS:

24 25 26

Subject to compliance with requirements, provide Manufacturer: products of one of the following:

27 28

Manufacturers of Porcelain Enamel Chalkboards:

29 30 31

32

33

34 35

36

Alliancewall Corp.

Best-Rite Chalkboard Co.

Claridge Products and Equipment, Inc.

Carolina Chalkboard Co.

Greensteel Inc.

Nelson-Adams Co.

Penninsular Slate Co.

Weber Costello Co.

37 38 39

Manufacturers of Porcelain Enamel Marker Boards:

40 41 42

43

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46

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Alliancewall Corp.

Best-Rite Chalkboard Co.

Carolina Chalkboard Co.

Claridge Products and Equipment, Inc.

Greensteel, Inc.

47 Nelson-Adams Co.

Peninsular Slate Co.

Weber Costello Co.

49 50 51

Manufacturers of Tackboards:

52

Best-Rite Chalkboard Co.

53 54 Carolina Chalkboard Co.

Claridge Products and Equipment, Inc. Greensteel, Inc. Nelson-Adams Co. Peninsular Slate Co. Weber Costello Co.

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3

MATERIALS:

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Porcelain Enamel Chalkboards: Provide balanced, high pressure laminated porcelain enamel chalkboards of 3-ply construction consisting of facing sheet, core material and backing.

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19 20

16 17

11

Facing Sheet: Provide facing sheet of 24-gage enameling grade steel sheet especially processed for temperatures used in coating porcelain on steel. Coat the exposed face with a 3-coat process consisting of primer, ground coat and color cover coat, and the concealed face with a 2-coat process consisting of primer and ground coat. Fuse cover and ground coats to the steel at the manufacturer's standard firing temperatures, but not less that 1,200 deg.F (649 deg.C).

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> 24 25 26

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Proprietary Facing Sheet: At the Contractor's option provide 24-gage "Vitracite", porcelain enamel clad, type 1 stretcher-leveled aluminized steel facing sheet, as manufactured by Claridge Products and Equipment, Inc. in lieu of the facing sheet construction specified above. Fuse porcelain enamel coating to sheet facing steel at approximately 1,000 deg.F (538 deg.C).

29 30 31

32

33

Cover Coat: Provide the manufacturer's standard matte finish cover coat, color as selected from the manufacturer's standards.

34 35 36

Provide the manufacturer's standard light Cover Coat: colored special writing surface with gloss finish intended for use with liquid felt tipped markers.

38 39 40

37

Provide the manufacturer's standard 3/8" particleboard core material complying with the requirements of ANSI A208.1, Grade 1-M-1.

42 43 44

41

Backing Sheet: Provide the manufacturer's standard 0.015" thick aluminum sheet backing.

45 46 47

Laminating Adhesive: Provide the manufacturer's standard moisture-resistant thermoplastic type adhesive.

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52

Natural Cork Tackboards: Provide single layer 1/4" thick seamless, compressed fine grain bulletin board quality natural cork sheet, face sanded for natural finish, complying with MS MIL-C15116, Type II.

Metal Trim and Accessories: Fabricate frames and trim of not less than 0.062" thick aluminum alloy, size and shape as indicated, to suit type of installation. Provide straight, single length units wherever possible; keep joints to a minimum. Miter corners to a neat, hairline closure.

Baked Enamel Finish: Furnish exposed aluminum trim, accessories and fasteners with the manufacturer's standard baked enamel finish in color matching the color of the porcelain enamel chalkboard.

Field-Applied Trim: Provide the manufacturer's standard snap-on or slip-on trim, with no visible screws or exposed joints.

<u>Chalktray</u>: Furnish the manufacturer's standard continuous, solid extrusion type aluminum chalktray with ribbed section and smoothly curved exposed ends, for each chalkboard.

Special Units:

Glass Covered Natural Cork Tackboard: Provide glass covered natural cork tackboard units of the sizes and arrangements indicated. Fabricate panels from the manufacturer's standard components for the type of assembly indicated. Provide sliding glass panels as required, in the size and design indicated, to operate smoothly. Provide locking device to secure sliding glass panels.

Provide the manufacturer's standard horizontal sliding hardware consisting of overhead extruded aluminum track with nylon ball-bearing rollers and channel-shaped bottom guides.

FABRICATION:

<u>Porcelain enamel</u> <u>Chalkboards</u>: Laminate facing sheet and backing sheet to core material under pressure with manufacturer's recommended flexible, waterproof adhesive.

Assembly: Provide factory-assembled chalkboard and tackboard units, except where field-assembled units are required.

 Make joints only where total length exceeds the maximum manufactured length. Fabricate with the minimum number of joints, balanced around the center of the board, as acceptable to the Architect.

Provide the manufacturer's standard vertical joint system between abutting sections of chalkboard.

Provide the manufacturer's standard mullion trim at joints between chalkboard and tackboard.

PART 3 - EXECUTION

PREPARATION:

7 8

INSTALLATION:

<u>Deliver factory-built</u> chalkboard and tackboard units completely assembled in one piece without joints, whenever possible. Where dimensions exceed panel size, provide 2 or more pieces of equal length as acceptable to the Architect. When overall dimensions require delivery in separate units, prefit components at the factory, disassemble for delivery, and make final joints at the site. Use splines at joints to maintain surface alignment.

<u>Install units</u> in locations and mounting heights indicated and in accordance with the manufacturer's instructions. Keep perimeter lines straight, plumb, and level. Provide all grounds, clips, backing materials, adhesives, brackets, anchors, trim and accessories necessary for a complete installation.

Coordinate job-site assembled units with grounds, trim, and accessories. Join all parts with a neat, precision fit.

ADJUST AND CLEAN:

<u>Verify</u> that accessories required for each unit have been properly installed and that operating units function properly.

<u>Clean units</u> in accordance with the manufacturer's instructions. Break-in chalkboards only as recommended by the manufacturer.

END OF SECTION 10100

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SECTION 10160 - TOILET PARTITIONS

PART 1 - GENERAL

RELATED DOCUMENTS:

9 Drawings and general provisions of Contract, including General 10 and Special Conditions and Division-1 Specification sections, 11 apply to work of this section.

SUMMARY:

Extent of toilet partitions is indicated on drawings.

Types of toilet compartments include:

Metal -- baked enamel finish.

Styles of toilet compartments include:

Ceiling-hung.

Styles of screens include:

Wall-hung.

Toilet accessories, such as toilet paper holders, grab bars, purse shelves, are specified elsewhere in Division 10.

SUBMITTALS:

<u>Product Data:</u> Submit manufacturer's detailed technical data for materials, fabrication, and installation, including catalog cuts of anchors, hardware, fastenings, and accessories.

Shop Drawings: Submit shop drawings for fabrication and erection of toilet partition assemblies not fully described by product drawings, templates, and instructions for installation of anchorage devices built into other work.

<u>Samples</u>: Submit full range of color samples for each type of unit required. Submit 6" square samples of each color and finish on same substrate to be used in work, for color verification after selections have been made.

QUALITY ASSURANCE:

Field Measurements: Take field measurements prior to

preparation of shop drawings and fabrication where possible, to ensure proper fitting of work. However, allow for adjustments within specified tolerances wherever taking of field measurements before fabrication might delay work.

<u>Coordination</u>: Furnish inserts and anchorages which must be built into other work for installation of toilet partitions and related work; coordinate delivery with other work to avoid delay.

PART 2 - PRODUCTS

MANUFACTURERS:

<u>Manufacturer</u>: Subject to compliance with requirements, provide one of the following:

21 Bobrick Washroom Equipment, Inc. 22 Flush-Metal Partition Corp. 23 General Partitions Mfg. Corp. 24 Global Steel Products Corp. 25 Knickerbocker Partition Corp. 26 Metpar Steel Products Corp. 27 Sanymetal Products Co.

MATERIALS:

General: Provide materials which have been selected for surface flatness and smoothness. Exposed surfaces which exhibit pitting, seam marks, roller marks, stains, discolorations, telegraphing of core material, or other imperfections on finished units are not acceptable.

Steel Sheets for Baked Enamel Finish: ASTM A 591, Class C, galvanized-bonderized, of following minimum thicknesses:

Pilasters (overhead braced): 20 gage. Pilasters (unbraced): 16 gage. Panels and Screens: 20 gage. Doors: 22 gage.

<u>Concealed Anchorage</u> <u>Reinforcement: Minimum 12-gage galvanized</u> steel sheet.

49 <u>Concealed Tapping Reinforcement:</u> Minimum 14-gage galvanized 50 steel sheet.

Core Material for Metal Partitions: Manufacturer's standard sound-deadening, honeycomb, of impregnated Kraft paper, in thickness to provide finished dimension of 1" minimum for doors,

panels, and screens, 1-1/4" minimum for pilasters.

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2 3 4

Stirrup Brackets: Manufacturer's standard design for attaching panels to walls and pilasters, either chromium-plated nonferrous cast alloy ("Zamac") or anodized aluminum.

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5

Hardware and Accessories: Manufacturer's standard design, heavy-duty operating hardware and accessories of chromium-plated non-ferrous cast alloy ("Zamac").

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16

Anchorages and Fasteners: Manufacturer's standard exposed fasteners of stainless steel, chromium-plated steel, or brass finished to match hardware, with theft-resistant type heads and nuts. For concealed anchors, use hot-dip galvanized, cadmiumplated, or other rust-resistant protective-coated steel.

17 18

FABRICATION:

19 20 21

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General: Furnish standard doors, panels, screens, and pilasters fabricated for partition system, unless otherwise indicated. Furnish units with cutouts, drilled holes, and internal reinforcement to receive partition-mounted hardware, accessories, and grab bars, as indicated.

25 26 27

28 29

Door Dimensions: Unless otherwise indicated, furnish 24" wide inswinging doors for ordinary toilet stalls and 32" wide (clear opening) outswinging doors at stalls equipped for use by handicapped.

30 31 32

Metal Toilet Partitions and Screens:

33 34

General: Pressure laminate seamless face sheets to material and seal edges with continuous interlocking strip or with lapped and formed edges. Weld edges and corners, with exposed welds ground smooth.

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<u>Ceiling-Hung Partitions:</u> Furnish galvanized steel anchorage devices, complete with threaded rods, lock washers, and leveling adjustment nuts at pilasters, to permit connection to structural support above finished ceiling. Furnish devices which are designed to support pilasters from structure transmitting load to ceiling finish. Furnish 3" high stainless steel trim piece, finished to match hardware, at each pilaster.

45 46 47

> Wall-Hung Screens: Furnish panel units in sizes indicated, of same construction and finish as partition system panels.

49 50 51

48

Hardware: Furnish hardware for each compartment in partition system, as follows:

52 53 54

Hinges: Cutout inset type, adjustable to hold door open at



any angle up to 90 degrees. Provide gravity type, springaction cam type, or concealed torsion rod type, to suit manufacturer's standards.

3 4 5

Latch and Keeper: Recessed latch unit, designed for emergency access, with combination rubber-faced door strike and keeper.

Coat Hook: Manufacturer's standard unit, combination hook
and rubber-tipped bumper, sized to prevent door hitting
mounted accessories.

Door Pull: Manufacturer's standard unit for out-swing doors.

FINISHES:

Baked Enamel Finish:

<u>Clean galvanized steel</u> surfaces after fabrication and before application of enamel coating system, to remove processing compounds, oils, and other contaminants.

Prime metal with baked-on rust inhibitive primer.

Apply two coats of thermostating enamel finish, applied by electrostatic process, and baked in accordance with paint manufacturer's instructions.

Color: Custom color, to match Architect's sample.

PART 3 - EXECUTION

INSTALLATION:

General: Comply with manufacturer's recommended procedures and installation sequence. Install partitions rigid, straight, plumb, and level. Provide clearances of not more than 1/2" between pilasters and panels, and not more than 1" between panels and walls. Secure panels to walls with not less than two stirrup brackets attached near top and bottom of panel. Locate wall brackets so that holes for wall anchorages occur in masonry or tile joints. Secure panels to pilasters with not less than two stirrup brackets located to align with stirrup brackets at wall. Secure panels in position with manufacturer's recommended anchoring devices.

50 <u>Ceiling-Hung Partitions</u>: Secure pilasters to supporting 51 structure, and level, plumb, and tighten installation with 52 devices furnished. Hang doors and adjust so that bottoms of 53 doors are level with bottom of pilasters when doors are in

1 closed position.
2
3 Screens: Att

<u>Screens</u>: Attach with concealed anchoring devices, as recommended by manufacturer to suit supporting structure. Set units to provide support and to resist lateral impact.

ADJUST AND CLEAN:

 Hardware Adjustment: Adjust and lubricate hardware for proper operation. Set hinges on inswinging doors to hold open approximately 30 degrees from closed position when unlatched. Set hinges on outswinging doors (and entrance swing doors) to return to fully closed position.

<u>Clean</u> exposed surfaces of partition systems using materials and methods recommended by manufacturer, and provide protection as necessary to prevent damage during remainder of construction period.

END OF SECTION 10160

SECTION 10200 - LOUVERS AND VENTS

2 3 4

PART 1 - GENERAL

5 6 7

RELATED DOCUMENTS:

8
9 Drawings and general provisions of Contract, including General
10 and Special Conditions and Division-1 Specification sections,
11 apply to work of this section.

12

DESCRIPTION OF WORK:

14 15 16

Extent of louvers and vents is indicated on drawings, including indications of sizes and locations.

17 18 19

Types of louvers and vents include the following:

20 21

Extruded aluminum louvers

22 23

Sealants including installation are specified in Division 7.

24 25

Air-handling louvers connected to ductwork are specified in Division 15.

26 27 28

Blank-off plates for air-handling louvers are specified in Division 15.

29 30 31

QUALITY ASSURANCE:

32 33 34

35

36

<u>Performance Requirements</u>: Where louvers are indicated to comply with specific performance requirements, provide units whose performance ratings have been determined in compliance with Air Movement and Control Associates (AMCA) Standard 500.

37 38 39

AMCA Certification: Where indicated, provide louvers with AMCA Certified Ratings Seal evidencing that product complies with above requirement.

41 42 43

40

Comply with SMACNA "Architectural Sheet Metal Manual" recommendations for fabrication, construction details and installation procedures, except as otherwise indicated.

Field Measurements: Verify size, location and placement of louver units prior to fabrication, wherever possible.

48 49

50 <u>Shop Assembly</u>: Coordinate field measurements and shop drawings 51 with fabrication and shop assembly to minimize field 52 adjustments, splicing, mechanical joints and field assembly of 53 units. Preassemble units in shop to greatest extent possible and disassemble as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

SUBMITTALS:

<u>Product</u> <u>Data</u>: Submit manufacturer's specifications; certified test data, where applicable; and installation instructions for required products, including finishes.

Shop Drawings: Submit shop drawings for fabrication and erection of louver units and accessories. Include plans, elevations and details of sections and connections to adjoining work. Indicate materials, finishes, fasteners, joinery and other information to determine compliance with specified requirements.

<u>Samples</u>: Submit 6" square, of each required aluminum finish. Prepare samples on metal of the same gage and alloy to be used in work. Where normal color and texture variations are to be expected, include 2 or more units in each sample showing the limits of such variations.

PART 2 - PRODUCTS

ACCEPTABLE MANUFACTURERS:

Manufacturer: Subject to compliance with requirements, provide products of one of the following:

 Airline Products Co.

The Airolite Co.

American Warming and Ventilating Co.

Construction Specialties, Inc.

Industrial Louvers, Inc.

Ruskin Mfg. Co.

MATERIALS:

Stainless Steel Sheet: ASTM A 167 and AISI Type 302/304, with No. 4 finish.

Aluminum Sheet: ASTM B 209, Alloy 3003 or 5005 with temper as required for forming, or as otherwise recommended by metal producer to provide required finish.

Aluminum Extrusions: ASTM B 221, Alloy 6063-T52.

<u>Fastenings</u>: Use same material as items fastened, unless otherwise indicated. Fasteners for exterior applications may be

hot-dip galvanized, stainless steel or aluminum. Provide types, gages and lengths to suit unit installation conditions. Use Phillips flat-head machine screws for exposed fasteners, unless otherwise indicated.

Anchors and Inserts: Use non-ferrous metal or hot-dip galvanized anchors and inserts for exterior installations and elsewhere as required for corrosion resistance. Use steel or lead expansion bolt devices for drilled-in-place anchors. Furnish inserts, as required, to be set into concrete or masonry work.

Bituminous Paint: SSPC-Paint 12 (cold-applied asphalt mastic).

FABRICATION, GENERAL:

 Provide louvers and accessories of design, materials, sizes, depth, arrangement, and metal thicknesses indicated, or if not indicated, as required for optimum performance with respect to airflow; water penetration; air leakage, where applicable (for adjustable units, if any); strength; durability; and uniform appearance.

 <u>Fabricate</u> <u>frames</u> including integral sills to suit adjacent construction with tolerances for installation, including application of sealants in joints between louvers and adjoining work.

<u>Include</u> <u>supports</u>, anchorages, and accessories required to achieve a complete assembly.

 Provide vertical mullions of type and at spacings indicated but not further apart than recommended by manufacturer or 72" o.c., whichever is less. At horizontal joints between louver units provide horizontal mullions except where continuous vertical assemblies are indicated.

<u>Provide sill extensions</u> and loose sills made of same material as louvers, where indicated, or required for drainage to exterior and to prevent water penetrating to interior.

Join frame members to one another and to stationary louver blades by welding, except where indicated otherwise or where field bolted connections between frame members are made necessary by size of louvers. Maintain equal blade spacing, including separation between blades and frames at head and sill, to produce uniform appearance.

STATIONARY EXTRUDED ALUMINUM WALL LOUVERS:

Horizontal Drainable Blade Louvers: Units designed to collect and drain water to exterior at sill by means of gutters in front

edges of blades, and channels in jambs and mullions. Furnish units with extrusions not less than 0.081" thick, of depth, and sizes indicated, complying with following performance requirements.

Static Pressure Loss: Not more than 0.10" of water gage at an airflow of 1000 fpm free area velocity in intake direction.

Water Penetration: Not more than 0.052 oz. per sq. ft. of free area at an airflow of 1000 fpm free area velocity.

AMCA Certification: Furnish units bearing AMCA Certified Ratings Seal.

<u>Horizontal Blade</u> <u>Louvers</u>: For crawl space vents, of size and depth indicated, with blades of profile, slope and spacing indicated, or if not indicated, to meet performance requirements.

Extrusion Thickness: Not less than 0.081" for blades and frames.

Furnish units complying with following performance requirments:

Static Pressure Loss: Not more than 0.15" of water gage at an airflow of 1000 fpm free air velocity.

Water Penetration: Not more than 0.05 oz. per sq. ft. of free area at an intake airflow of 100 fpm free area velocity.

 Continuous Horizontal Blades: Conceal supporting framework from vision on outside face of louver by placing braces, mullions and brackets on inside face; with close fitting, field-made splice joints in blades designed to permit expansion and contraction without deforming blades or framework.

LOUVER SCREENS:

Provide removable screens for exterior louvers where indicated.

Fabricate screen frames of same metal and finish as louver units to which secured, unless otherwise indicated.

Provide rewireable frames consisting of formed or extruded metal with a driven spline or insert for securing screen mesh.

Use bird screens where indicated, of the following:

1/2" sq. mesh. 0.063" aluminum wire.

Locate screens on inside face of louvers, unless otherwise

indicated. Secure screens to louver frames with machine screws, spaced at each corner and at 12" o. c. between.

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METAL FINISHES:

Comply with NAAMM "Metal Finishes Manual" for finish designations application recommendations, and otherwise indicated. Apply finishes in factory after products are assembled. Protect finishes on exposed surfaces with protective covering, prior to shipment. Remove scratches and blemishes from exposed surfaces which will be visible after completing finishing process.

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Provide colors or color matches as indicated or, if not indicated, as otherwise selected by Architect manufacturer's standard colors.

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Aluminum Finishes:

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Color Anodized Finish: AA-C22A42 (medium matte etched finish with 0.7 mil. min. thick integrally colored anodic coating).

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Color: Match Architect's sample.

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PART 3 - EXECUTION

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PREPARATION:

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Coordinate setting drawings, diagrams, templates, instructions and directions for installation of anchorages which are to be embedded in concrete or masonry construction. delivery of such items to the project site.

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INSTALLATION:

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Locate and place louver units plumb, level and in proper alignment with adjacent work.

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Use concealed anchorages wherever possible. Provide brass or lead washers fitted to screws where required to protect metal surfaces and to make a weathertight connection.

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Form tight joints with exposed connections accurately fitted together. Provide reveals and openings for sealants and joints fillers, as indicated.

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51 Repair finishes damaged by cutting, welding, soldering and grinding operations required for fitting and jointing. Restore 52 53 finishes so there is no evidence of corrective work.

items which cannot be refinished in the field to shop, make required alterations, and refinish entire unit, or provide new units, at Contractor's option.

Provide concealed gaskets, flashings, joint fillers, and

insulations, and install as work progresses to make the installations weathertight.

Refer to Division-7 sections for sealants in connection with installations of louvers.

END OF SECTION 10200

SECTION 10270 - ACCESS FLOORING

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PART 1 - GENERAL

RELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Special Conditions and Division-1 Specification sections, apply to work of this section.

SUMMARY:

Extent of access flooring, including underfloor clearances,
offsets, closures and accessories, is indicated on Drawings.

Types of access flooring systems specified in this section include the following:

Gravity-held panels, understructure with bolted stringers.

Computer room air-conditioning units are specified in Division 15.

Connection to ground of access floor understructure is specified in a Division-16 section.

<u>Sealer for concrete subfloor</u> surfaces is specified in a Division-3 section.

DEFINITIONS:

Access flooring is a complete portable assembly of modular floor panels on an elevated support system (understructure) forming an accessible underfloor cavity to accommodate electrical and mechanical services.

SYSTEM DESCRIPTION:

<u>Structural</u> <u>Performance</u>: Provide manufacturer's standard access flooring system which, when installed, complies with the following minimum requirements for structural performance.

Floor Panels: Units, including those with cutouts, capable of supporting design loads of type and magnitude indicated below:

Concentrated loads of following magnitude, applied to one square inch located anywhere on panel, with a top surface

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Certified

SUBMITTALS:

Test Reports: evidencing compliance of access flooring with

Submit certified requirements specified based on comprehensive testing of current

deflection under load and a permanent set not to exceed, respectively, 0.080" and 0.010".

1,000 lbf.

Pedestals: Pedestal assemblies capable of withstanding the following types of loads per pedestal, without panels or other supports in place.

Bending moment of 1,000 inch-pounds.

Axial load of 5,000 lbs.

Understructures: Stringers capable, without panels in place, of supporting a concentrated load of 200 lbs. at center of span with a permanent set not to exceed 0.010".

Electrical Resistance of System: Provide manufacturer's standard access flooring system which, when installed, has the following electrical resistance characteristics:

Static-Conductive Floor Covering Resistance: Not less than 25,000 ohms nor more than 1,000,000 ohms, measured across surface of floor covering through panel to understructure, by test method for conductive flooring specified in Chapter 3 of NFPA 99.

Panel to Understructure Resistance: Not more than 10 ohms.

Submit manufacturer's technical data for each Product Data: type of access flooring required.

Submit shop drawings showing complete layout of Shop Drawings: access flooring based on field-verified dimensions; include dimensional relationships to adjoining work installation Include details, with descriptive notes indicating tolerances. materials, finishes, fasteners, typical and special conditions, accessories, understructure and other data to permit a full evaluation of entire access flooring system.

Submit samples of each exposed metal finish and each Samples: type and color of floor covering and accessory.

In addition, submit one complete full size floor panel, pedestal and grid unit for each type of access floor required.

products representative of those provided for this project.

reports

performance

10270 - 2

test

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Engage an independent inspection and testing agency, acceptable to Architect and experienced in testing of this kind, to certify and evaluate test results either after performing tests or witnessing tests performed by manufacturer.

<u>Certificates</u>: Submit certificates from manufacturers of access flooring attesting that their products comply with specification requirements.

QUALITY ASSURANCE:

 Installer Qualifications: Engage an Installer who is acceptable to access flooring manufacturer and who has successfully completed within the last 3 years at least 3 access flooring installations similar in type and size to that of this project and who will assign mechanics from these earlier installations to this project, of which one will serve as lead mechanic.

NFPA Standard: Provide access flooring complying with NFPA 75 requirements for raised flooring.

<u>Coordination</u> of <u>Work</u>: Coordinate location of access flooring pedestals to prevent interference with mechanical and electrical work in underfloor cavity.

DELIVERY, STORAGE AND HANDLING:

<u>Deliver</u> <u>access</u> <u>flooring</u> <u>components</u> in original, unopened packages, clearly labeled with manufacturer's name and item description.

<u>Handle and store packages</u> containing access flooring in a manner which avoids overloading building structure.

PROJECT CONDITIONS:

Environmental Conditions: Do not proceed with installation of access flooring until installation area is enclosed and has an ambient temperature of between 40 deg. F (4.4 deg. C) and 90 deg. F (32.2 deg. C), and a relative humidity of not more than 70 percent.

SEQUENCING AND SCHEDULING:

<u>Mark pedestal locations</u> on concrete subfloor so that mechanical and electrical work can take place without interfering with installation of pedestals.

 $\underline{\text{Do}}$ $\underline{\text{not}}$ $\underline{\text{proceed}}$ with installation of access flooring until after substantial completion of other performable work within affected spaces.

EXTRA MATERIALS:

<u>Deliver extra materials</u> to Owner. Furnish extra materials described below matching products installed, packaged with protective covering for storage and identified with appropriate

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Standard Field Panels and Understructure: Furnish quantity of standard field panels and understructure components to support them equal to 3 percent of the amount installed.

PART 2 - PRODUCTS

MANUFACTURERS:

Manufacturers: Subject to compliance with requirements, provide products of one of the following:

<u>Manufacturers</u> of <u>Systems</u> with <u>Fiber-Reinforced</u> <u>Calcium</u> Sulfate Panels:

Mero Corp.

H.H. Robertson Co.

FLOOR PANELS:

General: Provide modular standard field panels of size and construction indicated which are interchangeable with other standard field panels, easily placed and removed without disturbing adjacent panels or understructure by one person using a portable lifting device, free of exposed metal edges in installed position with floor covering in place.

Nominal Panel Size: 24" x 24" unless otherwise indicated.

<u>Fabrication</u> <u>Tolerances</u>: Fabricate panels to the following tolerances with squareness tolerances expressed as the difference between diagonal measurements from corner to corner:

Size and Squareness of Fiber-Reinforced Calcium-Sulfate Panels: Plus or minus 0.008" of size required, with a squareness tolerance of plus or minus 0.012".

<u>Fiber-Reinforced Calcium Sulfate Panels:</u> Manufacturer's standard panel construction molded from fiber-reinforced calcium sulfate to produce monolithic units with flat top and bottom surfaces and tapered edges.

FLOOR PANEL COVERING:

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General: Cover tops of floor panels to comply with requirements indicated for color, pattern and material.

<u>Colors and Patterns</u>: Provide floor covering materials complying with colors and patterns indicated or, if not indicated, as selected by Architect from manufacturer's standard colors and patterns.

Colors and Patterns: Match Architect's sample.

Static Conductive Vinyl Tile: FS SS-T-312, Type III; fabricated in one piece to cover each panel face within perimeter plastic edging, unless otherwise indicated, with static generation of less than 100 volts with conductive footwear at 20% R.H. as per AATCC-134 and static decay of 5,000 volts to zero in less than 0.03 seconds per Fed. Test Method 101B, Method 4046, at 15% R.H.

 <u>Plastic Edging</u>: Manufacturer's standard plastic edge trim applied by manufacturer's standard method either mechanically or adhesively, or both, to perimeter of each panel, of size and profile to suit floor covering selected, unless otherwise indicated.

UNDERSTRUCTURE:

<u>Pedestals</u>: Provide manufacturer's standard pedestal assembly including base, column with provisions for height adjustment and head (cap); made either of steel or aluminum or a combination of both.

<u>Base</u>: Square or circular base with not less that 16 sq. in. of bearing area.

 Provide vibration proof mechanism for making and holding fine adjustments in height for leveling purposes over a range of not less than 2". Include means of locking leveling mechanism at a selected height, which requires deliberate action to change height setting and prevents vibratory displacement.

Fabricate units of sufficient height to provide required underfloor clearance.

Head: Of type designed for direct, bolted support of floor Fabricate head with 4 holes aligned with holes in floor panels for positive bolting of panels to pedestals.

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Provide fasteners and fittings for bolting panels to pedestals.

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Manufacturer's standard steel modular Stringer Systems: stringer system, designed and fabricated to interlock with pedestal head and to form a grid pattern with members under each edge of each floor panel and with a pedestal under each corner of each floor panel. Protect steel components against corrosion with manufacturer's standard galvanized or paint finish.

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Bolted Stringers: System of main and cross stringers connected to pedestals with threaded fasteners accessible from above.

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Provide continuous gasket at contact surfaces between panel and stringers to deaden sound, to form an effective plenum seal, and where required, to maintain panel alignment and position.

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Provide stringers which support each edge of each panel where required to meet design load criteria.

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ACCESSORIES:

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Colors and Finishes: For exposed accessories available in more than one standard color or finish, provide color or finish selected by Architect from manufacturer's full range of standard colors and finishes.

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Cutouts: Fabricate cutouts in floor panels to accommodate cable penetrations and service outlets, if any. Comply with requirements indicated for size, shape, number and location. Provide reinforcement or additional support, if needed, to make performance panel with cutouts comply with standard requirements.

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Fit cutouts with manufacturer's standard grommets in sizes indicated or, where size of cutouts exceed maximum grommet size available, trim edge of cutouts with manufacturer's standard plastic molding having tapered top flange.

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Furnish removable covers for grommets.

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Provide foam rubber pads for sealing annular space formed in cutouts by cables and trim edge of cutout with molding having flange and ledge for capturing and supporting pads.

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Service Outlets: Manufacturer's standard UL-listed and -labeled assemblies, for recessed mounting flush with top of floor panels, designed and fabricated to accommodate power, communication and signal cables, and complying with following requirements:

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<u>Cover and Box Type:</u> Grommet with twist-close cover and including steel junction box for mounting of electrical receptacle with provision for passage or housing of telephone amphenol connectors and signal cables.

Location: Locate outlets in center of panel quadrant.

Receptacles and Wiring: Electrical receptacles and wiring for service outlets are specified in Division-16 sections.

<u>Perforated</u> <u>Panels</u>: Manufacturer's standard load-bearing perforated metal panels interchangeable with standard field panels and complying with the following requirements:

<u>Air Distribution Characteristics of Units without Dampers:</u>
Capable of delivering 770 cfm at 0.10" static pressure.

Air <u>Distribution Characteristics</u> of <u>Units with Dampers</u>: Where indicated provide units with air volume control dampers adjustable from top surface and capable of delivering 585 cfm at 0.10" static pressure with damper full open.

Structural Performance: Capable of supporting a 1,000 lbf. concentrated load.

Floor Covering: Same as standard field panel.

<u>Plenum Dividers</u>: Manufacturer's standard metal plenum divider located where indicated to divide underfloor plenum.

 <u>Vertical Closures (Fascia)</u>: Where underfloor cavity is not enclosed by abutting walls, columns, beams or downturned slabs, provide manufacturer's standard metal closure plates with factory-applied finish.

Ramps: Manufacturer's standard ramp construction of width and slope indicated, with non-slip vinyl floor covering, and of same materials, performance and construction requirements as the access flooring.

<u>Panel Lifting Device</u>: Manufacturer's standard portable lifting device of type and number required for lifting panels with floor covering provided.

Provide 4 lifting devices of each type required.

<u>Vinyl</u> <u>Base</u>: Vinyl wall base complying with FS SS-W-40, Type II, with matching end stops and preformed or molded corner units, with topset cove, and of height and thickness indicated.

PART 3 - EXECUTION

Perimeter Support:

at same level as access flooring.

PREPARATION:

<u>Field Measurements</u>: Take field measurements prior to preparation of shop drawings and fabrication to ensure proper fitting of work. Otherwise, indicate final measurements on shop drawings.

standard aluminum extrusion to support panel edge and 'form

transition between access flooring and adjoining floor covering

Where indicated provide manufacturer's

<u>Pre-Installation</u> <u>Adhesive</u> <u>Subfloor</u> <u>Field</u> <u>Test</u>: Prior to proceeding with installation of pedestals, field test their adhesion to subfloor surfaces as follows:

In areas representative of each subfloor surface condition, set typical pedestal assemblies in same adhesive and methods required for completed work.

Allow test installation to cure for 14 days, with a pressure of 25 lbf applied vertically to pedestals during this period.

After curing, apply lateral loads against a straight steel extension bar inserted 2" into pedestal stems. Measure with spring scale the force needed to cause adhesive failure between pedestal base and subfloor.

<u>Do not proceed</u> with installation until tests evidence compliance with indicated requirement for pedestal's capability to resist overturning bending movement.

Locate each pedestal and complete any necessary subfloor preparation, and vacuum clean the subfloor of all dust, dirt and construction debris before starting installation.

INSTALLATION:

 <u>Install floor</u> <u>system</u> and accessories under supervision of the manufacturer's authorized representative to ensure rigid, firm installation free of vibration, rocking, rattles, squeaks, and other unacceptable performance.

<u>Set pedestals</u> in adhesive as recommended by the floor manufacturer to provide full bearing of the pedestal base on the subfloor.

Layout floor panel installation to keep the number of cut panels at the floor perimeter to a minimum. Scribe panel assemblies at perimeter to provide a close fit with no voids greater than 1/8" where panels abut vertical surfaces.

<u>Secure grid members</u> to pedestal heads in accordance with manufacturer's instructions.

Accurately scribe and fit plenum dividers to subfloor and seal with mastic to ensure maintenance of plenum effect.

Thoroughly vacuum clean the subfloor area as installation of floor panels proceeds. Extend cleaning under installed panels as far as possible.

<u>Cutting</u> and <u>trimming</u> or other dirt-or-debris-producing operations will not be permitted in the rooms where the floor is being installed.

<u>Level installed access floor</u> to within 0.10" of true level over the entire area and within 0.0625" in any 10' distance.

CLEANING, PROTECTION AND FINAL ADJUSTMENTS:

After completion of installation, vacuum clean the entire floor system and cover with continuous sheets of reinforced paper or plastic. Maintain and repair damages to protective covering until directed to be removed by the Architect.

Replace access floor panels which are chipped, broken, stained, scratched or otherwise damaged, or do not conform to specified requirements.

END OF SECTION 10270

SECTION 10440 - SPECIALTY SIGNS

 $\begin{pmatrix} Add \\ A \end{pmatrix}_{5}^{2}$

Add to this specification one new sign type for installation at two ground floor vestibule doors. The sign shall be the Hospital Logo, shown on sheet A-b4, 1'-0" in diameter, reverse cut for application to inside surface of glass. Logo colors shall match samples provided by Owner. Sign material shall be "3M Scotchcal", premium grade vinyl

RELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Special Conditions and Division-1 Specification sections, apply to work specified in this section.

DESCRIPTION OF WORK:

Extent of specialty signs is shown on drawings.

Forms of specialty signs required include the following:

21	Sign Description	Sign Type
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23	Building logo I.D.	I
24	Emergency canopy I.D.	H
25	Emergency lobby sign	0
26	Garage column sign	C
27	Garage elevator panel sign	M
28	Garage elevator spanning sign	G
29	Garage entrance/exit sign	Α
30	Garage handicapped sign	D
31	Garage level I.D. sign	E
32	Garage no entry sign	N
33	Garage spanning sign	В
34	Garage ticket booth sign	F
35	Hospital department I.D.	L
36	Hospital primary I.D.	J
37	Hospital secondary directional	K
38	Regulatory Signs	R

Plastic Door Frame Number Signs. Cast Metal Plaques.

Refer to Sign Schedules at the end of this Section for:

Addition Sign Schedule/Exterior Regulatory Message Schedule Parking Garage Schedule

Directories and bulletin boards are specified in another Division-10 section. (Defeate A-Z)

Electrical service and connections for illuminated letters are specified in Division-16.

QUALITY ASSURANCE:

 Uniformity of Manufacturer: For each sign form and graphic image process indicated, furnish products of a single manufacturer.

Drawings and Specifications: Plans, elevations, details, and specifications indicate spacings of members, sizes of components as well as profile, dimensional, material, fabrication, and similar design requirements for all sign types. Minor deviations will be accepted in order to utilize manufacturer's standard products when, in Architect's sole judgement, such deviations do not materially detract from design concept or

intended performance.

<u>UL Compliance</u>: Provide lighting fixtures and electrical components which are UL-labeled and listed.

<u>Aesthetic Requirements</u>: All copy to be straight with letters tightly spaced, typeface accurately reproduced with square corners and even curves, letters and symbols uniform, edges straight and true, and all finishes smooth and with no visible imperfections.

Typographic Requirements: All type used shall be Helvetica Medium as manufactured by: Visual Graphics Corp., Font #TH-3. Lettering shown on the drawings are intended as guidelines for layouts and type size only, and are based on scale calculations of the message lengths within given and estimated sign areas. Refer to the Schedule of Sign Messages for the copy to be provided on individual signs. Should conflicts arise in the final message layut, notify the Architect before proceeding. Notations contained within parenthesis () in the Schedule are instructions for glyphs that should be included on sign.

All spelling and punctuation shall be correct. Should an error in spelling or punctuation be found, or the spelling appear questionable, notify the Architect before proceeding.

Align all letter forms to maintain a baseline parallel to the sign format. Maintain margins as specified in sign layouts.

SUBMITTALS:

Shop Drawings: Submit shop drawings for fabrication and erection of specialty signs. Include plans, elevations, and large scale details of sign wording and lettering layout, inlcuding outline of sign face, letter spacing, line spacing, spelling, punctuation, legibility, copy composition, etc. Show fabrication joints and fasteners. Show anchorages and accessory items. Furnish location template drawings for items supported or anchored to permanent construction. All submittals must be

made simultaneously for review and comparison.

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PART 2 - PRODUCTS

Furnish full-size spacing templates for individual buildingmounted letters and numbers. Template to include markings that show actual block sizes and joint lines.

Furnish wiring diagrams for illuminated sign units.

Submit all text, in half-size, to Architect fabrication is commenced for verification of spacing and letter height.

Submit manufacturer's technical Product Data: data installation instructions for each type of sign required.

Submit samples, 6"x6", of each sign form and material showing finishes, colors, surface textures and qualities of manufacturer and design of each sign component including graphics. Samples to be kept by Architect as a record to later match against items in the field.

Submit full-size letter from emergency lobby sign. Submit 12"x12" working sample showing fiberglass changeable panel and retaining extrusion. (Types J, K, L) Submit 12"x12" working sample of panaflex material and stretching/retaining system. (Type I) All color submittals shall show true translucent or opaque condition.

DELIVERY, STORAGE, AND HANDLING:

Package in like groups and label accordingly.

Protect all items during transit, delivery, storage, handling to prevent damage, soiling, and deterioation. Inspect items upon delivery for damage. Minor damages may be repaired provided the finish items are equal in all respects to new work and acceptable to the Architect; otherwise, remove and replace damaged items as directed.

WARRANTY:

Provide a one-year warranty of materials and workmanship for all sign types required. Should one or more defects appear within the warranty period, the Owner shall have the right to continue use of the defective part until such time that it is replaced, without loss or inconvenience to the Owner. Replacements must fulfill an additional one year warranty period. Warranty period begins with certicate of substantial completion.

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ACCEPTABLE MANUFACTURERS:

Manufacturers: Subject to compliance with requirements, provide products of one of the following:

APCO, Inc.

Architectural Graphics, Inc.

ASI Sign Systems, Inc. General Sign Company

MATERIALS:

 General: All materials shall be new stock, free from defects impairing strength, durability, and appearance. No fabrication or installation materials or procedures shall be used that will in any way change the usual quality or in any manner have an adverse effect on existing materials and surfaces.

Metal:

For the fabrication of exposed metal work, use only materials which are smooth and free of surface blemishes including pitting roughness, seam marks, roller marks, and trade names. Do not use materials which have stains and discolorations.

For exposed items of work which include plain flat surfaces in width of more than 50 times the metal thickness, provide sheet stock from the mill which has been stretcher leveled to the highest standard of flatness commercially available.

Welding, when necessary, shall be of the correct type to minimize permanent distortions of flat surfaces. All welding flux, oxides, and discolorations shall be removed by pickling or grinding, so that these areas match the finish of the adjacent areas. Any damage caused by fabrication must be repaired by grinding, polishing, or buffing.

Aluminum shall be Aluminum Association Alloy 60637T5 or 6061T6 or as recommended to suit required service and finish.

 Aluminum Extrusions: Alloy and temper recommended by aluminum producer or finisher for type of use and finish indicated, and with not less than the strength and durability properties specified in ASTM B 221 for 6063-T5.

Aluminum Sheet: Alloy and temper recommended by aluminum producer or finisher for type of use and finish indicated, and with not less than the strength and durability properties specified in ASTM B 209 for 5005-H15.

Plastic:

Edges shall be free of saw marks, chips, and square to face. All edges to be smooth and flame polished unless otherwise specified.

Furnish acrylic as manufactured by Rohm and Haas, or approved equal.

Cast Acrylic Sheet: Provide cast (not extruded or continuous cast) methyl metharcrylate monomer plastic sheet with a minimum flexural strength of 16,000 psi, when tested in accordance with ASTM D 790, minimum allowable continuous service temperature of 180 degrees F (82 degrees C); in sizes and thickness indicated; and in the following general types:

 Transparent Sheet: Where indicated as "clear" provide colorless sheet with light transmittance of 92%, when tested in accordance with ASTM D 1003, in matte finish, unless othewise indicated.

Opaque Sheet: Where indicated as "opaque" provide colored opaque acrylic sheet in colors and finishes indicated, or if not indicated, as selected from manufacturer's standards.

Flexible Face: Flexible translucent stablized polymeric material with high strength polyester reinforcing fibers. The material weighs approximately 26 ounces per square yard and has a controlled caliper range of 26 mils +/- 1 mil. The single piece material maintains original tensioned memory in temperature extremes (-30 degrees to 170 degrees F) and is coated with a gloss finish U.V. inhibitor. Material to be certified that is passes the U.V.48 strength and weather-ability tests for component sign accessories.

Colored Coatings for Acrylic Plastic Sheet: Use colored coatings, including inks and paints for copy and background colors, which are recommended by acrylic manufacturers for optimum adherence to acrylic surface and are non-fading for application indicated.

Fiberglass:

Molded fiberglass is a glass reinforced polyester material with a high stength-to-weight ratio. Fiberglass consists of thermo setting polyester resin, reinforced with chopped glass fiber strands. A molded-in layer of gel coat is used to seal the resin and glass laminate against pinholes and fiber bloom (transfer pattern of the glass strands to the molded surface). The gel coat thus serves as an undercoat for the graphics and the polyurethane finish. The polyurethane coatings are formulated with compents that resist yellowing and chalking. Inorganic pigments are used to assure color stability and to minimize fading. Graphics and panel colors are substrate and are integral with the molded, gel coated

panel and the glare-free matte polyurethane finish coating creating opaque graphics and background.

Wherever fiberglass is called for in the specification, no substitution such as metal, aluminum, plastics, etc. will be allowed.

Reflective Vinyl Film: "Scotchlite" brand reflective sheeting as manufactured by 3M to be engineer grade, Imperial white 3280. Exterior life durability shall be a minimum of 5 years.

Fasteners:

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Use concealed fasteners, unless otherwise indicated, which are fabricated from metals which are non-corrosive to either sign materials or mounting surface.

All exposed scres to be countersunk unless otherwise noted, with screw heads painted to match base material.

Expansion Bolts: 5/8" round bolt, 1" round x 2-7/8" shield unless otherwise noted.

Bolts shall conform to ASTM A 307, Grade A.

Anchors and Inserts: Use non-ferrous metal or hot-dipped galvanized anchors and inserts for exterior installations and elsewhere as required for corrosion resistance. Use toothed steel or lead expansion bolt devices for drilled-in-place anchors. Furnish inserts, as required, to be set into concrete or masonry work.

Silkscreening:

Aesthetic Requirements: The silkscreen inks shall be appropriate for exterior or interior applications where required. Ink colors must match specified colors and be consistent throughout the job. Ink coverage to be solid and accurate, in accurate registration. All lines and edges to be accurately defined, sharp and crisp. All finishes to be smooth, free of air bubbles, ink runs or drips, and appear with no visible imperfections.

<u>Fabrication</u> <u>Requirements</u>: The copy in the artwork shall have letter spacing as shown on the drawings. Negatives used in the exposing of the silkscreen to be accurately exposed, clean, free of dust particles and fully retouched.

All silkscreening shall employ 390-mesh, or finer, screen. The letter forms should not touch, and when silkscreened, shall not bleed together in any way. Letter form to have crisp, clean edges and have consistent line weight. The ink shall be totally opaque and uniform in coverage throughout.

All silkscreening to use Nazdar, fast drying enamel silkscreen ink. Ink to be totally opaque and a high gloss color not limited to manufacturer's standard colors.

<u>Camera-Ready Artwork:</u> Documents include specifications for all visual elements (i.e., type, symbol, logos, arrows, etc.). Create all "camera-ready artwork" necessary to complete all signs.

Fabricated Letters: Fabricate letters to required sizes and styles, using metals and thicknesses indicated below. From exposed faces and sides of characters to produce surfaces free from warp and distortion, include internal bracing for stability and attachment of mounting accessories as required.

Aluminum Sheet: Not less than 0.090" thick. Fabricate by heliarc welding process.

Application of Inks and Paints: "Paint" as used herein means all coating systems, materials, including primers, emulsions, enamels, stains, sealers, and fillers.

General: Apply paint in accordance with manufacturer's directions. Use applicators and techniques best suited for substrate and type for material being applied.

Apply additional coats when under coats, stains, or other conditions show through final coat of paint, until paint film is of uniform finish, color, and appearance. Give special attention to insure that surfaces, including edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.

Sand lightly between each succeeding enamel or varnish coat.

COMPONENTS OF MOLDED FIBERGLASS:

<u>General</u>: Provide molded fiberglass signs with requirements indicated for materials, thickness, finishes, colors, designs, shapes, sizes, and details of construction.

All surfaces shall be smooth, free of dimples, scratches, gouges, air bubbles, bulges, foreign matter, and any other imperfections. No glass fiber strands shall appear between the surface and the background color. The background color shall be free of any streaking or uneven fading. Any "dimpling" or gouges caused by an improperly fabricated mold are unacceptable.

Fabricate and install as seamless, monolithically fabricated fiberglass panels (glass fiber-reinforced plastic) with sufficient internal reinforcement to insure structural integrity and withstand any extra loads that might normally be expected. Internal reinforcements shall be heavy gauge aluminum extrusions

or comparably engineered and manufactured to withstand 100 mph windloads, and shall be structurally coupled with fiberglass to ensure maximum strength. All interanl joints are welded to provide maximum strength and durability. Metal molds and hand lay-up shall be used to achieve sign configuration and structure panel.

These panels shall be constructed of thermosetting polyester resins reinforced with chopped glass fiber strands, and shall be sprayed a minimum of 1/8" thick, average 3/16" thick, opaque and molded in one piece with integrally molded returns. Edges and corners are finished with a 1/8" radius.

Fiberglass material shall have a flexural strength of 16 - 28,000 psi, tensile strength of 9 - 18,000 psi, compressive strength of 14 - 17,000 psi, and shall not be affected by alkalis, oils, carbon tetrachloride, weak acids, or solvents.

The graphics and sign colors shall be subsurface, integral with molded sign face structure, and protected with linear polyurethane with ultra-violet inhibitors for maximum color stability.

 Illumination: Provide manufacturer's standard lighting provisions using only UL approved electrical components, including neon tubes, transformers, insulators, with provisions for servicing and concealed connection to building system. Coordinate electrical characteristics of sign with those of power supply provided. Make provision for servicing oflamps and other components. The minimum brightness ratio between the illuminate letter and the signface shall be 30 to 1, assuming an ambient lighting level of 10 foot candles. Themaximum variation in brightness between any two points onthe copyt shall be 5percent.

The subsurface copy (second surface: on top of the fiberglass and below the polyurethane finish) shall be integral with the fiberglass and not vinyl die-cut letters covered with gel coat. A minimum of 10 coats of polyurethane finish with ultra-violet inhibitors is required. Sign finish shall be glare-free satin matte, not exceeding 15 degrees of gloss.

The stability of urethane colors used is essential. Any color fade within the guarantee period is unacceptable. All paints, inks, resins, and other materials shall be compatible and guaranteed not to cause deterioration or delamination of any material used in fabrication. Records of paint mixing equations and any other pertinent information will be retained indefinely by this Contractor for use in fabricating replacements in the future.

DESCRIPTION OF SIGN TYPES:

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Fiberglass Signs:

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Illuminated sign types A, J, K, L, H:

 Product: wall and base mount units as shown on drawings.

Changeable fiberglass panels:

Construction: (GTP) seamless, 3/16" thick translucent fiberglass panel, molded in one piece with integral returns and a 1/8" radius on all corners. Material to be a combination of thermosetting polyester reinforced with glass fiber strands.

<u>Panel mounting:</u> Panel mounts to be aluminum extrusions which track into receiving channels integral with the sign frame.

Sign finish: Satin matte, maximum gloss of 15 degrees, smooth, free of scratches, gouges, air bubbles, glass fiber strands exposed between surface and background color, and free of foreign matter or other imperfections.

Sizes: As shown on drawings.

Sign Frame:

Aluminum extrusions: Quarter or half round vertical corner sections, welded to flat horizontal sections to form frame.

 Exposed frame finish: Matte polyurethane finish to match sign panels, maximum gloss of 15 degrees, black base, smooth, free of scratches, gouges, bulges, foreign matter, or other imperfections.

Size: As shown on drawings.

Base: 3-1/2" high structural aluminum frame attached to sign frame with stainless steel bolts.

Electrical rating: 120v., 60 Hz.

<u>Windload</u>: Sign shall be constructed to withstand 100 mph (30 psf) windload.

Photocell: All illuminated signs shall have
photoelectric cell. Photocell shall be mounted flush on
top of sign.

Graphics:

5 6 7

Graphics shall be subsurface, integral with the molded sign panel and protected with a clear matte polyurethane coating containing ultra-violet inhibitors for maximum color stability. Paints, inks, and resins shall be compatible and guaranteed not to cause discoloration, deterioration, or delamination of materials used in fabrication.

 Sign lettering shall be provided in the sizes, colors, and letter styles as shown on the drawings and sign schedule. All lettering shall be executed in such a manner that all edges and corners of the letter forms are true, clean, correctly spaced, photographically precise, and must accurately reproduce the letter form.

Non-illuminated sign type G and F:

Product: Wall mounted unit as shown on drawings.

Changeable fiberglass panels:

Construction: (GOP) seamless, 1/8" thick opaque fiberglass panel, molded inone piece with integral returns and a 1/8" radius on all edges and corners. Material to be a combination of thermosetting polyester reinforced with glass fiber strands.

<u>Panel</u> <u>mounting</u>: Panel mounts to aluminum extrusions which track into receiving channels integral with the sign frame.

<u>Sign Finish</u>: Satin matte, maximum gloss of 15 degrees, smooth, free of scratches, gouges, air bubbles, glass fiber strands exposed between surface and background color and free of foreign matter or other imperfections.

Sign Frame:

Aluminum Extrusions: Half-round vertical sides, welded to flat horizontal sections to form frame.

Exposed frame finish: Matte polyurethane finish to match sign panels, maximum gloss 15 degrees, black base, smooth, free of scratches, gouges, bulges, foreign matter, or other imperfections.

Size: As shown on drawings.

<u>Windload</u>: Sign shall be constructed to withstand 100 mph (30 psf) windload.

Graphics:

Graphics shall be subsurface, integral with the molded sign

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panel and protected with a clear matte polyurethane coating containing ultra-violet inhibitors for maximum color stability. Paints, inks, and resins shall be compatible and guaranteed not to cause discoloration, deterioration, or delamination of materials used in fabrication.

Sign lettering shall be provided in the sizes, colors, and letter styles as shown on the drawings and sign schedule. All lettering shall be executed insuch a manner that all edges and corners of the letter forms are true, clean, correctly spaced, photographically precise, and must accurately reproduce the letter form.

<u>Dimensional letters (interior) sign type 0:</u>

Letters are to be cut from 1/4" plexiglass, not injected molded. Paint letters with semi-matte polyurethane enamel and mount flush to soffit with G.E. silicone as shown on drawings.

Color to be selected by owner.

Garage spanning directional signs and column graphics, sign types B & C, D, M, N:

1/8" thick aluminum sign panel with silkscreened graphics, one side. Panels mounted to columns and beams as shown on drawings.

Finish: Polyurethane enamel, semi-matte.

Fabricate panels to be rigid, neat in appearance and free of rough edges, defects, warp or buckle. Accurately form metal to required sizes and profiles. Fabricate panels in one piece.

Clean surfaces of oil, grease, dirt, and other foreign materials before the application of the primer. All exposed surfaces shall be given one spray coat of primer. After primer coat has been applied, cured and sanded, all surfaces that will be exposed shall be spray painted with the specified finish coat. Allow finish coat to set before silkscreening copy and graphics.

Garage level I.D. sign type E:

Graphic painted on painted concrete wall.

 Placement of colors and graphics as shown on drawings. Coat wall with two coats white prior to graphic application.

<u>Clear Top Coat</u>: Steelcote "MCU-3655", single package, amber resistant clear urethane enamel as manufactured by Steelcote Manufacturing Co., St. Louis, Missouri. Apply top coat, to entire walls surface containing painted graphics, in strict accordance with manfacturer's recommendations. Apply coating to produce a dry film thickness of 2 mils.

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Flexible face logo, sign type I:

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"Illumination and Tubing Layout. Fluorescent tubes shall be arranged so that the distance from the tube to the flex face is equal to the distance between tubes.

Pa distance from the tube to the flex face is equal to the distance between tubes.

Pa distance from the tube to the flex face is equal to the distance between tubes.

Pa distance from the tube to the flex face is equal to the distance between tubes.

Wyandotte's grip guard paint system. All surfaces to receive three coats.

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10 Cabinet returns and retainers - .090 fabricated aluminum, color
11 to match PMS 285, Blue.
12

13 Face - 22 oz. Flexible fabric, color to be PMS 285 translucent and white.

Fabricated, non-illuminated letters, sign type I:

18 Fabricated letters, channel type, from .090 aluminum. All welds
19 shall be filed and ground smooth prior to painting.
20

21 Letters shall project from building a maximum of 1/2".
22

Use only stainless steel studs for mounting.

Regulatory signs, sign type R:

1/8" thick aluminum sign panel with vinly die-cut graphics and extruded aluminum half-round posts.

Vinly die-cut copy to be 3M, engineered grade REFLECTIVE vinyl in colors and sizes as shown on the Drawings.

Finish: Polyurethane enamel, semi-matte.

Fabricate panels to be rigid, neat in appearance and free of rough edges, warp or buckle. Accurately form metal to required sizes and profiles. Fabricate panels in one piece.

Clean surfaces of oil, grease, dirt, and other foreign materials before the application of the primer. All exposed surfaces shall be given one spray coat of primer. After primer coat, all surfaces shall recieve the specified finish coat. Allow finish coat to set before application of vinyl copy.

<u>Plastic Laminate</u>: Provide high pressure plastic laminate engraving stock with face and core plies in contrasting colors, in finishes and color combinations indicated or, if not indicated, as selected from the manufacturer's standards.

FABRICATION:

53 <u>General</u>: Fabricate signs to comply with the requirements 54 indicated for materials, thicknesses, finishes, colors, designs,

shapes, sizes and details of construction.

Produce smooth, even, level sign surfaces, constructed to remain flat under installed condition within a tolerance of plus or minus 1/16" measured diagonally.

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<u>Plastic Door Frame Number Signs</u>: Fabricate unframed panel signs with edges mechanically and smoothly finished to conform with following requirements:

Edge Condition: Beveled.

Edge Color for Plastic Laminate: Provide edge color same as the background.

Corner Condition: Provide square.

<u>Brackets</u>: Fabricate brackets and fittings for bracket-mounted signs from extruded aluminum to suit sign panel construction and mounting conditions indicated. Factory paint brackets in a color matching the background color of the sign panel.

Graphic Image Process:

Graphic Content and Style: Provide sign copy to comply with the requirements indicated for sizes, styles, spacing, content, positions, materials, finishes and colors of letters, numbers, symbols and other graphic devices.

<u>Subsurface</u> <u>Copy</u>: Apply copy to the back face of clear acrylic sheet forming the panel face by the process indicated to produce precisely-formed opaque images, free from rough edges.

Fabricated Letters and Numbers: Fabricate letters and numbers to the required sizes and styles, using metals and thicknesses indicated below. Form exposed faces and sides of characters to produce surfaces free from warp and distortion. Include internal bracing for stability and attachment of mounting accessories as required.

<u>Illuminated</u> <u>Units</u>: Illuminate units in the manner indicated using the manufacturer's standard lighting components including neon tubes, transformers, insulators and other components. Make provisions for servicing and for concealed connection to the building system. Coordinate the electrical characteristics of signs with those of the power supply provided.

Backlighted Units: Provide concealed white neon tubes of the number indicated or required by the size of the characters. Include the manufacturer's hardware for projection mounting of the characters at the distance from the wall surface indicated.

Facelighted Units: Fabricate letters with faces formed from white translucent plastic sheet of thickness indicated. Attach letters to sheet metal back channels. Provide neon tubes of the number and spacing required to illuminate letter faces evenly.

Cast Metal Plaques: Fabricate cast plaques to comply with requirements specified for metal, border style, background texture and finish and to comply with requirements shown for thickness, size, shape, and copy. Produce castings free from pits, scale and sand holes or other defects. Hand tool and buff borders and raised copy to produce the manufacturer's standard satin polished finish. Refer to "Finish" article for other finish requirements.

Metal: Bronze.

Border Style: As indicated.

Background Texture: Manufacturer's standard leatherette finish.

Background Finish: Provide dark statuary finish to comply with the requirement specified and "Finish" article for bronze finishes, except provide background texture finish specified above in lieu of mechanical finish indicated.

FINISHES:

 Colors and Surface Textures: For exposed sign material that requires selection of materials with integral or applied colors, surface textures or other characteristics related to appearance, provide color matches indicated, or if not indicated, as selected by the Architect from the manufacturer's standards.

Metal Finishes: Comply with NAAMM "Metal Finishes Manual" for finish designations and application recommendations.

Bronze Finishes:

 Natural Satin Finish: Provide NAAMM-M31-06x (fine satin directional textured mechanical finish with clear organic coating specified below).

<u>Clear Organic Coating</u>: Air-dried acrylic coating "Incralac" as developed by International Copper Research Corporation, 1.0 mil minimum dry thickness.

PART 3 - EXECUTION

INSTALLATION:

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General: Installer must examine areas, surfaces, and conditions under which the work is to be installed. Notify the Construction Manager and/or General Contractor in writing of conditions detrimental to the proper and timely completion of the work; i.e., existing mechanical, electrical, or plumbing elements, or any visual or physical conflicts. Starting work implies acceptable surfaces and conditions.

Locate sign units and accessories where shown on Schedule of Sign Messages and/or sign location plans, attaching signs to substrates in accordance with manufacturer's instructions, Where free standing signs are unless otherwise indicated. mounted on concrete bases, installed is to coordinate the drilling of expansion anchor bolts with sufficient bearing and uplift capacity to meet the design wind requirements. Letters and signs shall be structurally designed as required to resist 30 psf windloads and thermal movements without distortions or excessive deflections.

Install sign units level, plumb, and at height indicated, with sign surfaces free from distortion or other defects appearance.

