Ahca Client Code/File No.:
14/14960974-101-1

Tenant:
Azura Vascular Care
52 East Swedesford Road
Suite 110
Malvern, PA 19355

Architect:
Jeffrey K. Griffin, AIA
931 Monroe Drive NE, Suite A102-181
Atlanta, GA 30308
404-310-8827

Project:
Azura Surgery Center Renalus Crestview

For Construction
June 27, 2019
Azura Surgery Center Renalus Crestview

SPECIFICATIONS-Shell

TABLE OF CONTENTS

PROCUREMENT AND CONTRACTING REQUIREMENTS

Document 00000  Geo Technical Report

SPECIFICATIONS

DIVISION 1 - GENERAL REQUIREMENTS

Section 01015  Contractor’s Use of the Premises
Section 01070  Abbreviations and Definitions
Section 01100  Alternates & Substitutions
Section 01100  FMC Product Substitution Form
Section 01200  Project Meetings
Section 01200  Generator Pre-Installation Checklist
Section 01340  Shop Drawings, Product Data and Samples
Section 01410  Testing and Inspection
Section 01410  Special Testing Inspection Agency Services
Section 01420  Master Submittal Transmittal Form
Section 01500  Temporary Facilities and Controls
Section 01600  Owner Furnished Equipment
Section 01640  Product Handling
Section 01700  Contract Closeout
Section 01700  Attic Stock Checklist – Appendix A
Section 01700  Life Safety Manual Checklist - Appendix B
Section 01710  Cleaning
Section 01720  Project Record Documents

DIVISION 2 - SITEWORK

Section 02221  Excavating Backfilling and Compacting for Structures
Section 02281  Termite Control

DIVISION 3 - CONCRETE

Section 03100  Concrete Formwork
Section 03200  Concrete Reinforcement
Section 03300  Cast In Place Concrete
Section 03600  Non Shrink Grout

DIVISION 4 - MASONRY

Section 04200  Unit Masonry
Section 04220  Structural Concrete Masonry

DIVISION 5 - METALS
Section 05100  Structural Steel
Section 05200  Steel Joists
Section 05300  Metal Decking
Section 05500  Metal Fabrications

DIVISION 6 - WOOD, PLASTICS AND COMPOSITES
Section 06100  Rough Carpentry

DIVISION 7 - THERMAL AND MOISTURE PROTECTION
Section 07110  Waterproofing & Crack Isolation
Section 07240  Exterior Insulation & Finish System
Section 07210  Thermal Insulation
Section 07542  Thermoplastic Polyolefin (TPO) Membrane Roofing
Section 07620  Sheet Metal Flashing and Trim
Section 07920  Joint Sealants & Waterproofing

DIVISION 8 - OPENINGS
Section 08111  Steel Doors and Frames
Section 08411  Aluminum-Framed Entrances and Storefronts
Section 08461  Sliding Automatic Entrance
Section 08710  Door Hardware
Section 08800  Glass and Glazing

DIVISION 9 - FINISHES
Section 09260  Gypsum Board Assemblies
Section 09900  Paints and Coatings

DIVISION 10 - SPECIALTIES
Section 10520  Fire-Protection Specialties
Section 10731  Overhead Supported Canopies

DIVISION 11 - EQUIPMENT
No Sections

DIVISION 12 - FURNISHINGS
No Sections

DIVISION 13 - SPECIAL CONSTRUCTION
No Sections
DIVISION 14 - CONVEYING SYSTEMS

No Sections

DIVISION 15 - MECHANICAL

Section 15010 General Mechanical Requirements
Section 15140 Hangers & Supports for Piping and Equipment
Section 15190 Equipment and Piping Identification
Section 15200 Insulation – HVAC and Plumbing
Section 15210 Vibration Isolation
Section 15400 Plumbing Piping
Section 15410 Plumbing Fixtures
Section 15500 Fire Protection Systems

DIVISION 16 - ELECTRICAL

Section 16010 General Electrical Requirements
Section 16110 Raceways and Wiring –600 Volt
Section 16140 Wiring Devices
Section 16175 Electrical Identification
Section 16200 Service and Distribution – 600 Volt
Section 16430 Motor Controls and Wiring
Section 16450 Grounding Systems
Section 16500 Lighting
Section 16610 Emergency Standby Generator
Section 16650 MOV SPDS
Section 16702 Nurse Call System
Section 16780 Lightning Protection

END OF TABLE OF CONTENTS
SECTION 01015

CONTRACTOR’S USE OF THE PREMISES

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work Included: This Section applies to situations in which the Contractor or his representatives including, but not necessarily limited to, suppliers, subcontractors, employees, and field engineers, enter upon the Owner’s property.

B. Related Work:
   1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.

1.02 QUALITY ASSURANCE

A. Promptly upon award of the Contract, notify all pertinent personnel regarding requirements of this Section.

B. Require that all personnel who will enter upon the Owner’s property certify their awareness of familiarity with the requirements of this Section.

1.03 USE OF PREMISES

A. The Contractor shall confine his apparatus, storage of materials and operations of his workmen to limits as required by the Owner, and shall not unreasonably encumber the premises with his materials.

B. The Contractor shall maintain access to and egress from the building in a safe manner, well marked and in locations as required by the local authorities having jurisdiction over this work. They shall be responsible for furnishing and maintaining in a safe condition all barricades, temporary enclosures, railings, lights, etc., and removing same at completion of job.

C. At no time shall the structure be loaded beyond safe limits, and in no case shall any loads exceed the design limits.

D. All work shall be done during the regular work hours of the day, unless specifically approved and/or requested by the Owner. All work carried on outside of regular working hours shall be done at the Contractor’s expense, and no extras will be allowed. The use of “Overtime” shall be at the Contractor’s option.

1.04 SECURITY

A. Restrict the access of all persons entering upon the Owner’s property in connection with the Work to the Access Route and to the actual site of the work.

1.05 COORDINATION OF WORK

A. The Contractor shall limit the storage of materials and equipment to the areas indicated or required by the Owner.
B. At no time during the work under the Contract shall the Contractor place, or cause to be placed, any material or equipment, etc. at any location that would impede or impair access to or from the present facilities for other tenants, employees, or delivery facilities.

C. The Contractor shall cooperate with the Owner to the fullest extent in providing traffic control during the course of construction so as to provide a minimum of inconvenience to existing tenants.

D. The Contractor shall send proper notices, make all necessary arrangements, and perform all services required in the care and maintenance of all public utilities. The Contractor shall, during the construction period and until final acceptance of the work as a whole by the Owner, assume all responsibility concerning the same for which the Owner may be liable.

E. It is of paramount importance that the work of this Contract does not interfere in any way with the normal operation of the existing utility services in use, and no interruption of the utility services in use in the existing building can be allowed. Coordinate all work affecting service in the existing building with the Architect and the Owner.

1.06 NOISE AND DUST CONTROL

A. Exercise all possible care to control excessive noise and dust during the construction to keep these problems to a minimum. Traffic or construction areas shall be kept clean as required by the Owner and in accordance with applicable local requirements.

B. Notify the Owner prior to using air compressor, jack-hammers, etc. in sufficient time to permit removal of any occupants close enough to be affected by such disturbances. Screen all noisy equipment with temporary enclosures to shield adjacent areas as much as possible.

C. Comply with all local noise and dust control requirements or as may be required by AHJ.

1.07 ADJACENT WORK

A. In preparing the Proposal, the Contractor and Subcontractors shall be aware that adjacent work may be required due to the scope of the work indicated by the Documents. These areas include, but are not limited to:

1. Adjacent space to remain.
2. Remote mechanical or electrical locations.
3. Roof areas above or adjacent to the space.
4. Site improvements and landscaping.

END OF SECTION
SECTION 01070

ABBREVIATIONS & DEFINITIONS

PART 1 - GENERAL

1.01 INTERPRETATIONS

A. This Section is not intended to cover all definitions which may be required, nor all the abbreviations which may be used in the Contract Documents.

B. Questions regarding definition of terms, or meaning of abbreviations should be directed to the Architect.

1.02 DEFINITIONS

A. The following definitions shall apply to the Specifications:
   1. The words “Furnish” or “Supply” mean purchase and delivery of items or materials to the project site, including proper storage without installation.
   2. The word “Install” means applications, connection or erection of items or materials that have been furnished.
   3. The word “Provide” means both furnishing, supplying and installing of items or materials.
   4. The term “Work” as used herein refers to work at site of project and includes all labor and materials to be incorporated in the construction.
   5. The word “Concealed” means work within or behind various construction elements, or in crawl spaces or trenches, which is not exposed to view when the project is complete.
   6. The word “Exposed” means anything exposed to view when the project is complete, as opposed to being “Concealed.”

1.03 ABBREVIATIONS

A. The following list of abbreviations shall apply to the Drawings and Specifications. This list is not all inclusive. Other abbreviations may exist on the drawings. If any questions arise regarding abbreviations, contact the Architect for interpretation.

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>A/B</td>
<td>Acid, Bicarbonate Tubing</td>
</tr>
<tr>
<td>ABV</td>
<td>Above</td>
</tr>
<tr>
<td>AC</td>
<td>Air Conditioning</td>
</tr>
<tr>
<td>ACR</td>
<td>Above Counter Refrigerator</td>
</tr>
<tr>
<td>ACT</td>
<td>Acoustical Tile</td>
</tr>
<tr>
<td>ADD</td>
<td>Addendum</td>
</tr>
<tr>
<td>ADJ</td>
<td>Adjacent</td>
</tr>
<tr>
<td>ADJT</td>
<td>Adjustable</td>
</tr>
<tr>
<td>AFF</td>
<td>Above Finished Floor</td>
</tr>
<tr>
<td>AHJ</td>
<td>Authority Having Jursidiction</td>
</tr>
<tr>
<td>AHU</td>
<td>Air Handling Unit</td>
</tr>
<tr>
<td>Abbreviation</td>
<td>Description</td>
</tr>
<tr>
<td>--------------</td>
<td>---------------------------</td>
</tr>
<tr>
<td>DISP</td>
<td>Disposal</td>
</tr>
<tr>
<td>DISPEN</td>
<td>Dispenser</td>
</tr>
<tr>
<td>DO</td>
<td>Door Opening</td>
</tr>
<tr>
<td>DPL</td>
<td>Disposal</td>
</tr>
<tr>
<td>DPR</td>
<td>Dispenser</td>
</tr>
<tr>
<td>DR</td>
<td>Door</td>
</tr>
<tr>
<td>DT</td>
<td>Direct Touch</td>
</tr>
<tr>
<td>DW</td>
<td>Drywall</td>
</tr>
<tr>
<td>DWG</td>
<td>Drawing</td>
</tr>
<tr>
<td>DWR</td>
<td>Drawer</td>
</tr>
<tr>
<td>EAR</td>
<td>Exhaust Air Register</td>
</tr>
<tr>
<td>EC</td>
<td>Electrical Contractor</td>
</tr>
<tr>
<td>EF</td>
<td>Exhaust Fan</td>
</tr>
<tr>
<td>EGG</td>
<td>Eggshell</td>
</tr>
<tr>
<td>ELEC</td>
<td>Electrical</td>
</tr>
<tr>
<td>EMER</td>
<td>Emergency</td>
</tr>
<tr>
<td>EMR</td>
<td>Existing Material to Remove</td>
</tr>
<tr>
<td>EP</td>
<td>Epoxy Paint</td>
</tr>
<tr>
<td>EQ</td>
<td>Equal</td>
</tr>
<tr>
<td>EQUIP</td>
<td>Equipment</td>
</tr>
<tr>
<td>EWC</td>
<td>Electric Water Cooler</td>
</tr>
<tr>
<td>EXG</td>
<td>Existing</td>
</tr>
<tr>
<td>EXH</td>
<td>Exhaust</td>
</tr>
<tr>
<td>EXIST</td>
<td>Existing</td>
</tr>
<tr>
<td>EXT</td>
<td>Exterior</td>
</tr>
<tr>
<td>FA</td>
<td>Fresh Air</td>
</tr>
<tr>
<td>FAA</td>
<td>Fire Alarm Annunciator</td>
</tr>
<tr>
<td>FACP</td>
<td>Fire Alarm Control Panel</td>
</tr>
<tr>
<td>FCO</td>
<td>Floor Clean Out</td>
</tr>
<tr>
<td>FD</td>
<td>Floor Drain</td>
</tr>
<tr>
<td>FD</td>
<td>Fire Damper</td>
</tr>
<tr>
<td>FE</td>
<td>Fire Extinguisher</td>
</tr>
<tr>
<td>FEC</td>
<td>Fire Extinguisher Cabinet</td>
</tr>
<tr>
<td>FIN</td>
<td>Finish(ed)</td>
</tr>
<tr>
<td>FIXT</td>
<td>Fixture</td>
</tr>
<tr>
<td>FL</td>
<td>Floor</td>
</tr>
<tr>
<td>FLR</td>
<td>Floor(ing)</td>
</tr>
<tr>
<td>FLUR</td>
<td>Fluorescent</td>
</tr>
<tr>
<td>FP</td>
<td>Fixed Panel</td>
</tr>
<tr>
<td>FRP</td>
<td>Fiberglass Reinforced Plastic</td>
</tr>
<tr>
<td>FS</td>
<td>Floor Sink</td>
</tr>
<tr>
<td>FSD</td>
<td>Fire Smoke Damper</td>
</tr>
<tr>
<td>GA</td>
<td>Gage, Gauge</td>
</tr>
<tr>
<td>GEN</td>
<td>Generator</td>
</tr>
<tr>
<td>GL</td>
<td>Glass</td>
</tr>
<tr>
<td>GV</td>
<td>Galvanized</td>
</tr>
<tr>
<td>GWB</td>
<td>Gypsum Wall Board</td>
</tr>
<tr>
<td>H</td>
<td>High</td>
</tr>
<tr>
<td>HCS</td>
<td>Hospital Communication Systems</td>
</tr>
<tr>
<td>Abbreviation</td>
<td>Description</td>
</tr>
<tr>
<td>--------------</td>
<td>------------------------------------</td>
</tr>
<tr>
<td>HCP</td>
<td>Handicapped</td>
</tr>
<tr>
<td>HM</td>
<td>Hollow Metal</td>
</tr>
<tr>
<td>HP</td>
<td>Heat Pump</td>
</tr>
<tr>
<td>HR</td>
<td>Hour</td>
</tr>
<tr>
<td>HT</td>
<td>Height</td>
</tr>
<tr>
<td>HVAC</td>
<td>Heating-Ventilating-Air-Conditioning</td>
</tr>
<tr>
<td>HW</td>
<td>Hot Water</td>
</tr>
<tr>
<td>HWR</td>
<td>Hot Water Return</td>
</tr>
<tr>
<td>ID</td>
<td>Inside Diameter</td>
</tr>
<tr>
<td>INS</td>
<td>Insulate (d), (ion)</td>
</tr>
<tr>
<td>INT</td>
<td>Interior</td>
</tr>
<tr>
<td>IW</td>
<td>Indirect Waste</td>
</tr>
<tr>
<td>IWV</td>
<td>Indirect Waste Vent</td>
</tr>
<tr>
<td>JT</td>
<td>Joint</td>
</tr>
<tr>
<td>KVA</td>
<td>Kilovolt Amps</td>
</tr>
<tr>
<td>KW</td>
<td>Kilowatt</td>
</tr>
<tr>
<td>LAM</td>
<td>Laminate</td>
</tr>
<tr>
<td>LAV</td>
<td>Lavatory</td>
</tr>
<tr>
<td>LDW</td>
<td>Less Door Width</td>
</tr>
<tr>
<td>LT</td>
<td>Light</td>
</tr>
<tr>
<td>MAS</td>
<td>Masonry</td>
</tr>
<tr>
<td>MAX</td>
<td>Maximum</td>
</tr>
<tr>
<td>MC</td>
<td>Mechanical Contractor</td>
</tr>
<tr>
<td>MECH</td>
<td>Mechanical</td>
</tr>
<tr>
<td>MT</td>
<td>Metal</td>
</tr>
<tr>
<td>MTL</td>
<td>Metal</td>
</tr>
<tr>
<td>MTD</td>
<td>Mounted</td>
</tr>
<tr>
<td>MIN</td>
<td>Minimum</td>
</tr>
<tr>
<td>MISC</td>
<td>Miscellaneous</td>
</tr>
<tr>
<td>MO</td>
<td>Masonry Opening</td>
</tr>
<tr>
<td>MOV</td>
<td>Moveable</td>
</tr>
<tr>
<td>MRGB</td>
<td>Moisture Resistant Gypsum Wallboard</td>
</tr>
<tr>
<td>NC</td>
<td>Nurse Call</td>
</tr>
<tr>
<td>NCL</td>
<td>Nurse Call Light</td>
</tr>
<tr>
<td>NIC</td>
<td>Not in Contract</td>
</tr>
<tr>
<td>NO</td>
<td>Number</td>
</tr>
<tr>
<td>NS</td>
<td>Nurses Station</td>
</tr>
<tr>
<td>NTS</td>
<td>Not to Scale</td>
</tr>
<tr>
<td>OA</td>
<td>Overall</td>
</tr>
<tr>
<td>OC</td>
<td>On Center</td>
</tr>
<tr>
<td>OF</td>
<td>Owner Furnished</td>
</tr>
<tr>
<td>OFI</td>
<td>Owner Furnished and Installed</td>
</tr>
<tr>
<td>OFIC</td>
<td>Owner Finished Installed by Contractor</td>
</tr>
<tr>
<td>OFOI</td>
<td>Owner Furnished Owner Installed</td>
</tr>
<tr>
<td>OH</td>
<td>Opposite Hand</td>
</tr>
<tr>
<td>OH</td>
<td>Overhead</td>
</tr>
<tr>
<td>OPG</td>
<td>Opening</td>
</tr>
<tr>
<td>OPNG</td>
<td>Opening</td>
</tr>
<tr>
<td>OTS</td>
<td>Open to Structure</td>
</tr>
<tr>
<td>Abbreviation</td>
<td>Description</td>
</tr>
<tr>
<td>--------------</td>
<td>--------------------------------------------------</td>
</tr>
<tr>
<td>PAT</td>
<td>Patient</td>
</tr>
<tr>
<td>PC</td>
<td>Plumbing Contractor</td>
</tr>
<tr>
<td>PL</td>
<td>Plate</td>
</tr>
<tr>
<td>PLAM</td>
<td>Plastic Laminate</td>
</tr>
<tr>
<td>PLAS</td>
<td>Plaster</td>
</tr>
<tr>
<td>PLYWD</td>
<td>Plywood</td>
</tr>
<tr>
<td>PNL</td>
<td>Panel</td>
</tr>
<tr>
<td>PSTA</td>
<td>Patient Station</td>
</tr>
<tr>
<td>PTD</td>
<td>Paper Towel Dispenser</td>
</tr>
<tr>
<td>PTN</td>
<td>Partition</td>
</tr>
<tr>
<td>PVC</td>
<td>Polyvinyl Chloride</td>
</tr>
<tr>
<td>PWD</td>
<td>Plywood</td>
</tr>
<tr>
<td>PSDS</td>
<td>Pressurized Solution Delivery System</td>
</tr>
<tr>
<td>R</td>
<td>Rubber</td>
</tr>
<tr>
<td>RA</td>
<td>Return Air</td>
</tr>
<tr>
<td>RB</td>
<td>Rubber Base</td>
</tr>
<tr>
<td>REF</td>
<td>Refrigerator</td>
</tr>
<tr>
<td>REFR</td>
<td>Refrigerator</td>
</tr>
<tr>
<td>REFRIG</td>
<td>Refrigerator</td>
</tr>
<tr>
<td>REMOV</td>
<td>Removable</td>
</tr>
<tr>
<td>RM</td>
<td>Room</td>
</tr>
<tr>
<td>RO</td>
<td>Reverse Osmosis (water)</td>
</tr>
<tr>
<td>RP</td>
<td>Removable Panel</td>
</tr>
<tr>
<td>RTU</td>
<td>Roof Top Unit</td>
</tr>
<tr>
<td>RTPU</td>
<td>Roof Top Package Unit</td>
</tr>
<tr>
<td>SC</td>
<td>Sealed Concrete</td>
</tr>
<tr>
<td>SDS</td>
<td>Solution Delivery System</td>
</tr>
<tr>
<td>SG</td>
<td>Semi-Gloss</td>
</tr>
<tr>
<td>SHT</td>
<td>Sheet</td>
</tr>
<tr>
<td>SIM</td>
<td>Similar</td>
</tr>
<tr>
<td>SL</td>
<td>Sliding</td>
</tr>
<tr>
<td>SQ</td>
<td>Square</td>
</tr>
<tr>
<td>SR</td>
<td>Sheet Rubber</td>
</tr>
<tr>
<td>SST</td>
<td>Stainless Steel</td>
</tr>
<tr>
<td>ST</td>
<td>Steel</td>
</tr>
<tr>
<td>STA</td>
<td>Station</td>
</tr>
<tr>
<td>STD</td>
<td>Standard</td>
</tr>
<tr>
<td>STL</td>
<td>Steel</td>
</tr>
<tr>
<td>STR</td>
<td>Structural</td>
</tr>
<tr>
<td>STRUCT</td>
<td>Structural</td>
</tr>
<tr>
<td>STUC</td>
<td>Stucco</td>
</tr>
<tr>
<td>SUS</td>
<td>Suspended</td>
</tr>
<tr>
<td>SV</td>
<td>Sheet Vinyl</td>
</tr>
<tr>
<td>TC</td>
<td>Time Clock</td>
</tr>
<tr>
<td>THK</td>
<td>Thick(ness)</td>
</tr>
<tr>
<td>TKBD</td>
<td>Tackboard</td>
</tr>
<tr>
<td>TTD</td>
<td>Toilet Tissue Dispenser</td>
</tr>
<tr>
<td>TYP</td>
<td>Typical</td>
</tr>
<tr>
<td>UCR</td>
<td>Under Counter Refrigerator</td>
</tr>
<tr>
<td>Abbreviation</td>
<td>Description</td>
</tr>
<tr>
<td>--------------</td>
<td>------------------------------------</td>
</tr>
<tr>
<td>V</td>
<td>Vinyl</td>
</tr>
<tr>
<td>VB</td>
<td>Vinyl Base</td>
</tr>
<tr>
<td>VACT</td>
<td>Vinyl Acoustical Ceiling Tile</td>
</tr>
<tr>
<td>VCT</td>
<td>Vinyl Composition Tile</td>
</tr>
<tr>
<td>VERT</td>
<td>Vertical</td>
</tr>
<tr>
<td>VWC</td>
<td>Vinyl Wall Covering</td>
</tr>
<tr>
<td>WC</td>
<td>Water Closet</td>
</tr>
<tr>
<td>WCO</td>
<td>Wall Clean Out</td>
</tr>
<tr>
<td>WD</td>
<td>Wood</td>
</tr>
<tr>
<td>WDP</td>
<td>Wood Panel on Gypsum Wallboard</td>
</tr>
<tr>
<td>WIN</td>
<td>Window</td>
</tr>
<tr>
<td>WO</td>
<td>Window Opening</td>
</tr>
<tr>
<td>WP</td>
<td>Waterproofing</td>
</tr>
<tr>
<td>WS</td>
<td>Wall Sconce</td>
</tr>
</tbody>
</table>

END OF SECTION
SECTION 01100

ALTERNATES & SUBSTITUTIONS

1.01 PROVISIONS INCLUDED
   A. The conditions of the Contract and Division 1, General Requirements, apply to the Work under this Section.

1.02 DESCRIPTION OF WORK
   A. Furnish all labor, materials and services necessary for the proper and complete execution of accepted alternates. The amount of alternate prices to be added to or deducted from the base bid shall be stated on the Bid Form and shall include the cost of any and all modifications made necessary by the Owner’s acceptance of an alternate.
   B. State the amount to be added to or deducted from the base bid for each of the following alternates, if these alternates are added to the work of the Contract. The base bid shall not include the following listed alternates or work required to be performed in connection thereto.
   C. There should be no substitution and/or deviation from the FMC design standards without notable benefit to the Owner by either enhanced quality, functionality or cost/scheduling savings.

1.03 SUBSTITUTIONS
   A. Use Substitution Request Form included in FMC Master Specification.

END OF SECTION
SUBSTITUTION REQUEST FORM
(Add additional sheets as necessary to provide adequate information)

Proposed Substitution Item

<table>
<thead>
<tr>
<th>Specification Section</th>
<th>Page Number</th>
<th>Drawing &amp; Detail(s) No.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Proposed Substitution (Attach complete description, Catalog #s, Specification Data, Lab test, etc.)

1. Will Substitution affect dimensions indicated on Drawings?_____(Yes)_____(No)

2. Will Substitution affect Electrical, Mechanical, Structural Frame, Architecture, etc?_____(Yes)_____(No)

3. Is weight greater/lesser than specified item?_____(Yes)____(No)____ by how much?______________

4. What effect will substitution have on other trades?_____________________________________________

5. Difference between proposed and specified item?_____________________________________________

6. Manufacturer’s guarantee/warranty: same_______ different________ Explain_____________________

7. Provide UL, WHI, (or other) Listing/Rating of proposed assembly._________________________________

8. If Substitution request is accepted, the owner will receive a credit of: $____________________________, which will be an adjustment to the contract price.

The undersigned agrees to pay all Architectural and Engineering costs, if required, to review, test or revise the drawings or specifications caused by this substitution, and further agrees to pay any and all additional construction costs created by acceptance of this substitution.

Submitted by:__________________________________ A & E Review
Firm:__________________________________________ Date:_____ / _____ / ______
Address:________________________________________ Accepted
Phone:_________________ Fax:_________________ email:_________________
Signature:______________________________________ Not Accepted
Printed Name:___________________________________ Accepted as noted________
Date:_________________ Remarks

11/18 Version
SECTION 01200

PROJECT MEETINGS

PART 1 - GENERAL

1.01 SECTION INCLUDES:
   A. Contractor’s Responsibilities:
      1. Schedule and administer meetings throughout duration of work.
      2. Prepare agenda for meetings.
      3. Distribute written notice of each meeting seven working days in advance of meeting date.
      4. Make physical arrangements for meetings.
      5. Preside at meetings.
      6. Record the minutes; include all significant proceedings and decisions.
      7. Reproduce and distribute copies of minutes within three working days after each meeting.
      8. Provide one copy to:
         a) All participants in the meeting, including the Architect.
         b) All parties affected by decisions made at the meeting.
   B. Participants:
      1. Qualified representative of Contractors, Subcontractors, and Suppliers authorized to act on behalf of the parties they represent.
      2. Owner’s Representative at their option.
      3. Architect at the discretion of the Project Manager.

1.02 PRE-CONSTRUCTION MEETING
   A. Schedule meeting within the early stages of Construction as determined by the General Contractor.
   B. Suggested agenda: Prepare written material, distribute lists, and discuss the following:
      1. Identification of major Subcontractors and Suppliers.
      2. Projected construction schedules.
      3. Critical work sequencing.
      4. Major equipment deliveries and priorities.
      5. Project coordination, including designation of responsible person.
      6. Procedures for, and processing of:
         a) Field decisions.
         b) Proposal requests.
         c) Submittals.
         d) Change orders.
         e) Applications for payments.
      9. Use of premises:
         a) Office, work, and storage areas.
         b) Owner’s requirements.
         c) Compliance with applicable CDC Guidelines
10. Construction facilities, construction aids, and controls.
11. Temporary utilities.
15. Working days/hours.

1.03 PROGRESS MEETINGS

A. Schedule regular (weekly or as warranted by construction progress) meetings and as necessary, schedule additional meetings.

1. Meetings shall be conducted as GoToMeeting or other web based video conference call and held on the same day and time each week. GC shall coordinate a time that is acceptable to Owner Representative and Architect.

B. Suggested Agenda:
   1. Review and approval of minutes of previous meeting.
   2. Review of work progress since previous meeting.
   3. Field observations, problems, and conflicts.
   4. Problems which impede construction schedule.
   5. Review of off-site fabrication, delivery schedules.
   6. Corrective measures and procedures required to regain projected schedule.
   7. Revisions to construction schedule.
   8. Plan progress and schedule for succeeding work period.
   9. Coordination of schedules.
   10. Review submittal schedules; expedite as required.
   11. Maintenance of quality standards
   12. Review proposed changes for:
       a) Effect on construction schedule and on completion date.
       b) Effect on other contracts of the Project.
   13. Other business.

1.04 PRE-INSTALLATION

A. When required in an individual Specification Section, schedule a pre-installation meeting at the job site prior to starting the work of the Section.

B. Require attendance of entities directly affecting, or affected by, the work of the Section.

C. Notify Owner’s Representative two weeks in advance of meeting date that requires on site attendance.

END OF SECTION
Contractor’s Generator Installation Checklist

Please fill out and sign the checklist to verify that all systems are complete and the unit is ready for start-up. When this form is complete and returned, the start-up will be scheduled. Please allow at least (1) week.

Generator Model ___________________________ SER#____________________________
ATS Model(s) ___________________________ SER#____________________________
Power Wiring Complete: Generator □ ATS □
Remote Annunciator Power and Communication Lines Terminated □
Belden 9841 used as specified □ Start Wires Connected □
Block Heater Powered (non GFCI)* □ Fuel Tank Filled □
Battery Charger Powered (non GFCI)* □ Normal Utility Power is Present □
*do not plug-in
Signature: _____________________________ Print Name: ___________________________
Phone #: _____________________________

Note:
Once scheduled, if for any reason the Generator is not ready for start-up or no one is available to be at start-up, the start-up is not able to proceed; the contractor will be back charged by FMC-NA for the next visit.

Comments: ______________________________________________________________
________________________________________________________________________
________________________________________________________________________

To be completed by NEC
Requested Start-up Date: _____________________________
Load Transfer and Training Time: _____________________________
Exercise Day and Time: ________________________________________
SECTION 01340

SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

PART 1 - GENERAL

1.01 GENERAL CONDITIONS

A. Refer to paragraphs 4.2 and 3.12 of the General Conditions.

B. In the event of conflict between requirements of the General Conditions and this Section covering shop drawings, product data and samples, the requirements of Section 01340 shall govern. Unaltered provisions remain in effect.

1.02 DESCRIPTION

A. Submit to the Architect shop drawings, product data and samples required by specification sections.

B. Prepare and submit the Construction Schedule, a separate schedule listing dates for submission and dates reviewed shop drawings, product data and samples will be needed for each product.

PART 2 PRODUCTS

2.01 SHOP DRAWINGS

A. Submit shop drawings electronically in PDF. Include fabrication, erection, layout and setting drawings and other such drawings as required under various sections of the specifications until final approval is obtained. Reproduction of Contract Drawings will not be used for Shop Drawings.
   1. Shop drawings and other data shall be combined (bound) in a single file.

B. Date and mark shop drawings to show name of the Project, the Architect, Contractor, originating Subcontractor, Manufacturer or Supplier, and separate details as pertinent.

C. Completely identify on shop drawings specification section and locations at which materials or equipment are to be installed.

2.02 PRODUCT DATA

A. Submit manufacturer’s descriptive data including catalog sheets for materials, equipment and fixtures, showing dimensions, performance characteristics and capacities, wiring diagram and controls, schedule and other pertinent information as required.

B. Submit brochures and other submittal data. Mark product data to show the name of the Project, Architect, Contractor, originating Subcontractor, Manufacturer or Supplier, and separate details if pertinent.
C. Completely identify on product data specification section and location at which materials or equipment are to be installed.

D. Clearly mark to show pertinent data applicable to the Project.

2.03 SAMPLES

A. Submit physical examples of materials in duplicate when required by specification sections to illustrate materials, workmanship or to establish standards by which completed work shall be judged.

B. Date samples and mark to show the name of the project, Architect, Contractor, originating Subcontractor, Manufacturer or Supplier and separate details if pertinent.

C. Completely identify on samples specification section and location in which materials or equipment are to be installed.

D. Provide wall and ceiling finish material samples from the manufacturer or supplier with attached flame resistance testing classification information (Class A, B or C) for use in Section 01700 Contract Closeout.

E. Provide floor finish material samples from the manufacturer or supplier with attached critical radiant flux testing classification information (Class I or Class II) for use in Section 01700 Contract Closeout.

2.04 CONTRACTOR RESPONSIBILITIES

A. Review shop drawings, product data and samples prior to submission to the Architect.

B. Include on submittals the Contractor's stamp, initialed or signed, certifying review of submittals, verification of field dimensions and compliance with Contract Documents. Shop drawings, product data and samples not so stamped, and checked and approved by the Contractor will not be reviewed by the Architect, but will be returned to the Contractor. Shop drawings stamped and signed as approved by the Contractor but showing evidence that they have not been carefully checked by the Contractor may be returned to the Contractor to be re-checked and re-submitted to the Architect.

C. Clearly identify where the submission deviates from the design intent or construction drawings.

2.05 SUBSTITUTIONS

A. Approval required:
   1. The Contract is based on the standards of quality established in the Contract Documents.
2. All products proposed for use, including those specified by required attributes and performance, require approval by the Architect before being incorporated into the Work.

3. Do not substitute materials, equipment or methods unless such substitution has been specifically approved for this Work by the Architect.

B. “Or equal”:
1. Where the phrase “or equal” or “or equal as approved by the Architect” occurs in the Contract Documents, do not assume that materials, equipment or methods will be approved as equal unless the items have been specifically approved for this Work by the Architect.

2. Substitutions shall be judged against the specified item for quality, durability, operation, appearance, and other applicable qualities including fitness for use in this situation. The decision of the Architect is final.

PART 3 - EXECUTION

3.01 SUBMISSION REQUIREMENTS

A. Schedule submissions at least two weeks before date reviewed submittals will be needed.

B. Accompany submittals with transmittal letters containing the date, project title, Contractor’s name and address, number of each shop drawing, product data and samples submitted, and notification of deviation from Contract Documents.

1. Material Safety Data Sheet
   Contractor shall furnish to the Architect, for review, four (4) copies of Material Safety Data Sheets (MSDS) for all products as specified or required. Allow ample time for Architect’s comment and review.

   Do not install products until confirmation of review is obtained.

   MSDS copies should be included at the same submittal with shop drawings or product submittal. The following products must include the MSDS copy with the shop drawing or submittal:

   a) Mechanical Insulation
   b) Mastic or Adhesive
   c) Ceiling Tiles or other Composite Materials
   d) Sealants or Caulking
   e) Materials containing or releasing volatile organic compounds (VOC’s)
   f) Paints, Varnishes, Stains or other similar coatings
2. Flame Spread Certificates  
Contractor shall furnish to the Architect, for review, four (4) copies of Flame Spread Certificates for all products as specified or required.

Allow ample time for Architect’s comment and review.

Do not install products until confirmation of review is obtained.

Flame Spread Certificate copies should be included at the same submittal with shop drawings or product submittal. The following products must include the Flame Spread Certificate copy with the shop drawing or submittal:

a) Carpet  
b) Wallcovering  
c) Fabrics  
d) Cubicle curtains

3.02 RESUBMISSION REQUIREMENTS

A. Shop Drawings: Revise initial drawings as required and resubmit as specified for initial submittals. Clearly identify on drawings any changes which have been made other than those requested by the Architect.

B. Product Data and Samples: Submit new datum and samples as required for initial submittal.

C. GC shall be responsible for costs associated with review of submissions beyond two reviews. Such costs shall include but are not limited to the Architect’s and/or Engineer’s time, cost of reproduction, scanning, and shipping charges.

3.03 DISTRIBUTION OF SHOP DRAWINGS AND SUBMITTALS

A. Contractor is still responsible for obtaining and distributing prints of shop drawings as necessary after as well as before final approval and for coordination of submittals between his subcontractors and suppliers.

B. Make prints of approved shop drawings which carry the Architect's appropriate stamp.

C. The cost of scanning and printing is the responsibility of the Contractor.

END OF SECTION
PART 1  GENERAL

1.01 GENERAL PROVISIONS

A. These specifications for Testing and Inspection are applicable to the Project and the Contract Documents therefore are hereby incorporated into these Specifications.

B. The Testing Agency shall conform to applicable requirements of ASTM E329, and any additional requirements specified herein or in the Contract Documents.
   1. Examine the Contract Documents and the Report on Subsurface Investigation and become thoroughly acquainted with the detailed testing and inspection requirements, especially those of the following Sections where incorporated into the work:
      Division 2 - Site Work
      Division 3 - Concrete
      Division 4 - Masonry
      Division 5 – Metal
      Division 9 – Finishes

C. The Testing Agency shall make all necessary arrangements with the Contractor in ensuring the presence of the required Inspectors at all Contract Operations specified to be included under the Testing and Inspection Agreement.

