ARTICLE 10: PROJECT SPECIFICATIONS

DEVELOPED AND APPROVED BY:
Division of Facilities & Property Management

Christopher J. Clouser 3/4/11
Christopher J. Clouser, AD Date

SPECIFICATIONS
DIVISION 01 - GENERAL REQUIREMENTS
SECTION-01010
SUMMARY OF WORK

PART 1 – GENERAL

1.1 STIPULATIONS

A. Related Documents

1. The "General Conditions for Construction Projects" form a part of this specification section by reference thereto and shall have the same force and effect, as if printed herewith in full.

1.2 SCOPE OF WORK

A. The work for this project covers the supplying of all labor, materials, tools, equipment and appurtenances to renovate the existing shower and pipe chases by removing existing showers and supporting components, light fixtures, light switches, grab bars, controls and branch plumbing systems, and exhaust duct and grilles. Furnish and install new showers, trench drains, plumbing controls and fixtures, partitioning, exhaust duct and grilles, chase walls, shower soffit, exhaust ducts and grilles, light fixtures, switches, grab bars and other accessories. Contract limits are indicated on drawing A-1 of 1.

The work shall include, but is not necessarily limited to the following:

1. Remove existing glazed masonry showers and pipe chase walls as noted on drawings.
2. Remove existing shower bases, lead flashing and all lightweight concrete fill.
3. Remove existing grab bars, soap dispensers, shower seats, curtains and rods.
4. Remove all expansion anchor plugs from glazed masonry walls.
5. Construct new shower walls using new steel studs and aluminum architectural panels.
6. Construct new soffit and pipe chase walls using steel studs and aluminum architectural panels.
7. Patch and repair floors using lightweight concrete and floor coating system to match existing.

8. Patch and repair walls where equipment fasteners were removed.
9. Patch and repair the existing concrete floors, as required, where the showers are removed.
10. Re-install the existing dressing benches with new support angles.
11. Furnish and install new shower unit cabinets in sizes and in areas as shown on the drawings.
12. Furnish and install new stainless steel access doors in walls as shown on drawings or at locations where required to facilitate installation and servicing of new branch plumbing systems.
13. Demolish all existing branch hot water piping, cold water piping, tempered water piping, valves and associated branch plumbing components, sanitary and sanitary vent piping within project area.
14. Demolish all fixtures and associated accessories, except existing therapeutic bathtub and supporting components to remain.
15. Remove and dispose of existing exhaust ductwork in project area as indicated on drawings.
16. Furnish and install new branch hot water piping, cold water piping, tempered water piping, valves and associated branch plumbing components, sanitary and sanitary vent piping within project area.
17. Furnish and install new ADA compliant/security grade fixtures with push button controls and all finished plumbing components.
18. Furnish, install and balance new exhaust grilles and ductwork within project area.
19. Disconnect and remove existing lighting and electrical devices in project area as indicated on the drawings. Rework or remove existing conduit system as indicated.
20. Furnish and install new lighting, switches and electrical devices including rough and final wiring as required. Provide all electrical power connections to new or altered mechanical equipment within the project area.

1.3 PROJECT DRAWINGS

A. The following drawing forms a part of the Contract Documents:

Sheet Nos. C-1 of 1 - Cover Sheet.
A-1 of 2 - Floor Plans & Elevations.
A-2 of 2 – Sections & Details
M-1 of 1 – Mechanical Floor Plans
E-1 of 1 – Electrical Floor Plans

1.4 DATES OF COMPLETION

A. No work shall commence until the Contractor receives a fully executed contract. All work under this contract will be completed within **90 calendar days** from the effective date of the contract. Requests for extension of time shall be submitted in accordance with the General Conditions for Construction Projects.

1.5 SITE VISIT

A. It is mandatory that the Bidder visits the Project Site prior to submitting his Price Quote and carefully note all existing conditions affection the Work of this Contract. Any features noted during the visit that are not clearly defined in the Specifications or on the drawing, shall be brought to the attention of the Project Designer for resolution. All visits shall be made only after contacting the Facility Maintenance Manager, Mr. Robert Artz, at (610) 670-4175. **One signed copy of the Proof of Visit form must be returned with the bid**.

1.6 CLARIFICATION OF CONTRACT DOCUMENTS

A. Any request for project clarification of technical drawings or specifications shall be directed to the Project Designer:

Department of Public Welfare
Division of Facilities & Property Management
P.O. Box 2675
Harrisburg, PA 17105-2675
Attention: Christopher Clouser A.D.2
Telephone: 717-772-0890 FAX: 717-772-2091

B. Any request for project clarification of financial or contact language or invoices shall be directed to the Project Officer:

Wernersville State Hospital
P.O. Box 300, Route 422 & Sportsmans Road
Wernersville, PA 19565
Attention: Mr. William Voeckler
Telephone: (610) 678-3411 FAX: (610) 670-4101

C. Any request for project clarification of contract language or general conditions shall be directed to:

Department of Public Welfare
Division of Facilities and Property Management
P.O. Box 2675
Harrisburg, PA 17105-2675
Attention: Mr. Greg Kratzer
Telephone: (717) 425-5454 FAX:(717) 772-2091

END OF SECTION

SECTION-01030
EXPLANATION OF BASE BIDS

PART 1 - GENERAL

1.1 STIPULATIONS

A. Related Documents

1. The "General Conditions for Construction Projects" form a part of this specification section by reference thereto and shall have the same force and effect, as if printed herewith in full.

2. It is the intention of the Department of Public Welfare to have all of the work, or as much of the work as possible, completed as shown on the drawing(s) and indicated in the specifications within the project budget allocation.

1.2 BASE BIDS

Base Bid No. 1 shall include the complete work as indicated on the contract drawings and herein specified to renovate the existing shower room and pipe chases by removing existing showers and supporting components, floor drain, light fixtures, light switches, grab bars, controls and branch plumbing systems, and exhaust duct and grilles. Furnish and install new showers, plumbing controls and fixtures, trench drains, exhaust duct and grilles, chase walls and ceilings, exhaust ducts and grilles, light fixtures, switches, grab bars, painting and other accessories.

END OF SECTION

SECTION 01040
SECURITY REQUIREMENTS

1.1 STIPULATIONS: The Contractor shall make himself familiar with all security procedures requirements of the Wernersville State Hospital, licensed as a Psychiatric Facility. Some requirements to be aware of are as follows:

A. The Contractor is required to provide the Facility with a list of names of all employees working on the project, for review by the Facility's security personnel.

B. In accordance with the Department of Public Welfare (DPW) contracts and the DPW Standard Contract Terms and Conditions, the contractor shall provide documentation of Criminal History Background Checks for employees of your Business entity.

C. All construction operations within the Facility must be coordinated with the Facility Maintenance Manager.

D. Parking: Construction vehicles, as well as employees' vehicles, will be parked in an area designated by the Facility and locked at all times. If any vehicles are to be left overnight, the license number or numbers of the vehicles shall be reported to the Facility's main office on a daily basis.

1.2 TOOLS: Tools shall be kept in a secure (locked) area, when not in use, and inventoried on a daily basis to insure proper accountability. While being used, they shall be kept in view or on person. Broken or non-usable tools are to be disposed of away from the Facility property. Any missing tools are to be reported promptly to the Facility Maintenance Manager.

1.3 FRATERNIZATION: There shall be no fraternization or private relationships of Contractor's employees with any Facility clients. This includes, but is not limited to, trading, bartering, receiving gifts, or money favors from the client or the clients friends, relatives, or representatives.

1.4 ALCOHOL AND CONTROLLED SUBSTANCES: Alcoholic beverages and controlled substances shall not be carried, stored, or consumed on the Facility property, nor left in any vehicle.

1.5 GAMBLING: Gambling or wagering of any type is not permitted on the Facility property.

1.6 WEAPONS:

A. OFFENSE DEFINED

1. It shall be unlawful for any person to have in his possession or under his control, any weapon on the grounds of the Facility or provide a facility client, thereof, with any weapon, tool, implement, or other items.

B. DEFINITIONS

1. As used in this section, the word "unlawfully" means surreptitiously or contrary to law, regulation or order of the Facility authority.

2. As used in this section, the word "weapon" means any implement readily capable of lethal use and shall include any firearm, knife, dagger, razor, other cutting or stabbing implement or club, including any item which has been modified or adapted so that it can be used as a firearm, knife, dagger, razor, or other cutting or stabbing implement or club. The word "firearm" includes any unloaded firearm and the unassembled components of a firearm.

1.7 CONTRABAND

A. Providing contraband to Facility clients persons is prohibited.

1. Any person entering this Facility is subject to a search of their person at anytime. While the person may refuse, his action may be cause for denial of further entrance.

END OF SECTION

SECTION-01300
SUBMITTALS

PART 1 – GENERAL

1.1 STIPULATIONS

A. Related Documents

1. The "General Conditions for Construction Projects" form a part of this specification section by reference thereto and shall have the same force and effect, as if printed herewith in full.

2. Included in this section of the specification is a list of submittals of materials to be incorporated into the work required by the Department for approval. The Department reserves the right to require additional submittals for approval, as it deems necessary. No material, or equipment listed herein shall be incorporated into the work until the Contractor has obtained approval from the Department.

1.2 SUBMITTAL PROCEDURES

A. The project number shall be indicated on each piece of material submitted for approval.

B. The Contractor shall signify his approval of the submitted material by stamping, initialing, and dating each piece submitted to the Department for approval.

C. The Contractor's failure to comply with the submittal procedures set forth herein will result in the return of the material for proper re-submittal.

D. The submittal items listed below shall be delivered or mailed to:

Department of Public Welfare
Division of Facilities and Property Management
1401 North 7th Street, P.O. Box 2675
Harrisburg, PA 17105-2675
Attention: Christopher Clouser, A.D.2, (717) 772-0890

1.3 SUBMITTAL LIST

SOSU - Source of Supp
DEDA - Descriptive Data or Catalog Cuts
SHDR - Shop Drawings
SAMP - Samples
TEST - Laboratory Testing Data
WRNTY – Warranty Data

DESCRIPTION OF ITEMS TO BE SUBMITTED	SOSU	DEDA	SHDR	SAMP.	TESTS	WRNTY.
Concrete Floor Material	X	X				
Aluminum Wall Panels	X	X		X		
Steel Studs	X	X				
Sealants	X	X				
Finish Floor Coating System	X	X				
Wall & Ceiling Patch Materials	X	X				
New Ceiling System	X	X				
Paint	X	X				
Shower, Trim & Accessories	X	X				
Trench Drains	X	X				
Steel Brackets for Exist'g Bench	X	X	X			
Exhaust Ductwork & Registers	X	X				
Valves	X	X				
Water Piping	X	X				
Piping Insulation	X	X				
Sanitary Sewer & Vent Piping	X	X				
Access Panels/Cabinet	X	X				
Lighting Fixtures	X	X				
Elect. Conduit & Fittings	X	X				
Elect. Wire and Cable	X	X				
Elect. Devices, Plates & Supports	X	X				

END OF SECTION

SECTION-10310
SEQUENCE OF CONSTRUCTION AND MILESTONES

PART 1 - GENERAL

1.1 STIPULATIONS

The "General Conditions for Construction Projects" form a part of this specification section by reference thereto, and shall have the same force and effect, as if printed herewith in full.

Before beginning work the Contractor shall prepare a critical path schedule in consultation with the Facility. The work shall then be carried out in full accordance with the schedule and milestones. The Contractor shall arrange without any unnecessary interference with the Facilities operation. The building will be occupied during the duration of this project. The contractor must coordinate the demolition and installation phases with the facility and obtain their approval before the start of the project.

1.2 CRITICAL MATERIALS AND EQUIPMENT

The Contractor is cautioned that all necessary and required critical materials and equipment shall be ordered as quickly as possible, so that the shipping will not delay the progress of the work.

1.3 CRITICAL ITEMS TO BE NOTED AS MILESTONES

The Contractor shall schedule the following critical items as Project Milestones with the completion dates. These dates shall be the basis of payments to the Contractor.

A. 100% of the project work completed (including punch list items) = 100% final payment

B. Payment is subject to the provisions of the General Conditions and approval by the facility.

END OF SECTION

SECTION 01500
TEMPORARY UTILITIES

Part 1 - GENERAL

1.1 STIPULATIONS

A. The "General Conditions for Construction Projects" form a part of this specification section by reference thereto and shall have the same force and effect, as if printed herewith in full.

1.2 TEMPORARY SERVICES DURING CONSTRUCTION

A. The designated Contractor shall install, operate, protect and maintain the respective temporary services as hereinafter specified during the construction of the entire project.

B. Temporary connections to new and/or existing permanent service lines shall be made at locations as directed by the Facility, and when the temporary service lines are no longer required, they shall be removed by the Contractor. Any part or parts of the permanent service lines, grounds and building, disturbed and damaged by the installation and/or removal of the temporary service lines, shall be restored to their original condition by the Contractor responsible for the temporary installation.

C. If the Contractor fails to carry out its responsibility in supplying temporary services as set forth in this contract it is responsible for such failure and the Facility may take such action as it deems proper for the protection and conduct of the work and shall deduct the cost involved from the amount due the Contractor. Only those temporary utilities required for construction need to be extended to the work area(s).

1.3 TEMPORARY WATER SUPPLY

A. The Using Agency will, within the limitations of its existing facilities, furnish water for construction purposes, free of charge to the Contractors.

1.4 TEMPORARY HEAT

A. None required.

1.5 CONSTRUCTION LIGHT AND POWER

A. Electric service will, within the limitations of the existing facilities, be provided by the Using Agency at no cost to the Contractor. Each Contractor must extend existing power/lighting to meet its own requirements. All work must comply with NEC and OSHA. Connection to existing source shall be as determined by the Department.

1.6 WELDING

A. Any Contractor using electrical power for welding on the site shall use self-contained engine generating units.

1.7 FIRE EXTINGUISHERS

A. The Contractor shall provide UL listed, NFPA approved fire extinguishers (ten (10) lb. minimum) at the construction site during operations, suitable for all types of fires in accordance with OSHA.

1.8 INTERRUPTION OF SERVICES

A. No additional compensation or time will be given to the Contractor if work must be performed on State or National Holidays or on weekends or on overtime.

B. No allowance will be made to shutdown the use of the facility's sanitary sewer system. The Contractor shall install the facility's new sanitary sewer while maintaining service to all buildings. Temporary sewage disposal service shall be maintained during construction through the use of holding tanks, by-pass pumping or by-pass piping.

END OF SECTION

SECTION 02050
DEMOLITION

Part 1 - GENERAL

1.1 STIPULATIONS

A. The specifications sections "General Conditions", "Special Requirements" and "General Requirements" form a part of this Section by this reference thereto and shall have the same force and effect as if printed herewith in full.

1.2 SCOPE OF WORK

A. Extent of demolition is shown on drawings.

1. The work includes, but is not necessarily limited to the following:

   a. Protection of new and/or existing equipment or finishes to remain in place.

   b. Removal of all glazed block shower walls, all shower bases, lead flashing and concrete fill in work area. Also removal of certain wall areas for installing access panels. Coordinate sizes and locations with the Plumbing and Electrical Contractors.