Surfaces under adhesive applied units shall be smooth, and free of dust, grease, fingerprints, or other foreign matter. adhesives required shall be used in accordance with recommendations made by the manfacturer of the material to be laminated or adhered. No adhesives that will fade, discolor, or delaminate as a result of ultra-violet light or heat shall be Adhesives shall not change the color of, or deteriorate the materials to which they are to be applied. The adhesives shall be of a non-staining, non-yellowing quality. All visible joints shall be free fromair bubbles and other defects.

Furnish the Owner with a list of cleaning materials appropriate for continued cleaning of signs. Provide written instructions for proper maintenance, service access, replacement procedures, Include recommended methods for removal of residual adhesives from wall surfaces after removal of interior signs.

Panel Signs:

Wall mounted units: Attach panel signs to wall surfaces using methods indicated below:

Silicone Adhesive Mounting (SAM): Use standard liquid silicone adhesive with a methanol cure recommended bysign manufacturer to attach sign units to irrequalr, brick, porous, or vinyl-covered surfaces. Use standard liquid silicone adhesive with an acetic acid cure recommended by sign manfacturer to attach sign units to smooth, painted, or glass surfaces. Use double-sided vinyl tape where ATE: 9-20-89

TO:

ALL CONTRACTORS

RE:

BID PACK #2, PROJECT 304.1, McCARTHY #1115-

UNIVERSITY OF KENTUCKY MEDICAL CENTER

Gentlemen:

The Architect/McCarthy has issued the attached Proposed Change Order dated 9-9-87. It is our opinion that the contractors indicated below would be directly affected by this proposed change:

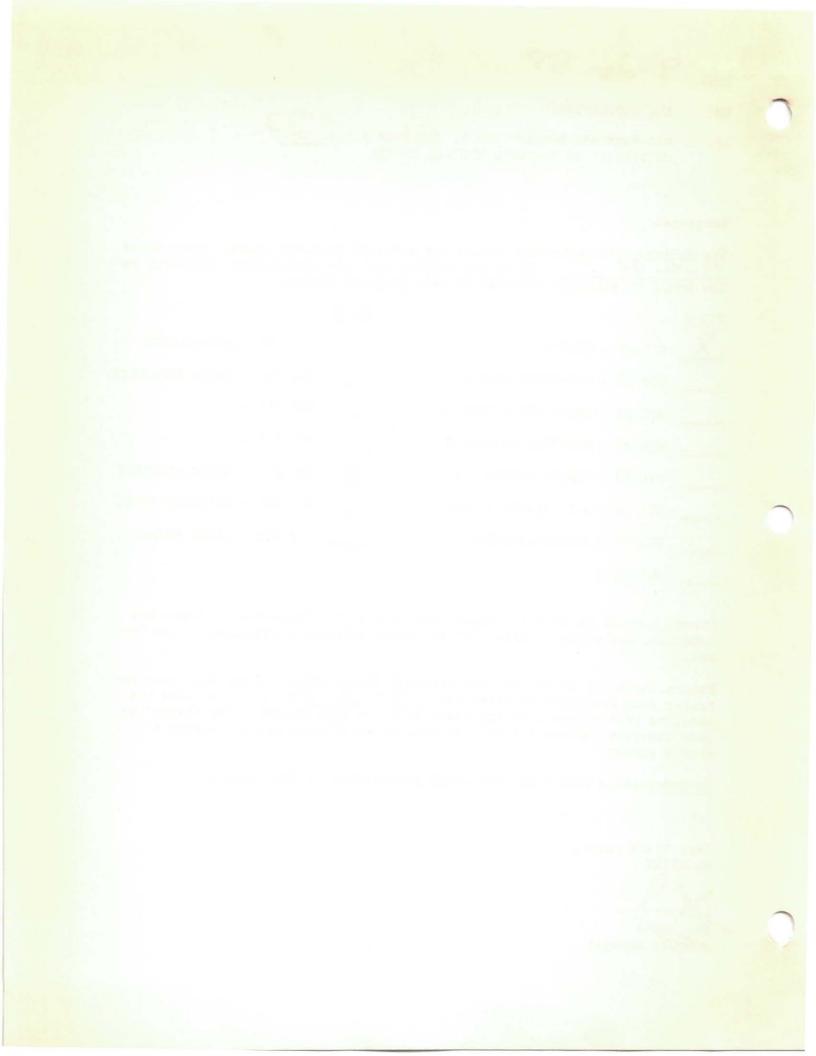
PCO #		PCO #	
X	W/C #1 - MESSER	-	W/C #9 - MMR/WALLACE
e	W/C #2 - TRI-STATE ROOFING		W/C #10 - BROWN SPRINKLER
	W/C #3 - BROADVIEW ACOUSTICAL	2	W/C #11 -
-	W/C #4 - DANVILLE ACOUSTICS	n :-	W/C #12 -
	W/C #5 - CARPET DECORATORS	<u>\</u>	W/C #13 - ARROW ELECTRIC
	W/C #6 - B.L. RADDEN & SON		W/C #14 - AMERICAN STEEL
	W/C #7 - DOVER ELEVATOR	2-72	W/C #15 - ATLAS METAL
	W/C #8 -		*

Please provide us with a detailed quantity survey breakdown of labor and material, including pricing, for the above referenced Proposed Change Order.

DO NOT proceed with this work until so directed by this office.

Very truly yours, McCARTHY

Project Manager



OMNI/CMW Joint Venture

In Association With Hellmuth, Obata, & Kassabaum, Inc.

September 21, 1988

To: Carolyn Bacdayan

Director of Planning University Hospital

A. B. Chandler Medical Center

40536-0084

Signage-UK Hospital Re:

Dear Carolyn:

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Per all of our discussions over the last few weeks I have summarized the status of signage shop drawings / approvals / revisions / etc. so that everyone is up to date.

By copy of this letter to McCarthy we are requesting the initation of a change order by Ron Decio to add:

> (1) Type L sign (per your instruction) at the intersection of University Drive and V.A. Drive. (to become sign #21) copy should be as follows:

> > Side A VA Med Cntr Entrance

Side C → VA Med Cntr VA Parking ↑ UK Hospital

- (2) No periods will be used in abbrevations on sign copy.
- (3) As indicated on attached schedule the following abbreviations are being made to facilitate copy length.

UK Med Cntr VA Med Cntr

S Limestone (replaces Nicholasville Rd)

Tates Creek (delete Rd.) Greg Page Apt (delete s) Man-O-War (delete Blvd)

New Circle 4 (delete Rd, show state road symbol)

Reserved Parking (delete staff)

(4) Relocate sign # 13 from island at Cancer Center entrance to west side of Hospital Drive.

OMNI • 2365 Harrodsburg Road, Lexington, Kentucky 40504 Phone 606-223-3045

Lexington, Kentucky 40508 Phone 606-254-6623 CMW . 326 South Broadway,



- (5) Dark Blue color to be Pantone # 19-4044 Lt. or Med. Blue to be Pantone # 17-4037
- (6) Room # signs on door frame to match existing.
- (7) Panaflex sign to be relocated to West face of new elevator tower, with access provided from rear.
- (8) Signage schedule has been revised per attached copy.
- (9) Sign manufacturer still needs the following:
 - a) copy for parking regulations
 - b) copy for plaque
 - c) room numbers
- (10) Per conversation with Tim Gray, no regulatory permits are required on University property

The signage shop drawings are being returned to the manufacturer so that he can begin fabrication. I have no doubt that they will request a revision in their completion date. I have discussed this with Ron Decio and he is going to make a recommendation regarding this. We generally concurtable that some revision to the schedule is appropriate.

Carolyn if you have any questions or need futher information please let me know.

Sincerely,

Erie P. Shaffer, A.I.A.

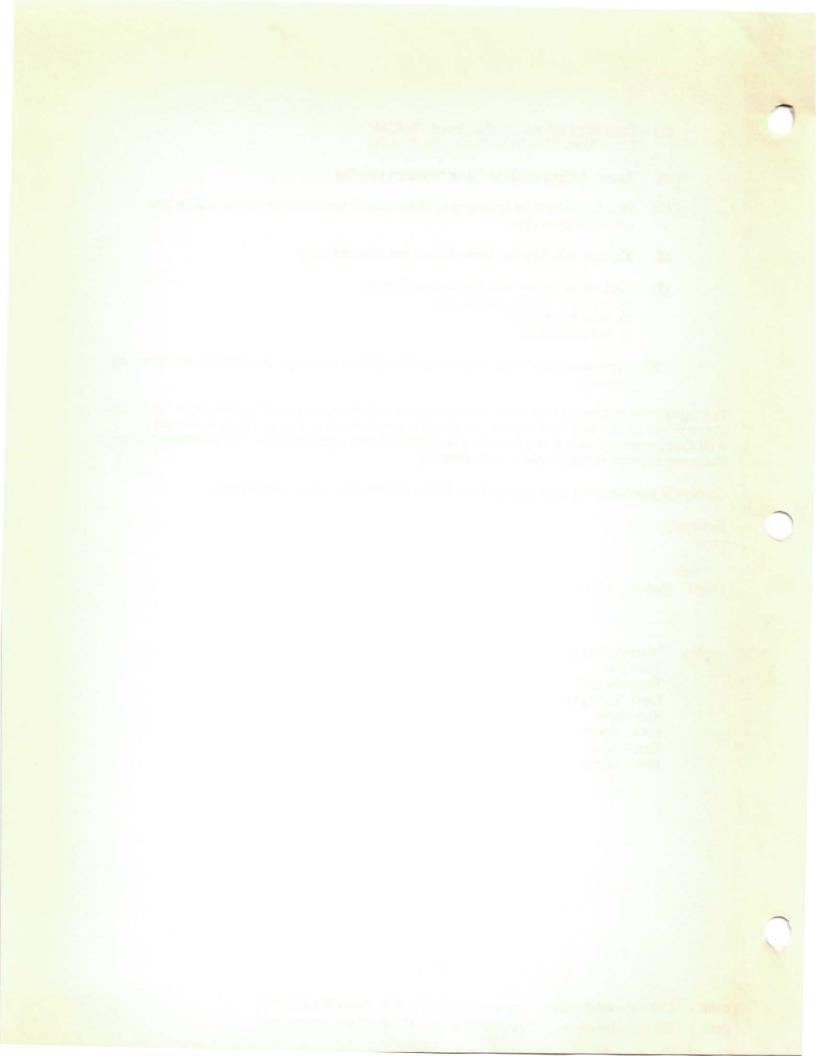
copies: Warren Denny Tim Gray

Terry Russell Larry Kittinger

Ron Decio

Brian Hoerr
Ken Greene

Jack Ballard



recommended by sign manfacturer to hold sign in place until adhesive has fully cured.

<u>Mechanical</u> <u>Mounting</u>: Securely attach signs to the supporting structure with permanent, vandal resistant fasteners in accordance with manufacturer's installation instructions.

Metal Letters:

Mount letters as follows; use standard fastening methods recommended by manufacturer for letter form, type of mounting, wall construction, and condition of exposure indicated. Provide heavy weight paper template to establish letter spacing and to locate holes for fasteners.

Standoff Mounting: (SM): Mount letters with 1/2" standoff from wall surface.

<u>Pin Mounting</u>: A minimum of three threaded studs to be 1/8" round minimum x 1/2" long minimum welded to the back with no distortions or discolorations to sign face. Appropriately increase size of studs according to weight of letters. Use epoxy adhesive where required and support all signs until setting time of adhesive with foam tape or other mechanical means that does not damage surrounding surfaces.

FIELD QUALITY CONTROL:

Repair or replace damaged units as required after Architect's inspection.

<u>Cast Metal Plaques:</u> Mount cast plaques using the standard fastening methods recommended by manufacturer for type of wall surface indicated.

Concealed Mounting: Mount the plaques by inserting threaded studs into tapped lugs on the back of the plaque. Set in predrilled holes filled with quick-setting cement.

CLEANING AND PROTECTION:

At completion of the installation, clean soiled sign surfaces in accordance with the manufacturer's instructions. Protect units from damage until acceptance by the Owner.

END OF SECTION 10440

University of Kentucky Regulatory Message Schedule

Sign No.	Graphic Room Number and Message	Sign Type	Remarks
1	Patient Loading Only (No Parking Symbol) (See Sept. 12,1988)	R4	Special Mounting #1 (See this Addendum for description of Special mounting #1)
2	Patient Loading Only (No Parking Symbol)	R4	Special mounting#1 (See this Addendum for descrip of special mounting#1)
3	Fire Lane (No Parking Symbol) Tow Zone	R3	Special Mounting #2 See this addendum for description of Special mounting #2)
4	Fire Lane (No Parking Symbol) Tow Zone	R3	Special Mounding #2 (See this Addendum for description of Special Mou
5	Handicapped Parking (Handicap Symbol)	R6	Sign height above ground 31-0" maximum.
6	Handicapped Parking (Handicap Symbol)	R6	Sign height above grown 31-011 maximum.
7	Handicapped Parking (Handicap Symbol)	R6	Sign height above ground 3'-0" maximum.
8	Handicapped Parking (Handicap Symbol)	R6	Sign height above ground

Page 1

Sign No.	Graphic Room Number and Message	Sign Type	Remarks
1	Patient Loading Only (No Parking Symbol)	R4	"GECIAL MOUNTING #1" (664 addendum # 7 Hem 78)
2	Patient Loading Only (No Parking Symbol)	F14	SAME. AS BROVE
3	Fire Lane (No Parking Symbol) Tow Zone (No Parking Symbol)	R3	"SPECIAL NOVINTING #2" (See addendum #2, Ham 78)
4	Fire Lane (No Parking Symbol)	R3	ditto above
	Tow Zone Handicapped Parking (Handicapped Parking Parking Handicapped Parking Handicapped Parking Handicapped Parking	PS R6	SIGN HEIGHT ABOVE GROVND - 3 '-O" MAX.
	Handicapped Parking (Handicap Symbol) Grandicap Symbol)	S . H6	ditto
	Handicapped Parking (Handicap Symbol)	R6	ditto
	Handicapped Parking (Handicap Symbol)	R6	ditto

University of Kentucky Regulatory Message Schedule

Sign No.	Graphic Room Number and Message	Sign Type		Remarks
9	Handicapped Parking (Handicap Symbol)	R	6	SIGN HT. AROVE GROVND - 3'-O" MAK.
10	Speed Limit	R	2	2 Signs for each side of support
31	MPH .	1		
11	Yleld (Yleld Symbol)	R	1	
12	Patient Loading Only (NO Parking Symbol)	R	4	*
13	Patient Loading Only (No Parking Symbol)	R	4	
14	Fire Lane (No Parking Symbol) Tow Zone	R	3	
11,		R	2	-0
15	Fire Lane (No Parking Symbol) Tow Zone	n	3	
			-	
16	Markey Cancer Center (Parking Symbol)	R	.i_ :	

Sign No.	Graphic Room Number and Message		Sign Type	Remarks
17	Yield (Yield Symbol)		R1	
	Speed Limit 5 5 MPH		R2	2 Signs for each side of support
19 Herre 20	U DO PARKING SYMBOL"		₹-7	add. #2
19 Well 32			R-3	v
33 hru 36			R-4	u
37 bru 14	teach R3 and R4 (No POST)		4ca R-3 and R-4	u
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NORTH - C A - SOUTH

Ign		Sign	
No.	Graphic Room Number and Message	Туре	Remarks
1	at Consu and Sina Side A	J	UK and Hospital Logo ALL SIDES
1	Hospital		Light Blue Background
	Emergency		Light Blue Background
1	Medical Plaza		Light Blue Background
-	Med-Center Campus UK Med Center Cuty		Light Blue Background
			Light Blue Background
1	Gates 1 and 2 and 3		
	(Blank)		
			1
	Side B		
-	Hospital		Light Blue Background
-			Light Blue Background
-			Light Blue Background
1	V.A. MedGenler Chtv	207 000	Light Blue Background
	South Campus Alumni Dr	270-27.0000 244	
- +	University Drive Dr		
-			
	(Blank)		
	Side C	345	
	Hospital		Light Blue Background
4	V.A. Med . Genter Catr		Light Blue Background
4-	University Drive Or		
4	Alumni Brive Dr		
4	Sports Center	100	
4-	Lex Commun College L C C		
	(Blank)		
	Side D		
>	Hospital		Light Blue Background
-,	Medical Plaza		Light Blue Background
	Med Center Campus UK Med Cuty		Light Blue Background
-			
	(Blank)		
	(Blank)		
	Tenano, and a second se		

Page 1

University of	Kenlucky	Sign	Schedule/Exterio
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Sign			Sign	T
No.		Graphic Room Number and Message	Тура	Remarks
2	00			UK and Hospital Logo ALL SIDES
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	-	Gales 1,454 2 2 444 3		
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	4	Hospital		Light Blue Background
	<u>+</u>	V.A Medical Plaza V.A. Med. South Cuty		Light Blue Background
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	<u></u>	Alumni Drive Or		
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	\rightarrow	(Blank) Gates 1, 2 and 3		
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	Graphic Room Number and Message	Туре	Remarks
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University of	10	Kentucky	Sign	Schedule/Exterio
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-	-	Side C		
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	-	Emergency		Light Blue Background
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	-	Hospital Entrance UK Hospital V:A. Medical Center VA Med Cutv		11 11 11
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	auk		
	Side C		
_ +	Visitor Parking		West blue buck open
	Emergency		H U .
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	>	Hospital Entrance Hospital		
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		Concer Center		
		Side C		
		Hospital-Bairanea (OSOItal		
	10	Emergency Entrance		
	1	Emeroeucy		- C-1
13	at As	and at Cencer Centre, Slop A	L_	Same as Sanda
	->	Hospital /Emergency		
		Cancer Center		
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		U Side C		
	4	Hospital/Emergency Hospital		
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Hospi Hospi Medic (Blank (Blank	ency al Plaza)) Side C	Type K	Remarks Hospital Logo Only 2 Sides Agust Okto hadganuse u a c
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			weenen.
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		A	
Clear	nce 7-2" 6'-8"		
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Telani			
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Sign		Sign	
No.	Graphic Room Number and Message	Тура	Remarks
			A MANUAC A
	Side B		UK Logo Only This Side
1	New Circle Boad + Rd (see not, at right)		State Highway Symbol for Road
1	Man-O-War- Blvd-	_	
1	1-75		Use Interstate Highway Symbol
-			
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	Side C		UK and Hospital Logos this Side
-			Light Blue Background
	Medical Conter UK Med Cutr		Light Blue Background
→	Medical Plaza		Light Blue Background
-	V.A. Modical Contor VA Med Cutr		Light Blue Background
→			
->	University Drive Dr		
->	Gales 1, and 8 2 and 3	-0. 	
	(Blank)		
2000	Side D		UK and Hospital Logos this Side
1	Hospital		Light Blue Background
	Medical Genter Campus UK Med Cuty		Light Blue Background
1	Medical Plaza .		Light Blue Background
1	V.A. Medical Genter V A Med CWY		Light Blue Background
	Stadium		
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- T	Gales 1 and 8 7 and 3		ALCOHOLOGICAL MARKET CONTRACTOR AND ALCOHOLOGICAL AND ALCOHOLOGICA AND ALCOHOLOGICAL AND ALCOHOLOGICA AND ALCOHOLOGICA AND ALCOHOLOGICA AND ALCOHOLOGICA AND ALCOHOLOGICA AND
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18	Emergency	Н	
- 73	Southeast corner of garage.	L	Harotal logo ball oil
			tospital loop but and
4-	Emergency Emergency		light blue brekgrown
	VA Medical Genter VA Med Chty		u u u u
properties:	(Blank)		

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No. Graphic Room	Number and Message	Туре	Remarks
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Hospital Padday	, , , , , , , , , , , , , , , , , , , 	Market Comment	Dight blue
1 Vishtor 1	arking.		
20 at laws. Dr. and	Alamnu Side A	J	UK and Hospital Logos all Sides
Hospitat	- ADMARD CICE II		Light Blue Background
→ Tates Creek Floor	H- (A)		Light blue background
→ Nicholasville Roa	t 3 Limestone		
Cooper Drive Dr			-
(Blank)			
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	Side B		
→ Hospital			Light Blue Background
4 Modinal Plaza	UK Med Cutr		Light Blue Background
4- Gates 1 and 3	Medical Diggs		W W W
- Ken Chawneolown	VA Med Cutor Cutr		
- du Greg Page Apts	Gate 1 and 2 and 3		H & H
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	greg rage of the		
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Page 10

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Sign		Sign							
No.	Graphic Room Number and Message	Туре	Remarks						
	Side D								
	→ Hospital		Light Blue Background						
-	→ Medical Center		Light Blue Background						
_	▶ Medical Plaza		Light Blue Background						
	→ Gates 1, and 3								
•	- Cooper Drank								
	(Blank)								
	(Blank)								
#21	D 641-1-4-4-35-C-4								
	By copy of this letter to McCarthy we	are requesting t	ne initation of a ———						
	_ change order by Ron Decio to add:		1 1						
			A STATE OF THE STA						
SEVERE PROPERTY.	- / (1) Thurs I sime (- '						
	(1) Type L sign (per your	Type L sign (per your instruction) at the intersection of							
	─ University Drive and V	V.A. Drive. (to b	ecome sign #21)						
	copy should be as follows								
		J VV 34							
	- Cricas	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	The state of the s						
		Side A	1						
	The same of the sa	VA Med Cntr	7.5						
		THE RESERVE OF CHARACTERS AND AND AND ADDRESS.							
		Entrance							
		C:1- C	Water Control of the						
		Side C							
		→ VA Med Cntr							
		VA Parking	104.5						
	The state of the s	UK Hospital							
	- Line and the second								
		·							

University of Kentucky - Parking Garage

Architect	Sign		Sign	
Room No.	No.	Graphic Room Number and Message	Type	Remarks
Level 1			A	All parties garage signs
LOTOLI	1.2	EXIT-ONLY EXIT ON IN PUBLIC PARKING RATES	×	New Market Street
	1.6	(Copy to be Supplied by Hospital)	~	G. 101 Lange Company
	1.3	(Copy to be Supplied by Hospital) PUBLIC PARKING Patrent/Visitor Parking	A	of upper and lower case
	2	HOSPITAL	· IVI	Colleging or shown on
		WALKWAY		
		LEVEL 3		drawing.
	3	ELEVATOR/STAIRS	G	0
	4		C	
		STAIRS		
		ELEVATORS		
	5	 ▶	C	
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		STAIRS		
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		L		Page 1

University of Kentucky - Parking Garage

Architect	Sign No.		I Clan	T
Room No.	No.	Graphic Room Number and Message	Sign	5
		The state of the Message	iybe	Remarks
	11	-		
		STAIRS	С	
		ELEVATORS .		
	12		C	
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		STAIRS	С	
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		+		
		STAIRS	С	
		ELEVATORS		
	20	PARKING †		
	21	PARKING †	BB	
	21.1	RESERVED PARKING		
	21.2	RESERVED PARKING/CARD HOLDER	A	
		Copy to be Supplied by Hospital)	F	
	21.3	EXIT ONLY .		- 00000-1000
			A	

University of Kentucky - Parking Garage

Architect	Sign		Sign	
Room No.	No.	Graphic Room Number and Message	Туре	Remarks
K4	22	← EXIT ←	В	
. ,	23	↑ PARKING ↑	В	
	24	↑ EXIT ↑	В	
	25	← EXIT ←	В	
	26	† EXIT †	В	
	27	EXIT	В	
	28	NO ENTRY	N	
		TWO WAY TRAFFIC	В	
	30	† PARKING †	В	•
€	31/	& EXITAGE COD OKAY	В	
	32	PARKING P	В	
Level 2	2	HOSPITAL	-14-	
		WALKWAY		
		LEVEL 3		
	3	ELEVATORS/STAIRS	G	A CONTRACTOR OF THE PARTY OF TH
	4	-	C	
		STAIRS		
		ELEVATORS		
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	Similarity.	ELEVATORS		
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University of Kentucky — Parking Garage

Architect	Sign		Sign	
Room No.	No.	Graphic Room Number and Message	Туре	Remarks
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	- 3	STAIRS		
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	10	←	C	
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	19	4-	C	687-001 (00.44) 3 30.07 (02) (0.57-012)
	27.34.47	STAIRS		
		ELEVATORS		

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University	αf	Kentucky	_	Parking	Garage
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Architect	Sign		Sign	
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	20	NO ENTRY,	N	
	21	† EXIT †	В	
	22	→ PARKING →	В	
		† PARKING †	В	
		→ PARKING → (Reverse Side) ↑ EXIT ↑	Xa	
	24	NO ENTRY	X	1
			В	
	26	← EXIT ←	В	
	27	† EXIT †	N	
	28	NO ENTRY	N	
		NO ENTRY	В	
	29	TEXIT TO BARKING A	X	
	30	EXIT PARKING	В	
	31	† PARKING †	B	
	32	← PARKING EXIT ←	B	
	33	PARKING EXIT	B	
	34	† EXIT †		
			-M	
Level 3	2	HOSPITAL	- 141	
		WALKWAY		
		THIS LEVEL	G	
	3	ELEVATORS/STAIRS " TO HOSPITAL"	- c	+
	4	→		
		STAIRS		
		ELEVATORS		
	5	-	С	
		STAIRS	_	
		ELEVATORS		
	6		С	
		ELEVATORS		
	-	STAIRS		
	7	- →	C	
		ELEVATORS		
-		STAIRS		in an in a state of the state o

University of Kentucky - Parking Garage

Architect Sign			Sign	
Room No.	No.	Graphic Room Number and Message	Туре	Remarks
	8		C	
		ELEVATORS		
		STAIRS		
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		STAIRS		
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	10	+	C	
		STAIRS		
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	11	←	С	
		STAIRS		
	-	ELEVATORS		
	12	<u>→</u>	С	
		STAIRS		
		ELEVATORS		
	13	→	С	
		STAIRS		•
		ELEVATORS		
	14		C	
		STAIRS		
		ELEVATORS		
	15		C	
		STAIRS		
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N	16	STAIRS	C	
		STAIRS		
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	17	←	C	
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		ELEVATORS		4 1
1	18	4	C	
		STAIRS		
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University of Kentucky	 Parking 	Garage
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Architect	Sign	1.	Sign	
Room No.	No.	Graphic Room Number and Message	Туре	Remarks
			C	FEET 10.
	19	OTAUDO		
		STAIRS		
		ELEVATORS		
	20	EXIT PARKING	В	
	21	† EXIT PARKING †	В	
	22	ASSPARKING & Otay	Xa	Blank on Back
	23	← EXIT PARKING ←	В	
	24	† PARKING † -		
X	25	EXIT PARKING T	В	
	26	PARKING T	В	
	27	† EXIT PARKING †	В	
	28	EXIT : PARKING !	X	Blank on Back
	29	NO TURN .	Xa	Blank on Back
	30	→ PARKING ←	В	
	31	EXIT PARKING +	В	
	32	← EXIT PARKING ← .	В	
Level 4	2	HOSPITAL	-M-	
	7.00	WALKWAY		
		LEVEL 3		
	3	ELEVATORS/STAIRS	. G	
	4	→	C	
		STAIRS		
		ELEVATORS		
	5		C	
	 -	STAIRS		
		ELEVATORS		
-	6	-	C	
		ELEVATORS		
		STAIRS		
-	7		C	
		ELEVATORS		
		STAIRS		

Page 7

833 833

Architect	Sign		Sign	
Room No.	No.	Graphic Room Number and Message	Туре	Remarks
	- 8			
	- 0	ELEVATORS	С	
		STAIRS		
	9	STAINS ←		
	- 5	STAIRS	C	
		ELEVATORS		
	10	←		
	10	STAIRS	C	
		ELEVATORS		
	11	d—		
		STAIRS	С	
		ELEVATORS		
	12			
		STAIRS	С	
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		STAIRS		
		ELEVATORS		
		+-	C	
		STAIRS		
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		-	C	
	1	STAIRS		
		ELEVATORS		

-		III I	
No.	Graphic Room Number and Message	lype	Hemarks
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	ELEVATORS		
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21	+ EXIT PARKING +	В	
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23	← EXIT PARKING ←	В	
24	↑ PARKING ↑		
25	+ EXIT PARKING +	В	
26	VING +	В	
27	◆ EXIT PARKING ◆	В	
28		×	Blank on Back
29	RN	Xa	Blank on Back
30	← PARKING ←	В	
1	* EXIT PARKING *	8	Delete
32	← EXIT PARKING ←	В	
	•		
2	HOSPITAL	+	
	WALKWAY		
	LEVEL 3		
က	ELEVATORS/STAIRS	G	
4	← EXIT ←	В	
2	← EXIT ←	В	
9	← EXIT ←	В	
~	ANTICAS PLEVATORS/STAIRS	ARC.	
8	1	ပ	
	ELEVATORS/STAIRS		
6	†	ပ	
	ELEVATORS	W	
	STAIRS		
10	1	ပ	9
	ELEVATORS		
	STAIRS		The same statement and the same of the sam

SECTION 10500 - METAL LOCKERS

9.19

PART 1 - GENERAL

RELATED DOCUMENTS:

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50 51 Drawings and general provisions of Contract, including General and Special Conditions and Division-1 Specification sections, apply to work of this section.

DESCRIPTION OF WORK:

Extent of metal lockers is shown on drawings.

Types of products in this section include the following:

Standard wardrobe lockers.

Single-tier lockers.

Double-tier lockers.

Locker room benches.

Concrete base for lockers is specified in Division 3.

QUALITY ASSURANCE:

<u>Uniformity:</u> Provide each type of metal locker as produced by a single manufacturer, including necessary mounting accessories, fittings, and fastenings.

SUBMITTALS:

<u>Product Data</u>: Submit manufacturer's technical data and installation instructions for metal locker units.

Samples: Submit color samples on squares of same metal to be used for fabrication of lockers.

Shop Drawings: Submit shop drawings for metal lockers, verifying dimensions affecting locker installations. Show lockers in detail, method of installation, fillers, trim, base, and accessories. Include locker numbering sequence information.

JOB CONDITIONS:

		$\overline{}$

University of Kentucky Regulatory Message Schedule

Sign		Sign	
No.	Graphic Room Number and Message	Туре	Remarks
9	Handicapped Parking (Handicap Symbol)	R6	Sign height above ground 3'-0" maximum.
10	Speed Limit 5 MPH	R2	2 Signs for each side of support
11	Yield (Yield Symbol)	R1	
12	Patient Loading Only (NO Parking Symbol)	R4	
13	Patient Loading Only (No Parking Symbol)	R4	
14	Fire Lane (No Parking Symbol) Tow Zone	R3	
15	Fire Lane (No Parking Symbol) Tow Zone	R3	
16	Markey Cancer Center (Parking Symbol)	R5	

University of Kentucky Regulatory Message Schedule

Sign No.	Graphic Room Number and Message	Sign Type	Remarks
17	Yield (Yield Symbol)	R1	
18	Speed Limit 5 MPH	R2	2 Signs for each side of support
19 U 28	no Parking (Symbol Only)	R1	2 Panels for each side of support. Location will be determined by Owner.
3 9			
√ 32		R3	Location and mounting will be determined
33 36		R4	by Owner. Location & mounting will be determined by Owner.
37 J 44		8 R34R	by Dwner. Location & mounting will be determined by Owner. (4) each of just sign panel (no Post) of type R3 + R4

Page 3

ign			Sign	
Vo.		Graphic Room Number and Message	Туре	Remarks
1		Side A		1111
	-		J	UK and Hospital Logo ALL SIDES
	$-\mathbf{I}$	Hospital		Light Blue Background
	$-\mathbf{I}$	Emergency Medical Plaza		Light Blue Background
	_			Light Blue Background
	I	Med Center Campus		Light Blue Background
	->	V.A. Med. Center		Light Blue Background
		University Drive		
		Gates 1 and 3		
		(Blank)		
		Side B		
	4	Hospital Side B		Light Blue Background
	+	Med. Center Campus		Light Blue Background
	<u> </u>	Medical Plaza		Light Blue Background
	4	V.A. Med. Center		Light Blue Background
	+	South Campus		Light blue background
	4	University Drive		
	4	Gates 1 and 3		
		(Blank)		
		Side C		
	←	Hospital		Light Blue Background
				Light Blue Background
	←	University Drive		
	4	Alumni Drive	Y	
	4	Sports Complex		
	4	Lex Commun College		
		(Blank)		
		Side D		
	→	Hospital Side D		Light Divo Bookeround
		Medical Plaza		Light Blue Background
	-	Med Center Campus		Light Blue Background
		Gates 1 and 3		Light Blue Background
	>	(Blank)		
		(Blank)		

Sign			Sign	
No.		Graphic Room Number and Message	Туре	Remarks
_				1111 111 11 11 11 11 11 11 11 11 11 11
2		Side A		UK and Hospital Logo ALL SIDES
	1	Hospital		Light Blue Background
		V.A. Medical Center		Light Blue Background
	←	Medical Plaza		Light Blue Background
	←	Med Center Campus		Light Blue Background
		Sports Complex		
	•-	Gates 1 and 3		
	 	Lex Commun College		
		(Blank)		
		Side B		
		Hospital		Light Blue Background
		V.A Medical Plaza		Light Blue Background
		Sports Complex		
		Dorm Complex		
	-	Alumni Drive		,
		South Campus		
		(Blank)		
		Side C		
-	+	South Campus		<u> </u>
	4	Alumni Drive		
	-	Lex Commun College		
		(Blank)		
		(Blank)		
		(Blank)		
		Side D		
		Hospital		Light Blue Background
-		V.A. Medical Center		Light Blue Background
	→			
		Medical Plaza		Light Blue Background
	T	Med Center Campus		Light Blue Background
	→	Dorm Complex		
	->	Sports Complex		
	4-	South Campus		
		(Blank)		

Sign			Sign	
No.		Graphic Room Number and Message	Туре	Remarks
3		Side A	100 Page 1	
	-	Hospital	L	Hospital Logo 2 Sides
		V.A. Medical Center		
		(Blank)		
		Cido O		
		Side C		
		Hospital		
		V.A. Medical Center		
	75.50	(Blank)		
4		Side A	K	UK Logo ALL SIDES
7	4	Medical Plaza		Light Blue Background
	-	Gate 1		Light blue background
10	*	Gate 3		
	-	Euclid Avenue		
		(Blank)	······································	
		(Blank)		
		(Blank)		
		(Diam)		
		Side B		
	→	Hospital		Light Blue Background
		South Campus		Light blue background
	>	Cooper Drive		
	-	Euclid Avenue		
	-	Gate 3		
	-	(Blank)	2	
		(Blank)		
	4			
		Side C		
	†	Hospital		Light Blue Background
	-	Medical Plaza	10 000000 0 N	Light Blue Background
	→	Gates 1 and 3		
		Cooper Drive		
	+	South Campus		
2000		(Blank)		Tooling and
		(Blank)	*****	

Sign	M .	Sign	
No.	Graphic Room Number and Message	Type	Remarks
	Side D		
	Medical Plaza		Light Blue Background
	Gate 1		
	(Blank)		
	(Blank)		
	(Blank)		
5	Side A		LIK Lana All Cidos
		K	UK Logo All Sides Light Blue Background
_	Gates 1 and 3		Light Blue Background
	(Blank)		<u> </u>
	(Blank)		
	(Blank)		
	(Blank)		
	(Blank)		
	(Daint)		
	Side B		
T #	Medical Plaza		Light Blue Background
			Light Blue Background
-	South Campus		
-			
	(Blank)	1900 190	
	Side C		
	Triouries I land		Light Blue Background
	Hospital		Light Blue Background
	South Campus		
	Cooper Drive		
	(Blank)		
	(Blank)		
	(Blank)	200	

Sign			Sign	
No.	1013	Graphic Room Number and Message	Туре	Remarks
		Side D		
- 45	<u> </u>	Euclid Drive		
	<u>†</u>	South Broadway		
	-	Hospital		Light Blue Background
	4	Cooper Drive		
		(Blank)		
		(Blank)		
200		(Blank)		
6		Side A		UK and Hospital Logo ALL SIDES
-	1	Hospital		Light Blue Background
	1	Med Center Campus		Light Blue Background
	4	Medical Plaza	-	Light Blue Background
	+	Gates 1 and 3		Light blue background
		(Blank)		
		(Blank)		
	-	(Blank)		
		(Diamy		
		Side C		
	4	Hospital		Light Blue Background
5090-4000 14000	•	Emergency		Light Blue Background
	•	V.A. Medical Center		Light Blue Background Light Blue Background
	4	Cooper Drive		
100000000		(Blank)		
		(Blank)		
1040241 0844-		(Blank)		
7		Side A	K	Hospital Logo Only - All Sides
-	—	Emergency		Troophar Logo Only - All Oldes
1	-	Visitor Parking		
	4	Hospital Entrance		
	-	V.A. Medical Center	······································	
		(Blank)		

Sign			Sign	
No.		Graphic Room Number and Message	Туре	Remarks
		Side B		
	1	Emergency V.A. Medical Center		
	1_	V.A. Medical Center		
	<u>†</u>	University Drive		
		(Blank)		
		(Blank)		
		Side D		
	4	Hospital Entrance		
	4	Visitor Parking		
	4	Medical Plaza		
		(Blank)		
		(Blank)		
8		Side A	L	Hospital Logo Both Sides
	-	Hospital		Sides
	→	Emergency		(A-9)
		(Blank)		
		(Blank)		
		(Blank)		
		Side C		
	4	Hospital		
	-	Emergency		
		(Blank)		
		(Blank)		
		(Blank)		
9		Side A		Illeration I can Radio Salar
	-	Visitor Parking		Hospital Logo Both Sides
		(Blank)		(A-2)
		Side C		
	+	Visitor Parking		
	<u>†</u>	Emergency		

oth Sides
oth Sides
orn sides
. 11 -
Both Sides

11 6.1
oth Sides
3-9-17
**
Both Sides
DOLK SIGES
1-2)

Sign			Sign	
No.		Graphic Room Number and Message	Type	Remarks
14		Side A	K	Hospital Logo Only 2 Sides
	→	Hospital		
	<u></u>	Emergency Medical Plaza		
		Medical Plaza		
		(Blank)		
		(Blank)		
		Cido O		
\rightarrow		Side C		The state of the s
	_	Hospital		
-+		Emergency		
		Cooper Drive (Blank)		
		(Blank)		· · · · · · · · · · · · · · · · · · ·
		(Blatik)		
15a		Patient/Visitor Parking	A	
, , ,		Clearance 7'-2"		
		Ordaniso / L		
15b		Exit Only (No Entry symbol)		
16a		Reserved Parking	A	
		Clearance 7'-2"		
16b		Exit Only (No Entry symbol)		
	- The same			
17		Side A	J	UK and Hospital Logo this side
	<u> </u>	Hospital	The state of the s	Light Blue Background
	•	Medical Center		Light Blue Background
	<u> </u>	Medical Plaza		Light Blue Background
	-	V.A. Medial Center		Light Blue Background
	_	University Drive		And the second second
	4	Stadium		
	◆	Gates 1 and 3		
		(Blank)		
				1

Sign			Sign	
No.		Graphic Room Number and Message	Туре	Remarks
	200			
	- 1	Side B		UK Logo Only This Side
	1	New Circle Road 4		State Highway Symbol for Road
	1	Man-O-War Blvd		
9000 0000 00	†	1-75		Use Interstate Highway Symbol
	-	Downtown		
		(Blank)	***	
		(Blank)		
		(Blank)		
		(Blank)		
		0:10		
		Side C		UK and Hospital Logos this Side
0.00	<u> </u>	Hospital		Light Blue Background
:-	<u> </u>	Medical Center		Light Blue Background
-		Medical Plaza	Light Blue Background	
		V.A. Medical Center		Light Blue Background
		Stadium		
-	->	University Drive		
-	<u> </u>	Gates 1 and 3		
		(Blank)		N. C.
		Side D		III/ and Haspital Lassa this Oids
	A	Hospital		UK and Hospital Logos this Side
	1	Medical Center Campus		Light Blue Background
	1			Light Blue Background
	\perp			Light Blue Background
	I	V.A. Medical Center		Light Blue Background
	T	Stadium		
300	I—	University Drive		
	<u>T</u>	Gates 1 and 3		
		(Blank)		
18		Emergency	Н	
10				
19	- N	Side A	L	Hospital Logo Both Side
	-	Emergency		1 , ,
		V.A. Medical Center		(A-2)
				-

Sign		Sign						
No.	Graphic Room Number and Message	Туре	Remarks					
	Side C							
	Emergency							
×	Emergency Hospital Parking							
	900 (V) 9 (V)							
20	Side A	J UK and Hospital Logos all S						
	Hospital	Light Blue Bac						
→								
4	7.1101.101.1110 1.101.11							
	Cooper Drive							
_	(Blank)							
	(Blank)							
	(Blank)							
	Side B							
-			Light Blue Background					
—			Light Blue Background					
- 4								
>								
↑	Greg Page Apts							
	(Blank)							
	(Blank)							
	Side C							
1	Shawneetown							
-								
4	Tates Creek Road							
			Use Interstate Highway Symbol					
	(Blank)							
	(Blank)							
	(Blank)							
1								

Sign No.			Sign	
No.		Graphic Room Number and Message	Sign Type	Remarks
		Side D		
	>	Hospital		Light Blue Background
	→	Hospital Medical Center Medical Plaza Gates 1 and 3 Cooper Drive (Blank) (Blank)		Light Blue Background Light Blue Background Light Blue Background
-	→	Medical Plaza		Light Blue Background
	→	Gates 1 and 3		
	←	Cooper Drive		
		(Blank)		
		(Blank)		
2-14-15 TREE PROPERTY				
		ALCONO.		
	- 75 Com - At			
	-52000000 20			
	2002103			

	-81 - 82			

 -				
180 W.				7
	***			+

Delete All Type "M" per A-Z

Architect			Sign	
Room No.	No.	Graphic Room Number and Message	Туре	Remarks
Level 1	1.1	EXIT ONLY	A	
	1.2	PUBLIC PARKING RATES	R	
		(Copy to be Supplied by Hospital) PUBLIC PARKING		
	1.3	PUBLIC PARKING	A	
	2	HOSPITAL	M	Delete Type M /A-2
		WALKWAY		
		LEVEL 3		
	3	ELEVATOR/STAIRS	G	
	4	-	С	
		STAIRS		
		ELEVATORS		
	5	→	С	
		STAIRS		1
	1	ELEVATORS		
	6	- →	С	
		STAIRS		
		ELEVATORS		
	7	->	С	
		STAIRS		
		ELEVATORS		
	8		С	
	 	STAIRS		
		ELEVATORS		
	9	—	С	
		STAIRS		
		ELEVATORS		
	ļ ————	ELLVATORIO		
	10	←	C	
	· · •	STAIRS	- - ĕ -	
		ELEVATORS		
		ELECTRICINO		

Architect	Sign		Sign	
Room No.	No.	Graphic Room Number and Message	Type	Remarks
	11	←	С	
		STAIRS		
		ELEVATORS		
	12	→	С	
		STAIRS		
		ELEVATORS		
2 1	13	→	С	
		STAIRS		
		ELEVATORS		
	14		С	
		STAIRS		
3. 3		ELEVATORS		
3 38 38	15		С	
		STAIRS		
		ELEVATORS		
	16	←	С	
		STAIRS	V.	
		ELEVATORS		
	17	-	C	
		STAIRS		
		ELEVATORS		
	18	-	С	
		STAIRS		
		ELEVATORS		
	19	←	С	
		STAIRS		
		ELEVATORS		
	20	† PARKING †	В	
	21	† PARKING †	В	
	21.1	RESERVED PARKING	Α	
	21.2	RESERVED PARKING/CARD HOLDER	F	
		(Copy to be Supplied by Hospital)		
	21.3	EXITONLY	Α	

Architect	Sign		Sign	
Room No.	No.	Graphic Room Number and Message	Туре	Remarks
		FVIT		
	22	← EXIT ← ↑ PARKING ↑	B	
			В	
		† EXIT †	В	
	25 26	← EXIT ← ↑ EXIT ↑	В	
	27	† EXIT †	B B	
·	28	NO ENTRY	N	
		TWO WAY TRAFFIC	B	
	30	† PARKING †	В	
	31	← EXIT ←	В	
		† PARKING †	В	
	1 32	FARRING		
Level 2	2	HOSPITAL	М	Delete /A-Z)
		WALKWAY		
		LEVEL 3		
	3	ELEVATORS/STAIRS	G	
	4	-	С	
		STAIRS		
		ELEVATORS		
	5		С	
		STAIRS		
		ELEVATORS		
	6	→	С	
		STAIRS		
		ELEVATORS		
	7	→	C	
		STAIRS		
		ELEVATORS		
	8	—	С	
		STAIRS		
	100	ELEVATORS		

Architect	Sign		Sign	
Room No.	No.	Graphic Room Number and Message	Туре	Remarks
	9	←	C	
		STAIRS		
		ELEVATORS		
	10	←	С	A
		STAIRS		
		ELEVATORS		
	11	4-	С	
		STAIRS		
		ELEVATORS		
	12		С	
	100	STAIRS		
		ELEVATORS		13
	13	→	С	
		STAIRS		
		ELEVATORS		
	14	→ M A N	С	
		STAIRS		
700 17 18		ELEVATORS		
	15	→	С	
		STAIRS		
		ELEVATORS		
	16	←	С	
	- '-	STAIRS		
		ELEVATORS		
	17	←	С	
	'-	STAIRS		
	**	ELEVATORS		
	18	←	С	
	10	STAIRS		
<u></u>	U 19340	ELEVATORS		
	19	←	С	
		STAIRS	U	- Alt 31.W.
	*	ELEVATORS		

Architect	Sign		Sign	
Room No.	No.	Graphic Room Number and Message	Туре	Remarks
	20	NO ENTRY	N	
	21	† EXIT †	В	
777	22	→ PARKING →	В	
	23	† PARKING †	В	
**************************************	24	→ PARKING → (Reverse Side) † EXIT †	Xa	
1	25	NO ENTRY	X	
	26	← EXIT ←	В	
		↑ EXIT ↑	В	
	28	NO ENTRY	N	
Walter Committee	28.1	NO ENTRY	N	
	29	↑ EXIT ↑	В	
	30	↑ EXIT PARKING ↑	X	
	31	↑ PARKING ↑	В	
	32	← PARKING EXIT ←	В	
	33	↑ PARKING EXIT ↑	В	
	34	† EXIT †	В	
Level 3	2	HOSPITAL	М	Driete (A-Z)
Level o		WALKWAY	IVI .	DETELL (ALL)
-		THIS LEVEL		* * * * * * * * * * * * * * * * * * * *
	3	ELEVATORS/STAIRS TO HOSPITAL	G	
	4	→ (A-7)	Č	
		STAIRS		
4		ELEVATORS		
	5		С	
	- Cont Bro	STAIRS		
		ELEVATORS		
	6	→	С	ı
1241		ELEVATORS		La seconda de la companya della companya della companya de la companya della comp
		STAIRS		
	7	- →	С	
		ELEVATORS		
		STAIRS		

Architect	Sign		Sign	
Room No.	No.	Graphic Room Number and Message	Type	Remarks
	8	←	С	
		ELEVATORS		
		STAIRS		
	9	4	С	
		STAIRS		
		ELEVATORS		
	10	-	С	
		STAIRS		
		ELEVATORS		
	11	4	С	
		STAIRS		
		ELEVATORS		
	12	→	С	
		STAIRS		
		ELEVATORS		
	13	-	С	
3.		STAIRS		
		ELEVATORS		
	14	→	С	
		STAIRS		
		ELEVATORS		
	15	→	С	
		STAIRS		
		ELEVATORS		
	16	>	С	
		STAIRS		
		ELEVATORS		
	17	4	С	
	3,3,0,00	STAIRS		
		ELEVATORS		
	18	4	С	
	500000	STAIRS		
		ELEVATORS		**************************************

Architect	Sign		Sign	
Room No.	No.	Graphic Room Number and Message	Type	Remarks
	19	←	С	
		STAIRS		
		ELEVATORS		
	20	†EXIT PARKING †	B	
	21	↑ EXIT PARKING ↑	В	
	22	→ PARKING →	Xa	Blank on Back
	23	← EXIT PARKING ←	В	
	24	† PARKING †		
	25	↑ EXIT PARKING ↑	В	
	26	† PARKING †	В	
	27	↑ EXIT PARKING ↑	В	
	28	↑ EXIT PARKING ↑	X	Blank on Back
	29	NO TURN	Xa	Blank on Back
	30	← PARKING ←	В	
	31	† EXIT PARKING †	В	
	32	← EXIT PARKING ←	В	
Level 4	2	HOSPITAL		Delete /A-Z)
		WALKWAY		JEIVIE (HC)
		LEVEL 3		
****	3	ELEVATORS/STAIRS	G	
	4	→	Č	
		STAIRS		
		ELEVATORS		
	5		С	
	-	STAIRS		
		ELEVATORS		
	6	>	С	
	****	ELEVATORS		
		STAIRS		
	7	->	C	
V		ELEVATORS		
2000		STAIRS		

Architect	Sign	STYAM DESCRIPTION OF THE STREET	Sign	
Room No.	No.	Graphic Room Number and Message	Туре	Remarks
		1 (144) N 104		
	8	-	С	
		ELEVATORS		
		STAIRS		
	9	-	С	
		STAIRS		
		ELEVATORS		
	10		C	
		STAIRS		
		ELEVATORS		
	11	← 10 0	С	
		STAIRS		
	2	ELEVATORS		
	12		С	
72227722 14-2		STAIRS		
		ELEVATORS		
5-X	13	LY WHAT	С	
		STAIRS		
		ELEVATORS		
	14	->	С	
-		STAIRS		
	. 110	ELEVATORS		
	15	→	С	
		STAIRS		
		ELEVATORS		
	16	- →	С	
		STAIRS		
		ELEVATORS		
	17	—	С	
		STAIRS		
		ELEVATORS		
	18	←	С	
	, ,	STAIRS		
		ELEVATORS		

Architect	Sign		Sign	
Room No.	No.	Graphic Room Number and Message	Туре	Remarks
	19		C	
	13	STAIRS		
		ELEVATORS		
	20	† EXIT PARKING †	В	
	21	† EXIT PARKING †	В	
	22	← PARKING ←	Xa	Blank on Back
	23	← EXIT PARKING ←	В	DIATIK OTI DACK
	24	† PARKING †		
	25	†EXIT PARKING †	В	
	26	† PARKING †	В	
	27	†EXIT PARKING †	В	
	28	† EXIT PARKING †	X	Blank on Back
		NO TURN	Xa	Blank on Back
	30	← PARKING ←	В	Didnik On Daok
3	31	↑ EXIT PARKING ↑	В	
	32	← EXIT PARKING ←	В	
Level 5	2	HOSPITAL	М	Delete (A-Z)
		WALKWAY		
		LEVEL 3		
	3	ELEVATORS/STAIRS	G	
	4	← EXIT ←	В	
2.70	5	←- EXIT ←	В	
	6	← EXIT ←	В	
	7	← EXIT ←	В	
	8	←	С	
		ELEVATORS/STAIRS		
	9		С	
		ELEVATORS		
		STAIRS		
	10		С	
		ELEVATORS		
		STAIRS		

929 1 SECTION 10500 - METAL LOCKERS 2 3 4 PART 1 - GENERAL 5 6 7 RELATED DOCUMENTS: 8 9 Drawings and general provisions of Contract, including General and Special Conditions and Division-1 Specification 10 11 apply to work of this section. 12 13 DESCRIPTION OF WORK: 14 15 Extent of metal lockers is shown on drawings. 16 17 Types of products in this section include the following: 18 19 Standard wardrobe lockers. 20 21 Single-tier lockers. 22 Double-tier lockers. 23 24 25 Locker room benches. 26 27 Concrete base for lockers is specified in Division 28 29 30 QUALITY ASSURANCE: 31 32 Uniformity: Provide each type of metal locker as produced by a 33 single manufacturer, including necessary mounting accessories, 34 fittings, and fastenings. 35 36 37 SUBMITTALS: 38 39 Product Data: Submit manufacturer's technical data and 40 installation instructions for metal locker units. 41 42 Submit color samples on squares of same metal to be used for fabrication of lockers. 43 44 45 Shop Drawings: Submit shop drawings for metal lockers, 46 verifying dimensions affecting locker installations. 47 lockers in detail, method of installation, fillers, trim, base, 48 and accessories. Include locker numbering sequence information.

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JOB CONDITIONS:

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METAL LOCKERS

Do not deliver metal lockers until building is enclosed and for locker installation. Protect from damage during delivery, handling, storage, and installation.

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PART 2 - PRODUCTS

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ACCEPTABLE MANUFACTURERS:

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Manufacturer: Subject to compliance with requirements, provide products of one of the following:

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Art Metal Products Co. Interior Steel Equipment Co.

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List Industries, Inc.

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Medart, Inc.

18 Penco Products, Inc. 19

Republic Storage Systems

20 21

MATERIALS:

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Sheet Steel: Mild cold-rolled and leveled steel, free from buckle, scale, and surface imperfections.

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Expanded Metal: 3/4" mesh flattened carbon steel, 13 gage minimum.

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Fasteners: Cadmium, zinc, or nickle plated steel; exposed bolt heads, slotless type; self-locking nuts or locker washers for nuts on moving parts.

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Equipment: Hooks and hang rods of cadmium-plated steel or zincplated steel or cast aluminum.

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FABRICATION, GENERAL:

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Construction: Fabricate lockers square, rigid, and without warp, with metal faces flat and free of dents or distortion. Make all exposed metal edges safe to touch. Weld frame members to form rigid, one-piece structure. Weld, bolt, or together joints and connections as rivet other standard manufacturer. Grind exposed welds flush. expose Do not bolts or rivet heads on fronts of locker doors or frames.

Fabricate of 16-gage channels or 12-gage angles, minimum, with continuous stop/strike formed on vertical members.

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Finishing: Chemically pretreat metal with degreasing 51 and phosphatizing process. Apply baked-on enamel finish to 52 surfaces, exposed and concealed, except plates and non-ferrous 53 54 metal.

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<u>Color</u>: Provide locker units in color(s) as selected by Architect from manufacturer's standards. Unless otherwise indicated, concealed parts may be manufacturer's standard neutral color.

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WARDROBE LOCKERS:

<u>Body</u>: Fabricate back and sides of minimum 24-gage steel, with double-flanged connections extending full height. Form top and bottom of not less than 24-gage steel, with flanged edges.

Provide 24-gage steel sheet hat shelf in single-tier units.

Form exposed ends of non-recessed lockers of minimum 16-gage steel.

<u>Door</u>: One-piece, minimum 16-gage sheet steel, flanged at all edges, constructed to prevent springing when opening or closing. Fabricate to swing 180°.

Reinforcing: Provide extra bracing or reinforcing on inside of doors over 15" wide.

<u>Ventilation</u>: Provide stamped, louvered vents in door face, as follows:

Single-tier lockers: Not less than 6 louver openings top and bottom.

<u>Double-tier lockers</u>: Not less than 3 louver openings top and bottom.

<u>Hinges:</u> Heavy-duty, not less than 0.050" thick steel, full-loop, 5-knuckle, tight pin, 2" high. Weld to inside of frame and secure to door with not less than 2 factory-installed fasteners which are completely concealed and tamperproof when door is closed.

Provide at least 3 hinges for each door over 42" high; at least 2 hinges for each door 42" high or less.

Projecting Handle and Latch: Positive automatic prelocking pry-resistant latch and pull with rubber silencers; chromium-plated, heavy-duty, vandalproof lift-up handle, containing strike and eye for padlock; and with mechanism as follows:

Single-tier lockers: Not less than 3-point latching.

Double-tier lockers: Not less than 2-point latching.

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LOCKER ACCESSORIES:

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Fabricate lockers to receive the following locking devices:

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Padlock: Provided by Owner.

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Equipment: Furnish each locker with the following items, unless otherwise shown:

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Single-Tier Units: Hat shelf, one double-prong hook and not less than 2 single-prong wall hooks.

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Double-Tier Units: One double-prong hook and not less than 2 single-prong wall hooks.

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Lockers 18" or 24" Deep: Provide hang rod in lieu of hook.

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Number Plates: Manufacturer's standard etched, embossed, or stamped, non-ferrous metal number plates with numerals not less than 3/8" high. Number lockers in sequence as directed by Attach plates to each locker door, near top, centered, with at least 2 fasteners of same finish as number plate.

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Continuous Sloping Tops: Not less than 20-gage sheet steel, approximately 250 pitch, in lengths as long as practicable, but not less than 4 lockers. Provide closures at ends. Finish to match lockers.

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Separators: Provide horizontal dividers of not less than 16gage sheet steel between doors of multiple-tier lockers, to ensure rigidity.

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Trim: Provide trim at jambs and head of recessed lockers, consisting of not less than 18-gage cold-rolled steel, 2" or 3" wide as necessary. Factory-finish trim to match lockers. Secure trim to lockers with concealed fastening clips.

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Filler Panels: Provide filler panels where indicated, of not less than 18-gage steel sheet, factory-fabricated and finished to match locker units.

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LOCKER ROOM BENCHES:

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52 53 Manufacturer's standard units with laminated hardwood tops approximately 9-1/2" wide by 1-1/4" thick, in lengths as indicated. Furnish steel pedestal supports not more than 6'-0" o.c., with provisions for concealed fastening to floor and Furnish all anchorages. Apply securing to bench. manufacturer's standard clear coating to bench tops and baked enamel finish to pedestals.

PART 3 - EXECUTION

INSTALLATION:

<u>Install metal lockers</u> at locations shown in accordance with manufacturer's instructions for plumb, level, rigid, and flush installation.

Space fastenings about 48" o.c., unless otherwise recommended by manufacturer, and apply through back-up reinforcing plates where necessary to avoid metal distortion; conceal fasteners insofar as possible.

<u>Install trim</u>, metal base, sloping top units, and metal filler panels where indicated, using concealed fasteners to provide flush, hairline joints against adjacent surfaces.

<u>Install</u> <u>benches</u> in compliance with manufacturer's instructions.

ADJUST AND CLEAN:

Adjust doors and latches to operate easily without binding. Verify that integral locking devices are operating properly.

Touch-up marred finishes, but replace units which cannot be restored to factory-finished appearance. Use only materials and procedures recommended of furnished by locker manufacturer.

END OF SECTION 10500

SECTION 10522 - FIRE EXTINGUISHERS, CABINETS, AND ACCESSORIES

PART 1 - GENERAL

RELATED DOCUMENTS:

 Drawings and general provisions of Contract, including General and Special Conditions and Division-1 Specification sections, apply to work of this section.

DESCRIPTION OF WORK:

Extent of fire extinguishers, cabinets and accessories is indicated on drawings.

<u>Definition</u>: "Fire extinguishers" as used in this section refers to units which can be hand-carried as opposed to those which are equipped with wheels or to fixed fire extinguishing systems.

Types of products required include:

Fire extinguishers.

Fire extinguisher cabinets.

Mounting brackets.

Fire hose cabinets and valve cabinets are specified in Division-

Fixed fire protection systems are specified in Division-15 sections.

QUALITY ASSURANCE:

<u>Single Source Responsibility:</u> Obtain products in this section from one manufacturer.

Coordination: Verify that fire extinguisher cabinets are sized to accommodate fire extinguishers of type and capacity indicated which will be provided by Owner under separate contract.

<u>UL-Listed</u> <u>Products</u>: Provide new portable fire extinguishers which are <u>UL-listed</u> and bear <u>UL "Listing Mark"</u> for type, rating, and classification of extinguisher indicated.

FM Listed Products: Provide new portable fire extinguishers which are approved by Factory Mutual Research Corporation for

type, rating and classification of extinguisher indicated and carry appropriate FM marking.