D. The Contractor shall notify the Testing Agency a reasonable time in advance (not less than 24 hours) of the time when operations requiring inspection or testing are scheduled to start.

E. Provide necessary personnel, equipment and facilities for tests and inspection. Personnel shall be experienced and competent in their particular specialties.

F. Nothing herein specified permits the Testing Agency to allow the Contractor to deviate from the requirements of the Contract Documents.
G. The Testing Agency shall conduct its work so as not to cause delay in the progress of construction. Any non-compliance with the Contract Documents shall be immediately reported to the Contractor and Architect.

H. The costs of the following tests and inspections shall be accounted for separately:
   1. Tests and inspection of materials and workmanship not conforming to Specification requirements.
   2. Acceptance tests for materials because of changes in properties or changed sources.
   3. Tests and services of inspectors required by a Public Authority.

1.02 TESTING AND INSPECTION

A. The Testing Agency shall maintain and distribute a continuous record of the quality of materials and workmanship under its control, and certify that such materials and workmanship meet the Specification requirements.

B. The inspection and control shall be performed under the direction of the Architect.

C. The duties of the Testing Agency shall include:
   1. Test and certification of materials or components designated to be tested at source, at place of fabrication, or at the job site.
   2. Supervision and certification of installation of materials designated to be inspected.
   3. Submission of reports:
      a) Reports of source and field inspections shall be prepared and distributed within 3 days of the test. Digital copies of each report of tests shall be distributed to the project team within 2 days of the performance of tests. Results of tests showing non-conformance to specification requirements shall be advised to the Contractor and the Architect via email at the same time the reports are distributed.
      b) Distribution of one copy of each report shall be as follows:
         (1) Owner’s Representative
         (2) Architect (JeffreyGriffin56@Gmail.com)
         (3) Contractor
         (4) Local Building Inspectors, when required by them.
      c) All reports shall include accurate and unambiguous descriptions of the source of the materials and their location in the project and a statement whether the work inspected or tested conforms or does not conform to the Contract Documents.

1.03 MATERIALS ACCEPTANCE TESTS

A. To determine that materials to be used on the job meet Specification requirements, the following tests shall be made prior to actual use of materials:
   1. Composition, gradation and moisture-density relationships for compacted and ordinary fill materials. One set of tests for each type of material from each source.
   2. Review of Contractor's qualification test results for cements, and for fine and coarse aggregates for:
      a) Normal weight concrete
   3. Review of Contractor's qualification test results for masonry unit and masonry prism strengths.
B. Whenever the source or characteristics of materials change or the quality of materials provided indicates lack of compliance with Specification requirements, full or partial acceptance tests shall be repeated as directed by the Architect until such materials conform. Cost of such tests and inspection repetitions shall be kept separately.

1.04 CONCRETE MIX DESIGNS

A. The Testing Agency shall review and/or make acceptance tests as specified for concrete design mixes provided by the Contractor:
   1. A mix for each specified strength and type of concrete, and each admixture or combination of admixtures specified.
   2. All materials and design mixtures to be supplied by the Contractor at least five (5) weeks prior to proposed use.

1.05 EARTHWORK

A. Inspection and control shall include:
   1. In-place density tests, generally at the rate of 3 tests per lift for compacted fill and 1 test per lift for ordinary fill. Tests for moisture content control of subgrade as required by existing conditions.
   2. Inspection of foundation pier excavation, footing bottoms and finished subgrades for bearing capacity and workmanship.
   3. Review and make necessary recommendations to ensure compliance to Specification requirements of all lime or cement stabilization, and compaction operations, materials, methods and equipment proposed by the Contractor.
   4. Inspection of and necessary adjustment recommendations for fills and subgrade stabilization materials and installation.

1.06 CONCRETE

A. Inspection and control shall, in general, conform to ACI Recommended Practice for Concrete Inspection, ACI 311, and shall include:
   1. Inspection of forms and form facing materials for line, grade, tightness, quality of surface, and cleanliness.
   2. Inspection of reinforcement for quantity, details, clearances and placement, including proper use of accessories.
   3. Inspection of concrete at the mixing plant, consisting of inspection of materials for conformance to the approved materials, check of batch quantities for compliance with design mixes and project requirements, recommendations for adjustment of batches for consistency.
   4. Inspection of concrete at the job site, including transportation, mixing, placement, protection and curing.
   5. Sampling of concrete at site, fabrication of compression test specimens, transportation to laboratory and performing standard compression tests. One set of three (3) specimens shall be made for each 50 cubic yards of concrete placed, but not less than one (1) set for each day's placement for each design mix used.
   6. Periodic slump, air content and density tests at the site. These tests shall be made whenever cylinders are taken or whenever field conditions indicate non-compliance with Specification requirements.
7. In addition to the above, the Contractor may direct additional control cylinders to be made, cured and tested to check strengths for shoring or adequacy of curing or cold weather protection. In such instances, the cylinders shall be cured with the concrete in the field under the least advantageous conditions. All work requested by the Contractor or all work required by non-compliance with the Specifications shall be at the Contractor's expense, utilizing the selected Testing Agency.

8. When tests of control specimens fall below the required strength, the Architect may require core specimens to be taken from the concrete which it represents, and tested in accordance with ASTM Methods, at Contractor's expense.

1.07 MASONRY

A. Inspection shall be of a nature as to determine, in general, that the construction and workmanship are in accordance with the Contract Documents, and shall include:
   1. Inspection of materials in field for conformance to Specification requirements and adequacy of Contractor's protection measures.
   2. Full time inspection of installation of all reinforced masonry.
   3. Inspection of reinforcement for quantity, details, clearances and placement.
   4. Inspection of grouting to ensure that required spaces are properly filled.
   5. Compression tests of field samples of mortar and grout at the rate of one set of 5 samples for each 1,000 square feet of wall (but not less than one set for each day's production).

1.08 STRUCTURAL STEEL, STEEL JOISTS & METAL DECKS

A. Inspection and control shall include:
   1. When directed by the Architect, inspection of materials and workmanship at shop to verify effectiveness of Contractor's quality control and conformance to Specification requirements.
   2. Verification of welder qualifications.
   3. Certification that quality and size of all field welds meet Specification requirements.
   4. Checking bolt installation and certifying that all bolts required are provided and properly tightened.
   5. Checking of high-strength bolt tightening tools for accurate performance. Procedure shall be approved by the Architect or Engineer.
   6. Inspection of primer paint film thickness and touch-up painting.
   7. Inspection (upon delivery to site) of steel joist weld quality and sizes for conformance to Specification requirements.
   8. Inspection of steel deck welding in the field.

1.09 FLOOR TESTING FOR MOISTURE VAPOR PRESSURE

A. Inspection and Control shall be performed by an independent testing agency and include the following:
   1. Alkalinity and adhesion testing:
      a) Perform all tests as recommended by manufacturer of flooring product(s) to be installed.
      b) Proceed with flooring installation only after substrates pass testing.
   2. Verify that substrates are dry and free from curing compounds, sealers and hardeners.
      a) Perform anhydrous calcium chloride test per ASTM F 1869. Proceed with flooring installation only after substrates have maximum moisture-vapor-emission rate within the
parameters of the glue and flooring manufacturer’s installation and warranty requirements.

b) Perform Relative humidity test (probe test) per ASTM F-2170. Proceed with flooring installation only after test results fall within the parameters of the glue and flooring manufacturer’s installation and warranty requirements.

c) Perform pH testing per ASTM F-710. Proceed with flooring installation only after substrates have an alkalinity rating within the parameters of the glue and flooring manufacturer’s installation and warranty requirements.

3. Provide written documentation of testing results via email to Owner’s Representative and Architect.

END OF SECTION
SECTION 01410
STRUCTURAL TESTING/INSPECTION AGENCY SERVICES

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Section summarizes the responsibility of the Contractor and the Structural Testing/Inspection Agency in the performance of the testing/inspection specified in the Contract Documents.

B. Neither the observation of the Design Professional in the administration of the contract, nor tests/inspections by the Testing/Inspection Agency, nor approvals by persons other than the Design Professional shall relieve the Contractor from his obligation to perform the work in accordance with the Contract Documents.

1.02 REFERENCES

A. ASTM D3740 - Practice for Evaluation of Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction.

B. ASTM E329 - Recommended Practice for Inspection and Testing Agencies for Concrete, Steel, and Bituminous Materials as Used in Construction.

C. American Council of Independent Laboratories - Recommended Requirements for Independent Laboratories Qualifications.

1.03 SELECTION AND PAYMENT

A. Owner will employ and pay for the structural testing/inspection services that are required by the Contract Documents.

B. Contractor shall pay for any additional structural testing/inspection required for work or materials not complying with Contract Documents due to negligence or nonconformance.

C. Contractor shall pay for any additional structural testing/inspection required for his convenience.


1.04 STRUCTURAL TESTING/INSPECTION REQUIREMENT SUMMARY

A. Specific structural testing/inspection requirements are given in the following specification sections:

   Specification 02221 – Excavating, Backfilling, and Compacting For Structures
   Specification 03100 – Concrete Formwork Inspection
   Specification 03200 – Concrete Reinforcement Inspection
   Specification 03300 – Concrete Testing/Inspection
   Specification 03600 – Non-Shrink Grout Inspection
   Specification 04220 – Structural Concrete Masonry Inspection
1.07 STATEMENT OF SPECIAL INSPECTIONS

A. Provide testing/inspection required to meet the provisions of the Schedule of Special Inspection Services below and this Specification.

PART 2 - MATERIALS

Not Used.

PART 3 - EXECUTION

3.01 STRUCTURAL PRECONSTRUCTION MEETING

A. A structural preconstruction meeting may be conducted at the construction site by the Design Professional to discuss quality issues. The parties involved may be the Design Professional, Contractor, Structural Testing/Inspection Agency, appropriate subcontractors, suppliers, and detailers.

3.02 STRUCTURAL TESTING/INSPECTION AGENCY'S RESPONSIBILITIES

A. Cooperate with the Contractor and provide timely service.

B. Upon arriving at the construction site, sign in and notify the Contractor of presence.

C. Select the representative samples that are to be tested/inspected.

D. Perform tests/inspections as outlined in Contract Documents, the applicable codes, and as directed by the Design Professional.

E. Report work and materials not complying with Contract Documents immediately to the Contractor and Design Professional.

F. Leave copies of field notes with the Contractor prior to leaving the construction site. Field notes shall include the message given to the Contractor, date, time of message, name of Contractor's representative informed, type and location of work or materials tested/inspected, whether the work or materials complies with Contract Documents and name of the Structural Testing/Inspection Agency's representative.

G. Report and distribute results of tests/inspections promptly in the form of written reports as directed by the Design Professional.

H. Structural Testing/Inspection Agency shall not alter requirements of Contract Documents, approve or reject any portion of the work, or perform duties of the Contractor.

3.03 CONTRACTOR'S RESPONSIBILITIES

B. Arrange the preconstruction meeting to discuss quality issues.

C. Notify the Structural Testing/Inspection Agency sufficiently in advance of operations to allow assignment of personnel and scheduling of tests.

D. Cooperate with Structural Testing/Inspection Agency and provide access to work.

E. Provide samples of materials to be tested in required quantities.

F. Furnish copies of mill test reports when requested.

G. Provide storage space for Structural Testing/Inspection Agency's exclusive use, such as for storing and curing concrete testing samples.

H. Provide labor to assist the Structural Testing/Inspection Agency in performing tests/inspections.

END OF SECTION
## SCHEDULE OF SPECIAL INSPECTION SERVICES

<table>
<thead>
<tr>
<th>PROJECT</th>
<th>AZURA SURGERY CENTER RENALUS CRESTVIEW</th>
<th>MATERIAL / ACTIVITY</th>
<th>SERVICE</th>
<th>APPLICABLE TO THIS PROJECT</th>
<th>Y/N</th>
<th>EXTENT</th>
<th>AGENT*</th>
<th>DATE COMPLETED</th>
</tr>
</thead>
<tbody>
<tr>
<td>1704.2.5</td>
<td>Inspection of Fabricators</td>
<td>Verify fabrication/quality control procedures</td>
<td>In-plant review (3)</td>
<td>Y</td>
<td>Periodic</td>
<td>TA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1705.1.1</td>
<td>Special Cases (work unusual in nature, including but not limited to alternative materials and systems, unusual design applications, materials and systems with special manufacturer's requirements)</td>
<td>Submittal review, shop (3) and/or field inspection *Only if utilized</td>
<td>Y*</td>
<td>TA/SEOR</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1705.2</td>
<td>Steel Construction</td>
<td>1. Fabricator and erector documents (Verify reports and certificates as listed in AISC 360, chapter N, paragraph 3.2 for compliance with construction documents)</td>
<td>Shop (3) and field inspection</td>
<td>Y</td>
<td>Each submittal</td>
<td>TA</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Material verification of structural steel</td>
<td>Shop (3) and field inspection</td>
<td>Y</td>
<td>Periodic</td>
<td>TA</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Embedments (Verify diameter, grade, type, length, embedment. See 1705.3 for anchors)</td>
<td>Field inspection</td>
<td>Y</td>
<td>Continuous</td>
<td>TA</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>4. Verify member locations, braces, stiffeners, and application of joint details at each connection comply with construction documents</td>
<td>Field inspection</td>
<td>Y</td>
<td>Periodic</td>
<td>TA</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>5. Structural steel welding:</td>
<td>Shop (3) and field inspection</td>
<td>Y</td>
<td>Observe or Perform as noted (4)</td>
<td>TA</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>a. Inspection tasks Prior to Welding (Observe, or perform for each welded joint or member, the QA tasks listed in AISC 360, Table N5.4-1)</td>
<td>Shop (3) and field inspection</td>
<td>Y</td>
<td>Observe (4)</td>
<td>TA</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>b. Inspection tasks During Welding (Observe, or perform for each welded joint or member, the QA tasks listed in AISC 360, Table N5.4-1)</td>
<td>Shop (3) and field inspection</td>
<td>Y</td>
<td>Observe or Perform as noted (4)</td>
<td>TA</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>c. Inspection tasks After Welding (Observe, or perform for each welded joint or member, the QA tasks listed in AISC 360, Table N5.4-3)</td>
<td>Shop (3) and field inspection</td>
<td>Y</td>
<td>Observe or Perform as noted (4)</td>
<td>TA</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>d. Nondestructive testing (NDT) of welded joints: see Commentary</td>
<td>Shop (3) or field ultrasonic testing - 100%</td>
<td>N</td>
<td>Periodic</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1)</td>
<td>Complete penetration groove welds 5/16” or greater in risk category III or IV</td>
<td>Shop (3) or field ultrasonic testing - 100% of welds minimum</td>
<td>N</td>
<td>Periodic</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2)</td>
<td>Complete penetration groove welds 5/16” or greater in risk category II</td>
<td>Shop (3) or field ultrasonic testing - 100% of welds minimum</td>
<td>N</td>
<td>Periodic</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3)</td>
<td>Thermally cut surfaces of access holes when material t&gt; 2”</td>
<td>Shop (3) or field magnetic Partical or Penetrant testing</td>
<td>N</td>
<td>Periodic</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4)</td>
<td>Welded joints subject to fatigue when required by AISC 360, Appendix 3, Table A-3.1</td>
<td>Shop (3) or field radiographic or Ultrasonic testing</td>
<td>N</td>
<td>Periodic</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>5)</td>
<td>Fabricator’s NDT reports when fabricator performs NDT</td>
<td>Verify reports</td>
<td>Y</td>
<td>Each submittal (5)</td>
<td>TA</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>6. Structural steel bolting:</td>
<td>Shop (3) and field inspection</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MATERIAL / ACTIVITY</td>
<td>SERVICE</td>
<td>Y/N</td>
<td>EXTENT</td>
<td>AGENT*</td>
<td>DATE COMPLETED</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---------------------</td>
<td>---------</td>
<td>-----</td>
<td>--------</td>
<td>--------</td>
<td>----------------</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Inspection tasks Prior to Bolting (Observe, or perform tasks for each bolted connection, in accordance with QA tasks listed in AISC 360, Table N5.6-1)</td>
<td>Y</td>
<td>Observe or Perform as noted (4)</td>
<td>TA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. Inspection tasks During Bolting (Observe the QA tasks listed in AISC 360, Table N5.6-2)</td>
<td>Y</td>
<td>Observe (4)</td>
<td>TA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1) Pre-tensioned and slip-critical joints</td>
<td>Y</td>
<td></td>
<td>TA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a) Turn-of-nut with matching markings</td>
<td>Y</td>
<td>Periodic</td>
<td>TA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b) Direct tension indicator</td>
<td>Y</td>
<td>Periodic</td>
<td>TA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c) Twist-off type tension control bolt</td>
<td>Y</td>
<td>Periodic</td>
<td>TA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>d) Turn-of-nut without matching markings</td>
<td>Y</td>
<td>Continuous</td>
<td>TA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>e) Calibrated wrench</td>
<td>Y</td>
<td>Continuous</td>
<td>TA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2) Snug-tight joints</td>
<td>Y</td>
<td>Periodic</td>
<td>TA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. Inspection tasks After Bolting (Perform tasks for each bolted connection in accordance with QA tasks listed in AISC 360, Table N5.6-3)</td>
<td>Y</td>
<td>Perform (4)</td>
<td>TA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Inspection of steel elements of composite construction prior to concrete placement in accordance with QA tasks listed in AISC 360, Table N6.1</td>
<td>Shop (3) and field inspection and testing</td>
<td>N</td>
<td>Observe or Perform as noted (4)</td>
<td>N/A</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1705.2.2 Cold Formed Steel Deck</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Material verification of cold-formed steel deck:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Identification markings</td>
<td>Field inspection</td>
<td>Y</td>
<td>Periodic</td>
<td>TA</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. Manufacturer's certified test reports</td>
<td>Submittal Review</td>
<td>Y</td>
<td>Each submittal</td>
<td>TA/SEOR</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Connection of cold-formed steel deck to supporting structure:</td>
<td>Shop (3) and field inspection</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Welding</td>
<td>Y</td>
<td>Periodic</td>
<td>TA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. Other fasteners (in accordance with AISC 360, Section N6)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1) Verify fasteners are in conformance with approved submittal</td>
<td>Y</td>
<td>Periodic</td>
<td>TA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2) Verify fastener installation is in conformance with approved submittal and manufacturer's recommendations</td>
<td>Y</td>
<td>Periodic</td>
<td>TA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1705.2.3 Open Web Steel Joists and Joist Girders</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Installation of open-web steel joists and joist girders</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. End Connections</td>
<td>Y</td>
<td>Periodic</td>
<td>TA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. Bridging - horizontal or diagonal</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1) Standard bridging</td>
<td>Y</td>
<td>Periodic</td>
<td>TA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2) Bridging that differs from the SJI specifications listed in Section 2207.1.</td>
<td>Y</td>
<td>Periodic</td>
<td>TA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1705.2.4 Cold formed steel trusses spanning 60 feet or greater</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Cold-formed steel trusses spanning 60 feet or greater</td>
<td>N</td>
<td>N/A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MATERIAL / ACTIVITY</td>
<td>SERVICE</td>
<td>Y/N</td>
<td>EXTENT</td>
<td>AGENT*</td>
<td>DATE COMPLETED</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---------------------</td>
<td>---------</td>
<td>-----</td>
<td>--------</td>
<td>--------</td>
<td>----------------</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Verify temporary and permanent restraint/bracing are installed in accordance with the approved truss submittal package</td>
<td>Field inspection</td>
<td>N</td>
<td>Periodic</td>
<td>N/A</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>1705.3 Concrete Construction</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1a. Inspection of reinforcing steel installation</td>
<td>Shop (3) and field inspection</td>
<td>Y</td>
<td>Periodic</td>
<td>TA</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1b. Inspection of prestressing steel installation</td>
<td>Shop (3) and field inspection</td>
<td>N</td>
<td>Periodic</td>
<td>N/A</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Reinforcing bar welding</td>
<td>Field inspection</td>
<td>Y*</td>
<td>In accordance with AWS D1.4 for special inspection and special inspector qualification</td>
<td>TA</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Verification of weldability of steel other than ASTM A706</td>
<td></td>
<td>Y</td>
<td>Periodic</td>
<td>TA</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. Inspect single-pass fillet welds, maximum 5/16&quot; and</td>
<td></td>
<td>Y</td>
<td>Continuous</td>
<td>TA</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. Inspect all other welds</td>
<td></td>
<td>Y</td>
<td>Continuous</td>
<td>TA</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Inspection of anchors cast in concrete</td>
<td>Field inspection</td>
<td>Y</td>
<td>Periodic</td>
<td>TA</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Inspect anchors post-installed in hardened concrete members</td>
<td>Field inspection</td>
<td>Y</td>
<td>Periodic</td>
<td>TA</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Adhesive anchors installed in horizontally or upwardly inclined orientations to resist sustained tension loads.</td>
<td></td>
<td>Y</td>
<td>Continuous</td>
<td>TA</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. Mechanical anchors and adhesive anchors not defined in 4a</td>
<td></td>
<td>Y</td>
<td>Periodic</td>
<td>TA</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Verify use of approved design mix</td>
<td>Shop (3) and field inspection</td>
<td>Y</td>
<td>Periodic</td>
<td>TA</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Fresh concrete sampling, perform slump and air content tests and determine temperature of concrete</td>
<td>Shop (3) and field inspection</td>
<td>Y</td>
<td>Continuous</td>
<td>TA</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Inspection of concrete and shotcrete placement for proper application techniques</td>
<td>Shop (3) and field inspection</td>
<td>Y</td>
<td>Continuous</td>
<td>TA</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Inspection for maintenance of specified curing temperature and techniques</td>
<td>Shop (3) and field inspection</td>
<td>Y</td>
<td>Periodic</td>
<td>TA</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Inspection of prestressed concrete:</td>
<td>Shop (3) and field inspection</td>
<td>N</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Application of prestressing force</td>
<td></td>
<td>N</td>
<td>Continuous</td>
<td>N/A</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. Grouting of bonded prestressing tendons in the seismic-force-resisting system</td>
<td></td>
<td>N</td>
<td>Continuous</td>
<td>N/A</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. Erection of precast concrete members</td>
<td></td>
<td>N</td>
<td>N/A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Inspect in accordance with construction documents</td>
<td>Field inspection</td>
<td>N</td>
<td>In accordance with construction documents</td>
<td>N/A</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. Perform inspections of welding and bolting in accordance with Section 1705.2</td>
<td>Field inspection</td>
<td>N</td>
<td>In accordance with Section 1705.2</td>
<td>N/A</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. Verification of in-situ concrete strength, prior to stressing of tendons in post tensioned concrete and prior to removal of shores and forms from beams and structural slabs</td>
<td>Review field testing and laboratory reports</td>
<td>N</td>
<td>Periodic</td>
<td>N/A</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. Inspection of formwork for shape, lines, location and dimensions</td>
<td>Field inspection</td>
<td>Y</td>
<td>Periodic</td>
<td>TA</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### SCHEDULE OF SPECIAL INSPECTION SERVICES

<table>
<thead>
<tr>
<th>PROJECT</th>
<th>AZURA SURGERY CENTER RENALUS CRESTVIEW</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATERIAL / ACTIVITY</td>
<td>APPLICABLE TO THIS PROJECT</td>
</tr>
<tr>
<td></td>
<td>SERVICE</td>
</tr>
<tr>
<td>1705.4 Masonry Construction</td>
<td></td>
</tr>
<tr>
<td>(A) Level A, B and C Quality Assurance:</td>
<td></td>
</tr>
<tr>
<td>1. Verify compliance with approved submittals</td>
<td>Field Inspection</td>
</tr>
<tr>
<td>(B) Level B Quality Assurance:</td>
<td></td>
</tr>
<tr>
<td>1. Verification of $f'<em>m$ and $f'</em>{A_{AC}}$ prior to construction</td>
<td>Testing by unit strength method or prism test method</td>
</tr>
<tr>
<td>(C) Level C Quality Assurance:</td>
<td></td>
</tr>
<tr>
<td>1. Verification of $f'<em>m$ and $f'</em>{A_{AC}}$ prior to construction and for every 5,000 SF during construction</td>
<td>Testing by unit strength method or prism test method</td>
</tr>
<tr>
<td>2. Verification of proportions of materials in premixed or preblended mortar, prestressing grout, and grout other than self-consolidating grout, as delivered to the project site</td>
<td>Field inspection</td>
</tr>
<tr>
<td>3. Verify placement of masonry units</td>
<td>Field Inspection</td>
</tr>
<tr>
<td>(D) Levels B and C Quality Assurance:</td>
<td></td>
</tr>
<tr>
<td>1. Verification of Slump Flow and Visual Stability Index (VSI) of self-consolidating grout as delivered to the project</td>
<td>Field testing</td>
</tr>
<tr>
<td>2. Verify compliance with approved submittals</td>
<td>Field inspection</td>
</tr>
<tr>
<td>3. Verify proportions of site-mixed mortar, grout and prestressing grout for bonded tendons</td>
<td>Field Inspection</td>
</tr>
<tr>
<td>4. Verify grade, type, and size of reinforcement and anchor bolts, and prestressing tendons and anchorages</td>
<td>Field Inspection</td>
</tr>
<tr>
<td>5. Verify construction of mortar joints</td>
<td>Field Inspection</td>
</tr>
<tr>
<td>6. Verify placement of reinforcement, connectors, and prestressing tendons and anchorages</td>
<td>Field Inspection</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Verify grout space prior to grouting</td>
<td>Field Inspection</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Verify placement of grout and prestressing grout for bonded tendons</td>
<td>Field Inspection</td>
</tr>
<tr>
<td>9. Verify size and location of structural masonry elements</td>
<td>Field Inspection</td>
</tr>
<tr>
<td>MATERIAL / ACTIVITY</td>
<td>SERVICE</td>
</tr>
<tr>
<td>---------------------</td>
<td>---------</td>
</tr>
<tr>
<td>10. Verify type, size, and location of anchors, including details of anchorage of masonry to structural members, frames, or other construction.</td>
<td>Field inspection</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>11. Verify welding of reinforcement (see 1705.2.2)</td>
<td>Field inspection</td>
</tr>
<tr>
<td>12. Verify preparation, construction, and protection of masonry during cold weather (temperature below 40°F) or hot weather (temperature above 90°F)</td>
<td>Field inspection</td>
</tr>
<tr>
<td>13. Verify application and measurement of prestressing force</td>
<td>Field Inspection</td>
</tr>
<tr>
<td>14. Verify placement of AAC masonry units and construction of thin-bed mortar joints (first 5000 SF of AAC masonry)</td>
<td>Field inspection</td>
</tr>
<tr>
<td>15. Verify placement of AAC masonry units and construction of thin-bed mortar joints (after the first 5000 SF of AAC masonry)</td>
<td>Field inspection</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>16. Verify properties of thin-bed mortar for AAC masonry (first 5000 SF of AAC masonry)</td>
<td>Field inspection</td>
</tr>
<tr>
<td>17. Verify properties of thin-bed mortar for AAC masonry (after the first 5000 SF of AAC masonry)</td>
<td>Field inspection</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>18. Prepare grout and mortar specimens</td>
<td>Field testing</td>
</tr>
<tr>
<td>19. Observe preparation of prisms</td>
<td>Field inspection</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>1705.5 Wood Construction</td>
<td>In-plant review (3)</td>
</tr>
<tr>
<td>1. Inspection of the fabrication process of wood structural elements and assemblies in accordance with Section 1704.2.5</td>
<td>Field inspection</td>
</tr>
<tr>
<td>2. For high-load diaphragms, verify grade and thickness of structural panel sheathing agree with approved building plans</td>
<td>Field inspection</td>
</tr>
<tr>
<td>MATERIAL / ACTIVITY</td>
<td>SERVICE</td>
</tr>
<tr>
<td>---------------------</td>
<td>---------</td>
</tr>
<tr>
<td>3. For high-load diaphragms, verify nominal size of framing members at adjoining panel edges, nail or staple diameter and length, number of fastener lines, and that spacing between fasteners in each line and at edge margins agree with approved building plans</td>
<td>Field inspection</td>
</tr>
<tr>
<td>4. Metal-plate-connected wood trusses spanning 60 feet or greater: verify temporary and permanent restraint/bracing are installed in accordance with the approved truss submittal package</td>
<td>Field inspection</td>
</tr>
<tr>
<td><strong>1705.6 Soils</strong></td>
<td></td>
</tr>
<tr>
<td>1. Verify materials below shallow foundations are adequate to achieve the design bearing capacity.</td>
<td>Field inspection</td>
</tr>
<tr>
<td>2. Verify excavations are extended to proper depth and have reached proper material.</td>
<td>Field inspection</td>
</tr>
<tr>
<td>3. Perform classification and testing of controlled fill materials.</td>
<td>Field inspection</td>
</tr>
<tr>
<td>4. Verify use of proper materials, densities, and lift thicknesses during placement and compaction of controlled fill</td>
<td>Field inspection</td>
</tr>
<tr>
<td>5. Prior to placement of controlled fill, observe subgrade and verify that site has been prepared properly</td>
<td>Field inspection</td>
</tr>
<tr>
<td><strong>1705.7 Driven Deep Foundations</strong></td>
<td></td>
</tr>
<tr>
<td>1. Verify element materials, sizes and lengths comply with requirements</td>
<td>Field inspection</td>
</tr>
<tr>
<td>2. Determine capacities of test elements and conduct additional load tests, as required</td>
<td>Field inspection</td>
</tr>
<tr>
<td>3. Observe driving operations and maintain complete and accurate records for each element</td>
<td>Field inspection</td>
</tr>
<tr>
<td>4. Verify placement locations and plumbness, confirm type and size of hammer, record number of blows per foot of penetration, determine required penetrations to achieve design capacity, record tip and butt elevations and document any damage to foundation element</td>
<td>Field inspection</td>
</tr>
<tr>
<td>5. For steel elements, perform additional inspections per Section 1705.2</td>
<td>See Section 1705.2</td>
</tr>
<tr>
<td>6. For concrete elements and concrete-filled elements, perform additional inspections per Section 1705.3</td>
<td>See Section 1705.3</td>
</tr>
<tr>
<td>7. For specialty elements, perform additional inspections as determined by the registered design professional in responsible charge</td>
<td>Field inspection</td>
</tr>
<tr>
<td><strong>1705.8 Cast-in-Place Deep Foundations</strong></td>
<td></td>
</tr>
<tr>
<td>MATERIAL / ACTIVITY</td>
<td>SERVICE</td>
</tr>
<tr>
<td>--------------------</td>
<td>---------</td>
</tr>
<tr>
<td>1. Observe drilling operations and maintain complete and accurate records for each element</td>
<td>Field inspection</td>
</tr>
<tr>
<td>2. Verify placement locations and plumbness, confirm element diameters, bell diameters (if applicable), lengths, embedment into bedrock (if applicable) and adequate end-bearing strata capacity. Record concrete or grout volumes</td>
<td>Field inspection</td>
</tr>
<tr>
<td>3. For concrete elements, perform additional inspections in accordance with Section 1705.3</td>
<td>See Section 1705.3</td>
</tr>
<tr>
<td>4. Perform additional inspections and tests in accordance with the construction documents</td>
<td>Field Inspection and testing</td>
</tr>
<tr>
<td>1705.9 Helical Pile Foundations</td>
<td></td>
</tr>
<tr>
<td>1. Verify installation equipment, pile dimensions, tip elevations, final depth, final installation torque and other data as required.</td>
<td>Field inspection</td>
</tr>
<tr>
<td>2. Perform additional inspections and tests in accordance with the construction documents</td>
<td>Field Inspection and testing</td>
</tr>
<tr>
<td>1705.10 Fabricated Items</td>
<td></td>
</tr>
<tr>
<td>1. Observe fabrication of structural, load bearing or lateral load resisting members or assemblies on the premises of the fabricator's shop.</td>
<td>Shop (3) and field inspection</td>
</tr>
<tr>
<td>1705.11.1 Structural Wood Special Inspections For Wind Resistance</td>
<td></td>
</tr>
<tr>
<td>1. Inspection of field gluing operations of elements of the main windforce-resisting system</td>
<td>Field inspection</td>
</tr>
<tr>
<td>2. Inspection of nailing, bolting, anchoring and other fastening of components within the main windforce-resisting system</td>
<td>Shop (3) and field inspection</td>
</tr>
<tr>
<td>1705.11.2 Cold-formed Steel Special Inspections For Wind Resistance</td>
<td></td>
</tr>
<tr>
<td>1. Inspection during welding operations of elements of the main windforce-resisting system</td>
<td>Shop (3) and field inspection</td>
</tr>
<tr>
<td>2. Inspections for screw attachment, bolting, anchoring and other fastening of components within the main windforce-resisting system</td>
<td>Shop (3) and field inspection</td>
</tr>
<tr>
<td>1705.11.3 Wind-resisting Components</td>
<td></td>
</tr>
<tr>
<td>1. Roof cladding</td>
<td>Shop (3) and field inspection</td>
</tr>
<tr>
<td>2. Wall cladding</td>
<td>Shop (3) and field inspection</td>
</tr>
<tr>
<td>1705.12.1 Structural Steel Special Inspections for Seismic Resistance</td>
<td></td>
</tr>
<tr>
<td>MATERIAL / ACTIVITY</td>
<td>SERVICE</td>
</tr>
<tr>
<td>-----------------------------------------------------------------------------------</td>
<td>-------------------------------</td>
</tr>
<tr>
<td>Inspection of structural steel in seismic force-resisting system in accordance with AISC 341</td>
<td>Shop (3) and field inspection</td>
</tr>
<tr>
<td>Inspection of structural steel elements in seismic force-resisting system in accordance with AISC 341 (including struts, collectors, chord and foundation elements)</td>
<td>Shop (3) and field inspection</td>
</tr>
<tr>
<td><strong>1705.12.2 Structural Wood Special Inspections for Seismic Resistance</strong></td>
<td></td>
</tr>
<tr>
<td>1. Inspection of field gluing operations of elements of the seismic-force resisting system</td>
<td>Field inspection</td>
</tr>
<tr>
<td>2. Inspection of nailing, bolting, anchoring and other fastening of components within the seismic-force-resisting system</td>
<td>Shop (3) and field inspection</td>
</tr>
<tr>
<td><strong>1705.12.3 Cold-formed Steel Light-Frame Construction Special Inspections for Seismic Resistance</strong></td>
<td></td>
</tr>
<tr>
<td>1. Inspection during welding operations of elements of the seismic-force-resisting system</td>
<td>Shop (3) and field inspection</td>
</tr>
<tr>
<td>2. Inspections for screw attachment, bolting, anchoring and other fastening of components within the seismic-force-resisting system</td>
<td>Shop (3) and field inspection</td>
</tr>
<tr>
<td><strong>1705.12.4 Designated Seismic Systems Verification</strong></td>
<td></td>
</tr>
<tr>
<td>Inspect and verify that that the component label, anchorage or mounting conforms to the certificate of compliance in accordance with Section 1705.12.3</td>
<td>Field inspection</td>
</tr>
<tr>
<td><strong>1705.12.5 Architectural Components Special Inspections for Seismic Resistance</strong></td>
<td></td>
</tr>
<tr>
<td>1. Inspection during the erection and fastening of exterior cladding and interior and exterior veneer</td>
<td>Field inspection</td>
</tr>
<tr>
<td>2. Inspection during the erection and fastening of interior and exterior nonbearing walls</td>
<td>Field inspection</td>
</tr>
<tr>
<td>3. Inspection during anchorage of access floors</td>
<td>Field inspection</td>
</tr>
<tr>
<td><strong>1705.12.6 Mechanical and Electrical Components Special Inspections for Seismic Resistance</strong></td>
<td></td>
</tr>
<tr>
<td>1. Inspection during the anchorage of electrical equipment for emergency or standby power systems</td>
<td>Field inspection</td>
</tr>
</tbody>
</table>
## SCHEDULE OF SPECIAL INSPECTION SERVICES