      (1).Clean removed glazed block and turn over to the site.

   c. Removal of existing handicapped grab bars, soap dispensers, curtains and rods in the work area.

   d. Removal of all existing shower seats in the work area.

   e. Removal of all existing expansion anchor plugs from glazed block walls.

1.3 SALVAGE

A. The Institution retains the right of salvage of any removed materials. Contractor shall contact the Facility Maintenance Manger prior to demolition. All removed materials not retained by the Institution shall become the property of the Contractor, shall not be used in the work and shall be promptly removed from the building.

B. Neatly store and protect, in a protected, dry, on-site location or move to an on-site location assigned by the Department's Representative any materials salvaged to be turned over to the Institution.

C. Contractor shall verify extent of remaining items for salvage or reuse at the time of bidding. Salvage value of these items shall be reflected in the Contractor's bid price.

D. On-site sale of materials is not permitted.

1.4 JOB CONDITIONS

A. Drawings are diagrammatic in nature and require field verification for actual conditions, quantities, and details. Failure to inspect actual field conditions and dimensions prior to preparation of bid shall not be justification to a claim for additional costs.

B. Cutting and removals indicated on the drawings are a general indication only and do not necessarily show the full extent of cutting and removals which may be required by job conditions.

1.5 SCHEDULING DEMOLITION

A. All demolition removal work must be done at times agreed upon by the representative of the Facility.

B. Once commenced, work shall proceed as scheduled, in an efficient, quiet operation without delays or interruptions.

C. For interior work do not start removal until areas in which the removal is to proceed, are thoroughly closed off from adjacent spaces.

Part 2 - PRODUCTS

2.1 MATERIALS

A. Not Used.

Part 3 - EXECUTION

3.1 PRECAUTIONS

A. Perform the work in a manner to prevent damage or injury to property or the public. Provide barriers, warning lights and other protection as required. Protection devices shall be maintained until completion of work, or until removal may be directed by the Facility. Restore any damage to grounds and building to original conditions or repair as directed at no additional cost.

B. Use caution and wear appropriate protective clothing, including gloves and safety goggles while removing materials.

C. Adopt a method for control and scheduling of loud noises.

D. Carefully remove all materials scheduled for removal so that adjacent surfaces and finishes are not damaged.

E. Leave all surrounding areas in a safe, clean condition.

F. Provide a fire extinguisher at construction site during operations.

G. Repair all damage to existing materials scheduled to remain, including damage to adjacent fixtures, finishes and materials damaged by work performed under this section.

3.2 DISPOSITION OF UTILITIES

A. Make all necessary arrangements for relocating active utilities in the way of new work that must be moved and for shutting off and disconnecting utilities that are to be abandoned.

B. Existing services and equipment, including any piping and/or conduits encountered that are not required to be removed shall be temporarily supported and maintained until permanent support has been restored.

C. Existing soil lines, drain lines, water service, and gas pipes, electrical conduits and wires, telephone conduits and wires, and/or other similar obstructions in the way of demolition or new construction and which have been scheduled to be removed, shall be removed after they have been satisfactorily closed off and/or capped.

3.3 DUST CONTROL

A. Control the amount of dust and dirt resulting from demolition to prevent the spread of dust and other airborne particles.

1. Erect plastic dust barricades as and where required to control airborne particles.

3.4 PROHIBITIONS

A. The use of burning at the project site for disposal of refuse and debris is not permitted.

3.5 CLEAN-UP

A. Debris and Rubbish: Remove debris and rubbish from the site daily. Do not allow to accumulate on site. Provide chutes from the upper floors to dumpster at ground level in locations satisfactory to the Facility.

B. Debris Control: Remove and transport debris in a manner as to prevent spillage on streets or adjacent areas.

1. Any area either temporary or permanent over which hauling operations or other moving operations are conducted shall be kept clean and any debris shall be removed promptly by the Contractor.

2. Streets, walks and drives, adjacent to the areas of construction, shall be kept clean and clear of obstructions at all times; they shall be kept clear of materials and debris to their full width and shall be maintained in such a manner as to permit safe and normal use.

C. Regulations: Local regulations regarding hauling and disposal apply.

END OF SECTION

SECTION 05500
METAL FABRICATIONS

Part 1 - GENERAL

1.1 STIPULATIONS

A. The "General Conditions for Construction Projects" form a part of this specification section by reference thereto and shall have the same force and effect, as if printed herewith in full.

1.2 SUMMARY

A. This section includes the following:

1. Support angles for dressing benches.

2. Fasteners.

1.3 SUBMITTALS

A. Product Data: For the following:

1. Select product data under provisions of Section 01300, Submittals.

1.4 PRODUCT HANDLING

A. Store materials in horizontal position on supports above ground.

B. Protect from elements, and keep free of dirt and debris.

C. Handle material carefully so as not to bend or mar.

D. Repair or replace damaged materials as determined by the Department, at no additional cost to the Department.

1.5 QUALITY ASSURANCE

A. Comply with:

1. American Institute of Steel Construction (AISC) Publications:

a. 'Manual of Steel Construction' (Includes 'Specifications for Structural Steel Buildings', 'Code of Standard Practice for Steel Buildings and Bridges', 'Specification for Structural Joints Using ASTM A 325 or A 490 Bolts, Volume II – Connections').

2. American Welding Society, Inc. (AWS):

   a. AWS D 1.1 – 'Structural Welding Code – Steel'.

   b. AWS C 5.4 – 'Recommended Practices for Stud Welding'.

3. Committee of Stainless Steel Producers, American Iron and Steel Institute (AISI):

   a. 'Selection and Use of Stainless Steel'.

4. Steel Structures Painting Council (SSPC):

   a. 'Surface Preparation Specifications'.

1.6 PRODUCT CONDITIONS

A. Field Measurements: Where metal fabrications are indicated to fit walls and other construction, verify dimensions by field measurements before fabrication and indicate measurements on shop drawings. Coordinate fabrication schedule with construction progress to avoid delaying the work.

1. Established Dimensions: Where field measurements cannot be made without delaying the work, establish dimensions and proceed with fabricating metal fabrications without field measurements. Coordinate construction to ensure that actual dimensions correspond to established dimensions. Allow for trimming and fitting.

1.7 COORDINATION

A. Coordinate installation of anchorages for metal fabrications. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to project site in time for installation.

Part 2 - PRODUCTS

2.1 METALS, GENERAL

A. Metal Surfaces, General: For metal fabrications exposed to view in the completed work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.

2.2 FERROUS METALS

A. Steel Plates, Shapes and Bars: ASTM A 36/ASTM A 36M.

B. Stainless Steel Sheet, Strip, Plate, and Flat Bars: ASTM A 666, Type 304.

C. Stainless Steel Bars and Shapes: ASTM A 276, Type 304.

2.3 PAINT

A. Shop Primers: Provide primers that comply with Section 09900, Painting.

B. Shop Primer for Ferrous Metal: Organic zinc rich primer, complying with SSPC-Paint 20 and compatible with topcoat.

2.4 FASTENERS

A. General: Provide Type 304 or 316 stainless steel fasteners for wet area use and zinc plated fasteners with coating complying with ASTM B 633, Class Fe/Zn 5.

B. Machine Screws: ASME B 18.6.3 (ASME B 18.6.7M).

C. Plain Washers: Round, carbon steel, ASME B 18.22.1 (ASME B 18.22M).

D. Lock Washers: Helical, spring type, carbon steel, ASME B 18.21.1 (ASME B 18.21.2M).

E. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to six (6) times the load imposed when installed in unit masonry and equal to four (4) times the load imposed when installed in concrete, as determined by testing per ASTM E 488, conducted by a qualified independent testing agency.

1. Material: Alloy Group 1 or 2 stainless steel bolts complying with ASTM F 593 (ASTM F 738M) and nuts complying with ASTM F 594 (ASTM F 836M).

2.5 GROUT

A. Non-Shrink, Metallic Grout: Factory packaged, ferrous aggregate grout complying with ASTM C 1107, specifically recommended by manufacturer for heavy duty loading applications.

B. Non-Shrink Non-Metallic Grout: Factory packaged, non-staining, non-corrosive, non-gaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.

2.6 FABRICATION, GENERAL

A. Shop Assembly: Where applicable pre-assemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units

only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.

B. Shear and punch metals cleanly and accurately. Remove burrs.

C. 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.

D. Weld corners and seams continuously to comply with the following:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.

2. Obtain fusion without undercut or overlap.

3. Remove welding flux immediately.

4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

E. Provide for anchorage of type indicated; coordinate with supporting structure. Fabricate and space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.

F. Cut, reinforce, drill and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.

G. Fabricate joints that will be exposed to wet and humid conditions in a manner to exclude water, or provide weep holes where water may accumulate.

H. Allow for thermal movement resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening up of joints, overstressing of components, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and night time sky heat loss.

1. Temperature Change (Range): 120°F (67°C), ambient; 180°F (100°C), material surfaces.

I. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges.

J. Remove sharp or rough areas on exposed traffic surfaces.

K. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible. Use exposed fasteners of type indicated or, if not indicated, Phillips flat head (countersunk) screws or bolts. Locate joints where least conspicuous.

2.7 WALL SUPPORT ANGLES

A. Fabricate support angles from stainless steel angles of sizes indicated on the drawings and for attachment to glazed block walls.

B. Weld new angles to existing bench supports.

C. Provide stainless steel 1/4" expansion anchors and sleeves. Two (2) per angle to fasten into block wall.

2.8 STEEL DOOR FRAME BOTTOMS

A. Fabricate door frame bottoms from 18 gauge stainless steel sheets or plates. Match the dimensions and profile of the existing door frame bottoms.

1. Weld to existing frame bottoms and paint entire frame.

Part 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing metal fabrications to in-place construction. Include threaded fasteners for concrete and masonry inserts, toggle bolts, through bolts, lag bolts, wood screws, and other connectors.

B. Cutting, Fitting and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.

C. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

D. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot dip galvanized after fabrication and are for bolted or screwed field connections.

E. Field Welding: Comply with the following requirements:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.

2. Obtain fusion without undercut or overlap.

3. Remove welding flux immediately.

4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

3.2 INSTALLING MISCELLANEOUS FRAMING AND SUPPORTS

A. General: Install framing and supports to comply with requirements of items being supported, including manufacturer's written instructions and requirements indicated on shop drawings, if any.

B. Anchor supports securely to and rigidly.

3.3 ADJUSTING AND CLEANING

A. Touch-Up Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop painted surfaces.

1. Apply by brush or spray to provide a minimum 2.0 mil dry film thickness.

B. Touch-Up Painting: Cleaning and touch-up painting of field welds, bolted connections, and abraded areas of shop paint are specified in Section 09900, Painting.

END OF SECTION

SECTION 07420
ARCHITECTURAL PANELS

Part 1 - GENERAL

1.1 STIPULATIONS

A. The "General Conditions for Construction Projects" form a part of this specification section by reference thereto and shall have the same force and effect, as if printed herewith in full.

1.2 DESCRIPTION

A. The panels required shall consist of metal skins laminated to stabilizer substrates with an insulating core material.

B. Provide and install all trim pieces and accessories required for a complete and functional wall system.

1.3 RELATED WORK

A. Section 09110 – Metal Stud System

1.4 QUALITY ASSURANCE

A. Panel manufacturer shall have a minimum of fifteen (15) years experience.

B. Field measurements shall be taken prior to completion of manufacturing and cutting.

C. Maximum deviation from vertical and horizontal alignment of installed panels is 1/8" in 20 ft. non-commutative.

1.5 REFERENCES

A. American Society of Testing Materials (ASTM):

1. E 330-84 – Structural Performance of Exterior Windows, Curtain Walls and Doors Under the Influence of Wind Loads

2. D 1781-76 – Climbing Drum Peel Test for Adhesives

3. D 3363-74 – Method for Film Hardness by Pencil Test

4. D 2794-90 – Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact)

5. D 3359-90 – Method for Measuring Adhesion by the Tape Test

1.6 SUBSTITUTIONS

A. The materials and products specified in this section establish a minimum standard of required function, design, appearance, quality and warranty to be met by any proposed substitution.

B. No substitution will be considered unless a written request for approval has been submitted by the bidder and received by the Designer ten (10) days prior to the bid date.

1.7 SUBMITTALS

A. Comply with pertinent provisions of Section 01300, Submittals.

B. Submit product data as noted below:

1. Manufacturer's specifications and other data needed to prove compliance with the specified requirements.

2. Manufacturer's recommended installation procedures which, when approved by the Architect, will become the basis for accepting or rejecting actual installation procedures used on the work.

1.8 PRODUCT HANDLING

A. Comply with pertinent instructions provided by the approved metal stud manufacturer.

1.9 DELIVERY, STORAGE AND HANDLING

A. Protect finish and edge in accordance with panel manufacturer's recommendations.

B. Store materials in accordance with panel manufacturer's recommendations.

Part 2 - PRODUCTS

2.1 PANELS – LAMINATED

A. As a standard of quality the new laminated metal faced panels shall be as manufactured by Mapes Industries, Inc. or another approved equal.

B. Acceptable Alternatives: Panels having similar composite construction and finish providing manufacturer has a minimum of fifteen (15) years panel laminating experience and comparable published warranties.

2.2 FINISH

A. Exterior: Kynar/Hylar (AAMA 605.2-92 resin based, 70%) over an embossed aluminum skin. Interior: .011 Smooth Mil Aluminum.

B. Color as selected by the Facility.

2.3 PANEL FABRICATION

A. Substrates: Exterior: High density polyethylene (HDPE). Interior: High density polyethylene (HDPE).

B. Cores: Mineral fiber board.

C. Tolerances: .8% of panels dimension length and width (±) 1/16" thickness.

D. Panel Thickness: 1/2".

E. R-Value: 1.23.

2.4 ACCESSORIES

A. Seals against moisture intrusion as recommended by the manufacturer. Polyurethane and silicone based sealant with a twenty (20) year life are recommended.

B. Provide all related material including, but not necessarily limited to, tracks, clips, anchors, fastening devices, sound attenuation, pencil rods and resilient clips, and other accessories required for a complete and proper installation and as recommended by the manufacturer of the steel studs used.

Part 3 - EXECUTION

3.1 SURFACE CONDITIONS

A. Examine the areas and conditions under which work of this section will be performed. Correct conditions detrimental to timely and proper completion of the work. Do not proceed until unsatisfactory conditions are corrected.

1. Provide shims as required and recommended.

3.2 INSTALLATION

A. Panel surfaces shall be free from defects prior to installation.

B. Coordination:

1. Space the studs as required for compliance with pertinent regulations, to give proper support for the covering material, and as indicated on the drawings.

2. Coordinate and provide required backing and other support for items to be mounted on the finished covering.

3. Coordinate requirements for pipes and other items designed to be housed within the partition and wall systems.

C. Anchor to metal studs using concealed fasteners wherever and whenever possible.

1. Use trim to cover manufacturer's approved fasteners.

D. Install panels according to manufacturer's written instructions.

3.3 EXECUTION

A. Erect panels plumb, level and true.

B. Install panels securely and in accordance with approved shop drawings and manufacturer's instructions to allow for necessary thermal movement and structural support.

C. Do not install panels that are observed to be defective including warped, bowed, dented, scratched and delaminating components.

D. Weather seal all joints as required using methods and materials as previously specified.

E. Separate dissimilar metals using gasketed fasteners and blocking to eliminate the possibility of electrolytic reaction.