SUBMITTALS:

 <u>Product</u> <u>Data</u>: Submit product data for each type of product included in this section. For fire extinguisher cabinets include roughing-in dimensions and details showing mounting methods, relationships of box and trim to surrounding construction, door hardware, cabinet type and materials, trim style and door construction, and panel style and materials.

<u>Samples</u>: Submit for verification purposes, samples of each required finish. Prepare samples on metal of same gage as used for actual production run. Where normal color variations are to be expected, include 2 or more units in each sample set showing limits of such variations.

 <u>For initial selection</u> of colors and finishes, submit manufacturer's color cards showing full range of standard colors available.

PART 2 - PRODUCTS

ACCEPTABLE MANUFACTURERS:

Manufacturer: Subject to compliance with requirements, provide products of one of the following:

J. L. Industries. Larsen's Mfg. Co. Johnson-Lee, Division of W.F. Lee Corp.

FIRE EXTINGUISHERS:

General: Provide fire extinguishers for each extinguisher cabinet and other locations indicated, in colors and finishes selected by Architect from manufacturer's standard which comply with requirements of governing authorities.

Fill and service extinguishers to comply with requirements of governing authorities and manufacturer's requirement.

Abbreviations indicated below to identify extinguisher types relate to UL classification and rating system and not, necessarily, to type and amount of extinguishing material contained in extinguisher.

Stored-Pressure Water Type: UL-rated 2A, 2-1/2 gallon nominal capacity, in stainless steel container with pressure indicating gage, for Class A fires.

Multi-Purpose Dry Chemical Type: UL-rated A:B:C, 20 lb. nominal capacity, in enameled steel container, for Class A, Class B and Class C fires.

Multi-Purpose Dry Chemical Type: UL-rated A:B:C 10 lb. nominal capacity, in enameled steel container, for Class A, Class B and Class C fires.

Multi-Purpose Dry Chemical Type: UL-rated A:B:C 5 lb. nominal capacity, in enameled steel container, for Class A, Class B and Class C fires.

<u>Halon Type</u>: UL-rated B:C, 20 lb. nominal capacity, in enameled steel container with pressure indicating gage, for Class B and Class C fires.

<u>Halon</u> <u>Type</u>: UL-rated B:C, 9 lb. nominal capacity, in enameled steel container with pressure indicating gage, for Class B and Class C fires.

Halon Type: UL-rated B:C, 5 lb. nominal capacity, in enameled steel container with pressure indicating gage, for Class B and Class C fires.

MOUNTING BRACKETS:

Provide manufacturer's standard bracket designed to prevent accidental dislodgement of extinguisher, of sizes required for type and capacity of extinguisher indicated, in manufacturer's standard plated finish.

Provide brackets for extinguishers not located in cabinets.

FIRE EXTINGUISHER CABINETS:

General: Provide fire extinguisher cabinets where indicated, of suitable size for housing fire extinguishers of types and capacities indicated.

Construction: Manufacturer's standard enameled steel box, with trim, frame, door and hardware to suit cabinet type, trim style, and door style indicated. Weld all joints and grind smooth. Miter and weld perimeter door frames.

Cabinet Type: Suitable for mounting conditions indicated, of
the following types:

<u>Semi-Recessed</u>: Cabinet box (tub) partially recessed in walls of shallow depth.

<u>Surface-Mounted</u>: Cabinet box (tub) fully exposed and mounted directly on wall.

Trim Style: Fabricate trim in one piece with corners mitered, welded and ground smooth.

Trimless: For installation in walls where surface of surrounding wall finishes flush with exterior finished surface of frame and door of fire extinguisher cabinet, without any overlapping trim attached to cabinet.

<u>Door Material and Construction</u>: Manufacturer's standard door construction, of material indicated, coordinated with cabinet types and trim styles selected.

Aluminum: Manufacturer's standard flush, hollow aluminum door construction.

<u>Door Glazing:</u> Tempered float glass, complying with FS DD-G-1403, grade B, style I, type I, quality q3, class as indicated below:

Clear glass, class 1 (transparent).

<u>Door Style:</u> Manufacturer's standard design as indicated below and on drawing.

<u>Duo-Panel</u>: Float glass, 1/8" thick, unless otherwise indicated.

<u>Door Hardware</u>: Provide manufacturer's standard door operating hardware of proper type for cabinet type, trim style, and door material and style indicated. Provide either lever handle with cam action latch, or door pull, exposed or concealed, and friction latch. Provide concealed or continuous type hinge permitting door to open 180 degrees.

FACTORY FINISHING OF FIRE EXTINGUISHER CABINETS:

General: Comply with NAAMM "Metal Finishes Manual" for finish designations and application recommendations except as otherwise indicated. Apply finishes in factory after products are assembled. Protect cabinets with plastic or paper covering, prior to shipment.

<u>Painted Finishes:</u> Provide painted finish to comply with requirements indicated below for extent, preparation and type:

FIRE EXTINGUISHERS, CABINETS, AND ACCESSORIES 10522 - 4

Extent of Painted Finish: Apply painted finish to both 1 concealed and exposed surfaces of cabinet components except 2 where other than a painted finish is indicated. 3 4

Color: Provide color or color matches indicated, or, if not selected by Architect from indicated, as otherwise manufacturer's standard colors.

Preparation: Clean surfaces of dirt, grease, and loose rust or mill scale.

Baked Enamel Finish: Immediately after cleaning pretreatment, apply cabinet manufacturer's standard baked enamel finish system to the following surfaces:

Interior of cabinet.

Exterior of cabinet except for those surfaces indicated to receive another finish.

PART 3 - EXECUTION

INSTALLATION:

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Install items included in this section in locations and at mounting heights indicated, or if not indicated, at heights to comply with applicable regulations of governing authorities.

Prepare recesses in walls for fire extinguisher cabinets as required by type and size of cabinet and style of trim and to comply with manufacturer's instructions.

Securely fasten mounting brackets and fire extinguisher cabinets to structure, square and plumb, to comply with manufacturer's instructions.

Where exact location of surface-mounted cabinets and bracketmounted fire extinguishers is not indicated, locate as directed by Architect.

IDENTIFICATION:

Identify existence of fire extinguisher in cabinet with lettering spelling "FIRE EXTINGUISHER" applied to door by process indicated below. Provide lettering to comply with requirements indicated for letter style, color, size, spacing and location or, if not otherwise indicated, as selected by Architect from manufacturer's standard arrangements.

Application Process: Silk screen.

1 <u>Identify</u> <u>bracket-mounted</u> <u>extinguishers</u> with red letter decals
2 spelling "FIRE EXTINGUISHERS" applied to wall surface. Letter
3 size, style and location as selected by Architect.

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END OF SECTION 10522

SECTION 10800 - TOILET AND BATH ACCESSORIES

PART 1 - GENERAL

RELATED DOCUMENTS:

 Drawings and general provisions of Contract, including General and Special Conditions and Division-1 Specification sections, apply to work of this section.

DESCRIPTION OF WORK:

Extent of each type of toilet accessory is indicated on drawings
and schedules.

Types of toilet accessories required include the following:

Paper towel dispenser.

Toilet tissue dispenser.

24 Grab bar.

Sanitary napkin dispenser.

Sanitary napkin disposal unit.

Shower curtain rod.

Shower hooks.

Soap dish, recessed.

Towel bar.

Folding shower seat.

Mop and broom holder.

Robe hook.

Air hair dryers.

Mirrors are specified in Section, "Mirror Units".

QUALITY ASSURANCE:

<u>Inserts and Anchorages</u>: Furnish inserts and anchoring devices which must be set in concrete or built into masonry; coordinate delivery with other work to avoid delay.

Accessory Locations: Coordinate accessory locations with other work to avoid interference and to assure proper operation and servicing of accessory units.

SUBMITTALS:

Product Data: Submit manufacturer's technical data and installation instructions for each toilet accessory.

<u>Samples</u>: Submit full-size samples of units to Architect for review of design and operation. Acceptable samples will be returned and may be used in the work.

<u>Setting Drawings</u>: Provide setting drawings, templates, instructions, and directions for installation of anchorage devices and cut-out requirements in other work.

PART 2 - PRODUCTS

ACCEPTABLE MANUFACTURERS:

<u>Manufacturers</u>: Subject to compliance with requirements, provide toilet accessories by one of the following:

A&J Washroom Accessories.
American Specialties, Inc.
Bobrick Washroom Equipment, Inc.
Bradley Corporation.
Hallmack-Nutone/Div. Scovill.
Parker-Scovill.
Watrous, Inc.

MATERIALS, GENERAL:

Stainless Steel: AISI Type 302/304, with polished No. 4 finish, 22 gage (.034") minimum, unless otherwise indicated.

 Brass: Leaded and unleaded, flat products, FS QQ-B-613; Rods, shapes, forgings, and flat products with finished edges, FS QQ-B-626.

<u>Sheet Steel</u>: Cold rolled, commercial quality ASTM A 366, 20-gage (.040") minimum, unless otherwise indicated. Surface preparation and metal pretreatment as required for applied finish.

Galvanized Steel Sheet: ASTM A 527, G60.

 Chromium Plating: Nickel and chromium electro-deposited on base metal, ASTM B 456, Type SC 2.

Baked Enamel Finish: Factory-applied, gloss white, baked acrylic enamel coating.

Galvanized Steel Mounting Devices: ASTM A 153, hot-dip galvanized after fabrication.

<u>Fasteners</u>: Screws, bolts, and other devices of same material as accessory unit or of galvanized steel where concealed.

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PAPER TOWEL DISPENSERS:

Surfaced-Mounted Towel Dispensers: Fabricate of stainless steel with hinged front equipped with tumbler lockset. Provide pierced slots at sides as refill indicator.

Capacity: Not less than either 400 multifold paper towels.

Design and Quality Example: Crown Zellenback #302 Chrome.

Unit must be specfically designed for multifold towels. Multi-use for C-fold type not acceptable.

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TOILET TISSUE DESPENSERS: Of OWNER

Double-Roll Dispenser: Size to accommodate two separate rolls of core type tissue to 5" diameter.

Spindleless chrome-plated zinc Fabrication: construction with tension spring delivery control; designed for surface mounting.

Design and Quality Example: Saalseld Co., #R-850.

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GRAB BARS:

Stainless Steel Type: Provide grab bars with wall thickness not less than 18 (.050") gage and as follows:

Mounting: Concealed, manufacturer's standard flanges and anchorages.

1-1/2" clearance between wall surface and inside Clearance: face of bar.

Gripping Surfaces: Manufacturer's standard non-slip texture.

Medium-Duty Size: Outside diameter of 1-1/4".

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SANITARY NAPKIN DISPENSERS:

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General: Fabricate cabinet of stainless steel, not less than 22 (.034") gage, all welded construction. Provide door of seamless stainless steel, minimum 18 (.050") gage, with returned edges and equipped with tumbler lockset. Provide identification reading "Napkins" and "Tampons" at coin slots; brand name advertising is not allowed. Capacity not less than 15 napkins and 20 tampons.

Mounting: Fully recessed type for nominal 6" wall.

Design and Quality Example: Bobrick #B-3502.

Mounting: Surface-mounted type.

Design and Quality Example: Bobrick B-2802

Operation: 25-cent coin operation, with locked coin box keyed separately from door and other accessory units.

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SANITARY NAPKIN DISPOSAL UNITS:

Recessed Type: Fabricate of stainless steel for nominal 4" wall depth. Provide self-closing door and removable stainless steel of all-welded construction.

Design and Quality Example: Bobrick B-353.

<u>Partition-Mounted</u> <u>Dual-Access</u> <u>Type</u>: Fabricate of stainless steel equipped with adjustable flanges to permit partition mounting to service 2 toilet compartments. Provide self-closing door and all-welded stainless steel receptacle removable from one side.

Design and Quality Example: Bobrick B-354.

SHOWER AND BATH ACCESSORIES:

Shower Curtain Rod, Heavy-Duty: 1-1/4" o.d., 18-gage (.050") stainless steel, satin finish; furnish 3" o.d. minimum 20-gage stainless steel flanges with stain finish, designed for exposed fasteners.

Recessed Soap Dish and Bar: One piece construction of stainless steel for recess mounting in wall; furnish with mounting clamp or lugs appropriate for wall construction indicated.

Design and Quality Example: Bobrick B-4390.

Towel Bar: 18" long satin-finished Type 304 stainless steel tubular (1" diameter) bar and rectangular end brackets.

Design and Quality Example: Bobrick B:205.

FOLDING SHOWER SEAT:

Heavy-duty hinged seat designed to fold up against wall when not in use. Provide support braces, hinges, frame and fasteners of Type 304 stainless steel. Construct frame of all welded tubular

construction for maximum strength. Provide seat with configuration and seating surface material as follows:

<u>Configuration</u>: Rectangular seat, nominal 18" wide x 16" projection from wall.

Design and Quality Example: Bobrick B-5191.

<u>Seat Material</u>: Phenolic or polymeric composite of either slat type or one-piece construction. Color as selected from manufacturers standard selections.

MISCELLANEOUS ACCESSORIES:

Mop and Broom Holder/Utility Shelf: Combination unit with 18-gage (.050") Type 304 stainless steel shelf with 1/2" returns, 16-gage (.062") support brackets for wall mounting, provide 16-gage stainless steel hooks for wiping rags on front of shelf, together with spring-loaded rubber cam type mop/broom holders; 1/4" diameter stainless steel drying rod suspended beneath shelf. Provide 36" long unit with 4 mop/broom holders and 3 hooks.

<u>Wall Mounted Electric Hair Dryers:</u> No-touch operation with electric sensor, fixed nozzle type with 1/10 hp, 6200 rpm motor. Surface mounted.

Design and Quality Example: Bobrick B-7307 (A-2)

<u>Double</u> Robe Hook: Heavy-duty satin-finished stainless steel double prong robe hook; rectangular wall bracket with backplate for concealed mounting.

FABRICATION:

General: Only an unobtrusive stamped logo of manufacturer, as approved by Architect, is permitted on exposed face of toilet or bath accessory units. On either interior surface not exposed to view or back surface, provide additional identification by means of either a printed, waterproof label or a stamped nameplate, indicating manufacturer's name and product model number.

General: No names or labels are permitted on exposed faces of toilet and bath accessory units. On either interior surface not exposed to view or on back surface, provide identification of each accessory item by either a printed, waterproof label or a stamped nameplate indicating manufacturer's name and product model number.

52 <u>Surface-Mounted Toilet Accessories, General</u>: Except where 53 otherwise indicated, fabricate units with tight seams and 54 joints, exposed edges rolled. Hang doors or access panels with

continuous stainless steel piano hinge. Provide concealed anchorage wherever possible.

Recessed Toilet Accessories, General: Except where otherwise indicated, fabricate units of all welded construction, without mitered corners. Hang doors or access panels with full-length stainless steel piano hinges. Provide anchorage which is fully concealed when unit is closed.

PART 3 - EXECUTION

INSTALLATION:

<u>Install</u> toilet accessory units in accordance with manufacturers' instructions, using fasteners which are appropriate to substrate and recommended by manufacturer of unit. Install units plumb and level, firmly anchored in locations and at heights indicated.

Install Owner furnished toilet paper dispensers in public areas.

ADJUSTING AND CLEANING:

Adjust toilet accessories for proper operation and verify that mechanisms function smoothly. Replace damaged or defective items.

<u>Clean</u> and polish all exposed surfaces after removing temporary labels and protective coatings.

36 END

END OF SECTION 10800

SECTION 10830 - MIRROR UNITS

PART 1 - GENERAL

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RELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Special Conditions and Division-1 Specification sections, apply to work of this section.

DESCRIPTION OF WORK:

Extent of mirror units is indicated on drawings.

 Types of mirror units required include the following:

Stainless steel framed mirrors.

Stainless steel framed mirrors and shelves.

Mirror glass for custom installations is specified in Division 8.

Toilet accessories are specified elsewhere in Division 10.

QUALITY ASSURANCE:

General: Provide mirror units produced by single manufacturer for entire project.

SUBMITTALS:

<u>Product</u> <u>Data</u>: Submit manufacturer's technical data, detail drawings, and installation instructions for mirror units.

<u>Schedule</u>: Submit schedule indicating mirror types, quantities, sizes and installation locations for each mirror to be provided for project.

SPECIFIED PRODUCT WARRANTY:

Provide manufacturer's written 5-year warranty against silver spoilage of mirrors, agreeing to replace any mirrors which develop visible defects within warranty period.

PART 2 - PRODUCTS

ACCEPTABLE MANUFACTURERS:

Manufacturer: Subject to compliance with requirements, provide
mirror units of one of the following:

A & J United Machine & Metal Products Corp.
American Specialties, Inc.

Bobrick Washroom Equipment, Inc.

Bradley Corp.

Hallmack-NuTone/Div. Scovill

G.M. Ketcham Company, Inc.

F.H. Lawson Co.

Meek Manufacturing Co., Inc.

McKinney/Kidde, Inc.

Parker - Scovill

P.D. Metal Industries

Tubular Specialties Mfg., Inc.

Watrous, Inc.

MATERIALS:

25 <u>Mirror Glass</u>: 1/4" thick, Type I, Class 1, Quality q2, 26 conforming to FS DD-G-451, with silvering, copper coating, and 27 protective organic coating complying with FS DD-M-411.

29 <u>Stainless Steel</u> <u>Framing</u>: AISI Type 302/304, with polished No. 4 30 finish.

Galvanized Steel Sheet: ASTM A 527, G60.

Galvanized Steel Mounting Devices: ASTM A 153, hot-dip galvanized after fabrication.

FABRICATION:

General:

Edge Protection: Fabricate frames for glass mirrors to accommodate wood, felt, plastic, or other glass edge protection material.

<u>Backing</u>: Provide mirror backing and support system which will permit rigid, tamperproof glass installation and prevent accumulation of moisture, as follows:

Galvanized steel backing sheet, not less than 22 gage and full mirror size, with non-absorptive filler material. Corrugated cardboard is not an acceptable filler material.

Hangers: Provide system of mounting mirror units which will
permit rigid, tamperproof and theftproof installation, as
follows:

One-piece galvanized steel wall hanger device with spring action locking mechanism to hold mirror unit in position with no exposed screws or bolts.

Stainless Steel Framed Mirrors:

 Standard Type: Fabricate frame with channel shapes of not less than 20 gage (.040"), with square corners carefully mitered to hairline joints and mechanically interlocked. Provide in Type 430 brite polished finish.

Shelves: Fabricate of stainless steel in same gage and finish as mirror frame, approximately 5" deep by width of mirror. Turn down and return edges for additional rigidity. Weld shelves securely to bottom of mirror frame; provide concealed rigid bracket supports for widths exceeding 36".

PART 3 - EXECUTION

INSTALLATION:

Secure mirrors to walls in concealed, tamperproof manner with special hangers, toggle bolts, or screws. Set units plumb, level, and square at locations indicated, in accordance with manufacturer's instructions for type of substrate involved.

ADJUST AND CLEAN:

<u>Verify</u> that adjustable tilting mirrors are properly installed and are operating smoothly.

<u>Clean</u> exposed surfaces of mirror units in compliance with manufacturer's recommendations.

END OF SECTION 10830

SECTION 10900 - MISCELLANEOUS SPECIALTIES

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PART 1 - GENERAL

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RELATED DOCUMENTS:

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Drawings and general provisions of Contract including General and Special Conditions and Division-1 Specification sections, apply to work of this section.

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DESCRIPTION OF WORK:

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Extent of each type of miscellaneous specialties is shown on drawings and schedules.

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Types of specialties required include the following:

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21 Corner Guards. 22 Crash Rails.

Bumper Guards.

Coat Hooks with Backboard.

Ceiling Hook.

Unistrut Ceiling Assemblies.

Lighted Windsock.

Heliport Rotating Beacon

Cylinder Storage Racks and Strap Holders.

Pegboards.

Helicopter Tie-Down Inserts

Stainless Steel Corner Guard

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QUALITY ASSURANCE:

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<u>Inserts and Anchorages</u>: Furnish inserts and anchoring devices which must be set in or built into other substrates; coordinate delivery with other work to avoid delay.

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<u>Coordination</u>: Coordinate specialty locations with other work to avoid interference and to assure proper operation and servicing of specialty units.

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<u>Uniformity</u>: Provide products of same manufacturer for each type of specialty unit and for units exposed in same areas, unless otherwise acceptable to Architect.

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SUBMITTALS:

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52 <u>Product</u> <u>Data</u>: Submit manufacturer's product data for each 53 specialty item. Include installation instructions for accessories which are built in or connected to other work.

Samples: Submit full-size samples of units to Architect for review of design and operation. Acceptable samples will be returned and may be used in the work.

<u>Setting Drawings</u>: Provide setting drawings, templates, and instructions for installation of anchorage devices in other work.

PART 2- PRODUCTS

MATERIALS:

Stainless Steel: AISI Type 302/304, with polished No. 4 finish, 22-gage min., unless otherwise indicated.

Brass: Leaded and unleaded, flat products, FS QQ-B-613; rods, shapes, forgings, and flat products with finished edges, FS QQ-B-626.

Aluminum: Alloy and temper as recommended by aluminum fabricator, ASTM B 209 for plate and sheet, ASTM B 26 or B 108 for castings.

Sheet Steel: Cold rolled, commercial quality, ASTM A 366, 20-gage minimum. Surface preparation and metal pretreatment as required for applied finish.

Galvanized Steel Sheet: ASTM A 527, G60.

Chromium Plating: Nickel and chromium electro-deposited on base metal, ASTM B 456, Type SC 2.

Baked Enamel Finish: Factory-applied, baked acrylic enamel coating.

Galvanized Steel Mounting Devices: ASTM A 386, hot-dip galvanized after fabrication.

<u>Fasteners</u>: Screws, bolts, and other exposed devices of same material as specialty unit, or of galvanized steel where concealed. Provide theft proof fasteners where exposed to view.

FABRICATION:

General: Stamped names or labels on exposed faces of specialty items are not permitted; inobtrusive labels on surfaces not exposed to view are acceptable. Fabricate units with tight seams and joints, with exposed edges rolled. Provide concealed anchorage for wall-mounted units wherever possible.

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CORNER GUARDS:

Plastic Corner Guards: Plastic corner guards shall be

7 Pre-Molded Corner Guards: Furnish and install as detailed and shown on drawings surface mounted corner guards. Provide corner guards with nominal wall thickness of .110" and impact strength 8 9 10 of 24.1 ft. lbs. per inch of notch (1290 J/M) ASTM D-256-78. Corner guard shall have matte finish pebblette grain surface 11 12 with color as selected by Architect. Chemical and stain resistant per CSAV-280 standards. Corner guards shall meet a 13 14 flame spread requirement of 25, and a smoke developed/density of 15 450 for a class A or 1 rating in accordance with ASTM-E84-75 Tunnel Test procedure. Corner guards shall contain a resin 16 17 containing an antibacterial agent, homogenously dispersed throughout the vinyl material. 18 Continuous extruded aluminum retainers shall be furnished for attachment to wall and 19 20 secured approximately 18" o.c. Neat, structural, color-21 coordinated closure caps of high impact resistance shall be supplied to close off top and bottom of corner guards. 22

Corner guards shall be manufactured by Construction Specialties, Inc. Model #SSM-20, Model # SM-10 for 135 deg angels, or approved equal.

CRASH RAILS:

Premolded Plastic 8" Crash Rail:

Furnish and install as detailed and shown on drawings surface mounted 8" crash rail. Provide crash rail with nominal wall thickness of .125" and shall be securely locked of 2" retainer clips positioned a maximum of 24" o.c. Entire guard length shall be supported and cushioned at internal center point to provide additional resistance to impact, while maintaining nominal guard configuration under such impact. Retainer clips shall be securely locked to continuous retainer cushion providing positive mounting alignment. Accessory end caps shall be mechanically fastened with concealed fasteners, and shall maintain a flush condition in relation to guard under impact. Crash rail shall contain a resin compound containing an antibacterial agent, which is homogenously dispersed throughout the vinyl material. Color as selected by Architect.

8" crash rail shall be as manufactured by Construction Specialties, Inc. Model #SCR-64 or approved equal.

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BUMPER GUARDS:

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53 <u>Pre-molded Plastic Bumper Guard:</u> Furnish and install as detailed and shown on drawings surface mounted bumper guard.

Provide bumper ; guard with nominal wall thickness of .100" and shall be securely locked in place over continuous aluminum retainer, yet provide for free-floating action under impact, without damage to guard, retainer or adjacent wall. Retainers shalal be a minimum .072" thickness, and shall be securely affixed to wall through bumper cushions and fasteners positioned maximum 16" apart. Accessory end caps shalal be mechanically fastened with concealed fasteners, and shall maintain a flush condition in relation to guard under impact. Bumper guard shall contain a resin compound which is homogenously dispersed throughout the vinyl material. Color as selected by Architect.

Bumper guard shall be as manufactured by Construction Specialties, Inc., Model #B-30 or approved equal

COAT HOOKS WITH BACKBOARD:

Furnish and install coat hooks and supporting backboard as indicated and detailed on drawings. Provide clear anodized aluminum coat hooks with no exposed fasteners. Provide model #901 as manufactured by Raymond Engineering, Inc., "Rigid Rak" or approved equal. Provide supporting backboard of transparent finished white oak with all exposed edges radiused. Refer to drawings for locations of single coat hooks which will not have wood backboard for support.

CEILING HOOKS:

Furnish and install clevis and swivel hook made of drop forged steel, heat treated for high strength. Provide spring snap safety latch. Hook shall be rated for 1,000 lb. load, 9/16" clevis opening, 3/8" bolt diameter and 6"overall length. Provide bright chrome finish on all exposed surfaces of hook assembly.

UNISTRUT CEILING ASSEMBLIES:

Furnish and install as detailed and shown on drawings unistrut framing assemblies with fittings, units and screws for complete installation. Provide cold formed framing members from low carbon strip steel with one side having continuous slot with inturned lips. Secure attachments may be made to the framing member with use of hardened, toothed, slotted nuts which engage the inturned lips. Steel material shall conform to the following ASTM specifications:

12 gauge ASTM No. A570 GR 33

All framing members and fittings shall be cleaned and phosphated with a rust inhibiting acrylic enamel paint applied by electrodeposition and throughly baked. Color is Perma-Green per

Federal Standard 595A color number 14109. The resulting finish will withstand 400 hours salt spray when tested in accordance with ASTM designation B-117.

Fittings shall conform to ASTM A575. Framing nuts shall conform to ASTM 675 GR 60. Screws shall conform to ASTM A307 and SAE J429 GR 2.

Ceiling assemblies shall be as manufactured by Unistrut Corporation or approved equal.

HELIPORT ACCESSORIES:

Lighted Windcone:

Provide and install lighted windcone assembly and mast as indicated on drawings. Windcone shall be constructed of nylon fabric, aviation orange color, coated for water repellency and resistant to rot. Internal cage of windcone shall be of lightweight construction which holds the fabric sock fully open at throat even under no wind conditions. Windcone assembly attachment to to support mast shall be by sealed hanger bearings to allow precision vaning for true wind direction throughout a full 360 degree rotation in any type of weather or wind condition. Windcone assembly shall be 18" diameter by 8' long. Windcone shall be internally lighted with two 75 watt, 120 VAC outdoor floodlight lamps.

Windcone support mast shall extend 6' above roof of helicopter hanger. Support mast shalal be constructed of 2" diameter aluminum pipe complete with fasteners and anchors as required for complete installation. Installing contractor shall provide shielded wiring for hook-up to junction box by Division 16 contractor. Color of support mast shall be as selected by Architect.

Lighted windcone assembly and support mast shall comply with all FAA regulations and as manufactured by Lift-A-Lite, Inc., Minot, ND or approved equal.

Heliport Rotating Beacon:

 Provide and install rotating beacon to meet FAA specification AC 150/5345-12. The beacon shall produce a total of 37 flashes per minute; alternately white, green and yellow. All three lamps shall be mounted in a cast aluminum housing, 120 degree apart and factory preset to an elevation 5 degrees above the horizontal. Flash intensity of each 1000 watt lamp shall provide a minimum effective flash intensity of 50,000 candles in white light and a rated life of 4,000 hours. The motor drive housing shall be cast aluminum with one side removable for access to interior. The 50/60 Hz motor and all moving parts

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shall be permanently lubricated and installed with heater to warm gear box lubricant when temperatures drops below +14 deg F. Operating conditions shall be:

Temperature: -67 deg F to +131 deg F. Humidity: 0 - 100% Wind: Velocities to 100 mph.

Provide mounting base for beam to pole installation. Provide all necessary fasteners, anchors, pole and permanent connection to the roof pad as indicated by drawings for complete installation. Support pole shall be hinged at base for lowering of pole to relamp beacon. Paint all exposed surfaces, except those factory finished and as directed by Architect.

Provide rotating beacon as manufactured by one of the following:

ADB-ALNACO, Inc., Columbus, OH Manairco, Inc., Mansfield, OH National Airport Equipment, Minneapolis, MN

Helicopter Tie-Down Inserts:

Provide and install custom fabricated stainless steel, flush mounted, helicopter tie-downs as detailed on drawings. Manufactured inserts, can be used if approved by Architect.

Stainless Steel Corner Guard:

Provide and install stainless steel corner guard constructed of 16 gauge, type 430 stainless steel, 3-1/2" x 3-1/2" x 1/8" thick and of length as indicated by drawings. If not indicated, 48" length. Install using fasteners or cement as appropriate to substrate. Provide corner guard as manufactured by Wilkinson Co., or equal.

CYLINDER STORAGE RACKS AND STRAP HOLDERS:

Furnish and install as detailed and shown on drawings using framing members, connectors, and 1/4 inch diameter retainer rods, as manufactured by Unistrut Corporation or approved equal.

Cylinder Strap Holders:

Cylinder strap holders shall be furnished and installed as specified herein and as detailed. Assembly shall be as distributed by McMaster-Carr, Aeroquip Security Systems, or approved equal.

Assembly shall consist of a P-1000 Unistrut in lengths required fastened to the wall. 90 degree angle fitting shall be bolted to the P-1000. Weblock nylon strapping, 1-inch wide, Number 3699T16 shall be looped through the angle fitting. Strapping

shall be fitted with safety belt type buckles similar to catalog Number 3699T11 with Number 3699T14 quick disconnect as distributed by McMaster-Carr, or approved equal. Assembly shall be painted in color as selected by Architect.

PEGBOARDS:

Furnish and install pegboards as detailed and shown on drawings. Provide 1/4" thick, tempered hardboard with pre-drilled holes for mounting of standard pegboard hanging accessories. Mount pegboard in custom wood oak framed with transparent finish on oak. Provide painted finish on pegboard, color as selected by Architect.

PART 3 - EXECUTION

INSTALLATION:

<u>Wall</u> and <u>Ceiling-Mounted</u> <u>Specialty</u> <u>Units:</u> Install specialty units in accordance with manufacturers' instructions, using fasteners which are appropriate to substrate and recommended by manufacturer of unit. Install units plumb and level, firmly anchored in locations indicated.

<u>Freestanding Specialty Units:</u> Install freestanding units in scheduled locations after finishes have been completed and prior to final acceptance in each area.

ADJUST AND CLEAN:

 Adjust specialty items for proper operation and verify that all components are in place and functioning smoothly. Clean and polish exposed surfaces, using materials and methods recommended by manufacturer of specialty item.

END OF SECTION 10900

SECTION 11132 - PROJECTION SCREENS

PART 1 - GENERAL

RELATED DOCUMENTS:

Drawing and general provisions of the Contract, including General and Special Conditions and Division-1 Specifications sections apply to work of this section.

DESCRIPTION OF WORK:

Extent of projection screens is shown on drawings.

Types of projection screens required include:

Front projection screens, manually operated.

QUALITY ASSURANCE:

Single Source Responsibility: Obtain each type of projection screen required from a single manufacturer as complete units, including necessary mounting hardware and accessories.

Measurement of Gain of Screen Viewing Surface: Measure gain of screen viewing surface against that of a magnesium carbonate surface by means of a photogoniometer using test methods and test apparatus per FS GG-S-00172D(1) for determining effect of reflected light at various viewing angles on screen surfaces. Ratings of "one" refer to those viewing surfaces having a reflectivity equal to the magnesium carbonate surface.

<u>Fire Performance Characteristics</u>: Provide projection screen fabrics identical to those materials which have undergone testing and passed requirements for flame resistance as indicated below:

NFPA 701 per small scale test.

Mildew Resistance: Provide mildew resistant screen fabrics as determined by Federal Standard 191A/5760.

SUBMITTALS:

Product Data: Submit manufacturer's product data for each type
of screen indicated.

DELIVERY, STORAGE, AND HANDLING:

<u>Do not deliver</u> projection screens until building is enclosed, other work within spaces where screens will be installed is substantially complete, and installation of screens is ready to take place.

Protect screens from damage during delivery, handling, storage and installation.

PART 2 - PRODUCTS

MANUALLY-OPERATED FRONT PROJECTION SCREENS:

General: Provide manufacturer's standard units consisting of case, screen, mounting accessories and other components as required for a complete installation and complying with descriptive requirements indicated below.

<u>Spring-Roller-Operated Projection Screens:</u> Units designed and fabricated for wall or ceiling installation and complying with the following requirements:

 Screen Case: Fabricated in one piece from not less than 22-gage steel with flat back design, vinyl-covered or baked-enamel finish, and end caps with integral roller brackets and furnished with universal mounting brackets in finish matching end caps to enable attachment to wall or ceiling. Provide extension from wall brackets where indicated.

 Screen: Mildew- and flame-resistant glass fiber fabric with vinyl-coated viewing surface complying with requirements indicated below, with top edge mounted on, and securely anchored to, a 3" diameter rigid steel spring roller and bottom edge formed into a pocket holding a tubular metal slat, with ends of rod protected by plastic caps containing a screw attached saddle and pull.

Size of Viewing Surface: 70" x 70".

Type of <u>Viewing Surface</u>: Glass beaded with minimum gain characteristics complying with FS GG-S-00172D(1) for Type C screen surface.

Edge Treatment: Without black masking borders.

Products: Subject to compliance with requirements, provide one
of the following:

Spring-Roller-Operated Projection Screens:

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Series 500 Auditorium; Bretford/Knox Manufacturing Co. "Vidio" C; Da-Lite Screen Co., Inc. Luma 2; Draper Shade & Screen Co.

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PART 3 - EXECUTION

INSTALLATION:

General: Install projection screens at locations indicated in compliance with screen manufacturer's instructions.

Install front projection screens with screen cases in position and relationship to adjoining work indicated, securely anchored to supporting substrate, and in manner which produces a smoothly operating screen with plumb and straight vertical edges and plumb and flat viewing surface when lowered.

PROTECTION AND CLEANING:

<u>Protect projection screens</u> after installation from damage during construction. If despite such protection, damage occurs, remove and replace damaged components or entire unit as required to restore units to their original, undamaged condition.

END OF SECTION 11132

SECTION 11160 - LOADING DOCK EQUIPMENT

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PART 1 - GENERAL

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RELATED DOCUMENTS:

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Drawings and general provisions of the Contract, including General and Special Conditions and Division-1 Specification sections, apply to work of this section.

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DESCRIPTION OF WORK:

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Extent of loading dock equipment is indicated on the drawings:

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Types of loading dock equipment include the following:

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Laminated tread bumpers. Hydraulic dock levelers.

Dock seals.

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Transparent strip door curtains.

25 26 Concrete work for dock levelers is specified in Division 3. Curb angles at edge of loading dock and around edge of dock

leveler pit are specified in Division 5. Electrical wiring and connections for loading dock equipment are specified in Division 16.

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34 QUALITY ASSURANCE:

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<u>Dock Leveler Standard:</u> Comply with applicable requirements of ANSI MH14.1 for construction and operation of dock levelers (fixed dockboards) except as otherwise indicated.

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Dock Lift Standards: Comply with applicable requirements of CS 202 for construction and operation of hydraulic dock lifts (scissor lifts) except as otherwise indicated.

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Single Source Responsibility: Provide dock levelers as complete units produced by a single manufacturer, including necessary accessories, fittings and anchorages.

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SUBMITTALS:

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52 Shop Drawings: Submit shop drawings for fabrication and erection of dock levelers. Include plans, elevations, and large 53

Show anchorages and accessory items. Provide scale details. location template drawings for items supported or anchored to permanent construction.

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Furnish roughing-in drawings for electrical service well in advance of concrete work.

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Submit manufacturer's product data and Product Data: installation instructions for each type of loading dock equipment, including installation details.

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Test Reports: Submit certified test reports showing compliance of dock levelers with requirements of ANSI determining rated capacity of magnitude indicated.

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Maintenance Data: Submit manufacturer's maintenance and service data, including, address and telephone number of nearest authorized service representative.

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PART 2 - PRODUCTS

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ACCEPTABLE MANUFACTURERS:

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Subject to compliance with requirements, provide Manufacturers: products of one of the following:

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Manufacturers of Bumpers:

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Blue Giant Equipment Corp. Kelley Company, Inc. Pawling Corporation. Pioneer Manufacturing, Inc.

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Serco Engineering Corporation.

Steel-Flexx Corp.

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Manufacturers of Dock Levelers:

39 40 41

Blue Giant Equipment Co. Kelly Company, Inc.

42 Rite-Hite Corp. 43

Serco Engineering Corp.

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Manufacturers of Dock Seals:

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Blue Giant Equipment, Co. Chalfant Sewing Fabricators, Inc.

48 Fairborn Industries, Inc. 49

50 Flexion, Inc.

Frommelt Industries, Inc.

Kelly Company, Inc./Tuf-Seal. 52

53 Serco Engineering Corp.

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DOCK BUMPERS:

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 Laminated Tread Bumpers: Provide laminated tread dock bumper units of size indicated, fabricated from multiple plies cut from fabric-reinforced rubber truck tires to a uniform thickness of 4 1/2". Laminate plies under pressure on 3/4" diameter steel supporting rods which are welded and bolted to 1/4" thick structural steel angle closures with predrilled anchor holes. Size angles to provide not less than 1" of tread plies extending beyond the face of the closure angles.

Anchorage Devices: Provide anchor bolts, nuts, washers, bolts, sleeves, cast-in-place and other anchorage devices as required to fasten bumpers securely in place and to suit installation type indicated. Furnish anchorage components that are galvanized, or cadmium plated unless otherwise indicated.

DOCK LEVELERS:

General: Provide the manufacturer's standard dock levelers of the type, function, operation, capacity, size and construction indicated, complete with controls, safety devices, and accessories required.

Type: Provide recessed hinged lip dock levelers designed for permanent installation in concrete pits preformed in the edge of the loading platform, at the location indicated.

<u>Function</u>: Provide dock leveler units which compensate in the following manner for differences in height between the truck bed and the loading platform.

<u>Vertical Travel</u>: Provide a minimum working range of 12" above and 12" below the adjoining platform level for dock leveler ramps. Provide an operating range above the platform level of sufficient height to enable the lip to extend and clear the truck bed before contact.

Automatic Vertical Compensation: The floating travel of the ramp with lip extended and resting on the truck bed shall compensate automatically for upward or downward movement of the truck bed during unloading and loading.

Automatic Lateral Compensation: Tilting of the ramp with lip extended and resting on the truck bed shall compensate automatically for canted truck beds, of up to 4" over the width of the ramp.

Lip Operation: Provide the manufacturer's standard mechanism for automatic extension and support of the hinged lipon the ramp edge that will enable the lip to rest on the truck bed over the dock leveler's working range, yet allow the lip to

 yield under impact of the incoming truck, with the lip's automatic retraction upon the truck's subsequent departure.

<u>Length of Lip Extension</u>: Provide lip extension of not less than 16" from the ramp edge and not less than 12" in front of the dock bumpers.

Automatic Ramp Return: Provide for automatic return of the unloaded ramp, from raised or lowered positions to stored position, level with the platform, upon the truck's departure.

Operation: Provide the manufacturer's standard operating system
as follows:

Hydraulic Operating System: Provide electric hydraulic raising and hydraulic lowering of the ramp, controlled from a remotely located push-button station. Equip the leveler with a packaged unit including a unitized, totally enclosed, nonventilated electric motor, pump, manifold reservoir, and valve assembly of proper size, type, and operation for the capacity of the leveler indicated. Include means for lowering ramp below platform level with lip retracted behind dock bumpers. Provide a hydraulic velocity fuse connected to the main hydraulic cylinder to limit the loaded ramps free-fall to not over 3".

<u>Electrical</u> <u>Requirements</u>: Coordinate wiring requirements and current characteristics with the building electrical system. See Division-16 sections.

Hydraulic Lip Operation: Provide electric-powered hydraulic raising and hydraulic lowering of the lip, controllable independently of raising and lowering of the ramp.

Rated Capacity: Provide dock levelers capable of supporting a gross moving load of 25,000 lbs. without permanent deflection or distortion, as determined by actual tests in compliance with the requirements of ANSI MH14.1 for rated capacity of fixed dockboards.

<u>Safety Devices</u>: Provide the manufacturer's standard and optional safety devices as follows:

Toe Guards: Protect open sides of the rising ramp over the entire upper operating range with metal toe guards mounted flush with the ramp edges and projecting below the ramp.

<u>Cross Traffic Support:</u> Provide support of the ramp at platform level in the stored position with the lip retracted by the manufacturer's standard method as follows:

Lip engaged in saddles.

<u>Maintenance</u> <u>Strut</u>: Provide an integral strut for positive support of the ramp in the up position during maintenance of the dock leveler.

Truck Restraining Device: Unless otherwise indicated provide, for each leveler unit, the manufacturer's standard electrically powered mechanical device designed and fabricated to capture the truck's ICC bumper and hold the truck at the loading dock during loading and unloading. Include a control panel and set of illuminated exterior and interior signals to indicate the device's status to both controller and truck driver. Interconnect device with dock leveler to permit simultaneous activation of leveler and truck restraining device.

Products: Subject to compliance with requirements, provide
one of the following:

"Truck-Latch"; by Blue Giant.

"Truk Stop"; by Kelly Company, Inc. "DokLok"; by Rite-Hite Corporation

"SercoLoc"; by Serco Engineering Corporation.

Construction: Provide the manufacturer's standard dock leveler construction for the type and capacity of units indicated, consisting of a frame made of structural and formed steel shapes, and a platform, including a hinged lip, fabricated from non-skid steel plate. Design and fabricate the assembly to withstand deformation during both operating and stored phases of service for the use intended. Chamfer the lip edge to minimize obstructing wheels of material handling vehicles. Include two dock bumpers attached to the frame.

Finish and Color: Provide the manufacturer's standard baked enamel finish system over steel surfaces which have been cleaned and pretreated to obtain optimum paint bond. Paint toe guards yellow to comply with ANSI Z53.1 requirements and, unless otherwise indicated, paint the remainder of the surfaces in the manufacturer's standard color.

Accessories: Equip units with the manufacturer's standard accessories as follows:

<u>Night Locks</u>: Provide the manufacturer's standard means to prevent the extension of the lip and lowering of the ramp when overhead doors are locked.

Side and rear weatherseals.

Foam insulation of ramps.

DOCK SEALS:

LOADING DOCK EQUIPMENT

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General: Provide the manufacturer's standard dock seals consisting of fabric covered foam pads designed to compress under pressure of the truck body to form an air tight seal at the jambs and head of the loading dock openings.

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<u>Size of Jamb Pads</u>: Unless otherwise indicated, provide beveled jamb pads not less than 18" wide and 12" deep, and sized to suit opening height.

<u>Size and Type of Head Pad</u>: Unless otherwise indicated, provide head pad of the same depth as jamb pads, sized to suit opening width, and as follows:

Type: Provide stationary head pads.

Height: Not less than 12".

<u>Construction</u>: Provide the manufacturer's standard construction consisting of single-or-double ply coated-fabric-covered urethane-foam core with supporting frame.

Cover Fabric: Provide hypalon coated nylon coated fabric with a total minimum weight of 16 oz. per sq. yd.

Tearing strength of not less than 210 - 235 lbs. per sq. in. when tested in accordance with Federal Standard 191, method 5134.1.

Abrasion resistance of not less than 2,000 cycles when tested in accordance with Federal Standard 191, method 5306.

Guide Strips: Provide 4" wide coated nylon guide strips on the jamb pads.

<u>Pleated Protectors</u>: Provide protectors on the face of jamb pads in the form of overlapping layers of coated fabric attached to the base fabric.

<u>Colors</u>: Provide colors as selected by the Architect from the manufacturer's standard colors.

<u>Wood Supporting Frame:</u> Provide dimension lumber, select structural grade in accordance with PS 20, pressure treated with water-borne preservatives to comply with AWPB L-2, kiln dried and factory painted, with steel mounting hardware.

TRANSPARENT STRIP DOOR CURTAINS:

General: Provide the manufacturer's standard door curtains consisting of overlapping transparent strips of extruded PVC,

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suspended on the manufacturer's standard mounting system from the top of the opening to form a sealed door curtain. Provide strips of adequate length to suit the height of the opening, and in sufficient number in the unit to close the opening width with the overlap indicated.

 Strip Material: Provide the manufacturer's standard curved clear, transparent strips extruded from USDA Accepted grade PVC designed to withstand a temperature range of -40 deg.F (-40 deg.C) to +140 deg.F (60 deg.C). Provide strips with the manufacturer's standard method of attachment to the overhead mounting system indicated.

Strip Width: 12" wide and 0.120" thick (3 mm).

Edge Condition: Rounded edges.

Overlap: No overlap.

Mounting:

<u>Header Mounting</u>: Provide the manufacturer's standard header type mounting system consisting of an angle bolted or welded to the opening lintel, with permanently attached mounting pins, and a steel angle or plate retaining strip attached to the angle with wing nuts.

Wall Surface Mounting: Provide the manufacturer's standard wall type mounting system.

PART 3 - EXECUTION

PREPARATION:

Coordinate installation of loading dock equipment indicated to be attached to or recessed into concrete or masonry and furnish anchoring devices with templates, diagrams and instructions for their installation.

Coordinate delivery of anchoring devices to project site to avoid delaying progress.

INSTALLATION:

General: Comply with manufacturer's detailed instructions for the installation of loading dock equipment.

<u>Dock Bumpers</u>: Attach dock bumpers to the structure in a manner to comply with requirements indicated for spacing, arrangement, position relative to top of platform and anchorage.

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Welded Attachment: Plug weld anchor holes in contact with steel inserts and fillet weld at other locations.

Bolted Attachment: Attach dock bumpers to preset anchor bolts embedded in concrete or to cast-in-place inserts or threaded studs welded to embedded steel plates or angles. If preset anchor bolts, cast-in-place inserts or threaded studs welded to embedded plates or angles are not provided attach dock bumpers by drilling and anchoring with expansion anchors and bolts.

Screw Attachment: Attach dock bumpers to wood construction with lag bolts, as indicated.

<u>Dock Levelers</u>: Coordinate forming of pit for dock levelers to ensure that the recess is adequate to accommodate the leveler in proper relationship to the loading platform. Attach leveler securely to the loading platform construction in accordance with the manufacturer's directions.

Hydraulic Dock Lifts: Coordinate forming of pit for hydraulic dock lifts to ensure that the pit depth is adequate to accommodate the lift in proper relationship to the loading platform. Attach the lift securely to the pit floor in accordance with the manufacturer's directions.

<u>Dock Seals</u>: Securely attach supporting frames to the building structure in proper relationship to openings, dock bumpers, and dock levelers in such a manner as to ensure effective compression of dock seals when trucks are positioned against dock bumpers.

<u>Transparent Strip Door Curtains</u>: Securely attach the door curtain mounting system to the lintel in accordance with the manufacturer's installation instructions.

ADJUST AND CLEAN:

Make necessary adjustments for safe, efficient operation of loading dock equipment.

After installation, restore marred abraded surfaces to the original condition.

END OF SECTION 11160

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SECTION 11600 - LABORATORY EQUIPMENT

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PART 1 - GENERAL

RELATED DRAWINGS:

Drawings and general provisions of the Contract, including General and Special Conditions and Division 1 specification sections apply to work of this section.

DESCRIPTION OF REQUIREMENTS:

Work under this section consists of providing everything necessary for, and incidental to, the complete installation of laboratory equipment as indicated on the drawings and as specified herein, including, but not limited to:

> UC Refrigerator and Freezer Stove Top Biological Safety Cabinet Freestanding OSHA Cabinet Flush Tank Sterilizers Washer Dryer Free Standing Shelving

WARRANTY:

All equipment furnished under this Section of the Specifications shall be guaranteed for a period of one year from the date of acceptance thereof against defective materials, design and workmanship. Equipment manufacturer's warranties shall be made to the benefit of the Owner.

INCORPORATED DOCUMENTS:

Balance Table

Published specifications, standards, tests, or recommended methods of trade, industry, or governmental organizations apply to work of this section where cited by abbreviations noted below:

American Society for Testing and Materials (ASTM).

Federal Occupation Safety and Health Act (OSHA) for safe handling of flammable/volatile solvents.

National Fire Protection Association (NFPA) Codes and Standards.

9:8

Underwriter's Laboratories, Inc. (UL) Standards for Safety.

 American Society of Mechanical Engineers (ASME), Boiler and Pressure Vessel Code.

National Electric Manufacturers Association (NEMA), Standards Publication No. LD3-1975 including Revisions 1 through 4.

National Sanitation Foundation (NSF).

National Cancer Institute (NCI).

National Institute of Health (NIH).

Scientific Apparatus Manufacturer Association (SAMA)

QUALITY ASSURANCE:

Bidders' Qualifications:

Bidders shall have an established organization and production facilities specializing in the type of equipment bid with an experienced engineering department. Each shall have the demonstrated ability to produce the specified equipment of the required quality and the proven capacity to complete an installation of this size and type within the required time limits.

SUBMITTALS: (Comply with requirements of Section 01340)

Shop Drawings: Submit for all items of work of this Section, showing in large scale, methods of construction, joining, dimensions, materials, thicknesses, finishes of materials, installation, relation to adjoining work, and all other details to fully illustrate the work.

Installation Drawings: Submit for all items.

Catalog Data: Submit for all appliances and equipment.

Equipment List: For ease of identification, equipment shall be provided with an identification number and room number in which they are to be installed.

PART 2 - PRODUCTS

General: Provide the following items:

9.9

UNDER COUNTER REFRIGERATOR OR FREEZER (Equipment Item E-1)

3 Manufacturer: 4

Under counter refrigerator shall be as manufactured by Marvel Industries, a division of Dayton-Walther Corporation, P.O. Box 997, Richmond, Indiana 47347, or approved equal.

Size:

Model 4570160 all refrigerators with freezer units Model 4470100 all freezer units

Construction and Features:

Box shall be insulated with vacuum foamed in place polyurethane.

1/10" HP compressor for refrigerators and 1/8" HP for freezer units, hermetically sealed.

Outside dimensions 34-1/2 inches high, 23-7/8 inches wide, 21-3/4 inches deep.

Electric - 115V, 60 cycle A.C.

Condenser fan - cooled to permit flush mounting.

Box shall self-defrosting.

Color shall be selected by Architect.

Door latch shall be magnetic, left hand or right, field interchangeable.

Provide finished sides for all units.

Warranty - provide owner with a 5-year warranty.

STOVE TOP (Equipment Item E-2)

Manufacturer:

Stove top shall be as manufactured by Jenn-Air Corporation 3035 Shadeland, Indianapolis, IN 46226.

The cook top shall have 4 burners and down draft exhaust fan with all required fittings and exhaust duct $(3-1/4" \times 10")$ for connection to the ceiling exhaust collar through the umbilical provided behind the unit. Maximum size of the unit shall be 30" \times 22".

9.0

BIOLOGICAL SAFETY CABINET CLASS II, TYPE A: (Equipment Item E-3)

Manufacturer:

Biological Safety Cabinet, Class I Type B3 shall be vertical laminar flow hood station with the rate of 30% exhaust to the room and 70% recirculated air from the room. The unit shall be as manufactured by Baker Company (Sterilgard), P.O. Drawer "E", Sanford, ME 04073 or Nuaire, Inc., 2100 Fernbrook Lane, Plymouth, MN 554411.

Requirements:

Manufacturer shall provide certified copy of the Personnel, Product and Cross-contamination (Biological) tests, equivalent to or more severe than a specified in NSF Standard #49, performed on one (1) of the units being supplied, chosen at random by the University.

High velocity return air slots shall be located at each end of the access opening. These slots help to prevent contaminated ambient air from being drawing into the work area along the edges of the wall panels or escaping from the work area to ambient.

Hinged window shall pneumatic lifters outside the work area.

The 4'-6' model shall be capable of automatically handling 100%/120% minimum increase in filter loading and not decrease total air delivery more than 10%. With use of the speed controller, a 130%/160% increase shall be attainable.

Unit shall be able to pass through standard door.

Interior work area shall be 30" maximum A.F.F.

Both exhaust and supply filters to be front loading.

39 Complete unit shall be listed as certified by Underwriters 40 Laboratory (UL) for electrical safety and integrity.

Calculated intake velocity through front access opening shall be minimum of 100-100 fpm.

Cabinet constructed of #18 gauge cold-rolled steel, with #16 gauge stainless steel work surface. Radius (rounded) corners on the work surface. Side walls and rear wall to be one-piece construction.

Work area shall be provided with two duplex outlets with dripproof covers and circuit breakers, and two petcocks as indicated on floor plans.

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UNDER COUNTER REFRIGERATOR OR FREEZER (Equipment Item E-1)

Under counter refrigerator shall be as manufactured by Marvel

Manufacturer:

Industries, a division of Dayton-Walther Corporation, P.O. Box 997, Richmond, Indiana 47347, or approved equal.

9 <u>Size</u>:

 Model 4570160 Model 4470100 all refrigerators with freezer units all freezer units

Construction and Features:

 Box shall be insulated with vacuum foamed in place polyurethane.

1/10" HP compressor for refrigerators and 1/8" HP for freezer units, hermetically sealed.

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Outside dimensions 34-1/2 inches high, 23-7/8 inches wide, 21-3/4 inches deep.

Electric - 115V, 60 cycle A.C.

Condenser fan - cooled to permit flush mounting.

Box shall self-defrosting.

Color shall be selected by Architect.

Door latch shall be magnetic, left hand or right, field interchangeable.

Provide finished sides for all units.

Warranty - provide owner with a 5-year warranty.

STOVE TOP (Equipment Item E-2)

Manufacturer:

Stove top shall be as manufactured by Jenn-Air Corporation 3035 Shadeland, Indianapolis, IN 46226.

The cook top shall have 4 burners and down draft exhaust fan with all required fittings and exhaust duct $(3-1/4" \times 10")$ for connection to the ceiling exhaust collar through the umbilical provided behind the unit. Maximum size of the unit shall be 30" \times 22".

9.0

BIOLOGICAL SAFETY CABINET CLASS II, TYPE A: (Equipment Item E-3)

Manufacturer:

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Biological Safety Cabinet, Class I Type B3 shall be vertical laminar flow hood station with the rate of 30% exhaust to the room and 70% recirculated air from the room. The unit shall be as manufactured by Baker Company (Sterilgard), P.O. Drawer "E", Sanford, ME 04073 or Nuaire, Inc., 2100 Fernbrook Lane, Plymouth, MN 554411.

Requirements:

 Manufacturer shall provide certified copy of the Personnel, Product and Cross-contamination (Biological) tests, equivalent to or more severe than a specified in NSF Standard #49, performed on one (1) of the units being supplied, chosen at random by the University.

High velocity return air slots shall be located at each end of the access opening. These slots help to prevent contaminated ambient air from being drawing into the work area along the edges of the wall panels or escaping from the work area to ambient.

Hinged window shall pneumatic lifters outside the work area.

The 4'-6' model shall be capable of automatically handling 100%/120% minimum increase in filter loading and not decrease total air delivery more than 10%. With use of the speed controller, a 130%/160% increase shall be attainable.

Unit shall be able to pass through standard door.

Interior work area shall be 30" maximum A.F.F.

Both exhaust and supply filters to be front loading.

 Complete unit shall be listed as certified by Underwriters Laboratory (UL) for electrical safety and integrity.

Calculated intake velocity through front access opening shall be minimum of 100-100 fpm.

 Cabinet constructed of #18 gauge cold-rolled steel, with #16 gauge stainless steel work surface. Radius (rounded) corners on the work surface. Side walls and rear wall to be one-piece construction.

Work area shall be provided with two duplex outlets with dripproof covers and circuit breakers, and two petcocks as indicated on floor plans.

Unit must meet performance requirements of NIH Spec. NIH03-112c 1 2 and must be listed by NSF as meeting Standard #49.

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Each unit, before shipping, shall have a complete test to assure cabinet meets Class II requirements. A copy of this test shall be provided with the unit.

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Total electrical running load shall not exceed 20 amps with 115V 1 phase service.

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The unit shall provide 100 footcandles of illuminations at work surfaces.

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Exterior cabinet shall be constructed of heavy gauge reinforced Interior side walls and front face, steel, baked enamel finish. at work area shall be stainless steel Type 304.

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The unit shall contain:

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Transition exhaust collar with air tight damper.

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FREE STANDING FLAMMABLE STORAGE (OSHA) CABINETS: (Equipment Item E-4)

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Cabinets shall be constructed to comply with Flammable and Combustion Liquids Code #30 of the National Fire Protection Association and with OSHA construction requirements as defined in current Occupational Safety and Health Act for Safe Handling of Flammable, Volatile Solvents. Cabinets shall be grounded. Coordinate with Electrical Contractor for location of grounding Cabinets shall have their own air supply from supply systems as well as vented to air exhaust system. Coordinate with Division 15 for connections of supply and vents.

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Free-standing cabinets shall be Model 50, 78-inches high, 36inches wide by 24-inches deep, 60 gallon capacity, complying with the above requirements as manufactured by Trojan Metal Products, Inc., or equal. Provide 3 shelves, 18-inches x 22-inches, and provide lock. Color of cabinet shall be selected by Architect.

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All OSHA cabinets shall be labeled in conspicuous lettering: "FLAMMABLE - KEEP FIRE AWAY". (See OSHA requirements).

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Equipment E-5 is listed in specifications as a flush This needs to be changed to an ice-machine. The sink. ice-machine required has the following specifications:

145 46 46/ 47 474 48 49

Scotsman Model AF325 Flaker with storage bin or equal. Storage bin, stainless steel lined, minimum 140 pound

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capacity with cord, plug and condensate drain line, 120 Provide for our review and approval, a proposal to delete the flush sink and add the ice-machine. The flush sink and its related costs included in your bid should be used as an offset to the cost of the ice-machine and its associated installation costs.

Sink shall be provided and installed with flush valve and wall mounted cold and hot water mixing service fitting coordinate with building plumbing contractor for waste location.j

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STERILIZERS (Equipment Item E-6)

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Sterilizers shall be AMSCO as manufactured by American Sterilizer Company, Castle Division of Sybron Corporation, or equal. Specifications are for AMSCO, EAGLE Series, steam operated model.

Pressure vessels shall bear the stamp of compliance of the ASME code and shall bear the label of approval form the Underwriters Laboratory.

Steam jacketed chambers shall be designed for full vacuum and working pressure of 365 psig for equipment item E-5 and 40 psig for equipment item E-6.

Jacket exterior shall be insulated with a 1-inch thick foil-covered blanket of glass fiber.

Door frames shall be constructed of corrosion-inhibiting Monel and shall be welded to the vessel.

 Doors shall be cast bronze, each with an accurately machined gasket groove on the chamber size. Doors shall be held to its respective frame by a bearing-mounted stainless steel hinge. Swing of doors are shown on the plans. All door shall be manually operated.

Controls shall be conveniently located and shall not be exposed to the heat, vapor and condensate resulting from the sterilization process.

Microcomputer monitors and controls systems operations and functions shall be as follows. Cycle progresses automatically through conditioning, sterilizing, exhaust. Completion of cycle indicated visually; also audibly for 90 seconds.