### AZURA SURGERY CENTER RENALUS CRESTVIEW

<table>
<thead>
<tr>
<th>MATERIAL / ACTIVITY</th>
<th>SERVICE</th>
<th>APPLICABLE TO THIS PROJECT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Y/N</td>
</tr>
<tr>
<td>2. Inspection during the anchorage of other electrical equipment</td>
<td>Field inspection</td>
<td>N</td>
</tr>
<tr>
<td>3. Inspection during installation and anchorage of piping systems designed to carry hazardous materials, and their associated mechanical units</td>
<td>Field inspection</td>
<td>N</td>
</tr>
<tr>
<td>4. Inspection during the installation and anchorage of HVAC ductwork that will contain hazardous materials</td>
<td>Field inspection</td>
<td>N</td>
</tr>
<tr>
<td>5. Inspection during the installation and anchorage of vibration isolation systems</td>
<td>Field inspection</td>
<td>N</td>
</tr>
<tr>
<td><strong>1705.12.7 Storage Racks</strong> Special Inspections for Seismic Resistance</td>
<td>Inspection during the anchorage of storage racks 8 feet or greater in height</td>
<td>Field inspection</td>
</tr>
<tr>
<td><strong>1705.12.8 Seismic Isolation Systems</strong></td>
<td></td>
<td>Shop and field inspection</td>
</tr>
<tr>
<td><strong>1705.12.9 Cold-formed steel special bolted moment frames</strong></td>
<td>Inspection during the fabrication and installation of cold-formed steel special bolted moment frames.</td>
<td>Shop and field inspection</td>
</tr>
<tr>
<td><strong>1705.13.1 Structural Steel</strong></td>
<td>Nondestructive testing for seismic resistance shall be in accordance with the quality assurance requirements of AISC 341</td>
<td>Shop (3) and field testing</td>
</tr>
<tr>
<td></td>
<td>Nondestructive testing of structural steel elements in the seismic force resisting systems of structures, including struts, collectors, chords and foundation elements shall be performed in accordance with the quality assurance requirements of AISC 341</td>
<td>Shop (3) and field testing</td>
</tr>
<tr>
<td><strong>1705.13.2 Seismic Certification of Nonstructural Components</strong></td>
<td>Review certificate of compliance for designated seismic system components.</td>
<td>Certificate of compliance review</td>
</tr>
<tr>
<td>MATERIAL / ACTIVITY</td>
<td>SERVICE</td>
<td>Y/N</td>
</tr>
<tr>
<td>---------------------------------------------------------</td>
<td>-----------------------------------------------------------</td>
<td>-----</td>
</tr>
<tr>
<td>1705.13.3 Designated Seismic Systems</td>
<td>Review certificate of compliance for designated seismic</td>
<td>N</td>
</tr>
<tr>
<td></td>
<td>system components</td>
<td></td>
</tr>
<tr>
<td>1705.13.4 Seismic Isolation Systems</td>
<td>Test seismic isolation system in accordance with ASCE 7</td>
<td>N</td>
</tr>
<tr>
<td></td>
<td>Section 17.8</td>
<td></td>
</tr>
<tr>
<td>1705.14 Sprayed Fire-resistant Materials</td>
<td>1. Verify surface condition preparation of structural</td>
<td>Field inspection</td>
</tr>
<tr>
<td></td>
<td>members</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. Verify application of sprayed fire-resistant materials</td>
<td>Field inspection</td>
</tr>
<tr>
<td></td>
<td>3. Verify average thickness of sprayed fire-resistant</td>
<td>Field inspection</td>
</tr>
<tr>
<td></td>
<td>materials applied to structural members</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4. Verify density of the sprayed fire-resistant material</td>
<td>Field inspection and testing</td>
</tr>
<tr>
<td></td>
<td>complies with approved fire-resistant design</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5. Verify the cohesive/adhesive bond strength of the cured</td>
<td>Field inspection and testing</td>
</tr>
<tr>
<td></td>
<td>sprayed fire-resistant material</td>
<td></td>
</tr>
<tr>
<td>1705.15 Mastic and Intumescent Fire-Resistant Coatings</td>
<td>Inspect mastic and intumescent fire-resistant coatings</td>
<td>Field inspection</td>
</tr>
<tr>
<td></td>
<td>applied to structural elements and decks</td>
<td></td>
</tr>
<tr>
<td>1705.16 Exterior Insulation and Finish Systems (EIFS)</td>
<td>1. Verify materials, details and installations are per the</td>
<td>Field inspection</td>
</tr>
<tr>
<td></td>
<td>approved construction documents</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. Inspection of water-resistive barrier over sheathing</td>
<td>Field inspection</td>
</tr>
<tr>
<td></td>
<td>substrate</td>
<td></td>
</tr>
<tr>
<td>1705.17 Fire-Resistant Penetrations and Joints</td>
<td>1. Inspect penetration firestop</td>
<td>Field testing</td>
</tr>
<tr>
<td></td>
<td>2. Inspect fire-resistant joint systems</td>
<td>Field testing</td>
</tr>
<tr>
<td>1705.18 Smoke Control Systems</td>
<td>1. Leakage testing and recording of device locations prior</td>
<td>Field testing</td>
</tr>
<tr>
<td></td>
<td>to concealment</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. Prior to occupancy and after sufficient completion,</td>
<td>Field testing</td>
</tr>
<tr>
<td></td>
<td>pressure difference testing, flow</td>
<td></td>
</tr>
<tr>
<td></td>
<td>measurements, and detection and control verification</td>
<td></td>
</tr>
</tbody>
</table>
## SCHEDULE OF SPECIAL INSPECTION SERVICES

### PROJECT
AZURA SURGERY CENTER RENALUS CRESTVIEW

### APPLICABLE TO THIS PROJECT

<table>
<thead>
<tr>
<th>MATERIAL / ACTIVITY</th>
<th>SERVICE</th>
<th>Y/N</th>
<th>EXTENT</th>
<th>AGENT*</th>
<th>DATE COMPLETED</th>
</tr>
</thead>
</table>

### * INSPECTION AGENTS

<table>
<thead>
<tr>
<th>1.</th>
<th>ADDRESS</th>
<th>TELEPHONE NO.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Notes:

1. The inspection and testing agent(s) shall be engaged by the Owner or the Owner's Agent, and not by the Contractor or Subcontractor whose work is to be inspected or tested. Any conflict of interest must be disclosed to the Building Official prior to commencing work. The qualifications of the Special Inspector(s) and/or testing agencies may be subject to the approval of the Building Official and/or the Design Professional.
2. The list of Special Inspectors may be submitted as a separate document, if noted so above.
3. Special Inspections as required by Section 1704.2.5 are not required where the fabricator is approved in accordance with IBC Section 1704.2.5.1
4. Observe on a random basis, operations need not be delayed pending these inspections. Perform these tasks for each welded joint, bolted connection, or steel element.
5. NDT of welds completed in an approved fabricator's shop may be performed by that fabricator when approved by the AHJ. Refer to AISC 360, N7.

Are Requirements for Seismic Resistance included in the Statement of Special Inspections?  
No

Are Requirements for Wind Resistance included in the Statement of Special Inspections?  
No

DATE:
SECTION 01420   SUBMITTAL TRANSMITTAL

Project Name & Location No.: ________________________________________ 

Date: ___________________________________________________________

NOTE: A Transmittal is required for each Specification Section.  
DO NOT bind together separate submittals from different 
Specification Sections.  
This form is to be used only if there are no deviations from the 
Contract Documents.

TO: ____________________________________________________________ 

FROM: ____________________________________________________________

SUBMITTAL TYPE: 

- Re-Submittal
- Information (Waiver)
- Product Data
- Shop Drawings
- Quality Control/Accurance
- Test Reports
- Certificate 
- Contract Closeout
- Design Data
- Samples
- Other

Comply with all submittal requirements in the Project Manual and the particular 
Specification Section for which you are transmitting material.

Specification Number and Title:

<table>
<thead>
<tr>
<th>Part</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Contractor’s Certification:

We have verified that all material or equipment contained in this submittal meets all the requirements specified or shown (no exceptions).

We acknowledge that in accordance with Article 4.7 of the General Conditions a re-evaluation fee can be assessed against our contract if this submittal requires a re-submission and review, if the submittal requirements have not been met.

____________________________________  ________________________________
Contractor/Contractor’s Representative (Print Name)  Signature
PART 1 - GENERAL

1.01 DESCRIPTION

A. Work included: Provide temporary facilities and controls needed for the work including, but not necessarily limited to:
   1. Temporary utilities such as heat, water, electricity, and telephone;
   2. Field office for the Contractor’s personnel;
   3. Sanitary facilities;
   4. Enclosures such as tarpaulins, barricades, and canopies;
   5. Fire protective measures;

B. Related work:
   1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.
   2. Except that equipment furnished by subcontractors shall comply with requirements of pertinent safety regulations, such equipment normally furnished by the individual trades in execution of their own portions of the work are not part of this Section.
   3. Permanent installation and hookup of the various utility lines are described in other Sections.

1.02 PRODUCT HANDLING

A. Maintain temporary facilities and controls in proper and safe condition throughout progress of the work.

PART 2 - PRODUCTS

2.01 UTILITIES

A. Temporary Toilet Facilities:
   1. Provide suitable toilet facilities, conforming with all code requirements, for use by his staff, representatives of the Owner and the Architect, and for all workmen on the job. Keep in neat and sanitary condition and provide reasonable heat during the winter months.

B. Temporary Services:
   1. Water:
      a) Make all necessary arrangements, with the responsible local authorities, and with the building Owner (if leased space), for all temporary water services for the construction operations as required for his use and the use of all trades.
      b) Obtain and pay for all permits or other sanctions required to furnish temporary water on the job site. The cost of all water use on the job shall be borne by the Contractor.
      c) Make all connections, furnish and install all pipes and fittings, including meter, and remove all temporary materials when this service is no longer required.
      d) Use due care to prevent waste of water, maintain in perfect condition at all times; pipes, hoses, valves, and connections.
e) Provide adequate drinking water satisfactorily cooled for all workmen on the job; water units shall be strategically located throughout the job.

2. Temporary Electricity:
   a) Make arrangements with local electric company for temporary electric service, pay expenses in connection with installation, operation and removal thereof and pay cost of energy consumed by all trades.
   b) Provide power distribution as required throughout structure 120/208 - volt, 3-phase, 60 cycle, AC. Termination or power distribution shall be one location on each floor or each major wing or section of building. Termination shall be provided complete with circuit breakers, disconnect switches and other electrical devices as required to protect power supply system.
   c) Temporary lighting systems shall be furnished, installed and maintained by Contractor as required to satisfy minimum requirements of safety and security. Temporary lighting to illuminate staging, stockpiles, trenches, projections, etc., to the satisfaction of the Architect and general illumination throughout, adequate for watchmen and emergency personnel.
   d) Temporary equipment and wiring for power and lighting shall be in accordance with applicable provisions of governing codes. Temporary wiring shall be maintained in safe manner and utilized so as not to constitute a hazard to persons or property.
   e) When permanent electrical power and lighting systems are in operating condition, they may be used for temporary power lighting for construction purposes, provided that Contractor obtains written approval of Architect and Owner, assumed full responsibility for entire power and lighting systems, and pays costs for operation and restoration of systems.
   f) At completion of construction work or at such time as Contractor makes use of permanent electrical installation, temporary wiring, lighting and other temporary electrical equipment and devices shall be properly removed by Contractor.

3. Temporary Heat:
   a) Provide all heat as may be necessary for thawing out and heating the ground or materials, and for the proper execution, protection and drying out of his and his Subcontractor’s work before permanent apparatus is installed.
   b) Temporary heaters shall be smokeless, portable unit heaters, (Underwriter’s Laboratories, Factory Mutual, and Fire Marshall approved).
   c) After the building or portion thereof has been enclosed, either temporarily or permanently, provide temporary heat and maintain continuously at a temperature of not less than 60 degrees nor more than 75 degrees until final acceptance of the work. Comply with requirements under Division 15, Heating, Ventilating, and Air Conditioning for use of permanent heating system for temporary heat.
   d) Provide heat as required for temporary structures of a type approved by the Architect.
   e) Include all costs of temporary heat in his proposal.
   f) When permanent heating system, or suitable portion thereof, is in operating condition, such system may be used for temporary heating, provided that Contractor obtains written approval of Architect and Owner, assumes full responsibility for new heating system, and pays costs for operation and maintenance, and restoration of system.
   g) Furnish an acceptable operator for the new heating plant during the period when temporary heat is required.
   h) Upon conclusion of temporary heating period, remove temporary piping, temporary radiators, other equipment and pay costs in connection with repairing damage caused by
installation or removal of temporary heating equipment, and thoroughly clean and recondition those parts of permanent heating system used for temporary service.

2.02 STAGING AND SCAFFOLDING

A. Furnish, erect, and maintain all staging and scaffolding (exterior and interior) eight (8) feet or over in height for all trades for such use. Furnish, erect and maintain all staging and scaffolding (exterior and interior) for his own use during construction of the building. Staging and scaffolding shall be of approved design, erected and removed by experienced stage builders, and shall have all accident prevention devices required by Federal, State, and Local Laws.

B. Erect and maintain heavy duty air and dust barriers to completely isolate areas undergoing demolition and construction from occupied areas. Barriers shall be erected so as to prevent the passage of dust, air, debris, etc. into adjoining spaces. Maintain relative negative pressure within areas of demo/construction activities.

C. Employ tacky floor coverings immediately outside of any entrances to the work area. Tacky surfaces shall be renewed daily or as required to maintain effectiveness.

D. Erect such staging and scaffolding in sufficient time and in proper sequence so as not to delay work. Subcontractors shall schedule and commence their work so that building progress is not delayed or obstructed once staging and scaffolding become available.

E. Each Subcontractor entering upon the work shall furnish, erect, and maintain all staging and scaffolding under 8 feet in height required for work under his subcontract, and where so indicated, all other staging and scaffolding required for his work. On completion of his work, each Subcontractor shall dismantle and remove such staging and scaffolding.

F. Erection of all staging, scaffolding, rigging, etc. shall be supervised and directed by a Licensed Rigger and inspected by a Registered Engineer. A certified affidavit shall be submitted to the Architect by this Engineer stating that all staging, scaffolding, rigging, etc. has been safely erected and conforms in all respects to State and Local Codes. The General Contractor shall pay for all services in connection with the erection and inspection of all staging, scaffolding, and rigging, etc.

G. Above facilities shall be constructed and maintained in accordance with applicable requirements of “American Standard Safety Code of Building and Construction”, published by USASI, and be removed after they have served their purpose or when directed by Architect.

H. Permanent stairs shall be erected as soon as possible and Contractor shall provide suitable temporary treads, risers, etc. as required to protect permanent stair members, and provide temporary railing as required for safety.

2.03 FIELD OFFICE AND TELEPHONE

A. The General Contractor is to provide a complete contact list for all pertinent project personnel and subcontractors.

B. An address where project-related mail can be received must also be made available for the duration of the project.
2.04 TEMPORARY STRUCTURES

A. The Contractor and Subcontractor shall construct and maintain, in locations approved by the Architect, all temporary structures, sheds, and similar needs for the storing of their respective materials for the duration of the Contract.

B. All temporary structures shall be of substantial construction and weather tight. Temporary structures shall be removed from site when no longer needed by the Contractor or trade responsible for their erection.

PART 3 - EXECUTION

3.01 FIRE PROTECTIVE MEASURES

A. The Contractor shall maintain a rubbish-free building and building site, and shall provide metal barrels into which all luncheon refuse shall be deposited. All such barrels shall have tight-fitting covers.

B. Store materials so they do not create natural pockets for papers or other combustible materials.

C. Construction debris shall not be thrown from the windows of the building but shall be removed through tight strong chutes, and all debris shall be wet down if necessary, or as directed by Architect.

D. When building materials with combustible contents are stored in the building during construction, they shall be located within easy reach of fire protection equipment.

E. An approved number of fire extinguishers shall be placed throughout work areas, temporary paint shop and within easy reach of mechanics who are operating plumber’s furnaces, burning or welding apparatus. The number and location shall be approved from time to time by the local fire department.

F. It shall be the duty and responsibility of the General Contractor or any subcontractor performing any cutting or welding, to comply with the safety provisions of the national Fire Protection Association’s “National Fire Codes” pertaining to such work and the respective contractor shall be responsible for all damages resulting from a failure to do so comply.

3.02 POLICE, FIREMEN AND INSPECTORS

A. Any police officer, fireman or inspector required by the local authorities having jurisdiction over the work, shall be employed by the Contractor and paid the standard rate or wage for the respective occupation of the work area. All personnel employed shall be covered by Workman’s Compensation and Employer’s Liability Insurance by the Contractor.

3.03 WINTER CONSTRUCTION

A. Remove snow and ice which may impair progress of work, be detrimental to workmen, or impair trucking, delivery or moving of materials at job site or prevent adequate drainage at site or adjoining areas.
B. Contractor shall take special precautions against damage to materials and work installed in freezing weather, by providing special heat and covering to prevent damage by elements, in manner approved by Architect. Ground surfaces under footings and under pipe lines, and masonry, concrete and other work subject to damage shall be protected against freezing.

3.04 MAINTENANCE AND REMOVAL

A. Maintain temporary facilities and controls as long as needed for safe and proper completion of the work.

B. Remove such temporary facilities and controls as rapidly as progress of the Work will permit, or as directed by the Architect.

END OF SECTION
SECTION 01600

OWNER FURNISHED EQUIPMENT

PART 1 GENERAL

1.01 DESCRIPTION

A. Work included: Receive, unload, store and install Owner furnished equipment as shown on the plans and called for in the Specifications.

B. Related Work:
   1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of the Specifications.
   2. Section 10440 Interior Signage

C. QUALITY ASSURANCE

D. Use adequate numbers of skilled workmen necessary to handle, receive and install Owner Furnished Equipment.

E. Upon written acknowledgment by Contractor of receipt in proper condition, the Contractor shall maintain responsibility for proper storage of the equipment, and shall provide a locked storage room on site as soon as possible for the storage of Owner furnished equipment.

1.02 WORK NOT INCLUDED

A. The Owner shall pay the net cost of shipping owner furnished equipment F.O.B. job site.

PART 2 PRODUCTS

2.01 EQUIPMENT

A. Owner furnished Equipment includes certain plumbing and/or electrical items purchased by the Owner and shipped to the job site.

B. See drawings and other sections of these specifications for items designated O.F.I.C. (Owner Furnished Installed by Contractor) including but not limited to the following:

<table>
<thead>
<tr>
<th>Item</th>
<th>Manufacturer / Vendor / Supplier</th>
<th>Product Number</th>
<th>Location</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Integrated Ceiling System used in procedure and OR</td>
<td>SLD Technologies</td>
<td>Procedure and OR</td>
<td>Owner furnished and installed by Owner’s Vendor</td>
<td></td>
</tr>
<tr>
<td>Room Signage</td>
<td>Owner</td>
<td>Throughout</td>
<td>Install per Owner’s instructions</td>
<td></td>
</tr>
<tr>
<td>Sterilizer</td>
<td>Steris</td>
<td>Clean Utility</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
2.02 NOT IN CONTRACT
A. "N.I.C." (Not in Contract) indicates equipment furnished by the Owner and installed under another construction contract or by another Contractor, or operations at the site not included as part of this Contract, unless the drawings or specifications require installation under this Contract.

B. Any questions concerning the scope or intent of any N.I.C. items during the bidding period shall be referred to the Architect.

C. The Owner reserves the right to let other contracts for work at the site.

PART 3 EXECUTION

2.03 RECEIVING/UNLOADING
A. The Contractor shall be responsible for noting any damage and/or short count on the Bill of Lading for any Owner Furnished Equipment received by him; such listing of damages or short count being required to establish the Owner's potential claim against the carrier. The Contractor shall also notify the Architect and Owner directly on any such damage and/or short count.

B. Unload Owner furnished equipment at the job site using necessary care and equipment as required to handle the equipment in a safe manner.

C. Install Owner furnished equipment as called for on the drawings and in these specifications.

D. Contract shall provide blocking and electrical service for owner furnished equipment including A/V equipment and millwork.

END OF SECTION
SECTION 01640

PRODUCT HANDLING

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work included: Products scheduled for use in the Work by means including, but not necessarily limited to, those described in this Section.

B. Related Work:
   1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.
   2. Additional procedures also may be prescribed in other Sections of these Specifications.

1.02 QUALITY ASSURANCE

A. Include within the Contractor’s quality assurance program such procedures as are required to assure full protection of work and materials.

1.03 MANUFACTURERS’ RECOMMENDATIONS

A. Except as otherwise approved by the Architect and Owner, determine and comply with manufacturers’ recommendations on product handling, storage and protection.

1.04 PACKAGING

A. Deliver products to the job site in their manufacturer’s original container, with labels intact and legible.
   1. Maintain packaged materials with seals unbroken and labels intact until time of use.
   2. Promptly remove damaged material and unsuitable items from the job site, and promptly replace with material meeting the specified requirements, at no additional cost to the Owner.

B. The Owner may reject as non-complying such material and products that do not bear identification satisfactory to the Owner as to manufacturer, grade, quality and other pertinent information.

1.05 PROTECTION

A. Every precaution shall be taken to see that all building materials and equipment of all descriptions and parts of the building under construction are properly braced and secured, protected from injury by water, fire, accident, cold weather or other cause; both during work hours and non-working hours.

B. Furnish, erect and maintain exterior barricades, fences and all other safety protection measures required by traffic, municipal and state safety regulation. Remove all enclosures when no longer needed.
C. All damage to materials shall be replaced at no cost to the Owner.

D. Temporary wood doors with self-closing hardware and padlocks shall be provided for exterior entrances and elsewhere as required.

E. Provide protection for all concrete and finished floors, treads, platforms and the like against mechanical damage, oil, grease, paint and other material which will stain the floor finish. Install and maintain adequate strips of Polyethylene laminated to sisal reinforced paper on finished floors where further work will be done by trades or where subject to traffic.

F. After the installation of work by a given Subcontractor is properly completed, the Contractor shall be responsible for protection and for repair, replacement or cleaning should the subject work be damaged by other trades or by any other cause. All work shall be in perfect condition at the time of final acceptance of the project.

G. Keep all access roads, walks and common corridors clear of construction equipment, materials, debris and all other items. Repair all work disturbed by construction operation and leave in as good or better condition after completion as found before new work started.

H. Protect everything on the premises from injury by water, frost, wind, fire, accident or other cause and any interference.

I. Provide ways and means to control the flow of water from every source, which may cause inconvenience or damage during the building operation.

J. All temporary protection and coverage shall be removed at the completion of the work.

1.06 REPAIRS AND REPLACEMENTS

A. In event of damage, promptly make replacements and repairs to the approval of the Architect and at no additional cost to the Owner.

B. Additional time required to secure replacements and to make repairs will not be considered by the Owner to justify an extension in the Contract Time of Completion.

1.07 BROKEN GLASS

A. The Contractor shall be responsible for all broken, scratched and cracked glass, regardless of cause and no matter by who damaged, from the time construction has begun until the project is accepted by the Owner. He shall replace all damaged glass and deliver the entire job with all glazing intact and clean.

END OF SECTION
Attic Stock Checklist

The Contractor shall deliver to the Owner the spare parts, extra stock and maintenance materials listed below, and shall obtain a signed receipt for these materials. All materials shall be neatly packaged and identified.

This completed checklist should be sent via fax or email to Owner’s Representative prior to Final Payment.

________________________________________________________________________

Project Name and Location

1. Acoustical Treatment - Two full cartons each acoustical tile. □

2. Resilient Flooring - 10% of each color VCT used throughout, 8 linear feet of each color and type of base; 12 linear feet of each type of sheet vinyl □

3. Painting - One full unopened gallon, each color and type of paint. □

4. Ceramic Tile - One unopened box of each color and type. □

5. Wall Protection - One four foot long corner guard with two spare end caps. □

6. Air Distribution - One full carton, each filter size and type. □

7. NRP Wall Protection – Four (4) 48” x 96” high pieces of each type installed. □

8. Four (4) Full tubes of Fire Caulking of type used in facility □

________________________________________________________________________

Signature of General Contractor    Job Title

________________________________________________________________________

Name of Company      Date
PART 1 - GENERAL

1.01 DESCRIPTION

A. Work included: Provide an orderly and efficient transfer of the completed Work to the Owner.

B. Related work:
   1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.
   2. Activities relative to Contract closeout are described in, but not necessarily limited to, the General Conditions.
   3. “Substantial Completion” is defined in the General Conditions.

1.02 QUALITY ASSURANCE

A. Prior to requesting inspection by the Owner, use adequate means to assure that the Work is completed in accordance with the specified requirements and is ready for the requested inspection.

1.03 PROCEDURES

A. Substantial Completion:
   1. Prepare and submit the punch list required by the General Conditions. Punch list shall be ordered by room number. Include photos of work to be completed or remedied.
   2. Within a reasonable time after receipt of the list, the Owner and/or Architect will inspect to determine status of completion and prepare Owner’s list of work to be completed or remedied.
   3. Should the Owner determine that the Work is not substantially complete:
      a) The Owner promptly will so notify the Contractor, in writing, giving the reasons therefore.
      b) Contractor shall remedy the deficiencies promptly, and notify the Owner when ready for re-inspection.
      c) The Owner will re-inspect the Work.
   4. When the Owner concurs that the Work is substantially complete:
      a) The Architect will prepare a “Certificate of Substantial Completion” on AIA Form G704, accompanied by the Contractor’s list of items to be completed or corrected, as verified by the Owner.
      b) The Architect will submit the Certificate to the Owner and to the Contractor for their written acceptance of the responsibilities assigned to them in the Certificate.

B. Final Completion:
   1. Prepare and submit the notice required by the General Conditions.
   2. Verify that the Work is complete including, but not necessarily limited to, the items mentioned in the General Conditions.
   3. Certify that:
a) Contract Documents have been reviewed;
b) Work has been inspected for compliance with the Contract Documents;
c) Work has been completed in accordance with the Contract Documents;
d) Equipment and systems have been tested as required, and are operational;
e) Work is completed and ready for final inspection.
4. If the Contractor is not complete for any of the above requested inspections, the Contractor shall bear the cost of any subsequent inspections to examine the work not complete at previously requested inspections. Costs due Owner will include any travel costs and related direct hourly costs from the Architect and Owner’s Representative.
5. The Owner will make an inspection to verify status of completion.
6. Should the Owner determine that the Work is incomplete or defective:
a) The Owner promptly will so notify the Contractor, in writing, listing the incomplete or defective work.
b) Contractor shall remedy the deficiencies promptly, and notify the Owner when ready for re-inspections.
7. When the Owner determines that the work is acceptable under the Contract Documents, he will request the Contractor to make closeout submittals.

C. Closeout submittals include, but are not necessarily limited to:

1. Project Record Documents described in Section 01720:
a) Two (2) complete sets of operation and maintenance manuals, and data for items so listed in pertinent other Sections of these Specifications, and for other items when so directed by the Owner.

2. Warranties and bonds including, but not limited to the following:
a) Termite bond
b) Product and appliance warranties
c) Plumbing fixture warranties
d) Med Gas and Vacuum systems
e) Roofing material warranties
f) Electronic systems and components warranties
   (1) Nurse call system
   (2) Intercom system
   (3) Fire alarm system

3. Keys and keying schedule;
a) Deliver keys and spare keys as specified in keying schedule.

4. Spare parts and materials extra stock. The Contractor shall deliver to the Owner the spare parts, extra stock and maintenance materials listed below, and shall obtain a signed receipt for these materials. Materials shall be neatly packaged and identified.
a) Provide as required by section 01700 – Attic Stock Checklist.

5. Evidence of compliance with requirements of governmental agencies having jurisdiction including, but not necessarily limited to:
a) Certificates of Inspection;
b) Certificates of Occupancy;

6. Certificates of Insurance for products and completed operations;

7. Evidence of payment and release of liens (see Lien Release Form at the end of this Section);

8. List of Subcontractors, service organizations, and principal vendors, including names, addresses, and telephone numbers where they can be reached for emergency service at all times including nights, weekends and holidays.
9. Project data catalog sheets and shop drawings approved and returned by architect described in Section 01340.

10. Class B Fire Alarm System:
   a) Provide a detailed one-line wiring diagram of each specified system and the interconnection wiring between all systems.

11. Item numbers 2, 3, 5, 6, 7, 8, 9 and 10 above shall be tabulated and bound into two (2) three-ring binders with the project name firmly affixed to the cover and binder spine. This document should be labeled “Operations and Maintenance Manual”. Two CD’s containing digital scans of all above documents along with one (1) hard copy for the facility is required. Deliver to Owner’s representative prior to final closeout and payment.

12. Provide As-Built drawing markups to Architect of Record.

13. Life Safety Manual:
   a) The Life Safety Manual shall consist of a three-ring binder with sleeves to hold papers, material samples and other pertinent documents related to the service contracts, fire ratings as well as all service and inspection reports of all materials used in the construction of the facility.
   b) Each section of the manual shall be tabbed by number and sub-number for easy access to all documents.
   c) All documents required for inclusion in the manual described in Section 01700 - Appendix B of this specification shall be included in the Life Safety Manual at project closeout. The parties responsible for each item listed in the appendix are also listed for clarification.
   d) Section 01700 - Appendix B also serves as a checklist for completion of the manual and a Table of Contents for the front of the manual.
   e) Only one (1) manual with this information will be required per project.
   f) This manual should be delivered to the Owner prior to final closeout and payment.

14. Turnover Commissioning Record
   a) A statement that systems have been completed in accordance with the contract documents and that the systems are performing in accordance with the final owner’s project requirements document.
   b) Identification and discussion of any substitutions, compromises, or variances between the final design intent, contract documents and as-built conditions.
   c) Description of components and systems that exceed owner’s project requirements and those which do not meet the requirements and why.
   d) Summary of all issues resolved and unresolved and any recommendations for resolution.
   e) The final commissioning report will be a critical reference and benchmark document for future recommissioning of the facility.

D. Project Closeout Timelines:

1. The Owner’s Representative must receive all closeout submittals and a final statement of accounting from the Contractor within thirty (30) days of the Owner’s written acceptance of the Certificate of Substantial Completion.

2. The Owner must receive all closeout submittals and a final statement of accounting from the Contractor before final payment can be made.

E. Final adjustment of accounts:
1. Submit a final statement of accounting to the Owner, showing all adjustments to the Contract Sum.
2. If so required, the Owner will prepare a final Change Order showing adjustment to the Contract Sum which was not made previously by Change orders.

1.04 STAFF TRAINING & INSTRUCTION

A. Provide training and instruction for the Owner’s personnel in proper operation and maintenance of all systems and equipment, after acceptance of Operation and Maintenance Manual. It is the Contractor’s responsibility to schedule training with the Owner’s personnel.
B. Any appropriate personnel or subcontractors should be on site to train the staff on their particular specialty.
C. It is intended for all facility systems to be reviewed with owner’s personnel on one complete day at some point prior to the opening and operation of the facility.
D. Provide at the Final Completion walkthrough a schedule of such training, allowing the following time periods:

1. Mechanical Systems – 2 hours
   a) Show locations and describe operation of thermostats
   b) Show location of package unit filters and how to replace them
   c) Describe operation of water heater thermostat
2. Electrical, Lighting, Alarm, Nurse Call Systems – 2 hours
   a) Describe operation of Generator ATS (if provided)
   b) Describe operation and layout of main distribution panels
   c) Describe VFD operation
   d) Show locations and describe fire alarm system operation
   e) Operation of the timeclock
   f) Operation of photo eye for parking lot lighting
3. Plumbing Systems – 2 hours
   a) Location of incoming water
   b) Show location of water meter and describe its function
   c) Show locations of sewer cleanouts
   d) Describe sprinkler riser layout and operation

END OF SECTION
### SECTION 1 – CERTIFICATES

<table>
<thead>
<tr>
<th>SECTION</th>
<th>DOCUMENT</th>
<th>DOCUMENT RESPONSIBILITY</th>
<th>COMPLETE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1A</td>
<td>Certificate of Occupancy</td>
<td>General Contractor</td>
<td></td>
</tr>
<tr>
<td>1B</td>
<td>Past CMS Life Safety code certificates (ongoing)</td>
<td>AVC Staff</td>
<td></td>
</tr>
<tr>
<td>1C</td>
<td>Generator initial certification and testing</td>
<td>AVC Staff</td>
<td></td>
</tr>
<tr>
<td>1D</td>
<td>Certification of inspection and test of sprinkler system</td>
<td>General Contractor</td>
<td></td>
</tr>
<tr>
<td>1E</td>
<td>Fire alarm installation certificate</td>
<td>General Contractor</td>
<td></td>
</tr>
<tr>
<td>1F</td>
<td>Certification of installation and test of nurse call system</td>
<td>General Contractor</td>
<td></td>
</tr>
<tr>
<td>1G</td>
<td>Certification letters from Subcontractors and General Contractors</td>
<td>General Contractor</td>
<td></td>
</tr>
<tr>
<td>1H</td>
<td>Fire alarm monitoring company UL certificate</td>
<td>Owner’s Representative</td>
<td></td>
</tr>
<tr>
<td>1I</td>
<td>Med Gas System Certification</td>
<td>General Contractor</td>
<td></td>
</tr>
</tbody>
</table>

### SECTION 2 - CORRESPONDENCE

<table>
<thead>
<tr>
<th>SECTION</th>
<th>DOCUMENT</th>
<th>DOCUMENT RESPONSIBILITY</th>
<th>COMPLETE</th>
</tr>
</thead>
<tbody>
<tr>
<td>2A</td>
<td>All letters or correspondence with Fire Marshal (ongoing)</td>
<td>AVC Staff</td>
<td></td>
</tr>
<tr>
<td>2B</td>
<td>All letters or correspondence with CMS (ongoing)</td>
<td>AVC Staff</td>
<td></td>
</tr>
<tr>
<td>2C</td>
<td>All letters or correspondence with local or city building officials (ongoing)</td>
<td>AVC Staff</td>
<td></td>
</tr>
<tr>
<td>2D</td>
<td>Architect’s Substantial Completion Letter</td>
<td>General Contractor</td>
<td></td>
</tr>
<tr>
<td>2E</td>
<td>All letters and correspondence with NCDHHS</td>
<td>General Contractor, AVC Staff</td>
<td></td>
</tr>
</tbody>
</table>

### SECTION 3 - POLICIES AND PLANS

<table>
<thead>
<tr>
<th>SECTION</th>
<th>DOCUMENT</th>
<th>DOCUMENT RESPONSIBILITY</th>
<th>COMPLETE</th>
</tr>
</thead>
<tbody>
<tr>
<td>3A</td>
<td>Fire Drill Observation Forms</td>
<td>AVC Staff</td>
<td></td>
</tr>
<tr>
<td>3B</td>
<td>Facility No Smoking Policy</td>
<td>AVC Staff</td>
<td></td>
</tr>
<tr>
<td>3C</td>
<td>Oxygen Storage Policy</td>
<td>AVC Staff</td>
<td></td>
</tr>
<tr>
<td>3D</td>
<td>Facility Safety Plan</td>
<td>AVC Staff</td>
<td></td>
</tr>
<tr>
<td>3E</td>
<td>Facility Fire Response Plan</td>
<td>AVC Staff</td>
<td></td>
</tr>
</tbody>
</table>

### SECTION 4 - SCHEDULES

<table>
<thead>
<tr>
<th>SECTION</th>
<th>DOCUMENT</th>
<th>DOCUMENT RESPONSIBILITY</th>
<th>COMPLETE</th>
</tr>
</thead>
<tbody>
<tr>
<td>4A</td>
<td>Finish material schedule with actual installed finish materials and location</td>
<td>General Contractor</td>
<td></td>
</tr>
<tr>
<td>4B</td>
<td>Door Schedule</td>
<td>General Contractor</td>
<td></td>
</tr>
</tbody>
</table>
# SECTION 5 – PRODUCT CUT SHEETS

<table>
<thead>
<tr>
<th>SECTION</th>
<th>DOCUMENT</th>
<th>DOCUMENT RESPONSIBILITY</th>
<th>COMPLETE</th>
</tr>
</thead>
<tbody>
<tr>
<td>5A*</td>
<td>Wall Finishes Data &amp; Samples</td>
<td>General Contractor</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Wall coverings</td>
<td>General Contractor</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fire-Rated plywood</td>
<td>General Contractor</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Wall Protection &amp; Corner Guards</td>
<td>General Contractor</td>
<td></td>
</tr>
<tr>
<td>5B*</td>
<td>Ceiling Data &amp; Samples</td>
<td>General Contractor</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Acoustical tile &amp; grid</td>
<td>General Contractor</td>
<td></td>
</tr>
<tr>
<td>5C*</td>
<td>Floor Finishes Data &amp; Samples</td>
<td>General Contractor</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sheet vinyl cut sheet</td>
<td>General Contractor</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Rubber base cut sheet</td>
<td>General Contractor</td>
<td></td>
</tr>
<tr>
<td>5D</td>
<td>Doors &amp; Hardware</td>
<td>General Contractor</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cut Sheets for all rated doors</td>
<td>General Contractor</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cut Sheet for each type of door hardware</td>
<td>General Contractor</td>
<td></td>
</tr>
<tr>
<td>5E</td>
<td>Glazing</td>
<td>General Contractor</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cut sheet for each type of rated glass</td>
<td>General Contractor</td>
<td></td>
</tr>
<tr>
<td>5F</td>
<td>Gypsum Board</td>
<td>General Contractor</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cut sheet for each type of rated gypsum board</td>
<td>General Contractor</td>
<td></td>
</tr>
<tr>
<td>5G</td>
<td>Firestopping</td>
<td>General Contractor</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cut sheet for each type of fire rated caulking</td>
<td>General Contractor</td>
<td></td>
</tr>
<tr>
<td>5H</td>
<td>UL Assemblies</td>
<td>General Contractor</td>
<td></td>
</tr>
<tr>
<td></td>
<td>All Approved UL Assembly Design Criteria used in facility</td>
<td>General Contractor</td>
<td></td>
</tr>
<tr>
<td></td>
<td>All Approved UL Penetration Design Criteria used in facility</td>
<td>General Contractor</td>
<td></td>
</tr>
<tr>
<td>5J</td>
<td>Fire Extinguishers</td>
<td>General Contractor</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cut sheet for each type of Fire Extinguisher installed</td>
<td>General Contractor</td>
<td></td>
</tr>
<tr>
<td>5K</td>
<td>Emergency Exit Signs</td>
<td>General Contractor</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cut sheet for each type of emergency exit sign installed</td>
<td>General Contractor</td>
<td></td>
</tr>
<tr>
<td>5L</td>
<td>Emergency Lighting</td>
<td>General Contractor</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cut sheet for each emergency light wall pack and/or light fixture with emergency battery back-up installed</td>
<td>General Contractor</td>
<td></td>
</tr>
<tr>
<td>5M</td>
<td>Fire Alarm</td>
<td>General Contractor</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cut sheet for fire alarm panel installed</td>
<td>General Contractor</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cut sheet for each type emergency pull station installed</td>
<td>General Contractor</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cut sheet for each type of smoke and heat detector installed</td>
<td>General Contractor</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cut sheet for each type of visual and audible/visual fire alarm notification devices installed</td>
<td>General Contractor</td>
<td></td>
</tr>
<tr>
<td>5N</td>
<td>Dampers</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cut sheet for each type of fire damper indicating fire rating</td>
<td>General Contractor</td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>----------------------------------------------------------</td>
<td>-------------------</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cut sheet for each type of smoke damper and fire/smoke damper</td>
<td>General Contractor</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Table listing each fire damper, smoke damper, and/or fire/smoke damper, the size, type (fused or motorized), location (room name and number, and type of duct), date inspected, and name of person/company name performing inspection**</td>
<td>General Contractor</td>
<td></td>
</tr>
<tr>
<td>5P</td>
<td>Generator or Generator Connection Panel &amp; ATS</td>
<td>General Contractor</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cut sheet for the generator or generator connection panel</td>
<td>General Contractor</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cut sheet of ATS</td>
<td>General Contractor</td>
<td></td>
</tr>
<tr>
<td>5Q</td>
<td>Oxygen Cylinder Storage Cabinet</td>
<td>AVC Staff</td>
<td></td>
</tr>
<tr>
<td>5R</td>
<td>Furniture</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cut sheet for each type of upholstered furniture indicating cigarette ignition test rating</td>
<td>AVC Staff</td>
<td></td>
</tr>
</tbody>
</table>

* Sections 5A, 5B & 5C shall include physical samples and cut sheets from the manufacturer with technical performance data and classifications. This information must state the smoke development and flame spread rating of the material.