3.4 ADJUSTING AND CLEANING

A. Remove masking film as soon as possible after installation. Masking intentionally left in place after panel installation will be the responsibility of the Contractor.

END OF SECTION

SECTION 09110
METAL STUD SYSTEM

Part 1 - GENERAL

1.1 STIPULATIONS

A. The "General Conditions for Construction Projects" form a part of this specification section by reference thereto and shall have the same force and effect, as if printed herewith in full.

1.2 DESCRIPTION

A. Work included but not limited to:

1. Provide metal studs and accessories as indicated on the drawings, as specified herein, and as needed for a complete and proper installation.

1.3 RELATED WORK

A. Aluminum panel walls

1.4 QUALITY ASSURANCE

A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this section.

B. In addition to complying with the pertinent codes and regulations of governmental agencies having jurisdiction, comply with pertinent recommendations contained in 'Specifications for Metal Lathing and Furring' published by the Metal Lath/Steel Framing Association.

1.5 SUBMITTALS

A. Comply with pertinent provisions of Section 01300, Submittals.

B. Submit product data as noted below:

1. Manufacturer's specifications and other data needed to prove compliance with the specified requirements.

1.6 PRODUCT HANDLING

A. Comply with pertinent instructions provided by the approved metal stud manufacturer.

Part 2 - PRODUCTS

2.1 METAL STUDS AND ACCESSORIES

A. Meet or exceed minimum requirements of Federal Specification QQ-S-698 and Federal Specification QQ-S-775d, Class D, for the item and use intended.

B. Metal Studs

1. At interior metal stud partitions, unless otherwise shown on the drawings, provide standard punched steel studs of 20 gauge hot dip galvanized, 6" wide.

C. Accessories

1. Provide all accessories including, but not necessarily limited to, tracks, clips, anchors, fastening devices, sound attenuation, pencil rods and resilient clips, and other accessories required for a complete and proper installation and as recommended by the manufacturer of the steel studs used.

2. Provide aluminum panel gusset plates in shower chase walls to support and brace metal studs.

2.2 GROUT, IF REQUIRED

A. Provide a good grade of commercial grout for leveling the floor runner member of steel stud partitions as required.

Part 3 - EXECUTION

3.1 SURFACE CONDITIONS

A. Examine the areas and conditions under which work of this section will be performed. Correct conditions detrimental to timely and proper completion of the work. Do not proceed until unsatisfactory conditions are corrected.

3.2 INSTALLATION

A. Accurately layout partition and wall lines from the dimensions shown on the drawings.

B. Install metal studs and accessories in strict accordance with the manufacturer's recommendations as approved by the Architect, anchoring all components firmly into position.

1. Install metal studs from the bottom of the lightweight concrete fill (top of concrete slab) to the new soffits above.

C. Align partition and wall assemblies to a tolerance of 1 in 200 horizontally and 1 in 500 vertically.

D. Coordination

1. Space the studs as required for compliance with pertinent regulations, to give proper support for the covering material, and as indicated on the drawings.

2. Coordinate and provide required backing and other support for items to be mounted on the finished covering.

3. Coordinate requirements for pipes and other items designed to be housed within the partition and wall systems.

3.3 LEVELING

A. By use of the specified grout, or by other means approved by the Architect, provide continuous solid bearing under floor runner members of steel stud partitions and walls.

B. Level in a manner to provide uniform interface with ceilings and other overhead construction.

END OF SECTION

SECTION 09900
PAINTING

Part 1 - GENERAL

1.1 STIPULATIONS

A. The "General Conditions for Construction Projects" form a part of this specification section by reference thereto and shall have the same force and effect, as if printed herewith in full.

1.2 SCOPE OF WORK

A. The Painting Contractor shall furnish all material, labor and equipment required to complete all painting and finishing as shown on drawings, plans and specifications.

1. Clean, prime and paint all ceilings and all interior metal window component surfaces

2. Prime and paint all filled holes in glazed block walls.

B. The Contractor shall examine the specifications and shall thoroughly familiarize himself with all provisions regarding painting. All surfaces that are left unfinished by the requirements of other specifications shall be painted or finished as a part of this contract.

C. The Painting Contractor shall be responsible for inspecting the work of others prior to the application of any paint or finishing material. If any surface to be finished cannot be put to proper condition for finishing by customary cleaning, sanding, and puttying operations, the Contractor shall assume responsibility for and rectify any unsatisfactory finish resulting.

1.3 SUBMITTALS

A. Colors and Samples

1. All colors shall be selected and approved by the Facility from manufacturers colors available for coating type.

2. Upon request, the Contractor shall prepare and submit finished samples of specified materials for approval. Successive coats on these sample panels shall be applied in such a way that portions of all preceding coats remain exposed. Samples shall be retained to compare with the finishes as they are applied.

1.4 STORAGE AND PROTECTION

A. All materials used on the job shall be stored in a single place designated by the Facility. Such storage place shall be kept neat and clean and all damage thereto or to its surrounding shall be made good by the Contractor.

B. All soiled or used rags, waste, and trash must be removed from the building each night, and every precaution taken to avoid the danger of fire.

C. The Painting Contractor shall protect surfaces and objects inside the building against damage. The Contractor shall hold himself responsible for damage to adjacent furnishings.

D. At completion of work, the Contractor shall remove from the premises all surplus painting materials and all debris created by him; he shall remove all spatters and leave his part of the work in a clean and finished condition.

Part 2 - PRODUCTS

2.1 MATERIALS

A. All materials used on the work shall be of the brand and quality specified and shall be delivered at the site of work in original containers with seals unbroken and labels intact.

1. Material used to fill holes in walls shall determine the type of finish to be used. A grout material is preferred.

    a. Contractor shall submit material to be used for filling holes and finishing, for approval prior to installing material.

B. All materials shall be used strictly in accordance with manufacturer's label directions.

C. All materials such as linseed oil, shellac, and turpentine shall be pure and of highest quality and approved by the Facility. They shall bear identifying labels on the containers.

D. Any necessary materials not specifically covered and specified in this contract shall be subject to approval before any materials are delivered. The Contractor shall submit the name and brand of the materials which it proposes to use and shall receive an approval in writing from the Facility prior to purchase and delivery to the site.

2.2 MANUFACTURERS

A. All paint used shall be Architectural quality, equal in all respects to those manufactured by the following or another approved equal:

1. MAB Paints
2. Pittsburgh Paint Architectural Finishes, Inc. (P.P.G)
3. Sherwin Williams

2.3 FINISHES

A. Provide the following paint finishes:

1. Interior Metal
   a. 1 coat Acrylic Resin, Interior Rust Inhibitor/Metal Primer (omit if factory primed) – Stainless metal may need a pretreatment wash (Flat).
   b. 2 coats Acrylic Latex, Interior (Flat)
      (1).Similar to PPG Speedhide 6-212 Primer and PPG Speedhide 6-700 Series Finish
2. Interior Plaster Ceilings
   a. 1 coat Vinyl Acrylic Latex Primer (Flat)
   b. 2 coats Acrylic Latex, Interior (Egg Shell)
      (1).Similar to PPG Speedhide 6-4 Primer and PPG Wallhide 84-45 Series Finish
3. Provide full color selection available for each coating type.

Part 3 - EXECUTION

3.1 SURFACE PREPARATION

A. All surfaces should be sound, clear, and free of oil, grease, dirt, loose or peeling paint and other foreign substances.

B. All stainless door frame bottoms shall have all joints welded or sealed, sanded, smoothed, cleaned and dried prior to applying primer and paint.

C. Remove all rust and scale from all existing metal surfaces down to sound, clean metal. Regalvanize as required and repair metal as required prior to painting.

1. Repairing shall be grinding out deteriorated areas and welding new galvanized plates into voids.

D. Remove all expansion fastener plugs from walls prior to filling holes.

1. Finish material shall match the surrounding areas.

E. Follow approved manufacturers surface preparation guidelines for each substrate.

3.2 WORKMANSHIP

A. All work shall be done by skilled mechanics in accordance with the best standard practice and the manufacturer's printed instructions in a manner acceptable to the Facility. Any work not conforming to these specifications shall be corrected to the satisfaction of the Facility. Such corrections shall be made at the expense of the Contractor.

B. All finishes shall be evenly applied and free from sags, runs, crawls, brush marks, skips or other defects.

C. Products shall be applied at the proper consistency and shall be thinned, tinted, or otherwise altered only in accordance with the manufacturer's printed directions.

D. If the finish coat is to be colored, the prime coat and the intermediate coat shall be tinted to have a slight variation in color from each other.

E. All materials shall be applied to surfaces that are dry and properly prepared and when conditions are favorable for paint.

F. Each coat of materials shall be thoroughly dry before application of the succeeding coat.

3.3 CEILINGS

A. Where ceilings have been cut and/or damaged from pipe installations or fastener removal, patch those areas with a plaster material matching the existing and finish to match the surrounding areas.

B. Thoroughly clean existing ceiling areas undisturbed by demolition.

C. Mask and/or cover all equipment, structures and features that remain and will not be removed.

3.4 CLEANING AND TOUCH UP

A. At the end of each day, the Contractor shall place in covered, metal containers, or destroy all cloths, waste and refuse, which have been used in the application of inflammable paint materials.

B. At completion of work, all staging, scaffolding, containers, and debris shall be removed from the premises, leaving all painting in perfect and clean condition.

C. Touch up and finish any part of the work requiring same, after all other trades have finished repairing any damage to the work.

D. Upon completion, leave the work clean and free from blemishes, hardware, stone, glass and any other materials shall be thoroughly cleaned of all paint to the satisfaction of the Department.

E. After painting is completed, joints between sash and frame shall be struck with a knife or other tool so that windows can be opened and not held closed by a paint film.

END OF SECTION

SECTION 10801
SHOWER AND ACCESSORIES

Part 1 - GENERAL

1.1 STIPULATIONS

A. The "General Conditions for Construction Projects" form a part of this specification section by reference thereto and shall have the same force and effect, as if printed herewith in full.

B. The provisions and requirements of the following sections apply to work in Section 15400, Plumbing General.

1.2 SECTION INCLUDES

A. Work in this section includes the following:

1. Providing and installing showers with anti ligature grab bars and folding seats.

2. Providing and installing trench drains.

1.3 SUBMITTALS

A. The Contractor shall submit manufacturer's catalog data in accordance with Section 01300, Submittals, for the following:

1. Showers

2. Anti ligature grab bars

3. Trench Drains

B. The Contractor shall submit Operation and Maintenance data in accordance with Section 01300 for the following:

1. Showers

2. Trench Drains

Part 2 - PRODUCTS

2.1 GENERAL

A. All exposed metal parts shall either be chromium plated or stainless steel.

B. Equipment shall be those of reputable manufacturers and shall be new and the best of their respective kinds.

C. Equipment of similar types shall be of the same manufacturer unless indicated otherwise on the drawings or specified herein.

2.2 FIXTURES

A. Showers:

1. SH-1 Shower (3-piece Gel-Coated Fiberglass)

   a. Barrier free ADA compliant shower with institutional type fixed chrome shower head factory assembled with all concealed piping. Drain body shall be stainless steel drain body cast integrally with unit providing 2" pipe connection a minimum of 1" deep with threaded removable stainless steel strainer plate. Strainer plate shall be secure with stainless steel vandal proof fasteners. O.D. shall be 62" x 39" x 78".

   b. Shower base shall comply with ADA barrier free requirements on bathing facilities for people with disabilities or wheelchair bound.

      (1).Fixture:

         (a).Florestone – Model No. 3PC-39-62H

         (b).Or approved equal

2. SH-2 Shower (2-piece Gel-Coated Fiberglass)

   a. Barrier free ADA compliant shower with institutional type fixed chrome shower head factory assembled with all concealed piping. Drain body shall be stainless steel drain body cast integrally with unit providing 2" pipe connection a minimum of 1" deep with threaded removable stainless steel strainer plate. Strainer plate shall be secured with stainless steel vandal proof fasteners. O.D. shall be 48-1/4" x 38" x 73".

      (1).Fixture:

         (a).Florestone – Model No. 2PC-48-3WTB

         (b).Or approved equal

3. No curtain rods shall be provided or installed.

4. Drain body locations shall be coordinated with prior to holes being drilled.

B. Anti Ligature Grab Bars: For the purpose of establishing a standard for this specification the manufacturer for the manufacturer for the anti ligature grab bars shall be SafeSupport of Weizel Security, P.O. Box 276, Blaine, WA, 98231-0276 (lawenforcerscatalog.com), or approved equal.

1. Anti ligature grab bars shall be stainless steel with wall, end and center supports, 1 ¼" diameter, 1 ½" standout with safety anti ligature draining type enclosure that extends a minimum of 1" from bottom circumference of grab bar, 36" and 42" long minimum (see drawing), mounted 34" above floor.

2. Mount grab bars to shower walls with stainless steel Phillips head machine screws, cap nuts and backing plates (reinforce to new steel stud walls). Mount grab bars to glazed block with stainless steel expansion anchors, approved by the grab bar manufacturer.

   a. Provide concealed mounting with set screws.

   b. Provide fasteners as required by the approved manufacturer.

   c. Provide spacers as required.

3. Grab bars shall support 250 lbs/lineal foot of force applied from any direction when installed.

4. Similar to 811-S38 SafeSupport SR Draining Grab Bar, Weizel, with a satin finish or approved equal.

C. Trench Drains:

1. Shall be polyester polymer cast concrete drain. The OD shall be 6-1/2" wide, 2-1/2" deep and lengths are shown on the drawings. End shall be capped.

   a. Drain shall be similar to Polycast 500 Series. Deck drain as manufactured by Delta Industrial Products of Warren, MI., or another approved equal.

2. Gratings shall be ADA stainless steel with 1/4" circle perforations covering surface. Provide grating hold down devices for security.

   a. Grate shall be similar to Stainless Steel Perforated Grate Model No. DG0657R as manufactured by Delta Industrial Products of Warren, MI., or another approved equal.

Part 3 - EXECUTION

3.1 SHOWER INSTALLATION

A. Equipment shall be installed in a neat and workmanlike manner and in accordance with the manufacturer's recommendations. The quality of installation shall be subject to the approval of the Professional.

1. Insure concrete base is level, sound, and smooth. Install lightweight concrete as required to level and make smooth the existing concrete base.

2. A 2 inch base recess shall be maintained to align wheelchair ramps with the existing flooring.

B. Equipment must be protected against damage during the progress of construction. Upon completion of construction, all fixtures and equipment must be thoroughly cleaned and left in perfect working order. All piping and accessories having polished, plated or finished surfaces shall be protected to prevent scarring or other damage and protect the finish against damage.

C. Shower outlets and drains shall be sized for the outlet pipe size shown on drawings. The Contractor shall be responsible for proper height setting and leveling of drains.

D. Apply a bead of waterproof caulking around the edge of all showers at walls for a tight seal between the fixture and wall finish. Color of caulk shall match the fixture color.

E. Thoroughly clean installed units, walls and floors surrounding the showers.

F. Furnish and install new galvanized metal angles and caulking system, similar to showers previously installed on the third floor of Building No. 34 to conceal shower unit mounting flanges.