Quartz-crystal based timing. Microcomputer shall use input from thumbwheel switches to accurately set exposure and drying times. Set times shall be displayed as digital readouts. Selected times shall be be changeable once a cycle has started. Automatic reset eliminates need to reprogram timers between repeated cycle.

<u>Cycle Monitoring</u>. Chamber door shall be locked pressure-tight to initiate a cycle. If unlocked, status light shall alert operator. Once selected, cycle shall be locked into microcomputer.

Throughout entire liquids cycle, WARNING light shall alert operator to HOT LIQUIDS in chamber. Following cycle, light shall

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begin flashing when chamber door is cracked open for cooling period.

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<u>Program boards</u> shall be keyed, plug-in type with printed circuits. Boards are coated for increased dielectric strength. Service shall be readily accomplished from front of sterilizer. For diagnostic purposes, light emitting diodes (LEDs) shall indicate presence of signal to associated valves or other electrically operated devices.

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<u>Auto-Lume</u> panels shall light up only when power is on. Top panel shall give cycle status, center panel, sterilize and dry time digital readouts; bottom panel features lighted cycle selectors. Selected cycle shall be clearly indicated, others locked out.

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Indicator-Recorder Controller shall provide control, shall continually indicate temperature and shall signal microcomputer when temperature is at set point; also, if chamber temperature drops below set value during exposure period. Indicating scale shall be reversible with Celsius and Fahrenheit markings. Sensor shall be in chamber drain line. Temperature shall be recorded on a synchronous motor-driven, 6-inch diameter chart using a pressure-sensitive cartridge type pen. The chart shall have both English and metric markings. Six cartridges and one hundred charts shall be furnished.

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With the Manual Control Option (sterilize cycle), the sterilizer shall be manually operable (without electric power) by a single programming wheel.

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STERILIZER IN ROOM #HAL335:

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Steam Sterilizer Isothermal Microcomputer-Controlled 20 inches by 38 inches chamber size, free standing, cabinet enclosed with single door.

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Electrical Requirements:

41 42 Terminal Box - 120V, 60Hz, single-phase service.

43 44 Accessories: For 20x20x38 and 16x16x26 type sterilizer.

45 46 Rack with 3 shelves.

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STERILIZERS IN ROOM #HAL343A:

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Steam Sterilizer Laboratory/Isothermal, Microcomputer Controlled, 24 inches by 36 inches by 48 inches or 20x20x38 or 16x16x26 chamber size, double interlocked doors with pass through cabinet.

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Electrical Requirements:

Terminal Box - 120V, 60Hz single-phase service.

Accessories: For 24x36x48 type sterilizer.

1 - Loading Car
1 - Carriage

Provide a set of rack and two shelves for 20x20x38 or 16x16x26 size sterilizer.

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GLASSWARE WASHER (Equipment Item E-7)

Provide and install where shown on drawings. Glassware washers, Model 3000 Turbomatic, Type I, Vernitron/Better Built as manufactured by Vernitron Medical Products, Division of Vernitron Corporation, 5 Empire Boulevard, Carlstadt, NJ 07072, or approved equal. Washers shall be capable of producing chemically clean glassware without presoaking, scraping, or other treatment, employing interchangeable headers and an automatic timed cycle of pump powered washing, rinsing, and draining. Glassware or metalware up to 25 inches in diameter to 19 inches high shall be accommodated.

Washers shall be Type 1 (free standing). Overall dimensions 42" wide, 40" deep, 90" high (includes air-powered booster tank).

Washers shall be provided with 3rd rinse treatment option, catalog DW.5, allowing operator to choose either tap or mineral-free water for the 3rd rinse treatment. Washer shall be provided with a stainless steel pump.

Washers shall be piped, wire, and tested at manufacturer's plant. Each connection shall be tagged for identification, ready for single point connection.

Electrical requirements shall be 208V, 3-Phase, 60 cycle, 4 wire. Washer shall be furnished with a heat exchanger "Graham 8WXF-12; prepiped and installed on machine.

Sound pressure level at operator locations shall not exceed 85 dBA under any circumstances.

Accessories:

Interchangeable headers shall be constructed of Type 304 stainless steel, mounted on nylon wheels and fitted with 1-1/2 inch ID quick-locking device for automatic connection to machine circulation piping. Spindle header manifold is fitted with hollow stainless steel spindles not less than 7 inches high. Each spindle is provided with Teflon nozzle tip and one or more lateral exit ports. Provide for each washer one each of the following items:

SP 25 spindle header frame for items up to 5 inches in diameter.

SP 49, 49 spindle header/frame up to 3-3/8" diameter.

SP 210, 210 spindle header up to 1-1/2" diameter.

Seriological or volumetric pipette washer shall process up to 400 1-ml pipettes per load.

Bottom rotary spray header for processing pre-loaded lots of baskets.

Provide set of test tube baskets, 6"x6"x6", stainless steel, 1/2-inch mesh to accommodate 144 each 1/2-inch diameter tubes; nine baskets to a set. Provide one set of adjustable covers for baskets.

Provide one transfer table per washer. Table shall be constructed of stainless steel, mounted on swivel casters, and fitted with tracks matching those of washer. Table shall be provided with drip tray to collect residual solutions and provide self-storage for two headers.

Provide for each washer, Type 304, stainless steel surge tank complete with cold water supply connections and controls for tempering effluent from the surge tank to 140 degree F. See Division 15 Laboratory Plumbing Drawings for size. Drain from the surge tanks shall be below tank with a 2-inch, right angle elbow. Provide all necessary shop drawings and components in proper configurations to allow Mechanical Contractor to field assemble washer-surge tank installation. See Detail on Laboratory Plumbing Drawings.

GLASSWARE DRYER: (Equipment Item E-8)

Provide a Type 1 (free standing) long wave radiant heat, glassware dryer, Model 8000, Vernitron/Better Built as manufactured by Vernitron Medical Products, or approved equal. See specs. for Glassware washer for address. Furnish companion dryer for washer, fitted with panels to provide long wave heat radiation for rapid drying of glassware.

Capacity: Drying chamber capacity shall be 9 cubic feet and shall accommodate any specified washer header or glassware from 1/4-inch diameter to 25-inch diameter to 20 inch high.

Construction: Housing shall be Type 304 stainless steel. Sides and rear shall be double-shell construction with venting to permit air circulation. Cabinet shall be mounted on adjustable legs.

Heating: Three 16x24: opaque white glass-ceramic face, infrared drying panels shall be mounted within drying chamber and interwired with thermostatic controls.

<u>Door</u>: Horizontally opening door shall be Type 304 stainless steel, insulated and with heat shielding panel beneath door handle. Interior face of door shall be fitted with tracks matching those in drying chamber.

Electrical: Dryer shall be complete with ON-OFF switch, pilot light and thermostatic controls interwired to fused disconnect switch.

Cabinet shall be fitted with quick-lock and blower to direct air through spindles to interior surfaces of glassware.

Electrical - 3-phase 60 Hz load requirement with 208 service, 10.7 KW.

Sound pressure-level shall not exceed 85 dBA at operator locations under any circumstance.

FREE STANDING SHELVING UNIT (Equipment Item E-9)

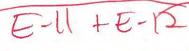
 Provide free standing, stainless steel shelves as shown on plans. Shelf unit shall be 18" wide, 64" high and 72" long standard shelving with 4 shelves and as manufactured by AMCO Corporation, 901 N. Kilpatrick Ave., Chicago, IL, Metropolitan Wire Corp., Wilkes-Barre, PA 18705, (714) 987-4731 or Market Forge, Inc., Everett, MA 02149. Provide a 5-year warranty.

BALANCE TABLES (Equipment Item E-10)

Tables shall be constructed of smooth finish, 3-inch thick white Vermont marble slabs of size shown on drawings. Marble table supports shall be held together by an iron-painted pipe with flanges, as detailed. Mount on live rubber vibration isolators. Tables shall be as manufactured by Waller Brothers Stone Co., P.O. Box 157, McDermott, OH 45652, or approved equal.

Balance tables shall be provided as specified herein as detailed.

PART 3 - EXECUTION



INSTALLATION - GENERAL:

Deliver to job site, uncrate and place in proper locations, and assemble all equipment specified herein. All debris, crating materials, etc., shall be removed. No asbestos, asbestos mix insulation is permitted.

ed to add Equipment #6 Still Water -11 / Line /45

Stillwater Generator (Equipment (#E-11)): Provide and install mega-pure 6A automatic still as manufactured by OPNING Coming Company, New York, or equal. Capacity shall be up to 6 liter per hour with maximum 208 single phase power requirement. Provide a proposal for our review and approval to add this item and all associated installation costs.

Need to add Equipment E-12. This is task lighting plug Insert the following at Page 10, Line 45: in type.

Under Cabinet Light Fixture (Equipment /#E-12): Provide shelf fluorescent task lighting as manufactured by Alko, 11500 West Melrose Avenue, Franklin Park, Il 60131, with 6'-0" white UL labeled 3 wire cord set, white grounded convenience outlet, energy saver ballasts and two 40 watt T-12 fluorescent lamps. The fixture shall be made of 20GA cold rolled, steel painted and baked white enamel. The fixture shall be furnished and installed under each cabinet with affix "L" as shown on the plans. The length of the fixture shall be the same as the cabinet. Provide a proposal for our review and approval to add these items and associated installation costs.

Section 11700 Medical Equipment (6)

> Please provide for our review and approval, a cost for the deletion of the scrub sinks in the O.R.'s. This cost should reflect equipment as well as associated installation costs.

(7) Section 11601 Daboratory Furnishings, Page 17, Line 39

All wall shelving pecifications should be heavy duty type with the following pecifications:

Heavy Duty Wall shelving: Heavy duty wall shelving shall be 1-inch plywood In a 3' \" span, faced both sides with acid-resisting plastic laminate. All exposed edges shall be self-edged.

Note: For beavy duty shelving, use "Unistrut" and "Unistrut Brackets". See drawings for details.

Reagent Shelves: Reagent shelves shall be 1-inch thick plywood, faced all sides with acid resisting plastic laminate in custom colors as selected by the Architect.

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END OF SECTION 11600

SECTION 11601 - LABORATORY FURNISHINGS

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PART 1 - GENERAL

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RELATED DOCUMENTS:

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9 Drawings and general provisions of each prime Contract,
10 including General and Special Conditions and other Division-1
11 Specification sections, apply to work of this section.

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DESCRIPTION OF REQUIREMENTS:

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Work under this section consists of providing everything necessary for and incidental to, the complete installation of laboratory furniture and furnishings as indicated on the drawings and as specified herein, including but not limited to:

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Snorkels

Overhead Service Carriers

Emergency Shower and Eyewash

Laboratory Service Fittings

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Laboratory Furniture
Materials and Finishes
   Steel
   Finish for Metal Work
   High Pressure Laminate Construction
   Stainless Steel
   Epoxy Resin Sheets
   Glass
   Mineral Fiber Board
   Finish on Plastic Laminate Top
Plastic Laminate Laboratory Furniture
Hardware - Plastic Laminate Casework
Ventilated Hood Cabinets
Undercounter Flammable Liquid Storage (OSHA)
Shelving
Drying Racks
Tops
Umbilicals
Sinks
Cylinder Strap Holders
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50 51 The Laboratory Furnishings subcontractor shall examine the substrate and the conditions under which the work in this Section is to be performed, and notify the General Contractor in writing of unsatisfactory conditions. Do not proceed with work under this Section until unsatisfactory conditions have been corrected in a manner acceptable to the Laboratory Furniture subcontractor.

Utility hook-up to equipment is specified in Mechanical and Electrical sections.

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Provide laboratory furniture in the Controlled Temperature Room #HAL 340. Coordinate with Controlled Temperature room subcontractor is furniture needs to be connected walls or floors.

WARRANTY:

All casework and equipment furnished under this section of the Specifications shall be guaranteed for a period of one (1) year from the date of substantial completion thereof against defective materials, design and workmanship. Equipment manufacturer's warranties shall be made to the benefit of the Owner.

QUALITY ASSURANCE:

Bidder's Qualifications:

Qualified manufacturers shall have an established organization and production facilities specializing in the type of equipment bid, with an experienced engineering department. Each shall have the demonstrated ability to produce the specified equipment of the required quality and the proven capacity to complete an installation of this size and type within the required time limits.

Any deviations from the Specifications, including type of finishes as set forth herein, shall be in compliance with Article 17 of Supplementary General Conditions.

SUBMITTALS:

Submit the following in accordance with Section 01340:

Shop Drawings (Reproducible).

Product Data.

<u>Installation</u> <u>Drawings</u>: Submit for items of work furnished under this Section.

<u>Catalog</u> <u>Data</u> for laboratory service fittings, electrical fixtures and fittings, appliances and equipment shall not be submitted piecemeal.

Material List: Submit for hardware, sinks, and tailpieces.

Samples: Submit samples of top material, paint/color shelving, drawer pulls, locks and hinges.

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PRODUCT HANDLING:

Protect finished surfaces from soiling and damage during handling and installation. Keep covered with polyethylene film or other protective covering until final inspection and acceptance by the Architect. Damaged and scratched surfaces shall be replaced at no cost to the Owner.

PART 2 - PRODUCTS

LABORATORY FURNISHINGS:

Acceptable Manufacturers:

Hamilton Industries Two Rivers, Wisconsin 54241

Laboratory Furniture, Inc. 115 Old Country Road Carle Place,

New York, New York, 11514

Kawaunee Scientific Equipment Corp. Statesville, North Carolina 28677

Colors: As selected by Architect from qualified manufacturer's standard colors.

Other manufacturers: Submit qualified manufacturer's request prior to bid date. Conform with general requirements. Include proof of ability to comply with Bidder's qualifications paragraph.

MATERIALS AND FINISHES:

Steel:

Steel conforming to ASTM No. A-366 for construction of bench frames, fume hoods, and furniture components shall be best mild steel, cold rolled, pickled, double annealed and patent leveled, free from dust, scales, deep scratches, buckles, ragged edges, and other injurious defects. Sheet shall be metallic furniture stock. All gauges as indicated shall be U.S. Standards.

Finish for Metal Work:

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Finishes for fume hoods, canopy hoods, casework and casework support structure, etc., indicated on the drawings and specified herein, shall be in accordance with the following specifications.

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Metal shall be pressure cleaned at elevated temperature and treated with a micro-crystalline, zinc-phosphate coating to insure superior adhesion and corrosion resistance. After fabrication of component parts, treatment shall be performed in six (6) stages as follows:

Pressure cleaning
Water rinse
Activating rinse
Zinc-phosphate spray
Water rinse
Chromic-acid rinse

All treated parts shall be immediately dried in heated ovens and gradually cooled before application of the finish. The treatment of the metal parts shall provide a better bond between finish and metal by increased finish adhesion and shall have greater resistance to rust and corrosion than untreated metal.

Finish laboratory shall be high-grade furniture quality chemically resistant baked enamel, of color selected by Architect from custom colors. Enamel shall be baked in a controlled high heat, high temperature continuous oven, assuring uniform curing to a smooth, hard satin finish. Surfaces exposed to view (interior of exterior) shall receive one coat pigmented primer applied over carefully sanded surface followed by two (2) coats of enamel. Surfaces not exposed to view shall have one (1) coat of primer and one (1) of enamel.

Surfaces shall be carefully sanded between coats and each coat shall be thoroughly dried under proper conditions of heat and humidity.

Completed finish shall be highly resistant to acids, alkalies, salts, and solvents in accordance with the following test:

 The enamel will withstand one (1) hour contact with ten (10) drops (1/2 ml) of the listed chemical reagents placed on the surface and covered with a watch crystal convex side up to prevent evaporation. After one hour, the test panels shall be washed off with soap and water and cleaned with naphtha. The test effects shall be noted 24 hours later.

CHEMICAL REAGENTS:

Sulphuric Acid	_	Up to 50%
Glacial Acetic Acid	<u> </u>	98%
Sodium Hydroxide		Up to 40%
Potassium Hydroxide	-	Up to 40%

190 Proof

Trisodium Phosphate Nitric Acid - Up to 30%
Phosphoric Acid - 75%
Ammonium Hydroxide - All concentrations

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The enamel will withstand ten (10) drops (1/2 ml) of the listed solvent applied and left to evaporate:

SOLVENTS:

Lacquer Thinner

Ethyl Alcohol Ethyl Ether
Acetone
V.M. & P.
Chloroform
Naptha
Toluene
Carbon Tetrachloride
Ethyl Acetate

The resultant finish shall pass the test with no effect other than a slight discoloration or change of gloss, or temporary softening of film, with no less of adhesion and no loss of film protection.

Completed finish shall be resistant to the following physical test:

<u>Abrasion</u>: Finish shall have high abrasion resistance with maximum weight loss of 5.5 mg. per 100 cycles as tested on a Taber abrasion tester #E4010 with 1000 GM wheel pressure and calibrase #CS10 wheels.

Hardness: Finish shall have hard surface equivalent to 5H or 6H
pencil lead.

Bend: Finish shall be able to withstand a 180 degree bend over a 3/8 inch diameter mandrel without chipping or flaking using a Gardner Conical Mandrel #1620 or equivalent, conforming to ASTM-D522-41 procedure.

<u>Impact</u>: Finish shall be able to withstand a forward impact of 64 pounds without chipping or crazing using a Gardner #167 Impact Tester with 5/8 inch diameter spherical punch.

<u>Salt Spray</u>: Finish shall withstand 1000 hours exposure in saturated humidity at 100 degrees Fahrenheit.

Humidity Resistance: Finish shall withstand 1000 hours exposure in saturated humidity at 100 degrees Fahrenheit.

Moisture Resistance: Finish shall resist boiling water trickled over the test panel surface inclined at a 45 degree angle for

five minutes. At the end of the test, the surface shall be dried and, upon examination, shall show no visible effect. 2

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Cabinets having "Flaking" (non-adhering) paint shall replaced. Field touch up, except for minor scratches, is not acceptable.

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High Pressure Plastic Laminate:

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11 12 Plastic laminate shall be high pressure melamine laminate equal to or exceeding NEMA standards LD3-1980 for vertical grade high pressure plastic laminate. Low glare, finely ground textured finish with gloss reading of 12.

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All colors shall be selected by the Architect.

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NEMA grade GP 50 in a choice of colors, Wilson Countertops: Art, (no known equal). Laboratory bench tops shall be acid resistant and shall be completed with backing sheet.

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Backing Sheets: NEMA grade BK 20.

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High pressure melamine laminate .027 inch Cabinet Liner: thickness.

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High pressure laminate shall be bonded to Laminate adhesive: core with a liquid polyvinyl acetate or a urea resin adhesive at temperature above 65 degrees F to a pressure no less than 15 pounds per square inch. Laminate and core to have minimum of 8% and maximum of 12% moisture content and is to be laminated and cured in a controlled environment between 40% and 60% relative humidity.

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Lytex overlay: High grade polyvinyl chloride (P.V.C.), 4 mil thickness, laminated to a sanded core.

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Composition board: High grade monolithic particle flakeboard with an average of forty-eight (48) pounds per cubic foot density and a maximum of 12% moisture content.

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Plywood: B grade or better Douglas Fir bonded with water proof phenolic adhesives.

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Pre-finished beige color, smooth two sides, oil impregnated wood fiber, uniform and free from defects.

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Stainless Steel: Unless otherwise noted on drawings or elsewhere in the specifications, stainless steel for tops, sinks, umbilical collar, certain shelves, fume hoods, etc., shall by Type 304. Stainless steel shall conform to ASTM Specification No. A240 and shall be of gauge as indicated on the Drawings, with all exposed surfaces ground and polished to a #4 satin finish. Stainless steel for Perchloric-acid hoods shall

54 be Type 316.

All stainless steel nuts, screws, bolts, and rivets, etc., shall be of the same type stainless steel as in the sheet materials and shall have a tumbled finish closely resembling that of a #4 finish.

All stainless steel welding material shall be of type similar to the sheet material or as acceptable to the Architect. The weld shall be made without discoloration and shall be ground, polished, and passivated to blend harmoniously with a #4 satin finish. All joints in stainless steel tops are to welded.

Stainless steel tops shall be e 16 gauge. Stainless steel sinks, side and backsplashes, where indicated, shall be integrally welded to top and finished as indicated above. Edges shall be flanged down the same dimension as the adjacent non-stainless top, with 1" as a minimum and shall be returned over a perimeter plywood frame to simplify securing top material to cabinet or structural frame. Under-surface shall be reinforced with full length 16-gauge structural metal channels as required to insure rigidity and prevent buckling, warping, or oil canning. Underside of top shall have a heavy mastic agent coating providing sound deadening.

Tops shall be fabricated with a marine edge and shall be pitched to sink bowl for proper drainage. Marine edge shall be seamless die-formed. Marine edge shall be provided in tops with sinks only, unless noted otherwise on plans.

Epoxy Resin Sheets:

Epoxy Resin sheets shall be molded from a modified epoxy resin that has been especially compounded and cured to provide optimum physical and chemical resistance required of a heavy duty laboratory working surface. Sheets shall be uniform mixture throughout and shall not depend on a surface coating that can be readily removed by chemical or physical abuse. Physical properties and tests shall be as follows:

Physical Properties Test Procedure:

42	Compressive Strength	36,500 PSI
43	(ASTM D695)	
44	Flexural Strength	16,000 PSI
45	(ASTM D790)	
46	Tensile Strength	10,500 PSI
47	(ASTM D638)	
48	Density	
49	(ASTM D792)	
50	Rockwell M. Hardness	110
51	(ASTM D785)	
52	Heat Distortion	350 F
53	(Temp. at 264 PSI)	
54	(ASTM D648)	

Thermal Coefficient of Expansion 2 (ASTM D 696) 3 1.1509 x 10 -5 inches/degree F 5 1.1441 x 10 -5 inches/degree F 6 7 Fire Resistant (Self Extinguishing) 8 ASTM D696) 9 10 Impact Resistance Test Procedure: 11 A 1-1/4" Countertop shall withstand a 1.4 KG impact from 2.75 12 meters. The sample shall be tested using a 10 pound (4.5 KG, 13 14 4.5" (114MM) diameter ball and no cracks or fractures shall be 15 noted. 16 17 Electrical Conductivity (non-conductor) Test Procedure: 18 19 Two electrodes shall be placed on the test specimen 12 inches apart and a voltage of 500 volts DC shall be applied between the 20 21 electrodes and a measurement shall be recorded. The resistance 22 measurement recorded on at least four countertops shall be 23 infinite verifying the material is non-conductor. 24 25 Water Absorption 0.0076% 26 (ASTM D570) 27 28 Chemical Spot Test, Test Procedure: 29 30 Non-volatile reagents: approximately 1/2 cc of the reagent 31 shall be applied to the surface tested. The reagent shall be applied to the surface tested. The reagent shall then be 32 covered with a wide mouth bottle to retard evaporation. 33 34 35 Volatile reagents...a one (1) inch ball of glass wool shall be 36 saturated with reagent, placed on the surface being tested, and 37 then covered with a wide mouth bottle. 38 All surface test spots shall be wet with reagent for a 16 hour 39 40 After exposure, the surface shall be washed with soap 41 and water, rinsed and dried before examination and evaluation. 42 43 Also, the test surface inclined at a 45 degree angle and subjected to a trickling of boiling water from the condensation 44 45 of steam blown against the surface for five minutes. 46 47 48 ACCEPTABLE CHEMICAL SPOT TEST RESULTS 49 50 NO SLIGHT 51 EFFECT SPOT SPOT

X

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Aceton

Acetic Acid, Glacial

					ල්ක උ
1	Ammonium Hydroxide,	28%	Х	•	100
	Aniline Oil		X		
2 3 4 5 6 7 8		189.	:P==/		
3	Benzene				
4	Carbon Tetrachloride	400	Х		
5	Chromic Acid,	40%		X	
6	Citric Acid,	10%	X		
7	Cottonseed Oil		X		
	Dichromate Cleaning So	olution			X
9	Diethyl Ether		X		
10	Dimethyl Formamide		X		
11	Distilled Water		X		
12	Detergent Solution,	1/4%	X		
13	Ethyl Acetate	4500 . 1010 1000	X		
14	Ethyl Alcohol,	95%	X		
15	Ethyl Alcohol,	50%	x		
16	Ethylene Dichloride	500	: 43		
17	(Dichloroethane		х		
18	Heptane	270	X		
19	Hydrochloric Acid,	37%	X		
20	Hydrochloric Acid,	20%	X		
21	Hydrogen Peroxide,	28%	X		
22	Hydrogen Peroxide,	3%	X		
23	Iso-Octane		X		
24	Kerosene		X		
25	Methyl Alcohol		X		
26	Mineral Oil		X		
27	Nitric Acid,	70%	X		
28	Nitric Acid,	10%	X		
29	Oleic Acid	100	X		
30	Olive Oil		X		
31	Phenol	4.5	X		
32	Soap Solution,	1 %	X		
33	Sodium Carbonate,	20%	X		
34	Sodium Carbonate,	2%	X		
35	Sodium Chloride,	10%	X		
36	Sodium Hydroxide,	10%	X		
37	Sodium Hydroxide,	5%		X*	
38	Sodium Hypochlorite	5%		X	
39	Sulfuric Acid,	96%		X	
40	Sulfuric Acid,	60%			
				X	
41	Sulfuric Acid,	33%		X	
42	Toluene			X	
43	Transformer Oil			X	
44	Turpentine			X	
45	Acetic Acid,	5%			
46	=== T20				
47	400 77 01771		de la companio		

100 Hour Soaked cellulose sponge test Boiling water trickling 5 minutes.

Heat Resistance Test Procedure:

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A high from porcelain crucible, size 15ml. capacity, shall be heated over a Bunsen burner until the crucible bottom attains a dull, red heat. Immediately the hot crucible shall be

transferred to the top surface and allowed to cool to room temperature. Upon removal of cooled crucible, there shall be no blisters, cracks, or any breakdown of the top surface whatsoever.

The top surface shall show no blistering or cracking when an overturned 3/8" (9.525MM) Bunsen burner, adjusted to quiet flame with a 1-1/2" (38MM) inner cone is allowed to remain on the surface for a period of five (5) minutes.

Glass:

21 22

Glass for framed and non-framed cabinet doors and fume hoods shall be 1/4" laminated safety glass.

Mineral Fiber Board:

Fume hood lining shall be 1/4 inch chemically-resistant compound of mineral fibers and Portland Cement, built up under pressure into a dense smooth and rigid monolithic sheet. All fabricated exposed edges shall have radius or chamfered edge. Lining or top shall not contain asbestos.

Finish on Mineral Fiber Board:

Finish for fume hood lining shall be a white gloss epoxy paint, 3 spray or 2 brush coats applied, to all liner surfaces exposed to fumes. Finish shall be self-extinguishing. Finish shall be smooth, properly applied, and baked and shall withstand the following tests:

Five (5) drops of each reagent shall be covered with a 25mm watch glass. All volatile materials shall be tested by using a one ounce, wide-mouthed bottle, stuffed with cotton and saturated. After 24 hours, the test panels shall be washed off with soap and water and cleaned with naphtha. The test effects shall be noted 24 hours later.

The finish deterioration shall be limited to superficial changes in surface color or gloss, affording excellent protectability to the following reagents and solvents.

43	ACIDS:	Hydrochloric	37%
44		Sulfuric	33% & 77%
45		Acetic	98%
46		Chromic	60%
47		Formic	90%
48		Nitric	20%, 30% &
49	70%		
50		Phosphoric	85%
51			
52	ALKALIS:	Ammonium Hydroxide	28%
53		Sodium Hydroxide	10% & 20%
54		Flake Caustic Soda	40%

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2	SALTS:	Sodium Sulfide (sat.)
3		Sodium Carbonate (sat.)
		Zinc Chloride (sat.)
5		Calcium Hypochlorite
4 5 6 7		Sodium Chloride (sat.)
8	SOLVENTS:	Methyl Alcohol
9		Ethyl Alcohol
10		Butyl Alcohol
11		Benzene
12		Xylene
13		Toluene
14		Gasoline
15		Kerosene
16		Carbon Tetrachloride
17		Formaldehyde 40%
18		Trichlorethylene
19		Ether
20		Furfural
21		Cottonseed Oil
22		Mono Chlor Benzene
23		Dioxana
24		

CASEWORK SUPPORT STRUCTURE (AND MOVABLE TABLES)

The support structure shall consist of a self-supporting steel frame of modular components bolted and/or welded together. Structure shall be such that installation, or disassembling for future relocation, can be accomplished with ease. Structure shall support countertops, sinks, cupsinks, and umbilicals independently from base cabinets. System shall provide the flexibility and interchangeability of any or all base cabinets without removal of the working top. Framing shall support and contain cabinets with unlimited horizontal interchangeability of all cabinet sizes along with the assemblies without interference of intermediate vertical legs, supports, brackets or framing between cabinets. Unused holes shall be plugged with matching finish plugs.

Framing shall be structurally designed so that assemblies can be of any length with legs spaced for maximum spanning capability but shall have the capacity of spanning at least 6'-0" under design loading. Leg locations have to be indicated on drawings for some island, wall, and peninsula assemblies. For situations not covered in the Drawings, legs shall be positioned using criteria stated herein and as shown on Drawings for other conditions. Legs will not be accepted when located within knee openings. Framing and cabinetry shall have a minimum of eight (8) inches clear space to floor for cleaning machines.

A plumbing space between vertical leg frame members for service lines, drain lines, and electrical lines shall be provided as detailed.

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The assembly shall be designed and manufactured in such a manner that for each linear foot of span between the supporting elements, there shall be the capability of supporting a live load of 200 pounds plus a top dead load of 50 pounds/linear foot. In addition, a concentrated load of 250 pounds may also be placed on the front edge at any point (assuming legs 6'-0" center) without causing the system to fail in its suspension or to tip or deflect more than 3/16 of an inch.

The basic support structure shall be as set forth or equivalent to the following:

Lower and upper horizontal leg members shall be not less than 11-gauge, 2"x3" cold-rolled steel tubing.

Horizontal front rail and rear leg posts shall be "C" shaped, seamless and continuous free of welds, not less than 2"x2"x11 gauge square, reinforced with $1-3/4" \times 1-3/4" \times 11$ gauge inner continuous reinforcement channel.

Secondary leg post and upper rear horizontal rail shall be "C" shaped not less than 2"x2" x 11 gauge.

Reinforcement channels and "C" shaped rails shall be flat and straight without warp or twist. Removable end caps shall be flat and straight without warp or twist. Removable end caps shall be provided at all exposed ends.

Reinforcement channel shall be spot welded approximately 12 inches on center, staggering welds on each side.

Lower rear angle for support of casework shall be 3" \times 3" \times 1/4" in size and shall be provided throughout and mounted as detailed on the Drawings.

 Mounting plates, when required, shall be a minimum of 11-gauge thick and of lengths and configurations needed to properly make all connections. All necessary hex-head bolts, nuts, washers, etc., shall be provided to complete installation and shall be commercially cadmium plated or stainless steel as protection against corrosion.

All components, except cadmium plated or stainless steel bolts, to be finished with chemically resistant baked enamel described under MATERIALS AND FINISHES Article of this Section of the Specifications.

Cases shall be suspended with fastener devices mounted in front of unit for attachment to the front rail and shall be designed so that easy removal of cabinets can be accomplished. Such

1 devices shall be of forged steel or cast steel and shall be 2 commercially cadmium plated (or approved coating).

Furnish a total of two (2) adjustable dollies for transportation and relocation of cabinets. The dolly shall be so designed that casework units can be transported fully loaded in a level and true position. Dollies shall be included in shop drawings.

Lower horizontal leg members shall have 5" clearance to the floor for cleaning purposes. See lab furniture drawings for detail.

METAL LABORATORY FURNITURE:

Casework shall be of metal construction of slim-line design and shall be constructed in accordance with the highest standards and practices of the metal casework industry. Superior quality casework shall be established by use of proper machinery, tools, dies, fixtures, and skilled workmanship such that the fit of doors and drawers shall allow vertical and horizontal openings of minimal tolerance.

Each unit shall be completely welded structure and shall not require additional parts such as applied panels at ends, backs, or bottom. All cases shall be rigid and self-supporting for use interchangeably in an assembly of cases or for free standing use.

All units shall be of flush-front construction. At the intersection of vertical and horizontal case members, such as end panels, top rails, bottoms and vertical posts, all parts shall be in same plane without overlap, spot and arc welded with heavy backup gusset reinforcement at exterior corners. Cracks and crevices are not acceptable. Doors and drawers hall have fronts in same plane as exterior case members. Case openings shall be rabbeted on all four sides for hinged doors, and on top and two sides for sliding doors, to provide a dust resistant case. All units hall have tops, bottoms and backs except top 18-inches at sink cabinets.

All units shall have cleanable flush interiors with no hole openings from interior of case to the exterior.

 Front and rear posts, reinforcing members, or channel uprights shall be enclosed full height or width of unit and at both ends. Bottom shall be of pan type construction with two ends and back formed up for easy cleaning. Perforations for shelf adjustment shall be internal and space behind shelf clip holes shall be completely enclosed.

Back panel for ventilated hood cabinets, upper, wall, and tall cases shall be multiple formed for strength.

Wall cabinets shall be designed so cabinets hang rigidly vertical without sag or tilt. Contractor shall be responsible for coordination with wall framing contractor to insure that proper reinforcement is installed at walls to support resultant load. Entire assembly shall be modular in design and installation shall permit immediate interchangeability of all wall cabinets and/or shelf units as specified hereinafter.

 Metal used in the construction of cases shall be of the following minimum gauges:

Solid door interior panels, scribing strips, fuller panels, enclosures, drawer fronts and drawer bodies, and shelves - 20 gauge.

Case tops, ends, bottoms, backs, vertical posts, uprights, glazed door members, door exterior panels and top rear corner gussets - 18 gauge.

Top front rails, top rear gussets and intermediate horizontal rails - 16 gauge.

Drawer suspensions, top rails, door and case hinge, and front corner reinforcement - 14 gauge.

Undercounter and wall cases shall be constructed in sizes indicated. The maximum variation in width for cases shall be +/-1/8".

End panels shall be formed with a front and rear post column to provide rigidity and strength and to prevent racking or case distortion. Front posts shall be fully closed with full height upright containing shelf adjustment holes. Rear posts shall be fully closed with one-piece back panel containing shelf adjustment holes. Adjustments 1/2-inch on center.

 Bottom and top shall be on-piece construction with the bottom having the top of the front edge formed into rabbet design for swinging doors and drawers with exposed face flush with end panels. The back and sides of bottom pan shall be formed up and welded case to prevent dirt accumulation and allow for easy cleaning.

Doors and drawers shall fit flush within case and not overlap case ends, top or bottom. Reinforcement shall be provided at all front corners for additional welded strength between vertical and horizontal case members.

 Floor mounted cabinets shall be properly reinforced, with adjusting glide at each corner (3/8-inch minimum diameter). Provide snap in stainless steel buttons at each leveling guide adjustment hole.

Drawers in cases are to modular in height to allow interchangeability for drawers in the same widths of cases.

Drawer bodies shall be made in one-piece construction including the bottom, two sides, back and inner front. They shall be fully coved at interior bottom on all four sides for easy cleaning.

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All top edges shall be formed for strength and shall provide a convenient hand-holding position if drawer is removed. Drawer front shall be double-wall construction, 3/4-inch thick, and sound deadened. All interior surfaces shall be painted before assembly. Top front corners surfaces shall be painted before assembly. Top front corners of outside drawer heads to be welded and ground smooth. Drawers shall be removable without the use of tools. Drawers shall be provided with rubber bumpers for cushioned closing. Friction centering devices not acceptable.

Hinged doors shall be double-wall telescoping construction 3/4-inch thick, with front panel and inner liner formed on four sides. All interior surfaces are to painted before assembly. Door shall be sound deadened on interior. Sound-deadening material shall be applied to both inner and outer door panels with structural sound-deadening material between for maximum sound deadening and extra rigidity. Hinges shall be removable and fastened with screws to door and case with mounting through door panels and case to a minimum 14-gauge inner reinforcements. Hinges welded to door or to case are not acceptable. Door closing action to be against rubber bumpers.

All removable shelves shall be adjustable on 1/2-inch centers. Shelves shall have four sides formed down 3/4-inch and front and back returns formed 1/2-inch minimum. Shelves over 36 inches wide or 16 inches deep shall have welded full width hat channel reinforcement.

 Unframed sliding glass doors shall be 1/4-inch thick laminated safety glass set in "H" shaped glazing channel of extruded, anodized aluminum, full length bottom channel with integral pull, operating on nylon rollers and anodized aluminum bottom track. Track shall have clean out opening at each end. Top edge of glass shall have spacer guides fitting in top anodized aluminum track. Provide snap-on nylon guide at top of door.

Filler panels shall be installed at exposed-to-view areas, between back of cabinets and walls, between backs of cabinets at end of peninsula or island benches, and in any other areas necessary to enclose gaps. Filler shall be required at knee opening spaces to cover service-chase.

Steel filler panels shall be 18-gauge with a 1/2-inch return four sides, removable with common tools.

Provide channel iron and Unistrut assemblies to support overhanging top material and to support pipes as detailed.

1 2 3

HARDWARE - METAL LABORATORY FURNITURE:

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Pulls shall be flush mounted satin finish, clear anodized aluminum extrusions, minimum 4-inches long, inset 1-inch from door or drawer edge. Mount door pulls and drawer pulls horizontally.

All drawers shall have full extension slides. Slides shall be multi-membered, fabricated of cold-rolled steel, 16-gauge minimum, bright electro-zinc plated finish. Slides shall be positive stop at full extension and permit the removal of the drawer without the use of tools.

Slides for drawers 4-inches and deeper shall be No. DS-4000 with a load rating per pair of 150 lbs. for drawers less that 4-inches deep, shall be No. DS 3290 with a load rating per pair of 100 lbs, all as manufactured by Waterloo Metal Stampings, Ltd., Kitchener, Ontairo or "Accuride" division of Standard Precision, Inc., Santa Fe Springs, CA.

Drawers shall be capable of supporting a static load of 150 pounds hung from drawer head at center line for five (5) minutes with drawer extension 13 inches.

Hinges to be institutional construction, 5 knuckles, 2-1/2 inches long. Hinge to be of heavy wrought steel, brush chrome plated with hinge barrel only projected beyond face of cabinet, two per door under 4'-0" high, three per door over 4'-0" high.

Friction catch shall be roller type, operating with a built-in tension spring. All parts except roller shall be steel, cadmium plated.

Shelf clips shall be die-formed steel, zinc plated, to engage in shelf adjustment holes on nominal 1/2-inch centers.

Locks, where called for on Drawings, shall be heavy duty cylinder type. Noses of each lock to be satin chrome plated, with phosphor bronze spring and 14 disk tumblers allowing individually faced cabinets on a grand master key arrangement and two master keyed groups with each individual cabinet having cylinder locks, keyed locks. Keys shall be 3/32-inch thick minimum stamped brass. Keys shall be available from manufacturer only. National Lock Company #M2-0106L.

Leveling glides for support structure shall be similar to Model No. GB8 as manufactured by Shepherd Casters, Inc., 203 Kerth Street, St. Joseph, Michigan 49085, or glide Model No. 62-004A as manufactured by National Lock Co., Rockford, Illinois.

Shelf Standards: Garcy #3225, Satin zinc.

Casters shall be 3-inch diameter \times 1-1/4 inch plastic, ball bearing, wheel swivel casters with brakes and standard top plate, catalog number 50-3UM-WK as manufactured by Payson Casters, Inc. or approved equal.

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VENTILATED HOOD CABINETS:

 Cabinet shall be constructed as specified for Metal Laboratory Casework, except interior and shelf shall be triple epoxy coated. Removable back shall be gasket sealed. Door shall be provided with louvered vents and two gasket tight 2-inch polypropylene vent pipes shall extend from back of cabinet through, and extend 1/4" above, hood work surface. Each cabinet shall be provided with a half depth adjustable shelf full width of the cabinet. Bottom shall be provided with a 1/4" thick heat welded, liquid tight, removable polypropylene pan. Catches and shelf clips shall be stainless steel. Custom color of cabinet(s) shall be as selected by Architect.

UNDERCOUNTER FLAMMABLE LIQUID STORAGE:

Metal cabinet shall be constructed to comply with OSHA and NFPA regulations. "Metal cabinets constructed in the following manner shall be deemed in compliance. The bottom, top, door and sides of the cabinet shall be at least No. 18-gauge sheet iron and double walled with 1-1/2 inches air space. Joints shall be riveted, welded or made tight by some equally effective means. The door shall be provided with a three point lock and the door sill shall be raised at least 2-inches above the bottom of the cabinet". OHSA 29 CFR 1910.106d. Cabinets shall be as manufactured by Lab Safety Supply, Division of Science Related Materials, Inc., P.O. Box 1368, Jamesville, Wisconsin 83647-1368. Provide grounding lug. No ventilation. Custom color of Architect.

SHELVING:

Wall Shelving

 Wall shelving shall be 3/4-inch particle board for 3'-0" span (except for heavy duty wall shelving which requires 1-inch plywood in a 3'-0" span, faced both sides with acid-resisting plastic laminate. All exposed edges shall be self-edged.

 Standards shall be satin zinc finish #3225 double-slotted type 30-inches long unless otherwise noted on Drawings, as manufactured by Garcy Corporation, or #44 as distributed by E.B. Bradley, or equal. In no case shall spacing exceed 48-inches on center.

1 Brackets shall be 16-gauge metal with three blade hooks as 2 detailed. Shelves shall be screwed to each bracket. Brackets 3 shall be painted as specified for steel in colors selected by 4 the Architect.

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Reagent Shelves:

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Reagent shelves shall be 1-inch thick plywood, faced all sides with acid-resisting plastic laminate in custom colors as selected by the Architect.

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16 17 Shelf supports shall be 1-inch OD, cold-rolled, seamless mechanical tubing of 0.065 wall thickness. Shelves shall be held in place with zinc-plated large head screws. Support tubing shall be attached to bench tops with 3/8-inch diameter threaded studs screwed to metal backup plates as detailed. All custom color including standards shall be as selected by the Architect.

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Note: For heavy duty shelving, use "Unistrut" and "Unistrut Brackets". See drawings for details.

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DRYING RACKS:

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Furnish and install drying racks as detailed elsewhere and as specified herein.

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44 45 Drying racks shall be stainless steel with white pegs. The body shall be one piece 20-gauge type 304 stainless steel with a No. 4 finish. The top shall have two 90 degree bends, and sides to have on 90 degree bend. The front shall have a multiple of Tshaped holes to accommodate injection molded white polypropylene A T-shaped protrusion on the base of pegs shall allow easy removal and replacement without the need for tools. shaped holes shall be designed to fit the protrusion on support pegs for holding single or multiple utensil drip trays, drain shelves, funnel racks or pipette holders. A wall hanger shall be provided to allow removal and replacement of the entire rack for cleaning without the need for tools. The bottom shall have two 90 degree bends to provide an integral drip trough. drip trough shall have 3/8-inch OD stainless steel tube. trough shall have a stainless steel screen insert. The screen shall be 16-gauge 304 stainless steel with 14 by 14 mesh, .025 wire. As manufactured by "Mod-Rack", Inter-Dyne, 15487 Linn Court, Spring Lake, MI 49456, and as detailed.

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UMBILICALS:

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Umbilicals shall be furnished and installed in the configurations and locations indicated on the Drawings and as detailed and specified herein.

Umbilical sections shall be constructed of 18-gauge sheet metal collars at top and bottom. Bottom collar shall be 16 ga. stainless steel. Type #304, properly caulked to bench top as detailed. Top collar shall be 16-gauge sheet steel.

Umbilicals shall have removable sections as detailed for easy access to piping and conduit. No exposed fasteners will be allowed. Removal of sections shall not disturb the ceiling or bench top.

 On umbilical type 1B, there shall be a unistrut channel spot welded to the fixed enclosure. Furnish under this section of the specification. On umbilical Types 1A and 1C, support shall be provided under Division 15. Coordinate exact location(s) with mechanical, electrical and ceiling contractors.

Finishes shall conform to Materials and Finishes Article of this Section with color sketched by the Architect.

21 TOPS:

Stainless Steel:

(See Page 8)

Plastic Laminate Tops:

 Plastic Laminate Tops shall be as specified under "High Pressure Plastic Laminate Construction", Page 7.

Epoxy Resin:

Materials:

Shall be as specified in Page 9.

Thickness:

Each epoxy top, before fabrication, shall be inspected for thickness. Each corner of the top shall not deviate more than plus or minus 1/32" (.793MM) from nominal.

Warpage:

 Each epoxy top, before fabrication, shall be inspected for warpage. The slab shall be placed on a true plane formed by a surface plate of "tool room Grade B or better". It will be measured in unrestrained condition. The top will be accepted for use if there is no gap exceeding 1/16" (1.587MM) in a 36" (914MM) span or a 3/32" (2.381MM) in 96" (2438MM) span.

Fabrication:

Tops are to be 1" (25MM) thick unless otherwise noted on the drawings. All tops shall be provided in the longest practical 2 lengths. All joints shall be bonded with a highly chemical and corrosion resistant cement having similar properties as the base material. Provide a 1/8" (3.175MM) wide drip groove on the underside of all exposed edges set back 1/2" (12.7MM) from the top edge. - All exposed edges shall be finished according to manufacturer's standard.

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Curbs shall be supplied loose for field application in same thickness as countertops. Curbs shall be 4" (102MM) high unless otherwise indicated on drawings. Where tops abut wall or fumehood, supply an end curb.

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Fabrication Tolerances:

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Size: Length plus or minus 1/8" (3.175MM); width plus or minus 1/6" (1.587MM).

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Squareness: plus or minus 1/64" (.396MM) for each 12" (304MM). A table top spanning 48" (1219MM) will be held to plus or minus 1/16" (1.587MM).

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Location of cutouts and drillings: plus or minus 1/8" (3.175MM).

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Sizes of cutouts and drillings: plus 1/8" (3.175MM) minus 0.

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SINKS:

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Stainless Steel:

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All stainless steel sinks shall be furnished of 18-gauge steel unless otherwise noted. All sink units shall be designed and fabricated with sufficient reinforcement to prevent oil canning. All sink joints shall be butt welded by the heliarc welding process, and ground smooth. Inside radii shall be 1-inch. Bottoms shall be pitched to the drain indent. No soldering will be permitted in connection with sink construction. Sinks shall be sound deadened on underside. All sink bowl dimensions given are inside dimensions. Provide all sinks with strainer and adapter, Part No. 7218, as manufactured by R and G Sloane Manufacturing Company.

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Stainless steel cup sinks shall be as described above for "sinks" including screen and swivel sink strainer adapter with gasket, Part NO. 7218 as manufactured by R and G Sloane Manufacturing Co., except that cup sink shall be fabricated of Type 304 stainless steel in conformance with the "stainless steel sinks" specifications with interior dimensions to match above.

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Epoxy Resin:

Epoxy resin sinks shall be constructed of material that must meet or exceed "Durcon" 2A, manufactured by Laboratory Services, Inc. Plymouth, MI; Prime Industries, or equal. Sinks shall be furnished complete with support straps, sink outlet, and open end overflow. Provide swivel sink strainer adapter with gasket, Part No. 7218, as manufactured by R and G Sloane Manufacturing Co., with each sink.

Epoxy resin cup sinks shall be as manufactured by Laboratory Services, In., Prime Industries or equal, with 8x8 per square inch, .028 wire diameter, Type 304 stainless steel screen. Equivalent model by R and G Sloane Manufacturing Company, Inc.will be accepted.

CYLINDER STORAGE RACKS:

Cylinder strap holders shall be furnished and installed as specified herein and as detailed. Assembly shall be distributed by McMaster-Carr, Aeroquip Security Systems, or equal.

CYLINDER STRAP HOLDERS:

Cylinder strap holders shall be furnished and installed as specified herein and as detailed. Assembly shall be distributed by McMaster-Carr, Aeroquip Security Systems, or equal.

McMaster Assembly:

Assembly shall consist of P-1000 Unistrut in lengths required, fastened to the wall or bench.

90 degree angle fitting shall be bolted to the P-1000

Weblock nylon strapping, 1-inch wide, Number 3699T16 shall be looped through the angle fitting. Strapping shall be fitted with safety belt type buckles similar to Catalog Number 3699T11 with Number 3699T14 quick disconnect as distributed by McMaster-Carr, or equal (no equal known).

Assembly shall be painted in color as selected by Architect.

SNORKELS:

Provide snorkels complete with cone and clamping ring, support arm and mounting bracket as detailed.

Cone collar, clamping ring, supporting arm and supporting arm and mounting bracket shall be 18-gauge, Type 304 stainless steel unless otherwise noted and shall be complete with clamping collar.

Stainless steel support arm, rod and bracket shall be adjustable in four dimensions as shown.

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Flexible duct shall be aluminum McMaster Carra (See Detail #9, Sheet LF-4, for catalog number).

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OVERHEAD SERVICE CARRIERS:

Units shall be constructed as detailed including double-channel Unistrut vertical supports and diagonal braces above ceiling. Entire assembly shall be securely fastened to structural slab above or to structural grid where provided. Coordination is required with structural framing.

EMERGENCY SHOWER AND EYEWASH:

Fitting #11:

Emergency Shower and eyewash shall be furnished assembled under this Section of the Specifications, and as detailed on Drawings for installation under Division 15.

Showers shall be deluge type with pull-on and push-off controls and shall be furnished complete with a flex hose mounted nozzle eyewash. Shower head and flush ceiling collar shall be polished chrome plated with a 3/8" anodized aluminum pull rod.

Horizontal piping (from shower head to wall) shall be provided under Division 15.

LABORATORY SERVICE FITTINGS:

General: Service fittings shall be furnished and delivered to point of use for installation as specified in Division 15 of the Specifications. All laboratory service fittings shall be of the product of one service fixture manufacturer to assure ease of replacement and maintenance. All service valves, fittings, and accessories shall be of cast brass with a minimum copper content of 85% except for items which are to be brass forging or bar stock. All units are to specifically designed for laboratory use. All faucets shall be of the tapered body design.

Assembly components and operating parts such as valve stems, renewable units, packing nuts, outlet nozzles, and straight serrated hose ends shall be made from solid brass stock.

Replaceable seats, needle cones, valve disc screws, and other accessories shall be monel or stainless steel alloys especially 2 3 selected for use intended.

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Fittings shall be factory tested and shall be supplied with nipples, lock nuts, shanks, etc.

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All faucets, valves, and fittings except water fittings shall withstand test of 100 pounds per square inch. Water fitting tested with 80 pounds. Unites for use at gases shall be tested under water.

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Serrated top fittings shall have 3/8-inch IPS thread with the hose end being tapered and shall not have less than ten serrations. Diameter or orifice in serrated tip shall be 1/8inch, except where otherwise specified.

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Turrets shall be brass drop forging of design indicated in details shown on the plans and shall be on or two-way as required with 34/8-inch IPS female inlet thread for connections. Units shall be furnished with brass shanks, brass locknuts, and washers.

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Fittings located on the same plan shall have their handles project the same distance from the plant of reference to present a uniform, related appearance, regardless of valve type construction.

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Flanges shall be brass forging of approved design with 3/8-inch IPS female inlet and outlet.

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All goosenecks shall provide full thread for attachment of antisplash outlet fittings, serrated tips and filter pumps.

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Hot water/cold water gooseneck mixers shall swivel. point shall be at turret or at valve level if wall or panel mounted. Swing joints shall have heavy teflon packings.

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Water Valves:

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Water valves shall include a renewable unit containing all the working parts which are subject to wear, including stainless steel or monel seat, monel screw, and heavy duty set disk and teflon packing, and an integral or external adjustable volume control.

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Unit shall be capable of being readily converted from compression to self-closing, and vice versa, without disturbing faucet body proper and shall also be capable of being readily converted from water construction to needle valve or steam valve construction having outside packing gland without disturbing faucet body.

1 Unit shall be sealed in valve body with special composition 2 gasket. Metal-to-metal or ground-joint type of sealing not 3 acceptable.

Needle Valves:

Water, gas and air needle valve fittings shall have a stainless steel replaceable floating cone that is precisions ground and self-centering. Action of valve shall be slow compression for fine control under pressure up to 100 psi and shall have part subject to wear easily replaceable.

Micro Control Valves:

Micro control valves for special gas service shall be as described for needle point valves with the following additions:

Fine stem threads with approximately 30 threads per inch.

Renewable stainless steel needle point.

Renewable stainless steel seat with 1/8" orifice.

1/16 turn of handle for first bubble appearance.

The valve shall be constructed so it will maintain a constant flow rate of four bubbles per 15 seconds as the valve is tested out under 50 pounds, 100 pounds, 150 pounds and 200 pounds of nitrogen pressure.

High Purity Water Fittings:

High purity water service fittings shall be all tinlined and shall have a tinlined unit containing all working parts which are subject to wear including all stainless steel replaceable seat and teflon valve discs. This unit shall have serrations for position locking in valve body.

Tinlined renewable unit shall be sealed in valve body with special composition gasket. Metal-to-metal or ground-joint type of sealing will not be acceptable.

Finish:

All fittings shall have chrome coating over a coating of nickel which is applied to a coating of copper, which is applied directly over the brass casting or forging. Each coating shall completely cover all visible areas and conform to the following minimum requirements:

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51	Plating	Plating Thickness
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53	Chromium	.000015 inch
54	Nickel	.000350 inch

Copper

.000050 inch

Coating:

All laboratory service fittings shall have an acid and solvent-resisting clear plastic coating applied over a cleaned, polished, chrome plated surface. The coating surfaces shall be sprayed and baked three times with a minimum coating thickness of 2 to 3 mils. After surfaces have been coated, faucet and valve components shall be assembled and tested at 100 pounds air under water. The coating material shall meet the following performance requirements:

Suspend samples in a container 6 cubic foot capacity, approximately 12 inches above open beakers, each containing 199cc of 75% nitric acid, 94% sulfuric acid, and 37% hydrochloric acid, respectively. After exposure to these fumes for 150 hours, the finish shall show no rupture, though slight discoloration or possible softening is permissible.

Service fittings in fume hoods shall have acid and solvent resistant plastic coating, applied over fine sandblasted surface, properly cleaned. Surfaces to be coated shall be sprayed and baked three times with minimum coating thickness of 6 mils. and must be capable of withstanding the following tests:

Suspend samples in a container 6 cubic foot capacity, approximately 12 inches above open beakers, each containing 199 cc of 70% nitric acid, 94% sulfuric acid, and 37% hydrochloric acid; respectively. After exposure to these fumes for 150 hours, finish shall not shown rupture. Slight discoloration or possible softening is permissible when sample is subjected for ten minutes to direct action of reagents and solvents listed below, dropping from burette at rate of 60 drops per minute.

Conc. Hydrochloric Acid	C.P.	37% (1.10sp.gr.)
Conc. Nitric Acid	C.P.	70% (1.42 sp.gr.)
Conc. Sulfuric Acid	C.P.	94% (1.84 sp.gr.)
Glacial Acetic	C.P.	99.5%
Ethyl and other alcohols	C.P.	
Toluene and other		
hydrocarbons	C.P.	
Carbon Tetrachloride	C.P.	
Mineral Oil	U.S.P.	

Plastic coating colors shall conform to corresponding indexed disc colors except for hot and cold water mixing faucets in fume hoods which shall be New York gray acid resistant plastic coating. Color code requirements for indexing service fittings shall be as follows:

Service Names Disco Color Letters Letter Color

				1003
1	Steam	Black	STM	White
2	Nitrogen	Grey	N2	Black
3	Vacuum	Yellow	VAC	Black
4	Gas	Dark Blue	GAS	White
5	Cold Water	Dark Green	CW	White
6	Hot Water	Ređ	HW	White
7	Deionized H2O	White	DI	Black
8	Air	Orange	AIR	Black
9	Distilled H2O	White	DW	Black

Catalog Numbers:

Fitting numbers, indicated on the Drawings are Water Saver Faucet Company Unit numbers. Fitting types not shown by unit number shall also conform to above state specification.

Fittings shall be manufactured by Water Saver Faucet or Chicago Faucet or equal.

For location and type of fitting, refer to Drawings.

FUME HOODS:

General Requirements:

 Fume hoods shall be designed for positive operation with uniform air flow through hood face. Variations of required face velocity shall not exceed 20% of the average face velocity as measured with the sash full open.

Fume hood evaluaiton of the manufacturer's standard product when required shall take place in the manufacturer's test facility with samples, apparatus, instruments, and test materials to be supplied by the manufacturer at no cost to the Architect or Owner. At his option, the Architect or Owner may verify data with his instruments, providing instrument suitability and calibration are mutually acceptable. Sound pressure level data shall be provided by the supplier for the prototype hood. The sound pressure levels shall be measured at a distance of 3 feet directly in front of the equipment under test, which shall be installed and operated under normal conditions. The sound data shall be reported in the form of one-octave band levels from 63Hz to 8000Hz and "A" weighted level.

Instructions covering safe and proper operation of the fume shall be provided in two forms:

 A 4"x6" corrosion-resistant metal or plastic frame attached to the front face of the fume hood exterior with plastic or glass glazing to contain a removable data card to identify hood and show hood characteristics and field test data.

A second sign made of plastic, approximately 4"x6" shall be 1 permanently attached to the hood and shall contain the 2 3 following information: 4 5 FUME HOOD SAFETY PROCEDURES: 6 7 DO NOT DO 8 9 1. USE HOOD UNLESS EXHAUST SYSTEM AVOID UNNECESSARY 10 IS IN OPERATION. EXPOSURE OF 11 2. CHANGE DAMPER OR BAFFLE SETTINGS PERSONNEL TO FUMES 12 AFTER INITIALLY SET. INSIDE HOOD BY 13 3. USE HOOD FOR STORAGE OF CORROSIVE KEEPING SASH CLOSED 14 OR VOLATILE MATERIALS. EXCEPT WHEN LOADING 4. BLOCK BAFFLE OR GRILLE OPENINGS. OR UNLOADING HOOD. 15 16 5. GENERATE LARGE QUANTITIES OF 2. KEEP MATERIALS 17 OR 18 FLAMMABLES WITHIN HOOD. MORE BACK FROM 6. PERMIT TEMPERATURE OF SASH GLASS 19 FRONT EDGE OF SASH. 20 TO EXCEED 160 DEGREES F. 3. CLEAN UP IMMEDIATELY ANY 21 22 MAJOR SPILLS 23 OCCURRING INSIDE 24 HOOD. 25 4. USE ONLY GROUNDED 26 ELECTRICAL 27 EQUIPMENT 28 5. REPORT EQUIPMENT OF 29 THE EXHAUST SYSTEM. 30 Samples of above shall be submitted to Owner for his review 31 32 and approval before proceeding. 33 34 Materials: 35 Tops shall be as specified under Materials and Finishes Article 36 of this Specification, and as called for in Fume Hood Schedule. 37 38 Fume hood lining shall be 1/4 inch chemically resistant compound 39 of mineral fibers and Portland cement as specified for "Mineral 40 Fiber Board" under Materials and Finishes. Liner shall not 41 contain asbestos. 42 43 44 Steel shall be high quality, cold-rolled, mild steel and shall conform to ASTM Specification Number A366. All gauges shall be 45

46 47 48 U.S. Standard.

Stainless steel shall be AISI Type 304. All gauges shall be U.S. Standard.

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Safety glass shall be laminated type, 1/4" thick.

Screws used to attached members shall be sheet metal type, zinc plated. Interior fastening devices shall be truss head stainless steel screws. No "Pop Rivets" allowed.

Sash cables shall be stainless steel.

Sash guides shall be stainless steel.

Pulleys for sash cable shall be 1-1/2 inches in diameter nylon tied, ball-bearing type, with cable-retaining device.