** See 01700 Appendix C – Damper Inspection Report for complete requirements

### SECTION 6 - VENDOR SERVICE AND INSPECTION REPORTS

<table>
<thead>
<tr>
<th></th>
<th>Fire extinguisher inspection and servicing reports (ongoing)</th>
<th>General Contractor</th>
</tr>
</thead>
<tbody>
<tr>
<td>6A</td>
<td>Fire alarm system inspection and servicing reports (ongoing)</td>
<td>General Contractor</td>
</tr>
<tr>
<td>6B</td>
<td>Sprinkler system professional inspection and servicing reports (ongoing)</td>
<td>General Contractor</td>
</tr>
<tr>
<td>6C</td>
<td>Generator professional inspection and servicing reports (ongoing)</td>
<td>General Contractor</td>
</tr>
</tbody>
</table>

### SECTION 7 - OTHER DOCUMENTS

<table>
<thead>
<tr>
<th></th>
<th>List of circuit breakers and panels for all emergency lighting and emergency exit signs</th>
<th>General Contractor</th>
</tr>
</thead>
<tbody>
<tr>
<td>7A</td>
<td>Fire Extinguisher servicing contract</td>
<td>AVC Staff</td>
</tr>
<tr>
<td>7B</td>
<td>Fire alarm servicing contract</td>
<td>AVC Staff</td>
</tr>
<tr>
<td>7C</td>
<td>Generator servicing contract</td>
<td>AVC Staff</td>
</tr>
<tr>
<td>7D</td>
<td>Sprinkler system servicing contract</td>
<td>AVC Staff</td>
</tr>
<tr>
<td>7E</td>
<td>Smoke Partitions</td>
<td>General Contractor</td>
</tr>
<tr>
<td>7F</td>
<td>Floor Plan (8 x 11) showing location of smoke partitions</td>
<td>General Contractor</td>
</tr>
<tr>
<td>7G</td>
<td>Smoke detector sensitivity testing reports (ongoing)</td>
<td>General Contractor</td>
</tr>
<tr>
<td>7H</td>
<td>Full hydraulic calculations for sprinkler system</td>
<td>General Contractor</td>
</tr>
<tr>
<td></td>
<td>Above ground materials list and certification</td>
<td>General Contractor</td>
</tr>
</tbody>
</table>
### SECTION 8 - DRAWINGS FOR STORAGE TUBE

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
<th>Responsible Party</th>
</tr>
</thead>
<tbody>
<tr>
<td>8A</td>
<td>“As Built” building drawings compiled by the General Contractor and completed by the architect of record at the end of the construction phase</td>
<td>AVC Staff</td>
</tr>
<tr>
<td>8B</td>
<td>Fire alarm as-built drawings signed by the designer and installer and indicating compliance with NFPA 72 and NFPA 101</td>
<td>General Contractor</td>
</tr>
<tr>
<td>8C</td>
<td>Sprinkler system as-built drawings</td>
<td>General Contractor</td>
</tr>
</tbody>
</table>
SECTION 01710
CLEANING

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work included: Throughout the construction period, maintain the building, work area and site in a standard of cleanliness as described in this Section.

B. Related work:
   1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.
   2. In addition to standards described in this Section, comply with requirements for cleaning as described in pertinent other Sections of these Specifications.

1.02 QUALITY ASSURANCE

A. Conduct daily inspection, and more often if necessary, to verify that requirements for cleanliness are being met.

B. In addition to the standards described in this Section, comply with pertinent requirements of governmental agencies having jurisdiction.

PART 2 - PRODUCTS

2.01 CLEANING MATERIALS AND EQUIPMENT

A. Provide required personnel, equipment, and materials needed to maintain the specified standard of cleanliness.

2.02 COMPATIBILITY

A. Use only the cleaning materials and equipment which are compatible with the surface being cleaned, as recommended by the manufacturer of the material.

PART 3 - EXECUTION

3.01 PROGRESS CLEANING

A. General:
   1. Retain stored items in an orderly arrangement allowing maximum access, not impeding traffic or drainage, and providing required protection of materials.
   2. Do not allow accumulation of scrap, debris, waste material, and other items not required for construction of this Work.
   3. At least twice each month, and more often if necessary, completely remove all scrap, debris, and waste material from the job site.
4. Provide adequate storage for all items awaiting removal from the job site, observing requirements for fire protection and protection of the ecology.

B. Site:

1. Daily, and more often if necessary, inspect the site and pick up all scrap, debris, and waste material. Remove such items to the place designated for their storage.
2. Weekly, and more often if necessary, inspect arrangements of materials stored on the site. Restack, tidy, or otherwise service arrangements to meet the requirements of subparagraph 3.01-A-1 above.
3. Maintain the site in a neat and orderly condition at all times.

C. Structures:

1. Weekly, and more often if necessary, inspect the structures and pick up all scrap, debris, and waste material. Remove such items to the place designated for their storage.
2. Weekly, and more often if necessary, sweep interior spaces clean.
   a) "Clean," for the purpose of this subparagraph, shall be interpreted as meaning free from dust and other material capable of being removed by use of reasonable effort and a hand-held broom.
3. As required preparatory to installation of succeeding materials, clean the structures or pertinent portions thereof to the degree of cleanliness recommended by the manufacturer of the succeeding material, using equipment and materials required to achieve the necessary cleanliness.
4. Following the installation of finish floor materials, clean the finish floor daily (and more often if necessary) at all times while work is being performed in the space in which finish materials are installed.
   a) "Clean," for the purpose of this subparagraph, shall be interpreted as meaning free from foreign material which, in the opinion of the Owner, may be injurious to the finish floor material.
5. For work performed on continuously operated facilities, premises shall be cleaned on a daily basis and more often as necessary in order to maintain premises free of dust in these instances clean shall be interpreted as meaning free from dust and other material capable of being removed by use of reasonable effort and a hand held wet mop.

3.02 FINAL CLEANING

A. "Clean," for the purpose of this Article, and except as may be specifically provided otherwise, shall be interpreted as meaning the level of cleanliness generally provided by skilled cleaners using commercial quality building maintenance equipment and materials. Facility shall be clean and ready for occupancy by the tenant for the intended purposes.

B. Prior to completion of the Work, remove from the job site all tools, surplus materials, equipment, scrap, debris, and waste. Conduct final progress cleaning as described in Article 3.1 above.

C. Site:

1. Unless otherwise specifically directed by the Architect, broom clean paved areas on the site and public paved areas adjacent to the site. Blow and remove all accumulated dirt, dust, plant material etc.
2. Completely remove the resultant debris.

D. Structures:

1. Exterior:
   a) Visually inspect exterior surfaces and remove all traces of soil, waste materials, smudges, and other foreign matter.
   b) Remove all traces of splashed materials from adjacent surfaces.
   c) If necessary to achieve a uniform degree of cleanliness, hose down the exterior of the structure.
   d) In the event of stubborn stains not removable with water, the Owner may require light sandblasting or other cleaning at no additional cost to the Owner.
   e) Clean windows using commercial cleaning methods for streak free condition.

2. Interior:
   a) Visually inspect interior surfaces and remove all traces of soil, waste materials, smudges, and other foreign matter.
   b) Remove all traces of splashed material from adjacent surfaces.
   c) Remove paint droppings, spots, stains, and dirt from finished surfaces.

3. Walls and Base:
   a) Clean walls and base, remove blemishes, spots, stains, dirt etc. from exposed surfaces.

4. Doors and Door Frames:
   a) Clean exposed surfaces, remove marks, blemishes, spots, stains etc.
   b) Clean top of doors and frames.
   c) Clean hardware.

5. Glass and mirrors: Clean inside and outside surfaces with glass cleaner, streak free condition.

6. Millwork
   a) Perform the following immediately following installation:
      (1) Clean all surfaces with clean water and detergent to remove blemishes, marks and soil.
      (2) Clean interior of all cabinets, vacuum out dust and debris, clean surfaces with clean water and detergent. Rinse with clean water.
   b) Perform the following during final cleaning:
      (1) Inspect each surface and clean to be dust and dirt free.
      (2) Inspect each opening and drawer and clean to be dust and dirt free.
      (3) Remove caulking from surfaces.
      (4) Wipe all surfaces with 409 or other approved cleaner.
      (5) Interior and exterior surfaces shall be completely clean and debris free.

7. Ceramic Tile:
   a) Perform the following operation immediately 48 hours after completing ceramic tile installation:
      (1) Remove grout from face of tiles
      (2) Remove adhesives and other blemishes from exposed surfaces.
      (3) Clean surfaces thoroughly.
      (4) Damp-mop floors with water and detergent to remove marks and soil.
(5) Clean tile trim, remove sealant, paint or grout from faces.

8. Resilient Tile Flooring (VCT, LVT):
   a) Scrub the floor with a neutral detergent solution (Armstrong S-485 Floor Cleaner or equivalent) and a scrubbing pad (3M blue/green or equal) or equivalent brushes.
   b) Thoroughly rinse floor and allow it to dry.
   c) Do not apply wax to the floor.
   d) Protect flooring from traffic.

9. Resilient Sheet Vinyl:
   a) Scrub the floor with a neutral detergent solution (Armstrong S-485 Floor Cleaner or equivalent) and a scrubbing pad (3M blue/green or equal) or equivalent brushes.
   b) Thoroughly rinse floor and allow it to dry.
   c) Do not apply wax to the floor.
   d) Protect flooring from traffic.

10. Carpet:
    a) Use manufacturer’s recommended cleaning products only.
    b) Spot clean blemishes and stains.
    c) Vacuum floor using commercial vacuum equipment to remove dust, dirt, debris.
    d) Clean all exposed surfaces.

11. Polished Surfaces: Surfaces requiring routine application of buffed polish, apply the polish recommended by the manufacturer of the material being polished.

12. Plumbing Fixtures:
    a) Clean all exposed surfaces, remove marks, blemishes, soil.
    b) Polish faucets and other hardware.
    c) Clean toilet tanks, remove any debris from tanks.

13. Light Fixtures
    a) Clean lenses and exposed surfaces.
    b) Remove exposed tags, stickers etc except where required by code.
    c) Replace inoperable lamps.

1. Polished surfaces: To surfaces requiring routine application of buffed polish, apply the polish recommended by the manufacturer of the material being polished.

B. Schedule final cleaning as approved by the Owner to Provide to the Owner a completely clean project ready for occupancy and use as intended.

2.03 CLEANING DURING OWNER’S OCCUPANCY

A. Should the Owner occupy the Work or any portion thereof prior to its completion by the Contractor and acceptance by the Owner, responsibilities for interim and final cleaning shall be as determined by the Owner in accordance with the General Conditions of the Contract.

END OF SECTION
SECTION 01720

PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.01 DESCRIPTION

   A. Work included:
      1. Throughout progress of the Work, maintain an accurate record of changes in the Contract
         Documents, as described in Article 3.01 below.
      2. Upon completion of the Work, transfer the recorded changes to a set of Record Documents,
         as described in Article 3.02 below.

   B. Related Work:
      1. Documents affecting the work of this Section include, but are not necessarily limited to, General
         Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.
      2. Other requirements affecting Project Record Documents may appear in other pertinent Sections of
         these Specifications.

1.02 QUALITY ASSURANCE

   A. Delegate the responsibility for maintenance of Record Documents to one person on the Contractor's
      staff as approved by the Architect.

   B. Accuracy of Records:
      1. Thoroughly coordinate changes within the Record Documents, making adequate and proper
         entries on each page of Specifications and each sheet of Drawings and other Documents where such
         entry in required to show the change properly.
      2. Accuracy of records shall be such that future searches for items shown in the Contract Documents
         may reasonably rely on information obtained from the approved Project Record Documents.

   C. Make entries within 24 hours after receipt of information that the change has occurred.

1.03 SUBMITTALS

   A. Comply with pertinent provisions of Section 01340.
   B. Prior to submitting request for final payment, submit the final Project Record Documents to the
      Architect and secure his approval.

PART 2 - PRODUCTS

2.01 RECORD DOCUMENTS

   A. Job Set Documents: Promptly following the receipt of the Owner's Notice to Proceed, secure from
      the Architect at no charge to the Contractor one complete set of all Documents comprising
B. Final Record Documents: At a time nearing the completion of the Work, the GC may print one clean set of all Drawings in the Contract if job set becomes too difficult to read. Cost of printing shall be borne by GC.

PART 3 - EXECUTION

3.01 MAINTENANCE OF JOB SET

A. Immediately upon receipt of the job set described in Paragraph 2.01A above, stamp or otherwise identify each of the Documents with the title "RECORD DOCUMENTS - JOB SET".

B. Preservation:
   1. Do not use the Job Set for any purpose except entry of new data and for review by the Architect.
   2. Maintain the Job Set at the site of work.

C. Making entries on the Drawings:
   1. Using an erasable colored pencil (not ink or indelible pencil), clearly describe the change by graphic line and note as required.
   2. Date all entries.
   3. Call attention to the entry by a “cloud” drawn around the area or areas affected.
   4. In the event of overlapping changes, use different colors for overlapping changes.

D. Make entries in any other pertinent Documents as approved by the Architect.

E. Conversion of Schematic Layouts:
   1. In some cases on the Drawings, arrangements of conduits, circuits, ducts, and similar items are shown schematically and are not intended to portray precise physical layout.
      a) Final physical arrangement is determined by the Contractor, subject to the Architect's approval.
      b) However, design of future modifications of the facility may require accurate information as to the final physical layout of items which are shown only schematically on the Drawings.
   2. Show on the Job Set of Record Documents, by dimension, accurate within one inch, the centerline of each run of items such as are described in subparagraph 3.01E.1 above.
      a) Clearly identify the item by accurate note such as “cast iron drain”, “galv. water”, and the like.
      b) Show, by symbol or note, the vertical location of the item, such as “under slab”, “in ceiling”, “exposed”, and the like.
      c) Make all identification sufficiently descriptive that it may be related reliably to the Specifications.
   3. The Architect may waive the requirements for conversion of schematic layouts where, in the Architect's judgment, conversion serves no useful purpose. However, do not rely upon
waivers being issued except as specifically issued in writing by the Architect.

3.02 FINAL PROJECT RECORD DOCUMENTS

A. The purpose of the final Project Record Documents is to provide factual information regarding all aspects of the Work, both concealed and visible, to enable future modification of the work to proceed without lengthy and expensive site measurement, investigation, and examination.

B. Project Record Documents are also known as “As-Built” drawings because they represent what was actually built on a given project. They are an important tool for the building owner when making future repairs to the building.

C. Review and Submittal:
   1. Submit the completed set of Project Record Documents to the Architect as described in Paragraph 1.03D above.
   2. Participate in review meetings with the architect as required to explain all as-built changes.
   3. Make any additional changes requested by the Architect to the Final Record Documents and promptly deliver the final documents to the Architect.
   4. If any such Document is not deemed acceptable by the Architect, secure a new copy of that Document from the Architect at the Architect's usual charge for reproduction and handling, and carefully transfer the change data to the new copy to the approval of the Architect.

D. Transfer of As-Built project information to the drawings:
   1. Following the transfer of as-built data from Job Set Documents to Final Record Documents, the GC is to submit all drawings to the Architect for incorporation into a final, revised set of CAD as-built drawings which will be provided to the owner under the A/E contract.

E. Transfer data to other Documents:
   1. If the Documents other than the Drawings have been kept clean during the progress of the Work, and if entries thereon have been orderly to the approval of the Architect, the job set of those Documents other than Drawings will be accepted as final Record Documents.
   2. If any such Document is not so approved by the Architect, secure a new copy of that Document from the Architect at the Architect's usual charge for reproduction and handling, and carefully transfer the change data to the new copy to the approval of the Architect.

3.03 CHANGES SUBSEQUENT TO ACCEPTANCE

A. The Contractor has no responsibility for recording changes in the Work subsequent to Final Completion, except for changes resulting from work performed under Warranty.
SECTION 02221

EXCAVATING, BACKFILLING, AND COMPACTING FOR STRUCTURES

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Section includes the excavation, backfilling and compacting required for the structures shown in the Contract Drawings.

1.02 RELATED SECTIONS

A. Section 01410 - Structural Testing/Inspection Agency Services.

1.03 REFERENCES


B. ASTM D698 - Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³).

C. ASTM D1556 - Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method.

D. ASTM D3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).


1.04 DEFINITIONS

A. Granular subbase: Granular fill directly beneath slabs-on-grade.

B. Backfill: Fill immediately behind foundation elements or retaining walls.

C. Structural fill: Fill under the structure other than the granular subbase.

1.05 SUBMITTALS

A. Upon request, submit soil test reports performed by the Structural Testing/Inspection Agency.

1.06 QUALITY ASSURANCE

A. Structural Testing/Inspection Agency shall perform the following quality related items:

1. Verify structural fill complies with specifications.

2. Determine particle size, liquid limit, plastic limit, plasticity index and maximum density of each type of soil.

3. Observe proofrolling.

4. Perform a sufficient number of field density tests to verify compaction of structural fill. As a minimum, perform one test per lift for every 2500 square feet of fill placed.

5. Verify foundation bearing capacity.
6. Verify quantities of material removed and quantities of material placed where Unit Prices are involved.

1.07 SURVEY

A. Prior to construction, have structure location staked and certified by a licensed surveyor. If discrepancies between actual lines and elevations exist, notify Design Professional before proceeding with layout of structure.

1.08 SUBSURFACE CONDITIONS

A. Copies of a subsurface investigation of the site will be made available upon request. The data is not intended as a representation or warranty of the continuity of such conditions. Owner will not be responsible for interpretation or conclusions drawn therefrom by the Contractor. The data is made available for the convenience of the Contractor and is not guaranteed to represent all conditions that may be encountered.

B. Contractor may examine the site and make his own subsurface explorations at no additional cost to the Owner. Notify Owner prior to making any subsurface explorations.

1.09 EXISTING UTILITIES

A. Locate existing underground utilities by careful hand excavation. If utilities are to remain in place, provide protection from damage during construction operations.

B. Cooperate with Owner and utility companies in keeping respective services and facilities in operation. Do not interrupt existing utility service facilities occupied and used by Owner or others, unless written permission is given by the Design Professional and then only after temporary utility services have been provided.

C. Should uncharted or incorrectly charted piping or other utilities be encountered during excavation, consult the Design Professional immediately for directions.

D. Repair damaged utilities to satisfaction of utility owner.

1.10 NOTICE

A. Notify the Design Professional 48 hours prior to the beginning of any excavation work.

PART 2 - PRODUCTS

2.01 GRANULAR SUBBASE

A. Granular subbase shall be sound and free-draining, such as sand, gravel or crushed stone with less than 10% passing the 200 sieve. Maximum diameter shall be 1-1/2 inches.

2.02 BACKFILL

A. Backfill shall meet the requirements of the granular subbase.
2.03 STRUCTURAL FILL

A. Structural fill shall consist of fill conforming to the following:

B. Structural fill shall be free of organics, debris and deleterious materials.

PART 3 - EXECUTION

3.01 STRIPPING

A. Strip vegetation, topsoil, roots, and other unsuitable material to a depth determined by the Structural Testing/Inspection Agency but not less than one foot, nor less than 10 feet outside the perimeter of the structure.

B. Stockpile sufficient amounts of topsoil as required to cover areas to be landscaped with a minimum of six inches of material.

3.02 EXCAVATION

A. Excavation shall be considered unclassified.

B. Perform excavation to the depths and limits on the Drawings and as specified herein.

C. Do not excavate to full depth when there is probability of frost forming or ground freezing in excavation before concrete is placed.

D. Ground water may be encountered during the foundation excavation. Provide a system for controlling the ground water to a level at least three feet below the lowest point of the excavation.

E. Keep excavations dry by sloping ground away from holes and trenches.

3.03 PROOFROLLING

A. After stripping or excavation and before any fill placement, fill areas shall be proofrolled with a minimum of two coverages of a loaded dump truck or scraper in each of two perpendicular directions.

B. Areas found to be soft or pumping shall have the soft soil removed and replaced with structural fill and compacted as outlined herein.

3.05 PLACEMENT OF STRUCTURAL FILL

A. Do not place structural fill on subgrade that contains frost, mud or is frozen.

B. Structural fill shall be placed and compacted in loose layers with a maximum thickness as determined by the Geotechnical Engineer.
C. Compact structural fill to 95 percent of the maximum dry density as measured by Modified Proctor, ASTM D1557, with water content within +2/-2 percent of the optimum moisture content.

D. Compact the top 12” of structural fill to 98 percent of the maximum dry density as measured by Modified Proctor, ASTM D1557, with water content within +2/-2 percent of the optimum moisture content.

3.06 PLACEMENT OF GRANULAR SUBBASE

A. Do not place granular subbase on subgrade that contains frost, mud or is frozen.

B. Compact granular subbase to 98 percent of the maximum dry density as measured by Standard Proctor, ASTM D1557, with the water content within +2/-2 percent of the optimum moisture content.

3.07 CLEAN UP

A. Remove excess excavated materials from job site and upon completion leave site in clean condition.

END OF SECTION
SECTION 02281
TERMITE CONTROL

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK
A. Work Included: Provide labor, materials and equipment necessary to complete the work of this Section, including but not limited to the following:
   1. Soil treatment for termite control.
B. Related Work: The following items are not included in this Section and will be performed under the designated Sections:
   1. Section 02300 – EARTHWORK for soil materials, excavating, backfilling and site grading.
   2. Section 03300 – CAST-IN-PLACE CONCRETE for footings, foundation walls and slabs-on-grade.

1.2 SUBMITTALS
A. Submit product data and application instructions.
B. Submit certification that products used comply with U.S. Environmental Protection Agency (EPA) regulations for termiticides and requirements applicable at the location of the Project.

1.3 QUALITY ASSURANCE
A. In addition to requirements of these specifications, comply with manufacturer's instructions and recommendations for preparing substrate and application.
B. Engage a professional pest control operator who is licensed according to regulations of governing authorities to apply soil treatment solution.
C. Use only termiticides that bear a federal registration number of the EPA and are approved by local authorities having jurisdiction.

1.4 JOB CONDITIONS
A. Restrictions: Do not apply soil treatment solution until excavating, filling, and grading operations are completed, except as otherwise required in construction operations.
B. To ensure penetration, do not apply soil treatment to frozen or excessively wet soils or during inclement weather. Comply with handling and application instructions of the soil toxicant manufacturer.

1.5 WARRANTY
A. Warranty: Furnish written warranty, executed by Applicator and Contractor, certifying that applied soil termiticide treatment will prevent infestation of subterranean termites. If subterranean termite activity is discovered during warranty period, Contractor will re-treat soil and repair or replace damage caused by termite infestation.
B. Warranty Period: Five years from date of Substantial Completion.
C. The warranty shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under requirements of the Contract Documents.

PART 2 - PRODUCTS

2.1 SOIL TREATMENT SOLUTION
A. General: Use an emulsible, concentrated termiticide that dilutes with water, specially formulated to prevent termite infestation. Fuel oil will not be permitted as diluents. Provide a solution consisting of one of following chemical elements.

B. Products: Subject to compliance with requirements, provide one of the following:
   1. Chloropyrifos:
      a. Dursban TC, Dow Chemical Co.
   2. Permethrin:
      a. Dragnet FT, FMC Corp.
      b. Torpedo, ICI Americas, Inc.
   3. Cypermethrine:
      a. Prevail FT, FMC Corp.
      b. Demon, ICI Americas, Inc.
   4. Fenvalerate:
      a. Gold Coast Tribute, Du Pont
   5. Isofenphose:
      a. Pryfon, Mobay Corp.

C. Dilute with water to concentration level recommended by manufacturer.

D. Other solutions may be used as recommended by Applicator if approved for intended application by local authorities having jurisdiction. Use only soil treatment solutions that are not harmful to plants.

PART 3 - EXECUTION

3.1 APPLICATION

A. Surface Preparation: Remove foreign matter that could decrease treatment effectiveness on areas to be treated. Loosen, rake, and level soil to be treated, except previously compacted areas under slabs and foundations. Toxicants may be applied before placing compacted fill under slabs if recommended by toxicant manufacturer.

B. Application Rates: Apply soil treatment solution as follows:
   1. Under slab-on-grade structures, treat soil before concrete slabs are placed, using the following application rates:
      a. Apply 4 gallons of chemical solution per 10 linear feet to soil in critical areas under slab, including entire inside perimeter of foundation walls, along both sides of interior partition walls, around plumbing pipes and electric conduit penetrating slab, and around interior column footers.
      b. Apply 1 gallon of chemical solution per 10 sq. ft. as an overall treatment under slab and attached slab areas where fill is soil or unwashed gravel. Apply 1-1/2 gallons of chemical solution to areas where fill is washed gravel or other coarse absorbent material.
      c. Apply 4 gallons of chemical solution per 10 linear feet of trench for each foot of depth from grade to footing, along outside edge of building. Dig a trench 6 to 8 inches wide along outside of foundation to a depth of not less than 12 inches. Punch holes to top of footing at not more than 12 inches o.c. and apply chemical solution. Mix chemical solution with the soil as it is being replaced in the trench.
   2. At expansion joints, control joints, and areas where slabs will be penetrated, apply at rate of 4 gallons per 10 linear feet of penetration.

C. Post signs in areas of application to warn workers that soil termiticide treatment has been applied. Remove signs after areas are covered by other construction.
D. Reapply soil treatment solution to areas disturbed by subsequent excavation, landscape grading, or other construction activities following application.

END OF SECTION
SECTION 03100
CONCRETE FORMWORK

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Section includes the design and erection of formwork, shoring and reshoring for cast-in-place concrete and accessories.

1.02 RELATED SECTIONS

A. Section 01410 – Structural Testing/Inspection Services.

B. Section 03200 – Concrete Reinforcement.

C. Section 03300 - Cast-in-Place Concrete.

1.03 REFERENCES


B. ACI 301 - Standard Specifications for Structural Concrete.

C. ACI 318 - Building Code Requirements for Structural Concrete.

D. ACI 347 - Recommended Practice for Concrete Formwork.


F. ASTM E154 - Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover.

G. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs

1.04 SUBMITTALS

A. Submit locations of construction joints for approval.

B. Submit manufacturer's data for waterstops, formwork accessories, inserts, form release agent, and isolation joint filler.

1.05 DESIGN OF FORMWORK

A. Design of formwork, shoring, and reshoring and its removal is the Contractor's responsibility.

B. Design of formwork, shoring, and reshoring shall conform to ACI 117, ACI 301, ACI 318, and ACI 347.
C. Design formwork in a manner such that existing or new construction is not overloaded.

D. Do not remove shores or reshores earlier than recommended by ACI 301 and ACI 347.

PART 2 - PRODUCTS

2.01 FORM MATERIALS
   A. Construct forms with wood, plywood, metal, fiberglass or a combination of these.
   B. Form materials shall have sufficient strength to prevent distortion.

2.02 FORMWORK ACCESSORIES
   A. Formwork accessories that are embedded in concrete, including ties and hangers, shall be commercially manufactured products. Do not use nonfabricated wire form ties.

2.03 FORM RELEASE AGENT
   A. Form release agent shall not bond with, stain, nor adversely affect concrete surfaces.

2.04 WATERSTOPS
   A. Waterstops at construction joints and control joints indicated by the Drawings shall be sized to suit the joints.
   B. Waterstops shall be preformed plastic adhesive waterstops at cold joints in concrete where shown on the drawings.

2.05 VAPOR RETARDER
   A. Vapor retarder shall consists of polyethylene sheet, not less than ten mils thick.

2.06 ISOLATION JOINT FILLER
   A. Asphalt impregnated premolded fiberboard isolation joint filler shall conform with ASTM D1751 and be 1/2-inch thick by full thickness of slab or joint, unless indicated otherwise on the Drawings.

2.07 CONSTRUCTION JOINTS
   A. Provide key type steel forms by Vulcan screed joints, Burke Keyed Kold joint form or Form-A-Key.

PART 3 - EXECUTION

3.01 GENERAL
   A. Erect formwork in accordance with ACI 301, ACI 318, and ACI 347.
   B. Maintain formwork and shoring to support loads until such loads can be supported by concrete structure.
3.02 TOLERANCES
   A. Finished work shall comply with ACI 117 tolerances.

3.03 SURFACE PREPARATION
   A. For concrete exposed to view, seal form joints to prevent leakage.
   B. Before reinforcement is placed, coat contact surfaces of form with form release agent in accordance with manufacturer’s recommendations. Do not allow excess form release agent to accumulate in forms or come in contact with concrete surfaces against which fresh concrete will be placed.

3.04 CHAMFERS
   A. Provide 3/4-inch chamfer at all corners.

3.05 FOUNDATION ELEMENTS
   A. Form foundation elements if soil or other conditions are such that earth trench forms are unsuitable.
   B. Sides of turned-down slabs shall be formed.
   C. Maintain minimum coverage of reinforcing steel as indicated on Structural Drawings.

3.06 INSERTS
   A. Install and secure in position required inserts, hangers, sleeves, anchors, and nailers.
   B. Locate anchor bolts by using templates with two nuts to secure in position.

3.07 EMBEDS
   A. Set and secure embedded plates, bearing plates, and anchor bolts in accordance with approved setting drawings and in such a manner to prevent displacement during placement of concrete.

3.08 VAPOR RETARDER
   A. Where indicated on Drawings, place vapor retarder over sewer, piping, and granular subbase, but below conduits and ducts, and behind insulation and expansion joints at sidewalls.
   B. Lap vapor retarder six inches minimum at splices.
   C. Do not puncture vapor retarder.

3.09 FORM REMOVAL
   A. Remove forms carefully in such manner and at such time as to ensure complete safety of structure. Do not remove forms shoring, or reshoring until members have acquired sufficient strength to support their weight and the load thereon safely.

3.10 PROVISIONS FOR OTHER TRADES
A. Provide openings in concrete formwork to accommodate work of other trades. Determine size and location of openings and recesses from trades providing such items.

B. Accurately place and securely support items built into forms. Obtain approval for openings not shown on Drawings.

3.11 CLEANING

A. Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt or other debris just before concrete is placed.

3.12 FORM SURFACES

A. Coat contact surfaces of forms with a formcoating compound before reinforcement is placed. Apply in accordance with manufacturer's recommendations. Rust-stained steel formwork is not acceptable.

3.13 CONSTRUCTION JOINTS

A. Provide construction joints in accordance with ACI 318.

B. Obtain Design Professional's prior approval for use and location of joints.

C. Provide 1-1/2 inch deep key type construction joints at end of each placement for slabs, beams, walls, and footings. Bevel forms for easy removal.

D. Remove loose particles and latency from surface prior to placing the next lift. Chip the surface to a depth sufficient to expose sound concrete.

END OF SECTION
SECTION 03200
CONCRETE REINFORCEMENT

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Section includes steel reinforcement and accessories for cast-in-place concrete work and concrete masonry.

1.01 RELATED SECTIONS

A. Section 01410 - Structural Testing/Inspection Agency Services.
B. Section 03100 - Concrete Formwork.
C. Section 03300 - Cast-in-Place Concrete.

1.02 REFERENCES

B. ACI 301 - Standard Specifications for Structural Concrete.
C. ACI 315 - Details and Detailing of Concrete Reinforcement.
D. ACI 318 - Building Code Requirements for Structural Concrete.
F. ASTM A615 - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
I. AWS D1.4 - Structural Weld Code - Reinforcing Steel.

1.03 SUBMITTALS

A. Submit shop drawings as follows:
   1. Notify Design Professional prior to detailing reinforcing steel shop drawings.
2. Indicate size, spacings, locations and quantities of reinforcing steel and wire fabric, bending and cutting schedules, splice lengths, stirrup spacing, supporting and spacing devices. Detail reinforcing steel in accordance with ACI 315 and CRSI Standards.
3. Written description of reinforcement without adequate sections, elevations, and details is not acceptable.
4. Reproduction of Structural Drawings for shop drawings is not permitted. Electronic drawing files will not be provided to the Contractor.

B. Submit a certification from each manufacturer or supplier stating that materials meet the requirements of the ASTM and ACI standards referenced.

C. Submit mill test reports.

D. Submit manufacturer's data for tensile and compressive splicers.

E. Submit manufacturer's data including installation recommendations for dowel adhesive.

1.04 QUALITY ASSURANCE

A. Coordinate and schedule in a timely manner with the Structural Testing/Inspection Agency the following quality related items:
   1. Verify reinforcing steel for quantity, size, location, and support.
   2. Verify proper reinforcing steel concrete coverage.

B. The Structural Testing/Inspection Agency shall provide special inspections as required by Chapter 17 of the building code as required by Specification 01410.

1.05 STORAGE AND PROTECTING

A. Store reinforcing steel above ground so that it remains clean. Maintain steel surfaces free from materials and coatings which might impair bond.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Deformed reinforcing steel shall conform to ASTM A615, refer to Structural Drawings for grade (Grade 60 minimum).

B. Welded steel wire fabric shall conform to ASTM A185.

2.02 ACCESSORY MATERIALS

A. Annealed steel tie wire shall be 16-1/2 gage minimum.

B. Bar supports shall be plastic-tipped steel Class I bar supports conforming to CRSI Specifications. Concrete brick may be used to support reinforcement to obtain proper clearance from earth.
2.03 SPLICERS

A. Tensile splicers shall be capable of developing 125% of the reinforcing steel ASTM specified minimum yield strength.

B. Compression splicers shall be the mechanical type such that the compression stress is transmitted by end bearing held in concentric contact.