G. Install waterproof grout between floor system and new shower base, install additional grout, as required, to raise floor height to no barrier shower base height.

3.2 TRENCH DRAIN INSTALLATION

A. After the existing showers, bases and tile walls are removed, determine where the new showers and chase walls will be located. Locate the new trench drains as close to the front edges of the new showers as is possible.

B. Remove all ceramic tile flooring from the drain area. Clean and store for reinstallation.

C. Cut and remove the existing lightweight concrete down to the existing concrete slab. Side cuts should be a minimum 1/2" larger than the trench drain size. Also cut a hole for the drain outlet through the concrete slab. Coordinate location with the Plumbing Contractor and with the structural steel joists below concrete slab.

1. Adjust the location of the drain if it is found that the steel floor joists below will interfere with the drain outlet and piping.

D. Install a waterproofing membrane on the cut concrete and a waterproofing ring in opening where drain pipe will be installed.

E. Install a waterproof grout in trench, install trench drain and install additional grout, as required, to raise drain to ceramic tile floor height.

1. Install trench drain and drain grate as recommended by the manufacturer.

2. Install additional grout to seal all cracks and/or voids that may develop.

F. Reinstall ceramic tile flooring up to the edge of the new trench drain.

END OF SECTION

SECTION 15400

GENERAL

Part 1 - GENERAL

1.1 STIPULATIONS

A. The "General Conditions for Construction Projects" form a part of this specification section by reference thereto and shall have the same force and effect, as if printed herewith in full.

1.2 SCOPE

A. Work consists of furnishing all labor, material, equipment and services necessary and reasonably incidental to the proper completion and proper operation of the plumbing systems. The work shall consist of but shall not necessarily be limited to the following:

1. Domestic water system including extension of piping and connections to all equipment, fixtures and accessories.
2. Sanitary drain, waste and vent system including connection to all equipment, fixtures, and accessories.
3. Modifications to existing plumbing systems, equipment, fixtures, and accessories as indicated and as specified.
4. Disconnection and removal of existing plumbing systems, equipment, piping, etc., no longer required as a part of the revised installations.
5. Plumbing Specialties as specified in Section 15430.
6. Plumbing Fixtures as specified in Section 15440.
7. Plumbing Equipment as specified in Section 15450.

1.3 CODES, REFERENCES AND STANDARDS

A. The Contractor shall comply with all laws, ordinances, and regulations of all Authorities Having Jurisdiction, including Township, Borough, City, County, State, Federal and Public Utility. All licenses, permits, fees, connection fees, tapping fees, inspection fees, etc., shall be obtained by the Contractor.

B. The minimum standard of work under this contract shall be in accordance with the following:

1. American National Standards Institute (ANSI)

2. American Water Works Association (AWWA)

a. Cement Mortar Lining for Ductile-Iron Pipe AWWA C104	ANSI A21.4
b. Rubber Gasket Joints for Ductile-Iron Pipe AWWA C111	ANSI A21.11
c. Ductile-Iron Pipe	ANSI A21.51 AWWA C151
d. Cast Iron Screwed Fittings	ANSI B16.4
e. Cast Iron Drainage Fittings, Threaded	ANSI B16.12
f. Pipe Fittings, Bronze, and 250 lb. Cast	ANSI B16.15
g. Cast Copper Allow Solder-Joint Pressure Fittings	ANSI B16.18
h. Solder-Joint Fittings, Pressure Wrought Copper and Copper Alloy	ANSI B16.22
i. Cast Copper Alloy Solder-Joint Drainage Fittings	ANSI B16.23
j. Bronze Pipe Flanges and Flanged Fittings	ANSI B16.24
k. Solder-joint fittings, Drainage, DWV Wrought	ANSI B16.29
Copper and Copper Alloy	ANSI B31.1

1.4 QUALITY ASSURANCE, WORKMANSHIP AND COORDINATION

A. The Contractor shall guarantee the workmanship, materials and equipment, furnished against defects, leaks, performance and non-operation for a period of one (1) year after the date of final acceptance. Defective workmanship shall be construed as meaning defective materials and unsatisfactory installation and not intended to apply to ordinary wear and tear. The Contractor shall pay for any repairs or replacements caused by defective workmanship as construed herein within the period covered by the Guarantee, including all incidental work required to correct the deficiency.

B. The Contractor will be held responsible for the proper installation of all materials and equipment required for a complete installation within the intent and meaning of the Contract Documents.

1.5 FIELD MEASUREMENTS

A. Before ordering any equipment and material, or performing any work, the Contractor shall verify all measurements and dimensions at the job site and shall be held responsible for the correctness of same.

B. No extra compensation will be allowed on account of differences between actual dimensions and measurements and those indicated on the drawings.

1.6 PROTECTION OF SERVICES AND EQUIPMENT

A. The Contractor, at his own expense, shall repair, replace and maintain in service any utilities, facilities or services (aboveground or interior) damaged, broken, or otherwise rendered inoperative during the course of construction due to activities on the part of the Contractor. The method used by the Contractor in repairing, replacing or maintaining the services shall be approved by the Facility.

B. The Contractor shall protect, at his own expense, such of his work, materials or equipment that is subject to damage during the project duration. All openings into any piping, ducts or equipment must be securely covered, or otherwise protected, to prevent injury due to carelessly or maliciously dropped tools or materials, grit, dirt, or any foreign material. The Contractor shall be held responsible for all damage so done until his work is fully and finally accepted.

1.7 INTERRUPTION OF SERVICES

A. The Contractor shall schedule his work to avoid any major interruption of any utility services.

1.8 CLEANUP

A. The Contractor shall maintain buildings, grounds and public properties free from accumulations of waste materials, debris and rubbish. At reasonable intervals during the progress of work, and when directed by the Facilities Authorized Representative, the site and public properties shall be cleaned and waste materials, debris and rubbish shall be disposed of in appropriate manner. The Contractor shall provide containers for collection of waste materials, debris and rubbish. Waste materials, debris and rubbish shall be removed from the job site and legally disposed of at a landfill area in accordance with all applicable regulations.

1.9 SUBMITTALS

A. The Contractor shall provide to the Designer for review four (4) copies minimum of required submittals, unless noted otherwise. All Catalog Data, Shop Drawings, Calculations, and Certificates of Compliance shall be submitted as a single package. Failure of the Contractor to provide a complete submittal package may result in delay in processing time.

B. Substitutions

1. If the Contractor desires to substitute material or equipment other than as indicated, the Contractor must provide submittals of the proposed substitute to the Designers for review. The Designer will issue a decision to all Contractors listing any equivalents accepted. No substitution shall be made without the review and acceptance of the Designer.

2. It shall be the responsibility of the Contractor to insure that each manufacturer can furnish a substitute in complete conformity with the requirements of this Project. The Contractor shall assume all costs or extra charges associated with the substitution, including: any architectural, structural, mechanical or electrical changes required, costs in connection with work of the other trades necessitated substitutes, and any additional engineering costs required.

C. Operation and Maintenance Manuals

1. Submit two (2) sets of 8-1/2" x 11" text sixty (60) days prior to operator training/pre-final inspection bound in three D side ring capacity expansion binders with durable plastic covers for review by the Facility.

1.10 ELECTRICAL EQUIPMENT

A. All control equipment and wiring shall meet the requirements of the National Electric Code

B. The Contractor shall verify electrical characteristics at the site before ordering electrical equipment.

1.11 CONTROL WIRING

A. The Contractor shall provide all necessary control wiring and related conduit required for complete and workable systems.

B. All conduit and wiring shall be in accordance with the latest edition of the National Electrical Code. Installation of control wiring shall be performed in a neat and workmanlike manner by competent workmen. Workmanship shall be as specified in Division 16.

C. Control circuits shall be wired for 110 volt control, using fused individual control transformers. Circuits shall be fused and shall be interrupted when the disconnect device is opened.

1.12 INSPECTION AND TESTING

A. General

1. New plumbing systems and parts of existing systems which have been altered, extended or repaired shall be tested to disclose leaks and defects.

2. The Contractor shall notify the Facility a minimum of 5 (five) working days prior to testing to coordinate the testing and inspection procedures.

3. If the Facility determines that the plumbing systems do not pass the prescribed tests, then the Contractor shall be required to make the necessary repairs, at his own expense, and the Contractor shall re-inspect and re-test the systems. Repairing, inspection and testing shall be continued until all systems pass as determined by the Facility.

4. All new, altered, extended or replaced plumbing shall be left uncovered and unconcealed until it has be inspected, tested and accepted by the Facility and Labor & Industry building Code Inspector. Where such work has been covered or concealed before it has been inspected, tested and accepted, it shall be uncovered by the Contractor, at his own expense as directed by the Facility.

5. All equipment, material, labor, etc., required for testing the plumbing systems shall be furnished by the Contractor.

B. Sanitary and Vent Systems

1. The systems shall be tested in accordance with the International Plumbing Code.

C. Domestic Water Systems

1. The system shall be tested either in its entirety or in sections.

2. The system shall be tested and proved tight per the International Plumbing Code testing provisions.

1.13 STERILIZATION OF THE DOMESTIC WATER SYSTEM

A. After the system has been tested and approved, the entire new system, including valves and accessories, shall be chlorinated. Disinfection to be in accordance with AWWA C651.

B. After the chlorination process, the chlorine shall be flushed from the system until the system water is equal chemically and bacteriological to those of the permanent source of water supply.

1.14 INSTRUCTION OF THE FACILITY

A. After acceptance of the Project, the Contractor shall furnish the services of personnel thoroughly familiar with the completed installation to instruct the Facility Staff in the proper operation and maintenance of all equipment and appurtenances provided. The Contractor shall provide the Facility with two weeks advance notice before the instruction session.

1.15 DEMOLITION

A. The Contractor shall disconnect and remove all plumbing equipment, materials, fixtures and existing services no longer required, unless noted otherwise. All exposed piping shall be removed and capped either below floors, in walls or above ceilings as may be required. All materials used for capping of existing services shall be fully compatible with existing piping materials and appropriate for the pressure involved.

B. Demolition of piping shall include the removal of existing hangers and similar items not to be reused. Demolition of equipment shall include the removal of anchors and similar items not be reused.

C. The Contractor shall patch and finish all holes associated with the demolition work. All patching and finishing shall match existing adjacent undisturbed surfaces to the satisfaction of the Professional.

1.16 CUTTING, PATCHING, FINISHING (EXISTING BUILDING)

A. Unless otherwise noted, the Contractor shall cut, patch and finish all chases and openings required for the installation of work to be performed under this Contract. All patching and finishing shall match existing adjacent undisturbed surfaces.

B. Cutting shall not cause damage to the building or leave unsightly surfaces. Where such unsightly conditions are caused by the Contractor, he shall be required to repair these.

C. No structural member shall be cut.

D. Penetrations made in existing fire rated chases, partitions, floors, etc. shall be sealed with an approved material and method as required to maintain the integrity of the fire separation.

E. All materials and methods to be used for patching and repairing shall be subject to the approval of the Facility.

F. The Contractor shall set all sleeves, hangers, and anchors required for the Plumbing Contract work and shall be responsible for their proper and permanent location.

G. Cutting shall be accomplished in such a manner as not to cause damage to the building or leave unsightly surfaces which cannot be concealed by plates, escutcheons or other construction. Where such unsightly conditions are caused, the Contractor shall be required, at his own expense, to repair the damaged areas.

H. Cutting of the construction excessively or carelessly done shall be repaired to match the original work by the Contractor and to the satisfaction of the Facility who will make the final decision with respect to excessive or careless cutting work. The Contractor shall seal all openings he has made in plenum spaces, fire rated floors, ceilings or partitions after his work has been installed. The material used for sealing the openings shall have a fire rating equal to or greater than the rating of the floor, ceiling or partition material.

1.17 CHASES AND OPENINGS

A. All chases and openings required for the installation of the work shall be coordinated with the other trades.

B. Penetrations made in fire rated chases, partitions, floors, etc. shall be sealed with an approved material and method as required to maintain the integrity of the fire separation.

C. The Contractor shall provide all sleeves, hangers, and anchors required for installation of the work in chases and openings.

1.18 MISCELLANEOUS STEEL AND ACCESSORIES

A. The Contractor shall provide all necessary steel angles, channels, pipe, rods, nuts, bolts, etcetera, as shown on plans, as specified, or as may be required for complete and proper installation of plumbing fixtures, systems and equipment. All material and workmanship shall be of the best quality and shall be installed in accordance with the best practices of the trade.

1.19 ACCESS PANELS

A. The Contractor shall furnish access doors for installation in ceilings, walls, partitions and floors for access to valves, traps, fittings, and all appurtenances.

B. Access panels shall be of sufficient size to permit removal or access to equipment, except that the minimum size shall be 12-inches by 12-inches.

C. Access door locations shall be as determined by field conditions for optimum access to equipment, and shall be reviewed by the Facility before final installation, and shall be subject to the following:

D. Bottom of access doors shall not be lower than the top of the partition base, or a minimum of 6 inches above floor.

E. Tops and/or sides of access panels shall be a minimum of 6-inches from the ceiling or opening or from the edge of a wall return.

F. Access doors shall be suitable for installation in the finish material of the ceilings, walls, partitions and floors.

G. Frame and panel access doors as indicated shall be stainless steel.

H. Access doors with UL Listing shall be provided in rated construction assemblies. Access doors shall be "B-Label" and shall have a UL one and one-half (1-1/2) hour rating at 250 degrees F rating for both door and frame. Maximum size shall be 24" x 48". Frame shall be sixteen (16) gauge minimum steel, panel shall be twenty (20) gauge minimum steel. Access doors shall be provided with a baked-on enamel finish (prime coat), continuous type hinge on one side, flush-face type lock with key operation and self-latching cylinder locks.

I. Access doors without UL label shall be provided in all non-rated construction assemblies: Frame shall be sixteen (16) gauge minimum steel, panel shall be fourteen (14) gauge minimum steel. Access doors shall be provided with a baked-on enamel finish (prime coat), concealed spring type hinges and flush-face type lock with key operation and self-latching cylinder locks. Door shall open 175 degrees (minimum).

J. All access doors shall be keyed alike.

Part 2 - PRODUCTS

2.1 GENERAL

A. All materials used on plumbing systems shall comply with the following lead ban requirements:

B. Solders with lead content exceeding 0.2% (two-tenths of a percent) are prohibited. Brass and bronze materials containing 8.0% (eight percent) or greater lead are prohibited.

Part 3 - EXECUTION

A. All materials and equipment used shall be installed in strict accordance with the Standards under which the materials are accepted and approved, and in strict accordance with the manufacturer's instructions.

B. The Contract Documents are not intended to indicate every bend, offset, change in direction and appurtenance required to provide a complete and workable system.

C. The contract drawings are diagrammatic and are indicative of the work to be performed. It is not intended that they show every pipe, fitting or apparatus required for a complete installation.

END OF SECTION

SECTION 15410
PIPING

Part 1 - GENERAL

1.1 STIPULATIONS

A. The "General Conditions for Construction Projects" form a part of this specification section by reference thereto and shall have the same force and effect, as if printed herewith in full.