Materials and finishes shall conform to MATERIALS AND FINISHES Article of this section of the Specifications.

Construction and Design:

 Fume hood superstructure shall be double-wall construction consisting of an outer shell of 16-gauge sheet metal and an inner liner of corrosion-resistant material as specified. Double wall shall house and conceal steel framing members, attaching brackets, and service fixture mechanism.

Frames, inner shell, and outer shell shall be assembled, fastened, and connected into a rigid, self supporting entity.

Wall thickness shall be 4-7/8 inches maximum, providing maximum interior work area. Access to fixture valves concealed between walls shall be provided by removable panels of hood interior.

Front, surrounding sash, shall be a long sweep 45-degree airfoil section (minimum 5").

Fume hood roof shall have a safety glass panel sealed into a neoprene or PVC glazing moulding or cemented and caulked to isolate the light fixture from fumes and vapors.

A two lamp fluorescent fixture shall be installed on exterior roof. Fixture shall be largest possible for fume hood size, up to 48 inches on a six-foot superstructure.

 Fluorescent fixtures shall be furnished with ballasts bearing the U.L. label and C.B.M. certification. These ballasts shall be of the automatic resetting class "P", high power factor type with "A" sound rating.

All ballasts shall be of the type approved by the major lamp manufacturers to give full rated lamp life and output and shall be operation on the voltage specified and shall be thermally protected.

51 Ballasts shall be of the energy-saving type, (Advance Mark III, 52 Universal SLH, or equal).

Lamps shall be new and shall be cool white energy saving type (for 4 foot units) as manufactured by Sylvania or General Electric. All lamps of the same type shall be of the same manufacturer.

Exhaust duct collar shall be constructed of Type 304 18-gauge stainless steel as detailed. For 8'-0" hoods provide also an S.S. type 304 plenum.

All ducts shall fit over the outside diameter of the exhaust ducts collar except for perchloric acid hoods which the duct will fit to the inside collar and be welded in all conditions. Hood manufacturer shall coordinate closely with contractor for Division 15 for as close as possible duct fit to eliminate joints.

Vertical rising fume hood sash shall be full-view type providing a clear and unobstructed side-to-side view of fume hood interior and service fitting connections. Sash shall be 1/4-inch laminated safety glass panels. Unless otherwise noted, set into neoprene or polyvinyl chloride glazing channel. Bottom rail shall have an integral, formed, full width, flush pull. Top rail shall be formed to accept lead weights for fine tuning of sash for exact and positive operation. A single weight, pulley cable counter-balance system shall be used to prevent sash tilting and permit one finger operation at any point along full width pull and to hold sash at any position without creep. Sash system shall be designed to prevent sash drop in the event of malfunction or failure of a cable. Sash shall open and close against rubber bumper stops.

Back baffles shall provide controlled air vectors into and through the fume hood and be fabricated of the same materials as the liner. Exhaust slots shall be horizontal with top slot adjustable. A fixed horizontal slot permanently open shall be provided to prevent eddying.

Upper baffle adjustment shall permit setting for high thermal loading heavier-than-air gases or fumes generated near work surface and normal or average operation. Adjustments shall be instantaneous, accomplished while hood is in use, without disturbing apparatus. Changes in average face velocity and exhaust volume as a result of baffle adjustment shall not exceed 5 percent for any baffle position at the specified face velocity. Baffle designs which permit close off of all slots are not acceptable. Adjustable hardware shall be Type 304 stainless steel.

 Hoods shall be factory pre-piped to a point of connection shown in details. Service fittings shall be furnished by this Contractor, and shall be of the same manufacturer as lab fittings, mounted inside of hood, and shall consist of front mounted valves with controlled from exterior vertical hood posts unless otherwise indicated. Provide U.L. Label and

certification regarding pressure testing. Installation shall be in accordance with Division 15 of the Specifications.

Provide grey grounding type receptacles, rated as shown on the Drawings. Flush plates shall be stainless steel in a design specified under Division 16. Installation and wiring shall be in accordance with Division 16 of the specifications.

Work surface shall be dished 1/4-inch to contain spills and caulked with acid resistant clear silicon at juncture of liner and worktop.

Caulk vertical hood surfaces to counter as well as all penetrations.

Fume hoods shall be designed to minimize static pressure loss with adequate slot area and exhaust collar configuration. Measured average static pressure loss readings taken three diameters above the hood outlet from four points, 90 degrees apart, shall not exceed the following maximums:

Face Velocity

Measured S.P.L. (W.G.)

100 FPM 150 FPM .50 inches

Furnish and install all laboratory service fittings, nipples, pipe, sinks, sink outlets and tailpieces. All shall be as required by and installed by Hood Manufacturer in accordance with all applicable codes and plumbing specifications.

 Furnish and install all electrical fittings and fixtures including lamps, wiring, and Variacs. All shall be installed by hood manufacturer in accordance with all applicable codes and electrical specifications. See drawings for electric diagrams.

FUME HOOD ACCESSORIES:

Each fume hood shall be equipped with an alarm system designed to signal unsafe operating conditions whenever fume hood face velocity falls below 70 percent of the specified value. Velocity sensor shall be as manufactured by Honeywell or T.S.I. The sensor shall be furnished, installed and connected by the Mechanical Contractor but the opening for mounting the sensor shall be provided by the manufacturer of the fume hood. Verify quantity, location and size of openings with sensor manufacturer.

Alarm signal shall consist of a red flashing light indicating unsafe operating conditions. Red visual signal light shall flash until safe condition is corrected. Test circuit operated by a push button shall permit regular verification of alarm lamp and circuit. Alarm shall be furnished complete with all internal

wiring. Signal for alarm shall come from face velocity controller.

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Provide a blank plate for high-low or on-off switch provided under Division 15.

PART 3 - EXECUTION

CASEWORK INSTALLATION:

Install, plumb, level, true and straight with no distortions. Shim as required, using concealed shims. Where laboratory furniture abuts other finished work, scribe, and apply filler strips for accurate fit with fasteners concealed where practicable. Caulk with acid resistant clear silicon at junction of bench top, curbs, and adjacent services.

Where required, assemble units into one integral unit with joints flush, tight, and uniform. Align similar adjoining doors and drawers to tolerance of 1/6".

<u>Wall Cabinets</u>: Wall cabinets shall be supported from upper and lower runner strips, fabricated of 11-gauge cold rolled steel. Spot welded to slotted brackets as detailed.

Reinforcement of stud walls to support wall-mounted cabinets shall be done during wall erection by trade involved, under Section 05400 but responsibility for accurate location and sizing of reinforcement is part of this work and shall be indicated in Shop Drawings.

Adjust casework and hardware so that doors and drawers operate smoothly without warp or bind. Lubricate operating hardware so recommended by manufacturer.

TOPS:

Field jointing: Where practicable, make in same manner as factory jointing using dowels, spines, adhesives, and fasteners recommended by manufacturer. Locate field joints as shown on accepted shop drawings, factory prepared so that there is no job site processing of top and edge surfaces.

<u>Workmanship</u>: Abut top and edge surfaces in one true plane, with internal supports placed to prevent any deflection. Provide flush hairline joints in top units.

 Provide all holes and cutouts as required for built-in equipment and mechanical and electrical service fixtures. Verify size of opening with actual size of equipment to be used, prior to making openings. Form inside corners to be radius of not less than 1/8 inch. After sawing, rout and file cutouts to ensure smooth, crack-free edges. Seal exposed edges after cutting with a waterproofing material recommended by the manufacturer.

Secure tops to support with concealed "Z" type, angle-type fastening or equivalent devices spaced no more than 3 feet on centers.

Plastic laminate work top joints shall be 1/4-inch diameter bolt type "dog bone" or "tite joint" fasteners routed into bottom surface of work tops.

CLEANING AND PROTECTION:

Repair or remove and replace defective work as directed by the Owner upon completion of installation.

Clean shop finished casework, touch-up as required, and remove and refinish damaged or soiled areas.

Cover casework for protection against soiling and deterioration during remainder of construction period.

Clean counter tops with diluted dishwashing liquid and water leaving tops free of all grease and streaks. Us no wax or oils.

Casework shall be protected before, during, and after installation. Damaged materials due to improper protection shall be cause for rejection.

END OF SECTION 11601

SECTION 11615 - LABORATORY CONTROLLED TEMPERATURE ROOMS 1010

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PART 1 - GENERAL

RELATED DOCUMENTS:

Drawings and general provisions of Contract, including General, Special Conditions, and Division-1 Specification sections, apply to work of this section.

DESCRIPTION OF REQUIREMENTS:

Work under this Section consists of providing all labor, materials, equipment, and services necessary to complete the controlled temperature room. Work including, but not limited to, the following:

Prefabricated, all metal clad construction, furnished and installed as a complete self-contained unit and system, with all essential plenums, controls, and balanced air circulation and all other equipment necessary to reach the environmental conditions specified herein. Refer to schedule at end of this section.

Factory assembled and factory tested major components, including air handler, condensing unit and control panels, prior to delivery. Test results shall be submitted to the Owner before delivery.

Delivery of room components to their final location, and complete assembly of rooms in place.

Refrigeration piping, electrical power wiring, control wiring and connections which are an integral part of the rooms.

Installation of light fixtures supplied by room manufacturer.

Start-up and field testing of rooms by controlled temperature rooms subcontractor.

PRODUCTS:

Acceptable Manufacturers
Construction
Condensing Unit and Refrigeration
Controls
Lighting
Personnel Emergency Alarm
Shelving
Service Requirements

Mechanical Systems - Cold Rooms

Work provided under this section with additional related requirements: For related requirement comply with Division indicated in front of each category listed below:

Resilient Flooring, MIPOLAM 150 of a color selected by the architect.

Mechanical connection of equipment, comply with Division 15.

Fire Protection, comply with Division 15.

Receptacles (including Isoduct) inside controlled temperature room and connection of power, comply with Division 16.

WARRANTY:

All equipment furnished under this Section of the Specifications shaoll be guaranteed for a period of one year from the date of acceptance thereof against defective materials, design, and workmanship. Date of acceptance shall be 30 days after the calibration of the room is taken place and proper operation is established. All hermetically sealed motors included in any of the above equipment shall be provided with a five-year guarantee.

QUALITY CRITERIA:

Bidder's Qualifications:

Qualified bidders shall have an established organization and production facilities specializing in the type of equipment bid with an experienced engineering department.

No deviations or substitutions from the Specification will be allowed.

The Controlled Temperature Room Subcontractor is responsible for any alterations to the mechanical or electrical servcice (as scheduled on Page 14) necessary to accommodate the manufacturer's product requirement.

The Controlled Temperature Room Subcontractor shall be responsible for providing sufficient monies to cover such alterations. No extra charge will be allowed for service alterations after award of the contract.

JOB CONDITIONS:

Scheduling and Coordination: Examine project conditions at the site with regard to access, dimensions, conditions as they exist and the general areas of work, and perform work in such a manner as required to deliver, install and connect the rooms in close coordination with work of other trades.

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SUBMITTALS: (Comply with Section 01340)

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Shop Drawings: Submit for all items of work of this section, in 3/4' = 1'-0" scale, dimensions, materials, showing of materials, construction details, finishes thicknesses, installation relation to adjoining work, service connections and all other details to fully illustrate the work.

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Installation Drawings: Submit for items.

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Submit manufacturer's specifications for product Product Data: specified herein.

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PART 2 - PRODUCTS

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ACCEPTABLE MANUFACTURERS:

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Environmental Gross Chamber; Chagrin Falls, OH 44022 Harris Environmental Systems; Andover, MA 01801 Nor-Lake Scientific; Hudson, WI

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CONSTRUCTION:

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The room shall be double wall, modular panel construction. structural metal, wood, or fiberglass material shall be used between the interior and exterior skins. Interior and exterior skin shall be a minimum of .040 inch thick patterned aluminum, prepainted with two coats of polyester or modified epoxy enamel, color as selected by the Architect. Panel insulation shall be self-extinguishing, foamed-in-place, polyurethane insulation providing a "K" factor of 0.118 BTU/hour/square foot/degree Fahrenheit/inch of thickness. No ureaformaldehyde type insulation will be permitted. Insulation shall bond the panel and shall have a minimum compressive strength of 28 lbs./square Sections shall match without distortion and shall be inch. aligned by tongue and groove joint, fastened by cam lock devices, maximum 48" apart. Finished walls shall be cleanable and without crevasses.

Walls shal be a minimum of 3-14/" thick and maximum of 4" thick.

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53 54 Roof panels shall be a minimum of 3" thick. Roof shall be properly reinforced to support equipment loads. Reinforcement shall not violate the insulation value of the panels.

Mechanical Systems - Cold Rooms

Work provided under this section with additional related requirements: For related requirement comply with Division indicated in front of each category listed below:

Resilient Flooring, MIPOLAM 150 of a color selected by the architect.

Mechanical connection of equipment, comply with Division 15.

Fire Protection, comply with Division 15.

Receptacles (including Isoduct) inside controlled temperature room and connection of power, comply with Division 16.

WARRANTY:

 All equipment furnished under this Section of the Specifications shaoll be guaranteed for a period of one year from the date of acceptance thereof against defective materials, design, and workmanship. Date of acceptance shall be 30 days after the calibration of the room is taken place and proper operation is established. All hermetically sealed motors included in any of the above equipment shall be provided with a five-year guarantee.

QUALITY CRITERIA:

Bidder's Qualifications:

Qualified bidders shall have an established organization and production facilities specializing in the type of equipment bid with an experienced engineering department.

No deviations or substitutions from the Specification will be allowed.

The Controlled Temperature Room Subcontractor is responsible for any alterations to the mechanical or electrical servcice (as scheduled on Page 14) necessary to accommodate the manufacturer's product requirement.

The Controlled Temperature Room Subcontractor shall be responsible for providing sufficient monies to cover such alterations. No extra charge will be allowed for service alterations after award of the contract.

JOB CONDITIONS:

Scheduling and Coordination: Examine project conditions at the site with regard to access, dimensions, conditions as they exist and the general areas of work, and perform work in such a manner as required to deliver, install and connect the rooms in close coordination with work of other trades.

SUBMITTALS: (Comply with Section 01340)

Shop Drawings: Submit for all items of work of this section, in 3/4' 1'-0" scale, dimensions, = showing materials, of materials, construction details, thicknesses, finishes installation relation to adjoining work, service connections and all other details to fully illustrate the work.

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Installation Drawings: Submit for items.

<u>Product</u> <u>Data</u>: Submit manufacturer's specifications for product specified herein.

PART 2 - PRODUCTS

ACCEPTABLE MANUFACTURERS:

Environmental Gross Chamber; Chagrin Falls, OH 44022 Harris Environmental Systems; Andover, MA 01801 Nor-Lake Scientific; Hudson, WI

CONSTRUCTION:

The room shall be double wall, modular panel construction. No structural metal, wood, or fiberglass material shall be used between the interior and exterior skins. Interior and exterior skin shall be a minimum of .040 inch thick patterned aluminum, prepainted with two coats of polyester or modified epoxy enamel, color as selected by the Architect. Panel insulation shall be self-extinguishing, foamed-in-place, polyurethane insulation providing a "K" factor of 0.118 BTU/hour/square foot/degree Fahrenheit/inch of thickness. No ureaformaldehyde type insulation will be permitted. Insulation shall bond the panel and shall have a minimum compressive strength of 28 lbs./square inch. Sections shall match without distortion and shall be aligned by tongue and groove joint, fastened by cam lock devices, maximum 48" apart. Finished walls shall be cleanable and without crevasses.

Walls shal be a minimum of 3-14/" thick and maximum of 4" thick.

Roof panels shall be a minimum of 3" thick. Roof shall be properly reinforced to support equipment loads. Reinforcement shall not violate the insulation value of the panels.

UK HOSPITAL EXPANSION ADDITION - BID PACK 2 - 304.1

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Section 11615 Laboratory Temperature Controlled Room

The laboratory controlled temperature room shall be 16'9"x13'0"x9'0" with a temperature range of +4°C +/- 1°C, Voltage 208V, 3-Phase, Power supply, Panel amps 25, Amps Comp Fla, 45 HP, 2-1/2 HP, GPM 1. The following notes apply to this item.

- Width dimensions given are outside and approximate.
- Building partition dimensions shall be verified before fabrication.
- Condensate pipe to be furnished and installed by environmental room manufacturer and routed to nearest floor drain. (Exposed to view condensate pipe is to be painted same color as environmental room exterior)
- Interior room ceiling height shall be 8'-0" U.N.O..
- Condensing units are to be located directly above the e. environmental rooms. Condensing units shall be accessible for maintenance.
- f. Condensing unit shall be water cooled.
- Electrical requirement for condensing units 208V, 3-Phase, 4-Wire for cold room.
- h. Electrical requirements for control panel on environmental room shall be 208V, 3-Phase, 4-Wire for cold room.

Please confirm the room offered meets these minimum requirements.

39 adjustable for proper gasket seal.

40 41 Where applicable, conditioning plenums shall contain heating 42 elements, evaporators, solenoids, expansion valve, fans, etc. 43 The conditioned air shall pass into a positive pressure plenum 44 extending across the room ceiling. Plenum shall allow the correct percentage of total opening to insure uniform air distribution throughout the room to achieve and maintain 45 46 47 performance specified. Evaporator coils shall be copper with 48 copper fins. A hot dipped, galvanized steel, condensate pan shall be built into the room plenum and be provided with drain 49 provisions to allow connection of waste line for removal of 50 51 condensate without running lines exposed through room. 52

53 All service line penetrations into room shall be properly sealed 54 with silicone caulking. Duct penetrations to room shall be 55 sealed to prevent moisture or air leakage.

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Defrost system shall be hot gas with time clock manually setable to control the time and cycle of the system.

Provide a 4" diameter exhaust duct collar in the roof of ventilated rooms, fitted with a removable insulated plug for duct connection to building exhaust under Division 15. Ducts shall be insulated under Division 15.

Provide a 4" supply air duct collar in the roof of ventilated rooms, fitted with a removable, insulated plug for duct connection foam building supply under Division 15. Install at warm side of cooling coil. Ducts shall be insulated.

Provide the necessary vertical and horizontal closure panels, strips, and shrouds to enclose opening between environmental room and adjacent corridor, building partitions, and ceiling. Finish to match interior of adjoining unit.

CONDENSING UNIT AND REFRIGERATION:

Install condensing unit in the ceiling space directly above the cold rooms. Provide isolation mountings and platforms for condensing units. Unless noted otherwsie on the floor plans.

Condensing unit shall be specifically designed, engineered, manufactured, and of adequate capacity to fulfill the individual room operating temperature requirements and performance, and shall be balanced with the air handling system in operation The condensing unit shall be complete in all respects and shall include compressor, condenser, high/low pressure control, receiver, sight glass, dryer, expansion valve, interconnecting piping, piping insulation, solenoid valves, motor starter and controls, and all necessary equipment to achieve the performance called for on the Environmental Room Schedule and specified.

Condensing unit system to be designed to operate continuously using a refrigeration bypass system control. Cycling compressor systems will not be acceptable. Provide water regulating valve and controls to operate condensing unit.

Compressor shall be furnished for water cooled operation provided by campus chilled water system and shall be designed to operate on 208 V, 3 phase, 60 Hz. Compressor shall be semi-hermetic.

Install all refrigeration lines (hot gas, liquid) between compressor and evaporators at environmental room. Refrigeration system shall be evacuated by vacuum pump for initial leak testing and evacuation of all moisture and air within systems. Lines shall be charged with refrigerant and rechecked with an electronic leak detector for presence of any refrigeration leaks. Provide all necessary line sizes, traps, etc., for

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proper operation of this equipment. All suction lines shall be insulated as specified herein. Only fluorinated hydrocarbon refrigerants from a list approved by WSU will be accepted.

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Condensing water is from campus chilled water system with nominal temperature of 45 degrees F and 15 degrees F allowable temperature rise.

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CONTROLS:

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14 15 Instruments and controls shall be located in control panel (mounted in the front of each room on a remote separate assembly independent from the environmental room structure). shall be mounted at 60" above floor level. A clear plexiglass cover shall protect controls from damage and shall be furnished with lock and two keys.

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Main temperature control shall be fully calibrated, solid state electronic control, with sensor for linearity of response through entire temperature range. Controller sensor shall be ange. Controller sensor shall be Controller shall provide direct protected against damage. setting of desired operating temperature and be calibrated both in degrees Centigrade and Fahrenheit. Accuracy of correlation between temperature set point and the true NBS temperature resulting from this setting shall be plus or minus 1 degree C.

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37 38 Individually adjustable and setable temperature limit controls for high and low temperature shall be furnished. Provide two extra dry contacts each (one normally closed, one normally open) for high and low temperature limit control. Safety limit controls shall be adjustable to within two degrees Centigrade of the desired operating temperature. Temperature dial shall be properly identified with readable setting degrees Centigrade. Visible and audible alarms system shall be circuited with limit controls. Limit controls shall cut off refrigeration systems in the event of failure of these systems. Connection to the University central control and monitoring system is under Division 15.

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All control functions (including room light) shall be indicated by pilot lights located in control console.

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Provide an electronics, one-pen recorder with 12" diameter charts, 7-day electronic drive, calibrated in degrees Centigrade.

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LIGHTING:

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Lighting shall be warm white, high output type enclosed vapor-proof fixture. Ballast shall be low temperature ballast, 120-volt, 60 Hz. No PCB material will be permitted in the 53 light fixture for 54 ballasts. The this room shall

Underwriters' Laboratories Approved and shall be rated to operate at room design temperatures. Light fixtures to be mounted at ceiling. Lighting fixtures shall create light intensity to provide a minimum of 50 and 75 footcandles 40" above floor and to be so installed as to provide uniform distribution of light. Light switch with pilot light shall be located outside of room on or near the control panel, convenient to door entrance, and properly identified.

PERSONNEL EMERGENCY ALARM:

The room shall be provided with reset type, electrically powered personnel emergency alarm system; power shall be provided by the room electrical input. The system shall consist of an actuator within the room and audible and visual alarms affixed to the front exterior of the rooms and an extra control for the central control console by providing two dry contacts.

 The alarm system actuator shall be a heavy duty, oil-tight switch, equipped with a red button marked, "EMERGENCY ALARM - PULL TO RESET". The actuator shall be mounted on the interior wall of the room adjacent to the door jamb and 12" above the finish floor.

The audible alarm shall be of a type that provides a high decibel level of sound output at a frequency distinct from room parameter alarms. The visual alarm shall be mounted in an area providing no vision interference and shall be prominently labeled "PERSONNEL EMERGENCY".

SHELVING:

Provided under Section 11600, item #E-9.

SERVICE REQUIREMENTS:

Electrical: See schedule of drawings.

Mechanical: See schedule of drawings.

MECHANICAL SYSTEM-COLD ROOMS:

Design:

 Refrigeration System: Complete integrated system consisting of an evaporator and condensing unit designed to operate continuously. Cooling output on demand proportioning basis in relation to the desired temperature control point. System capacity shall be sufficient to meet simultaneously:

Performance test requirements included in the Execution Section of this specification.

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Additional internal heat gain generated by user of equipment to a maximum of 15 watts per sq. ft. gross floor area with room lights on.

Defrost System: Shall be a hot gas system. Equip timer with fan delay switch. Design system to operate without defrost period when room is operated above 5 degrees C. The defrost period shall be adjustable, but not to exceed fifteen minutes.

Components:

Cold Room Evaporator Unit:

 <u>Coil</u>: Copper tube, copper fin design with aluminum housing, minimum 8 fins per inch, minimum four rows deep. Air velocity shall be less than 500 FPM.

Coil Fan Motor: Minimum 1/6 H.P., ballbearing design, rubber mounted; minimum 16" diameter heavy duty aluminum fan blade.

Heating Coil: Rooms shall be equipped with electrical heaters integrated into air flow system. The heaters shall be stainless sheathed with stainless steel fins and shall have thermal safeties attached to protect the heater. Heat shall be controlled at the control panel in a manner to give control to the desired level.

Condensing Unit: Water cooled with semi-hermetic serviceable compressor, and spring mounted. Equip each condensing unit with:

High/low pressure control.

Vibration eliminating devices on suction and discharge lines.

Fusible plug.

Liquid line dryer.

Moisture indicating sight glass.

Suction line filter.

Refrigerant specialties shall be maintainable without losing system charge.

Magnetic contactor on all three phase units.

will be from a list approved by WSU.

cooled condensers

All other safety mechanical devices required.

evaporating and condensing temperatures.

Refrigerant

shall

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manufactured and be properly matched to compressors determined by condensing unit manufacturer.

ACR type, hard drawn, cleaned and capped Type L copper tubing soldered with silver solder, except hot gas lines which shall be silver brazed. All lines shall be installed to allow for linear expansion of copper after start-up.

Size for velocity of 500-700 FPM on Suction Lines: horizontal runs and show a slight pitch toward condensing unit. When condensing unit is located below evaporator, and there is no possibility of trapping oil, size vertical runs same as horizontal runs. When condensing unit is located above evaporator, size vertical runs for velocity of 1,000-1,5000 FPM and install proper (shallow) "P" traps spaced not over 10' apart on all tubing risers.

Select refrigerant to give optimum operation considering

furnished

herein

Hot Gas Lines: When hot gas lines are field installed remote from compressor, size tubing at same velocities and with same "P" trap requirements as specified above for suction lines.

Liquid Lines: Size all liquid lines for a maximum 2 PSIG pressure drop.

F&M ring type or Unistrut assemblies with appropriate tubing clamps to support liquid, suction, and discharge lines individually. Space hangers or clamps 8' o.c. maximum.

Condensate Drain Piping: 7/8" O.D., or greater, Type L copper tubing piped from evaporators to open floor drain, rigidly support at walls 3' o.c. maximum, installed in such a manner that leaves 1" clearnace space between wall drain, and and equipped with cleanout tee Adequately pitch piping toward floor drain, evaporator. carry through wall of refrigerated areas properly trapped and discharged within 2' of floor drain. Provide chrome plated escutcheons on both sides of wall penetrations.

Lab controlled temperature room Refrigerant Testing: contractor shall pressurize and leak test entire system at not less than 100 PSIG, clean and dehydrate by maintaining a vacuum of 50 microns, or lower, for a five hour period. Add required charge of refrigerant, and oil if necessary, and test entire system for performance.

Mark each system clearly as to refrigerant type used. Inform the owner of the time that test would be performed so the test can be viewed if desired.

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<u>Insulation</u>: Fire retardant Armstrong "Armaflex Insulation" or equal for insulating refrigeration suction lines. Use minimum 1/2" thick wall; apply during tubing assembly wherever possible.

Provide manual switch valve from chilled to cold water for situations when campus chilled water is off and drain the water to the adjacent floor drain.

PART 3 - EXECUTION

<u>INSTALLATION</u> - GENERAL:

Deliver to job site, uncrate and place in proper locations, and assemble all equipment specified herein. All debris, crating materials, etc., shall be removed. No asbestos, asbestos mix insulation is permitted.

Sections shall match without distortion. Door shall close and seal without binding.

Final connection of condensing unit to condensing water shall be by Division 15.

Electrical:

Provide all electrical work inside environmental rooms, including connections to electrical junction box located outside of environmental rooms provided under Division 16.

Furnishing, installation and connection of control panel.

Connection of interlocking control wiring between control panel and remote compressors or heaters, also between fan/coil unit and remote compressors or heaters, where required.

Provide a dry contact, for use by building automation system, that will close when any of the operating controls fail or when any of the safety devices prevent operation of conditioning equipment.

TESTING:

Factory tests shall be made of all air handlers compressors, condensers, and control panels before delivery on the job site by the laboratory controlled temperature room subcontractor.

Provide all equipment for testing by lab controlled temperature subcontractor in Owner's presence.

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Temperature control of plus or minus 1 degree C shall be the temperature at the sensing bulb and shall be the total variation in the temperature control of the room. It should not be confused with temperature uniformity as noted below.

 Temperature uniformity of plus or minus 0.5 degrees C refers to the temperature as measured on a horizontal plane 40 inches above floor and within 12 inches of walls throughout the entire room. Uniformity shall be measured by a multipoint strip chart recorder utilizing a minimum of twelve (12) thermocouples during a continuous 24-hour test period. Gradient from floor to ceiling shall be 1 degree C.

END OF SECTION 11615

SECTION 11700 - MEDICAL EQUIPMENT

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PART 1 - GENERAL

RELATED DOCUMENTS:

Drawings and general provisions of contract, including General and Special Conditions and Division-1, Specification sections, apply to work of this section.

DESCRIPTION OF WORK:

The extent of medical equipment is indicated on the drawings and by provisions of this section, including schedules and equipment lists associated with either drawings or this section.

The types of equipment required for this project include the following:

Narcotics Cabinet

Warming Cabinets

Nitrogen Control Cabinets

Ceiling Gas Columns

Clocks

Disinfecting Unit

Patient Headwall Units

Ice Machine

X-ray Film Illuminators

Ceiling Lifter

Exam Lights

Surgical Lights

X-ray Film Processing Equipment

Otoscope/Ophthalmoscope

Patient Service Column

Lead Apron and Glove Rack

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 Walk-in Refrigerator Sphygmomanometers

Scrub Sink

Silver Recovery Unit ---

Sterilizer

Cubicle Curtain Tracks

I.V. Tracks

Eyewash

X-ray Film Dispensing Equipment

QUALITY ASSURANCE:

Installer: Where indicated units of equipment require shop/field custom fabrication, provide units fabricated and installed by shops which are skilled and which have a minimum of 5 years of experience in similar work.

SUBMITTALS:

Product Data: Submit manufacturer's product specifications and installation instructions for each item; include rough-in dimensions, service connections, performances, power/fuel requirements, water/drainage requirements, environmental requirements, and similar information.

 Shop Drawings: Submit plans, elevations, sections and details of custom-fabricated units and of assembled units made up of manufactured equipment. Show required services by size and location.

Maintenance Manuals: Submit bound manuals for maintenance of operative medical equipment items. For each item, include operating and cleaning/maintenance instructions, parts listing, recommended parts inventory listing, purchase source listing, copy of warranties, estimated annual cost for maintenance and supplies, and similar applicable information.

PART 2 - PRODUCTS

FABRICATED PRODUCTS:

CABINET, NARCOTICS, WALL MOUNTED (CAB1401)

Unit shall function as a wall mounted cabinet designed for secure storage of narcotics.

Unit shall include, but not be limited to, the following features and characteristics:

Heavy gauge steel cabinet with both inner and outer piano hinged doors.

Separate lock and key for each door. (2 keys furnished for each lock).

Key not removable unless door is locked.

Four (4) shelves, including bottom interior surface. (Three (3) adjustable shelves.)

Mounting on wall.

Overall dimensions of approximately 24" height, 16" width, and 8" depth.

Unit shall be American Hospital Supply Model 12308-025 or approved equal by Hamilton or Atlantic Alloy.

CABINET, WARMING, DUAL COMPARTMENT RECESSED (CAB2306)

Unit shall be used for warming blankets and sterile solutions.

Unit shall include, but not be limited to, the following features and characteristics:

Recessed mounting through one (1) wall.

All facial weldments shall be ground smooth and be flush with adjacent surfaces.

Include all accessories as applicable for installation.

Upper heating chamber with controls to automatically maintain temperature within 100 degrees F to 180 degrees F as selected.

Upper heating chamber to hold twenty (20), two (2) liter square surgical flasks, sixty (60) in the heated storage chamber.

Lower heating storage compartment with single temperature heater and independent power switch.

1024 door and walls of 1 Double pan upper heating chamber 2 constructed of at least 18 gauge steel and at least 1" 3 insulation between the pans. 4 5 Right hand hinged door for each chamber. 6 7 Chrome plated hinges and magnet-imbedded heat resistant vinyl 8 gaskets included with doors. 9 10 Removable aluminum blanket shelf. 11

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Temperature indicating thermometer for upper chamber.

Blanket-type heater for upper chamber with air circulating fan and overtemperature protection, visual and audible alarm.

Power on/off switch and visual indicator.

Electrical fault power line interruption device.

Approximate dimensions of 75"H x 30"W x 24"D.

Operation on 115 VAC, 60 Hz.

Conform to Underwriters Laboratories Standard 544.

Unit shall be AMSCO Model DJ04-112-131 or approved equal by Atlantic Alloy, Castle/Sybron, or Continental Metal Products.

CABINET, NITROGEN CONTROL, RECESSED (CAB4001)

Unit shall provide pressure regulation for nitrogen gas.

Unit shall include, but not be limited to, the following features and characteristics:

Rough-in assembly consisting of a steel backbox with mounting flanges on all four (4) sides, with plaster shield to protect against dust and other foreign matter.

Crossover U-tube to facilitate testing of nitrogen system prior to manifold installation.

Manifold assembly with line-pressure control regulator of the self-relieving, diaphragm type, having high-flow pressure adjustment and maximum working pressures not less than 200 psig.

Two (2) line-pressure gauges, calibrated from 0 to 300 psi in increments of 10 psi, to indicated supply line pressure and outlet line pressure.

DISS outlet with self-sealing dust plug, primary check unit to seal outlet when equipment is removed, and maximum working pressure not less than 200 psig.

Bronze-bodied supply valve of the double seal, full flow, ball type with maximum working pressure not less than 200 psig.

Movement of valve through full range from "open" to "closed" by rotating knob approximately 90 degrees.

Stainless steel coverplate inprinted with control identification and operating instructions.

Overall dimensions approximately 11"H x 15"W x 6"D.

Unit shall be Ohio Medical Products Model 321-7375-980 or approved equal.

CEILING GAS COLUMN, RETRACTABLE, FOR SURGERY (CLG1801)

Unit shall be used as a ceiling mounted service column to provide medical gases, vacuum, and electrical power to the surgical suite.

Unit shall include, but not be limited to, the following features and characteristics:

Rigid frame mount configured for concealed mounting to ceiling.

Capability of adjustment in the vertical range 66" to 84" above the finished floor.

Vertical adjustment shall be manually operable.

Two (2) medical vacuum outlets.

One (1) medical air outlet.

Two (2) medical oxygen outlets.

One (1) nitrous oxide outlet.

Two (2) outlets for SARA system connections

One phone (1) phone jack.

One (1) physiological monitor hook-up.

One (1) video monitor hook-up.

Chemeter (A-1)

All outlets shall be quick disconnect type, nonremovable positive pin-keying arrangement and primary check valve for each specific gas service.

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Identification of each gas shall be permanently cast into the backplate.

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Outlet shall contain a secondary check to prevent flow when the assembly is removed for service.

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Outlets shall be manufactured in accordance with all applicable NFPA and CGA Standards.

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Outlets shall be factory tested to be 100% leak free.

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Outlet shall include a double seal to automatically engage when hose adaptor is removed from outlet.

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Flexible hose assemblies in column shall be preassembled and factory tested.

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All threaded connections within the column shall be accordance with NFPA 56F and Diameter Index Safety System preventing interchangeability of connections.

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Six (6) 115 VAC, 20 amp electrical outlets connected to emergency power.

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Receptacles shall be twist lock devices specifically designated, designed, and indelibly marked as hospital grade devices.

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Each receptacle shall be wired for connection to a separate circuit.

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> Receptacles shall be designated by color as being connected to emergency power.

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Removable service access panel.

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Four (4) removable I.V. hooks mounted on face of column.

42 43

Mounting plates, dust cover, and finish escutcheon collars.

44 45

Stainless steel construction with polished finish.

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Approximate dimensions of 18"W x 13"D.

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Unit shall be Ohmeda Model 465 or approved equal by Chemetron or Oxequip Health Industries.

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CEILING GAS COLUMN, RETRACTABLE, FOR EMERGENCY (CLG1802)

1 Unit shall be used as a ceiling mounted service column to 2 provide medical gases, vacuum, and electrical power for the 3 Emergency Trauma Area.

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Unit shall include, but not be limited to, the following features and characteristics:

Rigid frame mount configured for concealed mounting to ceiling.

Capability of adjustment in the vertical range 66" to 84" above the finished floor.

Vertical adjustment shall be manually operable.

Three (3) medical vacuum outlets.

One (1) medical air outlet.

One (1) medical oxygen outlet.

One (1) nitrous oxide outlet.

All outlets shall be quick disconnect type, with a nonremovable positive pin-keying arrangement and primary check valve for each specific gas service.

Identification of each gas shall be permanently cast into the backplate.

Outlet shall contain a secondary check to prevent flow when the assembly is removed for service.

Outlet shall be manufactured in accordance with all applicable NFPA and CGA Standards.

Outlets shall be factory tested to be 100% leak free.

Outlet shall include a double seal to automatically engage when hose adaptor is removed from outlet.

Flexible hose assemblies in column shall be preassembled and factory tested.

All threaded connections within the column shall be in accordance with NFPA 56F and Diameter Index Safety System preventing interchangeability of connections.

Six (6) 115 VAC, 20 amp electrical outlets connected to emergency power.

Receptacles shall be twist lock devices specifically designated, designed, and indelibly marked as hospital grade devices.

 Each receptacle shall be wired for connection to a separate circuit.

Receptacles shall be designated by color as being connected to emergency power.

Removable service access panel.

Physiological monitor interface.

Four (4) removable I.V. hooks mounted on face of column.

Mounting plates, dust cover, and finish escutcheon collars.

Stainless steel construction with polished finish.

Approximate dimensions of 18"W x 13"D.

Unit shall be Ohmeda Model 465 or approved equal by Chemetron or Oxequip Health Industries.

CLOCK, DIGITAL, WITH DAY/DATE (CLK0401)

Unit shall provide indication of time of day (digital), day of the week, month, and date.

Unit shall include, but not be limited to, the following characteristics:

Wall mounting.

Numerals not less than 2" high and letters not less than 7/8" high.

Digital indication of hours and minutes with quartz movementy but he weeked. Automatic compensation for leap year variance.

Impact-resistant case.

Controls for setting all displayed parameters.

Operation on 115 VAC, 60 Hz.

Unit shall be Simplex, Type 30 "Calenda" or approved equal.

CLOCK, DIGITAL, TIME OF DAY/ELAPSED TIME (CLK0599)

Unit shall provide dual display indicating time of day elapsed time.

Unit shall include, but not be limited to, the following features and characteristics: Digital display of elapsed time in hours, minutes, seconds. Illuminated numerals not less than 2" high. Instantaneous reset for elapsed time. Controls for both real-time and elapsed time displays built into front of unit. Memory mode to prevent time information from being lost during a power interruption. Operation on 115 VAC, 60 Hz. Unit shall be Simplex type 2301 Celestra or approved equal. IELAPPSED TIME (AZ) CLOCK, DIGITAL, TIME OF DAY (CLK0599)K Unit shall provide digital display indicating time of day QV Unit shall include, but not be limited to, the following features and characteristics: + extures A-L) Digital display of real-time (hours, minutes, seconds) in a 24 hour format. Digital Display of elapsed time in hours, minutes, seconds: (A-Z) Illuminated numerals not less than 2" high. Instantaneous reset for elapsed + me. (A-Z) Controls for real time display remotely mounted. Time of DAY and Elapsed time. (A-1)
Memory mode to prevent time information from being lost during a power interruption. Operation on 115 VAC, 60 Hz.

Unit shall be Simplex type 2301 Celestra or approved equal.

DISINFECTING UNIT (DISO001)

Unit shall be designed for washing and pasteurizing anesthetic equipment.

Unit shall include, but not be limited to, the following features and characteristics:

Usable load capacity not less than 2.5 cubic feet.

Thirty-minute hot water wash cycle including pre-rinse, detergent wash, and two after rinses.

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Thirty-minute pasteurization cycle at 160 to 170 degrees F.

Automatic operation through complete washing and pasteurizing cycles.

1 2

Status signal to indicate which operation is in process.

Capability of interrupting, advancing, or repeating cycles at any point.

 A total of three (3) stainless steel wire baskets (two (2) measuring approximately 4" x 16.5' x 16.5", one (1) measuring approximately 8" x 16.5" x 16.5") to contain equipment during washing and pasteurizing.

Continuous vertical rotation of baskets during wash cycle.

Vertical rotation of baskets for not less than one (1) minute at beginning of pasteurizing cycle.

Vertical rotation of baskets for not less than one (1) minute while draining.

Power hoist for raising and lowering baskets.

Unit shall be Olympic Pasteurmatic Compact or approved equal.

HEADWALL UNIT, ICU PROCEDURE (HDW1801)

Unit shall incorporate an aggregation of piped gas, suction, and electrical power connections required for isolation recovery area care.

Unit shall include, but not be limited to, the following features and characteristics:

Housing structures shall provide rigid and secure mounting for all service connectors, signalling devices, patient monitoring equipment, container holders, clocks, and sphygmomanometers as specified.

Housing structure and covernign shall resist impact, abrasion, cleaning and disinfection materials, and physicological solutions.

Components, assemblies, connections, and configurations shall be in accordance with current NFPA standards and comply with requirements for UL listing.

Static pressure loss shall not exceed one inch of water for gas connections.

Housing frame structure members shall be rigidly bonded mechanically.

Housing covering panels shall be constructed from or coated with a material resistant to impact, abrasion, scratching, cleaning solutions, disinfection agents, physiological fluids, and pharmaceutical products.

Headwall assembly shall be preplumbed, prewired, and manifolded close to the top surface.

Outlets shall be piped and manifolded by headwall manufacturer. Piping shall be copper. Piping joints shall be brazed with silver brazing alloy (1000 deg F melting point).

Identification of piping manifold connections and pressure testing of each gas system shall be provided and documented by manufacturer of headwall.

Receptacles shall be connected to emergency power and rated for 20 ampere service at 115 volts, 60 Hz.

Receptacles shall be parllel blade U ground devices specifically designated, designed and indelibly marked as hospital grade devices.

Receptacles shall be permanently colored baby blue to indicate connection to emergency power.

Thirteen (13) duplex receptacles shall be provided in the locations and orientation shown on the drawings.

CPR Assistance (Code Blue) signaling device shall be distinctively and permanently identified by face markings and color.

Device shall be operated readily by a finger push motion.

Device location shall be as shown on drawings.

Medical Gas Outlets shall be Chemetron quick connect type or equal and provided as shown on the drawings in the following quantities:

- Eight (8) medical vacuum outlets.
- Two (2) medical oxygen outlets.
- Two (2) medical air outlets.

MEDICAL EQUIPMENT

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9 10 The following accessories shall be provided in the locations

shown on the drawings:

Monitor hook-up for remote monitor location.

Adjustable writing shelf.

Two (2) vacuum bottle slides.

Trhee (3) storage baskets.

Elapsed time clock.

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Nurse call.

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Two (2) adjustable/bumper guards.

17 18

Mercurial sphygmomanometer and cuff basket (see specflication for Item #SFG1305).

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Stretcher Bumpers.

22 23

Plastic laminate panels.

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Unit shall be Hill-Rom, Hospital Systems, or approved equal.

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HEADWALL UNIT, ISOLATION RECOVERY (HDW1802)

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Unit shall incorporate an aggregate of piped gas, suction, and electrical power connections required for isolation recovery area care.

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Unit shall include, but not be limited to, the following features and characteristics:

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Housing structure shall provide rigid and secure mounting for service connectors, signalling devices, container monitoring equipment, holders, clocks, sphygmomanometers as specified.

41 42 43

Housing structure and covering shall resist impact, abrasion, cleaning and disinfection materials, and physiological solutions.

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Components, assemblies, connections, and configurations shall be in accordance with current NFPA standards and comply with requirements for UL listing.

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Static pressure loss shall not exceed one inch of water for gas connections.

Housing frame structure members shall be rigidly bonded 2 mechanically. 3 4 Housing covering panels shall be constructed from or coated 5 with a material resistant to impact, abrasion, scratching, 6 cleaning solutions, disinfection agents, physiological 7 fluids, and pharmaceutical products. 8 9 Headwall assembly shall preplumbed, be prewired and 10 manifolded close to the top surface. 11 12 Outlets shall be provided with permanently marked faceplates 13 for ease in identification. 14 15 Outlets shall be piped and manifolded headwall by 16 manufacturer. Piping shall be copper. Piping joints shall 17 be brazed with silver brazing alloy (1000 degrees F melting point). 18 19 20 Identification of piping manifold connections and pressure 21 testing of each gas system shall be provided and documented 22 by manufacturer of headwall. 23 24 Receptacles shall be connected to emergency power and rated 25 for 20 ampere service at 115 volts, 60 Hz. 26 27 shall be parallel blade U Receptacles ground devices 28 specifically designated, designed and indelibly marked 29 hospital grade devices. ROOK (A-1) 30 31 Receptacles shall be permanently colored baby blue to 32 indicate connection to emergency power. 33 34 Twelve (12) duplex receptacles shall be provided in the 35 locations and orientation shown on the drawings. 36 37 CPR Assistance (Code Blue) signalling device shall 38 distinctively and permanently identified by face markings and 39 color. 40 41 Device shall be operated readily by a finger push motion. 42 43 Device location shall be a shown on drawings. 44 45 Medical Gas Outlets shall be quick disconnect type and 46 provided as shown on the drawings in the following 47 quantities: 48 49 Five (5) medical outlets. 50 51 Two (2) medical oxygen outlets. 52

One (1) medical air outlet.

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The following accessories shall be provided in the locations shown on the drawings:

Monitor support bracket and support arm.

Monitor hook-up.

Adjustable writing shelf.

Adjustable upper shelf.

Two (2) vacuum bottle slides.

Ceiling light switch.

Night light connected to emergency power.

Stretcher bumpers.

Mercurial sphygmomanometer and cuff basket (see specification for Item #SFG1305).

Time of day/elapsed time clock (see specification for Item #CLK0599).

Plastic laminate panels.

Unit shall be by Hill-Rom, Hospital Systems, or approved equal.

HEADWALL SYSTEM, RECOVERY (HDW1803)

Unit shall incorporate an aggregation of piped gas, suction, and electrical power connections required for isolation recovery area care.

Unit shall include, but not be limited to, the following features and characteristics:

System shall be customized to fit as indicated on the drawings.

Housing structure shall provide rigid and secure mounting for all service connectors, signalling devices, patient monitoring equipment, container holders, clocks, and sphygmomanometers as specified.

Housing structure and covering shall resist impact, abrasion, cleaning, and disinfection materials, and physiological solutions.

Components, assemblies, connections, and configurations shall be in accordance with current NFPA standards and comply with requirements for UL listing.

MEDICAL EQUIPMENT

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Static pressure loss shall not exceed one inch of water for gas connections.

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Housing frame structure members shall be rigidly bonded mechanically.

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Housing covering panels shall be constructed from or coated with a material resistant to impact, abrasion, scratching, cleaning solutions, disinfection agents, physiological fluids, and pharmaceutical products.

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Headwall assembly shall be plumbed, wired and manifolded close to the top surface.

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Outlets shall be provided with permanently marked faceplates for ease in identification.

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Outlets shall be piped and manifolded by headwall manufacturer. Piping shall be copper. Piping joints shall be brazed with silver brazing alloy (1000 degrees F melting point).

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Identification of piping manifold connections and pressure testing of each gas system shall be provided and documented by manufacturer of headwall.

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Receptacles shall be connected to emergency power and rated for 20 ampere service at 115 volts, 60 Hz.

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Receptacles shall be parallel blade U ground devices specifically designated, designed, and indelibly marked as hospital devices.

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Receptacles shall be permanently colored baby blue to indicate connection to emergency power.

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Ten (10) duplex receptacles shall be provided for each patient in the locations and orientation shown on the drawings.

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CPR Assistance (Code Blue) signalling device distinctively and permanently identified by face markings and color.

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Device shall be operated readily by a finger push motion.

46 47 48

Device location shall be as shown on drawings.

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Medical Gas Outlets shall be quick disconnect type and provided for each patient as shown on the drawings in the following quantities:

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Five (5) medical vacuum outlets.

Two (2) medical oxygen outlets.

One (1) medical air outlet.

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Two (2) outlets for SARA system connections.

The following accessories shall be provided for each patient in the locations shown on the drawings.:

Monitor support bracket and support arm.

Monitor hook-up.

Vacuum bottle cove.

Two (2) vacuum bottle slides.

Ceiling light switch.

Stretch bumpers.

Adjustable bumper guards.

Mercurial sphygmomanometer and cuff basket (see Specification for Item #SFG1305).

Electric time of day clock.

Vertical tracks for universal mounting of accessories.

Unit shall be by Hill Rom Hospital Systems, or approved equal.

34 HEADWALL UNIT, HOLDING (HDW1804)

Patient headwall shall incorporate an aggregation of piped gas, suction, and electrical power connections required for surgical holding area care.

Unit shall include, but not be limited to, the following features and characteristics:

Headwall components shall provide rigid and secure mounting for all service connectors, signalling devices, patient monitoring equipment, container holders, and sphygmomanometers as specified.

Components, assemblies, connections, and configurations shall be in accordance with current NFPA standards and comply with requirements for UL listing.

Covering panels shall be constructed from or coated with a material resistant to impact, abrasion, scratching, cleaning

solution, disinfection agents, physiological fluids, and pharmaceutical products.

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Static pressure loss shall not exceed one inch of water for gas connections.

6 7 8

Headwall components shall be preplumbed, prewired, and manifolded. Piping shall be copper. Piping joints shall be brazed with silver brazing alloy (1000 degrees F melting point).

Identification of piping manifold connections and pressure testing of each gas system shall be provided and documented by the manufacturer.

Receptacles shall be rated for 20 ampere service at 115 Volts, 60 Hz.

Receptacles shall be parallel blade U ground devices specifically designated, designed, and indelibly marked as hospital grade devices.

Headwall shall include a total of five (5) duplex receptacles, two (2) of which shall be connected to emergency power and colored red. Refer to drawings for locations and orientation.

CPR Assistance (Code Blue) signalling device shall be distinctly and permanently identified by face markings and color. Device shall be operated readily be a finger push motion. Device location shall be as shown on drawings.

Medical Gas Outlets shall be quick disconnect type and provided as shown on the drawings. in the following quantities:

One (1) medical vacuum outlet.

One (1) medical oxygen outlet.

One (1) medical air outlet.

The following accessories shall be provided in the location shown on the drawings.

Monitor support bracket and support arm.

Monitor hook-up.

Vacuum bottle slide.

Ceiling light switch.

Mercurial sphygmomanometer and cuff basket (see specification for Item #SFG1305).

the following

holders,

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Unit shall be by Hill-Rom, Hospital Systems, or approved equal.

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HEADWALL UNIT, BLOCKING ROOM (HDW1805)

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Patient headwall shall incorporate an aggregation of piped gas, suction, and electrical power connections required for surgical 8 area care.

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Unit shall include, but not be limited to, features and characteristics: Headwall components shall provide rigid and secure mounting

monitoring

sphygmomanometers as specified. Components, assemblies, connections, and configurations shall be in accordance with current NFPA standards and comply with requirements for UL listing.

for all service connectors, signalling devices,

equipment,

Covering panels shall be constructed from or coated with a material resistant to impact, abrasion, scratching, cleaning solution, disinfection agents, physiological fluids, pharmaceutical products.

container

Static pressure loss shall not exceed one inch of water for gas connections.

Headwall components shall be preplumbed, prewired, manifolded. Piping shall be copper. Piping joints shall be brazed with silver brazing alloy (1000 deg F melting point).

Identification of piping manifold connections and pressure testing of each gas system shall be provided and documented by the manufacturer.

Receptacles shall be rated for 20 ampere service at 115 Volts, 60 Hz.

Receptacles shall be parallel blade U ground specifically designated, designed, and indelibly marked as hospital grade devices.

include a total of Headwall shall five (5)duplex receptacles, two (2) of which shall be connected to emergency power and colored baby blue. Refer to drawings for locations and orientation. Reg

(Code Blue) signalling device shall CPR Assistance distinctly and permanently identified by face markings and Device shall be oeprated readily be a finger push motion. Device location shall be as shown on drawings.

4	r and the latest being a series of the serie
1 2 3 4	Medical Gas Outlets shall be Chemetron quick connect type or equal and provided as shown on the drawings in the following quantities:
5	One (1) medical vacuum outlet.
7 8 9	One (1) medical oxygen outlet.
10	One (1) medical air outlet.
12	One medical nitrous oxide outlet.
14 15 16	The following accessories shall be provided in the location shown on the drawings.
17 18	Monitor support bracket and support arm.
19 20	Monitor hook-up.
21 22	Vacuum bottle slide.
23 24	Ceiling light switch.
25 26	Two 92) outlets for SARA system connections.
27 28 29	Mercurial sphygmomanometer and cuff basket (see specification for Item #SFG1305).
30 31	Unit shall be by Hill-Rom, Hospital Systems, or approved equal.
32 33 34	CABINET WARMING, DUAL COMPARTMENT, FREE-STANDING (CAB2307)
35 36	Unit shall be used for warming blankets and sterile solutions.
37 38 39	Unit shall include, but not limited to, the following features and characteristics:
40 41	Free-standing cabinet configuration.
42 43	Top and side panels of stainless steel construction.
44 45 46	All facial weldments shall be ground smooth and be flush with adjacent surfaces.
47	Include all accessories as applicable for installation.
49 50 51	Upper heating chamber with controls to automatically maintain temperature within 100 degrees F to 180 degrees F as selected.

10:0

Upper heating chamber to hold twenty (20), two (2) liter square surgical flasks, sixty (60) in the heated storage chamber.

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> Lower heated storage compartment with single temperature heater and independent power switch.

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Double pan door and walls of upper heating chamber constructed of at least 18 gauge stainless steel and at least 1" insulation between the pans.

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Door for each chamber right or left-hand hinged as specifed by architect.

14 15

Chrome plated hinges and magnet-imbedded heat resistant vinyl gaskets included with doors.

16 17 18

Removable aluminum blanket shelf.

19 20

Temperature indicating thermometer for upper chamber.

21 22

23

Blanket-type heater for upper chamber with air circulating fan and over temperature protection, visual and audible alarm.

24 25

Power on/off switch and visual indicator.

26 27 28

Electrical fault power line interruption device.

29 30

Approximate dimensions of 75"H x 30"W x 24"D.

31

Operation on 115 VAC, 60 Hz.

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Conform to Underwriters Laboratories Standard 544.

34 35 36

Unit shall be AMSCO Model DJ04-112-131 or approved equal by Atlantic Alloy, Castle/Sybron, or Continental Metal Products.

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ICE MACHINE, FLAKER/DISPENSER, WALL MOUNTED (ICE0307)

41 42 43

Unit shall function as an ice maker and dispenser.

44 45 46

Unit shall include, but not be limited to, the following features and characteristics:

47 48

Capable of dispensing flaked ice in measured amount of 1 oz. or 2 ozs., or in a continuous flow mode. Shall be capable of dispensing water in either of those modes.

49 50 51

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53 54 With inlet water temperature of 70 degrees F and ambient air temperature of 70 degrees F, unit shall be capable of producing not less than 380 lbs. of flaked ice in a 24 hour period.

Stainless steel storage bin with capacity of not less than 8

lbs.

Air cooled, operation on 115 Volts, 60 Hz.

Baked enamel finish.

Wall mounting.

Dimensions approximately 14"w x 24"D x 28"H.

Unit shall be Scotsman model FD4AE-1D or approved equal by Ferno Forge.

ILLUMINATOR, X-RAY FILM, 1 PANEL, SURFACE MOUNTED (ILL0102)

Unit shall provide illumination for viewing radiographic films.

Unit shall include, but not limited to, the following features and characteristics:

One (1) illumination panel measuring 14"W x 17"H.

Two (2) 15 watt fluorescent lamps for panel.

Retainers to hold film over panel.

Three position rocker switch to provide manual on/off or film-activated operation.

Surface mounting.

Single piece diffusing panel.

Operation on 115 VAC, 60 Hz.

Unit shall be General Electric Model E5003A or approved equal by Cone Instruments, Halsey, or S&S X-Ray.

 ILLUMINATOR, X-RAY FILM, 2 PANEL, SURFACE MOUNTED (ILL0207)

Unit shall provide illumination for viewing radiographic films.

Unit shall include, but not limited to, the following features and characteristics:

Two (2) side-by-side illumination panels, each measuring 14"w х 17"H.

Two (2) 15 watt fluorescent lamps for each panel.

Retainers to hold film over each panel. Master on/off power switch with visual on indicator. Cluster switch configuration. Three-position rocker switches to provide manual on/off or film-activated operation for each viewing panel. Surface mounting. Single piece diffusing panel. Operation on 115 VAC, 60 Hz. Unit shall be General Electric Model E5004B or approved equal by Cone Instruments, Halsey, or S&S X-Ray. ILLUMINATOR, X-RAY FILM, 4 PANEL, RECESSED (ILL0405) Unit shall provide illumination for viewing radiographic films. Unit shall include, but not be limited to, the following features and characteristics: Four (4) side-by-side illumination panels, each measuring 14"W x 17"H. Two (2) 15 watt fluorescent lamps for panel. Retainers to hold film over each panel. Master on/off power switch with visual on indicator. Cluster switch configuration. Three-position rocker switches to provide manual on/off or film-activated operation for each viewing panel. Recessed mounting. Single piece diffusing panel. Operation on 115 VAC, 60 Hz. Unit shall be General Electric Model E5004D or approved equal by Cone Instruments, Halsey, or S&S X-Ray. ILLUMINATOR, X-RAY FILM, 4 PANEL, SURFACE MOUNTED (ILL0406) Unit shall provide illumination for viewing radiographic films.

1 Unit shall include, but not be limited to, the following features and characteristics: 2 4 Four (4) side-by-side illumination panels, each measuring 5 14"W x 17"H. 6 7 Two (2) 15 watt fluorescent lamps for panel. 8 9 Retainers to hold film over each panel. 10 Master on/off power switch with visual on indicator. 11 12 13 Cluster switch configuration. 14 15 Three-position rocker switches to provide manual on/off or 16 film-activated operation for each viewing panel. 17 18 Surface mounting. 19 Single piece diffusing panel. 20 21 22 Operation on 115 VAC, 60 Hz. 23 24 Unit shall be General Electric Model E5004D or approved equal by 25 Cone Instruments, Halsey, or S&S X-Ray. 26 27 28 -ILLUMINATOR, X-RAY FILM, SPINAL, 1 PANEL, RECESSED (ILL0099) 29 30 Unit shall provide illumination for viewing radiographic films 31 of the spine and long bones. 32 33 Unit shall include, but not be limited to, the following 34 features and characteristics: 35 One (1) illumination panel measuring 14"W x 36"H. 36 37 Two (2) cool white fluorescent lamps and two (2) daylight 38 39 fluorescent lamps for panel. 40 41 Switch to allow selective illumination of either pair of 42 lamps or all four (4) lamps simultaneously. 43 44 Retainers to hold film over panel. 45 46 Recessed mounting. 47 48 Single piece diffusing panel. 49 50 Operation on 115 VAC, 60 Hz. 51

Unit shall be General Electric Model E5087FE or approved equal

by Cone Instruments, Halsey, or S&S X-Ray.

52 53

1 2 ILLUMINATOR, X-RAY FILM, 3 OVERE 3 PANEL, SURFACE MOUNTED 3 (ILL3099) 4 Unit shall provide illumination for viewing radiographic films. 5 6 Unit shall include, but not be limited to, the following 7 features and characteristics: 8 9 10 Two (2) banks of three (3) side-by-side illumination panels. each panel measuring 14"W x 17"H. 11 12 13 Two (2) 15 watt fluorescent lamps for each panel. 14 15 Retainers to hold film over each panel. 16 17 Cluster switch configuration. 18 19 Three-positioning rocker switches to provide manual on/off or 20 film-activated operation for each viewing panel. 21 22 Surface mounting. 23 24 Single piece diffusing panel for each bank. 25 26 Operation on 115 VAC, 60 Hz. 27 28 Unit shall be General Electric model E5004AE or approved equal 29 by Cone Instruments, Halsey, or S&S X-Ray. 30 31 32 ILLUMINATOR, X-RAY FILM, 4 OVER 4 PANEL, SURFACE MOUNTED 33 (ILL4099) 34 Unit shall provide illumination for viewing radiographic films. 35 36 37 Unit shall include, but not be limited to, the following 38 features and characteristics: 39 40 Two (2) banks of side-by-side illumination panels, each panel measuring 14"W x 17"H. 41 43 Two (2) 15 watt fluorescent lamps for each panel. 45 Retainers to hold film over each panel. 46 47

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Cluster switch configuration.