2.04 DOWEL ADHESIVE

A. Adhesive for reinforcing dowels in existing concrete shall conform to ASTM C881-02, Type IV, Grade 3, CLASS A, B, & C except gel times and epoxy content. Adhesive shall consist of a two component adhesive system contained in side by side packaging connected to a mixing nozzle which thoroughly mixes the components as it is injected into the hole. Adhesive shall have passed ICC Evaluation Services, Inc. Acceptance Criteria 308 for long term creep and be specifically approved for use in cracked concrete.

PART 3 - EXECUTION

3.01 FABRICATION

A. Fabricate steel in accordance with ACI 318 and CRSI standards.

B. Bend bars cold. Do not heat or flame cut bars. No field bending of bars partially embedded in concrete is permitted, unless specifically approved Design Professional and checked by Testing and Inspection Agency for cracks.

C. Weld only as indicated. Perform welding in accordance with AWS D12.1 and or AWS D1.4.

D. Tag reinforcing steel for easy identification.

3.02 INSTALLATION

A. Before placing concrete, clean reinforcement of foreign particles and coatings.

B. Place, support, and secure reinforcement against displacement in accordance with ACI 318 and CRSI standards. Do not deviate from alignment or measurement.

C. Place concrete beam reinforcement support parallel to main reinforcement.

D. Locate welded wire fabric in the top third of slabs. Overlap mesh one lap plus two inches at side and end joints.

E. Furnish and install dowels or mechanical splices at intersections of walls, columns and piers to permit continuous reinforcement or development lengths at such intersections.

F. Maintain cover and tolerances in accordance with ACI and CRSI Specifications, unless indicated otherwise on Structural Drawings.
3.03 SPLICES

A. Do not splice reinforcement except as indicated on Structural Drawings.

B. Tension couplers may be used and installed in accordance with manufacturer's specifications.

3.04 DOWELS IN EXISTING CONCRETE

A. Install dowels and dowel adhesive in accordance with manufacturer’s recommendations.

B. Minimum embedment length shall be 12 bar diameters, unless noted otherwise.

END OF SECTION
SECTION 03300
CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Section includes cast-in-place concrete work indicated in the Contract Documents or otherwise required for proper completion of the work.

1.02 RELATED SECTIONS

A. Section 01410 – Structural Testing/Inspection Agency Services.
B. Section 03100 – Concrete Formwork.
C. Section 03200 – Concrete Reinforcement.
D. Section 03600 – Non-Shrink Grout.

1.03 REFERENCES

A. ACI 214 – Recommended Practice for Evaluation of Strength Test Results of Concrete.
B. ACI 301 – Specifications for Structural Concrete for Buildings.
C. ACI 302.1 – Guide for Concrete Floor and Slab Construction.
E. ACI 305 – Hot Weather Concreting.
F. ACI 306 – Cold Weather Concreting.
G. ACI 308 – Standard Practice for Curing Concrete.
H. ACI 309 – Guide for Consolidation of Concrete.
I. ACI 318 – Building Code Requirements for Structural Concrete.
J. ASTM C31 – Standard Practice for Making and Curing Concrete Test Specimens in the Field.
N. ASTM C138 – Standard Test Method for Unit Weight, Yield, and Air Content (Gravimetric) of Concrete.


1.04 NOTICE

A. Notify Design Professional and Structural Testing/Inspection Agency not less than 48 hours prior to placing concrete.

1.05 QUALITY ASSURANCE

A. Structural Testing/Inspection Agency shall perform the following quality related items:
   1. Examine concrete in truck to verify that concrete appears properly mixed.
   2. Perform a slump test for each concrete load. Record if water or admixtures are added to the concrete at the job site. Perform additional slump tests after job site adjustments.
   3. Mold four specimens per set for compressive strength testing; one set for each 75 cubic yards of each mix design placed in any one day. Perform one 7-day test for information and two 28-day compressive strength tests for acceptance. (Use one as a spare to be broken as directed by the Design Professional if compressive strengths do not appear adequate.) For each set molded, record:
      a. Slump.
      b. Air content.
      c. Unit weight.
      d. Temperature, ambient and concrete.
      e. Location of placement.
      f. Any pertinent information, such as addition of water, addition of admixtures, etc.
B. The ready-mixed concrete plant shall be certified for conformance with the requirements of the National Ready Mix Concrete Association.

C. The Structural Testing / Inspection Agency shall provide special inspections as required by Chapter 17 of the building code as required in Specification Section 01410.

1.06 CONCRETE MIX DESIGN

A. Establish concrete mix design proportions in accordance with ACI 318, Chapter 5.

B. Submit concrete mix designs. Include the following:
   1. Type and quantities of materials.
   2. Slump.
   3. Air content.
   4. Fresh unit weight.
   5. Aggregates sieve analysis.
   6. Design compressive strength.
   7. Location of placement in structure.
   10. Seven-day and 28-day compressive strengths.

C. Concrete supplier shall submit certifications that the materials used meet applicable ASTM Specifications. Mix designs not conforming to the above will be rejected.

1.07 SLUMP

A. Conventional concrete shall have a maximum slump of five inches.

B. If a slump greater than five inches is desired it shall be achieved with a high-range water reducer. All concrete containing the high range water reducing admixture shall have a maximum slump of 8 inches with a verified water slump of 2 to 3 inches.

1.08 FRESH UNIT WEIGHT

A. Normal weight concrete shall have a fresh unit weight of 140 to 152 pcf.

1.09 AIR CONTENT

A. Provide entrained air content per the table below and exposure category specified on structural drawings. Tolerance on air content as delivered shall be +/-1.5 percent. For f’c greater than 5,000 psi, reduction of air content indicated in the table below by 1.0 percent shall be permitted. No air content is required for Exposure Class F0.

<table>
<thead>
<tr>
<th>Nominal maximum aggregate size, in.*</th>
<th>Air Content, percent</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Exposure Class F1</td>
</tr>
<tr>
<td>3/8</td>
<td>6</td>
</tr>
<tr>
<td>1/2</td>
<td>5.5</td>
</tr>
</tbody>
</table>

Azura Surgery Center Renalus Crestview 03300-3
### 1.10 WATER/CEMENTITIOUS MATERIAL RATIO

A. Provide a maximum water/cementitious material ratio in accordance with the structural general notes.

### 1.11 SUBMITTALS

A. Submit a concrete mix design as specified above for each type of concrete included in the work.

B. Submit a certification from each manufacturer or supplier stating that materials meet the requirements of the ASTM and ACI standards referenced.

C. Submit manufacturer's data including Product Data and installation instructions for the following items. Manufacturer’s Data shall include the name of the manufacturer and date of the publication. All manufacturers’ data shall be maintained at the project site by the contractor.
   1. Admixtures.
   2. Curing materials.
   4. Expansion joint fillers.
   5. Polymer repair compounds.
   7. Underlayment and overlayment products.

### PART 2 - PRODUCTS

#### 2.01 MATERIALS

A. Materials designated by specific manufacturer's trade names are approved, subject to compliance with the quality and performance indicated by the manufacturer. Instructions and specifications, published by the manufacturer of such materials are included in and are a part of these specifications. Upon request, provide certification from manufacturer or supplier that materials designated by reference to ASTM and ACI standards meet the requirements of these standards.

#### 2.02 CONCRETE STRENGTH

A. Provide concrete strengths indicated on the Structural Drawings.

#### 2.03 CEMENT

<table>
<thead>
<tr>
<th>Size</th>
<th>3/4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>4.5</td>
<td>6.5</td>
</tr>
<tr>
<td></td>
<td>1-1/2</td>
<td>4.5</td>
<td>5.5</td>
</tr>
</tbody>
</table>

* See ASTM C33 for tolerance on oversize for various nominal maximum size designations.
A. Portland cement shall conform to ASTM C150, Type I, unless noted otherwise. Use one brand only.

2.04 AGGREGATE

A. Fine aggregate shall conform to ASTM C33.

B. Coarse aggregate of gravel or crushed stone shall conform to ASTM C33, Class 3M. Size coarse aggregate in accordance with ACI 318.

2.05 WATER

A. Water shall be potable and free of deleterious substances in accordance with ACI 318.

2.06 AIR ENTRAINING AGENT

A. Air entraining agent shall conform to ASTM C260, certified by manufacturer to be compatible with other required admixtures.

2.07 WATER REDUCER

A. Water reducing agent shall conform to ASTM C494 Type A, and contain not more than 0.05 percent chloride ions.

2.08 WATER REDUCER AND RETARDER

A. Water reducing and retarding agent shall conform to ASTM C494, Type D, and contain not more than 0.05 percent chloride ions.

2.09 HIGH-RANGE WATER REDUCER

A. High-range water reducing agent (superplasticizer) shall conform to ASTM C494 Type F or Type G and contain not more than 0.05 percent chloride ions.

2.10 HIGH-RANGE WATER REDUCER AND RETARDER

A. High-range water reducing and retarding agent shall conform to ASTM C494 Type G and contain not more than 0.05 percent chloride ions.

2.11 NON-CHLORIDE, NON-CORROSIVE ACCELERATOR

A. Non-chloride, non-corrosive accelerating agent shall conform to ASTM C494, Type C or E, and not contain more chloride ions than are present in municipal drinking water. The admixture manufacturer must have long-term non-corrosive test data from an independent testing laboratory (of at least a year’s duration) using an acceptable accelerated corrosion test method such as that using electrical potential measures.

2.12 ADMIXTURE CERTIFICATION

A. Written conformance with the specified requirements and the chloride ion content of admixtures will be required from the admixture manufacturer prior to mix design review by the Design Professional.
2.13 PROHIBITED ADMIXTURES

A. The use of calcium chloride thiocyanates or admixtures containing more than 0.05 percent chloride ions is prohibited.

2.14 SUPPLEMENTARY CEMENTITIOUS MATERIALS

A. Fly Ash: ASTM C618, Type F may be used up to a maximum of 25% of the total cementitious content.

B. Ground Granulated Blast-Furnace Slag: ASTM C989, Grade 100 or 120 may be used up to a maximum of 40% of the total cementitious content.

C. The exact percentages of supplementary cementitious materials used shall be based on a successful test placement on-site.

2.15 RETARDERS

A. Retarders shall conform to ASTM C494.

2.16 CURING COMPOUND

A. Clear Curing and Sealing Compound (VOC Compliant, 350 g/l): Provide a liquid type membrane forming curing compound, clear styrene acrylate type, complying with ASTM C1315, Type I, Class A, 25% solids content minimum. Moisture loss shall be not more than 0.40 Kg/m² when applied at 300 ft²/gal.

B. Curing Compound (Strippable, VOC Compliant, 350 g/l): Provide a compound conforming to ASTM C 309.

2.17 ELASTOMERIC JOINT SEALANT

A. Provide an elastomeric sealant conforming to ASTM C920, Type M, Grade P, Class 25.

PART 3 - EXECUTION

3.01 ADMIXTURE USAGE

A. Use admixtures according to manufacturer's written instructions.

B. Use water-reducing or high-range water-reducing admixture in concrete, as required, for placement and workability.

C. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.

D. Use high range water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs and parking structure slabs, macro synthetic fiber concrete, concrete required to be watertight, and concrete with a water-cementitious materials ratio below 0.50.

3.02 ADDITION OF WATER AT JOB SITE
A. Provide batch tickets indicating the amount of mix water withheld at the batch plant for each load of concrete delivered. Water may be added to the batch only if neither the maximum permissible water/cement ratio nor the maximum slump is exceeded.

B. Water shall not be added to the batch after the required on-site testing has been performed.

3.03 PLACEMENT OF CONCRETE

A. Deposit concrete as near as practical to final position to prevent segregation of concrete.

B. Do no flowing of concrete with vibrators.

C. Place floors and slabs in accordance with ACI 302.

D. Do not use aluminum equipment in placing and finishing concrete.

E. Place thickened slabs for partitions integral with floor slabs.

F. Prepare place of deposit, mix, convey, place, and cure concrete in accordance with ACI 301, ACI 304, and ACI 318. Wet forms or use approved form release agent before placing concrete.

3.04 TIME LIMIT

A. Deposit concrete within one and one-half hours after batching.

3.05 VIBRATION

A. Consolidate concrete in accordance with ACI 301 and ACI 309.

3.06 CURING

A. Begin curing procedures immediately following the commencement of the finishing operation.

B. Cure concrete in accordance with ACI 308. Keep the concrete surface moist and above 50o F for seven days. When high early strength concrete is used this time period may be reduced to 3 days.

C. Curing and Sealing Compound: All exposed troweled interior slabs, not receiving a penetrating liquid densifier, shall be cured with the specified curing and sealing compound. Exterior slabs, sidewalks, curbs, and architectural concrete, not receiving a penetrating sealer, shall be cured with the specified clear, non-yellowing curing and sealing compound. Maximum coverage shall be 400 ft²/gallon on steel troweled surfaces and 300 ft²/gallon on floated or broomed surfaces for the curing/sealing compound.

D. Use the specified strippable curing compound on surfaces to be covered with finish or coating material applied directly to concrete, such as liquid densifier/sealer, waterproofing, dampproofing, membrane roofing, flooring, painting, and other coatings and finish materials. Apply in accordance with manufacturer’s instructions.

3.07 ENVIRONMENTAL PROVISIONS

Azura Surgery Center Renalus Crestview 03300-7
A. Perform cold weather concreting in accordance with ACI 306.1, Specification for Cold Weather Concreting, published by the American Concrete Institute.

B. Perform hot weather concreting in accordance with ACI 305.1, Specification for Hot Weather Concreting, published by the American Concrete Institute.

C. Protect concrete from drying and excessive temperature for the first seven days.

D. Protect fresh concrete from wind.

3.08 CONTRACTION JOINTS

A. Submit a plan for location of construction, contraction, and expansion joints for the Design Professional’s approval.

B. Do not place contraction joints in framed floors, composite slabs, or shear walls.

C. Place contraction joints in slabs-on-grade with a maximum spacing of 48 times the slab thickness to form a regular grid. The long dimension of the grid shall not exceed 1.5 times the short dimension of the grid. Saw cut joints shall be cut as soon as possible after finishing without raveling but no later than 24 hours after placement of concrete. Saw cuts shall be a depth equal to one-fourth the slab thickness by one-eighth inch wide. Alternately, in areas to receive carpeting or wood flooring contraction joints may be provided by preformed plastic strip inserts.

3.09 CUTTING CONCRETE

A. Obtain Design Professional's written approval prior to cutting concrete for installation of other work.

3.10 PATCHWORK AND REPAIRS

A. Notify Design Professional of any defective areas in concrete to be patched or repaired. Repair and patch defective areas with approved polymer repair mortars. Cut out defective areas over two inches in diameter to solid concrete, but not less than a depth of one inch. Make edges of cuts perpendicular to the concrete surface.

3.11 CONCRETE FINISHES

A. Finish concrete in accordance with ACI 301.

B. Finish concrete slabs to flatness and levelness tolerances which correspond to FF 25/FL 20 minimum overall for composite of all measured values and FF 18/FL 13 minimum for any individual floor section.

C. Slabs, which do not meet the flatness and levelness criteria shall be repaired or replaced.

END OF SECTION
SECTION 03600
NON-SHRINK GROUT

PART 1 - GENERAL

1.01 SECTION INCLUDES
   A. Section includes non-shrink grout under base plates, bearing plates, and where specified in Contract Documents.

1.02 RELATED SECTIONS
   A. Section 01410 - Structural Testing/Inspection Agency Services.

1.03 REFERENCES
   A. CRD C621 - Specification for Non-Shrink Grout.

1.04 QUALITY ASSURANCE
   A. Structural Testing/Inspection Agency shall perform the following quality related items:
      1. Perform compressive strength tests in accordance with ASTM C109 with 2-inch x 2-inch cubes. Test one cube at three days, two cubes at seven days and three cubes at 28 days. Perform one test for each ten bags of grout used or one test in accordance with day of grouting.

1.05 SUBMITTALS
   A. Submit product data sheets for review.

PART 2 - PRODUCTS

2.01 GROUT
   A. Provide a non-shrink, non-metallic grout that complies with Corps of Engineers Specification CRD-C-621.
   B. Grout shall have a minimum compressive strength of 5000 psi at 28 days.

2.02 WATER
   A. Provide clean, potable water.

PART 3 – EXECUTION

3.01 HANDLING
   A. Store and protect non-shrink grout from moisture and contamination.
3.02 PREPARATION

A. Remove mud, dirt and other foreign materials from areas to be grouted.

3.03 MIXING

A. Mix grout to its fluid, self-leveling consistency in accordance with manufacturers recommendations. Do not retemper grout. Do not exceed manufacturer's maximum limit on water content or use at a consistency which produces free bleeding. Mix grout in a paddle-type mortar mixer. Do not mix by hand.

3.04 PLACEMENT

A. Consolidate grout to provide uniformity. Do not vibrate grout.

B. Use forms to contain grout.

3.05 PROTECTION

A. Protect grout and areas to be grouted from excessive heat and cold in accordance with manufacturer's specifications. Protect grout from excessive drying shrinkage resulting from wind or direct sunlight. Protect areas grouted from excessive vibrations for three days.

END OF SECTION
SECTION 04200

UNIT MASONRY

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. Work Included: Provide labor, materials and equipment necessary to complete the work of this Section, including but not limited to the following:
   1. Concrete masonry units.
   2. Face brick.
   3. Mortar and grout.
   4. Reinforcing steel, masonry joint reinforcement, ties and anchors

B. Items To Be Installed Only: Install the following items as furnished by the designated Sections:
   1. Section 05500 - METAL FABRICATIONS:
      a. Lintels, miscellaneous metal and iron sleeves, anchors, inserts and plates to be built into masonry walls.
   2. Section 06100 - ROUGH CARPENTRY:
      a. Wood nailers and blocking built into masonry.
   3. Section 08111 - STEEL DOORS AND FRAMES:
      a. Hollow metal frames in masonry openings.
   4. Division 15 - FIRE PROTECTION:
      a. Access doors in masonry openings.
   5. Division 15 - PLUMBING:
      a. Access doors in masonry openings.
   6. Division 15 - HEATING, VENTILATING, AND AIR CONDITIONING:
      a. Grilles in interior masonry walls.
      b. Access doors in masonry openings.
      c. Pipe and duct sleeves for placement into masonry openings.
   7. Division 16 - ELECTRICAL:
      a. Access doors in masonry openings.

C. Items To Be Furnished Only: Furnish the following items for installation by the designated Sections:
   1. Section 03300 - CAST-IN-PLACE CONCRETE:
      a. Dovetail slots for masonry anchors.

D. Related Work: The following items are not included in this Section and will be performed under the designated Sections:
   1. Section 07844 - FIRE-RESISTIVE JOINT SYSTEMS for fire-resistive joint systems openings in masonry walls and at heads of masonry walls.
   2. Section 07920 - JOINT SEALANTS for sealing control and expansion joints in unit masonry.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: For the following:
   1. Masonry Units: Show sizes, profiles, coursing, and locations of special shapes.
   2. Reinforcing Steel: Detail bending and placement of unit masonry reinforcing bars.
      Comply with ACI 315, "Details and Detailing of Concrete Reinforcement."
C. Samples for Verification: For each type and color of the following:
   1. Exposed concrete masonry units.
   2. Face brick, in the form of straps of five or more bricks.
   3. Pigmented mortar. Make Samples using same sand and mortar ingredients to be used on Project. Label Samples to indicate types and amounts of pigments used.
   4. Weep holes/vents.
   5. Accessories embedded in masonry.

D. Qualification Data: For testing agency.

E. Material Certificates: Include statements of material properties indicating compliance with requirements including compliance with standards and type designations within standards. Provide for each type and size of the following:
   1. Masonry units:
      a. Include material test reports substantiating compliance with requirements.
      b. For bricks, include size-variation data verifying that actual range of sizes falls within specified tolerances.
      c. For exposed brick, include material test report for efflorescence according to ASTM C 67.
      d. For masonry units used in structural masonry, include data and calculations establishing average net-area compressive strength of units.
   2. Cementitious materials. Include brand, type, and name of manufacturer.
   3. Mortar mixes. Include description of type and proportions of ingredients.
   4. Grout mixes. Include description of type and proportions of ingredients.
   5. Reinforcing bars.
   7. Anchors, ties, and metal accessories.

F. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.
   1. Include test reports, per ASTM C 780 for mortar mixes required to comply with property specification.
   2. Include test reports, per ASTM C 1019 for grout mixes required to comply with compressive strength requirement.

G. Cold-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with cold-weather requirements.

1.3 QUALITY ASSURANCE

A. Testing Agency Qualifications: An independent agency qualified according to ASTM C 1093 for testing indicated, as documented according to ASTM E 548.

B. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, through one source from a single manufacturer for each product required.

C. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from a single manufacturer for each cementitious component and from one source or producer for each aggregate.

D. Preconstruction Testing Service: The Owner will engage a qualified independent testing agency to perform preconstruction testing indicated below. Payment for these services will be
made by the Owner. Retesting of materials that fail to meet specified requirements shall be done at Contractor's expense.

1. Prism Test: For each type of construction required, per ASTM C 1314.

E. Fire-Resistance Ratings: Where indicated, provide materials and construction identical to those of assemblies with fire-resistance ratings determined per ASTM E 119 by a testing and inspecting agency, by equivalent concrete masonry thickness, or by other means, as acceptable to authorities having jurisdiction.

F. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01. Agenda shall include protection of air barrier membrane during construction.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.

B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.

D. Deliver preblended, dry mortar mix in moisture-resistant containers designed for lifting and emptying into dispensing silo. Store preblended, dry mortar mix in delivery containers on elevated platforms, under cover, and in a dry location or in a metal dispensing silo with weatherproof cover.

E. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.5 PROJECT CONDITIONS

A. Protection of Air Barrier Membrane: During construction, protect air barrier membrane from penetrations which allow air to pass through air barrier assemblies. Engage original installer to repair damage promptly using identical materials and methods of installation, and to the satisfaction of the Owner.

B. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.

1. Extend cover a minimum of 24 inches down both sides and hold cover securely in place.

2. Where 1 wythe of multiwythe masonry walls is completed in advance of other wythes, secure cover a minimum of 24 inches down face next to unconstructed wythe and hold cover in place.

C. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least 3 days after building masonry walls or columns.

D. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.

1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.

2. Protect sills, ledges, and projections from mortar droppings.

3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.

E. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F and above and will remain so until masonry has dried, but not less than 7 days after completing cleaning.


PART 2 - PRODUCTS

2.1 MASONRY UNITS, GENERAL

A. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to exceed tolerances and to contain chips, cracks, or other defects exceeding limits stated in the standard. Do not use units where such defects, including dimensions that vary from specified dimensions by more than stated tolerances, will be exposed in the completed Work or will impair the quality of completed masonry.

2.2 CONCRETE MASONRY UNITS (CMUs)

A. Concrete Masonry Units: ASTM C 90, normal weight unless indicated otherwise manufactured to dimensions 3/8 inch less than nominal dimensions.

B. Shapes: Provide standard shapes indicated and as required for building configuration. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.

2.3 BRICK

A. Face Brick: ASTM C 216, Grade SW, Type FBS.

1. Trade Reference and Color: As selected by Architect.
2. Size (Actual Dimensions): As selected by Architect.
3. Initial Rate of Absorption: Less than 30 g/30 sq. in. per minute when tested per ASTM C 67.
4. Efflorescence: Provide brick that has been tested according to ASTM C 67 and is rated "not effloresced."
5. Where shown to "match existing," provide face brick matching color range, texture, and size of existing adjacent brickwork.

B. Building (Common) Brick where Concealed: ASTM C 62, Grade SW.

C. General: Provide shapes indicated and as follows:

1. For ends of sills and caps and for similar applications that would otherwise expose unfinished brick surfaces, provide units without cores or frogs and with exposed surfaces finished.
2. Provide special shapes for applications where stretcher units cannot accommodate special conditions, including those at corners, movement joints, bond beams, sashes, and lintels.
3. Provide special shapes for applications requiring brick of size, form, color, and texture on exposed surfaces.
4. Provide special shapes for applications where shapes produced by sawing would result in sawed surfaces being exposed to view.
5. Units which are sawn and less than one-half full size shall not be used.

2.4 MORTAR AND GROUT MATERIALS

A. Portland Cement: ASTM C 150, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.

B. Hydrated Lime: ASTM C 207, Type S.

C. Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes. Use only pigments with a record of satisfactory performance in masonry mortar.

1. Available Products:
   a. LanXess; Bayferrox Iron Oxide Pigments.
   b. Davis Colors; True Tone Mortar Colors.
   c. Solomon Grind-Chem Services, Inc.; SGS Mortar Colors.

D. Aggregate for Mortar: ASTM C 144. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.

E. Aggregate for Grout: ASTM C 404.

F. Water: Potable.

2.5 REINFORCEMENT

A. Uncoated Steel Reinforcing Bars: ASTM A.

B. Masonry Joint Reinforcement, General: ASTM A 951.
   1. Interior Walls: Mill-galvanized, carbon steel.
   2. Exterior Walls: Hot-dip galvanized, carbon steel.
   3. Wire Size and Spacing: As required by Code.
   4. Provide in lengths of not less than 10 feet, with prefabricated corner and tee units.

C. Masonry Joint Reinforcement for Multiwythe Masonry:
   1. Ladder type with 1 side rod at each face shell of hollow masonry units more than 4 inches in width, plus 1 side rod at each wythe of masonry 4 inches or less in width.

2.6 TIES AND ANCHORS

A. Materials: Provide ties and anchors specified in subsequent paragraphs that are made from materials that comply with subparagraphs below, unless otherwise indicated.
   4. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

B. Adjustable Anchors for Connecting to Structure: Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.
   1. Anchor Section for Welding to Steel Frame: Crimped 1/4-inch-diameter, hot-dip galvanized steel. Mill-galvanized wire may be used at interior walls, unless otherwise indicated.
C. Partition Top Anchors: 0.097-inch-thick metal plate with 3/8-inch-diameter metal rod 6 inches long welded to plate and with closed-end plastic tube fitted over rod that allows rod to move in and out of tube. Fabricate from steel, hot-dip galvanized after fabrication.

D. Adjustable Masonry-Veneer Anchors:
   1. General: Provide anchors that allow vertical adjustment but resist tension and compression forces perpendicular to plane of wall, for attachment over sheathing to wood or metal studs, with structural performance capable of withstanding a 100-lbf load in both tension and compression without deforming or developing play in excess of 0.05 inch.
   2. Screw-Attached, Masonry-Veneer Anchors: Units consisting of a wire tie and a metal anchor section.
      a. Anchor Section: Zinc-alloy barrel section with flanged head with eye and corrosion-resistant, self-drilling screw. Eye designed to receive wire tie and to serve as head for drilling fastener into framing. Barrel length to suit sheathing thickness, allowing screw to seat directly against framing with flanged head covering hole in sheathing.
      b. Wire Ties: Triangular-, rectangular-, or T-shaped wire ties fabricated from 0.188-inch-diameter, hot-dip galvanized steel wire.

2.7 MISCELLANEOUS ANCHORS
A. Anchor Bolts: L-shaped steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and, where indicated, flat washers; hot-dip galvanized to comply with ASTM A 153/A 153M, Class C; of dimensions indicated.

2.8 EMBEDDED FLASHING MATERIALS
A. Metal Flashings: Furnished under Section 07620 - SHEET METAL FLASHING AND TRIM.

2.9 MISCELLANEOUS MASONRY ACCESSORIES
A. Compressible Filler: Premolded filler strips complying with ASTM D 1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from neoprene.
B. Preformed Control-Joint Gaskets: Made from styrene-butadiene-rubber compound, complying with ASTM D 2000, Designation M2AA-805 designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.
C. Bond-Breaker Strips: Asphalt-saturated, organic roofing felt complying with ASTM D 226, Type I (No. 15 asphalt felt).
D. Weep/Vent Products: Free-draining mesh; made from polyethylene strands, full height and width of head joint and depth 1/8 inch less than depth of outer wythe; in color selected from manufacturer's standard.
E. Cavity Drainage Material: Free-draining mesh, made from polymer strands that will not degrade within the wall cavity. Provide strips, full-depth of cavity and 10 inches wide, with dovetail shaped notches 7 inches deep that prevent mesh from being clogged with mortar droppings or equivalent. Available products:
   1. Advanced Building Products Inc.; Mortar Break II.
   2. Archovations, Inc.; CavClear Masonry Mat.
   3. Dayton Superior Corporation, Dur-O-Wal Division; Polytite MortarStop.
2.10 MASONRY CLEANERS

A. Proprietary Acidic Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry without discoloring or damaging masonry surfaces. Use product expressly approved for intended use by cleaner manufacturer and manufacturer of masonry units being cleaned.

1. Available Manufacturers:
   a. Diedrich Technologies, Inc.
   b. EaCo Chem, Inc.
   c. ProSoCo, Inc.

2.11 MORTAR AND GROUT MIXES

A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures, unless otherwise indicated.

1. Do not use calcium chloride in mortar or grout.
2. Limit cementitious materials in mortar to Portland cement, mortar cement, and lime.

B. Mortar for Unit Masonry: Comply with ASTM C 270, Proportion Specification. Provide the following types of mortar for applications stated unless another type is indicated [or needed to provide required compressive strength of masonry].

1. For masonry below grade or in contact with earth, use Type M.
2. For reinforced masonry, use Type S.
3. For exterior, above-grade, load-bearing and non-load-bearing walls and parapet walls; for interior load-bearing walls; for interior non-load-bearing partitions; and for other applications where another type is not indicated, use Type N.

C. Pigmented Mortar: Use colored cement product. Pigments shall not exceed 10 percent of Portland cement by weight.

D. Grout for Unit Masonry: Comply with ASTM C 476.

1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with Table 1.15.1 in ACI 530.1/ASCE 6/TMS 602 for dimensions of grout spaces and pour height.
2. Provide grout with a slump of 8 to 11 inches as measured according to ASTM C 143/C 143M.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.

1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of work.
2. Verify that foundations are within tolerances specified.

B. Before installation, examine rough-in and built-in construction for piping systems to verify actual locations of piping connections.

C. Proceed with installation only after unsatisfactory conditions have been corrected.
3.2 INSTALLATION, GENERAL

A. Thickness: Build cavity and composite walls and other masonry construction to full thickness shown. Build single-wythe walls to actual widths of masonry units, using units of widths indicated.

B. Build chases and recesses to accommodate items specified in this and other Sections.

C. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match the construction immediately adjacent to opening.

D. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed. Do not use units cut to less than one-half size.

E. Do not install concrete masonry units with more than 5 percent damage to the face. Do not install brick units which will show defects after installation.

F. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures. Mix units from several pallets or cubes as they are placed.

G. Matching Existing Masonry: Match coursing, bonding, color, and texture of existing masonry.

H. Comply with construction tolerances in ACI 530.1/ASCE 6/TMS 602 and with the following:
   1. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2 inch maximum.
   2. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet, or 1/2 inch maximum.
   3. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2 inch maximum.
   4. For exposed bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch, with a maximum thickness limited to 1/2 inch. Do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch.
   5. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch. Do not vary from adjacent bed-joint and head-joint thicknesses by more than 1/8 inch.
   6. For faces of adjacent exposed masonry units, do not vary from flush alignment by more than 1/16 inch except due to warpage of masonry units within tolerances specified for warpage of units.

3.3 LAYING MASONRY WALLS

A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.

B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in [running bond] [one-third running bond] [Flemish bond] [bond pattern indicated on Drawings]; do not use units with less than nominal 4-inch horizontal face dimensions at corners or jambs. Prior to installation review bond pattern with Architect and the Owner.

C. Stopping and Resuming Work: Stop work by racking back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive
mortar, remove loose masonry units and mortar, and wet brick if required before laying fresh masonry.

D. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.

E. Fill space between steel frames and masonry solidly with mortar, unless otherwise indicated.

F. Fill cores in hollow concrete masonry units with grout 24 inches under bearing plates, beams, lintels, posts, and similar items, unless otherwise indicated.

G. Build non-load-bearing interior partitions full height of story to underside of solid floor or roof structure above, unless otherwise indicated.
   1. Install compressible filler in joint between top of partition and underside of structure above.
   2. Fasten partition top anchors to structure above and build into top of partition. Grout cells of CMUs solidly around plastic tubes of anchors and push tubes down into grout to provide 1/2-inch clearance between end of anchor rod and end of tube. Space anchors 48 inches o.c., unless otherwise indicated.
   3. Wedge non-load-bearing partitions against structure above with small pieces of tile, slate, or metal. Fill joint with mortar after dead-load deflection of structure above approaches final position.
   4. At fire-rated partitions, treat joint between top of partition and underside of structure above to comply with Section 07841 - PENETRATION FIRESTOPPING.

3.4 MORTAR BEDDING AND JOINTING

A. Lay hollow brick and concrete masonry units as follows:
   1. With face shells fully bedded in mortar and with head joints of depth equal to bed joints.
   2. With webs fully bedded in mortar in all courses of piers, columns, and pilasters.
   3. With webs fully bedded in mortar in grouted masonry, including starting course on footings.
   4. With entire units, including areas under cells, fully bedded in mortar at starting course on footings where cells are not grouted.

B. Lay solid masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.

C. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness, unless otherwise indicated.

D. Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint), unless otherwise indicated.

3.5 CAVITY WALLS

A. Bond wythes of cavity walls together using one of the following methods:
   1. Masonry Joint Reinforcement: Installed in horizontal mortar joints. Where one wythe is of clay masonry and the other of concrete masonry, use adjustable (two-piece) type reinforcement with continuous horizontal wire in facing wythe attached to ties to allow for differential movement regardless of whether bed joints align.

B. Bond wythes of cavity walls together using bonding system indicated on Drawings.
C. Keep cavities clean of mortar droppings and other materials during construction. Bevel beds away from cavity, to minimize mortar protrusions into cavity. Do not attempt to trowel or remove mortar fins protruding into cavity.

3.6 MASONRY JOINT REINFORCEMENT

A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch on exterior side of walls, 1/2 inch elsewhere. Lap reinforcement a minimum of 6 inches. Space reinforcement not more than 16 inches o.c.

B. Interrupt joint reinforcement at control and expansion joints, unless otherwise indicated.

C. Provide continuity at wall intersections by using prefabricated T-shaped units.

D. Provide continuity at corners by using prefabricated L-shaped units.

3.7 ANCHORING MASONRY TO STRUCTURAL MEMBERS

A. Anchor masonry to structural members where masonry abuts or faces structural members to comply with the following:
   1. Provide an open space not less than 1 inch in width between masonry and structural member, unless otherwise indicated. Keep open space free of mortar and other rigid materials.
   2. Anchor masonry to structural members with anchors embedded in masonry joints and attached to structure.
   3. Space anchors as indicated, but not more than 24 inches o.c. vertically and 36 inches o.c. horizontally.

3.8 ANCHORING MASONRY VENEERS

A. Anchor masonry veneers with masonry-veneer anchors to comply with the following requirements:
   1. Embed tie sections in masonry joints. Provide air space indicated on the Drawings between back of masonry veneer and face of insulation.
   2. Locate anchor sections to allow maximum vertical differential movement of ties up and down.
   3. Space anchors as required by Code.

3.9 CONTROL AND EXPANSION JOINTS

A. General: Install control and expansion joint materials in unit masonry as masonry progresses. Do not allow materials to span control and expansion joints without provision to allow for in-plane wall or partition movement.

B. Form control joints in concrete masonry using one of the following methods:
   1. Fit bond-breaker strips into hollow contour in ends of concrete masonry units on one side of control joint. Fill resultant core with grout and rake out joints in exposed faces for application of sealant.
   2. Install preformed control-joint gaskets designed to fit standard sash block.
   3. Install interlocking units designed for control joints. Install bond-breaker strips at joint. Keep head joints free and clear of mortar or rake out joint for application of sealant.
   4. Install temporary foam-plastic filler in head joints and remove filler when unit masonry is complete for application of sealant.

C. Form expansion joints in brick made from clay or shale as follows:
1. Build flanges of metal expansion strips into masonry. Lap each joint 4 inches in direction of water flow. Seal joints below grade and at junctures with horizontal expansion joints if any.
2. Build flanges of factory-fabricated, expansion-joint units into masonry.
3. Build in compressible joint fillers where indicated.
4. Form open joint full depth of brick wythe and of width indicated, but not less than 3/8 inch for installation of sealant and backer rod specified in Section 07920 - JOINT SEALANTS.