1.2 SECTION INCLUDES

A. The provisions and requirements of the following sections apply to work in this section.

1. Plumbing General

B. Work in this Section includes the following:

1. Interior domestic water piping systems
2. Interior sanitary piping systems
3. Sleeves and floor plates
4. Supports, hangers, inserts and fasteners
5. Valves
6. Pipe insulation
7. Pipe identification
8. Valve tags

1.3 SUBMITTALS

A. The Contractor shall submit manufacturer's catalog data in accordance with Section 15400 for the following:

B. The Contractor shall submit Certificates of Compliance in accordance with Section 15400 for the following:

1. Valving (Lead ban requirement)

Part 2 - PRODUCTS

2.1 INTERIOR DOMESTIC WATER PIPING

A. Water piping above grade shall be Type "L" hard temper copper tubing conforming to ASTM B88, with cast bronze or wrought copper solder end fittings, conforming to ANSI B16.18, ANSI B18.24 or ANSI B16.22.

B. All solder joints in copper tubing shall be made with 95-5 tin-antimony solder. Use of lead solder will not be permitted.

2.2 INTERIOR SANITARY PIPING

A. Above Ground Sanitary Waste and Vent Piping - Sanitary waste and vent conductors inside buildings above ground shall be service weight cast iron conforming to ASTM A74. Fittings shall be drainage pattern type. No-Hub fittings and joints as manufactured by Charlotte Foundry, Clamp-all, or Tyler shall utilize neoprene couplings with stainless steel shield torqued tight with two threaded type circular clamps. No-Hub piping shall be substantially supported. Threaded cast iron drainage fittings shall conform to ANSI B16.12. Type DWV hard drawn copper tube conforming to ASTM B306 with ANSI B16.29 DWV wrought copper or ANSI B16.23 cast copper fittings with 95-5 tin-antimony solder.

2.3 SLEEVES AND FLOOR PLATES

A. Sleeves through interior partitions shall be galvanized sheet metal and shall be provided with means for holding the sleeve securely in the penetrated construction. Exposed sleeves shall have a chrome plated floor or ceiling plate escutcheon securely fastened around pipe. Where pipe is covered or insulated, escutcheon shall fit over covering.

B. Penetration sealant fire stopping system shall be a mixture of fusible ceramic firebreak material, water releasing hydrates, gas producing cenospheres, and a binder resin containing essentially no corrosive halogens, no asbestos and no glass fiber making the compound intrinsically safe under adverse fire conditions. Under fire conditions, the material shall form a vitrified surface coating acting as an effective refractory barrier. The cenospheres contained in the mixture swell when exposed to high heat, releasing inert nitrogen and carbon dioxide gases. Penetration sealant shall flow free under pressure of agitation and thicken when in place. Penetration sealant shall remain permanently pliable after curing. Penetration sealant shall be "Flame Safe" Fire Retardant as manufactured by Thomas and Betts Corporation or another approved equal.

C. Mechanical type fire stopping system shall conform to UL-1479 and ASTM E119 test standards. Assemblies shall have fire ratings consistent with the floor or wall assembly rating shown on the plans. Copper and steel piping shall utilize Proset System "A" penetration system. Cast iron piping shall utilize Proset System "B" penetration system.

2.4 SUPPORTS, HANDERS, INSERTS AND FASTENERS

A. Hanger Materials

1. Products shall be as manufactured by B-Line, Grinnell Company or Crane Company. Model numbers are Grinnell and are provided for reference or another approved equal.

2. All steel hangers on piping including clevis hangers, rods, inserts, clamps, stanchions, brackets, shall be dipped in Zinc Chromate Primer before installation, or furnished from the factory in this manner.

3. Hangers for use on uninsulated copper piping shall be provided with inserts to isolate the copper piping from the hanger. Inserts shall be made of felt or plastic and shall be as manufactured by the hanger manufacturer.

4. Horizontal Waste, Vent Piping:

   a. 3 inch and smaller: Figure No. 260.

   b. 4 inch and larger: Figure No. 590.

5. Horizontal Domestic Water Piping:

   a. 2 inch and smaller: Figure No. 260 with 6 inch metal shield.

   b. 2-1/2 inch and larger: Figure No. 260 with 12 inch metal shield.

6. Vertical Piping (Riser Clamps):

   a. Copper Pipe: Figure No. CT-121C, copper plated with plastic coated formed portion.

   b. Steel Pipe: Figure No. 261, galvanized.

7. Connectors:

   a. For bolt-on locations to structure, No. 88, 133, 134 or 292S.

   b. For concrete spot inserts at single locations for casting into structure No. 282 or 285 for pre-determined rod size and No. 186 for universal use.

c. Welded beam attachments, Figure No. 66.

d. Piping adjacent to walls or steel columns, brackets No. 194, 195, or 199, depending on weight to be supported.

e. Base supports, Figure No. 259, or 264.

8. Hanger Rods:

a. Hanger rod, Figure No. 140.

b. Continuous threaded rod, Figure No. 146.

c. Eye Rods, Figure No. 248.

9. Trapeze Hangers - Direct Mounting Hangers:

a. Figure No. 46.

10. Spring Hangers:

a. Light loads, movement less than 1/4 inch, Figure No. 247.

b. Medium loads, movement 1/4 inch or 3/4 inch, Figure No. 268.

c. Heavy loads, movement exceeding 3/4 inch, Figure No. 268.

11. Protection Saddles

a. Insulated pipe supports, calcium silicate insulation with galvanized sheetmetal jacket - Figure No. 167.

12. Horizontal AWWA Pipe (Flanged or Bell-Spigot

a. Cast iron pipe, No. 590.

2.5 VALVES

A. Domestic Hot and Cold Water Valves

1. Ball Valves

a. 2-1/2-inch and Smaller - 600 psi WOG, full port, three piece, bronze body, chrome plated steel ball and stem NIBCO T595Y Series, threaded end; Nibco OS595Y Series, sweat ends.

b. 2-1/2" and Smaller – 600 psi WOG, full port, 2-piece, bronze body, chrome plated bronze ball and stem NIBCO T-585-70 Series, threaded end; NIBCO S-585-70 Series, sweat ends or Apollo Nos. 77-100 and 77-200. Valves shall be manufactured to comply with MSS-SP110.

Where piping is insulated, ball valves shall be equipped with 2" extended handles of non-thermal conductive material. Also provide a protective sleeve that allows operation of the valve without breaking the vapor seal or disturbing the insulation. Memory stops, which are fully adjustable after insulation is applied, shall be included NIBCO T-585-70-NS, S-585-70-NS or approved equal.

2.6 PIPE INSULATION

A. All insulation shall have composite surface burning characteristic ratings as tested by ASTM E 84, UL 723, or NFPA 255 not exceeding:

1. Flame Spread 25

2. Smoked Developed 50

B. Composite shall include insulation, jacketing and adhesive used to secure jacketing or facing. All accessory items such as PVC Jacketing and Fittings, adhesive, mastic, cement, tape and cloth shall have the same component rating as specified above.

C. Insulation shall be molded one (1) piece with a maximum thermal conductivity of 0.23 BTU-in./hr-sq. ft.-°F at seventy-five (75) degrees F mean temperature.

D. Insulation shall be heavy density fiberglass, ASJ/SSL-II as manufactured by Owens-Corning Fiberglass Corp., Johns Manville or accepted substitute. Valve and fitting covers shall be Zeston 2000 PVC fitting covers as manufactured by Manville Co. Mastic sealer shall be Foster Tite-Fit Coating 30-35 as manufactured by H.B. Fuller Company or approved equal.

E. Closed cell foam insulation of 1 inch thickness may be substituted for fiberglass type sealed with compatible adhesives. Insulation shall by Model AP Armaflex as manufactured by Armstrong or approved equal.

2.7 VALVE TAGS

A. Tags shall be brass, 1" in diameter with large stamped numerals and attached by a short link brass chain or brass "S" hook.

Part 3 - EXECUTION

3.1 GENERAL

A. All materials, equipment and accessories specified in this section shall be installed in strict accordance with the manufacturers' recommendations.

3.2 PIPING INSTALLATION

A. General

1. All piping in finished areas shall be run concealed. The Contractor shall fur in piping or provide soffiting as required and in accordance with the Professional's instructions. All piping shall be installed as required to suit space available in building structure, above suspended ceilings, and other locations found necessary for installation. Install piping as high as possible.

2. The Contractor shall not install any piping that will interfere with any lights, openings, doors, windows, ductwork, equipment, and existing or special conditions. Headroom in front of openings, doors, or windows shall not be less than the top of the opening. Provide all piping offsets necessary to avoid interferences with other work. Piping offsets shall include all devices and assemblies necessary to accommodate the change in direction of the piping.

3. All piping shall run straight with no more couplings and joints than necessary, shall be grouped wherever practical and shall be carefully installed to provide for proper alignment slope and expansion.

4. Pipes carrying fluids shall not be installed in transformer vaults, electrical equipment rooms, elevator hoistways, elevator equipment rooms, or similar areas having a collection of electrical equipment. Pipes shall not be installed over, around, in front of, in back of, or directly below, electrical controls, panels, switches, terminals, boxes, or similar electrical equipment.

5. All piping shall be installed with not less than 2 inches between finish covering of pipe and all other work or piping.

6. All piping shall have shut-off valves at all branch connections to mains.

7. Reduction in sizes of pipes shall be made with reducing fittings. Bushings will not be permitted.

8. Bullhead connections in any piping service are prohibited.

9. All screwed joints shall be made with a non-corrosive, non-hardening compound or teflon tape applied on the male thread only. All compounds must be approved for the pipe on which they are used. Pipe ends shall be reamed or filed out to size of bore and all chips and cuttings removed. Ends of pipe must be cut square so as to seat in the bottom of the recess in drainage fittings. In making joints in chromium plated brass pipe no

more than one thread shall remain exposed when joint is completed. Caulking of screwed joints is not permitted. Pipe joint cement and paint will be permitted only on external threads.

10. All soldered joints shall be made with fittings specified. Copper tube and brass pipe, valves, unions, flanges, fittings, and connections shall be joined by means of leadfree solder. Ends of all pipe and inside surfaces of fittings shall be cleaned, burnished and tinned before solder is applied. All joints in tubing 2 inches and larger shall be tinned and then soldered with a circular type flame torch. Pull joints, saddle type joints, and "T-Drill" type connections are prohibited.

B. Drainage Piping

1. All sewer piping shall be set true to line and even slope using grade boards and targets or grade lines in accordance with ASTM C12, "Recommended Practice for Laying Sewer Pipe". Horizontal sanitary piping shall be installed to pitch towards drain points. Minimum pitch shall be 1/8 inch per foot for piping 4 inch and larger. Pitch for smaller piping shall be 1/4 inch per foot minimum. To join screwed pipe to cast iron pipe, provide ring on screwed pipe to form spigot end.

2. All changes in pipe size of soil, waste, and drain lines shall be made with reducing fittings or reducers. Changes in direction, where space permits, shall be made with long sweep bends, Y-fittings, and one-eighth (1/8) or one-sixteenth (1/16) bends, or combination "Y" and 1/8 bends.

3. Cleanouts shall be furnished installed on horizontal runs and at the base of stacks for all soil, waste, and drain conductor lines. A cleanout shall be installed at every change of direction of greater than 45 degrees. Cleanouts shall be installed not more than at locations indicated on drawing for piping 4 inch size and smaller. Cleanouts on horizontal runs above ground, including crawl spaces, shall be cast brass plugs in wye fittings. Cleanouts at the base of each vertical stack shall be cast brass plugs in wye fittings. Cleanouts on buried or concealed lines shall be brought flush with grade or floor level. Cleanouts in walls shall be brought flush with finished face of the wall. 45 degree fittings shall be set against concrete cradle to prevent separation or misalignment of joints. Cleanout plugs shall be full size for pipe up to and including 4 inch diameter and not less than 4 inch diameter for larger size pipe.

4. Water closet floor flanges shall be cast iron, screwed or caulked, not less than 1/4 inch thick; not less than 2 inches caulking depth. Bolted with approved gasket between closet bowl and flange. Closet screws shall be of brass. The use of commercial putty or plaster for setting closet bowls is prohibited.

C. Pressure Piping

1. Branch piping shall be as indicated, but shall be a minimum 3/4 inch in nominal size with the last ten feet to each 1/2 inch outlet fixture a minimum of 1/2 inch in nominal size.

2. Each water piping system within the building shall be properly arranged and graded to low points where the entire system can be emptied through a drain.

D. Equipment Piping

1. Provide shutoff valves in supply and return to each item of equipment. Valves shall be suitably located to isolate each unit to facilitate maintenance or removal of all equipment and apparatus. Valves shall be flanged or have a union installed between valve and equipment.

3.3 ELECTROLYSIS CONTROL

A. All copper tubing installed under this Contract shall be installed so that the tubing will not touch or come in contact with ferrous metals. Where copper tubing or piping for fittings is anchored, guided, supported, secured, or may come in contact with ferrous metal, an insulating nonconductor spacer, similar to rubber or fiber, shall be installed to assure prevention of electrolysis.

B. When copper tubing or piping is connected to ferrous piping or equipment, connections shall be made with dielectric unions, couplings, or isolating flanges.

3.4 SLEEVES AND FLOOR PLATES

A. Sleeves shall be provided for all pipes passing through walls, partitions, floor slabs or roof slabs. Sleeves shall be cut flush with wall, floor or ceiling surfaces except that sleeves through waterproofed roof or floor slabs shall extend one inch (1") above the finished surface. Sleeves shall be sufficient size to allow a sealable annular space between the sleeve and the pipe or between the sleeve and the pipe insulation. All exposed piping passing through floors, walls or ceiling shall be provided with a chrome escutcheon plate securely fastened around the pipe. The annular space around the pipe in non-water-proof sleeves shall be filled with penetration sealant and smoothed out flush with all surface.

B. All pipe, tube, conduit, or similar through-penetrations of all fire rated walls, floor-ceiling, or roof-ceiling assemblies shall be provided with a fire stopping system to achieve a tight seal that will maintain the fire resistant rating of the assembly containing the through-penetration. Fire stopping system may be sealant or mechanical type.

3.5 PROTECTION AGAINST PHYSICAL DAMAGE

A. In concealed locations, where piping, other that cast-iron or galvanized steel, is installed through holes or notches in studs, joists, rafters or similar members less than 1¼-inches from the nearest edge of the member, the pipe shall be protected by shield plates. Protective shield plates shall be a minimum of 1/16-inch thick steel, shall cover the area of the pipe where the member is notched or bored and shall extend a minimum of 2-inches above sole plates and below top plates.

3.6 SUPPORTS, HANGERS, INSERTS AND FASTENERS

A. The Contractor shall furnish and install all supports, hangers, inserts and fasteners for the items incidental to the work in the construction of the project. Supports and hangers shall be provided to suit specific conditions for the type of construction. The method adopted shall be subject to the approval of the Professional.

B. Supports shall secure pipes in place, prevent swaying and vibration, provide free expansion and shall have a neat appearance. Supports shall be selected for strength and service and installed in a manner which will not stress building construction. Supports shall be selected for safety factor of five (5) to one (1) for gross weight of piping system including fluid and installation.

C. Fastenings required in masonry walls, bolts shall be galvanized U-bolts set in the construction during erection.

D. Where several pipes can be installed in parallel at the same elevation, provide trapeze hangers. Trapeze hangers shall be suspended by means of rods or angles. Brace trapeze hangers to prevent motion due to expansion and contraction of pipe. Support individual pipes by hangers or rollers.