48 49

Three-position rocker switches to provide manual on/off or film-activated operation for each viewing panel.

50 51 52

Surface mounting.

53 54

Single piece diffusing panel for each bank.

Operation on 115 VAC, 60 Hz. Unit shall be General Electric model E5004AF or approved equal by Cone Instruments, Halsey, S&S X-Ray. LICHT, CEILING MOUNTED (LFT0399) Unit shall function as ceiling mounted lifting device. Unit shall include, but not be limited to, the following features and characteristics: Load capacity of not less than 1000 lbs. Bronze and ball thrust bearings. Adjustable anti-slip safety brake and safety latch. Impact-resistant metal housing. Steel chain not less than 13 feet long with 360 degree swivel hooks attached. Unit shall be Sears Model 9F78703C or approved equal by Abbeon or Brodhead-Garrett. LIGHT, CEILING MOUNTED (LTS0399) Unit shall provide illumination for dental examinations and procedures. Unit shall include, but not be limited to, the following features and characteristics: Mounting by ceiling pendant. Single lighthead with rotation axis at lighthead. Light color corrected at 3800 degrees to 5400 degrees Kelvin. Operating field approximately 3 1/4" x 6 1/2" at a distance of 27" from lighthead. Maximum light intensity of not less than 2500 footcandles.

Counterbalanced, drift-free arm system.

Snap release lens shield.

Scratch-resistant reflector.

Operation on 115 VAC, 60 Hz.

Unit shall be ADEC Model 6300 or approved equal by Syntex or Dentsply.

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LIGHT, EXAMINATION/MINOR SURGICAL, SINGLE HEAD, CEILING MOUNTED (LTS0513)

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Unit shall provide illumination adequate for minor surgery and emergency room procedures.

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Unit shall include, but not be limited to, the following features and characteristics:

15 16

Steel suspension tube mounted on ceiling.

17 18

Horizontal crossarm and lamphead yoke assembly attached to suspension tube.

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Crossarm and yoke assembly for lamphead capable of 19" vertical travel upward from horizontal, 16" downward from horizontal, and 250 degrees rotation about suspension tube.

23 24

Lamphead capable of rotating 180 degrees about its own axis.

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Fully enclosed counterbalancing of arm, yoke, and lamphead assemblies to permit drift-free positioning lampheads both by a detachable sterilization handle and by a non-sterile handle on lamphead.

30 31 32

Illumination from each lamphead of approximately 3000 foot candles at a point 36" below the lamphead.

33 34 35

Fluted reflector for each lamphead to reduce glare be diffusing light.

36 37 38

Dichroic reflector coating to limit radiant heat to not more than 5 microwatts per square centimeter per footcandle.

39 40 41

Light color temperature corrected to approximately 4800 degrees K.

42 43 44

Halogen lamp rated at not less than 1000 hours.

45 46

Universal focus design to keep beam in proper focus throughout normal range of use.

47 48 49

Corrosion-resistant finish on all metal surfaces.

50 51

Operation on 115 VAC, 60 Hz.

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Unit shall be Castle Model 2410C or approved equal by Chick or Skytron.

1 2 3

LIGHT, EXAMINATION/MINOR SURGICAL, SINGLE HEAD, CEILING MOUNTED (LTS0513F)

Unit are existing (quantity of 3) and are to moved from Room HE112 to Room HAE011 of the University Hospital.

Unit is Sybron/Castle model 2410C.

Contractor shall disconnect unit and reinstall as per manufacturer's specification.

 Contractor shall move unit in such a way to insure that no damage occurs to unit during transport. Contractor shall assume full responsibility to unit during disassembly, transport, and re-installation.

Disconnection, disassembly, transport, and re-installation shall be coordinated with appropriate University Hospital Emergency Department Personnel.

LIGHT, SURGICAL, PROCEDURE (LTS4504)

Unit shall provide illumination suitable for minor surgical and catheterization procedures.

Unit shall include, but not be limited to, the following features and characteristics:

Single lamphead mounted in a movable yoke support.

Ceiling hub mounted drift-free suspension system with fully enclosed counterbalancing.

Lamphead capable of rotating 180 degrees about its own axis.

Capability of positioning lamphead both by a detachable sterilization handle and by a non-sterile handle.

Dichroic reflector coating to limit radiant heat to not more than 5 microwatts per square centimeter per footcandle.

Illumination intensity of approximately 4500 footcandles at a point of 38" below the lamphead.

Light diffusion by means of reflector or lens to reduce glare.

Light color temperature corrected to approximately 4400 degrees Kelvin.

Lamps rated at not less than 1000 hours.

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53 54 Universal focus design to keep beam in proper focus throughout normal range of use.

Corrosion-resistant finish on all metal surfaces.

Operation on 115 VAC, 60 Hz.

Unit shall be Amsco model Polaris or approved equal by Martin or Chick.

LIGHT, SURGICAL, MAJOR (LTS4505)

Unit shall provide illumination suitable for major surgical procedures.

Unit shall include, but not be limited to, the following features and characteristics:

Steel suspension tube mounted to ceiling.

- Two (2) horizontal crossarms and lamphead yoke assemblies attached to suspension tube. Surgical light assembly shall of adding another horizontal capable crossarm lamphead.
- Two (2) independent lampheads, one attached to each yoke assembly. Each lamphead shall be completely sealed.

Fully enclosed counterbalancing of arm, yoke, and lamphead assemblies to permit drift-free positioning without the use of locking devices.

Each lamphead capable of rotating 180 degrees about its own axis.

Capability of positioning lampheads both by a detachable sterilizable handle and a non-sterile handle lamphead. Sterile handle to have focus control.

Beam intensity of the major lamphead shall be variable from 0 to approximately 7,000 footcandles at a point 36" below the lamphead.

Heat energy in the beam of either lamphead shall not exceed 5 microwatts per square centimeter per footcandle.

- Lamps for each lamphead rated at not less than 1000 hours.
- Light from each lamp color corrected to 4300-4500 deg K.
- Universal focus design to keep beams in proper focus throughout normal range of use.

1 Corrosion-resistant finish on all metal surfaces. 2 3

Operation on 115 VAC, 60 Hz.

On/off switch for each lamphead.

Unit shall be Siemens model London Duo or approved equal. 9 This equipment will be Owner Furnished and Contractor installed.

LIGHT, SURGICAL, MINOR, DUAL HEAD (LTS4516)

Unit shall provide illumination adequate for minor surgery and emergency room procedures.

Unit shall include, but not be limited to, the following features and characteristics:

Steel suspension tube mounting on ceiling.

Two horizontal crossarms and lamphead yoke attached to suspension tube.

Crossarm and yoke assembly for each lamphead capable of 19" vertical travel upward from horizontal, 16" downward from horizontal, and 250 degrees rotation about suspension tube.

Each lamphead capable of rotating 180 degrees about its own axis.

Counterbalancing of arm, yoke, and lamphead assemblies to permit drift-free positioning without the use of locking devices.

Capability of positioning lampheads both by a detachable sterilizable handle and by a non-sterile handle on lamphead.

Illumination from each lamphead of approximately 3,000 footcandles at a point 36" below the lamphead.

Fluted reflector for each lamphead to reduce glare by diffusing light.

Dichroic reflector coating to limit radiant heat to not more than 5 microwatts per square centimeter per footcandle. Lens shall have infared radiation absorbing capability.

Borosilicate glass filter to correct light color temperature to approximately 4800 degrees K.

Two (2) halogen lamps rated at not less than 1000 hours.

Universal focus design to keep beam in proper focus throughout normal range of use.

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MEDICAL EQUIPMENT

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Corrosion-resistant finish on all metal surfaces.

Operation on 115 VAC, 60 Hz.

Chick model (73251) or Unit shall be approved equal by Sybron/Castle.

LIGHT, SURGICAL, TRIPLE HEAD (LTS4599)

Unit shall provide illumination adequate for major trauma surgical procedures.

Unit shall include, but not be limited to, the following features and characteristics:

Steel suspension hub mounted to ceiling.

Three (3) horizontal crossarms and lamphead yoke assemblies attached to suspension hub.

Three (3) independent lampheads, one (1) attached to each yoke assembly.

Fully enclosed counterbalancing of arm, yoke, and lamphead assemblies to permit drift free positioning without the use of locking devices.

Each lamphead capable of rotating 180 degrees about its own axis.

Capability of positioning lampheads both by a detachable sterilizable handle and a non-sterile handle each lamphead.

Beam intensity of each lamphead shall be variable from 0 to approximately 8,000 footcandles.

Heat energy in the beam of each lamphead shall not exceed 5 microwatts per square centimeter per footcandle.

Lamps for each lamphead rated at not less than 1000 hours.

Light for each lamphead color corrected to 4300-4500 deg. K.

keep beams in proper focus Universal focus design to throughout normal rang of use.

Corrosion-resistant finish on all metal surfaces.

Operation on 115 VAC, 60 Hz.

On/off switch for each lamphead.

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7 8 Unit shall be Siemens model London or approved equal.

Unit will be furnished; Contractor installed. (A-Z

MIXER, X-RAY CHEMICALS, AUTO (MIX2301)

Unit existing is to be moved from Room HE129A to Room HAE045A.

Unit is Kodak model Automixer.

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unit and reinstall Contract shall disconnect per manufacturer's specification.

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Contractor shall move unit in such a way to insure that no damage occurs to unit during transport. Contractor shall assume full responsibility to unit during disassembly, transport, and re-installation.

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Disconnection, disassembly, transport, and re-installation shall be coordinated with appropriate University Diagnostic Radiology Department Personnel.

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OTOSCOPE/OPHTHALMOSCOPE, WALL MOUNTED WITH CHARGER (OTS0099)

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Unit shall be designed for examination of the eyes, ears, and throat.

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Unit shall include, but not be limited to, the following features and characteristics:

30 31 32

Cordless ophthalmoscope operating on rechargeable batteries.

33 34

Sixteen lenses, five aperture selections, and polarizing filter for ophthalmoscope.

35 36 37

Cordless otoscope operating on rechargeable batteries.

38 39

Wide angle viewing lens for otoscope.

40 41

Capability for pneumatic otoscopy.

42 43

Capability for converting otoscope to general purpose illuminator by removing otoscope head.

44 45 46

Halogen illumination with variable intensity for both otoscope and ophthalmoscope.

47 48 49

Wall mounted charger for otoscope and ophthalmoscope, operating on 115 VAC, 60 Hz.

50 51 52

Unit shall be Welch Allyn model 91100 or approved equal by American Optical or Sybron/Tycos.

10.3

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SERVICE COLUMN, ICU (PWC0001)

Unit shall be configured as a free-standing column mounted between floor and ceiling. Unit shall incorporate an aggregation of piped gas, suction, electrical power connections, and accessories required for intensive care areas.

Unit shall include, but not be limited to, the following features and characteristics:

Housing structure shall provide rigid and secure mounting for all service connectors, signalling devices, patient monitoring equipment, container holders, clocks, and sphygmomanometers as specified.

Housing structure and covering shall resist impact, abrasion, cleaning and disinfection materials, and physiological solutions.

Components, assemblies, connections, and configurations shall be in accordance with current NFPA standards and comply with requirements for UL listing.

Static pressure loss shall not exceed one inch of water for gas connections.

Housing frame structure members shall be rigidly bonded mechanically.

 Housing covering panels shall be constructed from or coated with a material resistant to impact, abrasion, scratching, cleaning solutions, disinfection agents, physiological fluids, and pharmaceutical products.

Column assembly shall be preplumbed, prewired, and manifolded close to the top surface.

Outlets shall be provided with permanently marked fireplates for ease in identification.

Identification of piping manifold connections and pressure testing of each gas system shall be provided and documented by manufacturer of headwall.

Receptacles shall be connected to emergency power and rated for 20 ampere service at 115 Volts, 60 Hz.

Receptacles shall be parallel blade U ground devices specifically designated, designed, and indelibly marked as hospital grade devices.

Receptacles shall be permanently colored baby blue to indicate connection to emergency power.

Thirteen (13) duplex receptacles shall be provided in the locations and orientation shown on the drawings.

CPR Assistance (Code Blue) signalling device shall be distinctively and permanently identified by face markings and color.

Device shall be operated readily be a finger push motion.

Device location shall be as shown on drawings.

Medical Gas Outlets shall be quick disconnect type and provided as shown on the drawings in the following quantities:

Eight (8) medical vacuum outlets.

Two (2) medical oxygen outlets.

Two (2) medical air outlets.

The following accessories shall be provided in the locations and orientation shown on the drawings:

Monitor support bracket and support arm.

Monitor hook-up.

1 2

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Two (2) adjustable writing shelves.

One (1) large storage basket.

Two (2) medium storage baskets.

Four (4) small swivel storage baskets.

Two (2) adjustable bumper guards.

Overhead light.

One (1) Ambu-bag holder.

Three-way ceiling light switch.

Phone outlet.

Bed communications outlet.

Night light.

52 Elapsed time clock.
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Nurse call/response speaker.

MEDICAL EQUIPMENT

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Mercurial sphygmomanometer and cuff basket (see specification for Item #SFG1305).

Unit shall be Hill-Rom model 950E or approved equal.

RACK, APRON/GLOVE, LEAD, MULTIPLE (RAK0101)

Unit shall function as a utility rack for convenient storage of lead aprons and gloves.

Unit shall include, but not be limited to, the following features and characteristics:

Frame of heavy gauge steel construction with baked enamel finish.

Glove and apron arms of anodized aluminum.

Wall mounted with weight floor-supported.

Dimensions approximately 30"W x 69"H.

Unit shall be Picker model 290233 or approved equal.

REFRIGERATOR, WALK-IN, 10.5' X 14.5' (REF2399)

Unit existing is to be moved from Room H2 to Room HAM012 of the University Hospital.

Unit is Tyler Refrigerator Corporation model 9782.

unit and reinstall Contractor shall disconnect as per manufacturer's specification.

Contractor shall move unit in such a way to insure that no damage occurs to unit during transport. Contractor shall assume full responsibility to unit during disassembly, transport, and re-installation.

Disconnection, disassembly, transport, and reinstallation shall be coordinated with appropriate University Hospital Pharmacy Department and Materials Management Department.

SPHYGMOMANOMETER, ANEROID, WALL MOUNTED (SFG0101)

Unit shall function as an aneriod device for the non-invasive measurement of blood pressure.

Unit shall include, but not be limited to, the following features and characteristics:

Swivel mounting on wall.

Calibration from 0 to 300 mm Hg.

8 foot tubing.

5

Adult size cuff.

Basket-type inflation system holder.

Airflow control device.

Guaranteed to be and to remain scientifically accurate.

Unit shall be Sybron/Tycos model 5091-38 or approved equal by Marshall Electronics.

SPHYGMOMANOMETER, MERCURIAL (SFG1305)

Unit shall function as a mercurial device for the non-invasive measurement of blood pressure.

Unit shall include, but not be limited to, the following features and characteristics:

Swivel mounting to headwall or service column as indicated on drawings.

Calibration from 0 to 300 mm Hg.

Aluminum scale with permanently etched numbers.

8 foot tubing.

Adult-size cuff.

Basket-type inflation system holder.

Air flow control device.

Guaranteed against glass breakage.

Guaranteed to be and to remain scientifically accurate.

Unit shall be Baum model 0661-0850 or approved equal by Sybron/Tycos or Pymah.

SINK, SCRUB, DOUBLE BAY (SNK1901)

52 Unit shall provide sinks and timed flow of thermostatically 53 controlled water to accommodate preoperative scrubbing 54 procedures.

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features and characteristics:

Two (2) sink compartments.

 Thermostatically controlled water dispensing system allowing varied water temperatures up to 115 degrees F, regulated by an in-line flow valve to a single gooseneck faucet at each sink compartment.

Unit shall include, but not be limited to, the following

Soap dispensing system to supply a minimum of 2 cc of soap solution when activated.

Independent knee controlled switches to activate water and soap dispensing systems at each single compartment.

Minimum of one (1) gallon soap solution storage capacity for each sink compartment.

Bracket for mounting unit on wall.

Stainless steel construction, welded into a rigid frame.

Sound deadening for sink compartments.

Timer to allow scrub cycles of 3 minutes or 10 minutes.

Steel skirt assembly with baked enamel finish.

Operation on 115 VAC, 60 Hz.

Overall dimensions approximately 65"W x 29"H x 42"D.

Unit shall be Amsco model Uni-Matic II or approved equal by Continental Metal Products or Ferno Forge.

SILVER RECOVERY UNIT, (SRU0003)

Unit existing is to moved from Room H127 to Room HAE045A of the University Hospital.

Unit is Picker model Ultra 12.

Contractor shall disconnect unit and reinstall as per manufacturer's specification.

Contractor shall move unit in such a way to insure that no damage occurs to unit during transport. Contractor shall assume full responsibility to unit during disassembly;, transport, and re-installation.

1 2	Disconnection, disassembly, transport, and reinstallation shall be coordinated with appropriate University Hospital
3 4	Diagnostic Radiology Personnel.
5	STERILIZER, VACUUM, 16X16X26, SINGLE DOOR, CABINET (STE2206)
6 7 8	Owner furnished, contractor installed.
9	Unit shall be used to sterilize heat and moisture stable materials using steam at 212 degrees F to 280 degrees F.
12	Unit shall include, but not be limited to, the following features and characteristics:
15	Chamber size 16"x16"x26", single door design.
17 18	Door to be manually operable with radial arm locking mechanism and monel door frames
20	Configured for free-standing cabinet mounting.
21	Double walled steel chamber with glass fiber insulation.
23 24 25 26	Prevacuum cycle for efficient, high volume processing of fabrics or wrapped hard goods at 270 degrees to 280 degrees F.
27 28 29	Gravity cycles for sterilizing liquids in flasks with vented closures at 212 degrees to 254 degrees F.
30	Chamber capable of withstanding a working pressure of 36 psig.
33 34 35	Pressure sensing mechanism which will automatically lock door when pressure exceeds 2.7 psig.
36 37 38 39	State of the art microcomputer control and monitoring for all cycles.
10	Continuous visual indication of working pressures.
12 13	Visual and audible indicators for cycle complete or interrupted cycle.
15	Manually selectable sterilizer and dry times.
17 18 19	Two (2) power switches, one (1) to isolate entire unit, other for controls only.
50	Digital printer for continuous record of chamber temperature in all cycles with memory to store data during momentary power outages.

manual operation of sterilizer without 1 Capability of 2 electrical power. 3 4 Display to indicate each cycle phase as they occur. 5 Steam condensate system disposing condensate to system drive. 6 7 8 Jacket condensate line with strainer, trap, and check valve. 9 Shutoff valves for both water and steam, accessible without 10 11 tools. 12 All exterior surfaces of stainless steel. 13 14 15 Operation on 115 VAC, 60 Hz. 16 Compatibility with existing sterilizers inthe Surgical Suite. 17 18 Compliance with all applicable requirements of the following 19 20 standards: 21 Underwriters Laboratories, Inc. 22 23 24 ASTM Specification B43 or B135, alloy 1 for seamless, red 25 brass tubing. 26 ASTM Specification B88 for seamless copper tubing. 27 28 Federal Specification GG-S-1343A performance requirements. 29 30 31 ASME Code, Section VIII, Division I for unfired pressure 32 vessels. 33 Unit shall be Amsco model 2013 or approved equal. 34 35 36 STERILIZER, VACUUM, 16X16X26, SINGLE DOOR, RECESSED STE2206F) 37 38 Units are existing (quantity of 3) and are to be moved to Room 39 HA0236 of the University Hospital from the following locations: 40 41 42 Substerile room between Operating Room E and Operating Room 43 G. 44 45 Substerile room between Operating Room J and Operating Room 46 47 48 Substerile room between Operating Room A and Operating Room 49 C. 50 Unit is Amsco model 2013. 51 52 53 Contractor shall disconnect unit and install as per manufacturer's specification. 54

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Disconnection, disassembly, transport, and reinstallation shall

be coordinated with appropriate University Hospital Surgery Department Personnel.

TRACK, CUBICLE CURTAIN, 90 DEGREE (TRK0303)

Unit shall suspend and mobilize cubicle privacy curtains to permit the complete screening of designated areas using flathead screening to the complete screening of designated areas using flathead screening to the complete screening of designated areas using flathead screening to the complete screening of designated areas using flathead screening to the complete screening of designated areas using flathead screening to the complete screening of designated areas using flathead screening to the complete screening of designated areas using flathead screening to the complete screening of designated areas using flathead screening to the complete screening of designated areas using flathead screening to the complete screening of designated areas using flathead screening to the complete screenin

Contractor shall move unit in such a way to insure that no damage occurs to unit during transport. Contractor shall assume

full responsibility to unit during assembly, transport, and

Unit shall include, but not be limited to, the following features and characteristics:

Surface mounting on ceiling.

Extruded anodized aluminum track with inside raceway smooth for uninterrupted movement of carriers.

Track to have 90 degree bend with approximately 14" radius.

One curtain carrier for each 6" of track.

End stops and pullouts as necessary to provide complete assemblies.

Carrier assembly shall be assembled on two noiseless selflubricating nylon wheels with stainless or nickel plated steel beaded drop chain and nickel plated or aluminum hook.

Pullout to permit entry of carriers.

Track length, location, and orientation as indicated on drawings.

Unit shall be Grant Hardware model 19201 or approved equal by Amsco or Clickeze.

TRACK, CUBICLE CURTAIN, STRAIGHT (TRK0304)

Unit shall suspend and mobilize cubicle privacy curtains to permit the complete screening of designated area.

Unit shall include, but not be limited to, the following features and characteristics:

Surface mounting on ceiling using flathead screws and countersunk mounting holes.

1

Extruded anodized aluminum track with inside raceway smooth for uninterrupted movement of carriers.

6

Track to be one continuous straight length.

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End stops and pullouts as necessary to provide complete assemblies.

11 12 Carrier assembly shall be assembled on two (2) noiseless self-lubricating nylon wheels with stainless or nickel plated steel beaded drop chain and nickel plated or aluminum hook.

13 14

Pullout to permit entry of carriers.

15 16

Track length, location, and orientation as indicated on drawings.

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Unit shall be Grant Hardware model 19101 or approved equal by Amsco or Clickeze.

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TRACK, IV, STRAIGHT (TRK0904)

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Unit shall be used for hanging and positioning IV containers from the ceiling.

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Unit shall include, but not be limited to, the following features and characteristics:

29 30 31

Surface mounting on ceiling using flathead screws and countersunk mounting holes.

32 33 34

Track of extruded aluminum with inside raceway smooth for uninterrupted movement of trollies.

35 36

All end stops, splicers, and track components needed for a complete assembly.

37 38 39

Two (2) self-lubricating trolleys that lock into position when loaded.

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Track to be one continuous straight length.

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Track length, location, and orientation as indicated on drawings.

46 47 48

Unit shall be by Grant Hardware or approved equal by Amsco or O.B. Masco.

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TRACK, IV, OVAL (TRK0908)

1 Unit shall be used for hanging and positioning IV containers 2 from the ceiling. 3 4 Unit shall include, but not be limited to, the following 5 features and characteristics: 6 7 Surface mounting on ceiling using flathead screws and 8 countersunk mounting holes. 9 10 Track of extruded anodized aluminum with inside raceway 11 smooth for uninterrupted movement of trollies. 12 13 All end stops, splicers, and track components needed for a 14 complete assembly. 15 16 Two (2) self-lubricating trolleys that lock into position when loaded. 17 18 19 Track to be oval shaped. 20 Track length, location, and orientation as indicated on 21 22 drawings.j 23 24 Unit shall be Grant Hardware or approved equal by Amsco or O.B. 25 Masco. 26 27 28 TRACK, IV, U-SHAPED (TRK0909) 29 30 Unit shall be used for hanging and positioning IV containers from the ceiling. 31 32 Unit shall include, but not be limited to, the following 33 34 features and characteristics: 35 36 Surface mounting on ceiling using flathead screws and 37 countersunk mounting holes. 38 39 Track of extruded anodized aluminum with insdie raceway 40 smooth for uninterrupted movement of trollies. 41 42 All end stops, splicers, and track components needed for a 43 complete assembly. 44 45 Two (2) self-lubricating trollies that lock into position 46 when loaded. 47 48 Track to be one (1) U-shaped. 49 50 Track length, location, and orientation as indicated on 51 drawings.

Unit shall be by Grant Hardware or approved equal by Amsco or

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O.B. Masco.

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WASHER, EYE, WALL MOUNTED (WSH0502)

Unit shall provide thorough washing of the eyes and facial area.

Unit shall include, but not be limited to, the following features and characteristics:

Wall mounting with threaded inlet for connection to cold water line.

Four nozzles to provide converging aerated streams of water with full facial coverage.

Stainless steel drain bowl approximately 12" in diameter.

Stay-open valve to provide full volume delivery once actuated until shut off.

Unit shall be Fisher Scientific model 91-572 or approved equal.

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X-RAY FILM PROCESSOR (XFP0008)

Unit shall be designed for automatic processing of x-ray film.

Unit shall include, but not be limited to, the following features and characteristics:

Processing time not more than 150 seconds for fully processed, dry, and ready-to-read radiographs.

Processing capacity not less than 125 sheets of 14" x 17" film per hour.

Corrosion-resistant developer tank, fixer tank, and wash tank.

Solid state controlled developer heater to maintain developer temperature to +0.3 deg F.

Films washed in ambient tap water from 40 deg to 87 deg F.

Film dryer with temperature thermostatically controlled and adjustable.

Standby control to automatically turn off drive, mechanisms, and incoming water when no film is being processed.

Operation on 120/208 VAC, 3-wire, single phase, 60 Hz.

Unit shall be Kodak model M6B or approved equal.'

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X-RAY FILM PROCESSOR (XFP0008F)

Unit is existing to be moved from Room HE129A to Room HAE045A of the University of Kentucky.

Unit is Eastman Kodak model M7B.

Contractor shall disconnect unit and reinstall as per manufacturer's specification.

Contractor shall move unit in such a way to insure that no damage occurs to unit during transport. Contractor shall assume full responsibility to unit during disassembly, transport, and re-installation.

Disconnection, disassembly, transport, and reinstallation shall be coordinated with appropriate University Hospital Emergency Department and Radiology Department personnel.

X-RAY SYSTEM, DAYLIGHT DISPENSER, 8X10 (XRY8203)

Unit is existing to be moved from Room H127 to Room HAE045A of the University Hospital.

Unit is Eastman Kodak model Kodaflex.

Contractor shall disconnect unit and reinstall as per manufacturer's specification.

Contractor shall disconnect unit and reinstall as per manufacturer's specification.

Contractor shall move unit in such a way to insure that no damage occurs to unit during transport. Contractor shall assume full responsibility to unit during disassembly, transport, and re-installation.

Disconnection, disassembly, transport, and reinstallation shall be coordinated with appropriate University Hospital Diagnostic Radiology Department Personnel.

X-RAY SYSTEM, DAYLIGHT DISPENSER, 10x12 (XRY8204)

Unit is existing to be moved from Room H127 to Room HAE045A of the University Hospital.

Unit is Eastman Kodak model Kodaflex.

53 Contractor shall disconnect unit and reinstall as per 54 manufacturer's specification.

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damage occurs to unit during transport. Contractor shall assume full responsibility to unit during disassembly, transport, and re-installation.

Contractor shall move unit in such a way to insure that no

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Disconnection, disassembly, transport, and reinstallation shall be coordinated with appropriate University Hospital Diagnostic Radiology Department Personnel.

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X-RAY SYSTEM, DAYLIGHT DISPENSER, 11x14 (XRY8205F)

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Unit is existing to be moved from Room H127 to Room HAE045A of the University Hospital.

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Unit is Eastman Kodak model Kodaflex.

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Contractor shall disconnect unit and reinstall per manufacturer's specification.

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Contractor shall move unit in such a way to insure that no damage occurs to unit during transport. Contractor shall assume full responsibility to unit disassembly, transport, and reinstallation.

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Disconnection, disassembly, transport, and reinstallation shall be coordinated with appropriate University Hospital Diagnostic Radiology Department Personnel.

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X-RAY SYSTEM, DAYLIGHT PROCESSOR LOADER (XRY8207F)

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Unit is existing to be moved from Room H127 to Room HAE045A of the University Hospital.

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Unit is Eastman Kodak model Kodaflex.

38 39 40

Contractor shall disconnect unit and reinstall as per manufacturer's specification.

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Contractor shall move unit in such a way to insure that no damage occurs to unit during transport. Contractor shall assume full responsibility to unit during disassembly, transport, and re-installation.

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Disconnection, disassembly, transport, and reinstallation shall be coordinated with appropriate University Hospital Diagnostic Radiology Department Personnel.

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CABINET, FILM STORAGE (BIN2403)

Unit shall be designed to safely store unexposed x-ray films under ambient lighting conditions.

Unit shall include, but not be limited to, the following features and characteristics:

Switch interconnected with room lights to shut off room lights before cabinet door is opened.

Cabinet constructed of steel with corrosion-resistant finish.

Door hinged at the bottom and opening at the top.

Overall dimensions approximately 19.5"W x 14.50"D x 34"H.

Unit shall be Picker model 390014 or approved equal.

PART 3- EXECUTION

INSPECTION AND PREPARATION:

Rough-In-Work: Installer of medical equipment must examine roughed-in electrical services, and installation of floors, walls, columns, and ceilings, and conditions under which the work is to be installed; and must verify dimensions of services and substrates before installing the work. Notify Contractor in writing of unsatisfactory locations and dimensions of other work, and of unsatisfactory conditions for proper installation of medical equipment. Do not proceed with installation until unsatisfactory dimensions and conditions have been corrected in a manner acceptable to Installer.

DELIVERY:

Quantities of each equipment item and locations for delivery and installation shall be as indicated on the drawings and equipment listings.

Room number for delivery and equipment item number shall be clearly marked on the packing crate or box for each equipment item.

INSTALLATION:

<u>Service Lines and Equipment Connections</u>: Comply with applicable requirements of Division 16 Sections for electrical work including equipment connections.

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53 <u>Set each item</u> of nonmobile and nonportable equipment securely in place, leveled and adjusted to correct height. Anchor to

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supporting substrate where indicated and where required for sustained operation and use without shifting or dislocation.

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INSTALLATION INSPECTION:

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Installation for the following items shall be inspected by the manufacturer's representative:

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        Ceiling Gas Column, Retractable, for Surgery (CLG1801)
        Ceiling Gas Column, Retractable, for Emergency (CLG1802)
11
        Headwall Unit, ICU Procedure (HDW1803)
12
13
        Headwall Unit, Isolation Recovery (HDW1802)
14
        Headwall System, Recovery (HDW1803)
15
        Headwall Unit, Holding (HDW1804)
        Headwall Unit, Blocking Room (HDW1805)
16
        Light, Ceiling Mounted (LTS0399)
17
18
               Examination/Minor Surgical,
                                              Single
        Light,
                                                        Head,
                                                               Ceiling
19
         Mounted (LTS0513)
20
        Light, Examination/Minor Surgical, Single
                                                        Head,
                                                               Ceiling
21
         Mounted (LTS0513F)
22
        Light, Surgical, Procedure (LTS4504)
23
        Light, Surgical, Major (LTS4505)
24
        Light, Surgical, Minor, Dual Head (LTS4516)
25
        Light, Surgical, Triple Head (LTS4599)
        Service Column, ICU (PWC0001)
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CLEANING, RESTORING FINISHES:

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After completion of installation, and completion of other major work in medical areas, remove protective coverages, if any, and clean medical equipment, internally and externally. Restore exposed and semi-exposed finishes to remove abrasions and other Restore damages; polish exposed-metal surfaces and touch-up painted surfaces. Replace work which cannot be successfully restored.

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TESTING, START-UP AND INSTRUCTIONS:

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Delay start-up of medical equipment until service lines have been tested, balanced, and adjusted for voltage and similar consideration.

46 47 48 Test each item of operational equipment to demonstrate that it is operating properly, and that controls and safety devices are functioning. Repair or replace equipment which is found to be defective in its operation, including units which are below capacity or operating with excessive noise or vibration.

49 50 51

Payment for medical equipment will be made only after acceptance testing has been completed.

Instruct Owner's operating personnel in proper operation and maintenance procedures for each item of operational medical equipment.

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Final Cleaning: After testing and start-up, and before the time of substantial completion, clean medical equipment, and leave in condition ready for use.

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WARRANTY:

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12 All items, systems or units of equipment included in the Proposal shall have individual guarantees/warrantees from the 13 14 manufacturer. Collective guarantees for all items of equipment by the same manufacturer are not acceptable. These guarantees 15 16 shall be delivered in two (2) copies to the Owner in bound 17 volumes, properly indexed. The guarantee shall be identified explicitly as to item by generic name, serial number and 18 19 building locations (by room number). This guarantee shall 20 provide for, as a minimum, the following supplemental conditions 21 of guarantee/warranty for products specified. Time: 22 calendar year beginning when the owner accepts that item, 23 system, or unit of equipment as complete, functional, and 24 approved in writing, or at a later agreed date between the Owner 25 and manufacturer, or installer. The manufacturer quarantees that all items, systems, components, accessories, functional capabilities and labor supplied conform to specifications, 26 27 drawings, and other descriptions supplied by the hospital and 28 29 are sufficient for the purpose for which they were intended, of 30 good material, design and workmanship and free from defects. In 31 addition, the manufacturer will repair or replace free of cost, 32 any equipment or parts that shall, in normal use and service and 33 under proper operation, fail because of faulty design or workmanship or defective material. The Owner shall incur no 34 35 expense for labor, material, freight, parts or other such 36 ancillary cost related to failure because of the aforementioned 37 reasons. If the item, system, or unit of equipment fails to 38 meet any guaranteed provision within the time frame identified 39 in the preceding, the guarantee period shall be considered to 40 begin anew starting from the date of written approval by the Owner of satisfactory repair/replacement and continuing for a period of one calendar year therefrom, except for items having a 41 42

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END OF SECTION 11700

guarantee in excess of one calendar year.

SECTION 12345 - MODULAR CASEWORK & STORAGE SYSTEM

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PART 1 - GENERAL

RELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Special Conditions and Division-1 Specification sections, apply to work of this section.

DESCRIPTION OF WORK:

Extent of modular casework and storage system is shown on drawings.

<u>Work</u> includes the fabrication and installation of standard casework components of base cabinets, wall cabinets, storage cabinets, tables, shelf units, and other units as indicated.

Tops are included as work of this section.

Plastic Laminate Casework is specified in section 06400 "Architectural Woodwork".

QUALITY ASSURANCE:

Single Source Responsibility: Provide modular casework with tops manufactured or furnished by same Modular company for single responsibility. Provide modular storage system with casework, rails, and accessories by same company for single responsibility.

Catalog Standards: Manufacturer's catalog numbers may be shown on drawings for convenience in identifying certain Modular cabinet work. Unless modified by notation on drawings or otherwise specified, catalog description for indicated number constitutes requirements for each such cabinet.

 The use of catalog numbers, and specific requirements set forth in drawings and specifications, are not intended to preclude the use of any other acceptable manufacturer's product or procedures which may be equivalent, but are given for purpose of establishing standard of design and quality for materials, construction and workmanship.

Chemical and Physical Resistance of Metal Casework Finish: Submit an independent testing laboratory report certifying that the exterior finish of modular casework is capable of withstanding following tests with no change, or slight change of gloss, slight discoloration, or slight temporary softening of

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film with no loss of adhesion and no loss of film protection.
 3
            Not less than 5 drops (0.25 cc) applied to finish
    surface, covered with watch glass for 60 minutes, then washed
 4
 5
    and dried.
    37% Hydrochloric Acid
    20% Hydrochloric Acid
8
    10% Hydrochloric Acid
10
    70% Sulphuric Acid
    25% Sulphuric Acid
    30% Nitric Acid
12
13
    10% Nitric Acid
    75% Phosphoric Acid
14
    25% Phosphoric Acid
15
    98% Acetic Acid
16
    50% Acetic Acid
17
18
19
    Solvent: Not less than 5 drops (0.25 cc) applied to finish
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    surface, covered with watch glass for 60 minutes, then washed
21
    and dried.
22
23
    Ethyl Alcohol
24
    Butyl Alcohol
25
    Methyl Alcohol
    Ethyl Acetate
26
27
    Ethyl Ether
    Methyl Ethyl Ketone
28
29
    Toluene
30
    Acetone
31
    Benzene
    Carbon Tetrachloride
32
33
    37% Formaldehyde
34
    Gasoline
35
    Naptha
36
    Kerosene
37
    Xylene
38
    Glycerin
39
    Furfural
40
41
    Bases and Salts: Not less than 5 drops (0.25 cc) applied to
42
    finish surface, covered with watch glass for 60 minutes, then
43
    washed and dried.
44
45
    40% Sodium Hydroxide
46
    10% Sodium Hydroxide
47
    28% Ammonium Hydroxide
48
    40% Potassium Hydroxide
    10% Potassium Hydroxide
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50
    Saturated Zinc Chloride
51
    Saturated Sodium Chloride
52
    Saturated Sodium Sulphide
53
    Saturated Sodium Carbonate
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Moisture Resistance: No visible effect when finish surface exposed to the following:

Hot water at a temperature of 190 degrees F (91 degrees C) to 205 degrees F (96 degrees C), trickled down surface at 45 degree angle for 5 minutes.

Constant Moisture using a 2" x 3" x 1" cellulose sponge, soaked with water, in contact with surface for 100 hours.

No effect when subjected to 10 cycles of Cold Crack: temperature change from 20 degrees F (14 degrees C) for 60 minutes to 125 degrees F (52 degrees C) for 60 minutes.

Adhesion and Flexibility: No peeling or cracking or exposure of metal when metal is bent 180 degrees over a 1/4" diameter mandrel.

SUBMITTALS:

Submit manufacturer's data and installation Product Data: instructions for each type of Modular furniture unit.

Include independent Modular certification that applied finish complies with specified chemical and physical resistance requirements.

Submit 6" x 6" samples of specified finishes, Samples: including top material. Samples will be reviewed by Architect for color, texture, and pattern only. Compliance with other requirements is exclusive responsibility specified Contractor.

Submit one full-size sample of finished base cabinet unit complete with hardware, doors and drawers, without finish top.

Submit one full-size sample of finished wall-mounted cabinet unit complete with hardware, doors, and adjustable shelves.

Furnish both hinged and sliding door samples if in project.

Acceptable sample units will be used for comparison inspections at project. Unless otherwise directed. acceptable sample units may be incorporated in work. Notify Architect of their exact locations. If not incorporated in work, retain acceptable sample units in building until completion of work. Remove sample units from premises when directed by Architect.

Submit shop drawings for modular furniture Shop Drawings: showing plans, elevations, ends and cross-sections. Show details and location of anchorages and fitting to floors, walls, and

base. Include layout of units with relation to surrounding walls, doors, windows, and other building components.

Coordinate shop drawings with other work involved.

PRODUCT HANDLING:

9 <u>Deliver</u> any wood components only after wet operations in 10 building are completed.

Store completed wood components in a ventilated place, protected from the weather, with relative humidity therein of 50% or less at 70 degrees F (22 degrees C).

<u>Protect</u> finished surfaces from soiling and damage during handling and installation. Keep covered with polyethylene film or other protective covering.

PART 2 - PRODUCTS

ACCEPTABLE MANUFACTURERS:

<u>Manufacturer:</u> Subject to compliance with requirements, provide Modular metal casework produced by one of the following:

Hamilton Manufacturing Co. Kewaunee Scientific Equipment Corp. Laboratory Furniture, Inc.

METAL MODULAR CASEWORK:

<u>Metal</u>: Prime furniture steel, stretcher or roller leveled, free of scales, buckles, or other defects; ASTM A 366, E finish.

Minimum Metal Gage: Provide steel Modular furniture components of following minimum U.S. Standard gages:

<u>20-Gage</u>: Back panels, inner door panels, drawer outer pan, inner pan and body, and shelves. Add reinforcement or use 18-gage material for shelves over 36" long.

18-Gage: Sides, ends, fixed backs, bottoms, tops, soffits, and outer door pans. Bottoms may be 20-gage if reinforced. Other items not otherwise noted.

16-Gage: Intermediate horizontal rails, table frame aprons and cross rails, center posts, top gussets.

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14-Gage: Drawer runners, sink supports.

12-Gage: Leveling and corner gussets.

Fabrication:

General: Complete assembly and finish work at point of manufacture. Perform unit assembly on precision jigs, to provide units which are square, fully reinforced with angles, gussets, and channels, integrally framed and welded to form a dirt and vermin retardant enclosure. Where applicable, reinforce base cabinets for heavy sink support. Maintain uniform clearance around door and drawer fronts, not exceeding 3/32".

Fabricate units on precision dies to provide field interchangeability of drawers, hinged doors, and similar pieces.

 Flush Doors: Outer pan and inner pan formed and telescoped into box formation, with channel reinforcements full height on center of each pan. Fill doors solid with fire-resistant, sound-deadening material.

Glazed Doors: Hollow metal stiles and rails of similar construction as flush doors, with glass held in resilient channel or gasket material.

<u>Hinged Doors:</u> Mortise at flanges for hinges and reinforce with minimum 16 gage angle, welded inside inner pan at hinge edge. Provide nylon roller catches and stainless steel strike welded to door assembly.

 <u>Drawers</u>: Assemble fronts from telescoping inner and outer pans, designed to eliminate raw edge of steel at top. Fabricate sides, back, and bottom of one piece, with rolled or formed top of sides for stiffening and comfortable grasp for drawer removal. Weld drawer front to sides, back, and bottom to form a single, integral unit. Provide drawers with rubber bumpers, runners and positive stops to prevent metal-to-metal contact or accidental removal.

Adjustable Shelves: Sides and ends formed down, and returned to front and back.

Glass for Glazed Doors: Double strength "B" quality.

 <u>Drawer Guides</u>: Provide nylon rollers with metal guide channels, with integral stops to eliminate accidental removal of drawer. Include provisions to prevent rebounding action when doors are closed.

 <u>Filler Strips</u>: Provide where required for closing space between cabinets and walls and ceilings, of same material and finish as cabinets. Hem exposed edges. Job fabricated fillers not

1 acceptable.

<u>Utility Space:</u> Provide space, cut-outs, and holes for pipes, conduits and fittings in cabinet bodies to accommodate services and their support-strut assemblies.

5 6 7

Toe Space: Approximately 4" high by 3" deep, closed metal with no open pockets.

Table Legs: Not less than 2" square electrically welded tubing. Provide leg stretchers where required for strength and rigidity welded or bolted to legs and cross-stretchers. Securely bolt legs to table aprons. Provide leveling device welded to bottom of each leg.

Steel Cabinet Finish:

 <u>Pretreatment</u>: After assembly, thoroughly clean surfaces of grease, dirt, oil, flux and other foreign matter by physical and chemical means. Treat entire unit with metallic phosphate process leaving surfaces with uniform, fine-grained, crystalline phosphate coating providing excellent bond for subsequent finish.

 Top Coats: One coat high-bake primer followed by one or more coats of high-bake chemical-resistant enamel, to provide a hard and smooth, satin luster finish, applied to treated surfaces. Unless otherwise indicated, color to be selected by Architect from manufacturer's standard palette of at least 5 colors.

CASEWORK HARDWARE AND ACCESSORIES:

Provide manufacturer's standard, satin finish hardware units, unless otherwise indicated.

<u>Hinges</u>: Institutional type, 5 knuckle. Provide one pair for doors less than 4 ft. high and 1-1/2 pair for doors over 4 ft.

<u>Pulls</u>: Solid metal, for drawers and swing doors, mounted with 2 screws fastened from back. For sliding doors, provide recessed flush pulls. Provide 2 pulls for drawers over 24" wide.

<u>Door Catches:</u> Nylon roller spring catch or dual self-aligning permanent magnet type. Provide 2 catches on doors over 4 ft. high.

<u>Drawer Stops</u>: Designed to permit easy removal, and yet prevent inadvertant drawer removal. Provide on all drawers, located on the inside.

Label Holders: Provide where indicated, size to receive standard label cards approximately 1" x 2" nominal size, finished to match other exposed hardware.

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Drawer and Cupboard Locks: Half-mortise type, 5-pin tumbler and dead bolt, round cylinder only exposed, brass with plated finish.

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Sliding Door Hardware Sets: Manufacturer's standard, to suit type and size of sliding door units.

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Cabinet Base Molding: Extruded vinyl or rubber, black, 4" high. Provide on exposed sides and fronts of floor-mounted cabinets.

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Leg Shoes: Extruded vinyl or rubber, black, open bottom type.

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Adjustable Shelf Supports: BHMA B84072, wrought steel, mortise mounted.

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FABRICATION:

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Fabricate Modular furniture to dimensions, profiles, and details shown.

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Assemble units in the shop in as large components as practicable to minimize field jointing.

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Install hardware uniformly and precisely after final finishing is complete. Set hinges snug and flat in mortises unless otherwise indicated. Turn screws to flat seat. Adjust and align hardware so that moving parts operate freely and contact points meet accurately. Allow for final field adjustment after installation.

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TOPS AND ACCESSORIES:

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Tops, Box Curbs, Splash Rim: Provide smooth, clean, exposed tops and edges, in uniform plane free of defects. Make exposed edges and corners uniformly rounded.

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Top Sizes: Furnish tops in maximum practicable lengths.

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Top Thickness: Maintain 1-1/2" thickness with tolerance not exceeding plus or minus 1/32". Provide front and end overhang of 1" over base cabinets, formed with continuous drip groove on under surface 1/2" from edge.

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52 53 Plastic Laminate: Provide plastic laminate sheet, color through entire thickness with satin finish, complying with NEMA LD-3. Use general purpose grade 0.050" thick for flat tops and postforming grade 0.042" thick on formed tops. Shop-bonded with fully waterproof bond glue to 3/4" thick sub-top hardwood faced plywood. Provide acid resistant plastic laminate sheet where indicated on drawings. Smooth sand surfaces to which plastic

laminate is to be bonded. Apply standard phenolic backing sheet 2 to back of panels. Build up exposed edges of tops to 1-1/4" 3 thickness. Self-edge exposed edges of top, splash, and openings with same plastic laminate used for tops. Unless otherwise indicated, top and back splash one piece with intersection 5 6 coved. Intersections of end splash with top and back splash need 7 not be coved.

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Custom Stainless Steel Countertops and Sinks:

Provide sink, countertop and backsplash as single integral unit fabricated of 14 gauge, Type 304, all exposed surfaces satin finish. Reinforce as required with 14 gauge 1-1/4" x 3" channels. Provide channel rim design, 1" wide at top, 1-1/2" and 1" turnunder. Provide backsplash and intersections with top with 1/4" radius for horizontal and vertical corners. Provide sink bowls with 1-3/4" radius for horizontal and vertical corners integrally an seamlessly welded into top. Overlapping or soldered edges are not permitted. Underside of sink bowls shall be sound deadened. Coordinate with mechanical plumbing drawings for fixture and drain types. Refer to drawings for sink bowl and countertop sizes. where indicated, pitched countertop drainboard toward sink. Provide necessary fasteners and anchors for securing top to wall and base cabinets. Provide units as manufactured by Elkay Manufacturing Co., or approved equal. Submit manufacturers shop drawings indicating dimensions and installation procedure.

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Custom Stainless Steel Writing Shelf:

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Provide 14 gauge stainless, Type 304 with No. 4 satin finish. Shop mold joints, grind smooth and polish to become practically invisible. Provide, as required, butt jointed field joints, mechanically bolted through continuous channels welded underside of edges. Keep field jointing to a minimum. reinforcing channels to underside of top, shelf, and necessary to insure rigidity without deflection. Coordinate with Division 16 Contractor the built-in radio system for cutout sizes and holes.

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MODULAR STORAGE SYSTEM:

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Acceptable Manufacturers:

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Milcare, Inc. Zeeland, MI 49464 or approved equal.

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Materials:

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Storage Locker: Injection-molded thermoplastic with elastrometric sealant in bonded joints. Accommodates interchangeable storage components as specified herein. 53 storage locker is moveable and hangs on wall rail for support. Locker is capable of withstanding steam cleaning or automated washer temperatures at a maximum of 160 deg F.

Storage Locker Door: Vertical sliding, self storing door constructed of extruded thermoplastic and high-impact, injection molded thermoplastic handle. Doors shall be lockable with keying as directed by Owner. Door opens downward, sliding across the locker bottom and up the back of locker to expose locker contents.

Storage Locker Components: Drawers and tray/shelf components shall be injection-molded thermoplastic with rounded edges and corners for fully accessible cleaning by hand or automated methods. There shall be no seams, cracks, or crevices to harbor accumulated dirt. Locks as specified herein shall be chromeplated brass bolt type locks. Keying as directed by Owner. Drawer capacity shall be 25 pounds. Drawer types shall be as follows:

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"A" Type is 3"h x 22-3/4"w x 15-3/8"d.
"B" Type is 6"h x 20-3/4"w x 15-3/8"d.
"C" Type is 9"h x 20-3/4"w x 15-3/8"d.
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Sterile Container: Constructed of silver-anodized aluminum with cover lid of same construction. Provide with each container wire lift-out basket constructed of welded, high-grade stainless steel. Provide Owner with one package (1000 quantity) of Identification labels and disposable filters. Container assembly shall be capable of sterilization in high vacuum steam, gravity steam and ethylene oxide cycles. Unit shall be 6" high.

<u>Wall Rail:</u> Constructed of Class A fire-retardant thermoplastic. Provide rail lengths as indicated on drawings complete with end caps and fasteners. Secure to blocking provided within wall, coordinate with other trades.

Rail Hanging Work Surface with Backsplash: (Room #HAE016)

Constructed of warp resistant, three ply 1-1/16" thickness, high density particle board core faced with high pressure laminate top and underside. Provide with extruded aluminum backsplash and backsplash angle, cast aluminum support arms and with 14 gauge cold rolled steel support beam. Provide supporting wall rail, fasteners and end caps as required for complete installation.

Quantities:

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48	Storage Locker, Door with Lock	24
49	Storage Tray/Shelf	52
50	"A" Type Drawer	39
51	"B" Type Drawer	72
52	"C" Type Drawer	59
53	"A" Type Drawer with Lock	33
54	Sterile Container	13

10:7 1 Wall Rail See Drawings 2 Rail Hanging Work Surface 3

Existing Amsco Wall Rail and Storage System:

Relocate from existing hospital Emergency Room H144, wall rail and component storage system as indicated on drawings.

Pharmacy Casework: (Room #HAE016)

Provide pharmacy casework component system as manufactured by Bard Med Systems, C.R. Bard, Inc., North Broadway, MA 01864 or approved equal. Provide wall mounted back frame (WBF2), 22-1/2" x 48-1/2" for support of shelves. Provide wall shelves (SH2), 12" x 22-1/2" for support of bins. Provide 6" bins as indicated on drawings.

PART 3 - EXECUTION

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CASEWORK INSTALLATION:

Install plumb, level, true and straight with no distortions. Shim as required, using concealed shims. Where Modular furniture abuts other finished work, scribe and apply filler strips for accurate fit with fasteners concealed where practicable.

Base Cabinets: Set cabinets straight, plumb, and level. Adjust sub-tops within 1/16" of a single plane. Fasten each individual cabinet to floor at toe space, with fasteners spaced 24" o.c. Bolt continuous cabinets together. Secure individual cabinets with not less than 2 fasteners into floor, where they do not adjoin other cabinets.

Where required, assemble units into one integral unit with joints flush, tight, and uniform. Align similar adjoining doors and drawers to a tolerance of 1/16".

Wall Cabinets: Securely fasten to solid supporting material, not plaster, lath, or wallboard. Anchor, adjust, and align wall cabinets as specified for base cabinets.

Reinforcement of stud walls to support wall-mounted cabinets will be done during wall erection by trade involved, but responsibility for accurate location and sizing reinforcement is part of this work.

Adjust casework and hardware so that doors and drawers operate smoothly without warp or bind. Lubricate operating hardware as recommended by manufacturer.

INSTALLATION OF TOPS:

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Field Jointing:

exceeding 24".

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instructions to exert a constant, heavy clamping pressure at joints. Workmanship: Abut top and edge surfaces in one true plane, with internal supports placed to prevent any deflection. Provide flush hairline joints in top units using clamping devices. At stone-type material joints, use manufacturer's recommended

processing of top and edge surfaces.

than 1/16" wide at any location, completely filled and flush with abutting edges.

factory jointing using dowels, splines, adhesives, and fasteners

recommended by manufacturer. Locate field joints as shown on

accepted shop drawings, factory prepared so there is no job site

Fastenings: Use concealed clamping devices for field joints,

except for natural stone, composition stone and epoxy tops,

located within 6" of front, at back edges and at intervals not

adhesives and holding devices to provide joint widths not more

Where necessary to penetrate tops with fasteners, countersink heads approximately 1/8" and plug hole flush with material equal in chemical resistance, color, hardness, and texture to top surface.

Where practicable, make in same manner as

Tighten in accordance with manufacturer's

After installation, carefully dress joints smooth, remove any surface scratches, clean and polish entire surface.

Provide holes and cutouts as required for mechanical and electrical service fixtures.

Provide scribe mouldings for closures at junctures of top, curb and splash with walls as recommended by manufacturer for materials involved. Use chemical resistant, permanently elastic sealing compound where recommended by manufacturer.

INSTALLATION OF ACCESSORIES:

CLEANING AND PROTECTION:

Install in a precise manner in accordance with manufacturer's directions. Turn screws to a flat seat; do not drive. moving parts to operate freely without excessive bind.

Repair or remove and replace defective work as directed upon completion of installation.

Clean shop-finished surfaces, touch-up as required, and remove or refinish damaged or soiled areas, as acceptable to Architect.

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<u>Protection</u>: Advise Contractor of procedures and precautions for protection of materials and installed Modular furniture from damage by work of other trades.

END OF SECTION 12345

SECTION 12500 - WINDOW TREATMENT

PART 1 - GENERAL

RELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Special Conditions and Division-1 Specification sections, apply to work of this section.

DESCRIPTION OF WORK:

The extent of window treatment is indicated on drawings and in schedules. Types of window treatment work in this section include:

Vertical blinds

QUALITY ASSURANCE:

General: Provide window treatment units which are complete assemblies produced by one manufacturer for each type required, including hardware, accessory items, mounting brackets, and fastenings.

<u>Furnish</u> materials in colors and patterns as indicated, or, if not indicated, as selected by Architect from manufacturer's standard colors/patterns.

SUBMITTALS:

<u>Product</u> <u>Data</u>: Submit manufacturer's specifications and installation instructions for each type of window treatment unit required. Include methods of installation for each type of opening and supporting structure.

 <u>Shop Drawings</u>: Submit shop drawings for special components and application conditions of window treatment units which are not fully dimensioned or detailed in manufacturer's product data. Show relationships to adjoining work.

 Include typical elevation layout indicating proposed division between blind units and meeting edges at corners. Provide sections and details at head and sill between blind units and corners including inclined installations.

Samples:

 For initial selection of colors, submit manufacturer's cofor charts consisting of sections of exposed components with integral or applied finishes showing full range of colors, materials, etc. available for each type of window treatment assembly required.

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8 9 For verification purposes, submit samples of each component, material and finish which will be exposed to view, for each type of window treatment required. Prepare samples from same materials to be used for the work.

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In addition, submit one complete small-size operating unit for each type of window treatment required.

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Maintenance Stock: Deliver stock of maintenance material to Owner. Furnish maintenance material matching products installed, packaged with protective covering for storage and identified with appropriate labels.

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Typical Window Treatment Units: Furnish quantity of typical window treatment units equal to 5% of amount installed.

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PART 2 - PRODUCTS

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VERTICAL BLINDS:

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Track System: Manufacturer's standard track system as follows, equipped with end caps and formed to accommodate indicated operating mechanism:

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Standard Duty Type Track: Extruded aluminum channel track section with an overall width of not less than 1-1/16" and an overall height not less than 1-1/4".

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Head and Sill Track Application: Provide both top and bottom tracks unless indicated otherwise. Include smap trim where standard with manufacturer.

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Coordinate rotating mechanism in top and bottom channels by means of tightly drawn beadchain belts operating in toothed sprocket wheels.

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Head Track Application: For free-hanging blind provide top track only.

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Finish for Aluminum Tracks: AA-C22A21 or AA-M31A31 clear anodized finish.

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Manufacturer's standard geared rotating Pivot Mechanism: mechanism providing full synchronous 180 deg. rotation for each louver blade. Cord linkages are not acceptable as the rotating mechanism.

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For traversing blinds provide geared pivot mechanism in each carrier, operated by keyed rod and geared operator assembly in channel and caps.

Rotate louver blades by means of Bead Chain Operation: endless stainless steel or nickle-plated brass bead chain with a breaking strength of not less than 100 lbs.

Manufacturer's standard assembly of Traversing Mechanism: carriers and traversing mechanism designed to maintain positive even spacing of louver blades, as follows:

Acetal resin molded plastic Heavy Duty Type Carriers: carriers with wheels of same material, or metal carriers with metal ball-bearing type wheels.

Cord Operation: Traverse blinds by means of pulley and ropetype system. Provide rope consisting of synthetic braided fiber jacket over synthetic fiber non-stretch core, with a breaking strength of not less than 200 lbs.

Provide biparting operation unless indicated otherwise.

Manufacturer's standard louver blades of Blades: Louver finish. unless otherwise material and following width, indicated.

Width:

Polyvinyl Chloride Louvers: Flat, washable, flame-resistant, integrally colored, extruded polyvinyl chloride, of thickness indicated, with 0.050" thick beaded edges. Fabricate without warp, bow or twist, with manufacturer's standard condition.

Thickness: Not less than 0.030".

Type: Solid.

Louver Blade Attachment: Bracket, clip or hook system of proper design for type of louver blade indicated, formed of stainless steel or other non-corrosive metal or plastic as standard with manufacturer. Design assembly to permit easy removal of louver blade, to yield when subjected to interference without damaging blade or any part of assembly. Limit light gap between ends of louver and channel track section to a maximum of 3/8".

sway chains for free-hanging blinds to ensure Provide accurate vertical alignment. Secure chains to louver blades so that chains never extend beyond bottom of blades and will not interfere with unit operation.

Installation Brackets and Fittings: Manufacturer's standard brackets designed to suit application indicated and to provide secure mounting of tracks. Include all hardware, fittings, and fasteners necessary for secure attachment of brackets and tracks to adjoining construction. Design brackets to support safely the weight of blind assemblies plus forces applied to operate blinds.

Manufacturers: Subject to compliance with requirements, provide products of one of the following:

12 Graber Co. Hunter Douglas, Inc.

13 Levelor Lorentzen, Inc.

14 LouverDrape, Inc.

FABRICATION AND OPERATION:

Prior to fabrication, verify actual opening dimensions by accurate site measurements. Adjust dimensions for proper fit at openings. Cooperate with other trades for securing tracks to substrates and other finished surfaces.

Fabricate window treatment components from non-corrosive, non-staining, non-fading materials which are completely compatible with each other, and which do not require lubrication during normal expected life.

Fabricate blind units to completely fill the openings as shown, from head-to-sill and jamb-to-jamb.

Space louver blades to provide a minimum overlap of 3/8" for light exclusion when in fully-closed position. Gear operating equipment for reduction of the ratio of hand-movement to louver position, so that blinds operate easily and can be set accurately and smoothly.