D. Provide horizontal, pressure-relieving joints by either leaving an air space or inserting a compressible filler of width required for installing sealant and backer rod specified in Section 07920 - JOINT SEALANTS but not less than 3/8 inch.
   1. Locate horizontal, pressure-relieving joints beneath shelf angles supporting masonry.

3.10 LINTELS
   A. Install steel lintels where indicated.
   B. Provide minimum bearing of 8 inches at each jamb, unless otherwise indicated.

3.11 FLASHING, WEEP HOLES, CAVITY DRAINAGE, AND VENTS
   A. General: Install embedded flashing and weep holes in masonry at shelf angles, lintels, ledges, other obstructions to downward flow of water in wall, and where indicated.
   B. Install flashing as follows, unless otherwise indicated:
      1. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place through-wall flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.
      2. At multiwythe masonry walls, including cavity walls, extend flashing through outer wythe, turned up a minimum of 8 inches, and 1-1/2 inches into the inner wythe. Form 1/4-inch hook in edge of flashing embedded in inner wythe.
      3. At masonry-veneer walls, extend flashing through veneer, across air space behind veneer, and up face of sheathing at least 8 inches; with upper edge covered with elastomeric membrane, lapping at least 4 inches.
      4. At lintels and shelf angles, extend flashing a minimum of 6 inches into masonry at each end. At heads and sills, extend flashing 6 inches at ends and turn up not less than 2 inches to form end dams.
   C. Install reglets and nailers for flashing and other related construction where they are shown to be built into masonry.
   D. Install weep holes in head joints in exterior wythes of first course of masonry immediately above embedded flashing and as follows:
      1. Use open head joints to form weep holes.
      2. Space weep holes 24 inches o.c., unless otherwise indicated.
   E. Place cavity drainage material in cavities to comply with configuration requirements for cavity drainage material in Part 2 "Miscellaneous Masonry Accessories" Article.
   F. Install vents in head joints in exterior wythes at spacing indicated.

3.12 REINFORCED UNIT MASONRY INSTALLATION
   A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.
1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.

2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and other temporary loads that may be placed on them during construction.

B. Placing Reinforcement: Comply with requirements in ACI 530.1/ASCE 6/TMS 602.

C. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure. Comply with requirements in ACI 530.1/ASCE 6/TMS 602 for cleanouts and for grout placement, including minimum grout space and maximum pour height.

3.13 FIELD QUALITY CONTROL

A. Inspectors: Engage qualified independent inspectors to perform inspections and prepare reports. Allow inspectors access to scaffolding and work areas, as needed to perform inspections. Place grout only after inspectors have verified compliance of grout spaces and grades, sizes, and locations of reinforcement.

B. Testing Agency: Engage a qualified independent testing and inspecting agency to perform field tests and inspections indicated below and prepare test reports. Retesting of materials failing to comply with specified requirements shall be done at Contractor's expense.

C. Testing Frequency: One set of tests for each 5000 sq. ft. of wall area or portion thereof. Test types as determined by the independent testing and inspection agency.

3.14 REPAIRING, POINTING, AND CLEANING

A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.

B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.

C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.

D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:

   1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
   2. Test cleaning methods on sample wall panel; leave one-half of panel uncleansed for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.
   3. Protect adjacent nonmasonry surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
   4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
   6. Clean concrete masonry by cleaning method indicated in NCMA TEK 8-2A applicable to type of stain on exposed surfaces.
3.15 MASONRY WASTE DISPOSAL

A. Salvageable Materials: Unless otherwise indicated, excess masonry materials are Contractor's property. At completion of unit masonry work, remove from Project site.

B. Waste Disposal as Fill Material: Dispose of clean masonry waste, including excess or soil-contaminated sand, waste mortar, and broken masonry units, by crushing and mixing with fill material as fill is placed.
   1. Crush masonry waste to less than 4 inches in each dimension.
   2. Mix masonry waste with at least two parts of specified fill material for each part of masonry waste. Fill material is specified in Section 02300 - EARTHWORK.
   3. Do not dispose of masonry waste as fill within 18 inches of finished grade.

C. Excess Masonry Waste: Remove excess clean masonry waste that cannot be used as fill, as described above, and other masonry waste, and legally dispose of off the Site.

END OF SECTION
SECTION 04220

STRUCTURAL CONCRETE MASONRY

PART 1- GENERAL

1.01 SECTION INCLUDES

A. Section includes structural concrete masonry shown on the Structural Drawings.

1.02 RELATED SECTIONS

A. Section 01410 - Structural Testing/Inspection Agency Services.
B. Section 03200 - Concrete Reinforcement.
C. Section 03300 - Cast-in-Place Concrete.
D. Section 04200 - Unit Masonry.

1.03 REFERENCES

D. ASTM C90 - Standard Specification for Load-Bearing Concrete Units.
F. ASTM C140 - Standard Methods of Sampling and Testing Concrete Masonry Units.
1.04 SUBMITTALS

A. Submit coarse grout mix design.

B. Upon request, submit material certificates signed by the material supplier that the masonry units, mortar, reinforcement, and joint material complies with specification requirements.

C. Submit shop drawings for masonry reinforcement in accordance with Section 03200.

D. Submit procedures for construction of masonry walls to be filled with coarse grout. Procedures should include high lift or low lift grouting as applicable to project.

1.05 QUALITY ASSURANCE

A. Structural Testing/Inspection Agency shall perform the following quality related items:
   1. Verify reinforcing steel for quantity, size, and location.
   2. Verify placement of coarse grout as indicated in high or low lift procedure.
   3. Verify compressive strength of concrete masonry units, mortar, coarse grout, or masonry prisms for each 5,000 sq. ft. of surface area as follows:
      a. Three (3) concrete masonry units shall be tested in accordance with ASTM C140.
      b. Six (6) mortar cube specimens shall be tested, three (3) at 7-days and three (3) at 28-days, in accordance with ASTM C109.
      c. Four (4) coarse grout specimens shall be tested, two (2) at 7-days and two (2) at 28-days, in accordance with ASTM C1019.
      d. In lieu of individual tests of masonry units, mortar, and grout, if directed by the Design Professional, perform one (1) prism test (which consists of three prisms) in accordance with ASTM E447.

B. The Structural Testing / Inspection Agency shall provide special inspections as required by Chapter 17 of the building code as required by Specification 01410.

1.06 HANDLING OF MATERIALS

A. Package, handle, and store materials to protect from elements and prevent contamination.

PART 2 -PRODUCTS

2.01 CONCRETE MASONRY

A. Concrete masonry shall have the minimum compressive strength (f’m) specified on the Drawings.

2.02 CONCRETE MASONRY UNITS

A. Concrete masonry units shall conform to ASTM C90, Type II (moisture controlled).

B. Provide normal weight concrete masonry units.

C. Concrete masonry units shall have, as a minimum, the net area compressive strength listed in Table 1.6.2.2 of ACI 530.1/ASCE 6/TMS 602 required for the specified f’m.
D. Provide standard units with face dimensions of 16” long x 8” high nominal, unless indicated otherwise.

E. Provide special shapes where indicated on the Drawings.

2.03 MORTAR

A. Mortar shall be Type M or Type S in accordance with ASTM C270. Refer to Drawings for locations.

B. Do not use admixtures that contain chlorides.

2.04 COARSE GROUT

A. Coarse grout shall conform to ASTM C476.

B. Coarse grout shall have the minimum compressive strength specified on the Drawings.

C. Mix grout to a consistency which has a slump between 8 and 10 inches.

D. Do not use admixtures that contain chlorides.

2.05 WATER

A. Provide clean potable water free of deleterious substances.

2.06 REINFORCEMENT

A. Horizontal and vertical reinforcing bars shall comply with Section 03200.

2.07 HORIZONTAL JOINT REINFORCEMENT

A. Horizontal joint reinforcement shall be manufactured with longitudinal parallel, deformed side wires in accordance with ASTM A496 and of the size specified on the Drawings. Cross wires shall be No. 9 gage, plain, in accordance with ASTM A82.

B. Provide as a minimum, one side wire for each face shell of hollow masonry units. Provide additional side wires or eye sections for adjustable wall ties as specified for multiwythe wall construction.

C. Provide truss type joint reinforcement, except ladder type reinforcement shall be used for walls with vertical reinforcement.

D. Horizontal joint reinforcement shall be hot-dipped galvanized in accordance with ASTM A153, Class B-2.

E. Provide prefabricated corner and tee shape corner accessories.
2.08 CONTRACTION JOINT MATERIAL

A. Contraction joint material shall comply with ASTM D2000, M2AA-805 with rubber shear keys with a minimum durometer hardness of 80.

PART 3- EXECUTION

3.01 MIXING

A. Except as otherwise approved for small batches, mix in mechanically operated batch mixers of drum type in which water can be accurately and uniformly controlled. Allow five minutes maximum mixing time, two minutes for dry mixing and three minutes for continued mixing after water has been added. Do not permit volume of batch to exceed manufacturer's rated capacity of mixer drum. Empty drum completely before placing next batch. Keep mixers and wheelbarrows clean. Do not deposit mortar upon or permit contact with ground.

B. Do not use anti-freeze compounds.

3.02 CONSTRUCTION

A. Use dry masonry units. No frozen or wet units shall be used.

B. Discard cracked, chipped, and spalled masonry units.

C. Deliver mortar to mason's board at point of use within 45 minutes after mixing. Do no retempering. Use no admixtures. Use pre-hydrated mortar for tuck points. Prepare pointing mortar with as dry consistency as will produce mortar sufficiently plastic to be worked into joints.

D. During erection cover top of wall with strong waterproof membrane at end of each day when shutdown. Cover partially completed walls when work is not in progress. Extend and secure cover a minimum of 24 in. down both sides. Do not apply uniform floor or roof loading for at least 12 hours after building masonry columns or walls. Do not apply concentrated loads for at least 3 days after building masonry columns or walls.

E. Provide temporary bracing during erection as required to stabilize erected masonry.

F. Except where otherwise indicated, lay block in running bond.

3.03 PLACING AND BONDING

A. Lay masonry in full beds of mortar on mating surfaces, and properly jointed with other work. Buttering corners of joints, deep or excess furrowing of mortar joints is not permitted.

B. Fully bond external corners of concrete block. Where interior block partitions intersect other block walls or partitions, provide control joints with mortar raked back 1/4 inch.

C. Isolate masonry partitions from vertical structural framing members with control joints, with mortar racked back 1/4 inch.
D. Where non-bearing masonry partitions extend to underside of floor, roof deck or structural system, stop masonry short 3/8 to 1/2 inch to allow for live load deflection. Fill gap with soft joint filler.

E. Where masonry chase walls are constructed, one wall can be stopped above ceiling to provide access space.

3.04 CONTRACTION JOINTS

A. Install contraction joints at locations indicated on the Drawings in all masonry walls. Do not run masonry reinforcement through contraction joints.

3.05 TOLERANCES

A. Variation from Unit to Adjacent Unit: 1/32 inch maximum.

B. Variation from Plan of Wall: Maximum 1/4 inch in 10 feet, and 1/2 inch in 20 feet or more.

C. Variation from Plumb: +/- 1/4 inch in 10 feet, +/- 3/8 inch in 20 feet; +/- 1/2 inch maximum.

D. Variation in Level Coursing: +/- 1/4 inch in 10 feet; +/- 1/2 inch maximum.

E. Variation in Joint Thickness: +/- 1/8 inch Maximum.

3.06 CLEANING AND POINTING

A. Clean space as it is completed, but in every case, clean at least once each week. All debris shall be removed to appropriate container and hauled off the site as required to avoid over filling.

B. Dry brush masonry surfaces before mortar has set hard to remove mortar crumbs and accumulation.

C. Clean masonry with commercial brick cleaner approved by brick manufacturer. Protect other work from cleaning materials.

D. Cut out defective mortar and repoint.

3.07 HORIZONTAL JOINT REINFORCEMENT

A. Place horizontal joint reinforcement in the horizontal mortar beds at spacings as noted in the Drawings, except as specified herein.

B. For masonry below grade, space horizontal joint reinforcing at 8 inches vertically.

C. Above lintels and below sills at openings, place a continuous run of horizontal joint reinforcement in the first two bed joints, 8 inches apart. Extend joint reinforcement two feet beyond opening.

D. Joint reinforcement shall be continuous, except it shall not pass through vertical masonry contraction joints. Lap joint reinforcement a minimum of 6 inches.
3.08 ENVIRONMENTAL PROVISIONS

A. Cold weather masonry construction shall comply with the International Masonry All-Weather Councils' "Recommended Practices and Guide Specifications for Cold Weather Masonry Construction, Section 04200."

END OF SECTION
SECTION 05100
STRUCTURAL STEEL

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Section includes fabrication and erection of structural steel indicated in the Contract Documents or otherwise required for proper completion of the work.

1.2 RELATED SECTIONS

A. Section 01410 - Structural Testing/Inspection Agency Services.

1.3 REFERENCES

C. AISC - Specifications of Structural Joints using ASTM A325 or A490 Bolts approved by the Research Council in Structural Connections.
D. AWS D1.1 - Structural Welding Code.
F. AWS A5.5 - Specification for Low-Alloy Steel Covered Arc Welding Electrodes.
I. SSPC - Steel Structures Painting Manual.
M. ASTM A490 - Standard Specification for Heat-Treated Steel Structural Bolts, 150 KSI Minimum Tensile Strength.
N. ASTM A500 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Tubing in Rounds and Shapes.
O. ASTM A501 - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.
P. ASTM A992 - Standard Specification for Steel for Structural Shapes For Use in Building Framing
R. ASTM F844 - Standard Specification for Washers, Steel, Plain (Flat), Unhardened for General Use.
1.4 SUBMITTALS

A. Contact Design Professional prior to detailing structural steel shop drawings.

B. Reproduction of Structural Drawings for shop drawings is not permitted. Electronic drawing files will not be provided to the Contractor.

C. Submit shop drawings for review.

D. Shop drawings shall clearly indicate the profiles, sizes, ASTM Grade, spacings and locations of all structural steel members, including connections, attachments, anchorages, framed openings, sizes and types of fasteners, method of tightening fasteners, cambers, and the number, type and spacing of the headed shear connectors.

E. For connections and elements designed by the contractor, submit shop drawings and calculations sealed by an engineer licensed in the project state.

F. For record only, submit written welding procedures for each type of welded joint used in accordance with Appendix E of the AWS Structural Welding Code.

G. Maintain at construction office mill certification that the steel supplied meets the specifications.

H. Maintain at construction office certification that high strength bolts supplied meet the specifications.

I. Submit certification that the fabricator meets the required qualifications. If fabricator has to have an independent testing agency to inspect fabrication as required by these specifications, submit the name and qualifications of the independent testing agency.

J. For each approved fabricator that is exempt from Special Inspections of shop fabrications and implementation procedures in accordance with Section 1704.2 of the Building Code, submit “Fabricator’s Certificate of Compliance”. Provide copies of fabricator’s certification or building code evaluation services report and fabricator’s quality control manual.

K. Submit certification that the erector meets the required qualifications.

L. Upon request, submit the erection sequence and procedures to be used by the steel erector.

M. Manufacturer’s recommendations for expansion anchor installation.

N. Manufacturer’s recommendations for adhesive anchor installation.

1.5 QUALITY ASSURANCE

A. Structural Testing/Inspection Agency shall perform the following quality related items:

1. Anchor Bolts
   a. Anchor bolt size, configuration, and embedment shall be verified prior to placement of concrete.

2. Welded Connections
   a. Inspection shall be in accordance with AWS Structural Welding Code.
   b. Visually inspect all field welded connections. Visual inspection of welded joints includes periodic examination of fitup.
   c. Ultrasonically inspect 100% of the complete penetration welds.
   d. Review approved welding procedures. Verify that welding procedures are being adhered to during field welding.
   e. Verify welder qualifications.

3. Bolted Connections
   a. Inspection and testing shall be in accordance with AISC Specifications for Structural Joints using ASTM A325 or A490 Bolts.
b. Prior to visual and physical testing, tension testing using a calibration device (Skidmore-Wilhelm) must indicate tensions at least 5% in excess of the AISC minimum. Structural steel erector shall supply the tension calibration device.

c. Test a minimum of 10% of the bolted connections.

B. The Structural Testing / Inspection Agency shall provide special inspections as required by Chapter 17 of the building code as required by Specification 01410.

1.6 STORAGE

A. Store materials off ground to permit easy access for inspection and identification. Store steel members and packaged items in a manner that provides protection against contact with deleterious materials.

PART 2 - PRODUCTS

2.1 ANCHOR ROD

A. Anchor rods shall conform to ASTM F1554 Grade 36 or Grade 55 as indicated on the drawings and shall be a headed rod or threaded rod with a heavy hexagonal nut welded to the bottom of the threaded rod.

B. Provide two hexagonal nuts and two plain steel washers for each anchor rod conforming to ASTM F844.

C. Provide 3/8-inch thick plate washers (4-inch x 4-inch) in lieu of top steel washer on base plates with oversized holes.

2.2 ROLLED STEEL WIDE FLANGE AND WT SHAPES

A. Rolled steel wide flange shapes shall conform to ASTM A992.

2.3 ROLLED STEEL SHAPES, PLATES, AND BARS, EXCEPT WIDE FLANGE AND WT SHAPES

A. Rolled steel shapes, plates, and bars, except wide flange and WT shapes, shall conform to ASTM A36.

2.4 ROUND STRUCTURAL STEEL TUBING

A. Round structural steel tubing shall conform to ASTM A500, Grade C, 46 ksi minimum yield strength.

2.5 SHAPED STRUCTURAL STEEL TUBING

A. Shaped structural steel tubing shall conform to ASTM A500, Grade C, 50 ksi minimum yield strength.

2.6 NON-HIGH-STRENGTH FASTENERS

A. Non-high-strength bolts shall conform to ASTM A307, Grade A, 60 ksi minimum, where noted on the Structural Drawings.

B. Hardened steel washers shall conform to ASTM F436.

2.7 HIGH-STRENGTH FASTENERS

A. High-strength bolts shall conform to ASTM A325 or ASTM A490 as noted on the Structural Drawings.

B. Provide 3/4-inch minimum diameter bolts, unless noted otherwise.

C. Hardened steel washers shall conform to ASTM F436.
D. Spline-type tension control bolts, plain hardened washers and suitable nuts are an acceptable alternate design bolt assembly.

E. Do not use load indicating washers.

2.8 EXPANSION ANCHORS

A. Expansion anchors shall have been evaluated by the ICC Evaluation Services, Inc. (ICC-ES) with a published evaluation report. Anchors shall be evaluated by ICC-ES Acceptance Criteria 193 and be specifically approved for use in cracked concrete. All anchors shall be approved for resisting wind and seismic loads.

2.9 ADHESIVE ANCHORS

A. Adhesive anchors shall consist of:
   1. An all-thread steel anchor conforming to ASTM A307, Grade A or ASTM A36, zinc plated in accordance with ASTM B633, unless noted otherwise on the Structural Drawings, and
   2. An adhesive conforming to to ASTM C881-02, Type IV, Grade 3, CLASS A, B, & C except gel times and epoxy content. Adhesive shall consist of a two component adhesive system contained in side by side packaging connected to a mixing nozzle which thoroughly mixes the components as it is injected into the hole. Adhesive shall have passed ICC Evaluation Services, Inc. Acceptance Criteria 308 for long term creep and be specifically approved for use in cracked concrete.

2.10 WELD ELECTRODES

A. E-70 series low hydrogen electrodes shall conform to AWS A5.1, A5.5, A5.17, or A5.20.

B. Properly store electrodes to maintain flux quality.

2.11 PAINT

A. Oxide primer shall conform to AISC Specifications, Code of Standard Practice, and SSPC Steel Structure Painting Manual, unless indicated otherwise.

B. Paint primer shall be free of lead and chromate and shall comply with State and Federal volatile organic compound (VOC) requirements.

C. Paint primer shall be compatible with finish coating.

PART 3 - EXECUTION

3.1 GENERAL

A. Fabricate and erect structural steel in accordance with AISC Specifications and Code of Standard Practice.

B. Notify Design Professional and Structural Testing/Inspection Agency at least 48 hours prior to structural steel fabrication and erection.

3.2 ANCHOR BOLT SETTING

A. Provide templates for setting anchor bolts. Position anchor bolts by using templates with two nuts to secure in place prior to placement of concrete.

B. Do not erect steel where anchor bolt nuts will not have full threads.

3.3 CONNECTIONS

A. Provide a minimum of two fasteners at each bolted connection.

B. Ensure fasteners are lubricated prior to installation.
C. Provide high-strength bolted connections in accordance with AISC Specifications for Structural Joints using ASTM A325 or A490 Bolts.

D. Provide connections for expansion and contraction where steel beams connect to concrete walls or concrete columns and at expansion joints. Secure nuts on bolts against loosening. (Dent threads with a chisel.)

3.4 FASTENER INSTALLATION

A. Bolts shall be installed in holes of the connection and brought to snug tight condition. Tighten connection progressing systematically from the most rigid part to the free edges of the connection to minimize relaxation of the bolts.

B. High-strength bolts installed shall have a hardened washer under the element turned in tightening.

C. Installation and tightening of bolts shall conform to the AISC Specifications for Structural Joints.

3.5 EXPANSION ANCHOR INSTALLATION

A. Install in accordance with manufacturer's recommendation.

B. Minimum embedment shall be equal to 4.5 times the anchor diameter unless noted otherwise.

3.6 ADHESIVE ANCHOR INSTALLATION

A. Install in accordance with manufacturer's recommendation.

B. Minimum embedment shall be equal to 4.5 times the anchor diameter unless noted otherwise.

3.7 WELDING

A. Comply with AWS Structural Welding Code. Use prequalified weld procedures.

B. Provide end returns where fillet welds terminate at end or sides. Returns shall be continuous for a distance of not less than two times the nominal size of the weld.

C. Complete penetration joints shall be backgouged to sound metal before the second side is welded or have 1/4-inch root opening with 3/16 x 1 inch backing bar. Access holes are required. Filling access holes is not required.

D. Remove all slag and weld splatter from deposited weld metal.

3.8 SPLICING

A. Splice members only where indicated unless authorized in writing by the Design Professional.

B. Provide shim plates at bottom flange splice at continuous beam splices with different depths.

3.9 CUTTING

A. Do not use flame cutting to correct errors unless authorized in writing.

3.10 Re-entrant corners shall have a minimum radius of one inch and be free of notches. Notches and gouges resulting from flame cutting shall be finished to a smooth appearance.

3.11 MILL SCALE

A. Remove loose mill scale.

3.12 BOLT HOLES

A. Cut, drill, or punch holes perpendicular to metal surfaces. Do not enlarge holes by burning. Drill or punch holes in bearing plates. Remove burrs.
3.13 PAINTING

A. Paint steel that is not encased in concrete, plaster, or sprayed fireproofing. Do not shop paint in areas to be field welded, contact surfaces of slip critical connections, or areas to receive special finishes.

B. Field paint as required steel that has been welded or that is unpainted after connections have been tightened.

END OF SECTION
SECTION 05200
STEEL JOISTS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Section includes the manufacture and erection of steel joists shown on the Drawings.

1.02 RELATED SECTIONS

A. Section 01410 - Structural Testing/Inspection Agency Services.
B. Section 05100 - Structural Steel.
C. Section 05300 - Metal Decking.

1.03 REFERENCES

A. ASTM A307 - Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
B. AWS D1.1 - Structural Welding Code.
C. SJI - Standard Specifications for Open Web Steel Joists, K-Series.

1.04 DESIGN REQUIREMENTS

A. Steel joists and bridging shall be designed by an engineer licensed in the project state.
B. Design joists and bridging in accordance with the Steel Joist Institute (SJI) Standard Specifications.
C. Refer to Drawings for special design requirements, if any.
D. Top chord extensions or extended ends are to be designed for the same tabulated uniform loads used in the design of the associated joists and for a concentrated load of 500 pounds at the end of the extension or extended end, unless noted otherwise on the Drawings.
E. Design KCS-Series joists to conform to the load tables published by Vulcraft.

1.05 SUBMITTALS

A. Submit certification letter stating compliance with SJI specifications.
B. Submit detailed shop drawings sealed by the design engineer showing layout of joist units, special connections, and accessories. Include the mark, number, type, location, and spacing of joists and bridging.
C. Upon request, submit mill test certificates.
D. Upon request, submit written welding procedures for each type of welded joint used. Use prequalified joints.
E. Upon request, submit the erection sequence and procedures to be used by the steel erector.

1.06 QUALITY ASSURANCE
A. Structural Testing/Inspection Agency shall perform the following quality related items:
   1. Visual inspection of bolted and welded connections.
   2. Verify installation of bridging or braces.
   3. Verify connections for top and bottom chords.
   4. Verify reinforcement of members for concentrated loads.
   5. Verify proper bearing.

B. The Structural Testing / Inspection Agency shall provide special inspections as required by Chapter 17 of the building code as required by Specification 01410.

1.07 QUALIFICATIONS
   A. Manufacturer shall verify that design and manufacture of joists and joist girders conforms with SJI Standard Specifications.

1.08 DELIVERY, STORAGE, AND HANDLING
   A. Store and handle joists as recommended in SJI Standard Specifications.

PART 2 - PRODUCTS

2.01 ROLLED STEEL PLATES, SHAPES, AND BARS
   A. Steel shall conform to SJI Standard Specifications.

2.02 UNFINISHED BOLTS, WASHERS, AND NUTS
   A. Unfinished bolts shall conform to ASTM A307, Grade A, 60 ksi minimum tensile strength. Provide compatible hexagonal nuts and plain washers.

2.03 WELD ELECTRODES
   A. E-70 series low hydrogen electrodes conforming to AWS A5.1 or A5.5, A5.17 or A5.20.
   B. Provide proper storage for electrodes to maintain flux quality.

2.04 PAINT

PART 3 - EXECUTION

3.01 MANUFACTURE AND ERECTION
   A. Manufacture and erect joists in accordance with SJI Standard Specifications.
   B. Members shall have parallel top and bottom chords unless otherwise indicated.
   C. Fabricate bearings which rest on sloped surfaces with a slope which conforms to that of the support unless otherwise approved.
   D. Provide for connections of kickers and hangers to members.
   E. Provide bottom chord extensions at columns and as indicated by the Contract Drawings. Weld bottom chords to members after dead loads have been applied.
F. Provide ceiling extensions in areas having ceilings attached directly to joist bottom chord (not suspended ceilings). Extend ends to within 1/2 inch of the finished wall surface unless otherwise indicated.

G. Camber joists according to SJI Standard Specifications. Negative camber and bent joists are unacceptable.

H. Do not erect joists until supporting work is secured.

I. Provide bridging complying with SJI Standard Specifications. Provide for connections where bridging terminates.

3.02 CONCENTRATED LOADS ON JOISTS

A. Concentrated loads not shown on Drawings must be verified by joist manufacturer for adequacy of joist design. The necessity of any reinforcement required for concentrated loads applied to either the top or bottom chord shall be designed by joist manufacturer.

3.03 HEADER UNITS

A. Provide header units to support openings in floor or roof system not framed with steel shapes.

3.04 SHOP PAINTING

A. Remove loose scale, heavy rust, and other foreign materials from joists and accessories before application of shop paint.

B. Apply one shop coat of steel joist primer paint to joists and accessories, by spray, dipping, or other method to provide a continuous dry paint film thickness of not less than 1.50 mil.

3.05 BEARING

A. Extend ends of steel joists not less than 4 inches over masonry and concrete supports. Extend ends of joists not less than 2-1/2 inches over steel supports. Positive attachment to support shall be made by welding or bolting. In such cases where a shorter end bearing length must be used, such condition must be designed.

B. "U" type anchors are not acceptable unless authorized in writing.

3.06 WELDING

A. Perform welding in accordance with AWS D1.1 "Structural Welding Code". Use AWS Certified Welders.

B. Weld ends of joists resting on steel supports with the minimum weld specified by the SJI standard specifications, unless otherwise indicated on Contract Drawings.

C. Remove all slag and weld splatter from deposited weld material.

3.07 BRIDGING INSTALLATION

A. Permanently fasten bridging before the application of loads.

B. In areas where joists will be exposed to view, align bridging in straight rows to create uniform appearance.

3.08 PROTECTION
A. Provide means for adequate distribution of concentrated loads so that carrying capacity of joists is not exceeded during construction.

B. Provide temporary bridging, bracing, connections, and anchors to ensure lateral stability during construction.

C. Joists damaged during construction shall be replaced or repaired with procedures submitted by the joist manufacturer.

3.09 CUTTING

A. Do not field cut or apply heat to joists unless authorized in writing.

END OF SECTION
SECTION 05300
METAL DECKING

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Section includes metal decking as indicated on Drawings, specified herein, and needed for a complete and proper installation.

1.02 RELATED SECTIONS

A. Section 01410 - Structural Testing/Inspection Agency Services.
B. Section 05100 - Structural Steel.
C. Section 05200 - Steel Joists.

1.03 REFERENCES

A. AISI - Specifications for the Design of Cold-Formed Steel Structural Members.
B. AWS D1.1 - Structural Welding Code.
C. AWS A5.5 - Specifications For Low Alloy Steel Covered Arc-Welding.
D. SDI - Basic Design Specifications.
E. SDI - Steel Roof Deck Design Manual.
F. ASTM A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvannealed) by the Hot Dip Process.

1.04 SUBMITTALS

A. Notify the Design Professional prior to detailing shop drawings.
B. Submit detailed shop drawings showing layout and types of deck panels, weld sizes, weld patterns and conditions requiring closure panels, finishes, supplementary framing, sump pans, cant strips, cut openings, special jointing or other accessories. Include calculations and required information if not completely covered by load tables and products data.
C. Submit mill certification that the steel supplied meets the required specifications.
D. Submit written welding procedures.
E. Submit manufacturer's specifications, section properties, load tables, diaphragm shear tables, noise reduction coefficients (if applicable) and installation instructions for each type of decking and accessories. Include manufacturer's certifications to show compliance with supplementary framing, sump pans, cant strips, curb openings, special jointing and other accessories.

1.05 QUALITY ASSURANCE

A. Structural Testing/Inspection Agency shall perform the following quality related items:
   1. Verify placement of deck for alignment and proper lap.
   2. Verify welds for size and pattern.
1.06 STORAGE

A. Store materials off ground to permit easy access for inspection and identification. Store steel members and packaged items in a manner that provides protection against contact with deleterious materials.

PART 2 - PRODUCTS

2.01 GENERAL

A. Provide metal deck sheets of three spans minimum wherever possible.

2.02 DECK ATTACHMENT

A. Use E-60 series electrodes conforming to AWS A5.5.
B. Provide weld washers for material thinner than 22 gage.

2.03 ROOF DECK

A. Metal roof deck formed from steel sheets shall conform to ASTM A653 structural quality (SQ). Provide roof deck types, minimum grades and gages as indicated on Drawings.

B. Before forming, the steel sheets shall receive a hot-dip protective coating of zinc conforming to ASTM A924 with the following minimum coating class, as defined in ASTM A653:

1. All locations G60

C. Roof deck that will be painted in the field (coordinate with Design Professional), shall comply with these additional requirements:

1. Before fabrication of the panel, all surfaces of the galvanized sheet steel shall be processed through a continuous coil coating line, designed to degrease and clean the metal, followed by a chemical conversion coating to etch the surface for proper bond characteristics. The roof deck shall then be coated with a 0.2 mil epoxy primer, oven baked and recoated with a 0.5 mil polyester primer and rebaked. This coil coated prime finish shall be applied to both sides of the material.

2. Compatibility of all field applied finish paint with the factory applied primer shall be the responsibility of the painting contractor.

D. Provide roof deck units with flush, nested 2-inch end laps and nested side laps, unless otherwise indicated or specified. Provide deck configurations complying with SDI "Basic Design Specifications".

2.04 ROOF SUMP PANS

A. When required by Design Professional fabricate from single piece of 14 gage galvanized sheet steel with level bottoms and sloping sides to direct water flow to drain, unless otherwise shown. Provide sump pans of adequate size to receive roof drains and with bearing flanges not less than 3 inches wide. Recess pans not less than 1-1/2 inches below roof deck surface, unless otherwise shown or required by deck configuration. Holes for drains will be cut in the field.

2.05 CANT STRIPS

A. When required by Design Professional fabricate cant strips of 20 gage sheet steel. Bend to form a 45 degree cant not less than 5 inches wide with top and bottom flanges not less than 2 inches wide, unless otherwise shown.
PART 3 - EXECUTION

3.01 GENERAL
   A. Load conditions shall be in accordance with Steel Deck Institute sequential loading formulas.
   B. Installer must examine the areas and conditions under which metal decking is to be installed and notify the Contractor in writing of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.

3.02 PLACEMENT
   A. Place steel deck units on supporting steel framework and adjust to final position before permanently fastening. Install deck units and accessories in accordance with manufacturer's recommendations and the Drawings, and as specified herein.

3.03 CUTTING
   A. Cut holes in deck indicated by the Drawings. Other holes required shall be supplied by those requiring them. Obtain written authorization for additional holes and cutting not indicated on erection drawings.

3.04 WELDING
   A. Perform welding in accordance with AWS Structural Welding Code.
   B. Provide weld washers for deck thinner than 22 gage.

3.05 CONCENTRATED LOADS
   A. Do not hang concentrated loads exceeding 50 pounds from the deck.

3.06 DECK SUPPORTS
   A. Fasten deck to steel framework at ends and at each intermediate support by welding according to manufacturer's specifications unless indicated otherwise on structural drawings or otherwise specified herein. Do not weld deck in place until all bolted and welded connections for the structural frame are complete. A minimum of one floor over the area to be decked is to be bolted and welded prior to welding deck in place.

3.07 ROOF DECK
   A. Place roof deck in straight alignment. Lap ends of sheets two inches.
   B. Attach side laps of roof deck with as shown on the Drawings. Fasteners for side laps and overlying roofing material in dovetail deck shall be concealed within the depth of the dovetail shaped ribs. Within aggressive environments, fasteners shall be stainless steel.
   C. Fasten roof deck in place as shown on the Drawings.

END OF SECTION
SECTION 05500

METAL FABRICATIONS

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 01 - GENERAL REQUIREMENTS which are hereby made a part of this Section of the Specifications.

1.2 DESCRIPTION OF WORK

A. Work Included: Provide labor, materials and equipment necessary to complete the work of this Section, including but not limited to the following:
   1. All Work in this Section, including Schedule in Paragraph 2.1 of this Section.

B. Related Work: The following items are not included in this Section and will be performed under the designated Sections:
   1. Section 03300 - CAST-IN-PLACE CONCRETE for installing metal items into concrete.
   2. Section 04200 - UNIT MASONRY for installing metal items into masonry walls.
   3. Section 10605 - WIRE MESH PARTITIONS for interior wire mesh partitions.

1.3 PERFORMANCE REQUIREMENTS

A. Structural Performance of Ladders: Provide ladders capable of withstanding the effects of loads and stresses within limits and under conditions specified in ANSI A14.3.

B. Thermal Movements: Provide exterior metal fabrications that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening 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 nighttime-sky heat loss.
   1. Temperature Change (Range): 120 deg F ambient; 180 deg F material surfaces.

1.4 SUBMITTALS

A. Product Data: For the following:
   1. Paint products.
   2. Grout.

B. Shop Drawings: Show fabrication and installation details for metal fabrications.
   1. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items.
   2. Provide templates for anchors and bolts specified for installation under other Sections.
   3. For installed products indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer, licensed by the local authorities having jurisdiction, responsible for their preparation.
   4. Where fabrications are to receive sprayed-on fireproofing, include statement that primer is compatible with fireproofing proposed for use.

C. Welding certificates.

D. Qualification Data: For professional engineer.

1.5 QUALITY ASSURANCE

A. Welding: Qualify procedures and personnel according to the following:
1. AWS D1.1, “Structural Welding Code--Steel.”

B. Metal Surfaces, General: Provide materials with smooth, flat surfaces, unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

1.6 PROJECT CONDITIONS

A. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication and indicate measurements on Shop Drawings.
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 wall and other contiguous construction to ensure that actual dimensions correspond to established dimensions.
2. Provide allowance for trimming and fitting at site.

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.
B. Coordinate installation of steel weld plates and angles for casting into concrete that are specified in this Section but required for work of another Section. Deliver such items to Project site in time for installation.