E. All vertical piping shall be supported at each floor level. Riser clamps at exposed locations shall be of such design as to avoid creating a hazardous or unsightly condition and stay within space limitations. Pipe supports are required at the base of all vertical risers and shall be of riser size. In the case of waste and vent risers for plumbing system, support the fitting at the base of the riser independently from the adjacent pipe joint support.

F. Where hanger rods are longer than 18 inches, provide lateral bracing at every fourth hanger. Do not support piping by wire, rope wood or other makeshift device. Provide additional steel supports where building construction does not permit the hanger spacing as specified in the schedules. Location and details shall be submitted to the Professional for review.

G. Where loading exceeds the safe allowable limit for any single insert, then multiple inserts shall be installed spaced no less than 12 inches on centers. The multiple inserts shall be connected with suitable size steel angles and locking bolts.

H. Where fastenings are required in steel stud, wire lath or other non-masonry construction, a "J" hook and holding lock washer and nut shall be used which shall fasten to the opposite stud edge to which the item will abut. If the location of the fastening is not a steel stud, a structural steel shape shall be fastened to the wall with bolt and holding nut, with the fastening extension through the wall. The use of toggle bolts will not be permitted.

I. Steel frame Construction

1. No hanging from corrugated metal deck shall be allowed.

2. Where concrete floor construction is supported by structural steel members or bar joist, support of piping, ductwork, devices and equipment may be from metal tabs integral with the metal deck system to the maximum of the equivalent of a 10 foot length of 6 inch cast iron drainage pipe. Where tabs projecting down from the metal deck system are not available, inserts for concrete deck construction shall be installed. Inserts in poured concrete slabs shall be iron, fabricated galvanized iron or steel of the type to receive a machine bolt head or nut after installation and shall permit adjustment of this bolt in one horizontal direction.

J. Concrete Construction

1. Before drilling any concrete for attachments verify locations of radiant heat piping within slabs.

K. HANGER AND ROD SCHEDULE

Hanger And Rod Spacing				
Pipe Nominal Diameter	**Steel Pipe**		**Copper Pipe**	
Inches	Spacing Feet	Rod Size Inches	Spacing Feet	Rod Size Inches
½"	5	3/8"	5	3/8"
¾"	6	3/8"	6	3/8"
1"	7	3/8"	6	3/8"
1 ¼"	8	3/8"	7	3/8"
1 ½"	10	3/8"	8	3/8"
2"	10	3/8"	9	3/8"
2 ½", 3"	10	1/2"	10	1/2"
4", 5"	10	5/8"	12	5/8"

Where unusual concentrated loads of valves and fittings occur, closer spacing shall be required. Where piping changes direction, supports shall be placed in each direction adjacent to joints and no more than 12 inches from the joint.

3.7 VALVES

A. Valves shall be installed at each riser, branch to equipment, at each group of fixtures, at each fixture not equipped with stop valves, and where shown on the drawings. Valves shall be installed with stems at or above the horizontal plane.

B. Where supplies to individual fixtures occur in base cabinets, or in other places where copper tubing supplies are used stops shall be solder end

3.8 INSULATION

A. Pipe Insulation

1. Piping to be insulated shall include all domestic water piping.

2. On cold surfaces where a vapor barrier must be maintained, insulation shall be applied with a continuous, unbroken moisture and vapor seal. All hangers, supports, anchors, or other projections that are secured to cold surfaces shall be insulated and vapor sealed to prevent condensation.

3. All pipe insulation shall be continuous through walls, ceiling, floor openings, or sleeves; except where firestop or firesafing materials are required.

4. Metal shields shall be installed between hangers or supports and the piping insulation. Rigid insulation inserts shall be installed as required between the pipe and the insulation shields. Inserts shall be of equal thickness to the adjacent insulation and shall be vapor sealed.

B. Insulation thicknesses shall conform to the PIPING INSULATION THICKNESS TABLE.

PIPING INSULATION THICKNESS TABLE

SERVICE	PIPE SIZE	INSULATION THICKNESS
Domestic Cold Water	1/2" to 2"	1/2"
Domestic Cold Water	Larger than 2"	1"
Domestic Hot Water	1/2" to 1-1/4"	1/2"
Domestic Hot Water	1-1/2" to 2"	1"
Domestic Hot Water	Larger than 2"	1-1/2"

C. Application

1. Piping - All ends shall be firmly butted and secured with ASJ OR SSL butt strips of a minimum 3 inches wide. ASJ jacket laps and butt strips shall be secured by use of a suitable lap adhesive. Exposed end of pipe insulation shall be sealed with vapor retardant mastic at all fittings and valves.

3.9 IDENTIFICATION

A. Valve Tags

1. The Contractor shall tag each new valve for cold water, hot water, and tempered water piping furnished under this Contract.

END OF SECTION

SECTION 15430
SPECIALTIES

Part 1 - GENERAL

1.1 STIPULATIONS

A. The specification section "General Conditions", "Special Requirements" and "General Requirements" form a part of this section and shall have the same force and effect as if printed herewith in full.

1.2 SECTION INCLUDES

A. Work in this Section includes the following:

1. Cleanouts
2. Floor Drains
3. Water Hammer Arrestors

1.3 SUBMITTALS

A. The Contractor shall submit manufacturer's catalog data in accordance with Section 15400 for the following:

1. Cleanouts
2. Floor Drains
3. Water Hammer Arrestors

Part 2 - PRODUCTS

2.1 CLEANOUTS

A. Cleanouts shall be of coated cast iron construction with scoriated nickle bronze tops, (unless noted), vandal-proof screws. Floor cleanouts shall be adjustable to finished floor after concrete is set. Cleanouts on exposed piping shall consist of threaded ferrules with threaded bronze plugs. Cleanouts shall be as manufactured by Jones Spec, Josam, J.R. Smith, Wade, Zurn or approved equal.

B. Cleanout types shall be as follows:

1. Finished Floor Cleanouts

Zurn	ZN-1400-2

2. Wall Cleanouts

Zurn	ZANB-1468

2.2 FLOOR DRAINS

A. Acceptable Manufacturers:

Trench Drain (TD-1) – See Section10801, 2.2 Fixtures

2.3 WATER HAMMER ARRESTORS

A. Water Hammer Arrestors shall be of Type "L", Type "K" copper or stainless steel bellows or plunger type construction conforming to PDI WH-201. Sioux Chief Series 650, PPP, Inc., Series SWA or SC, JR Smith, Josam, or Zurn.

Part 3 - EXECUTION

3.1 INSTALLATION

A. Equipment shall be installed per manufacturer's recommendations.

END OF SECTION

SECTION 15440
FIXTURES

Part 1 - GENERAL

1.1 STIPULATIONS

A. The "General Conditions for Construction Projects" form a part of this specification section by reference thereto and shall have the same force and effect, as if printed herewith in full.

1.2 SECTION INCLUDES

A. Work in this Section includes the following:

1. Showers
2. Quick Disconnect Shower Head
3. Safety Equipment

1.3 SUBMITTALS

A. The Contractor shall submit manufacturer's catalog data in accordance with Section 15400 for the following:

Part 2 - PRODUCTS

2.1 GENERAL

A. All fixtures shall be furnished complete with traps, faucets, wastes, supplies with stops, etc., as required. All exposed metal parts shall be chromium plated.

B. Fixtures and equipment shall be those of reputable manufacturers and shall be new and the best of their respective kinds.

C. All fixtures and equipment of similar types shall be of the same manufacturer unless indicated otherwise on the drawings or specified herein.

D. Fixtures shall be mounted at mounting heights as indicated in PART 3, EXECUTION, Paragraph "MOUNTING HEIGHTS."

E. If fixtures and equipment indicated in the Contract Documents are not currently manufactured, the manufacturer's current equivalent to the indicated fixtures and equipment shall be provided at no additional cost, subject to review and acceptance by the Designer.

2.2 PLUMBING FIXTURES

A. Shower Controls and Shower Head

1. Shower Controls

a. Shower controls shall be pushbutton shower system combined modular shrouding with the convenience of electronic shower control for single, pre-mixed shower.

Powers Model No. ESP Hydropanel II Series 450-5100 Pushbutton Sensor Shower System or approved equal.

Include a Powers or approved equal transformer and hand held shower with quick disconnect with shower controls.

2. Shower Head

a. Handshower shall have full spray with security grade quick disconnect. Minimum flow 2.0 gpm @ 20 psi. Maximum flow 2.5 gpm @ 80 psi. 60" reinforced vinyl hose with ½" chrome plated supply connections.

b. Quick release hose coupling shall be chrome plated with ½" connection.

c. Shower shall include a chrome push button diverter valve for the shower heads.

Part 3 - EXECUTION

3.1 INSTALLATION

A. Fixtures and equipment shall be installed in a neat and workmanlike manner and in accordance with the manufacturer's recommendations.

B. All fixtures and equipment must be protected against damage during the progress of construction. Upon completion of construction, all fixtures and equipment must be thoroughly cleaned and left in perfect working order. All piping and accessories having polished, plated or finished surfaces shall be protected to prevent scarring or other damage and protect the finish against damage.

C. Provide isolation valves for all fixtures, equipment, and accessories.

D. All fixture supplies and waste lines shall be run to wall unless construction requires they be run to floor. All supplies through walls shall be provided with angle stops. All supplies through floors shall be provided with straight stops. Unions shall be provided adjacent to all equipment or wherever necessary to facilitate the removal of equipment for repair of replacement. Unions for copper tubing up to and including 2 inch diameter shall be brass

ground joint with socket ends for solder. Unions for copper tubing 2-1/2 inches in diameter and over shall be standard brass flanges with socket ends for solder. Flanges to be drilled for ASA Standard 125 pounds flanges and so stamped. No lip type unions or long screws will be permitted. The Contractor shall furnish and install all structural steel angles, channels, etc. necessary to properly support all fixtures and equipment to the satisfaction of the Professional.

E. Shower outlets and drains shall be sized for the outlet pipe size shown on drawings and shall be equipped with P-traps. The Contractor shall be responsible for proper height setting and leveling of drains.

F. Apply a bead of waterproof caulking around the edge of surface mounted plumbing fixture to mask any irregularities between the fixture and wall finish. Color of caulk shall match the fixture color.

3.2 MOUNTING HEIGHTS

A. Plumbing fixture mounting heights shall conform to the following unless directed otherwise by the Facility. The Contractor shall coordinate the mounting height of all fixtures with the mounting heights indicated on the drawings. Mounting heights for barrier free fixtures shall meet the requirements of the ADA Accessibility Guidelines, and shall apply unless superseded by more stringent State or local code.

1. Showerhead - 6'-0" to showerhead A.F.F.

2. Shower Control Valves - 4'-0" to center line from finished floor.

END OF SECTION

SECTION 15890
DUCTWORK, ACCESSORIES, AND SHEETMETAL SPECIALTIES

Part 1 - GENERAL

1.1 STIPULATION

A. The "General Conditions for Construction Projects" form a part of this specification section by reference thereto and shall have the same force and effect, as if printed herewith in full.

Part 2 - PRODUCTS

2.1 DUCTWORK

A. General

1. All duct dimensions listed on drawings are clear inside openings.

B. Material

1. SMACNA has discontinued the use of the terms "low", "medium", "high" as applied to duct air velocity and or pressure classifications, however, for the purpose of this contract: low, medium, and high pressure ductwork shall be defined as follows, unless more stringent requirements are indicated on the drawings or specified herein.

Classification: "LOW" PRESSURE DUCTWORK

SMACNA Pressure Class	Operating Pressure	Velocity
1/2" w.g. pos. or neg.	Up to 1/2" w.g.	2000 fpm max.
1" w.g. pos. or neg.	Over 1/2" up to 1" w.g.	2000 fpm max.
2" w.g. pos. or neg	Over 1" up to 2" w.g.	2000 fpm max.

Classification: "MEDIUM" PRESSURE DUCTWORK

SMACNA Pressure Class	Operating Pressure	Velocity
3" w.g. pos. or neg.	Over 2" up to 3" w.g.	2800 fpm max.
4" w.g. pos.	Over 3" up to 4" w.g.	2800 fpm max.
6" w.g. pos.	Over 4" up to 6" w.g.	2800 fpm max.

2. Ductwork shall be sealed with a UL listed sealing compound in accordance with SMACNA and as required below.

SEAL CLASS A

Sealing Required: All transverse joints, longitudinal seams and duct wall penetrations

Static Pressure Construction Class: 4" w.g. and up
Medium and high pressure ductwork

SEAL CLASS B

Sealing required: All transverse joints and longitudinal seams

Static Pressure Construction Class: 3" w.g.
Medium pressure ductwork

SEAL CLASS C

Sealing required: Transverse joints

Static Pressure Construction Class: 2" w.g.
Low pressure ductwork

Static Pressure Construction Class: 2" w.g. and down
Low pressure supply, fresh air, and combination fresh air/return ductwork

C. Low Pressure Rectangular Ducts

1. Duct base metal shall be not less than the following gauges:

Longest Side or Diameter	U.S.S. Gauge Number
12" or less	26
13" to 30"	24
31" to 60"	22
61" to 90"	20
Over 90"	18

2. Bracing angles generally shall be of the same material as the ducts or structural steel shapes. Bracing shall be riveted to duct 5" o.c.

3. Long radius elbows and transitions shall be used wherever possible. Where not possible, rectangular elbows may be used. Provide air foil turning vanes with rectangular or short radius elbows.

4. Transform duct sizes gradually, not exceeding 15 degrees divergence and 30 degrees convergence.

5. Structural steel angle cradles or metal strips shall be used to support all ductwork as required for proper installation.

D. Medium Pressure Rectangular Duct Work:

1. Ductwork installed throughout the mechanical room and in inaccessible chases shall be considered as "medium pressure".

2. All gauges of sheet metal, transverse joints and bracing shall be set forth in the latest ASHRAE Guide, or as set forth in SMACNA for medium pressure ductwork. Ductwork not insulated with a hard board type of insulation shall have each side and/or top and bottom over 18" wide, cross broken in each four foot length.

3. Construct T's, bends, and elbows with radius of not less than 1-1/2 times width of duct on centerline. Where not possible, rectangular elbows may be used. Provide air foil turning vanes for rectangular or short radius elbows.

4. Transform duct sizes gradually, not exceeding 15 degrees divergence and 30 degrees convergence.

5. Fabricate continuously welded medium pressure round and oval duct fittings two gages heavier than duct gages indicated in SMACNA Standard. Joints shall be minimum 4 inch (100 mm) cemented slip joint, brazed or electric welded. Prime coat welded joints.

6. Provide standard 45 degree lateral wye takeoffs unless otherwise indicated where 90 degree conical tee connection may be used.

7. When transverse joints are flanged, use gaskets or neoprene or other suitable material between flanges. Ductmate connectors may be submitted for review as applicable.