PART 3 - EXECUTION

INSTALLATION:

General: Install window treatment units in manner indicated to comply with manufacturer's instructions. Position units level, plumb, secure, at proper height and location relative to adjoining window units and other related work. Securely anchor units with proper clips, brackets, anchorages, suited to type of mounting indicated.

Provide adequate clearance between sash and blinds to permit unencumbered operation of sash hardware.

Isolate metal parts from concrete and mortar to prevent galvanic

manufacturer to effect separation.

action. Use tape or thick coating or other means recommended by

Protect installed units to ensure their being in operating condition, without damage, blemishes, or indication of use at

completion of project. Repair or replace damaged units as

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END OF SECTION 12500

directed by Architect.

SECTION 12670 - ENTRANCE MATS

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PART 1 - GENERAL

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RELATED DOCUMENTS:

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Drawings and general provisions of Contract including General and Special Conditions and Division-1 Specification sections, apply to work of this section.

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DESCRIPTION OF WORK:

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Extent of entrance mat work is indicated by drawings and by provisions of this section.

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Types of work specified as work of this section include the following:

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Set-in frames to receive recessed mats, grilles or flooring units.

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28 29 Recessed mats or flooring units.

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Refer to Division-3 sections of these specifications for grouting, topping and finishing of related concrete; not work of this section.

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QUALITY ASSURANCE:

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Manufacturer: Except as otherwise indicated, provide entrance mats and accessories by a single manufacturer for the entire project.

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SUBMITTALS:

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Submit manufacturer's specifications installation instructions for each type of entrance mat. Include methods of installation for each type of substrate.

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Submit samples for each type and color of exposed entrance mat, frames and accessories required. Provide 12" square samples of mat materials and 12" lengths of frame members.

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Maintenance Data: Submit manufacturer's printed instructions for cleaning, drying, maintaining and rehandling of removable entrance mat units.

SEQUENCING/SCHEDULING:

General: Except as otherwise indicated herein, sequencing or scheduling for performance of work in this section in relation with other work is Contractor's option.

Provide oversized recesses in concrete work, to receive mat frames. Delay frame installations until building enclosure is completed and related interior finish work is in progress.

<u>Install mat frames integrally</u> with principal pour of concrete floor system. Locate, align and level frame members accurately, but recess in-fill concrete by at least 2" for placement of concrete topping promptly after principal pour has hardened.

<u>Protection</u>: Upon completion of frame installations and concrete work, provide temporary filler of plywood or fiberboard in mat recesses, and cover frames with plywood protective flooring. Maintain protection until construction traffic has ended and project is near time of substantial completion.

<u>Delay installation of mats</u>, foot grilles and other finish flooring units until near time of substantial completion for project.

PART 2 - PRODUCTS

ACCEPTABLE MANUFACTURERS:

<u>Manufacturer</u>: Subject to compliance with requirements, provide products of one of the following:

Balco, Inc.; Wichita, KS Construction Specialties, Inc.; Muncy, PA Reese Enterprises, Inc.; Rosemont, MN

MATERIALS AND FABRICATION:

 General: Provide colors/patterns/profiles of materials including metals and metal finishes, as indicated on drawings or by this specification or, where not indicated, as selected by Architect from manufacturer's standard colors/patterns/profiles.

Shop fabricate units of entrance mat work to greatest extent possible, in sizes as indicated. Where not otherwise indicated, provide single unit for each mat installation, but do not exceed manufacturer's maximum size recommendation for

units intended for removal and cleaning. Where joints in mats are necessary, space symmetrically and away from normal hairline joints, or provide prefabricated corner units without joints. Where possible, verify sizes by field measurement prior to shop fabrication.

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Entrance Mat Frames: Provide Manufacturer's standard design of size and style to mate with insert type and adjacent finish floor or wall construction, for permanent recessed installation in subfloor; complete with corner pins or reinforcing, and installation anchorages.

<u>Provide frames</u> of extruded architectural bronze, ASTM B 455, alloy 385. Coat surface of frame with clear methacrylate lacquer of type recommended by metal producer.

<u>Provide frame members</u> in single lengths or, where frame dimensions exceed maximum available lengths, provide minimum number of pieces possible, with hairline joints equally spaced, with pieces and spliced together by means of straight connecting pins.

Roll-Up Type Foot Grilles: Provide manufacturer's standard extruded aluminum hinged tread-slat mat system, with slotted hinges of either aluminum or vinyl to form 2" wide x 3/8" thick slat modules; with top-surface tread inserts of fusion-bonded carpet of 1/4" high x 28 oz. per sq. yd. level-cut DuPont "Antron III" nylon filament; with continuous vinyl cushions on bottom surface of slats, and vinyl edge accessories to accomodate frame application as indicated.

Aluminum Finish: Dark bronze anodized finish.

PART 3 - EXECUTION

INSTALLATION:

<u>Install recessed frames and entrance mats</u> to comply with manufacturer's instructions, at locations indicated and with top of frames and mats in proper relationship to one another and to adjoining finished flooring. Set mat tops at proper height for most effective cleaning action; coordinate top of mat surfaces with doors that swing across mats, to provide underdoor clearance.

For installation in terrazzo flooring areas, exercise care to provide allowance for grinding and polishing of terrazzo without grinding surface of recessed frames. Coordinate with other trades as required.

Where frame is embedded in grout, provide necessary shims, spacers and anchorages for proper location and secure attachment.

END OF SECTION 12670

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SECTION 13091 - X-RAY PROTECTION

PART 1 - GENERAL

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RELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Special Conditions and Division-1 Specification sections, apply to work of this section.

SUMMARY:

Extent of X-ray protection work is indicated on the drawings.

Types of X-ray protection specified in this section include the following:

21 Lead sheet.

22 Lead glass.

23 Lead-lined hollow metal frames.

24 Lead-lined wood doors.

25 Lead-lined gypsum board.

26 Control windows.

Note: Refer to Radiation Shielding Evaluation at the end of this Section for requirements of State Regulatory Agency.

SUBMITTALS:

<u>Product Data:</u> Submit manufacturer's detailed technical product information and installation instructions for each item of X-ray protection and accessories required.

Shop Drawings: Submit shop drawings of the entire layout of the X-ray suite for special components and installations that are not fully dimensioned or detailed in manufacturer's data.

QUALITY ASSURANCE:

National Bureau of Standards: Comply with requirements of the National Council on Radiation Protection and Measurement (NCRP) Report No. 49, "Structural Shielding Design and Evaluation for Medical Use of X-Rays and Gamma Rays of Energies up to 10 MeV", as applicable to this work.

Comply with requirements of local regulatory agencies where local standards and criteria exceed requirements of NCRP Report No. 49.

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Single Source Responsibility: Provide radiation protection materials, equipment, and accessories produced as standard products of a single manufacturer regularly engaged in the production of X-ray shielding materials.

DELIVERY, STORAGE AND HANDLING:

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Lead-Lined Hollow Metal Frames: Comply with requirements of applicable Divisions-8 sections for delivery, storage and handling requirements.

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<u>Lead-Lined Wood Doors:</u> Comply with requirements of applicable sections for delivery, storage Division-8 and requirements.

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<u>Lead-Lined Gypsum Board</u>: Comply with requirements of applicable Division-9 sections for delivery, storage and handling requirements.

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PART 2 - PRODUCTS

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MANUFACTURERS:

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Subject to compliance Manufacturers: Available requirements, manufacturers offering products which may be incorporated in the Work include, but are not limited to, the following:

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A & L Lead Co., Inc.

34 Ameray Corp.

35 Bar-Ray Products, Inc.

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Nelco (New England Lead Burning Co., Inc.) Nuclear Associates Radiation Protection Products, Inc.

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MATERIALS:

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Sheet shall be unpierced rolled virgin Lead sheet lead conforming to requirements of FS QQ-L-201, Grade C, in sizes and thicknesses indicated.

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Lead glass shall be lead barium polished plate glass containing more than 60 percent heavy metal oxide, including 55 percent lead oxide, and conforming to the requirements of FS DD-G-451, Type 1.

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51 Lead-lined gypsum board shall comply with requirements of ASTM 52 C36 and FS SS-L-30, Grade 3, Type X, Class 1, Form A, Style 3. Provide gypsum board sheets not less than 5/8" thick, of width 53

and length required for support spacing and to prevent cracking during handling. Laminate a single sheet of unpierced virgin lead sheet, thickness as indicated, to the back of gypsum board units. Provide 2" wide lead strips for lapping at joints.

<u>Accessories and Fasteners</u>: Provide the manufacturer's standard fasteners and accessories as required for the installation, maintaining equivalent protection as the system.

MANUFACTURED UNITS:

<u>Lead-Lined Wood Doors</u>: Comply with applicable requirements of Division-8 sections for wood doors.

Fabricate doors of solid core flush construction with one or more continuous unpierced lead sheets to make up the total lead thickness indicated on the drawings. Apply lead sheet continuously from top to bottom and edge to edge. Lead lining may be constructed in the core, or between the core and cross-banding at the manufacturer's option. Assemble lead lining and core with poured lead fasteners or steel bolts. Space lead dowels not more than 1-1/2" from door edge and approximately 8" on center. Countersink bolt heads and cover with poured lead.

Shield cutouts for locksheets with sheet lead of the same thickness as used in the door; lap lead lining of locksets and the door lining.

Furnish face veneer of face quality and finish as required to match finish of other interior flush wood doors.

<u>Lead-Lined Metal Door Frames</u>: Comply with requirements of applicable Division-8 sections for hollow metal frames.

Provide additional reinforcements and internal supports to adequately carry the weight of lead-lined doors. Perform such work prior to installation of lead lining.

Line the inside of frames with a single thickness of unpierced sheet lead; sheet lead thickness shall not be less than the thickness of lead used in doors and walls in which the frames are used. Form lead sheet to match the frame contour, continuous in each jamb and across the head, lapping the stops. Form lead shields around areas prepared to receive hardware. Fabricate lead lining wide enough to maintain an effective lap with the lead of adjoining shielding units.

<u>Control</u> <u>Windows</u>: Provide control viewing window where indicated. Fabricate window frame of cold-rolled steel or aluminum extrusions with lead sheet lining of thickness not less than the thickness of lead protection in the X-ray protection

system. Form the frame sill with a horizontal trapped or baffled opening for voice passage. Construct the frame so as to overlap lead glass perimeter by not less than 3/8" and provide removable glass stops.

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PART 3 - EXECUTION:

PREPARATION:

Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication where possible to ensure proper fitting of the work.

INSTALLATION:

<u>Lead-Lined Gypsum Board</u>: Install lead-lined gypsum board over supports as indicated.

Refer to Division-9 sections for metal furring or supports.

Predrill lead-lined gypsum board or drill pilot holes for fasteners to prevent deformation of lead-headed fasteners and distortion of lath.

Apply lead-lined gypsum board with the long edge parallel to supports and lead lining facing supports. Provide blocking at end joints. Install lead strips 1-1/2" wide and the same thickness as the lead lining of the gypsum board to the face of supports and blocking where joints occur. Secure lead strips to blocking and supports with wire nails along the outer edge.

Nail gypsum board to supports with lead-headed nails spaced as recommended by the gypsum board manufacturer. Drive nail heads slightly below the exposed surface.

Refer to Division-9 sections for joint treatment and preparation for finishing.

<u>Lead-Lined Hollow Metal Door Frames</u>: Refer to Division-8 sections for installation requirements of lead-lined metal door frames.

Finish hardware is specified in a Division-8 section on "Finish Hardware".

Hand doors to have a clearance of 1/16" at sides and top and with a minimum clearance at the bottom.

Built-In Items: Where other built-in items penetrate lead linings, provide lead shields as required to maintain continuity

of shielding. Install shields in accordance with manufacturer's instructions.

Outlet boxes, Ducts and Conduit: Where outlet boxes, junction boxes, ducts, conduit and similar items prevent use of shields, provide lead sleeves or lead linings as required.

Provide lead linings, sleeves, shields, and other protection of an equivalent thickness of lead as that used in the shielding system.

FIELD QUALITY CONTROL:

 Testing: After X-ray equipment has been installed and placed in operating condition, radiation shielding will be tested at the Owner's expense, by a health physicist, certified by a nationally recognized agency.

 Testing will be performed in accordance with requirements of NBS Handbook H-76 "Medical X-Ray Protection Up to Three Million Volts." The decision of the health physicist on acceptability shall be binding on the contractor.

 Repair or replace defective work, including other work affected thereby and conduct additional testing to the satisfaction of the health physicist, at no additional expense to the Owner.

PROTECTION:

 <u>Initiate</u> and <u>maintain</u> protection of lead-linings throughout remainder of the construction period, to ensure that the protective system will be free from damage at the time of substantial completion.

END OF SECTION 13091

RADIATION SHIELDING EVALUATION FOR

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HAC	108

Name: U/N Workload: (ma-n	KMC								Ro	om Type &	Number:	Maile 7	hormon	uy .
Workload:	400				Max	. Kvp or Kv	/ср	12	5	Max. M	illiamp	erage:	600	0
(ma-n	in./wk)													
		•												
		Barrier		Γ							Exit B		WW 62 12 10W 105	PLS 1989A 1989 1
Barrier Description	Occup. (C-NC)	Type (P-S)	U	T	UT	Distance (Feet)**	Required Lead or Conc.		Exit Barrier Pb.Eq. & Conc.Eq.		Combination Pb.Eq.qrConc.Eq.		Additional Needed Pb.Eq.or Conc.Eq.	
			-	1	01	(reet)		Conc.	10.24.	Conc. Eq.	1 D. E.q.	Toone . Eq.	5/28"	Done, Eq.
Doors and wall A	NC	5	/	_		7	1044							
В	NC	5	1	1	1	10	0.8 MM				•		1/32"	
C	NC	5	1	1	1	7	110MM	LL,		*		- 1	5/128	
D	NC	3	1	1	1	10	0.8m						1/32"	
E	NC	5	1	/	1	10	0.8 MM						1/32"	
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RADIATION SHIELDING EVALUATION FOR

PAGE 2

Workload:	400 nin./wk)				Мах	- c. Kvp or Kv	/ср	123	Roc	om Type &	Number:	Uneral Kas erage:	600	
	Occup.	Barrier Type				Distance	Requir		Exit Ba		Combi	arrier nation		al Needed
Barrier Description wall A	(C-NC)	(P-S)	U	T	UT	(Feet)**	lead o	r Conc.	Pb.Eq.	Conc.Eq.	Pb.Eq.	orConc.Eq.	5/28"	Conc.Eq.
wall B	NC	5	,	1	1	7	1.0 mm	B			7.		5/28"	
Door and wall C	NC	5	1	1	1	7	1.04n						5/28"	
wall D	Ne	5	1	1	1	14	06MM						1/32"	,
vindow and Booth E	C	5	1	1	1	5	0.55 ng	1					1/6"	
Ceilin	Ne	5	1	1	1	14		2.1"		6.0."				noru
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SECTION 14210 - ELECTRIC ELEVATORS

PART 1 - GENERAL

REDATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Special Conditions and Division-1 Specification sections, apply to work of this section.

Refer to other sections of these specifications for related work which is not work of this section, including electrical service with fused disconnect switches for elevator system, hoistway, pits, and machinery rooms with access, lighting, communications, ventilation and services.

Refer to Division-5 for freight elevator hoistway entrance frames; not work of this section.

DESCRIPTION OF WORK:

Extent of electric elevator work is indicated on drawings, in schedules and by provisions of this section.

Types of electric elevator service required include the following:

Patient Transport Elevators (Nos. 1 & 2)

Service elevators. (Nos. 3 & 4)

<u>Definitions</u>: Electric elevators are hereby defined to include elevators in which cars are hoisted by ropes over power-driven traction sheaves, complete components, equipment, machines, controls and devices as indicated and as required for safely operating elevators at rated speed and capacity.

Elevator schedules indicate required performances, controls, capacities, features and finishes for each elevator or group of elevators.

QUALITY ASSURANCE:

Installer Qualifications: Either the elevator manufacturer or a licensee of the manufacturer, who has not less than 5 years successful experience with the installation of similar elevators.

Regulatory Requirements:

SECTION 14210 - ELECTRIC ELEVATORS

2 3 4

PART 1 - GENERAL

RELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Special Conditions and Division-1 Specification sections, apply to work of this section.

 Refer to other sections of these specifications for related work which is not work of this section, including electrical service with fused disconnect switches for elevator system, hoistway, pits, and machinery rooms with access, lighting, communications, ventilation and services.

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<u>Elevator</u> <u>schedules</u> indicate required performances, controls, capacities, features and finishes for each elevator or group of elevators.

QUALITY ASSURANCE:

Manufacturer Qualifications: In the interest of unified responsibility, acceptable elevator companies shall be limited to those with a minimum of 5 years experience in being regularly engaged in the business of manufacturing major elevator components. Acceptable elevator companies shall manufacture at least four (4) of the following components:

Motor Cab

54 Door Operator

Complete Control System
Entrances
Car Operation Push Button Fixtures

Any major elevator components which are to manufactured by the company must be so listed on the Form of Proposal. These major components, not manufactured by the named company, must be manufactured by another recognized elevator company with at least 3 years experience in the business of elevator component manufacturing and further must be prefabricated in accordance with written specifications provided by the named company.

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The acceptable elevator company shall also maintain a service offer, with substantial parts department and service personnel, and shall offer a 3 hour maximum site response time.

<u>Installer Qualifications</u>: Either the elevator manufacturer or a licensee of the manufacturer, who has not less than 5 years successful experience with the installation of similar elevators, and who can provide a continuous maintenance program and has a service center which can provide maintenance at the hospital within 1 hour of a request for service.

Regulatory Requirements:

 <u>Elevator</u> <u>Code</u>: Except for more stringent requirements as indicated or imposed by governing regulations (which must be complied with), comply with applicable requirements of ANSI/ASME A17.1, "Safety Code for Elevators and Escalators" (here after referred to as the "Code).

NFPA Code: Comply with applicable NFPA codes, and specifically with sections relating to electrical work and elevators.

Fire Resistance of Entrances: Comply with NFPA No. 80, and provide units bearing UL labels with 90-min. temperature rise on labels.

Standards for Handicapped: Elevators must comply with Kentucky Building Code requirements of the handicapped.

SUBMITTALS:

<u>Product</u> <u>Data</u>: Submit manufacturer's technical product data and installation instructions for each principal component or product, and include certified test reports on required testing. List and describe features of control system, performances, and operating characteristics.

Shop Drawings: Submit plans, elevations and details of car enclosures and hoistway entrances. Prepare elevatoring diagrams to show service to each level.

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<u>Samples</u>: Submit samples of exposed finishes of car enclosures, hoistway entrances, and signal equipment. Provide 6" to 8" square samples of sheet materials and 10" to 12" lengths of running trim members.

Maintenance Manuals: Submit three bound manuals for each elevator or group of elevators, with operating and maintenance instructions, parts listing, recommended parts inventory listing, purchase source listing, for major and critical components, emergency instructions, description of operating sequences and similar information.

<u>Certificates</u> <u>and</u> <u>Permits</u>: Provide Owner with copies of all inspection/acceptance certificates and operating permits as required by governing authorities to allow normal, unrestricted use of elevators.

INITIAL MAINTENANCE AND WARRANTY:

 Maintenance Service: Provide full maintenance service by skilled, competent employees of the elevator Installer for period of 12 months following date of "beneficial occupancy of the building or a portion of the building." Include monthly preventive maintenance, performed during normal working hours. Include repair/replacement of worn or defective parts or components and lubrication, cleaning and adjusting as required for proper elevator operation in conformance with specified requirements. Include 24 hour/day, 7 days/week emergency callback service. Exclude only repair/replacement due to misuse, abuse, accidents or neglect caused by persons other than Installer's personnel.

Warranty: Provide special project warranty, signed by Contractor, Installer and Manufacturer, agreeing to replace/repair/restore defective materials and workmanship of elevator work during warranty period. "Defective" is hereby defined to include, but not by way of limitation, operation or control system failures, performances below required minimums, excessive wear, unusual deterioration or aging of materials or finishes, unsafe conditions, the need for excessive maintenance, abnormal noise or vibration, and similar unusual, unexpected and unsatisfactory conditions.

The warranty period is 12 months starting on date of beneficial occupancy of the building or a portion of the building.

PART 2 - PRODUCTS

ACCEPTABLE MANUFACTURERS:

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Manufacturer: Subject to compliance with requirements, provide products of one of the following:

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Dover Corp.
Montgomery Elevator Co.
Otis Elevator Co.

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MATERIALS AND COMPONENTS:

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manufacturer's standard pre-engineered General: Provide elevator systems which will comply with or requirements of elevator schedule sheets at end of this section: or, at manufacturer's option, provide custom manufactured elevator systems which will fulfill requirements. are not otherwise indicated, components provide standard components, published by manufacturer as included in standard pre-engineered elevator systems, and as required for a complete system.

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Elevator Machines and Equipment:

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General: Except as otherwise indicated, provide manufacturer's standard variable-voltage traction type hoisting machines. Provide geared type machines for speeds up to and including 350 f.p.m.

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36 37 Machine: The machine shall be of the single worm geared traction type, with motor brake, gearing and driving sheave mounted in proper alignment on a steel bedplate. The worm shall be of hardened and ground steel, integral with the worm shaft, and shall be provided with a ball or roller thrust bearing designed to take the end thrust of the worm in both directions. The ring gear shall be hobbed from a bronze rim which shall be accurately fitted and bolted to the gear spider. The sheave and gear spider shall be supported by heavy duty ball or roller bearings. The roller and anti-friction metal bearings shall be provided with adequate means of lubrication.

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<u>Motor</u>: The motor shall be designed and built expressly for elevator service with a high starting torque and low starting current. The motor armature shall by dynamically balanced and supported by ball bearings of ample capacity. It shall be rated in accordance with the standards of NEMA 1.

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Brake: The electric brake shall be spring applied. It shall be held open by an electro-magnet actuated by the controller and designed to make smooth, positive stops. It shall be designed to automatically apply in event of interruption of power supply from any cause.

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<u>Machine Location:</u> The machine shall be mounted directly overhead on structural steel beams or channels furnished in

place with any necessary bearing plates by the Elevator Contractor. These beams shall be securely fastened to supports provided by others.

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Variable voltage control equipment utilizing solid Control: state components suitable for the type of operation specified, shall be provided for smooth acceleration and retardation and to limit the difference in speed between no load and full load The control system shall include a ball bearing, dynamically balanced motor generator set, and electro-magnet motor generator set shall be located in the The starter. machine room and isolated from the floor on suitable isolation mountings. The design of the motor generator set shall comply with NEMA 1 Standards and shall deliver its rated output with a maximum of 50 degree C. temperature rise. The power control equipment shall be mounted in a NEMA 1 enclosure. harmonics fed back to power system shall not exceed 8% referenced to 300 KVA transformer source.

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<u>Excitation</u>: Direct current for the motor and motor generator fields, for operating the electric brake and power controller, shall be obtained from a dry type rectifier.

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Ropes: Provide suitable traction steel hoist ropes of sizes and number to insure proper wearing qualities. Governor ropes shall be iron or steel. All ropes shall consist of at least six strands wound around a hemp core center. Adequate compensation for weight of hoist ropes to be furnished when required to maintain proper counterbalance ratio.

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<u>Counterweights</u>: Each elevator shall be suitably counterbalanced for smooth and economical operation. Cast iron or steel plate shall be contained in a structural steel frame. The counterweight shall be equal to the complete elevator car and approximately 40% of the specified load.

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<u>Safety</u> and <u>Governor</u>: The car safety shall be mounted on the bottom members of the car frame and shall be operated by a centrifugal speed governor located over the hoistway. The governor will be designed to cut off power to the motor and apply the brake whenever the governor indicates the car has excessive speed.

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<u>Inserts</u>: Furnish required concrete inserts and similar anchorage devices for the installation of guide rails, machinery and other components of elevator work; where installation of devices is indicated as work of another specification section.

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<u>Guide Shoes/Rollers</u>: Except as otherwise indicated, provide manufacturer's standard units; shoes for speeds of 200 fpm and less, rollers for speeds in excess of 200 fpm.

51 52 <u>Car Frame and Platform:</u> Manufacturer's standard welded steel units. Car frames and platforms shall be designed for class "A" freight loading.

Control Systems:

6 7 <u>General</u> 8 standar

General: Except as otherwise indicated, provide manufacturer's standard control system for each elevator or group of elevators, as required to provide automatic or group automatic operation of the type indicated, and defined in the Code as "Operations."

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<u>University Carrier Signals:</u> The contractor is hereby made aware of the University's carrier current signals. It shall be the Contractor's responsibility to recognize and avoid interference with these signals. The signal frequencies are 2340 Hertz and 3216 Hertz.

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Multiple-Car Elevator Control: Provide solid-state modular microprocessor to control car movements. Provide automatic dispatching of selected cars in a regulated sequence in response to hall calls; with automatic response of system to changes in demand for different traffic conditions including heavy incoming, heavy 2- way, heavy outgoing and light off-hours as variations of normal 2-way traffic.

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Products: Subject to compliance with requirements, provide
one of the following:

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"Elevonic 401" by Otis Elevator Co.
"Mark V" by Westinghouse Elevator Co.
"Miprom" by Montgomery Elevator Co.
"Traflomatic III" by Dover Corp.
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Traflomatic III Group Supervisory Operation:

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The elevator control system shall be microprocessor based and software oriented. The system shall operate in real time, continuously analyzing each cars changing position, condition, The microprocessor shall constantly scan the and workload. system for hall calls. When halls calls are registered, the control system shall instantly calculate the estimated time of arrival for each car in the assigned hall call. The following factors shall be used in calculating the estimated time of Number of floors to travel from the current position, arrival: the time it takes to travel the floor at top speed, calls assigned to a car, and car reversal time to respond to a call. When a car status changes or additional hall calls are registered, the estimated time of arrival shall be recalculated and calls reassigned if necessary.

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Traffic Pattern: The microprocessor shall provide flexibility to meet well-defined patterns of traffic such as up peak, down peak, and heavy interfloor demands and still adjust for the many

indeterminate variations in these patterns which occur in buildings.

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Load Weighing Device: Each car shall be provided with a load weighing device which, when the particular car is filled to an adjustable percentage of the capacity load, shall cause the car to bypass the landing calls but not car calls. These passed landing calls shall remain registered for the next following car. The device shall be unaffected by the action of compensating chain or rope.

Anti-Nuisance Call Control: The microprocessor control system shall evaluate the number of people on the car and compare that value to the number of car calls registered. If the number of car calls exceeds the number of people by a field programmable value, the car calls shall be cancelled after the first call has been answered.

<u>Position Selection</u>: The position selector shall be part of the microprocessor system. The car position in the hoistway shall be digitized through a stationary steel perforated tape. This tape shall run the full length of the hoistway and it shall be encoded by the car position transducer. The car position transducer shall detect magnetic leveling strips installed on the tape for floor reference and stop accuracy. The microprocessor control system shall store the floor position and slowdown points in memory.

Motion Control: The drive control system shall be a dual-loop feedback system based primarily on car position. The velocity profile shall be calculated by the microprocessor control system producing extremely smooth and accurate stops. The velocity transducter shall permit continuous comparison of machine speed to velocity profile and to actual car speed. This accurate position/velocity feedback shall permit a fast and accurate control of acceleration and retardation.

A machine room temperature between 50 degrees and 90 degrees Fahrenheit shall be provided and maintained by the Owner.

Auxiliary Operations/Controls:

<u>General</u>: In addition to primary control system features, provide the following controls or operational features for passenger elevators, except where otherwise indicated:

Emergency power operation.

Code Blue Operation.

Loaded car by-pass.

Independent service for each car of a group.

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Automatic 2-way leveling.

Automatic dispatching of loaded car, in conjunction with load weighing device.

Code Blue Operation: Upon registration of a code blue call, the microprocessor shall allow emergency car selection to be either a preselected sequence or automatically select the car in the best position to respond to the emergency call. When the car is selected, the microprocessor system shall immediately cancel the existing car calls and bypass normal hall calls. If the car is traveling away from the emergency call, it shall stop at the next floor its position shall allow, reverse direction, and proceed directly in the direction of the call, it shall continue until it arrives at the emergency call.

Once the car has stopped at the floor the emergency call was registered the car shall sit with the doors open for field programmable time or until the car is placed on car independent service or hospital emergency service. Should the field programmable time expire, the car shall return to automatic operation.

Patient transport elevators (Nos. 1 & 2) only are to have code blue operation. A code blue key switch is to be included in the hall call stations at each landing for initiating operation.

Emergency Power Operation: Upon failure of normal power and establishment of the emergency power source, each elevator will be automatically sequentially selected, according to a predetermined sequence, to return to the assigned landing and park with the door open.

After all cars have returned or failed to return, a car may be manually selected to return to normal automatic operation. Elevators No. 1 and 2 are to be considered a group. Elevators No. 3 & 4 are to be considered a group. Only one car from each group is to run on emergency power.

 The emergency power supply, including the transfer switch and auxiliary contact, shall be furnished by Division 16 under another section of the specifications. It shall be available to all the elevators in this system through normal power feeders. The emergency power shall be of the same characteristics as the normal power and shall have the same phase rotation.

A signal must be provided to the elevator system approximately 20 seconds before normal power is to be restored to the system or testing of emergency power when normal power is present.

Lobby Monitor: A video monitor shall be furnished in a location specified by the Architect. This monitor shall provide a graphic representation of the elevator system. The screen

display the following information: Car position, car direction, individual car calls, hall calls, and car door status.

Control Monitor: a panel shall contain a video monitor and key switches required by operational features. This panel shall be in a location as directed by the Architect. Information about the elevator control system shall be displayed in tabular form on the video monitor.

Included are the following visual indicators:

12 CAR DIRECTION STOP SWITCH POSITION
13 CAR POSITION FIRE SERVICE
14 IN-SERVICE INDEPENDENT SERVICE
15 DOOR POSITION EMERGENCY POWER
16 CODE BLUE OPERATION

Included are the following mechanical controls:

MOTOR GENERATOR KEY
EMERGENCY FIRE RECALL SWITCH
SWITCHES

EMERGENCY FIRE RECALL SWITCH
INDEPENDENT SERVICE SWITCH

Machine Room Monitor: A video monitor shall be mounted in the elevator machine control room. The information provided in this format shall aid in adjusting and/or diagnosing the elevator control system. The monitor shall display in tabular form information that includes: Status of individual input/output devices, slowdown position, operating modes, and door status. Include a standard printer interface for the addition of a printer at a future date.

Door Operation: A direct current motor driven heavy duty operator shall be furnished and installed, designed to operate the car and hoistway doors simultaneously. Door movements shall be electrically cushioned at both limits of travel and the door operating mechanism shall be arranged for manual operation in event of power failure. The leading edge of the car door shall be provided with a retractable reversal edge arranged to automatically return car and hoistway doors to the open position in event the doors are obstructed during closing cycles. Doors will then resume closing cycle. Doors shall automatically open when the car arrives at the landing and shall automatically open when the car arrives at the landing and shall automatically close after an adjustable time interval or when the car is dispatched to another landing. Direct drive gear operators, A.C. controlled units with oil checks or other deviations from the above are not acceptable.j

If the electronic detector is activated when the doors are closing and the doors are more than one-third closed, they shall reverse direction and open only partially. The doors shall begin to reclose when the electronic detector is deactivated. The doors shall reopen fully if the electronic detector is activated longer than a fixed time.

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The current door hold open time shall be changed to a shorter

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The doors will remain open as long as the electronic detector senses the presence of a passenger or object in the door If door movement is obstructed longer than a field programmable time value, a buzzer will sound and the doors will close at a reduced speed. If the reversing edge contacts a person or object when closing, the doors will stop and resume closing after the obstruction has been removed.

field programmable time when the electric eye is activated. The microprocessor control system shall provide separate timers for car call door hold open time and hall call door open time.

The door hold open times shall be field programmable. Signal Equipment: General: Except as otherwise indicated, provide manufacturer's

standard signal equipment for each elevator or group of Provide car control station and car position elevators. indicator in each car, hall push-button station on each landing for each elevator or group of elevators but not less than one station for each 4 elevators in a group, and other units as Provide illuminated buttons and signals, which indicated. light-up when activated and remain lighted until call or other function has been fulfilled; fabricate of acrylic or other permanent translucent plastic. Faceplates/trim on signal fixtures to be satin finish stainless steel.

Car Control Stations: Provide flush-mounted metal faceplates, containing call button for each landing served, and containing other buttons, switches and controls required for specified car operation and control. Mount as shown, or scheduled, and at height complying with NEII "Suggested Minimum Passenger Elevator Requirements for the Handicapped". If not otherwise indicated, mount in return panel adjacent to car door. Provide operating Mark other buttons and device symbols as required by Code. with manufacturer's standard identification required use or function. Swing return type required. "Dover Impulse" type car control station is acceptable. Include fireman's phone jack in car operating panel.

<u>Car Position Indicator:</u> For passenger and service elevator cars, provide either illuminated-signal type or digital-display type, located near top of car.

In addition to visual indicator, provide audible signal to indicate to passengers that car is either stopping at or passing each of the floors served.

For each group of passenger and Hall Push-Button Station: service elevators, located between 2 elevators at center of group, or at location most convenient for approaching passengers. Provide type with flat face plate for surface mounting on wall finish (body of unit recessed). Provide 2-button station where passengers can travel either direction; 1-button station where only one direction of travel is available and indicate which direction that is.

<u>Hall Lanterns</u>: Provide units with illuminated "up" and "down" signal arrows, but provide single arrow where only one direction is possible. Provide units projecting from face plate for ease of angular viewing, except provide flush units where a location in hoistway entrance frame is indicated. Match materials, finishes and mounting method with hall push-button stations.

In conjunction with each hall lantern device, provide an audible to indicate that a car is arriving in response to a hall call and to indicate direction of car travel. Signal shall sound once for up direction of travel and twice for down direction.

At manufacturer's option, audible signal may be placed on each car.

<u>Hall Position Indicator:</u> Provide digital-display type signal, located above each hoistway entrance at ground floor. Match materials, finishes and mounting method with hall push-button stations.

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At manufacturer's option, ground floor hall lantern signals may be integrated with hall position indicators.

 <u>Communications:</u> A means of two way conversation between the Control Monitor location, the elevator cars and machine rooms to be by intercom.

 The elevator contractor is to provide elevator traveling cables containing two cables, one for the intercom system and one for paging system. Paging wiring shall be shielded twisted pair, 18 gauge stranded wire. Intercom wiring shall be twisted, shielded, 5 conductor (3 wires 16 gauge, 2 wires 20 gauge). Shield shall be ungrounded. Fireman's phone jack is also to be furnished and installed in main car station.

The intercom/paging system, including all wiring (except for that located in elevator traveling cable) is to be furnished and installed by others under Division 16 of the specifications.

Alarm System: Provide emergency alarm bell properly located within building and audible outside hoistways, equipped to sound automatically in response to emergency stops and in response to "Alarm" button on each car control station.

Passenger Elevator Car Enclosures:

General: Except as otherwise indicated, provide manufacturer's standard pre-engineered car enclosures, of the selections indicated. Include ventilation, lighting, ceiling finish, wall finish, access doors, doors, power door operators, sill (threshold), trim, accessories, and floor finish unless indicated as not work of this section. Provide horizontal sliding doors of manufacturer's standard flush panel type, with operation and number of panels as indicated. Provide manufacturer's standard protective edge trim system for door and wall panels, except as otherwise indicated.

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<u>Materials</u> and <u>Fabrication</u>: Provide selections as indicated for each car enclosure surface; manufacturer's standards, but not less than the following:

<u>Stainless</u> <u>Steel</u>: AISI type 302/304; with manufacturer's standard directional polish or satin finish.

<u>Car</u> <u>Sills:</u> Elevator car sills are to be made of solid nickel silver construction on all four elevators.

<u>Plastic Laminate</u>: High-pressure type complying with NEMA LD3, 0.05" thickness; color, texture and pattern as selected by Architect from elevator manufacturer standard selected minimum of 34 selections available.

Fabricate car with recesses and cutouts for signal equipment.

<u>Luminous</u> <u>Ceiling</u>: Fluorescent light fixtures and ceiling panels of translucent or open egg-crate plastic, of acrylic or other permanent rigid plastic complying with flammability requirements.

<u>Handrails</u>: Provide manufacturer's standard stainless steel handrails, on side walls and back wall unless otherwise indicated; either continuous or panellized.

<u>Door Edge Protective Device</u>: Provide retractable edge shoe on leading edges of elevator entrance doors which, upon contacting an obstruction in entrance, causes doors to stop and reopen. Provide heavy-duty boot at all safety edges, all cars.

 Photo-Eye Detection Device: Provide electronic photo-eye device with timed cut-out, projecting dual light beams across car entrance at 5" and 29" heights, which, when interrupted, will cause closing doors to stop and reopen. Provide keyed switch in car operating panel for disconnecting photo-eye device.

Passenger Hoistway Entrances:

General: Except as otherwise indicated, provide manufacturer's standard, pre-engineered, hollow metal type, sliding, door-and-

frame hoistway entrances; complete with track systems, hardware, safeties, sills and accessories. Match car enclosure doors for size, number of door panels and door panel movement. Provide 3 4 frame-section size and profile to coordinate with hoistway wall 5 construction as indicated. 6 7 Where gypsum-board type wall construction is indicated, 8 fabricate frames with reinforced head sections; provide sufficient strength without support from wall lintels. 9 10 11 Fabrication: Provide selections Materials and indicated: manufacturer's standards, but not less than the following: 12 13 14 Stainless Steel Frames: Formed stainless steel sheet, AISI 15 Type 302/304; with manufacturer's standard directional polish 16 or satin finish. (All four elevators at all landing 17 openings.) 18 19 Stainless Steel Door Panels: Flush stainless construction, AISI Type 302/304; with manufacturer's standard 20 21 directional polish or satin finish. (All four elevators at 22 all landing openings.) 23 24 Hoistway Entrance Sills: Hoistway entrance sills are to be 25 made of solid nickel silver construction for all four 26 elevators at all landing openings. 27 28 29 ELEVATOR EQUIPMENT SCHEDULE NOS. 3 & 4 SERVICE ELEVATORS 30 31 32 DESCRIPTION OF EQUIPMENT 33 34 35 CONTROL: Variable voltage 36 37 CAPACITY: 5,000 lbs. 38 39 SPEED: 350 f.p.m. geared 40 41 OPERATION: Traflomatic III by Dover or 42 approved equal. 43 6'-0" w. x 9'-7" D. 44 CAR SIZE: PLATFORM: 45 46 CLEAR INSIDE: 5'-8"W X 8'-7"D X 7'-4"H 47 48 TRAVEL: 104' - 1-3/8" 49 50 POWER SUPPLY: 208 v. 3 ph.; 60 cy. 51 52 MACHINE LOCATION: Directly overhead

Nine (9)

53 54

STOPS:

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1 2 3	OPENINGS:	Nine (9) in-line
4 5	HOISTWAY DOORS: (SIZE AND TYPE)	4'-0"w x 7'-0"h two speed
6 7	DOOR OPERATION:	D.C. power
8 9 10 11	CAR ENCLOSURE:	Dover design DLP-1 as described
12 13 14 15 16	SIGNALS:	Illuminated pushbuttons Car position indicator Combination hall position indicator/lantern at G Hall lanterns typical
17 18 19 20 21 22 23 24 25 26 27 28	SPECIAL FEATURES:	Emergency Fire Service per ANSI A17.1 Emergency light and alarm bell. Handicapped features per Ky. Bldg. Code Dual electronic passenger sensing devices Closed-transition Wye-Delta reduced voltage starting
29 30 31 32		Emergency power operation Code Blue Operation Independent service
33 34 35	ELEVATOR EQUIPMENT SCHEDULE NOS. 1	&2 (Patient Transport)
36 37 38	DESCRIPTION OF EQUIPMENT	
39 40	CONTROL:	Variable voltage
41 42 43	CAPACITY:	No. 1 - 10,000 lbs. No. 2 - 5,000 lbs.
44 45 46	SPEED:	No. 1 - 300 fpm. No. 2 - 350 fpm.
47 48 49	OPERATION:	Traflomatic III by Dover or approved equal.
50 51 52	CAR SIZE: PLATFORM:	No. 1 - $7'-4"$ w x $13'-0"$ d. No. 2 - $6'-0"$ w x $9'-7"$ d.
53 54	CLEAR INSIDE:	No. 1 - 7'-0" w x 12'-0"d x 7'-4"h.

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1
                                         No. 2 - 5' - 8'' \le x 8' - 7'' \le x
 2
                                            7'-4"h.
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     TRAVEL:
                                         104' - 1-3/8"
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 6
    POWER SUPPLY:
                                         208 v. 3 ph.; 60 cy.
 7
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    MACHINE LOCATION:
                                         Directly overhead
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    STOPS:
                                         Nine (9)
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    OPENINGS:
                                         Nine (9) in-line
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                                         No. 1 - 5' - 0" w x 7' - 0"h two
    HOISTWAY DOORS:
15
     (SIZE AND TYPE)
                                            speed
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                                         No. 2 - 4' - 0'' w x 7' - 0''h two
17
                                             speed
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    DOOR OPERATION:
                                         D.C. power
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    CAR ENCLOSURE:
                                         Dover design DLP-1
                                                                     as
22
                                         described
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24
    SIGNALS:
                                         Illuminated pushbuttons
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                                         Car position indicator
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                                         Combination hall position
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                                          indicator/lantern at G
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                                        Hall lanterns typical
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    SPECIAL FEATURES:
                                        Emergency Fire Service
31
                                          ANSI A17.1
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                                        Emergency light and alarm
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                                          bell.
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                                        Handicapped features per Ky.
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                                          Bldg. Code
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                                        Dual electronic passenger
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                                          sensing devices
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                                        Wye-Delta reduced voltage
39
                                          starting
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                                        Emergency power operation
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                                        Code Blue Operation
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                                        Independent service
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                             ELEVATORS NO. 1-4
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    CAR ENCLOSURE:
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    Walls:
              Side and rear walls of solid wood core construction
    faced on both sides with high pressure plastic laminate.
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    Stainless steel wainscoating to be provided to handrail height.
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Canopy: Unitized steel construction with top emergency exit.

Front and Transom: Integral swing return, entrance columns, and transom of stainless.

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Hollow metal, horizontal sliding type, clad with Doors: stainless steel.

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Ceiling: Suspended with plastic grid diffuser in black baked enamel steelframe with fluorescent lights above.

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Emergency Lighting: Located above car operating controls with battery pack.

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Sill: Nickel Silver.

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Handrails: Stainless steel handrails located on side and rear walls (2" x 1/4" bar). Also, locate second set of handrails 1'-3" above car floor sides and rear wall.

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Intercom speaker: Provide perforations in return panel for speaker behind panel. Locate below car operating controls.

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Finished Flooring: By others, including any underlayment that may be required.

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Finish Selections: Plastic laminate to be per manufacturer's standard with a minimum of 34 selections available. Stainless steel to be No. 4 satin finish.

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Accessories: Certificate frame, Capacity plate, Two speed exhaust fan, Pad hooks and protection pads.

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PART 3 - EXECUTION

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INSPECTION:

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<u>Prior to commencing elevator installation</u>, inspect hoistways, hoistway openings, pits and machine rooms, as constructed, verify all critical dimensions, and examine supporting structure and all other conditions under which elevator work is to be installed. Notify Contractor in writing of any dimensional discrepancies or other conditions detrimental to the proper installation or performance of elevator work. Do no proceed with elevator installation until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.

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INSTALLATION OF ELEVATOR SYSTEM:

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Comply with manufacturer's instructions and recommendations for work required during installation.

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Construction: Provide welded connections for Welded installation of elevator work where bolted connections are not required for subsequent removal or for normal operation, adjustment, inspection, maintenance and replacement of worn parts. Comply with AWS standards for workmanship and for qualifications of welding operators.

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> Coordinate elevator work with work of other Coordination: trades, for proper time and sequence to avoid construction delays. Use benchmarks, lines and levels designated by Contractor, to ensure dimensional coordination of the work.

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15 16 Sound Isolation: Mount rotating and vibrating elevator equipment and components on vibration-absorption mounts, designed to effectively prevent transmission of vibrations to structure, and thereby eliminate sources of structure-borne noise from elevator system.

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24 25 Lubricate operating parts of systems, including ropes, recommended by manufacturers.

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Alignment: Coordinate installation of hoistway entrances with installation of elevator guide rails, for accurate alignment of entrances with cars. Where possible, delay final adjustment of sills and doors until car is operable in shaft. clearances to minimum, safe, workable dimension at each landing.

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Leveling Tolerance: 1/2", up or down, regardless of load and direction of travel.

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FIELD QUALITY CONTROL:

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Acceptance Testing: Upon nominal completion of each elevator installation, and before permitting use of elevator (either temporary or permanent), perform acceptance tests as required and recommended by Code and governing regulations or agencies.

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Advise Contractor, Owner, Architect and Inspection Department of governing agencies, in advance of dates and times tests are to be performed on elevators.

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PROTECTION:

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At time of substantial completion of elevator work (or portion thereof), provide suitable protective coverings, barriers, devices, signs or such other methods or procedures to protect elevator work from damage or deterioration. Maintain protective measures throughout remainder of construction period.

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52 Provide similar protective measures for elevator units which 53 will be placed in temporary service, including inspection and maintenance service during period of temporary service.

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INSTRUCTION AND MAINTENANCE:

Instruct Owner's personnel in proper use, operations and daily maintenance of elevators. Review emergency provisions, including emergency access and procedures to be followed at time of failure in operation, removal of passengers, and other building emergencies. Train Owner's personnel in normal procedures to be followed in checking for sources of operational failures or malfunctions. Confer with Owner on requirements for a complete elevator maintenance program. Instruction period to be approximately 8 hours. Instructions to be provided in elevator machine rooms and hoistways. All training shall include personnel from UK Fire and Accident Prevention and Lexington County Fayette Urban Government Fire Department notification one week in advance.

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<u>Make a final check</u> of each elevator operation, with Owner's personnel present and just prior to date of substantial completion. Determine that control systems and operating devices are functioning properly.

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Continuing Maintenance: Installer shall provide a continuing maintenance proposal to Owner, in the form of a standard yearly (or other period) maintenance agreement, starting on date construction contract maintenance requirements are concluded. State services, obligations, conditions and terms for agreement period, and for renewal options.

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END OF SECTION 14210

SECTION 14240-A - ANNUAL ELEVATOR MAINTENANCE AGREEMENT

DESCRIPTION:

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This section is to establish a Price Contract for Elevator Maintenance for the University of Kentucky, Lexington Campus, UK Hospital Expansion - Addition, at the Albert B. Chandler Medical Center.

CONTRACT -PERIOD:

Specifications. Annual Elevator Maintenance Agreement. Section 14240-A. page 1. (1) year lines 14 thru 17: Delete lines 14 thru 17 and insert the following: "The Contract is to an option be effective upon building substantial completion of one (1) year warranty period and continuous for one (1) year, following warranty period, with an option to renew for three (3) additional years in one (1) year increments."

INTENT:

It is the intent of these specifications to provide the University with uniform service from experienced and reliable elevator service contractors. It is required that each contractor under this agreement shall perform service in a workmanlike manner, provide a safe and comfortable ride, keep equipment in penthouse, bottom of pit and premises in general in an orderly, free of trash and debris, condition, and provide trained (current technology), experienced mechanics. These mechanics shall be skilled in the elevator trade and be courteous and cooperative with the University of Kentucky staff, students and general public in all respects.

DEFINITIONS:

Full Maintenance: Full Maintenance service specifies a regular and systematic examination of the elevator equipment as specified herein and to include necessary repairs and replacements throughout the life of the contract.

Repair: Shall mean (including but not limited to) the renewal, replacement, adjustment, etc. of all items covered by the specifications to return any and/or all functions, parts, machines, wiring, etc. to the condition of normal and safe operation as originally designed and/or as intended by the original elevator manufacturer.

Contractor: The successful qualified bidder.

<u>Using Department</u>: Department within the University who is responsible for payment and responsible for operation of equipment.

Inspection: A regularly scheduled visit to a specific elevator or bank elevators for the sole purpose of cleaning, inspecting, etc. for the determining of the condition of and/or the scheduling of maintenance/repair operations to the elevator or Merely answering a trouble call will not bank of elevators. satisfy the definition of an inspection.

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9 10 Trouble Call: A visit necessitated by a problem with and/or a breakdown of an elevator needing immediate attention by the service personnel of the contractor and which is initiated by the Owner.

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TENURE OF CONTRACT AND TERMINATION RIGHTS:

The University shall be authorized to terminate for its own convenience all contracts for the procurement of supplies and services when the purchasing official has determined that such termination will be in the University's best interest. has been determined that a contract should be terminated for the convenience of the University, a Purchasing Services Division shall be authorized to negotiate a settlement with the Contractor according to terms deemed just and equitable by the Compensation to a Contractor for lost purchasing agency. profits on a contract terminated for convenience of the University shall not exceed an amount proportionate to the sum that the Contractor's total expected margin of profit on the contract bore to the contract price, based on the total out of pocket expense incurred by the contractor as of the date of termination of the contract.

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Wherever a contract is terminated for the convenience of the University, the contractor shall have the burden of establishing the amount of compensation to which he believes himself to be entitled, by submitting his bid or proposal for the contract, and evidence of expenses paid or incurred in performance of the contract from the date of award through the date of termination. Payment of the same agreed to in the settlement of a contract terminated for convenience of the University shall be made from the same source of funds or account as the original contract.

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At expiration of its initial term, this contract may, contingent on availability of funds, and at the option of the parties hereto, be extended upon the same terms and conditions as set forth herein for further periods not to exceed twelve (12) months each. In the event the "option of renewal" is exercised, the University shall request the renewal from the Contractor no later than June 1, of each year before expiration of the information Contractor shall reply with all concerning any price adjustments.

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THIS CONTRACT MAY BE TERMINATED BECAUSE OF DEFAULT OF THE CONTRACTOR:

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The contract established from this Invitation is subject to cancellation in the event of vendor malperformance, non-performance, product substitution, failure to meet delivery requirements, of failure to provide the product and/or service in accordance with terms and conditions of this bid.

 In the event the Contractor is precluded from performing service required, under contract, for a period of time, the Contractor must notify the University. The University, at its option, upon ten (10) days written notification cancel contract.

The contract will be null and void upon receipt of written notification from the Director and/or Associate Director of Purchasing.

In the event of contract cancellation, the Contractor/vendor will precluded from having the opportunity to submit a bid or a replacement contract.

BASIS OF METHOD OF AWARD:

As described in Method of Award.

CONTRACT PRICE:

Owner shall pay contractor on a monthly or quarterly basis during the term of this agreement for work performed.

1. Owner shall pay, in addition to the price and tax imposed by any existing or future law and the amount of any tax imposed on the Contractor, his supplies or the Owner under any statute, court decision, rule or regulation becoming effective after the date of this proposal which is based on or incident to the transfer, use, ownership, or possession of the materials or equivalent involved in the performance hereof or the services rendered hereunder.

2. The prices shall be subject to adjustment in the manner set forth as follows:

a. The proposal, when accepted by Owner or Owner's agent below and approved by Contractor's representative, shall constitute the contract, and all prior representations or agreements not incorporated herein are superseded.

3. The Contract price shall be adjusted yearly in the manner provided below:

EACH ADJUSTMENT SHALL BE MADE AS FOLLOWS:

1. The contract price shall be adjusted yearly in the manner provided below, the first such adjustment and each subsequent adjustment to be due the start of each fiscal year. adjustments shall be made as soon as possible after the end of each year of the term here of and the price as adjusted shall be effective for the next year. Each such adjustment shall be made as follows:

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2. Twenty-five percent (25%) of the contract price shall be increased or decreased by the percentage of increase or decrease shown by the index of "Wholesale Commodity Prices for Metals or Metal Products", published by the U.S. Department of Labor, Bureau of Statistics, for the month of January as compared with the index for January of the previous year. (1967 Base Year = 100.0) January 1987 which was 313.2.

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3. Seventy-five percent (75%) of the contract price shall be increased or decreased by the percentage of increase or decrease in the average hourly rates for "General Building Contractors" as published by the Federal Bureau of Labor Statistics, for the month of January as compared with the rates for January of the previous year (January 1987 11.48).

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4. No adjustment in price resulting from this Price Adjustment Provision shall increase the contract price to more than the maximum price permitted by any applicable legally-issued Government Regulations in effect at the time that such adjustment is made. No single year adjustment shall increase the contract price by more than ten percent (10%).

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PERFORMANCE BOND AND ISSUANCE:

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1. The Contractor shall furnish on the effective date of the Contract a Performance and Payment Bond in an amount equal to to one hundred percent (100%) of the annual contract price as security for the faithful performance of this contract and the payment of all persons performing labor, including the payment of all unemployment contributions, which become due and payable Kentucky Unemployment Insurance Law and furnishing materials in connection with this contract.

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The Vendor shall furnish certificate indicating Insurance: currently effective policies of insurance naming the University as additional Insured so far as its interest might appear. Proof of Insurance should be filed with the Department of Purchasing and kept currently effective: insurance is required as follows:

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Workers Compensations including Employees Liability with all States Endorsement to provide Statutory benefits.

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Public Liability and Product Liability\$200,000. each accident

\$500,000. aggregate 3 Bodily Injury Liability \$500,000. each person 4 \$1,000,000. each accident 5 6 \$200,000. one accident Property Damage 7 \$500,000. aggregate 8 9 Automobile \$500,000 per person 10 \$1,000,000 per accident 11

Excess or umbrella liability coverage to apply over the primary coverage with minimum limits of \$1,000,000.

The successful bidder shall be required to place all insurance coverages (Liability and Performance Bond) required by the laws of this State and this Invitation for Bids with a licensed resident local agent of Kentucky, who represents insurance companies authorized to do business in the State of Kentucky.

In the event the "Option of Renewal" is exercised by the University, the Contractor shall, within ten (10) calendar days from effective date of renewal provide valid renewals of Bond and Insurance.

TAXES AND WORKERS BENEFITS:

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The Contractor will be required to accept liability and include cost in Bid amount for payment of all payroll taxes, sales and use tax, and all other taxes or deductions required by local or Federal laws, such as old age pensions, social security or annuities measured by wags. shall Workmen's He carry Compensation Insurance to the full amount as required by all statues and shall include the cost of all foregoing items in the proposal.

CONTRACTOR'S OBLIGATIONS:

The Contractor shall and will, in good workmanlike manner, do and perform all work and furnish and supply all materials, machinery equipment, facilities, and means, except as herein otherwise expressly specified, necessary or proper to perform and complete all the work required by the contracts issued under these specifications and terms and conditions. The Contractor alone shall be responsible for the safety, efficiency, and adequacy of his plant, appliances, and the methods and for any damage which may result from their failure or their improper construction or maintenance of equipment. The Contractor shall observe, comply with, and be subject to all terms, conditions, and shall do, carry on, and complete the entire work to the satisfaction of the University.

CALL BACK SERVICE:

Call back service shall be required as hereinafter specified. All contacts made directly between the Contractor and the institution are to be directly with the business manager or a person-so authorized by him or indicated on the Form of Proposal to this Invitation. The Contractor will not be required to answer call back service from persons other than those specified. These individuals will be identified when the Contract becomes effective.

The Contractor will not be required to answer call back service from persons other than those specified. The Contractor shall be accepting liability for callbacks from other than the individuals listed above.

CONTRACTORS:

The successful contractor may delegate the work to be performed under this Contractor, to an authorized agent or branch located in the Commonwealth of Kentucky owned by the successful bidder. The Contractor may not sublet to a firm having no direct business relation or association with the Contractor. If it is the intent of the Contractor to sublet or delegate all or any part of the work to be performed, it is necessary that such intent be stated by the Contractor in his proposal.

ELIGIBILITY OF CONTRACTOR:

Bidder must currently employ sufficient member of employees to maintain areas bid. Each bidder shall submit as part of the Form of Proposal a resume indicating experience and qualifications of Elevator Service Mechanics.

- 1. Bidder must have a regular and well established place of business.
- 40 2. Bidder must have been engaged in and rendering the type of 41 service required under this contract for a period of not less 42 than five (5) years.
- 3. Bidder must maintain adequate number of employees to service areas bid, state number of employees who will be assigned to this area.
 - 4. Bidder must maintain an adequate stock of replacement parts.
- 5. Bidder must file a financial statement with the University of Kentucky Department of Purchasing (Such statement shall indicate dollar value, breakdown on parts, tools, service vehicles, et.)
- 6. Bidder must have successfully concluded all contracts for equipment described or subcontracts with the University of Kentucky for the past five (5) years.

7. When additional information relating to bidder's qualifications and proprietary interest is requested it will be supplied within two (2) weeks.

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ADDENDA:

8 Any "Addenda" or "Instructions to Bidders" issued by the 9 University of Kentucky, Purchasing Services Division prior to the time for receiving bids shall be covered in the proposal and 10 in closing a contract they shall become a part thereof. Such 11 12 "Addenda" shall be acknowledged on the Bid Proposal.

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METHOD OF PAYMENT:

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Contractor shall submit monthly invoices on his own form to the University of Kentucky for work performed covered by the "Full Maintenance" program. Invoices submitted for work not covered shall be received by the University within 30 days after the work was performed. Copies of the maintenance work tickets must be attached with full explanation of work performed, complete with, but not limited to, dates, times and person authorizing the work.

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TERMS AND CONDITIONS:

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Should a unit need pre-contractural repairs that were covered under the past contract agreements, the owner reserves the right to hire an elevator inspector or utilize the services of the State Elevator Division in the Department of Housing, Building and Construction, to determine if such repairs are required. The inspector's and owner's decision as to previous Contractor's responsibility in fulfilling his contract obligation shall be final. If the previous Contractor fails to make correction to elevators as directed by the inspector through the owner, and/or all contracts held by the contractor will be cancelled and/or bids rejected.

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TERMS AND CONDITIONS AND POST-CONTRACTURAL REPAIRS:

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The successful contractor(s) will have ten percent (10%) retainage held from each monthly payment during the current year, to insure that repairs necessitated by University inspections or State Elevator inspector will be completed prior to conclusion of the yearly contract. In the ninth (9th) month of each year the University will make an inspection of each elevator or request the State Elevator Inspector to inspect and determine the status of each elevator. If these inspections reveal that repairs are required, then said repairs are to be made and completed prior to the conclusion of the current contract year. If the elevators meet the requirements of the

contract, the current annual retainage will be released. At the end of the annual period, if the contractor fails to make the necessary repairs during the allotted time, the University may make said repairs and pay for these repairs using the monies held in retainage from the current contract.

PROTECTION OF PREMISES:

The contractor shall provide and properly maintain protection as required by the governing laws, rules, regulations and ordinances, together with such additional protection as may be required for the safety of workmen and the public.

DAMAGED FACILITIES:

This contractor shall repair and/or replace damaged sections of existing utilities and structures caused by work performed under this section.

DISAGREEMENT AND FAILURE TO PERFORM:

1. The University of Kentucky, Purchasing Services Division shall be responsible for making final decisions when disputes between the University of Kentucky, using department, and the Elevator Contractor occur.

2. During the term of the contract or any extensions thereof, in the event that disputes regarding proper maintenance, repairs or other contractural matters by the Contractor should arise the Purchasing Services Division of the University of Kentucky reserves the right to obtain the services of the Commonwealth of Kentucky Elevator Inspector and/or an outside consultant to evaluate the vendor compliance.

3. The University's decision as to the Contractor's responsibility in fulfilling his contract obligation shall be final. If the Contractor fails to make correction to elevators as directed by the inspector through the University, any and/or all contracts held by the Contractor will be cancelled.