PART 2 - PRODUCTS

2.1 SCHEDULE

A. Miscellaneous items include the following. Requirements for materials, hot-dip galvanizing and shop-applied primers are included with each item as applicable.
1. Steel framing and supports with shop-applied primer for sliding doors.
2. Steel framing and supports for countertops with shop-applied primer.
3. Galvanized steel framing and supports for mechanical and electrical equipment.
4. Steel framing and supports for applications where framing and supports are not specified in other Sections; galvanized at exterior locations and in exterior walls.
5. Galvanized steel bollards with shop-applied primer.

2.2 FERROUS METALS

A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
B. Steel Tubing: ASTM A 500, cold-formed steel tubing.
C. Steel Pipe: ASTM A 53/A 53M, standard weight (Schedule 40), unless another weight is indicated or required by structural loads.
D. Cast Iron: ASTM A 48/A 48M, Class 30, unless another class is indicated or required by structural loads.

2.3 FASTENERS

A. General: Unless otherwise indicated, provide Type 316 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633, Class Fe/Zn 5, at exterior walls. Provide stainless-steel fasteners for fastening aluminum. Select fasteners for type, grade, and class required.
B. Anchor Bolts: ASTM F 1554, Grade 36. Provide hot-dip or mechanically deposited, zinc-coated anchor bolts where item being fastened is indicated to be galvanized.

C. Cast-in-Place Anchors in Concrete: Anchors capable of sustaining, without failure, a load equal to four times the load imposed, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.
   1. Threaded or wedge type; galvanized ferrous castings, either ASTM A 47/A 47M malleable iron or ASTM A 27/A 27M cast steel. Provide bolts, washers, and shims as needed, hot-dip galvanized per ASTM A 153/A 153M.

D. Expansion Anchors: Anchor bolt and sleeve assembly with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.

2.4 MISCELLANEOUS MATERIALS

A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

B. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79. Use primer containing pigments that make it easily distinguishable from zinc-rich primer.

C. Zinc-Rich Primer: Complying with SSPC-Paint 20 or SSPC-Paint 29 and compatible with topcoat.


E. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

F. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.

2.5 FABRICATION, GENERAL

A. Shop Assembly: Preassemble items in the shop to greatest extent possible. 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. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch, unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.

C. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.

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

E. 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.

F. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) screws or bolts, unless otherwise indicated. Locate joints where least conspicuous.

G. Fabricate seams and other connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.

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

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

2.6 MISCELLANEOUS FRAMING AND SUPPORTS

A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.

B. Fabricate units from steel shapes, plates, and bars of welded construction, unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction retained by framing and supports. Cut, drill, and tap units to receive hardware, hangers, and similar items.

1. Furnish inserts if units are installed after concrete is placed.

2.7 METAL BOLLARDS

A. Fabricate metal bollards from Schedule 40 steel pipe.

2.8 FINISHES, GENERAL

A. Comply with NAAMM’s “Metal Finishes Manual for Architectural and Metal Products” for recommendations for applying and designating finishes.

B. Finish metal fabrications after assembly.

2.9 STEEL PRIMERS AND FINISHES

A. Preparation for Shop Priming: Prepare uncoated ferrous-metal surfaces to comply with minimum requirements indicated below for SSPC surface preparation specifications and environmental exposure conditions of installed metal fabrications:

1. Exteriors (SSPC Zone 1B) and Items Indicated to Receive Zinc-Rich Urethane Primer: SSPC-SP 6/NACE No. 3, “Commercial Blast Cleaning.”

2. Interiors (SSPC Zone 1A): SSPC-SP 7, “Brush Off Blast Cleaning.”

3. Apply shop primer to uncoated surfaces of metal fabrications, except those with galvanized finishes and those to be field welded, embedded in concrete or masonry, unless otherwise indicated. Extend priming of partially embedded members to a depth of 2 inches.


5. Comply with SSPC-PA 2, “Measurement of Dry Coating Thickness with magnetic Gages.”

B. Zinc-Rich Primer: Urethane zinc rich primer compatible with topcoat Specified in Section 09900 - PAINTING. Provide primer with a VOC content of 340 g/L (2.8 lb/gal.) or less per OTC ozone standards when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
Provide Tnemec Series 394 Perimerprime or Ameron Series 68HS at 3.0 mils DFT or approved equal by DuPont or Carboline.

C. Hot-Dip Galvanizing: For steel exposed to the elements, weather or corrosive environments and other steel indicated to be galvanized, provide coating for iron and steel fabrications applied by the hot-dip process. Comply with ASTM A 123 for fabricated products and ASTM A 153 for hardware. Provide thickness of galvanizing specified in referenced standards. The galvanizing bath shall contain high grade zinc and other earthly materials. Fill vent holes and grind smooth after galvanizing.

D. Hot-Dip Galvanizing And Factory-Applied Primer for Steel: Provide hot-dip galvanizing and factory-applied prime coat, certified OTC/VOC compliant less than 2.8 lbs/gal., and conforming to EPA and local requirements. Apply primer within 12 hours after galvanizing at the galvanizer’s plant in a controlled environment meeting applicable environmental regulations and as recommended by the primer coating manufacturer. Blast cleaning of the surface is unacceptable for surface preparation. Primer shall have a minimum two year re-coat window for application of finish coat. Coatings must meet or exceed the following performance criteria:

1. Abrasion: ASTM D 4060, CS17 Wheel, 1,000 gram load.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. 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.

B. 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.

C. 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.

D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag bolts, wood screws, and other connectors.

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

F. Corrosion Protection: Coat concealed surfaces of aluminum that will come into contact with grout, concrete, masonry, wood, or dissimilar metals with a heavy coat of bituminous paint.
3.2 INSTALLING MISCELLANEOUS FRAMING AND SUPPORTS

A. General: Install framing and supports to comply with requirements of items being supported, including manufacturers’ written instructions and requirements indicated on Shop Drawings.

B. Anchor supports for operable partitions securely to and rigidly brace from building structure.

C. Support steel girders on solid grouted masonry, concrete or steel pipe columns. Secure girders with anchor bolts embedded in grouted masonry or concrete or with bolts through top plates of pipe columns.
   1. Where grout space under bearing plates is indicated for girders supported on concrete or masonry, install as specified in this Section.

D. Install pipe columns on concrete footings with grouted baseplates. Position and grout column baseplates as specified in this Section.
   1. Grout baseplates of columns supporting steel girders after girders are installed and leveled.

3.3 INSTALLING PIPE BOLLARDS

A. Anchor bollards in place with concrete footings. Center and align bollards in holes 3 inches above bottom of excavation. Place concrete and vibrate or tamp for consolidation. Support and brace bollards in position until concrete has cured.

B. Fill bollards solidly with concrete, mounding top surface to shed water.

3.4 ADJUSTING AND CLEANING

A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded 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. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

END OF SECTION
SECTION 06100
ROUGH CARPENTRY

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. Work Included: Provide labor, materials and equipment necessary to complete the work of this Section, including but not limited to the following:
1. Wood blocking, metal blocking, cants, and nailers.
2. Plywood backing panels.
3. Rooftop equipment bases and support curbs.

B. Related Work: The following items are not included in this Section and will be performed under the designated Sections:
1. Section 06402 - INTERIOR ARCHITECTURAL WOODWORK for interior woodwork not specified in this Section.

1.2 SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product, indicate component materials and dimensions, and include construction and application details.
1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used, net amount of preservative retained, and chemical treatment manufacturer’s written instructions for handling, storing, installing, and finishing treated material.
2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Include physical properties of treated materials, both before and after exposure to elevated temperatures when tested according to ASTM D 5516 and ASTM D 5664.
3. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
4. Include copies of warranties from chemical treatment manufacturers for each type of treatment.
5. Manufacturers’ product data for construction adhesive, including printed statement of VOC content.
6. Composite wood manufacturer’s product data for each composite wood product used indicating that bonding agent used contains no urea formaldehyde.

1.3 DELIVERY, STORAGE, AND HANDLING

A. Stack lumber, plywood, and other panels; place spacers between each bundle to provide air circulation. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

A. Lumber: DOC PS 20 and applicable rules of lumber grading agencies certified by the American Lumber Standards Committee Board of Review.
1. Factory mark each piece of lumber with grade stamp of grading agency.
2. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry lumber.
3. Provide dressed lumber, S4S, unless otherwise indicated.
4. Provide dry lumber with 15 percent maximum moisture content at time of dressing for 2-inch nominal thickness or less, unless otherwise indicated.

B. Plywood Panels:
   1. Plywood: Either DOC PS 1 or DOC PS 2, unless otherwise indicated.
   2. Thickness: As needed to comply with requirements specified but not less than thickness indicated.
   3. Factory mark panels according to indicated standard.

2.2 WOOD-PRESERVATIVE-TREATED MATERIALS

A. Preservative Treatment by Pressure Process: AWPA C2 (lumber) and AWPA C9 (plywood), except that lumber that is not in contact with the ground and is continuously protected from liquid water may be treated according to AWPA C31 with inorganic boron (SBX).
   1. Preservative Chemicals: Acceptable to authorities having jurisdiction and not containing arsenate.

B. Kiln-dry material after treatment to maximum moisture content of 19 percent for lumber and 15 percent for plywood. Do not use material that is warped or does not comply with requirements for untreated material.

C. Mark each treated item with the treatment quality mark of an inspection agency approved by the American Lumber Standards Committee Board of Review.

D. Application: Treat items indicated on Drawings, and the following:
   1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
   2. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete in exterior walls.

2.3 MISCELLANEOUS LUMBER

A. General: Provide lumber for support or attachment of other construction, including the following:
   1. Rooftop equipment bases and support curbs.
   2. Blocking.
   3. Cants.
   5. Furring.

B. For items of dimension lumber size, provide Construction, Stud, or No. 2 grade lumber with 15 percent moisture content.

2.4 PANEL PRODUCTS

A. Miscellaneous Concealed Plywood: Exposure 1 sheathing, span rating to suit framing in each location, and thickness as indicated but not less than 5/8".

B. Telephone and Electrical Equipment Backing Panels, including those at Water Treatment: DOC PS 1, Exposure 1, A-C Plugged, fire-retardant treated, in thickness indicated or, if not indicated, not less than 5/8" thick.

2.5 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and manufacture.
1. Where carpentry is exposed to weather, in ground contact, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.


D. Wood Screws: ASME B18.6.1.

E. Screws for Fastening to Cold-Formed Metal Framing: ASTM C 954, except with wafer heads and reamer wings, length as recommended by screw manufacturer for material being fastened.

F. Bolts: Steel bolts complying with ASTM A 307, Grade A with ASTM A 563 hex nuts and, where indicated, flat washers.

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

2.6 MISCELLANEOUS MATERIALS

A. Adhesive, including Gluing Furring and Sleepers to Concrete or Masonry: Formulation complying with ASTM D 3498 that is approved for use indicated by adhesive manufacturer.
   1. Use adhesives that have a VOC content of 70 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

B. Metal stud backing (alternate to replace wood blocking) as follows:
   1. “Notch Tite” brand Flat-Reinforced Backing (1.25 x 6" x 16 GA; 9'-4" length).
   2. “Metal-Lite” brand flush mount backing (1.25" x 6" x 14 GA).

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Discard units of material with defects that impair quality of carpentry and that are too small to use with minimum number of joints or optimum joint arrangement.

B. Set carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit carpentry to other construction; scribe and cope as needed for accurate fit. Locate furring, nailers, blocking, grounds, and similar supports to comply with requirements for attaching other construction.

C. Apply field treatment complying with AWPA M4 to cut surfaces of preservative-treated lumber and plywood.

D. Securely attach carpentry work as indicated and according to applicable codes and recognized standards.

E. Countersink fastener heads on exposed carpentry work and fill holes with wood filler.

F. Use fasteners of appropriate type and length. Predrill members when necessary to avoid splitting wood.

G. Cutting and Repairing: Do such work as normally required and done for mechanical and other trades.
H. Blocking: Furnish and install blocking, furring, brackets, etc. as required to properly carry out all work shown and reasonably inferred by the Drawings and Specifications.

I. Underlayment Installation:
1. Acclimate underlayment by standing individual panels on edge in rooms where they are to be installed 24 to 48 hours prior to installation.
2. Plywood underlayments shall be installed immediately before laying finished floor.
3. Install plywood underlayment smooth side up with face grain perpendicular to floor joists. Stagger end joints in underlayment panels and offset end and edge joints of underlayment panels by at least two inches from joints in SW floor panels.
   * Panel edge and ends shall be space 1/16".
4. Underlayment nailing shall be 3" o.c. along edge 3/8" minimum to ½" maximum from edge and 6" o.c. each way in field. Begin in corner adjacent to previous panels working diagonally across to opposite corner. DO NOT TACK PANELS FIRST.

J. Nailers and Wood Cants: Nailers, 2" stock unless otherwise noted, of the proper widths. Bevel nailers for concrete ½" both sides and properly place in forms. Bolt nailers in place on steel or masonry. Furnish ledgers bolted to wall in locations shown and as required.

K. Shoring: Furnish and place all necessary shoring and bracing of types and sizes best suited for the conditions to be met. Shoring must comply with all governing requirements.

L. Provide wood curbs, required blocking and cants around all openings through the roof indicated on all architectural, mechanical and electrical drawings. Check drawings for all trades and furnish for all openings indicated.

M. Studs for interior walls shall be solid and continuous from floor to double place at trusses, and shall not be cut for straightening; warped studs shall be replaced.

N. Studs shall be doubled at all corners, opening, and beam bearing points.

O. Headers over openings in walls shall be as follows, unless noted otherwise:

<table>
<thead>
<tr>
<th>Opening Width</th>
<th>Header Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>up to 6'-0&quot;</td>
<td>2-2x6</td>
</tr>
<tr>
<td>6' to 8'-0&quot;</td>
<td>2-2x8</td>
</tr>
<tr>
<td>8' to 10'-0&quot;</td>
<td>2-2x10</td>
</tr>
</tbody>
</table>

P. Plywood Backer Boards:
1. Electrical, telephone, video and alarm equipment locations: Install 5/8" plywood over gypsum board, fastening into studs @ 8" o.c. Seal all vertical joints top, bottom and ends with Tremco sealant.
2. Water Treatment Equipment: Install 5/8" exterior grade plywood over gypsum board. Finish with Class A FRP, panels to be butt jointed where they meet another panel. Apply Type IA acrylic fire stop sealant along all top and side top edges.

3.2 WOOD BLOCKING, AND NAILER INSTALLATION

A. Install where indicated and where required for attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.

B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces, unless otherwise indicated.

END OF SECTION
SECTION 07140
WATERPROOFING & CRACK ISOLATION

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

A. Work Included: Provide labor, materials and equipment necessary to complete the Work of this Section including, but not limited to, the following:
   1. Application of fluid applied waterproofing/crack isolation membrane over substrate above grade.

B. Related Work: The following items are not included in this Section and will be performed under the designated Sections:
   1. Section 03300 - Cast-In-Place Concrete
   2. Section 04200 - Unit Masonry (CMU wall substrates)
   3. Section 06100 - Rough Carpentry (plywood sub-floors)
   4. Section 07130 - Sheet Waterproofing
   5. Section 07500 - Roofing Remodeling
   6. Section 07841 - Penetration Firestopping
   7. Section 07844 - Fire Resistive joint system
   8. Section 07920 - Joint Sealants and Waterproofing Membranes
   9. Section 09260 - Gypsum Board Assemblies

1.02 SUBMITTALS

A. Product Data:
   1. UL GREENGUARD Certification Program For Chemical Emissions For Building Materials, Finishes And Furnishings, UL 2818 or UL GREENGUARD Gold certificates provided by the installation materials manufacturer on UL GREENGUARD letterhead stating “This product has been UL GREENGUARD Gold Product Certified For Low Chemical Emissions by the UL Environment under the UL GREENGUARD Certification Program For Chemical Emissions For Building Materials, Finishes And Furnishings” for each tile installation product used to verify Low VOC product information.

1.03 QUALITY ASSURANCE

A. Tile Manufacturer (single source responsibility): Company specializing in ceramic tile, thin brick, masonry veneer, mosaics, pavers, trim units and/or thresholds with three (3) years minimum experience. Obtain tile from a single source with resources to provide products of consistent quality in appearance and physical properties.

B. Installation System Manufacturer (single source responsibility): Company specializing in adhesives, mortars, grouts and other installation materials with ten (10) years minimum experience and ISO 9001 certification. Obtain installation materials from single source manufacturer to ensure consistent quality and full compatibility.

C. Submit laboratory confirmation of adhesives, mortars, grouts and other installation materials:
   1. Identify proper usage of specified materials using positive analytical method.
   2. Identify compatibility of specified materials using positive analytical method.
   3. Identify proper color matching of specified materials using a positive analytical method.
D. Installer qualifications: Company specializing in installation of ceramic tile, thin brick, masonry veneer, mosaics, pavers, trim units and/or thresholds with five (5) years documented experience with installations of similar scope, materials and design.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Acceptance at Site: Deliver and store packaged materials in original containers with seals unbroken and labels, including grade seal, intact until time of use in accordance with manufacturer’s instructions.

B. Store ceramic tile, stone, and installation system materials in a dry location; handle in a manner to prevent chipping, breakage, and contamination.

C. Protect latex additives, organic adhesives, epoxy adhesives and sealants from freezing or overheating in accordance with manufacturer’s instructions; store at room temperature when possible.

D. Store Portland cement mortars and grouts in a dry location.

1.05 PROJECT/SITE CONDITIONS

A. Provide ventilation and protection of environment as recommended by manufacturer.

B. Prevent carbon dioxide damage to ceramic tile, thin brick, masonry veneer, mosaics, pavers, trim units and/or thresholds as well as adhesives, mortars, grouts and other installation materials, by venting temporary heaters to the exterior.

C. Maintain ambient temperatures not less than 50°F (10°C) or more than 100°F (38°C) during installation and for a minimum of seven (7) days after completion. Setting of Portland cement is retarded by low temperatures. Protect work for extended period of time and from damage by other trades. Installation with latex Portland cement mortars requires substrate, ambient and material temperatures at least 37°F (3°C). There should be no ice in slab. Freezing after installation will not damage latex Portland cement mortars. Protect Portland cement-based mortars and grouts from direct sunlight, radiant heat, forced ventilation (heat & cold) and drafts until cured to prevent premature evaporation of moisture. Epoxy mortars and grouts require surface temperatures between 60°F (16°C) and 90°F (32°C) at time of installation. It is the General Contractor’s responsibility to maintain temperature control.

PART 2 - PRODUCTS

2.01 HYDRO BAN

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

   LATICRETE
   1 LATICRETE Park North
   Bethany, Connecticut 06524-3423
   Telephone 1-203-393-0010, Ext 235
   Toll Free 1-800-243-4788, Ext. 235
   Fax 1-203-393-1684
   Internet www.laticrete.com

2.02 WATERPROOFING AND CRACK ISOLATION MEMBRANE

A. Waterproofing and Crack Isolation Membrane to be thin, cold applied, single component liquid and load bearing and UL GREENGUARD Gold certified. Reinforcing fabric to be non-woven
rot-proof specifically intended for waterproofing membrane. Waterproofing Membrane to be non-toxic, non-flammable, and non-hazardous during storage, mixing, application and when cured. It shall be certified by IAPMO and ICC approved as a shower pan liner and shall also meet the following physical requirements:

1. Hydrostatic Test (ASTM D4068): Pass
2. Elongation @ break (ASTM D751): 20-30%
3. System Crack Resistance (ANSI A118.12): Pass (High)
4. 7 day Tensile Strength (ANSI A118.10): 265 psi (1.8 MPa)
5. 7 day Shear Bond Strength (ANSI A118.10) 200 psi (1.4 MPa)
6. 28 Day Shear Bond Strength (ANSI A118.4): 214 psi (1.48 – 2.4 MPa)
7. Service Rating (TCNA/ASTM C627): Extra Heavy
8. VOC Content: 2.39 g/L
9. Total VOC Emissions: ≤0.22 mg/m³

**Basis of Design: LATICRETE® HYDRO BAN®**

**PART 3 - EXECUTION**

3.01 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements of Sections in which substrates and related work are specified and for other conditions affecting performance.
1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Clean substrates of substances harmful to insulation or vapor retarders including removing projections capable of puncturing waterproofing and crack isolation membrane or of interfering with application on membrane.

3.03 INSTALLATION, GENERAL

A. Comply with manufacturer’s written instructions applicable to products and application indicated.
B. Install product that is undamaged, unsoiled and that has not been left exposed at any time to ice, rain, and snow.
C. Extend application of membrane in thickness indicated to envelop entire area to be protected. Remove projections that interfere with application process.

3.04 INSTALLATION ACCESSORIES – CERAMIC TILE

A. Waterproofing and Crack Isolation Membrane (Liquid-Applied):
1. Install waterproofing and crack isolation membrane in compliance with current revisions of ANSI A108.1 (2.7 Waterproofing), ANSI A108.13, and ANSI A108.17. Review the installation and plan the application sequence. Pre-cut LATICRETE® Waterproofing/Anti-Fracture Fabric (if required) allowing 2" (50mm) for overlap at ends and sides to fit the areas as required. Roll up the pieces for easy handling and placement. Shake or stir LATICRETE HYDRO BAN® before using.
2. **Pre-Treat Cracks and Joints** - Fill all substrate cracks, cold joints and control joints to a smooth finish using a LATICRETE® latex-fortified thin-set. Alternatively, a liberal coat* of LATICRETE HYDRO BAN® applied with a paint brush or trowel may be used...
to fill in non-structural joints and cracks. Apply a liberal coat* of LATICRETE HYDRO BAN approximately 8" (200mm) wide over substrate cracks, cold joints, and control joints using a paint brush or heavy napped paint roller.

3. **Pre-Treat Coves and Floor/Wall Intersections** - Fill all substrate coves and floor/wall transitions to a smooth finish and changes in plane using a LATICRETE latex-fortified thin-set. Alternatively, a liberal coat* of LATICRETE HYDRO BAN applied with a paint brush or trowel may be used to fill in cove joints and floor/wall transitions <1/8" (3mm) in width. Apply a liberal coat* of LATICRETE HYDRO BAN approximately 8" (200mm) wide over substrate cracks, cold joints, and control joints using a paint brush or heavy napped paint roller.

4. **Pre-Treat Drains** - Drains must be of the clamping ring type, with weepers as per ASME A112.6.3. Apply a liberal coat* of LATICRETE HYDRO BAN around and over the bottom half of drain clamping ring. Cover with a second liberal coat of LATICRETE HYDRO BAN. When the LATICRETE HYDRO BAN dries, apply a bead of LATICRETE LATASIL™ where the LATICRETE HYDRO BAN meets the drain throat. Install the top half of drain clamping ring.

5. **Pre-Treat Penetrations** - Allow for a minimum 1/8" (3mm) space between drains, pipes, lights, or other penetrations and surrounding ceramic tile, stone or brick. Pack any gaps around pipes, lights or other penetrations with a LATICRETE latex-fortified thin-set. Apply a liberal coat* of LATICRETE HYDRO BAN around penetration opening. Cover the first coat with a second liberal coat* of LATICRETE HYDRO BAN. Bring LATICRETE HYDRO BAN up to level of tile or stone. When LATICRETE HYDRO BAN has dried to the touch, seal with LATICRETE LATASIL.

6. **Main Application** - Allow any pre-treated areas to dry to the touch. Apply a liberal coat* of LATICRETE HYDRO BAN with a paint brush or heavy napped roller over substrate including pre-treated areas and allow to dry to the touch. Install another liberal coat* of LATICRETE HYDRO BAN over the first coat. Let the top coat of LATICRETE HYDRO BAN dry to the touch approximately 1 – 2 hours at 70°F (21°C) and 50% RH. When the top coat has dried to the touch, inspect the surface for pinholes, voids, thin spots or other defects. LATICRETE HYDRO BAN will dry to an olive green color when fully cured. Use additional LATICRETE HYDRO BAN to seal any defects.

7. **Movement Joints** - Apply a liberal coat* of LATICRETE HYDRO BAN approximately 8" (200mm) wide over the areas. Then embed and loop the 6" (150mm) wide LATICRETE Waterproofing/Anti-Fracture Fabric and allow the LATICRETE HYDRO BAN liquid to bleed through. Immediately apply a second coat of LATICRETE HYDRO BAN.

8. * Dry coat thickness is 20 – 30 mil (0.02 - 0.03" or 0.5 - 0.8mm); consumption per coat is approximately 0.01 gal/ft² (approx. 0.4 L/m²); coverage is approximately 100 ft² /gal (approx. 2.5 m²/ L). LATICRETE® Waterproofing/Anti-Fracture Fabric can be used to pre-treat cracks, joints, curves, corners, drains, and penetrations with LATICRETE HYDRO BAN®.

9. **Protection** - Provide protection for newly installed membrane even if covered with a thin-bed ceramic tile, stone or brick installation against exposure to rain or other water for a minimum of 2 hours at 70°F (21°C) and 50% RH. For temperatures between 45°F and 69°F (7°C to 21°C), allow a minimum 24 hour cure period.

10. **Flood Testing** - Allow membrane to cure fully before flood testing, typically a minimum of 2 hours at 70°F (21°C) and 50% RH. Cold conditions will require a longer curing time. For temperatures between 50°F and 69°F (10°C to 21°C), allow a minimum 24 hour cure period prior to flood testing.
3.05 SUBSTRATE EXAMINATION

A. Verify that surfaces to be covered with ceramic tile, mosaics, pavers, brick, masonry veneer, stone, trim or waterproofing are:
   1. Sound, rigid and conform to good design/engineering practices;
   2. Systems, including the framing system and panels, over which ceramic tile will be installed shall be in conformance with the International Residential Code (IRC) for residential applications, the International Building Code (IBC) for commercial applications, or applicable building codes.
   3. Clean and free of dust, dirt, oil, grease, sealers, curing compounds, laitance, efflorescence, form oil, loose plaster, paint, and scale.
   4. For thin-bed Ceramic tile installations when a cementitious bonding material will be used including medium bed mortar, maximum allowable variation in the tile substrate – for tiles with edges shorter than 15" (375mm), maximum allowable variation is 1/4" in 10' (6mm in 3m) from the required plane with no more than 1/16" variation in 12" (1.5mm variation in 300mm) when measured from the high points in the surface. For tiles with at least one edge 15" (375mm) in length, maximum allowable variation is 1/8" in 10' (3mm in 3m) from the required plane, with no more than 1/16" variation in 24" (1.5mm variation in 600mm) when measured from the high points in the surface. For modular substrate units such as exterior glue plywood panels or adjacent concrete masonry units, adjacent edges cannot exceed 1/32" (0.8mm) difference in height. For thick bed (mortar bed) ceramic tile and stone installations and self-leveling methods, maximum allowable variation in the installation substrate to be 1/4" in 10' (6mm in 3m).
   5. To fully evacuate water, shower pan membranes and bonded waterproofing membranes in wet areas must slope to and connect with a drain. Plumbing code typically requires membranes to be sloped a minimum of 1/4" per ft. (6mm per 300mm) and extend at least 3" (75mm) above the height of the curb or threshold. Account for the perimeter floor height required to form adequate slopes. Membranes must be installed over the other horizontal surfaces in wet areas subject to deterioration like shower seats. They must be sloped and configured so as to direct water to the membrane connected to the drain. The weep holes of clamping ring drains enable water to pass from the membrane into the plumbing system. Crushed ceramic tile or stone, or other positive weep protectors placed around/over weep holes help prevent their blockage. To form a watertight seal, membranes must have adequate contact with the clamping ring of the drain or with the bonding area of an integrated bonding flange.
   6. Not leveled with gypsum or asphalt based compounds.
   7. For substrates scheduled to receive a waterproofing and/or crack isolation membrane, maximum amount of moisture in the concrete/mortar bed substrate should not exceed 5 lbs./1,000 ft\(^2\) / 24 hours (283 µg/s•m\(^2\)) per ASTM F1869 or 75% relative humidity as measured with moisture probes per ASTM F2170. Consult with finish materials manufacturer to determine the maximum allowable moisture content for substrates under their finished material. Please refer to LATICRETE TDS 183 “Drying of Concrete” and TDS 166 “LATICRETE and Moisture Vapor Emission Rate, Relative Humidity and Moisture Testing of Concrete,” available at www.laticrete.com, for more information.

B. Concrete surfaces shall also be:
   1. Cured a minimum of 28 days at 70°F (21°C), including an initial seven (7) day period of wet curing.
   2. Wood float finished, or better, if the installation is to be done by the thin bed method.
C. Advise General Contractor and Architect of any surface or substrate conditions requiring correction before tile work commences. *Beginning of work constitutes acceptance of substrate or surface conditions.*

**PART 4 – HEALTH AND SAFETY**

The use of personal protection such as rubber gloves, suitable dust masks, safety glasses and industrial clothing is highly recommended. Discarded packaging, product wash and waste water should be disposed of as per local, State or Federal regulations.

**END OF SECTION**
PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. Work Included: Provide labor, materials and equipment necessary to complete the work of this Section, including but not limited to the following:
1. Perimeter insulation under slabs-on-grade.
2. Perimeter foundation wall insulation.
3. Concealed building insulation.
4. Vapor retarders.

B. Related Work: The following items are not included in this Section and will be performed under the designated Sections:
1. Section 07841 - PENETRATION FIRESTOPPING for firestopping insulation.
2. Section 07500 - ROOF REMODELING for roofing insulation.
3. Section 09260 - GYPSUM BOARD ASSEMBLIES for acoustic insulation in gypsum board assemblies.
5. Division 15 - HEATING, VENTILATING, AND AIR CONDITIONING for mechanical insulation.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated.
1. Manufacturer’s product data indicating percentages by weight of post-consumer and pre-consumer recycled content for products having recycled content.
2. Manufacturer’s product data indicating no urea-formaldehyde content.

1.3 QUALITY ASSURANCE

A. Source Limitations: Obtain each type of building insulation through one source from a single manufacturer.

B. Fire-Test-Response Characteristics: Provide insulation and related materials with the fire-test-response characteristics indicated, as determined by testing identical products per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Protect insulation materials from physical damage and from deterioration by moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer’s written instructions for handling, storing, and protecting during installation.

B. Protect plastic insulation as follows:
1. Do not expose to sunlight, except to extent necessary for period of installation and concealment.
2. Protect against ignition at all times. Do not deliver plastic insulating materials to Project site before installation time.
3. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.
PART 2 - PRODUCTS

2.1 FOAM-PLASTIC BOARD INSULATION
   A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
      1. DiversiFoam Products.
      2. Dow Chemical Company.
      3. Owens Corning.
   B. Extruded-Polystyrene Board Insulation: ASTM C 578, Type IV, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively.

2.2 GLASS-FIBER BLANKET INSULATION
   A. Available Manufacturers:
      1. CertainTeed Corporation.
      2. Guardian Fiberglass, Inc.
      4. Knauf Fiber Glass.
      5. Owens Corning.
   B. Unfaced, Glass-Fiber Blanket Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.
   C. Faced, Glass-Fiber Blanket Insulation: ASTM C 665, Type III (blankets with reflective membrane facing), Class A (membrane-faced surface with a flame-spread index of 25 or less); Category 1 (membrane is a vapor barrier), faced with foil-scrim-kraft vapor-retarder membrane on 1 face.
   D. Where glass-fiber blanket insulation is indicated by the following thicknesses, provide blankets in batt or roll form with thermal resistances indicated:
      1. 3-1/2 inches thick with a thermal resistance of 11 deg F x h x sq. ft./Btu at 75 deg F.
      2. 9-1/2 inches thick with a thermal resistance of 30 deg F x h x sq. ft./Btu at 75 deg F.
   E. Provide glass-fiber blanket insulation as follows:
      1. Recycled content of 20% minimum.
      2. Contain no urea-formaldehyde resins.
   F. Where the thermal performance of an existing roof is not indicated on the drawings, Contractor shall verify the existing R-Valve prior to bidding. Contractor’s bid shall include an alternate identifying the existing R-Valve and the cost to achieve a R-Valve that meets governing energy codes but is not less than R-19. Furnish and install Batt Insulation at the underside of the existing roof to attain required values.

2.3 VAPOR RETARDERS
   A. Polyethylene Vapor Retarders: ASTM D 4397, 6 mils thick, with maximum permeance rating of 0.13 perm.
   B. Vapor-Retarder Tape: Pressure-sensitive tape of type recommended by vapor-retarder manufacturer for sealing joints and penetrations in vapor retarder.

2.4 AUXILIARY INSULATING MATERIALS
   A. Adhesive for Bonding Insulation: Product with demonstrated capability to bond insulation securely to substrates indicated without damaging insulation and substrates.
PART 3 - EXECUTION

3.1 EXAMINATION
   A. Examine substrates and conditions, with Installer present, for compliance with requirements of Sections in which substrates and related work are specified and for other conditions affecting performance.
      1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION
   A. Clean substrates of substances harmful to insulation or vapor retarders, including removing projections capable of puncturing vapor retarders or of interfering with insulation attachment.

3.3 INSTALLATION, GENERAL
   A. Comply with insulation manufacturer’s written instructions applicable to products and application indicated.
   B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed at any time to ice, rain, and snow.
   C. Extend insulation in thickness indicated to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.

3.4 INSTALLATION OF PERIMETER AND UNDER-SLAB INSULATION
   A. On vertical surfaces, set insulation units in adhesive applied according to manufacturer’s written instructions. Use adhesive recommended by insulation manufacturer.
      1. If not otherwise indicated, extend insulation a minimum of 48 inches below exterior grade line.
   B. On horizontal surfaces, loosely lay insulation units according to manufacturer’s written instructions. Stagger end joints and tightly abut insulation units.

3.5 INSTALLATION OF GENERAL BUILDING INSULATION
   A. Apply insulation units to substrates by method indicated, complying with manufacturer’s written instructions. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.
   B. Seal joints between foam-plastic insulation units by applying adhesive, mastic, or sealant to edges of each unit to form a tight seal as units are shoved into place. Fill voids in completed installation with adhesive, mastic, or sealant as recommended by insulation manufacturer.
   C. Set vapor-retarder-faced units with vapor retarder in location indicated of construction, unless otherwise indicated.
      1. Tape joints and ruptures in vapor retarder, and seal each continuous area of insulation to surrounding construction to ensure airtight installation.

3.6 INSTALLATION OF VAPOR RETARDERS
   A. General: Extend vapor retarder to extremities of areas to be protected from vapor transmission. Secure in place with adhesives or other anchorage system as indicated. Extend vapor retarder to cover miscellaneous voids in insulated substrates, including those filled with loose-fiber insulation.
B. Seal vertical joints in vapor retarders over framing by lapping not less than two wall studs. Fasten vapor retarders to wood framing at top, end, and bottom edges; at perimeter of wall openings; and at lap joints. Space fasteners 16 inches o.c.

C. Firmly attach vapor retarders to metal framing and solid substrates with vapor-retarder fasteners as recommended by vapor-retarder manufacturer.

D. Seal joints caused by pipes, conduits, electrical boxes, and similar items penetrating vapor retarders with vapor-retarder tape to create an airtight seal between penetrating objects and vapor retarder.

E. Repair tears or punctures in vapor retarders immediately before concealment by other work. Cover with vapor-retarder tape or another layer of vapor retarder.