E. Duct Connection Systems

1. At the Contractor's option or where indicated on drawings, the Ductmate Duct Connection System manufactured by Ductmate Industries, Inc., and as specified herein, may be used as a method for connection sections of rectangular ductwork. Ductmate shall be used on round ducts in chase areas where indicated on drawings.

   a. The Ductmate System shall result in the creation of a tight joint with zero leakage.

   b. System shall be assembled and installed per manufacturer's instructions.

   c. All component parts shall be of the composition and materials manufactured only by Ductmate Industries, Inc., and guaranteed against defective material and workmanship. If the Contractor desires to submit a substitute manufacturer, he shall provide full compliance report containing catalog data, test data, and engineering specifications, to the Professional for review.

   d. The Ductmate System shall not be used for applications with duct gauges heavier than 16 gauge or lighter than 26 gauge.

   e. Factory trained personnel shall be available upon the Contractor's request, at no charge, to instruct the Contractor in the use of the Ductmate System.

2.2 FIRE DAMPERS

A. A sleeve gauge may not be less than shown for duct gauge as listed in NFPA Bulletin 90A, Latest Edition.

B. All fire dampers shall have been tested under the STANDARD FOR FIRE DAMPERS UL -55-(latest edition) and shall be so labeled by UNDERWRITERS' LABORATORIES, INC. Dampers shall also be of the stacked blade design with the blade ends extended into the tracks at both jambs a minimum of 3/4". Dampers shall be UL listed for installation in a 2 hour fire stop. For locations where the damper is in the rectangular duct with an air flow velocity between 1000 and 2000 FPM, the nominal damper width shall be the same as the duct width but the blade stack (damper in open position), shall be out of the air steam (Type B damper). For locations involving round or flat oval duct, or rectangular with an air velocity exceeding 2000 FPM, the fire damper frame in the air stream (Type C damper). Mullions required for multiple damper installations shall have the same rating of the dampers. Manufacturer's data shall show UL testing approval for both duct and ductless testing. Dampers shall be Air Balance

Inc., Ruskin Manufacturing Company Inc., Prefco Products, Inc.or approved equal, and must meet applicable U.L. design numbers.

Part 3 - EXECUTION

3.1 GENERAL

A. Where equipment furnished vary in dimensions, configuration, electrical characteristics, or location, etc., from the layout indicated on the drawings, the contractor shall make all modifications required to accommodate the actual equipment to be provided. Submission of shop drawings shall indicate acceptance of this responsibility. In any case an accurate 1/4" - 1'0" drawings shall be submitted with the shop drawings for approval by the professional prior to installation.

B. All equipment shall be installed in a workmanlike manner by skilled workmen regularly engaged in this type of work.

C. Where equipment is relocated to a place other than that shown on the drawings or when equipment other than that specified is used, the Contractor shall pay the entire cost of required revisions to such items as structural steel, concrete, electrical work, piping and ductwork.

3.2 SHEETMETAL SHOP DRAWINGS

A. General

1. Submit shop drawings and product data provisions of Section 01300 SUBMITTALS

3.3 DUCT WORK

A. General

1. Ducts, casings, fittings, transitions and accessories shall be made of galvanized sheet iron or steel, and shall be installed in complete accordance with ASHRAE & SMACNA.

2. All ducts shall be strongly and rigidly constructed and all joints and seams shall be mechanically tight as well as substantially and properly air tight. Sheet metal for slips and drive caps shall be of equal thickness and material as ducts.

3. Manufacturer's recommendations regarding product application and installation shall be strictly adhered to.

4. Special care shall be taken to construct, support and dress exposed ductwork neatly.

3.4 DUCTWORK ACCESSORIES

A. Turning Vanes

1. Furnish and install turning vanes where indicated on drawings or as herein specified.

END OF SECTION

SECTION 15936

AIR INLETS AND OUTLETS

Part 1 - GENERAL

1.1 STIPULATIONS

A. The "General Conditions for Construction Projects" form a part of this specification section by reference thereto and shall have the same force and effect, as if printed herewith in full.

Part 2 - PRODUCTS

2.1 AIR CONTROL DEVICES

A. This Contractor shall furnish and install air control devices and accessories, as shown on plans and as specified herein.

B. Interior grilles shall have white enamel finish ready for field painting.

C. All security air control devices shall be installed with vandal proof screws. Fasteners shall be one-way vandal proof #8 - 3/4 S/M screws. Through bolts shall be one-way vandal proof heads.

D. Air control devices shall be as manufactured by Anemostat, Titus Corporation, Tuttle & Bailey or approved equal.

E. Shop drawings showing room schedule, style, catalog numbers, finish, size, details, CFM, NC ratings, and accessories shall be submitted for review.

F. For the purpose of setting a minimum standard, Model numbers listed below shall be referenced to Anemostat, unless otherwise noted. Other manufacturers submitted shall be in all ways equal with NC ratings limited to a maximum of NC 30, as accepted by the Professional.

1. Steel Security Lattice Face Exhaust Register (E.R.)

a. Anemostat Model SGEHD: Security grille type shall be all steel construction with reinforced welded corners.

b. A 12 gauge cold rolled steel face plate shall cover the unit. The hole pattern for the face plate will be 9/16" holes on 11/16" center.

c. The face shall be finished in temperature set while prime coat for field painting by this Contractor.

d. The frame will consist of countersunk screw holes.

e. The manufacturing dimensions shown shall be plus or minus 1/32 of an inch.

f. Each register shall be furnished and installed with a heavy gauge steel volume control.

2. Siteproof Wall Mounted Transfer Grilles (T.G.) & Low Wall Return Registers (R.R.)

a. Wall mounted return registers or transfer grilles shall be steel construction with baked enamel prime coat finish in color as selected by the Professional.

b. The frame shall be constructed of extruded aluminum 0.055" thick with aluminum fins of 0.032" thickness.

c. The grilles face shall have a sight proof core with an opposed blade volume damper.

d. The damper shall be constructed of 18 gauge steel frame and extruded aluminum blades of 0.051" thickness.

e. Units shall be Anemostat Model SNSB with opposed blade balancing damper as previously specified.

Part 3 - EXECUTION

3.1 GENERAL

A. Coordinate all devices with ceiling construction and type, and work of other trades.

END OF SECTION

SECTION 16010

GENERAL PROVISIONS

Part 1 - GENERAL

1.1 SCOPE OF WORK

A. Disconnect and remove existing lighting and electrical devices in Area A as indicated on the Drawings. Rework or remove existing conduit system as indicated.

B. Provide lighting, switches, new electrical devices and power connections to new or altered mechanical equipment in Area A.

1.2 GENERAL

A. Coordinate work included in other trades which affect the work of this Division.

1.3 CODES, STANDARDS AND PERMITS

A. Perform work in accordance with the latest editions, revisions, amendments or supplements of applicable statutes, ordinances, codes or regulations of Federal, State and Local Authorities having jurisdiction in effect on the date bids are received.

B. The Contractor shall be licensed in the Municipality having jurisdiction where licenses are required.

C. Resolve any code violation discovered in contract documents with the Department prior to award of the contract. After award of the contract, make any correction or addition necessary for compliance with applicable codes at no additional compensation.

1.4 CONTRACT DRAWINGS

A. The contract drawings are generally diagrammatic and are intended to encompass a system that will not interfere with the structural and architectural design of the building and grounds. Coordinate the work to avoid interferences between conduit, equipment, architectural and structural work.

B. Contract drawings are based on the equipment specified. Make adjustments, modifications, or changes required, due to use of other equipment, at no additional compensation.

1.5 PROJECT/SITE CONDITIONS

A. Space Requirements:

1. Make changes in equipment location of up to 5', to allow for field conditions prior to actual installation, at no additional compensation, as directed by the Facility.

2. Conceal all conduit in finished areas. Route conduit through the building without interfering with other Contractor's equipment or construction.

3. Provide maximum possible clear height underneath all conduit. Install conduit as high as possible.

4. Install all equipment requiring service so that it is easily accessible.

B. Compare the equipment sizes with the space allotted for installation before installation and make written notice of possible conflict. Disassemble large equipment to permit installation through normal room openings when required.

C. Cutting and Patching:

1. Execute cutting and demolition by methods which will prevent damages to other work and will provide proper surfaces to receive installation of repairs.

2. Restore work which has been cut or removed; install new products complying with specified products, functions, tolerances and finishes as stated in the contract documents. Provide heavy chrome plated or nickel plated escutcheon plates of approved pattern for penetrations of finished surface. Approved escutcheon plates are B&C No. 10 with concealed hinges.

3. Fit work airtight to conduit, sleeves and other penetrations through surfaces. For fire rated penetrations, provide in accordance with UL 1479 and ASTM E 814 assemblies utilizing products and materials equal to the rating of all surfaces penetrated.

1.6 MATERIALS AND WORKMANSHIP

A. Provide new materials and equipment of a domestic manufacturer by those regularly engaged in the production and manufacture of specified materials and equipment. Where UL or other agency has established standards for materials, provide materials which are listed and labeled accordingly.

B. Perform work by workmen skilled in the trade required for the work. Install all materials and equipment to present a neat appearance when completed and in accordance with the approved recommendations of the manufacturer and the best practices of the trade and in conformance with the contract documents.

C. Provide all labor, materials, apparatus, and appliances essential to the complete functioning of the systems described or indicated herein, or which may be reasonably implied as essential whether mentioned in the contract documents or not.

1.7 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Follow the manufacturer's directions completely in the delivery, storage, and handling of equipment and materials.

B. Store equipment in a clean, dry place, protected from other construction. While stored, maintain factory wrappings or tightly cover and protect equipment against dirt, water, construction debris, chemical, physical or weather damage, traffic and theft.

1.8 SERVICE

A. Immediately prior to final acceptance of project, inspect, clean and service all light fixtures.

B. Remove all excess material and debris. Place all electrical systems in complete working order before request for final review.

1.9 GUARANTEE

A. Guarantee materials, parts and labor for all work for one (1) year from the date of issuance of occupancy permit. During that period make good any faults or imperfections that may arise due to defects or omissions in materials or workmanship with no additional compensation and to the complete satisfaction of the Department.

END OF SECTION

SECTION 16050

BASIC MATERIALS AND METHODS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Raceways.
2. Building wire and connectors.
3. Supporting devices for electrical components.
4. Electrical identification.
5. Electrical demolition.
6. Cutting and patching for electrical construction.

1.2 SUBMITTALS

A. Product Data: Submit per the requirements of Section 01300.

1.3 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Comply with NFPA 70.

1.4 COORDINATION

A. Coordinate chases, slots, inserts, sleeves, and openings for electrical supports, raceways, and cable with general construction work.

B. Coordinate location of access panels and doors for electrical items that are concealed by finished surfaces.

C. Where electrical identification devices are applied to field-finished surfaces, coordinate installation of identification devices with completion of finished surface.

PART 2 - PRODUCTS

2.1 RACEWAYS

A. EMT: Electrical metallic tubing; ANSI C80.3, zinc-coated steel, with compression fittings.

B. FMC: Flexible metal conduit; zinc-coated steel.

C. IMC: Intermediate metal conduit; ANSI C80.6, zinc-coated steel, with threaded fittings.

D. LFMC: Liquidtight flexible metal conduit; zinc-coated steel with sunlight-resistant and mineral-oil-resistant plastic jacket.

E. RMC: Rigid metal conduit; galvanized rigid steel; ANSI C80.1.

F. RNC: Rigid nonmetallic conduit; NEMA TC 2, Schedule 40 PVC, with NEMA TC3 fittings.

G. Raceway Fittings: Specifically designed for raceway type with which used.

2.2 WIRES, CABLES, AND CONNECTIONS

A. Conductors, No. 10 AWG and Smaller: Solid or stranded copper.

B. Conductors, Larger Than No. 10 AWG: Stranded copper.

C. Insulation: Thermoplastic, rated 600 V, 75 deg C minimum, Type THW, THHN-THWN, or USE depending on application.

D. Cable: Type MC with ground wire.

E. Wire Connectors and Splices: Units of size, ampacity rating, material, type, and class suitable for service indicated.

2.3 SUPPORTING DEVICES

A. Material: Cold-formed steel, with corrosion-resistant coating.

B. Metal Items for Use Outdoors or in Damp Locations: Hot-dip galvanized steel.

C. Raceway and Cable Supports: Manufactured clevis hangers, riser clamps, straps, threaded C-clamps with retainers, ceiling trapeze hangers, wall brackets, and spring-steel clamps or click-type hangers.

D. Expansion Anchors: Carbon-steel wedge or sleeve type.

E. Toggle Bolts: All-steel springhead type.

F. Powder-Driven Threaded Studs: Heat-treated steel.

2.4 ELECTRICAL IDENTIFICATION

A. Identification Device Colors: Use those prescribed by ANSI A13.1, NFPA 70, and these Specifications.

B. Colored Adhesive Marking Tape for Raceways, Wires, and Cables: Self-adhesive vinyl tape, not less than 1 inch wide by 3 mils thick.

C. Tape Markers for Conductors: Vinyl or vinyl-cloth, self-adhesive, wraparound type with preprinted numbers and letters.

D. Color-Coding Cable Ties: Type 6/6 nylon, self-locking type. Colors to suit coding scheme.

E. Engraved-Plastic Labels, Signs, and Instruction Plates: Engraving stock, melamine plastic laminate punched or drilled for mechanical fasteners 1/16-inch minimum thickness for signs up to 20 sq. in. and 1/8-inch minimum thickness for larger sizes. Engraved legend in black letters on white background.

F. Warning and Caution Signs: Preprinted; comply with 29 CFR 1910.145, Chapter XVII. Colors, legend, and size appropriate to each application.

G. Interior Units: Aluminum, baked-enamel-finish, punched or drilled for mechanical fasteners.

H. Fasteners for Nameplates and Signs: Self-tapping, stainless-steel screws or No. 10/32 stainless-steel machine screws with nuts and flat and lock washers.

PART 3 - EXECUTION

3.1 ELECTRICAL EQUIPMENT INSTALLATION

A. Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide maximum possible headroom.

B. Materials and Components: Install level, plumb, and parallel and perpendicular to other building systems and components, unless otherwise indicated.

C. Equipment: Install to facilitate service, maintenance, and repair or replacement of components. Connect for ease of disconnecting, with minimum interference with other installations.

D. Right of Way: Give to raceways and piping systems installed at a required slope.

3.2 RACEWAY APPLICATION

A. Indoor Installations:

1. Exposed: EMT except in wet or damp locations, use IMC.
2. Concealed in Walls or Ceilings: EMT.
3. Connection to Vibrating Equipment: FMC; except in wet or damp locations: LFMC.
4. Boxes and Enclosures: NEMA 250, Type 1, unless otherwise indicated.

3.3 RACEWAY AND CABLE INSTALLATION

A. Conceal raceways and cables, unless otherwise indicated, within finished walls, ceilings, and floors.

B. Keep legs of raceway bends in the same plane and keep straight legs of offsets parallel.

C. Install pull wires in empty raceways. Use No. 14 AWG zinc-coated steel or woven polypropylene or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of pull wires.

D. Install telephone and signal system raceways, 2-inch trade size and smaller, in maximum lengths of 150 feet and with a maximum of two 90-degree bends or equivalent. Add pull boxes where necessary to accomplish this.

E. Connect motors and equipment subject to vibration, noise transmission, or movement with a maximum of 72-inches flexible conduit. Install LFMC in wet or damp locations. Install separate ground conductor across flexible connections.

3.4 WIRING METHODS FOR POWER, LIGHTING, AND CONTROL CIRCUITS

A. Application: Use wiring methods specified below to the extent permitted by applicable codes as interpreted by authorities having jurisdiction.