VANDALISM REPAIRS:

Vandalism repairs shall be handled as trouble/service calls. Labor cost for vandalism repair will not be charged to the University except when the labor exceeds one (1) hour. Then the contractor shall bill the University for that hour and all additional hours thereof. Replacement of parts as a result of vandalism will be considered as extra cost.

An appointed representative from the University of Kentucky must inspect and approve all repairs to be made under the Vandalism Clause, prior to beginning repairs.

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REPAIRS NOT COVERED BY PRICE CONTRACT:

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For elevator repairs that are not covered by price contract, the University may choose to allow the current holder of the maintenance price contract to submit proposals as described below.

The materials charge will be at manufacturer's cost plus 15%. A copy of the manufacturer's price list (as proof of purchase) shall be submitted along with the invoice when billing the agency for repairs of this nature. Manufacturer's invoice will suffice in lieu of the price list. Authorized representative from UNIVERSITY OF KENTUCKY, must approve prior to installation.

NOTE* Contractor shall show proof of parts replaced, (present replaced parts) to the authorized representative of UNIVERSITY OF KENTUCKY.

DRAWINGS, WIRING SCHEMATICS, AND SPECIFICATIONS:

1. Each contractor will satisfy himself as to the drawings, schematic, and specifications that are available at each location. It is the contractors responsibility to acquire all needed information in order to perform and provide the services as specified.

 It is the elevator contractor's responsibility to maintain existing drawings and technical information, and to turn this and ALL other information over to the using agency at the end of the contract period.

SPECIAL CONDITIONS FOR HOSPITAL:

 The elevator contractor shall maintain an adequate inventory of consumable and accessible parts in Lexington, Kentucky for all units under contract. The University reserves the right to inspect the facilities to verify inventories if necessary.

2. The Elevator Contractor shall furnish annual written reports on conditions of each unit to the Medical Center, Physical Plant Division authorized representative. A weekly report shall be submitted showing the problems reported and action taken to resolve problem. This report is to be submitted to Jack Mellott, Physical Plant Medical Center.

Monthly meetings may be required to discuss elevator problems and how they can be resolved.

At the first monthly meeting the Elevator contractor and Medical Center, Physical, Division, will work jointly in developing an inspection report which is to be submitted monthly by the elevator contractor.

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3. The elevator contractor shall notify the authorized representative of the Medical Center, Physical Division, before making or renewals, which would create an additional cost to the Medical Center. Such notification shall include description of repairs needed, cost of repairs, and completion date of repairs.

The elevator contractor shall respond to any call backs as 12 13 specified in the general conditions and specifications; 14 however the elevator contractor shall furnish a trained 15 16 17

mechanic on site within one (1) hour of receiving such notification of any situation. ; The elevator mechanic shall work continuously until such elevator is safely placed back

in service and repairs are accomplished.

If more than one (1) elevator is down for more than four (4) hours, additional mechanics will be brought in to repair such units.

5. The elevator contractor shall notify the authorized representative of the Medical Center, Physical Plant Division before "Specified Inspections" are performed during normal working hours (8:00 A.M. to 5:00 P.M.) Monday thru Friday.

The elevator contractor shall keep "Down Time" of all units to a minimum by stocking readily available parts and providing additional trained mechanics as necessary. Down Time due to major equipment malfunctions (down time greater than four (4) hours shall constitute immediate notification to the authorized representative of the Medical Center, Physical Plant Division, the description of repairs needed, and completion date. Any changes in completion date shall necessitate additional notification with reasons for delay.

7. No elevator will be removed from service, except in cases of hazard to life, without prior clearance with designated owner's representative.

When an elevator is out of service for whatever reason, signs shall be placed at all floor entrances to that elevator indicated that the elevator is out of service.

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9. Response to any call back during regular or over time hours shall be within sixty (60) minutes.

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10. At any time an elevator is out of service for reasons other than scheduled preventative maintenance, a mechanic will be provided for each such elevator out of service whether during regular or overtime hours.

FULL MAINTENANCE SPECIFICATIONS:

 Full maintenance service specifies a regular and systematic examination of the elevator equipment as specified herein and to include necessary repairs and replacements throughout the life of the contract. Examination are to be made on a regular basis or as necessity demands. If the bid documents indicate one (1) inspection per month but elevator usage dictates a need for more frequent servicing, the contractor shall be required to provide whatever is necessary to maintain the unit in good repair. However, the minimum number of inspections per month, as indicated in the Form of Proposal, shall be performed. The inspection personnel are to contact the Business Manager, Administrator, or other designated and authorized representatives at the beginning of each visit, in order to be advised if any particular point should be given special attention.

A trouble call can be used as an opportunity to do an inspection/servicing; however, a trouble call for only shall not be substituted for regularly scheduled inspection/servicing.

entire elevator Contractor agrees to maintain The the equipment as hereinafter described on the terms conditions subsequently set forth. Trained men will be directly employed and supervised. If all or any part of the service to be rendered under this contract is delegated to authorized branches or agents, it is understood that the contractor is solely responsible to the University of Kentucky for meeting and fulfilling all terms and conditions of this contract. The contractor will be qualified to keep th equipment properly adjusted and use all reasonable care to maintain the elevators in proper and safe operating condition.

To Cover all Traction or Drum Type Elevators and Dumbwaiters

The contractor will regularly and systematically, as required and as conditions warrant, examine, adjust, lubricate, repair or replace machine, motor, motor bearings, motor windings, starters, armatures, brake, brake coils, brake lining, resistance for operating and motor circuits, worms, gears, thrust bearings, sheave bearings, machine bearings, controllers, selectors, relay panels, signal machines, motor generator sets, M.G. Starting panels. proposal also includes the maintaining of all necessary elevator equipment, including signals, interlocks, door hangers, door closers, retiring cams, car and landing door operators, safety edges, switches, SCR drives, microprocessors, computers, card readers, computer periferial equipment and/or software and wiring of car lights.

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- 1. Properly lubricate guide rails, and renew guide gibs and rollers when necessary, to insure smooth quiet operation.
- 2a. Inspect and test all safety devices and governors, and equalize the tension on all hoisting ropes, as per the elevator safety requirements as covered by the latest edition of ANSI A.17.1, Code for elevators, dumbwaiters, escalators and moving walks (800 KAR 4:010)
- b. All tests recommended in Section 1001 "Periodic Tests and Inspections" including annual no load and five year full load, shall be required with the exception of the 6 month test in section 1001. 6A. The twelve month test in that section will be required.
- c. After award of contract, the contractor shall submit to the University within a reasonable time, an approximate schedule of when tests will be performed on the particular agency's units. This schedule shall include:

 (1) date of last test, (2) approximate month in which the currently required test will be performed.
- 3. Renew all wire ropes as often as necessary to maintain an adequate safety factor, and repair or replace conductor cables.
- 4. Furnish high grade lubricants.

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- 29 5. During regular service calls the contractor will check and 30 replace as needed indicator lights and pushbutton lights as necessary.
- 33 6. Furnish annual report on conditions of elevator and tests performed. This report shall be submitted to the agency by May 1 of each year.
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- 37 7. Service and maintain all Fireman's Service equipment an 38 wiring.
 - Maintain, repair and/or replace car fan.
 - E. The Contractor is not required to:
 - 1. Refinish, repair, or replace the elevator cabs, handrails, car floors, hoistway enclosure, doors, door frames, sills, and Oil Hydraulic piston cylinders.
 - 2. Make repair or renewals by reason of negligence or misuse of the equipment beyond the control of the contractor, except normal wear and tear.
 - 3. Install new attachments as recommended by insurance companies, or governmental authorities.

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- 4. Be liable for any loss, damage or delay caused by strikes, lockout, fires, (except such fire or explosions as may be caused by the acts or omissions of the Contractors) explosion, theft, floods, riot, civil commotion, war, malicious mischief, Act of God, or any cause beyond the Contractor's control.
- 5. Be liable for injuries or damage to persons (other than contractor's employees) or property except those directly due to the acts or omissions of the Contractor.
- 6. Furnish and install overhead light bulbs in cars.
- F. All work to be normally scheduled and performed during regular working hours on regular working days of the elevator trade.

18 If an emergency exists, necessary overtime callback service as in general use in the elevator trade will be made. Notify 19 20 of emergency shall be given the Contractor by Business Manager, Administrator, or previously 21 22 representative of the University. Refer to the Form of 23 Proposal for individual units that will required overtime call back service to be included in the monthly maintenance 24 charge. For units with overtime callbacks excluded, unit prices shall be submitted for labor and mileage charges 25 26 27 should an overtime callback be required. The contractor will 28 be reimbursed for these charges in addition to the regular 29 monthly charge.

SECTION 14560 - CHUTES

PART 1 - GENERAL

RELATED DOCUMENTS:

 Drawings and general provisions of Contract, including General and Special Conditions and Division-1 Specification sections, apply to work of this section.

SUMMARY:

Extent and location of each chute is indicated on drawings and by provisions of this section.

Types of chutes required include the following:

Rubbish (waste) chutes

Linen (laundry) chutes

Hook-ups for water and electrical services are included in Divisions 15 and 16 respectively.

REFERENCE STANDARDS:

NFPA Code: Comply with applicable portions of National Fire Protection Association (NFPA) No. 82 Standard on "Incinerators, Waste and Linen Handling Systems and Equipment".

SUBMITTALS:

<u>Product Data</u>: Submit manufacturer's product specifications, standard details, installation instructions and general recommendations for total pre-engineered chute system. Mark-up data sheets to indicate actual selections for sizes and other details of installation.

Shop Drawings: Submit 1/4" scale section/elevation drawing, 1/2" scale typical landing plans, and 1-1/2" scale details of chute fabrication and installation including roof flashing. Distinguish between factory fabrication and field assembly work. Show required piping, and wiring connections and conduit runs for wiring.

QUALITY ASSURANCE:

Fabricator Qualifications: Firm with at least 5 years of

experience in fabrication of chutes similar to those required for project.

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PART 2 - PRODUCTS

MANUFACTURERS:

<u>Manufacturer</u>: Subject to compliance with requirements, provide products of one of the following:

Cutler-Federal, Inc.; Eaton Park, FL Midland Metalcraft Corp.; Joliet, IL U.S. Chutes Corp.; Brookfield, CT Wilkinson Chutes, Inc.; Stow, OH

MATERIALS AND FABRICATION:

General: Provide manufacturer's standard chute system of type, service, sizes and shapes indicated. Fabricate of metals and finishes as indicated; include support units, expansion joint materials; roof counterflashing and retainer band, roof-termination vent unit; intake chute throat sections located where indicated to accommodate door units as specified, discharge door units of type indicated; sanitizing or flushing units as specified, sprinkler heads where indicated, and manufacturer's standard accessories, fasteners and installation materials.

Chute Metal: Aluminum-coated cold rolled commercial quality, steel sheet ASTM A 463, Type 1 with T1-40 coating, gages as indicated.

Gage: U.S. No. 16 (0.062" thick).

Chute Intake Door/Frame Units: Provide self-closing units at each landing and at heights above floor as indicated. Use manufacturer's recommended heights if not otherwise shown. Provide door sizes and door swings as indicated or, if not indicated, provide hopper type doors for rubbish chutes and right-hand hinged doors with 180 deg swing for other chutes. Equip doors with positive latch and latch handle. Provide manufacturer's standard stainless steel door units, AISI Type 304/304 with standard satin finish or No. 3 directional polish.

<u>UL Labeled Door Units</u>: Provide UL "B" labeled door units (1.0 hour with 30-min temp. rise of 250 deg F. (139 deg. C), complete with closers.

Foot Operators: Equip each hopper-type door unit with manufacturer's standard foot operator, which unlatches and opens

hopper door when foot pedal is depressed.

<u>Electrical Interlocks</u>: Equip intake door units of each chute with manufacturer's standard electrical interlocks; normally unlocked, locked when energized to prevent opening of door until unenergized. Design door lock units for wiring together (for each chute), and for connection to power source and control elements as indicated (if any). Conduit for wiring is not work of this section.

Single Door Use: Provide interlock system which locks all other doors of chute when any one door is open.

Fire Protection: Provide interlock system with temperaturerise elements which lock all doors of chute at predetermined, adjustable temperature in chute.

Manual Control Switch: Provide interlock system with manual control stations where indicated, with switch to lock all doors of chute during shut-down hours and service operations.

Chute Discharge Door Units: Provide manufacturer's standard fusible-link, fire-protection, self-closing steel door unit of the type label construction even though UL label may not be required.

<u>Direct (Vertical) Discharge:</u> Provide inclined horizontally-rolling shutter-type door unit.

Horizontal Discharge: Provide top-hinged self-closing hopper door with self-latching hardware, bearing UL "B" label. Provide floor leg-brace, designed to absorb impact of material dropping against chute turn unit. Provide drain pipe connection, minimum 2" I.P.S.

 Roof-Termination Vent Units: Provide vent unit with roof-deck flange. Comply with NFPA requirements for full-sized chute extension to 4'-0" above roof, with full diameter screened vent area and metal safety cap or glass explosion-release cap. Provide nonferrous metal roof counterflashing and clamping ring, compatible with chute metal.

Fire Sprinklers: Equip chute with sprinkler heads in accordance with NFPA Standard No. 13, ready for piping connections (as work of another specification section). Provide access for maintenance of heads. Except as otherwise indicated or required by governing regulations, provide 1/2" I.P.S. heads, one located in chute above highest intake door, and one located at intake door on alternate floors.

Flushing Spray Unit: Provide 3/4" I.P.S. spray head unit in chute above highest intake door, ready for hot water piping connection (as work of another specification section). Provide access for maintenance of head and piping.

Equip spray unit with disinfecting and sanitizing unit, including 1-gal tank and adjustable proportioning valve with by-pass for manual control of sanitizing and flushing operation.

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PART 3 - EXECUTION

INSTALLATION:

General: Comply with chute manufacturer's instructions and recommendations. Assemble components with tight, nonleaking joints; and anchor securely to supporting structure with sufficient anchorages to withstand impact and wind loading stresses on vent units. Provide for thermal expansion movement of chute sections. Except as otherwise indicated, install chutes plumb, without offsets or obstructions, for free fall of materials within chutes. Install chute systems complete with doors, and with safety, sanitizing and fire-resistive components and accessories.

 Coordination with Roofing: Where roof deck curb units are not shown to receive chute roof-termination vent units, anchor vent unit support flange directly to deck before installation of roofing/insulation system. Install counterflashing after roofing/flashing system has been installed.

<u>Intake and Discharge Doors:</u> Install doors at heights and locations indicated. Provide anchorages, wall/chute interfaces, self-closing operation, self-latching and similar features of installation to comply with labeling and fire-resistive requirements for fire-resistive door construction. Interface door units with throat sections of chutes in a manner which will ensure safe, snag-proof, sanitary depositing of materials in chutes by users.

Coordinate foot-pedal door operator installation with door and enclosure wall installation.

Sanitizer Unit: Install sanitizer unit where indicated, cutting and patching chute wall only to extent necessary for installation; maintain fire-resistive construction. Interconnect sanitizer control with door interlock system.

 <u>Interlock System Wiring:</u> Install electrical wiring for operation and control of door interlock system; comply with applicable NECA standards and recommendations.

TESTING, ADJUSTING, CLEANING:

Test operate components of chute system upon completion of

installation; demonstrate use and safety features to Owner's personnel. Operate doors, locks and interlock system to demonstrate that hardware is adjusted and electrical wiring is connected correctly. Where possible, complete test operations prior to installation of shaft enclosures.

Provide heat/smoke test to demonstrate that heat/smoke
sensing devices and sprinkler heads are operable.

Operate sanitizing equipment through one complete cycle of use and cleanup, and demonstrate replenishment of chemicals or cleaning fluids in containers of unit.

<u>Cleaning</u>: Following completion of enclosure walls and ceilings, clean exposed surfaces of finished metal components of chute system. Remove foreign substances and repair imperfections in finishes, but do not remove UL labels.

END OF SECTION 14560

SECTION 14600 - HOISTING EQUIPMENT

PART 1 - GENERAL

RELATED DOCUMENTS:

 Drawings and general provisions of Contract, including General and Special Conditions and Division-1 Specification sections, apply to work of this section.

DESCRIPTION OF WORK:

 The Contractor shall furnish, install, and place in satisfactory operation the hoisting equipment and appurtenances as indicated on the Drawings and as herein specified.

 Location, capacity, critical dimensions, and other pertinent data are listed in the "Schedule of Hoisting Equipment" included herein.

The capacity of each hoist and trolley shall be permanently marked in a conspicuous manner.

All hooks shall be safety type.

The Contractor shall verify all dimensions and clearances in the field prior to erection and shall be responsible for the proper fittings and operation of the equipment.

Hoists shall be as manufactured by Mannesmann Demag Corp., Cleveland, Ohio; Harnischfeger P&H, Milwaukee, Wisc.; or approved equal.

MISCELLANEOUS REQUIREMENTS:

The Contractor's attention is directed to the following requirements:

Submission of manufacturer's specifications, catalog data, descriptive matter, illustrations, electrical control diagrams, erection drawings, etc., including complete motor data.

Installation.

Services of the manufacturer's representative.

Operating and maintenance instructions and parts lists.

Lubricants.

Special tools.

Electric motors.

 Bolts, anchor bolts, and nuts.

Inserts.

Manual Hoists:

Hoist mechanism shall be a fully enclosed high-speed, spurgeared, ball or roller bearing, hand-operated, chain hoist with a retaining brake or other acceptable service built into the hoisting mechanism.

Hooks shall be of high grade, forged steel and shall have swivel, antifriction bearings.

Load wheels shall have accurately formed chain pockets to fit the load chain.

Hoist operating wheel shall be provided with chain guides, and the chain shall be of sufficient length to hang above the operating floor.

Lightweight hoists shall have strength aluminum frame, hand wheel and housing.

Each hoist shall be integrally built into the trolley as indicated on the Drawings or herein specified.

Electric Hoist:

Electric hoist shall be spur-gear driven and shall have antifriction bearings throughout, a mechanical load brake, and a separate electrically operated motor brake. Either brake shall be capable of supporting the full load of two tons and shall be easily accessible for external adjustment by removing coverplates. Shafts of the motor, drum, and drum pinion shall run in grease-lubricated ball or roller bearings. The mechanical-load brake and the gear train and bearings shall be oil-bath lubricated.

Hoist shall be arranged for transverse suspension from a 4-wheel geared trolley.

Hoists shall be close headroom type.

A chain container shall be included in the hoist assembly.

The drum shall have machine-cut grooves and guarded flanges and shall have the capacity to take the entire run of cable in one 2 layer with no overlapping.

The hoist shall be provided with an upper and lower guard limit switch of the automatic reset control circuit type to prevent overtravel.

Sufficient hoisting cable shall be supplied with hoists for twopart single reeving and to accommodate not only the maximum lift, but two additional wraps on the drum. The cable shall be flexible high-strength plowsteel cable having a load safety factor of at least 5 to 1.

The load block shall be of rugged construction containing a ball-bearing sheave and a high-grade forged steel swivel hook with antifriction bearings.

Control equipment shall be mounted in an enclosed compartment which forms and integral part of the hoist and shall include a transformer for a 120-volt control circuit. The pushbutton stations shall be suspended from the compartment.

Trolleys:

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Manual trolleys shall be 4-wheel type fabricated from heavy steel or aluminum sections with sides extending beyond the wheel flanges to provide bumper protection. Wheels shall have machined treads surface hardened and set at the proper angle to bear the load evenly on the supporting beam flanges. Wheels shall be provided with lifetime lubricated ball or roller bearings.

Gears for the geared trolley drive shall have cut teeth.

Trolley operating wheels shall be provided with chain guides, and the chains for each shall be of sufficient length to hang 3 ft. above the operating floor.

Motor-driven trolley shall be the 4-wheel type consisting of a fully encloseded electric motor equipped with a magnetic brake, a geared transission completely enclosed in an oiltight housing and suspended on the flanged driving wheels with power to two wheels. Ball or roller bearings shall be used throughout. power supply of the unit shall be a cord reel.

Trolleys shall be suitable for operation on the beam or rail indicated on the Drawings and acceptable to the Architect. Trolleys shall be by the same manufacturer.

Switches:

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Switches shall be glide-or-sliding type and shall be manually operated. Transfer mechanisms and locking devices shall be capable of positioning the switch to maintain true vertical and horizontal alignment of the track and conductors and prevent switch operation when any part of the trolley is in the switch.

Switches shall be as manufactured by American Monorail Co., Cleveland, Ohio; Richards-Wilcox Mfg. Co., Aurora, IL.,; Louden Div., or American Chain and Cable Co., Inc., Fairfield, Iowa.

Safety Stops: Safety stops shall be provided on all open ends of track to prevent the trolley from running off the ends or damaging the building. The stops shall be capable of withstanding the impact imposed by the motion of the fully loaded hoist and trolley.

Track:

The monorail track shall be Standard beam of the sizes indicated on the Drawings.

All curves for either track or switches shall be shop fabricated to the radius indicated.

 The track shall be erected level throughout, with section ends machined fitted and spliced with web-type or other suitable couplings to provide flush level connections. The maximum gap between adjacent ends shall not exceed 1/16 in.

No cast fitting shall be used.

Electrical Controls:

 A complete integral electrical control system shall be supplied with the electrical hoisting equipment by the hoist manufacturer. Controls shall consist of starters, circuit breakers, overload relays, limit switches, control transformer for a 120-volt control circuit, control relays, and controlling devices.

Magnetic controls shall be furnished for motors. The design of the controls shall permit "inching" in both forward and reverse directions under full load, provide automatically regulated acceleration, and rapid brake response.

Each winch shall be provided with limit switches of automaticreset control circuit type to prevent overtravel in both raising and lowering directions.

All electrical equipment, including motors, controls, resistors, brakes, plus all conduit, wiring, panels, and enclosures, shall comply with the applicable requirements for materials, workmanshipm construction, and installation of the latest NEMA National Electrical Code Standards.

<u>Motors</u>: The motors for the hoists and trolley shall be totally enclosed, reversible, induction motors especially adapted to hoist service and suitable for operation on 3-phase, 60-Hertz alternating current of the voltage specified.

The motors for the chlorine storage area hoist shall be woundrotor type and shall not exceed 3 hp. The trolley motor shall be a single-speed, squirrel-cage type and shall not exceed 1/2 hp.

Pushbutton Control:

The pendent pushbutton control station shall be provided with sufficient pushbuttons to control all operations of the hoists and trolley. Each pushbutton shall be clearly marked to indicated its function. The cable shall be long enough to reach within 4 ft. of the operating floor or platform level and shall be provided with a supporting chain. If necessary, an arm shall be attached to the hoist so that the pendent cable and pushbutton controls will hang vertically and be readily accessible from the operating positions.

Controls for wound-rotor motors shall be five-step, full magnetic type. All other controls shall be suitable for single-speed motors.

Conductors and Collectors:

Conductors for electric current supply shall be safety type in which the conductor is shielded by a moded-plastic cover that surrounds the conductor except for a slotted opening shaped to the contour of the collector head. A separate conductor shall be provided for each phase. Dual conductors in a single insulating shield will not be acceptable. The conductor shall be of plated steel or copper as necessary for carrying the maximum anticipated current. The molded-plastic shield shall be of high dielectric strength, ridgid, yet sufficiently flexible to permit bending to the radius of curves or switches, and resistant to corrosion and deterioration from sunlight or Insulated supports shall be spaced at not over 5 ft. weather. on straight track and 3 ft. on curves.

A weather shield shall be provided for exterior conductors.

The collectors shall be of the sliding shoe type with an adjustable spring-loaded arm capable of horizontal or vertical movement to automatically adapt to irregularities of the conductor. The shoe shall be set in a molded-plastic head that

will prevent external contact with the shoe when it is running on the conductor. There shall be no exposed bare current-carrying surfaces or wires in the collector or arm where the shoe is in contact with the conductor.

The equipment and accessories shall be approved by the Underwriter's Laboratories and shall be "Insul-8-Bar" protected conductors made by Insul-8-Corp., San Carlos, Calif.; "Safety-T-Bar" Conductor Systems made by Howell Corp., Stratford, Conn.; "Duct-O-Bar" Conductor System made by Duct-O-Wire Co., Long Beach, Calif.; or acceptable equivalent products.

Painting:

Ferrous surfaces obviously not to be painted shall be given a shop coat of grease or other suitable rust-resistant coating.

Field Acceptance Tests:

The equipment shall be tested at rated load by the Contractor and shall be adjusted to operate smoothly without malfunctions under all load conditions.

Tests shall include a check of the horizontal and vertical alignment of the rails.

1 2 3	SCHEDULE OF HOISTING EQUIPMENT						
3 4 5 6 7 8 9 10	SERVICE AND LOCATION	NO. REQUIRED	CAPACITY (TONS)	TYPE HOIST	TYPE TROLLEY	OPERATING LEVEL	TOTAL LIFT
	Helicopter Hanger	1 Hoist/ Trolley	2	Electric	Motorized	6'	20'
12 13 14 15	Mechanical Room	1 Hoist/ 2 Trolley	2 s	Manual	Geared	6'	56'
16 17	END OF SECTION 14600						

SECTION 14700 - PNEUMATIC TUBE SYSTEM

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PART 1 - GENERAL

RELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Special Conditions and Division-1 Specification sections, apply to work of this section.

GENERAL REQUIREMENTS:

Scope of Work:

Furnish and install all equipment as required to furnish and install pneumatic tube blood and specimen transport system including all components, as indicated or implied by the Contract Documents.

Work Included:

The materials and work required to modify and extend the existing system is indicated on the Contract Drawings and includes, but is not limited to, the following:

Furnish and install all related 6" tube and fittings.

Furnish and install 6" stations with soft delivery at locations shown on the Contract Drawings.

Furnish and install low voltage control wiring.

Provide sleeve openings for all wall, floor, or partition penetration.

Provide carriers with suitable liners for specimen transport.

Related work or services to be performed by others:

115 VAC power source at main station in HA0251.

Patching and fireproofing of all sleeve openings or penetrations.

Painting other than standard factory finish.

Furring and/or cabinetry enclosures of PTS equipment if returned.

GENERAL INDEX PROJECT NO. 304.1

ADDENDA NO. 4 - CCK-291-8

HOSPITAL EXPANSION/PHASE II ADDITION - BID PACKAGE 2

ALBERT B. CHANDLER MEDICAL CENTER

UNIVERSITY OF KENTUCKY LEXINGTON, KENTUCKY

PNEUMATIC TUBE SYSTEM - COMPUTER CONTROLLED SPECIFICATIONS

SECTION 14710 - PNEUMATIC TUBE SYSTEM - COMPUTER CONTROLLED

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PART 1 - GENERAL

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RELATED DOCUMENTS:

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Drawings and general provisions of Contract, including General and Special Conditions and Division-1 Specification sections, apply to work of this section.

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GENERAL REQUIREMENTS:

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Scope of Work: Furnish and install a complete 6" computer controlled pneumatic tube blood and specimen transport system, including components, as indicated or implied by the Contract Documents and as shown on the Contract Drawings.

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Work Included: The computer controlled specimen transportation system required for this work is indicated on the drawings and includes, but is not limited to, the following:

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6" steel tube, bends and hangers.

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Micro Processor Computer Control Center with CRT Transaction Printer shall be located in the Engineering Department, Room H62 within existing hospital.

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> A system Remote Alarm Indicator (RAI) shall be located as shown on the Contract Drawings in room HAL319.

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Stations - 6" carrier size.

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Carrier Arrival indicators at each pneumatic tube station, except HA0251.

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Transfer units.

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Exhauster (floor mounted).

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Bi-parting, bi-directional, transparent carriers with vacutainer or urine specimen liners.

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Inter-station and all control wiring in conduit installed in accordance with Division 16.

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Cutting of all holes required for passage of tube lines in walls, floors, and ceilings.

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Removal and replacement of liftout ceilings.

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Hand held tester.

Training of maintenance personnel.

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Related work to be performed by others:

Removal, relocating and/or replacement of other equipment, fixtures, ceilings, conduit, pipe and etc., required for the right of way and installation of the system.

Patching and fireproofing of all holes cut for passage of tube lines.

Painting other than standard factory finish.

Furring and/or cabinetry enclosures of PTS equipment.

Cleanup of plaster, mortar and/or foreign debris on/in PTS equipment resulting from activities of other trades.

Concrete pads or base for blower units, if required.

The electrical Contractor will provide:

120 volt, 60 cycle, single phase power source terminated in the following PTS equipment:

Stations.

Transfer units.

Exhausters.

220/440 volt, 60 cycle, 3 phase power source thru a fused disconnect to each exhauster unit.

125 volt, 60 cycle, single phase, 20 AMP dedicated uninterrupted power source at Control Center.

QUALITY ASSURANCE:

Manufacturer's Qualifications:

Acceptable manufacturers must have successfully completed, and have operational at least five hospitals using the same system as the specified, which routinely test for and transport in this system:

Serum Lactate Dehydrogenase Acid Phosphotase Potassium CO2

Creatinine Protein

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1
         Glucose
 2
         Plasma Hemoglobin
 3
         Hemoglobin
 4
         Complete Blood Count
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         Blood Gases
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     Acceptable Manufacturers:
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     TransLogic Corporation, Denver, Co., CTS 620 System, multi zone
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     or approved equal.
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     SUBMITTALS:
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     Manufacturer's Data:
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     Provide manufacturer's literature and data showing illustration
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     and description of system to be furnished.
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     Submit system performance and operating characteristics.
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     Furnish maintenance manual including:
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         System component and part description.
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        Complete operating and trouble shooting instructions.
27
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        Electrical schematics.
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        Mechanical riser diagram and electrical wiring diagram.
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        Specific maintenance instructions.
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        Recommended service schedule for adjustment, lubrication and
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        inspection.
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        Listing of replacement parts of the components and complete
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        equipment drawings.
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    Shop Drawings: Submit shop drawings, including the following:
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        System layout indicating station locations, tube routing, and
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        control center location.
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        Dimensional data.
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        Installation methods.
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        Required mechanical and electrical drawings.
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WARRANTY:

All components shall be warranted free from defects in material and workmanship for a period of one (1) year from the date of Substantial Completion.

Normal operating wear shall be excluded from this warranty.

PART 2 - PRODUCTS

GENERAL DESCRIPTION:

The system shall consist of a computer controlled complex, composed of tubing, transfer units, exhauster, stations, carriers, and a computer control center with CRT and printer.

General system configuration shall be a single zone, composed of five (5) stations, each connected to the zone via a single tubing line to a transfer unit.

The dispatching, routing, and spacing of carriers shall be directed by the control center to provide automatic, unattended, transmission of carriers between all stations.

Provide shortest route vacuum-pressure travel. Transactions shall process to the closest turnaround point to the destination.

Allow all station dispatchers to be simultaneously loaded and destinations selected. Automatically process all carriers until clear.

Provide maximum capacity of thirty-two (32) stations without the need to modify or replace existing equipment. Additions shall require add-on equipment only.

System configuration and components shall be of modular design.

Allow individual station shutdown without affecting remainder of system.

Entire system and related components shall be Underwriters Laboratory tested and approved.

SYSTEM COMPONENTS:

Tubing:

Transmission tubing shall be 6" O.D., 15 gauge, cold rolled, galvanized electric welded steel with flash removed.

Bends shall be of the same material as the straight tubing, formed on the centerline to a radius of 48 inches, maintaining a uniform cross section dimension throughout.

Support tubing with suitable hangers and supports 10'-0" o.c.

Exhauster:

Provide one (1) vacuum and pressure exhauster unit to maintain average carrier speed of 25 feet per second.

Provide automatic shutdown during low usage periods.

14 Unit is to be floor mounted on vibration isolators.

16 Provide acoustical enclosure of exhauster by manufacturer.

Stations:

20 Station terminals shall be wall recessed as shown on the 21 drawings.

Station control panel shall contain:

Numerical keypad.

Station directory.

Send button with light.

Cancel button with light.

Carrier dispatcher shall contain one carrier at a time and be independent of the receiver. Provide each station with heavy duty dispatcher for payloads up to 15 pounds.

Carrier receiver shall be independent of dispatcher and contain open storage capacity of four (4) carriers. Provide high volume receiver at station located in Room HAL319 (Laboratory Accessions at new 5th floor).

Carriers:

Standard carrier shall be clear molded plastic with full access side opening. It is critical that user be capable of determining if spill has occurred inside carrier before opening.

Nominal outside dimension of carrier: 6" diameter x 15" long.

Each carrier shall be furnished with a foam rubber vacutainer or urine liner for transporting specimens.

53 A total of eighty-five (85) carriers shall be furnished with system.

Transfer Unit:

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49 50 Provide in tubing network 4 position transfer units for routing carriers between stations as required.

Transfer units shall be a minimum of 40" in length to insure smooth travel of carriers containing fragile materials or specimens.

Control Center:

Shall include computer, cathode ray tube (CRT) and keyboard Provide keylock on computer to prevent unauthorized access to memory. A computer shall control, monitor, analyze and record system operation. Provide permanent storage of system configuration and operating program. Additionally, provide memory protection of current operating data during power loss for up to 10 hours such that, upon restoration of power, the system operating can automatically resume where it left off. Provide computer with standard operating program which will optional equipment following accommodate the reprogramming:

Remote station controls.

Printer.

Remote alarm indicator.

Alternate routing of carrier travel to multiple stations at single location.

Computer modem hook-up to telephone.

The computer circuits, the interface circuits, and CRT with keyboard, shall be modular and shall be solid state components throughout. Each circuit module shall be readily removable for ease of maintenance.

Printer shall provide ability to:

Print all transactions, time and date of transaction and from which station transaction originated to receiving station. It shall also print alarm, time and date of alarm, and reports time and date when alarm is cleared.

Keyboard shall provide ability to:

Call up various CRT displays.

Change priority ratios and sign-off schedules.

Assign any station to priority and sign-off schedules.

Independently shut down and start-up any station, zone or system for isolated diagnostic interrogation or repair.

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Interrogate any system component through command, execute/respond diagnostic program. Allow for ability to manually process any carrier through the system from the keyboard.

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Provide ability to load and/or change system configuration including addition of new zones and stations.

The video display terminal (CRT) shall provide the following information in abbreviated English language on a minimum of twelve (12) inch diagonal screen:

Operating Status Display - current location of each carrier to process, pending carriers and operating status of each zone and total system transactions to date.

<u>Alarm Status Display</u> - each current alarm by zone, component failed, nature of failure, time of occurrence and transaction involved.

<u>Sign-Off Schedule</u> <u>Display</u> - the time intervals assigned to the available sign-off schedules.

Full Station Display - all stations with overload receivers.

Station Transaction Count Display - all active stations may be displayed with corresponding assigned and present carrier counts. Updating counts will be accomplished from station status display.

Resident Carrier Display - all active station numbers will be displayed with corresponding assigned and present carrier counts. Updating counts will be accomplished from station status display.

Alarm Index Display - alarm index display as in Installation and Service Manual operations are displayed on the CRT by keyboard entry. The display will include the conditions, problems, results and maintenance instructions as shown in the manual.

Computer Control Center Location:

The Computer Control Center, with CRT and Printer, shall be set on a desk or fixture provided by the owner in the Engineering Offices at room H62 of the existing ground floor of the hospital.

Remote Alarm Indicator:

The remote alarm indicator (RAI) provides a visual and audible signal that a malfunction has occurred in the system. When the control center registers an alarm, the red indicator on the panel and an audible signal come on. Pressing the pushbutton

resets both indicators. If another alarm occurs, the sequence is repeated, regardless of whether or not the first alarm is still in effect. The RAI should be located as directed by Architect in room HAL319 (Laboratory Accessions at new 5th floor).

Carrier Arrival Indicator:

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The carrier arrival indicator provides a visual and audible signal that carrier has arrived at the station via a flashing light and two second piezoelectric horn. The light shall continue to flash until reset by operator having received the carrier. Location of indicator shall be in each room having a station and as located by Architect near station.

SPECIAL TOOLS:

Hand Held Tester: At system turnover, deliver one hand held portable tester to owner's maintenance department. This tester is a necessary tool for maintenance and allows total analysis and repairs to be accomplished by one man vs. two men. This portable test device which is supplement to the control center diagnostics, permits technicians to fully test any station, transfer unit or blower.

PART 3 - EXECUTION

SURFACE CONDITIONS:

<u>Inspections</u>: Prior to all work of this section, carefully inspect existing conditions for routing of transmission tubing as shown on Drawings and/or as required for a complete and operable system.

<u>Discrepancies:</u> Do not proceed with installation until any discrepancy or conflict has been fully resolved.

INSTALLATION:

Assemble and install pneumatic tube system and components in strict accordance with Contract Documents, applicable codes and regulations, approved shop drawings, coordination drawings and manufacturer's recommendations.

In the presence of the Architect/Engineer, the Contractor shall perform final operational tests, inspecting system components and verifying equipment is installed and operating in proper condition, according to the intent of the contract.

In the event system does not perform accordingly, test will be rescheduled until satisfactory performance is achieved.

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TESTING:

7 Prior to formal system performance test, Contractor shall 8 perform preliminary tests, verifying all components are in full 9 operational condition for carrier processing between all 10 possible station combinations.

 In the presence of the Architect/Engineer, and Owner's Representative's the Contractor shall perform final operational tests, inspecting system components and verifying equipment is installed and operating in proper condition, according to the intent of the contract.

Before system is accepted by Owner, manufacturer shall assist users in programming control center to prioritize transactions from a particular floor or department and which stations can send only to the laboratory station.

INSTRUCTION:

The manufacturer shall provide:

In-service training to all operating personnel who will use the system, including after normal hours shift changes.

On-site maintenance training (24 hours) to all personnel who will service the system.

The services of an authorized service representative to supervise the installation, checking, adjusting, and start-up of system.

One week off-site maintenance training at factory to designated persons (4 maximum), not including travel and boarding expenses.

MAINTENANCE AGREEMENT AND WARRANTY:

Manufacturer shall provide full maintenance service for a period of one year, upon date of substantial completion for entire building, as described by specification section 14710-A "Annual Pneumatic Tube Systems Maintenance Agreement". Minimum visits by manufacturer to maintain, inspect, etc., the system shall be quarterly.

All parts and labor shall carry a full one year warranty upon date of substantial completion for entire building.

Remove all crating, cartons, and packing debris.

equipment and adjacent finishes clean.

partial start-up will be required.

Make final adjustments to system and components as required at

completion of installation. Clean entire tubing route before

Remove protective coatings and clean finished surfaces, leaving

The completed system shall be turned over to the Owner scheduled in the Critical Path Method (CPM) provided.

CLEANING AND FINAL ADJUSTMENTS:

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END OF SECTION 14710

SYSTEM TURNOVER:

turnover to Owner.

PNEUMATIC TUBE SYSTEM - COMPUTER CONTROLLED 14710 - 10

SCHEMATIC DIAGRAM. PNEUMATIC TUBE STISTEM

SC: HONE

ADDENDUM #4 8/88

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GENERAL INDEX PROJECT NO. 304.1

ADDENDA NO. 4 - CCK-291-8

HOSPITAL EXPANSION/PHASE II ADDITION - BID PACKAGE 2

ALBERT B. CHANDLER MEDICAL CENTER

UNIVERSITY OF KENTUCKY LEXINGTON, KENTUCKY

PNEUMATIC TUBE SYSTEM

ANNUAL MAINTENANCE AGREEMENT

SECTION 14710-A - ANNUAL PNEUMATIC TUBE SYSTEMS MAINTENANCE AGREEMENT

DESCRIPTION:

This section is to establish a Price Contract for Pneumatic Tube System Maintenance for the University of Kentucky, Lexington Campus, UK Hospital Expansion - Addition, at the Albert B. Chandler Medical Center.

CONTRACT PERIOD:

 The Contract is to be effective upon expiration of one (1) year warranty period and continuous for one (1) year with an option to renew for three (3) additional years in one (1) year increments.

INTENT:

It is the intent of these specifications to provide the University with uniform service from experienced and reliable pneumatic tube service contractors. It is required that each contractor under this agreement shall perform service in a workmanlike manner, and provide trained (current technology), experienced mechanics. These mechanics shall be skilled in the pneumatic tube systems trade and be courteous and cooperative with the University of Kentucky staff, students and general public in all respects.

DEFINITIONS:

<u>Full Maintenance</u>: Full Maintenance service specifies a regular and systematic examination of the pneumatic tube system equipment as specified herein and to include necessary repairs and replacements throughout the life of the contract.

 Repair: Shall mean (including but not limited to) the renewal, replacement, adjustment, etc. of all items covered by the specifications to return any and/or all functions, parts, machines, wiring, etc. to the condition of normal carriers operation as originally designed and/or as intended by the original pneumatic tube system manufacturer.

Contractor: The successful qualified bidder.

50 <u>Using Department</u>: Department within the University who is 51 responsible for payment and responsible for operation of 52 equipment.

<u>Inspection</u>: A regularly scheduled visit to a specific pneumatic tube station for the sole purpose of inspecting, etc. for the determining of the condition of and/or the scheduling of maintenance/repair operations to the pneumatic tube station. Merely answering a trouble call will not satisfy the definition of an inspection.

Trouble Call: A visit necessitated by a problem with and/or a breakdown of the pneumatic tube system or station needing immediate attention by the service personnel of the contractor and which is initiated by the Owner.

TENURE OF CONTRACT AND TERMINATION RIGHTS:

The University shall be authorized to terminate for its own convenience all contracts for the procurement of supplies and services when the purchasing official has determined that such termination will be in the University's best interest. When it has been determined that a contract should be terminated for the convenience of the University, a Purchasing Services Division shall be authorized to negotiate a settlement with the Contractor according to terms deemed just and equitable by the purchasing agency. Compensation to a Contractor for lost profits on a contract terminated for convenience of the University shall not exceed an amount proportionate to the sum that the Contractor's total expected margin of profit on the contract bore to the contract price, based on the total out of pocket expense incurred by the contractor as of the date of termination of the contract.

Wherever a contract is terminated for the convenience of the University, the contractor shall have the burden of establishing the amount of compensation to which he believes himself to be entitled, by submitting his bid or proposal for the contract, and evidence of expenses paid or incurred in performance of the contract from the date of award through the date of termination. Payment of the same agreed to in the settlement of a contract terminated for convenience of the University shall be made from the same source of funds or account as the original contract.

 At expiration of its initial term, this contract may, contingent on availability of funds, and at the option of the parties hereto, be extended upon the same terms and conditions as set forth herein for further periods not to exceed twelve (12) months each. In the event the "option of renewal" is exercised, the University shall request the renewal from the Contractor no later than June 1, of each year before expiration of the contract. Contractor shall reply with all information concerning any price adjustments.

THIS CONTRACT MAY BE TERMINATED BECAUSE OF DEFAULT OF THE CONTRACTOR:

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The contract established from this Invitation is subject to cancellation in the event of vendor malperformance, non-performance, product substitution, failure to meet delivery requirements, or failure to provide the product and/or service in accordance with terms and conditions of this bid.

In the event the Contractor is precluded from performing service required, under contract, for a period of time, the Contractor must notify the University. The University, at its option, upon ten (10) days written notification cancel contract.

The contract will be null and void upon receipt of written notification from the Director and/or Associate Director of Purchasing.

 In the event of contract cancellation, the Contractor/vendor will precluded from having the opportunity to submit a bid or a replacement contract.

BASIS OF METHOD OF AWARD:

As described in Method of Award.

CONTRACT PRICE:

Owner shall pay contractor on a monthly or quarterly basis during the term of this agreement for work performed.

Owner shall pay, in addition to the price and tax imposed by any existing or future law and the amount of any tax imposed on the Contractor, his supplies or the Owner under any statute, court decision, rule or regulation becoming effective after the date of this proposal which is based on or incident to the transfer, use, ownership, or possession of the materials or equivalent involved in the performance hereof or the services rendered hereunder.

2. The prices shall be subject to adjustment in the manner set forth as follows:

a. The proposal, when accepted by Owner or Owner's agent below and approved by Contractor's representative, shall constitute the contract, and all prior representations or agreements not incorporated herein are superseded.

3. The Contract price shall be adjusted yearly in the manner provided below:

EACH ADJUSTMENT SHALL BE MADE AS FOLLOWS:

- 1. The contract price shall be adjusted yearly in the manner provided below, the first such adjustment and each subsequent adjustment to be due at the start of each Contract renewal period. Such adjustments shall be made as soon as possible after the end of each contract period of the term here of and the price as adjusted shall be effective for the next contract period. Each such adjustment shall be made as follows:
- 2. Twenty-five percent (25%) of the contract price shall be increased or decreased by the percentage of increase or decrease shown by the index of "Wholesale Commodity Prices for Metals or Metal Products", published by the U.S. Department of Labor, Bureau of Statistics, for the month of January as compared with the index for January of the previous year. (1967 Base Year = 100.0) January 1987 which was 313.2.
- 3. Seventy-five percent (75%) of the contract price shall be increased or decreased by the percentage of increase or decrease in the average hourly rates for "General Building Contractors" as published by the Federal Bureau of Labor Statistics, for the month of January as compared with the rates for January of the previous year (January 1987 11.48).
- 4. No adjustment in price resulting from this Price Adjustment Provision shall increase the contract price to more than the maximum price permitted by any applicable legally-issued Government Regulations in effect at the time that such adjustment is made. No single year adjustment shall increase the contract price by more than ten percent (10%).

PERFORMANCE BOND AND ISSUANCE:

- 1. The Contractor shall furnish on the effective date of the Contract a Performance and Payment Bond in an amount equal to to one hundred percent (100%) of the annual contract price as security for the faithful performance of this contract and the payment of all persons performing labor, including the payment of all unemployment contributions, which become due and payable under Kentucky Unemployment Insurance Law and furnishing materials in connection with this contract.
- 2. <u>Insurance</u>: The Vendor shall furnish certificate indicating currently effective policies of insurance naming the University as additional Insured so far as its interest might appear. Proof of Insurance should be filed with the Department of Purchasing and kept currently effective: insurance is required as follows:
- 51 Workers Compensations including Employees Liability with all 52 States Endorsement to provide Statutory benefits. 53
- Public Liability and Product Liability\$200,000. each accident

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Bodily Injury Liability

Property Damage

Automobile

\$500,000. aggregate

\$500,000. each person \$1,000,000. each accident

\$200,000. one accident \$500,000. aggregate

\$500,000 per person \$1,000,000 per accident

Excess or umbrella liability coverage to apply over the primary coverage with minimum limits of \$1,000,000.

The successful bidder shall be required to place all insurance coverages (Liability and Performance Bond) required by the laws of this State and this Invitation for Bids with a licensed resident local agent of Kentucky, who represents insurance companies authorized to do business in the State of Kentucky.

In the event the "Option of Renewal" is exercised by the University, the Contractor shall, within ten (10) calendar days from effective date of renewal provide valid renewals of Bond and Insurance.

TAXES AND WORKERS BENEFITS:

The Contractor will be required to accept liability and include cost in Bid amount for payment of all payroll taxes, sales and use tax, and all other taxes or deductions required by local or Federal laws, such as old age pensions, social security or measured by annuities wags. He shall carry Workmen's Compensation Insurance to the full amount as required by all statues and shall include the cost of all foregoing items in the proposal.

CONTRACTOR'S OBLIGATIONS:

The Contractor shall and will, in good workmanlike manner, do and perform all work and furnish and supply all materials, machinery equipment, facilities, and means, except as herein otherwise expressly specified, necessary or proper to perform and complete all the work required by the contracts issued under these specifications and terms and conditions. The Contractor alone shall be responsible for the safety, efficiency, and adequacy of his plant, appliances, and the methods and for any damage which may result from their failure or their improper construction or maintenance of equipment. The Contractor shall observe, comply with, and be subject to all terms, conditions, and shall do, carry on, and complete the entire work to the satisfaction of the University.

CALL BACK SERVICE:

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Call back service shall be required as hereinafter specified. All contacts made directly between the Contractor and the institution are to be directly with the business manager or a person so authorized by him or indicated on the Form of Proposal to this Invitation. The Contractor will not be required to answer call back service from persons other than those specified. These individuals will be identified when the Contract becomes effective.

The Contractor will not be required to answer call back service from persons other than those specified. The Contractor shall be accepting liability for callbacks from other than the individuals listed above.

CONTRACTORS:

The successful contractor may delegate the work to be performed under this Contractor, to an authorized agent or branch located in the Commonwealth of Kentucky owned by the successful bidder.

The Contractor may not sublet to a firm having no direct business relation or association with the Contractor. If it is the intent of the Contractor to sublet or delegate all or any part of the work to be performed, it is necessary that such intent be stated by the Contractor in his proposal.

ELIGIBILITY OF CONTRACTOR:

Bidder must currently employ sufficient member of employees to maintain areas bid. Each bidder shall submit as part of the Form of Proposal a resume indicating experience and qualifications of Pneumatic Tube System Service Mechanics.

- 1. Bidder must have a regular and well established place of business.
- 2. Bidder must have been engaged in and rendering the type of service required under this contract for a period of not less than five (5) years.
- 3. Bidder must maintain adequate number of employees to service areas bid, state number of employees who will be assigned to this area.
- 4. Bidder must maintain an adequate stock of replacement parts.
- 5. Bidder must file a financial statement with the University of Kentucky Department of Purchasing (Such statement shall indicate dollar value, breakdown on parts, tools, service vehicles, et.)
- 6. When additional information relating to bidder's qualifications and proprietary interest is requested it will be supplied within two (2) weeks.

ADDENDA:

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 Any "Addenda" or "Instructions to Bidders" issued by the University of Kentucky, Purchasing Services Division prior to the time for receiving bids shall be covered in the proposal and in closing a contract they shall become a part thereof. Such "Addenda" shall be acknowledged on the Bid Proposal.

METHOD OF PAYMENT:

Contractor shall submit invoices for monthly service contract amount on his own form to the University of Kentucky for work performed covered by the "Full Maintenance" program. Invoices submitted for work not covered shall be received by the University within 30 days after the work was performed. Copies of the maintenance work tickets must be attached with full explanation of work performed, complete with, but not limited to, dates, times and person authorizing the work.

TERMS AND CONDITIONS:

Should a unit need pre-contractural repairs that were covered under the past contract agreements, the owner reserves the right to hire an independent pneumatic tube inspector to determine if such repairs are required. The inspector's and owner's decision as to previous Contractor's responsibility in fulfilling his contract obligation shall be final. If the previous Contractor fails to make correction to pneumatic tube system as directed by the inspector through the owner, and/or all contracts held by the contractor will be cancelled and/or bids rejected.

TERMS AND CONDITIONS AND POST-CONTRACTURAL REPAIRS:

The successful contractor(s) will have ten percent (10%) retainage held from each monthly payment during the current year, to insure that repairs necessitated by University inspections will be completed prior to conclusion of the yearly contract. In the ninth (9th) month of each year the University will make an inspection of pneumatic tube system to inspect and determine the status of the system. If these inspections reveal that repairs are required, then said repairs are to be made and completed prior to the conclusion of the current contract year. If the pneumatic tube systems meet the requirements of the contract, the current annual retainage will be released. At the end of the annual period, if the contractor fails to make the necessary repairs during the allotted time, the University may make said repairs and pay for these repairs using the monies held in retainage from the current contract.

PROTECTION OF PREMISES:

The contractor shall provide and properly maintain protection as required by the governing laws, rules, regulations and ordinances, together with such additional protection as may be required for the safety of workmen and the public.

DAMAGED FACILITIES:

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This contractor shall repair and/or replace damaged sections of existing utilities and structures caused by work performed under this section.

DISAGREEMENT AND FAILURE TO PERFORM:

- The University of Kentucky, Purchasing Services Division shall be responsible for making final decisions when disputes between the University of Kentucky, using department, and the Contractor occur.
- 2. During the term of the contract or any extensions thereof, in the event that disputes regarding proper maintenance, repairs or other contractural matters by the Contractor should arise the Purchasing Services Division of the University of Kentucky reserves the right to obtain the services of an outside consultant to evaluate the vendor compliance.
- 3. The University's decision as to the Contractor's responsibility in fulfilling his contract obligation shall be final. If the Contractor fails to make correction to pneumatic tube system as directed by the inspector through the University, any and/or all contracts held by the Contractor will be cancelled.

VANDALISM REPAIRS:

Vandalism repairs shall be handled as trouble/service calls. Labor cost for vandalism repair will not be charged to the University except when the labor exceeds one (1) hour. Then the contractor shall bill the University for that hour and all additional hours thereof. Replacement of parts as a result of vandalism will be considered as extra cost.

An appointed representative from the University of Kentucky must inspect and approve all repairs to be made under the Vandalism Clause, prior to beginning repairs.

REPAIRS NOT COVERED BY PRICE CONTRACT:

For pneumatic tube system repairs that are not covered by price contract, the University may choose to allow the current holder

of the maintenance price contract to submit proposals as 2 described below.

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The materials charge will be at manufacturer's cost plus 15%. A copy of the manufacturer's price list (as proof of purchase) shall be submitted along with the invoice when billing the agency for repairs of this nature. Manufacturer's invoice will suffice in lieu of the price list. Authorized representative from UNIVERSITY OF KENTUCKY, must approve prior to installation.

NOTE* Contractor shall show proof of parts replaced, (present replaced parts) to the authorized representative of UNIVERSITY OF KENTUCKY.

DRAWINGS, WIRING SCHEMATICS, AND SPECIFICATIONS:

 Each contractor will satisfy himself as to the drawings, schematic, and specifications that are available at each location. It is the contractors responsibility to acquire all needed information in order to perform and provide the services as specified.

 2. It is the pneumatic tube system contractor's responsibility to maintain existing drawings and technical information, and to turn this and ALL other information over to the using agency at the end of the contract period.

SPECIAL CONDITIONS FOR HOSPITAL:

1. The pneumatic tube system contractor shall maintain an adequate inventory of consumable and accessible parts in Lexington, Kentucky for all units under contract. The University reserves the right to inspect the facilities to verify inventories if necessary.

2. The Pneumatic Tube System Contractor shall furnish annual written reports on conditions of each unit to the Medical Center, Physical Plant Division authorized representative. A report shall be submitted showing the problems reported and action taken to resolve problem. This report is to be submitted to the Director of Physical Plant Medical Center.

Quarterly meetings may be required to discuss pneumatic tube system problems and how they can be resolved.

At the first quarterly meeting the Pneumatic Tube System Contractor and Medical Center, Physical, Division, will work jointly in developing an inspection report which is to be submitted by the pneumatic tube system contractor.

 3. The pneumatic tube system contractor shall notify the authorized representative of the Medical Center, Physical Plant Division, before making or renewals, which would create

- an additional cost to the Medical Center. Such notification shall include description of repairs needed, cost of repairs, and completion date of repairs.
 - 4. The pneumatic tube system contractor shall respond to any call backs as specified in the general conditions and specifications; however the pneumatic tube system contractor shall furnish a trained technician on site within an agreed upon time (as determined by bid proposal) of receiving such notification of any situation. The pneumatic tube system technician shall work continuously until such system is safely placed back in service and repairs are accomplished.

NOTE* If more than one (1) pneumatic tube station is down for more than four (4) hours, additional mechanics will be brought in to repair such units.

- 5. The pneumatic tube system contractor shall notify the authorized representative of the Medical Center, Physical Plant Division before "Specified Inspections" are performed during normal working hours (8:00 A.M. to 5:00 P.M.) Monday thru Friday.
- of all units to a minimum by stocking readily available parts and providing additional trained mechanics as necessary. Down Time due to major equipment malfunctions (down time greater than four (4) hours shall constitute immediate notification to the authorized representative of the Medical Center, Physical Plant Division, the description of repairs needed, and completion date. Any changes in completion date shall necessitate additional notification with reasons for delay.
- 7. No pneumatic tube station will be removed from service, except in cases of hazard to life, without prior clearance with designated owner's representative.
- 8. When an pneumatic tube station (s) or system is out of service for whatever reason, signs shall be placed at all stations indicated that the station or system is out of service.
- 9. Response to any call back during regular or over time hours shall be within two hours.

FULL MAINTENANCE SPECIFICATIONS:

1. Full maintenance service specifies a regular and systematic examination of the pneumatic tube system equipment as specified herein and to include necessary repairs and replacements throughout the life of the contract. Examination are to be made on a quarterly basis or as necessity demands. If the bid documents indicate one (1)

inspection per quarter but the pneumatic tube system usage dictates a need for more frequent servicing, the contractor shall be required to provide whatever is necessary to maintain the unit in good repair. However, the minimum number of inspections per quarter, as indicated in the Form of Proposal, shall be performed. The inspection personnel are to contact the Business Manager, Administrator, or other designated and authorized representatives at the beginning of each visit, in order to be advised if any particular point should be given special attention.

NOTE:

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A trouble call can be used as an opportunity to do an inspection/servicing; however, a trouble call for repairs only shall not be substituted for a regularly scheduled inspection/servicing.

2. The Contractor agrees to maintain the entire pneumatic tube system equipment as hereinafter described on the terms and conditions subsequently set forth. Trained men will be directly employed and supervised. If all or any part of the service to be rendered under this contract is delegated to authorized branches or agents, it is understood that the contractor is solely responsible to the University of Kentucky for meeting and fulfilling all terms and conditions of this contract. The contractor will be qualified to keep th equipment properly adjusted and use all reasonable care to maintain the pneumatic tube system in proper and safe operating condition.

- 3. The Contractor Agrees To:
- 4. Furnish high grade lubricants.

5. During regular service calls the contractor will check and replace as needed indicator lights and pushbutton lights as necessary.

37 6. Furnish quarterly report on conditions of pneumatic tube 38 system and tests performed. This report shall be submitted 39 to the agency by May 1 of each year.

 Service and maintain all pneumatic tube system carriers which show worn inner liners, latches, carrier housing and/or worn bands.

45 8. Service and maintain pneumatic tube system blower, motor, valves and associated electrical system components.

48 9. Service and maintain control center computer, screen and keyboard terminal as required.

51 10. Service and maintain all transfer units associated with 52 pneumatic tube system to insure proper alignment and 53 lubrication.

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 - 50 END OF SECTION 14710-A

- 11. Complete visual and operational inspection of the overall system operation.
- 12. Emergency service assistance by calling a toll free telephone number with capability for control center modem hook-up to diagnose system problems.
- 13. Provide complete unit price listing for all parts accessories.
- 14. Provide complete list of parts inventory. Contractor shall provide and maintain sufficient inventory of major componet parts at the hospital.
- The Contractor is not required to: E.
 - 1. Refinish or replace pneumatic tube station.
 - Make repair or renewals by reason of negligence or misuse of the equipment beyond the control of the contractor, except normal wear and tear.
 - Install new attachments as recommended by companies, or governmental authorities.
 - Be liable for any loss, damage or delay caused by strikes, lockout, fires, (except such fire or explosions as may be caused by the acts or omissions of the Contractors) explosion, theft, floods, riot, civil commotion, war, malicious mischief, Act of God, or any cause beyond the Contractor's control.
 - Be liable for injuries or damage to persons (other than contractor's employees) or property except those directly due to the acts or omissions of the Contractor.
- All work to be normally scheduled and performed during regular working hours on regular working days.
 - If an emergency exists, necessary overtime callback service will be made. Notification of an emergency shall be given Contractor by Business Manager, Administrator, previously authorized representative of the University. Refer to the Form of Proposal for individual units that will required overtime call back service to be included in the quarter maintenance charge.

GENERAL INDEX PROJECT NO. 304.1

ADDENDA NO. 4 - CCK-291-8 HOSPITAL EXPANSION/PHASE II ADDITION - BID PACKAGE 2

ALBERT B. CHANDLER MEDICAL CENTER UNIVERSITY OF KENTUCKY

LEXINGTON, KENTUCKY

BUILDING MANAGEMENT AND CONTROL SYSTEM