B. Exposed Feeders: Insulated single conductors in raceway.

C. Concealed Feeders in Ceilings, Walls or Gypsum Board Partitions: Insulated single conductors in raceway.

D. Exposed Branch Circuits: Insulated single conductors in raceway.

E. Concealed Branch Circuits in Ceilings, Walls, or Gypsum Board Partitions: Insulated single conductors in raceway. (Metal-clad cable may be used for fishing existing masonry walls and as fixture whips.)

F. Remote-Control Signaling and Power-Limited Circuits, Classes 1, 2, and 3: Insulated conductors in raceway unless otherwise indicated.

3.5 WIRING INSTALLATION

A. Make splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.

3.6 ELECTRICAL SUPPORTING DEVICE APPLICATION

A. Damp Locations and Outdoors: Hot-dip galvanized materials or nonmetallic, slotted channel system components.

B. Dry Locations: Steel materials.

C. Strength of Supports: Adequate to carry present and future loads, times a safety factor of at least four with, 200-lb minimum design load for each support element.

3.7 SUPPORT INSTALLATION

A. Support parallel runs of horizontal raceways together on trapeze- or bracket-type hangers.

B. Size supports for multiple raceway or cable runs so capacity can be increased by a 25 percent minimum in the future.

C. Support individual horizontal single raceways with separate, malleable-iron pipe hangers or clamps except use spring-steel fasteners for 1-1/2-inch and smaller single raceways above suspended ceilings and for fastening raceways to slotted channel and angle supports.

D. Secure electrical items and their supports to building structure, using the following methods unless other fastening methods are indicated:

1. Wood: Wood screws or screw-type nails.
2. Gypsum Board: Toggle bolts. Seal around sleeves with joint compound, both sides of wall.
3. Masonry: Toggle bolts on hollow block and expansion bolts on solid block. Seal around sleeves with mortar, both sides of wall.
4. New Concrete: Concrete inserts with machine screws and bolts.
5. Existing Concrete: Expansion bolts.
6. Structural Steel: Welded threaded studs, or Spring-tension clamps.
    a. Comply with AWS D1.1 for field welding.
7. Light Steel Framing: Sheet metal screws.
8. Fasteners for Damp, Wet, or Weather-Exposed Locations: Stainless steel.
9. Light Steel: Sheet-metal screws.
10. Fasteners: Select so load applied to each fastener does not exceed 25 percent of its proof-test load.

3.8 IDENTIFICATION MATERIALS AND DEVICES

A. Install at locations for most convenient viewing without interference with operation and maintenance of equipment.

B. Coordinate names, abbreviations, colors, and other designations used for electrical identification with corresponding designations indicated in the Contract Documents or required by codes and standards. Use consistent designations throughout Project.

C. Self-Adhesive Identification Products: Clean surfaces before applying.

D. Tag and label circuits designated to be extended in the future. Identify source and circuit numbers in each cabinet, pull and junction box, and outlet box. Color-coding may be used for voltage and phase identification.

E. Install continuous underground plastic markers during trench backfilling, for exterior underground power, control, signal, and communication lines located directly above power and communication lines. Locate 6 to 8 inches below

finished grade. If width of multiple lines installed in a common trench or concrete envelope does not exceed 16 inches, overall, use a single line marker.

F. Install warning, caution, and instruction signs where required to comply with 29 CFR 1910.145, Chapter XVII, and where needed to ensure safe operation and maintenance of electrical systems and of items to which they connect. Indoors install engraved plastic-laminated instruction signs with approved legend where instructions are needed for system or equipment operation. Install metal-backed butyrate signs for outdoor items.

3.9 FIRESTOPPING

A. Apply firestopping to cable and raceway sleeves and other penetrations of fire-rated floor and wall assemblies to restore original undisturbed fire-resistance ratings of assemblies.

3.10 DEMOLITION

A. Protect existing electrical equipment and installations indicated to remain. If damaged or disturbed in the course of the Work, remove damaged portions and install new products of equal capacity, quality, and functionality.

B. Accessible Work: Remove exposed electrical equipment and installations, indicated to be demolished, in their entirety.

C. Abandoned Work: Cut and remove buried raceway and wiring, indicated to be abandoned in place, 2 inches below the surface of adjacent construction. Cap raceways and patch surface to match existing finish.

D. Remove, store, clean, reinstall, reconnect, and make operational components indicated for relocation.

3.11 CUTTING AND PATCHING

A. Cut, channel, chase, and drill floors, walls, partitions, ceilings, and other surfaces required to permit electrical installations. Perform cutting by skilled mechanics of trades involved.

B. Repair, refinish and touch up disturbed finish materials and other surfaces to match adjacent undisturbed surfaces.

END OF SECTION

SECTION 16140

WIRING DEVICES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes:

1. Receptacles.
2. Connectors.
3. Switches.
4. Finish plates.

1.2 SUBMITTALS

A. Product Data: For each product used, submit product data per Section 01300.

1.3 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Comply with NEMA WD 1.

C. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Wiring Devices:

1) Bryant Electric, Inc.
2) Eagle Electric Manufacturing Co., Inc.

3) GE Company; GE Wiring Devices.
4) Hubbell, Inc.; Wiring Devices Div.
5) Killark Electric Manufacturing Co.
6) Leviton Manufacturing Co., Inc.
7) Pass & Seymour/Legrand; Wiring Devices Div.
8) Pyle-National, Inc.; an Amphenol Co.

2.2 RECEPTACLES

A. Straight-Blade and Locking Receptacles: Heavy-Duty grade.

B. GFCI Receptacles: Feed-through type, with integral NEMA WD 6, Configuration 5-20R duplex receptacle arranged to protect connected downstream receptacles on same circuit. Design units for installation in a 2-3/4-inch deep outlet box without an adapter.

2.3 SWITCHES

A. Snap Switches: Heavy-duty, quiet type.

2.4 FINISH COLOR FOR RECEPTACLES AND SWITCHES

A. Color: Ivory, unless otherwise indicated or required by Code.

2.5 WALL PLATES

A. Single and combination types match corresponding wiring devices.

1. Plate-Securing Screws: Metal with head color to match plate finish.
2. Material for Finished Spaces: Type 302, satin-finished stainless steel.
3. Material for Unfinished Spaces: White nylon.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install devices and assemblies plumb and secure.

B. Install wall plates when painting is complete.

C. Arrangement of Devices: Unless otherwise indicated, mount flush, with long dimension vertical, and grounding terminal of receptacles on top. Group adjacent switches under single, multigang wall plates.

D. Protect devices and assemblies during painting.

3.2 FIELD QUALITY CONTROL

A. Test wiring devices for proper polarity and ground continuity. Operate each device at least six times.

B. Test GFCI operation with both local and remote fault simulations according to manufacturer's written instructions.

C. Replace damaged or defective components, and prepare written report of tests.

END OF SECTION

SECTION 16410

ENCLOSED SWITCHES AND CIRCUIT BREAKERS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes individually mounted enclosed switches and circuit breakers, rated 600 V and less, used for disconnecting and protection functions.

B. See Division 16 Section "Fuses" for fuses for fusible disconnect switches.

1.2 SUBMITTALS

A. Product Data: For each type of switch and circuit breaker indicated.

B. Shop Drawings: Include wiring diagrams for shunt-tripped circuit breakers.

C. Field quality-control test reports.

D. Operation and maintenance data.

1.3 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Source Limitations: Obtain switches and circuit breakers through one source from a single manufacturer.

C. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. Eaton Corp.; Cutler-Hammer Products.
    b. General Electric Co.; Electrical Distribution & Control Division.
    c. Siemens Energy & Automation, Inc.
    d. Square D Co.

2.2 ENCLOSED SWITCHES

A. Enclosed, Nonfusible Switch: NEMA KS 1, Type HD, with lockable handle, interlocked with cover.

B. Enclosed, Fusible Switch, 800 A and Smaller: NEMA KS 1, Type HD, with clips to accommodate specified fuses, and lockable handle, interlocked with cover.

2.3 ENCLOSED CIRCUIT BREAKERS

A. Molded-Case Circuit Breaker: NEMA AB 1, with interrupting capacity to meet available fault currents.

1. Thermal-Magnetic Circuit Breakers: Inverse time-current element for low-level overloads, and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.
2. GFCI Circuit Breakers: Single- and two-pole configurations with 5-mA trip sensitivity.

B. Molded-Case Circuit-Breaker Features and Accessories: Standard frame sizes, trip ratings, and number of poles.

1. Lugs: Suitable for number, size, trip ratings, and material of conductors.
2. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HACR for heating, air-conditioning, and refrigerating equipment.

3. Ground-Fault Protection: Integrally mounted relay and trip unit with adjustable pickup and time-delay settings, push-to-test feature, and ground-fault indicator.

2.4 ENCLOSURES

A. Listed for environmental conditions of installed locations, including:

1. Outdoor Locations: NEMA 250, Type 3R.
2. Food Service Areas: NEMA 250, Type 4X, stainless steel.
3. Other Wet or Damp Indoor Locations: NEMA 250, Type 4.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Temporary Provisions: Remove temporary lifting provisions and blocking of moving parts.

B. Identify components; provide warning signs as specified in Division 16 Section "Basic Electrical Materials and Methods"

3.2 FIELD QUALITY CONTROL

A. Testing: After installing disconnect switches and circuit breakers and after electrical circuits have been energized, demonstrate product capability and compliance with requirements.

B. Inspections and Tests for Switches and Circuit Breakers: Make internal and external inspections and perform tests, including the following:

1. Inspect for freedom from physical damage, proper unit rating, mechanical condition, enclosure integrity, cover operation, unit anchorage, clearances, and tightness of electrical connections. If a loose electrical connection is observed on any unit, check each electrical connection for each switch and circuit breaker with a torque wrench for compliance with manufacturer's torquing instructions.
2. Test insulation resistance of each pole, phase-to-phase, and phase-to-ground, following manufacturer's written instructions. Test insulation resistance of shunt trip circuits. Use 500-V minimum test voltage for units and circuits rated up to 250 V, 1000-V minimum test voltage for units rated more than 250 V. Measured insulation resistance must be 25 megohms, minimum, for switches rated up to 250 V, and 100 megohms, minimum, for switches rated more than 250 V.

3. Test cover and other interlocks and interlock release devices for proper operation.

C. Additional Inspections and Tests for Switches: Include the following:

1. Inspect for proper rating and fuse provisions.
2. Check adequacy and integrity of fuseholders by removing and installing fuses.
3. Check integrity of phase barriers.
4. Inspect blade alignment visually while operating switch to observe adequacy of blade pressure.

D. Additional Inspections and Tests for Circuit Breakers: Include the following:

1. Inspect for proper frame, trip, and fault current interrupting rating.
2. Test shunt trip devices, circuits, and actuating components for proper operation.

E. Correct defective and malfunctioning units on-site, where possible, and reinspect and retest to demonstrate compliance; otherwise, remove and replace with new units and retest.

END OF SECTION

SECTION 16511

INTERIOR LIGHTING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes interior lighting fixtures, ballasts, emergency lighting units, and accessories.

1.2 SUBMITTALS

A. Product Data: For each type of lighting fixture and lamp indicated. Include illustrations and dimensions of fixtures, and showing photometric performance.

1.3 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Comply with NFPA 70.

1.4 COORDINATION

A. Fixtures, Mounting Hardware, and Trim: Coordinate layout and installation of lighting fixtures with ceiling system and other construction.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the products specified.
2. Products: Subject to compliance with requirements, provide one of the products specified.

2.2 FLUORESCENT BALLASTS

A. Description: Unless otherwise indicated, features include the following:

1. Designed for type and quantity of lamps indicated at full light output.
2. Total Harmonic Distortion Rating: Less than 20 percent. Lamp current crest factor: less than 1.7.
3. Transient Protection: Comply with IEEE C62.41 for Category A1 locations.
4. Sound Rating: A or better unless otherwise indicated.
5. Ballasts for Linear Lamps: Electronic type, unless otherwise indicated. Include the following added features:

    a. Certified Ballast Manufacturer Certification: Indicated by label.
    b. Encapsulation: Without voids in potting compound.
    c. Parallel Lamp Circuits: Multiple lamp ballasts connected to maintain full light output on surviving lamps if one or more lamps fail.
6. Ballasts for Compact Lamps: Electronic or electromagnetic, fully encapsulated in potting compound, and with the following features:
7. Power Factor: 90 percent, minimum.
8. Operating Frequency for Electronic Ballasts: 20 kHz or higher.
9. Flicker: Less than 5 percent.
10. Electronic Ballast Interference: Comply with 47 CFR, Chapter 1, Part 18, Subpart C for limitations on electromagnetic and radio-frequency interference for nonconsumer equipment.

2.3 LIGHTING FIXTURES

A. Individual fixtures are specified on the contract drawings in the "Lighting Fixture Schedule". The naming of a particular Manufacturer in the schedule does not preclude the Contractor from submitting a fixture equal in performance and appearance to the specified unit.

2.4 LAMPS

A. Fluorescent Color Temperature and Minimum Color-Rendering Index: 3500 K and 85 CRI, unless otherwise indicated.

B. Noncompact Fluorescent Lamp Life: Rated average shall be 20,000 hours at 3 hours per start when used on rapid-start circuits.

2.5 FIXTURE SUPPORT COMPONENTS

A. Comply with Division 16 Section "Basic Electrical Materials and Methods," for channel- and angle-iron supports and nonmetallic channel and angle supports.

B. Single-Stem Hangers: 1/2-inch steel tubing with swivel ball fitting and ceiling canopy. Finish same as fixture.

C. Rod Hangers: 3/16-inch minimum diameter, cadmium-plated, threaded steel rod.

D. Hook Hangers: Integrated assembly matched to fixture and line connection and equipped with threaded attachment cord and locking-type plug.

2.6 FINISHES

A. Fixtures: Manufacturer's standard, unless otherwise indicated.

1. Paint Finish: Applied over corrosion-resistant treatment or primer, free of defects.
2. Metallic Finish: Corrosion resistant.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install new lighting fixtures in accordance with the manufacturer's installation instructions. Provide all anchors and electrical hardware required for installation.

3.2 FIELD QUALITY CONTROL

A. Tests:

1. Verify normal operation of each fixture after installation.

B. Defective and Malfunctioning Fixtures and Components: Replace or repair, then retest. Repeat procedure until units are acceptable.

END OF SECTION

END OF SPECIFICATIONS

PROOF OF VISIT

Department of Public Welfare
Division of Facilities and Property Management

Project No. W-0515-0901
Shower Room 245 Renovations & Modifications at Building 34
Wernersville State Hospital

Vendor's Name: VHRIG CONSTRUCTION

Address: 1700 N 5TH ST
READING, PA 19601

☒ I visited the Project site and reviewed the work to be completed prior to submitting a Bid Proposal.

Signature Todd Kamen Date 3/30/11

ESCORTED BY: CARL McLaughlin Plu. Foreman

Facility Representative's Signature:

Title: FMM I

Date Escorted: 3-30-11

SPECIAL NOTE TO BIDDER

One signed copy of this Proof of Visit form must be returned with your Bid or your Bid will be rejected.
You may keep one copy for your records.