3.7 PROTECTION

A. Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION
PART 1 GENERAL

1.1 SUMMARY

A. Provide air and moisture barrier, and compatible EIFS for vertical above grade exterior walls

B. Related Sections

1. Section 04200 Unit Masonry
2. Section 07500: Membrane Roofing
3. Section 07620: Sheet Metal Flashing and Trim
4. Section 07900: Joint Sealants
5. Section 08111: Metal Doors and Frames
6. Section 08411: Aluminum Framed Entrances and Storefronts
7. Section 08461: Sliding Automatic Entrance Doors

1.2 SUBMITTALS

C. Manufacturer's specifications, details, installation instructions and product data

D. Manufacturer’s code compliance report

E. Manufacturer’s standard warranty

F. Applicator's industry training credentials

G. Samples for approval as directed by architect or owner

H. Sealant manufacturer’s certificate of compliance with ASTM C 1382

I. Manufactures standard details applicable to this project

J. Prepare and submit project-specific details
1.3 REFERENCES

J. ASTM Standards:

B 117 Test Method for Salt Spray (Fog) Testing
C 297 Standard Test Method for Flatwise Tensile Strength of Sandwich Constructions
C 578 Specification for Preformed, Cellular Polystyrene Thermal Insulation
C 1177 Specification for Glass Mat Gypsum for Use as Sheathing
D 522 Test Methods for Mandrel Bend Test of Attached Organic Coatings
D 882 Standard Test Methods for Tensile Properties of Thin Plastic Sheeting
D 968 Test Method for Abrasion Resistance of Organic Coatings by Falling Abrasive
D 1784 Specification for Rigid Poly (Vinyl Chloride) (PVC) and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds
D 2247 Practice for Testing Water Resistance of Coatings in 100% Relative Humidity
D 3273 Test for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber
E 84 Test Method for Surface Burning Characteristics of Building Materials
E 96 Test Methods for Water Vapor Transmission of Materials
E 119 Method for Fire Tests of Building Construction and Materials
E 330 Test Method for Structural Performance of Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference
E 331 Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference
E 1233 Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls and Doors by Cyclic Static Air Pressure Difference
E 2098 Test Method for Determining Tensile Breaking Strength of Glass Fiber Reinforcing Mesh for Use in Class PB Exterior Insulation and Finish System after Exposure to a Sodium Hydroxide Solution
E 2178 Test Method for Air Permeance of Building Materials
E 2357 Standard Test Method for Determining Air Leakage of Air Barrier Assemblies
G 153 Recommended Practice for Operating Light-and Water-Exposure Apparatus (Carbon-Arc Type) for Exposure of Nonmetallic Materials
G 154 Recommended Practice for Operating Light-and Water-Exposure Apparatus (Fluorescent UV-Condensation Type) for Exposure of Nonmetallic Materials
K. Building Code Standards
AC 235  Acceptance Criteria for EIFS Clad Drainage Wall Assemblies (November, 2009)

L. National Fire Protection Association (NFPA) Standards
NFPA 285  Standard Method of Test for the Evaluation of Flammability Characteristics of Exterior Non-Load-Bearing Wall Assemblies containing Combustible Components Using the Intermediate-Scale, Multistory Test Apparatus

M. Other Referenced Documents
2. APA Engineered Wood Association E 30, Engineered Wood Construction Guide
   1. ICC-ES ESR-1233, StoGuard with Gold Coat, StoGuard with EmeraldCoat, and StoGuard VaporSeal Water-Resistive Barriers and StoEnergy Guard
   2. ICC-ES ESR-1748, StoTherm® NExT®

1.4 DESIGN REQUIREMENTS

A. Wind Load
1. Design for maximum allowable system deflection, normal to the plane of the wall, of L/240.
2. Design for wind load in conformance with code requirements.
3. Maximum wind load resistance: +188 psf (9.00 kPa), provided structural supports and sheathing/sheathing attachment are adequate to resist these pressures.

B. Moisture Control
1. Prevent the accumulation of water behind the EIFS or into the wall assembly, either by condensation or leakage through the wall construction.
   a. Provide flashing to direct water to the exterior where it is likely to penetrate components in the wall assembly, including, above window and door heads, beneath window and door sills, at roof/wall intersections, decks, abutments of lower walls with higher walls, above projecting features, at floor lines, and at the base of the wall.
   b. Air Leakage Prevention – provide continuity of the air barrier system
at foundation, roof, windows, doors, and other penetrations through
the wall with connecting and compatible air barrier components to
minimize condensation and leakage caused by air movement.

P. Impact Resistance
   1. Provide ultra-high impact resistance of the EIFS to a minimum
      height of 6'-0" (1.8 m) above finished grade at all areas
      accessible to pedestrian traffic and other areas exposed to
      abnormal stress or impact.

Q. Color Selection: Refer to drawings for color selections.

R. Joints
   1. Provide minimum 3/4 inch (19 mm) wide joints in the EIFS
      where they exist in the substrate or supporting construction,
      where the cladding adjoins dissimilar construction or materials,
      at changes in building height, at expansion, control, and cold
      joints in construction, and at floor lines in multi-level wood frame
      construction. Size joints to correspond with anticipated
      movement. Align terminating edges of EIFS with joint edges of
      through wall expansion joints and similar joints in construction.
      Refer to Sto Details.

   2. Provide minimum 1/2 inch (13 mm) wide perimeter sealant
      joints at all penetrations through the EIFS (windows, doors,
      mechanical, electrical, and plumbing penetrations, etc.).

   3. Use compatible backer rod and sealant that has been
      evaluated in accordance with ASTM C 1382, and meets
      minimum 50% elongation after conditioning.

   4. Provide joints so that air barrier continuity is maintained across
      the joint, and drain joints to the exterior, or provide other means
      to prevent or control water infiltration at joints.

S. Grade Condition
   1. Do not install EIFS below grade or for use on surfaces subject
      to continuous or intermittent water immersion or hydrostatic
      pressure. Provide minimum 6 inch (152 mm) clearance above
      grade or as required by code.

T. Trim, Projecting Architectural Features and Reveal
1. All trim and projecting architectural features must have a minimum 1:2 [27°] slope along their top surface. All reveals must have minimum ¾ inch (19 mm) insulation thickness at the bottom of the reveal. All horizontal reveals must have a minimum 1:2 [27°] slope along their bottom surface. Increase slope for northern climates to prevent accumulation of ice/snow and water on surface. Where trim/feature or bottom surface of reveal projects more than 2 inches (51 mm) from the face of the EIFS wall plane, protect the top surface with waterproof base coat. Periodic inspections and increased maintenance may be required to maintain surface integrity of the EIFS finish on weather exposed sloped surfaces. Limit projecting features to easily accessible areas and limit total area to facilitate and minimize maintenance. Refer to Sto Details.

2. Do not use the EIFS on weather exposed projecting ledges, sills, or other projecting features unless supported by framing or other structural support and protected with metal coping or flashing. Refer to Sto Detail 10.61.

u. Insulation Thickness
   1. Minimum EPS insulation thickness is 1 inch (25 mm).
   2. Maximum EPS insulation thickness is 12 inches (305 mm), except as noted below for fire-resistance rated wall assemblies.

v. Fire Protection
   1. Do not use EPS foam plastic in excess of 12 inches (305 mm) thick on types I, II, III, or IV construction unless approved by the code official.
   2. Where a fire-resistance rating is required by code use the EIFS over a rated concrete or concrete masonry assembly. Limit use over rated frame assemblies to non-load bearing assemblies (the EIFS is considered not to add or detract from the fire-resistance of the rated assembly). Maximum allowable EPS thickness: 4 inches (102 mm).
   3. Refer to manufacturer’s testing or applicable code compliance report for other limitations that may apply.

1.5 PERFORMANCE REQUIREMENTS
w. Comply with ASTM E 2568, ASTM E 2570, and the following:

Table 1  AirlMoisture Barrier Performance

<table>
<thead>
<tr>
<th>TEST</th>
<th>METHOD</th>
<th>CRITERIA</th>
<th>RESULT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Water Penetration Resistance</td>
<td>AATCC 127 (Water Column)</td>
<td>Resist 21.6 in (55 cm) water for 5 hours before and after aging</td>
<td>Pass</td>
</tr>
<tr>
<td>2. Water Penetration Resistance after Cyclic Wind Loading</td>
<td>ASTM E 1233 / ASTM E 331</td>
<td>No water at exterior plane of sheathing after 10 cycles @ 80% design load and 75 minutes water spray at 6.24 psf (299 Pa) differential</td>
<td>No water penetration</td>
</tr>
<tr>
<td>3. Water Resistance Testing</td>
<td>ASTM D 2247</td>
<td>Absence of deleterious effects after 14 day exposure</td>
<td>No deleterious effects</td>
</tr>
<tr>
<td>4. Water Vapor Transmission</td>
<td>ASTM E 96 Method B (Water Method)</td>
<td>Measure</td>
<td>Sto Gold Fill*: 7.10 perms [408 ng/(Pa·s·m²)] Sto Gold Coat: &gt; 10 perms [574 ng/(Pa·s·m²)]</td>
</tr>
<tr>
<td>5. Air Leakage (material)</td>
<td>ASTM E 2178</td>
<td>&lt; 0.004 cfm/ft2 at 1.57 psf (0.02 L/s·m² at 75 Pa)</td>
<td>Pass</td>
</tr>
<tr>
<td>6. Air Leakage (assembly)</td>
<td>ASTM E 2357</td>
<td>≤ 0.04 cfm/ft² (0.2 L/s·m²)</td>
<td>Pass</td>
</tr>
<tr>
<td>7. Structural Integrity</td>
<td>ASTM E 330</td>
<td>2-inches (51 mm) H₂O pressure (positive &amp; negative) for 1 hour.</td>
<td>Pass</td>
</tr>
<tr>
<td>8. Dry Tensile Strength</td>
<td>ASTM D 882</td>
<td>20 lbs/in (3503 N/m), minimum before and after aging</td>
<td>Sto Gold Fill:* 159 lbs/in (27845 N/m)) before aging 213 lbs/in (37302 N/m) after aging</td>
</tr>
<tr>
<td>9. Pliability</td>
<td>ASTM D 522</td>
<td>No Cracking or Delamination using %* (3 mm) mandrel at 14°F (-10°C) before and after aging</td>
<td>Pass</td>
</tr>
<tr>
<td>10. Surface Burning</td>
<td>ASTM E 84</td>
<td>Flame Spread 0 – 25 for NFPA Class A, UBC Class I</td>
<td>Flame Spread: 5 Smoke Density: 10</td>
</tr>
<tr>
<td>11. Tensile Adhesion</td>
<td>ASTM C 297</td>
<td>&gt;15 psi (103 kPa)</td>
<td>&gt;30 psi (207 kPa) to Plywood, OSB, Glass Mat Faced Gypsum sheathings</td>
</tr>
</tbody>
</table>

* Note: Sto Gold Fill testing with Sto Detail Mesh reinforcement

Table 2  EIFS Weather Resistance and Durability Performance*

<table>
<thead>
<tr>
<th>TEST</th>
<th>METHOD</th>
<th>CRITERIA</th>
<th>RESULTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Accelerated Weathering</td>
<td>ASTM G 153 (Formerly ASTM G 23)</td>
<td>No deleterious effects* at 2000 hours when viewed under 5x magnification</td>
<td>Pass</td>
</tr>
<tr>
<td>2. Accelerated Weathering</td>
<td>ASTM G 154 (Formerly ASTM G 53)</td>
<td>No deleterious effects* at 2000 hours</td>
<td>Pass</td>
</tr>
<tr>
<td>3. Freeze/Thaw Resistance</td>
<td>ASTM E 2485</td>
<td>No deleterious effects* at 10 cycles when viewed under 5x magnification</td>
<td>Pass</td>
</tr>
<tr>
<td>TEST</td>
<td>METHOD</td>
<td>CRITERIA</td>
<td>RESULTS</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>----------------------------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------</td>
</tr>
<tr>
<td>4. Water Penetration</td>
<td>ASTM E 331 (modified per ICC-ES AC 235)</td>
<td>No water penetration beyond the plane of the base coat/insulation board interface after 15 minutes at 6.24 psf (299 Pa) or 20% of design wind pressure, whichever is greater</td>
<td>Pass at 12.0 psf (575 Pa) after 30 minutes</td>
</tr>
<tr>
<td>5. Drainage Efficiency</td>
<td>ASTM E 2273</td>
<td>90% minimum</td>
<td>&gt; 90%</td>
</tr>
<tr>
<td>6. Tensile Adhesion</td>
<td>ASTM E 2134</td>
<td>Minimum 15 psi (103kPa) tensile strength</td>
<td>Pass</td>
</tr>
<tr>
<td>7. Water Resistance</td>
<td>ASTM D 2247</td>
<td>No deleterious effects* at 14 day exposure</td>
<td>Pass @ 28 days</td>
</tr>
<tr>
<td>8. Salt Spray</td>
<td>ASTM B 117</td>
<td>No deleterious effects* at 300 hours</td>
<td>Pass @ 300 hrs</td>
</tr>
<tr>
<td>9. Abrasion Resistance</td>
<td>ASTM D 968</td>
<td>No cracking or loss of film integrity at 528 quarts (500 L) of sand</td>
<td>Pass @ 528 quarts (1000 L)</td>
</tr>
<tr>
<td>10. Mildew Resistance</td>
<td>ASTM D 3273</td>
<td>No growth supported during 28 day exposure period</td>
<td>Pass @ 28 days</td>
</tr>
</tbody>
</table>
Level 2: 50-89 in-lbs (5.65-10.1J)  
Level 3: 90-150 in-lbs (10.2-17J)  
Level 4: >150 in-lbs (>17J) | Pass with one layer Sto Mesh  
Pass with two layers Sto Mesh  
Pass with one layer Sto Intermediate Mesh  
Pass with one layer Sto Armor Mat and one layer Sto Mesh |

* No deleterious effects: no cracking, checking, crazing, erosion, rusting, blistering, peeling or delamination

<table>
<thead>
<tr>
<th>TEST</th>
<th>METHOD</th>
<th>CRITERIA</th>
<th>RESULT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Fire Endurance</td>
<td>ASTM E 119</td>
<td>Maintain fire resistance of existing rated assembly</td>
<td>Pass (4 inch [102 mm] maximum allowable insulation thickness)</td>
</tr>
</tbody>
</table>
| 2. Intermediate Scale Multi-Story Fire Test | NFPA 285 (formerly UBC Standard 26-9) | 1. Resistance to vertical spread of flame within the core of the panel from one story to the next  
2. Resistance to flame propagation over the exterior surface  
3. Resistance to vertical spread of flame over the interior surface from one story to the next  
4. Resistance to significant lateral spread of flame from the compartment of fire origin to adjacent spaces | Pass with 12 inches (305 mm) insulation                                 |
| 3. Radiant Heat Ignition    | NFPA 268        | No ignition @ 20 minutes                                                  | Pass with 1 and 12 inches (25 and 305 mm) insulation                  |
| 4. Surface Burning (individual components) | ASTM E 84      | Individual components shall each have a flame spread of 25 or less, and smoke developed of 450 or less | Flame Spread: < 25  
Smoke Developed: < 450                                                  |

Table 3  AirMoisture Barrier and EIFS Fire Performance

Table 4  EIFS Component Performance
1.6 QUALITY ASSURANCE

A. Manufacturer Requirements
   1. Member in good standing of the EIFS Industry Members Association (EIMA)
   2. Air/moisture barrier and EIFS manufacturer for a minimum of thirty (30) years

B. Contractor Requirements
   1. Engaged in application of similar systems for a minimum of three (3) years
   2. Knowledgeable in the proper use and handling of Sto materials
   3. Employ skilled mechanics who are experienced and knowledgeable in air/moisture barrier and EIFS application, and familiar with the requirements of the specified work
   4. Successful completion of minimum of three (3) projects of similar size and complexity to the specified project
   5. Provide the proper equipment, manpower and supervision on the job site to install the system in compliance with Sto’s published specifications and details and the project plans and specifications

C. Insulation Board Manufacturer Requirements
   1. EPS board listed by an approved agency
   2. EPS board manufactured under Sto licensing agreement and recognized by Sto as being capable of
producing EPS insulation board to meet EIFS requirements

3. EPS board labeled with information required by Sto, the approved listing agency, and the applicable building code.

D. Mock-up Testing
   1. Construct full-scale mock-up of typical air/moisture barrier and EIFS/window wall assembly with specified tools and materials and test air and water infiltration and structural performance in accordance with ASTM E 283, ASTM E 331 and ASTM E 330, respectively, through independent laboratory. Mock-up shall comply with requirements of project specifications. Where mock-up is tested at job site maintain approved mock-up at site as reference standard. If tested off-site accurately record construction detailing and sequencing of approved mock-up for replication during construction.

E. Inspections
   1. Provide independent third party inspection where required by code or contract documents
   2. Conduct inspections in accordance with code requirements and contract documents

1.7 DELIVERY, STORAGE AND HANDLING

A. Deliver all materials in their original sealed containers bearing manufacturer's name and identification of product

B. Protect coatings (pail products) from freezing and temperatures in excess of 90°F (32° C). Store away from direct sunlight.

C. Protect Portland cement based materials (bag products) from moisture and humidity. Store under cover off the ground in a dry location.

1.8 PROJECT SITE CONDITIONS

A. Maintain ambient and surface temperatures above 40°F (4°C) during application and drying period, minimum 24
hours after application of Air/Moisture barrier and EIFS products

b. Provide supplementary heat for installation in temperatures less than 40°F (4°C)

c. Provide protection of surrounding areas and adjacent surfaces from application of products

1.9 COORDINATION SCHEDULING:

a. Provide site grading such that the EIFS terminates above grade a minimum of 6 inches (150 mm) or as required by code

b. Coordinate installation of foundation waterproofing, roofing membrane, windows, doors and other wall penetrations to provide a continuously connected air and moisture barrier

c. Provide protection of rough openings before installing windows, doors, and other penetrations through the wall

d. Install window and door head flashing immediately after windows and doors are installed

e. Install diverter flashings wherever water can enter the wall assembly to direct water to the exterior

f. Install splices or tie-ins from air/moisture barrier over back leg of flashings, starter tracks, and similar details to form a shingle lap that directs incidental water to the exterior

g. Install copings and sealant immediately after installation of the EIFS when coatings are dry, and such that, where sealant is applied against the EIFS surface, it is applied against the base coat or primed base coat surface

h. Schedule work such that air/moisture barrier is exposed to weather no longer than 30 days

i. Attach penetrations through the EIFS to structural support and provide water tight seal at penetrations

1.10 WARRANTY

b. Provide full manufacturer's standard system, material and
installation warranty. Term 11 years.

PART 2 PRODUCTS

1.11 MANUFACTURERS

A. Provide Air/Moisture Barrier and EIFS coatings and accessories from single source manufacturer or approved supplier

B. The following are acceptable manufacturers:
   1. Sto Corp. – Air/Moisture Barrier, EIFS
   2. Plastic Components, Inc. – EIFS Accessories

1.12 AIR/MOISTURE BARRIER

A. StoGuard®
   1. Joint Treatment, Rough Opening Protection, and Detail Components:
      a. Sto Gold Fill® – ready mixed coating applied by trowel or knife for rough opening protection of frame walls and joint treatment of sheathing when used with StoGuard Mesh. Also used as a detail component with StoGuard Mesh to splice over back flange of starter track, flashing, and similar ship lap details
      b. Sto Gold Coat® – ready mixed coating applied by brush, roller or spray for rough opening protection of frame walls and joint treatment of sheathing when used with StoGuard Fabric. Also used as a detail component with StoGuard Fabric to splice over back flange of starter track, flashing, and similar ship lap details
      c. StoGuard RapidFill™ – one component rapid drying gun-applied joint treatment for sheathing. Also used at static transition joints or seams in construction and to seal fish mouths, wrinkles, seams, gaps, holes, or other voids in StoGuard air barrier materials. Also used as a detail component to splice over back flange of starter track, flashing, and similar ship lap details
      d. StoGuard RapidSeal™ – one component rapid drying gun-applied rough opening protection for frame and CMU walls without mesh or fabric reinforcement. Also used as a joint treatment for sheathing when used with StoGuard Mesh. Also used to seal fish mouths, wrinkles, seams, gaps, holes, or other voids in StoGuard air barrier materials

3. Transition Membrane: StoGuard Transition Membrane – flexible air barrier membrane for continuity at transitions such as sheathing to foundation, dissimilar materials (CMU to frame wall), wall to balcony floor slab or ceiling, flashing shingle lap transitions, floor line deflection joints, masonry control joints, and through wall joints in masonry or frame construction.

1.13 ADHESIVE

A. Sto BTS Plus – factory blended one-component polymer-modified portland cement based high build adhesive.

1.14 INSULATION BOARD

G. Sto EPS Insulation Board: nominal 1.0 lb/ft³ (16 kg/m³) Expanded Polystyrene (EPS) insulation board in compliance with ASTM E 2430 and ASTM C 578 Type I requirements and listed, labeled, and furnished in accordance with Section 1.06C.

1.15 BASE COAT

A. Cementitious Base Coat

1. Sto BTS Plus – factory blended one component polymer modified portland cement based high build base coat. Also used as a leveler for concrete and masonry surfaces.

B. Waterproof Base Coat

1. Sto Watertight Coat – pre-packaged two component fiber reinforced acrylic based waterproof base coat (for use as a waterproof base coat over Sto BTS Plus or BTS Xtra for foundations, parapets, splash areas, trim and other projecting architectural features).

1.16 REINFORCING MESHES

A. Standard Mesh.
1. Sto Mesh – nominal 4.5 oz/yd\(^2\) (153 g/m\(^2\)), symmetrical, interlaced open-weave glass fiber fabric made with alkaline resistant coating for compatibility with Sto materials

b. High Impact Mesh

1. Sto Intermediate Mesh – nominal 11.2 oz./yd\(^2\) (380 g/m\(^2\)), high impact, interwoven, open weave glass fiber fabric with alkaline resistant coating for compatibility with Sto

c. Ultra-High Impact Mesh

1. Sto Armor Mat – nominal 15 oz/yd\(^2\) (509 g/m\(^2\)), ultra-high impact, double strand, interwoven, open-weave glass fiber fabric with alkaline resistant coating for compatibility with Sto materials Install under Sto Mesh at all areas within 6’-0” of Finish Floor.

d. Specialty Meshes

1. Sto Detail Mesh – nominal 4.2 oz/yd\(^2\) (143 g/m\(^2\)), flexible, symmetrical, interlaced glass fiber fabric, with alkaline resistant coating for compatibility with Sto materials

1.17 PRIMER

A. Sto Primer Sand – acrylic based tintable primer with sand for roller application

B. Sto Primer Smooth – acrylic based tintable primer for spray application

1.18 FINISH COAT

A. Stolit® – acrylic based textured wall finish with graded marble aggregate

1.19 JOB MIXED INGREDIENTS

A. Water – clean and potable
B. Portland cement – Type I, Type II, or Type I-II in conformance with ASTM C 150

1.20 ACCESSORIES

A. Starter Track – Rigid PVC (polyvinyl chloride) plastic track Part No. STDE as furnished by Plastic Components, Inc., 9051 NW 97th Terrace, Miami, Florida 33178 (800 327-7077) or equivalent

1.21 MIXING

A. Sto Gold Fill – mix with a clean, rust-free high speed mixer to a uniform consistency

B. Sto Gold Coat – mix with a clean, rust-free high speed mixer to a uniform consistency

C. Sto BTS Plus – mix ratio with water: 5-6.5 quarts (4.7-6.2 L) of water per 47 pound (21.3 kg) bag of Sto BTS Plus. Pour water into a clean mixing pail. Add Sto BTS Plus, mix to a uniform consistency and allow to set for approximately 5 minutes. Adjust mix if necessary with additional Sto BTS Plus or water and remix to a uniform trowel consistency. Avoid retempering. Keep mix ratio consistent. Do not exceed maximum water amount in mix ratio.

D. Sto BTS Xtra – mix ratio with water: 4.75-5 quarts (4.5-4.7 L) of clean potable water per 38 pound (17.2 kg) bag of Sto BTS Xtra. Pour water into a clean mixing pail. Add Sto BTS Xtra, mix to a uniform consistency and allow to set for approximately 5 minutes. Adjust mix if necessary with additional Sto BTS Xtra or water and remix to a uniform trowel consistency. Avoid retempering. Keep mix ratio consistent. Do not exceed maximum amount of water in mix ratio.

E. Sto Flexyl – mix ratio with portland cement: 1:1 ratio by weight. Pour Sto Flexyl into a clean mixing pail. Add portland cement, mix to a uniform consistency and allow to set for approximately five minutes. Adjust mix if necessary with additional Sto Flexyl and remix to a uniform trowel consistency. Avoid retempering. Keep mix ratio consistent.
F. Sto Watertight Coat – pour liquid component into a clean mixing pail. Add dry component, mix to a uniform consistency and allow to set for approximately five minutes. Adjust mix if necessary and remix to a uniform trowel consistency. Avoid retempering. Keep mix ratio consistent.

G. Sto primer – mix with a clean, rust-free high speed mixer to a uniform consistency

H. Stolit – mix with a clean, rust-free high speed mixer to a uniform consistency. A small amount of water may be added to adjust workability. Limit addition of water to amount needed to achieve the finish texture.

I. Mix only as much material as can readily be used

J. Do not use anti-freeze compounds or other additives

PART 3 EXECUTION

1.22 ACCEPTABLE INSTALLERS

A. Prequalify under Quality Assurance requirements of this specification (section 1.06 B)

1.23 EXAMINATION

A. Inspect concrete and masonry substrates prior to start of application for:

1. Contamination—algae, chalkiness, dirt, dust, efflorescence, form oil, fungus, grease, laitance, mildew or other foreign substances

2. Surface absorption and chalkiness

3. Cracks—measure crack width and record location of cracks

4. Damage and deterioration such as voids, honeycombs and spalls

5. Moisture content and moisture damage—use a moisture meter to determine if the surface is dry enough to receive the products and record any areas of moisture damage

6. Compliance with specification tolerances—record areas that are out of tolerance (greater than ¼ inch in 8-0 feet
B. Inspect sheathing application for compliance with applicable requirement and installation in conformance with specification and manufacturer requirements:

1. Glass Mat Faced gypsum sheathing compliant with ASTM C 1177

2. Exterior Grade and Exposure I wood based sheathing – APA Engineered Wood Association E 30

3. Cementitious sheathing – consult manufacturer

4. Attachment into structural supports with adjoining sheets abutted (gapped if wood-based sheathing) and fasteners at required spacing to resist design wind pressures as determined by design professional

5. Fasteners seated flush with sheathing surface and not over-driven

C. Report deviations from the requirements of project specifications or other conditions that might adversely affect the Air/Moisture Barrier and the EIFS installation to the General Contractor. Do not start work until deviations are corrected.

1.24 SURFACE PREPARATION

A. Remove surface contaminants on concrete, concrete masonry, gypsum sheathing, or coated gypsum sheathing surfaces

B. Repair cracks, spalls or damage in concrete and concrete masonry surfaces and level concrete and masonry surfaces to comply with required tolerances

C. Apply conditioner (consult Sto) by spray or roller to chalking or excessively absorptive surfaces or pressure wash to remove surface chalkiness

D. Remove fasteners that are not anchored into supporting construction and seal holes with air barrier material

E. Seal over-driven fasteners with air barrier material and
install additional fasteners as needed to comply with fastener spacing requirement

F. Fill large gaps between sheathing or voids around pipe, conduit, scupper, and similar penetrations with spray foam and shave flush with surface (refer to Sto Details)

G. Replace weather-damaged sheathing and repair or replace damaged or cracked sheathing

1.25 INSTALLATION

NOTE: The air/moisture barrier described below is one set of materials in the air barrier system and the moisture protection for the structure. Installation of the air/moisture barrier must be integrated with flashing and other air and moisture barrier materials to ensure that where water is likely to penetrate the wall assembly, it will be drained to the exterior at the source of the leak. Proper air barrier connections and integration of the air/moisture barrier through proper sequencing of work and coordination of trades is necessary for a complete air barrier system and complete moisture protection.

IMPORTANT: Ensure the air/moisture barrier surface (Sto Gold Coat), insulation board surface, and reinforced base coat surface are free of surface contamination. Install Sto EPS Insulation Board within 30 days of the application of Sto Gold Coat, or clean the surface and recoat with Sto Gold Coat.

1.25.1 Air/Moisture Barrier Installation over Exterior or Exposure I Wood-Based Sheathing (Plywood and OSB), Glass Mat Faced Gypsum Sheathing in Compliance with ASTM C 1177, and Concrete, or Concrete Masonry (CMU) Wall Construction

A. Transition Detailing with StoGuard Transition Membrane

At floor line deflection joints up to 1 inch (25 mm) wide, and static joints and transitions such as: sheathing to foundation, dissimilar materials (i.e., CMU to frame wall), flashing shingle-lap transitions, and wall to balcony floor slab or ceiling:

1. Apply waterproof coating (Sto Gold Coat) liberally to properly prepared surfaces with brush, roller, or spray.

2. Place pre-cut lengths of StoGuard Transition Membrane centered over the transition in the wet coating. At changes in plane crease the membrane and similarly place the membrane material in the wet coating. At floor line deflection joints achieve a slightly concave profile (recessed into the joint) of the membrane.

3. Immediately top coat the membrane with additional coating and apply pressure with brush or roller to fully embed the
membrane in the coating and achieve a smooth and wrinkle-free surface without gaps or voids.

4. Apply coating liberally along all top horizontal edges on walls and along all edges on balcony floor slabs to fully seal the edges.

5. Overlap minimum 2 inches (51 mm) at ends and adhere lap seams together with coating. Shingle lap vertical seams and vertical to horizontal intersections with minimum 2 inch (51 mm) overlap.

At movement joints up to 1 inch (25 mm) wide with up to + 50% movement such as masonry control joints, and through wall joints in masonry or frame construction:

1. Insert backer rod sized to friction fit in the joint (diameter 25% greater than joint width).

6. Recess the backer rod ½ inch (13 mm).

7. Apply the waterproof coating liberally to properly prepared surfaces with brush, roller, or spray along the outer surface on each side of the joint (not in the joint).

8. Immediately place the membrane by looping it into the joint against the backer rod surface to provide slack.

9. Embed the membrane in the wet coating along the outer surface on the sides of the joint by top coating with additional coating material and applying pressure with a brush or roller.

For all applications, after the membrane installation is complete and the waterproof coating is dry:

1. Apply a final liberal coat of the waterproof coating to all top horizontal edges on walls to ensure waterproofing integrity. Similarly apply coating at all edges on balcony floor slabs.

10. Inspect the installed membrane for fish mouths, wrinkles, gaps, holes or other deficiencies. Correct fish mouths or wrinkles by cutting, then embedding the area with additional coating applied under and over the membrane.

11. Seal gaps, holes, and complex geometries at three dimensional corners with StoGuard, RapidFill or StoGuard RapidSeal.
b. Transition Detailing with StoGuard RapidFill

At flashing shingle laps, and through wall penetrations such as pipes, electrical boxes, and scupper penetrations:

1. Flashing leg or penetration flange must be seated flat against the wall surface without gaps. Apply StoGuard RapidFill liberally with a caulking gun in a zig-zag pattern across the flashing leg or flange/wall surface seam and spread to a thickness that covers the flange and fastener penetrations and directs water away from the wall. Extend application minimum 1 inch (25 mm) onto both surfaces (flashing leg/flange and wall surface).

2. At through wall penetrations without flanges ensure the penetrating element (i.e., pipe or scupper) is fitted snug against abutting wall surfaces. Apply a fillet bead with a caulking gun around the penetration and tool against both surfaces (penetration and wall surface) to create a bead profile that directs water away from the penetration. Extend application minimum 1 inch (25 mm) onto both surfaces.

c. Rough Opening Protection:

1. StoGuard RapidSeal: apply a generous bead of StoGuard RapidSeal with a caulking gun in a zig-zag pattern along the inside and outside surface of the rough opening. Spread with a 6 inch (152 mm) wide plastic drywall knife all the way around the opening (refer to Sto Details 20.20R and 21.20R)

d. Sheathing Joint Treatment

1. Sto Gold Fill with StoGuard Mesh: place 4 inch (102 mm) wide mesh centered along sheathing joints and minimum 9 inch (229 mm) wide mesh centered and folded at inside and outside corners. Immediately apply Sto Gold Fill by spray or trowel and spread with a trowel to create a smooth surface that completely covers the mesh.

2. Sto Gold Coat with StoGuard Fabric: apply Sto Gold Coat liberally by spray or roller along sheathing joints and immediately place 4 inch (102 mm) wide fabric centered over the joints into the wet coating, and 6 inch (152 mm) wide fabric centered and folded at inside and outside corners into the wet coating. Smooth any wrinkles with a brush or roller and apply
additional coating to completely embed the fabric. Overlap seams minimum 2 inches (51 mm).

3. StoGuard RapidFill: apply a thick bead of StoGuard RapidFill with a caulking gun along sheathing joints, or apply in a zig-zag pattern across and down the joints. Spread to a uniform thickness of 20-30 mils (0.5-0.6 mm). Spread 1 inch (25 mm) beyond the sheathing joint on each side. Follow the same procedure for inside and outside corners.

c. Air/Moisture Barrier Coating Installation

1. Plywood and Gypsum Sheathing: apply waterproof coating by spray or roller over sheathing surface, including the dry joint treatment, rough opening protection, and transition areas, to a uniform wet mil thickness of 10 mils in one coat. Use ½ inch (13 mm) nap roller for plywood. Use ¾ inch (19 mm) nap roller for glass mat faced gypsum sheathing. Protect from weather until dry.

2. OSB Sheathing: apply waterproof coating by spray or with a ¾ inch (19 mm) nap roller to sheathing surface to a uniform wet mil thickness of 10 mils. Protect rough openings, joints, and parapets (Paragraph 3.04D), then apply a second coat of waterproof coating.

3. CMU Surfaces:
   a. Repair static cracks up to 1/2 inch (13 mm) wide with StoGuard RapidFill. Rake the crack with a sharp tool to remove loose or friable material and blow clean with oil-free compressed air. Apply the crack filler with a trowel or putty knife over the crack and tool the surface smooth. *(Note: For moving cracks or cracks larger than ½ inch [13mm]), consult with a structural engineer for repair method).* Protect repair from weather until dry.
b. Liberally apply two coats of Sto Gold Coat to the surface with a ¾ inch nap roller or spray equipment to a minimum wet thickness of 10 – 30 mils each, depending on surface condition. Additional coats may be necessary to provide a void and pinhole free surface. Protect from weather until dry.

q. Air /Moisture Barrier Connections and Shingle Laps
   1. Coordinate installation of connecting air barrier components with other trades to provide a continuous air tight membrane.
   2. Coordinate installation of flashing and other moisture protection components with other trades to achieve complete moisture protection such that water is directed to the exterior, not into the wall assembly, and drained to the exterior at sources of leaks (windows, doors and similar penetrations through the wall assembly).
   3. Splice-in head flashings above windows, doors, floor lines, roof/sidewall step flashing, and similar locations with StoGuard detail component to achieve shingle lap of the air/moisture barrier such that water is directed to the exterior.

1.25.2 EIFS Installation

A. Starter Track
   1. Strike a level line at the base of the wall to mark where the top of the starter track terminates.
   2. Attach the starter track even with the line into structural supports with the proper fastener: Type S-12 corrosion resistant screws for steel framing with minimum 3/8 inch (9 mm) and three thread penetration, galvanized or zinc coated nails for wood framing with minimum 3/4 inch (19 mm) penetration, and corrosion resistant concrete or masonry screws with minimum 1 inch (25 mm) penetration for concrete or CMU. Attach between studs into blocking as needed to secure the track flat against the wall surface. Attach at maximum 16 inches (406 mm) on center into framing. For solid wood sheathing or concrete/masonry surfaces, attach directly at 12 inches (305 mm) on center maximum.
   3. Butt sections of starter track together. Miter cut outside corners and abut. Snip front flange of one inside corner piece (to allow EPS insulation board to be seated inside of track) and abut.
   4. Install Starter Track at other EIFS terminations as designated
on detail drawings: above roof along dormers or gable end walls, and beneath window sills with concealed flashing (refer to Sto Details).

B. Detail Splice Strips for Starter Track, Flashing at Floor Lines, Head of Windows and Doors
1. Starter Track, Window/Door Head Flashing, Floor Line Flashing, and Roof/Side Wall Step Flashing: Install minimum 4 inch (100 mm) wide detail component over back flange of starter track, floor line flashing, head flashing, and roof/side wall step flashing. Center the detail component so it spans evenly between the back leg of flashing (or accessory) and the coated sheathing. Make a smooth transition to the coated sheathing with a trowel, knife, or roller, depending on the detail component material being used. When Sto Gold Fill with StoGuard Mesh is the detail component apply another coat of the waterproof coating over the detail area. Do not leave detail components exposed for more than 30 days.

BA Backwrapping
1. Apply a strip of detail mesh to the dry air/moisture barrier at all system terminations (windows, doors, expansion joints, etc.) except where the Starter Track is installed. The mesh must be wide enough to adhere approximately 4 inches (100 mm) of mesh onto the wall, be able to wrap around the insulation board edge and cover a minimum of 2 ½ inches (64 mm) on the outside surface of the insulation board. Attach mesh strips to the air/moisture barrier and allow them to dangle until the backwrap procedure is completed (paragraph 3.04 G1). Alternatively, pre-wrap terminating edges of insulation board.

c. Adhesive Application and Installation of Insulation Board
1. Ensure the air/moisture barrier surface (Sto Gold Coat) is free of surface contamination. Install the insulation board within 30 days of the application of the air/moisture barrier coating (Sto Gold Coat), or clean the surface and recoat with Sto Gold Coat.

2. Rasp the interior lower face of insulation boards to provide a snug friction fit into the Starter Track. *(Note: rasping prevents an outward bow at the Starter Track).*

3. Use either polyurethane spray foam adhesive (StoTurboStick) or cementitous adhesive (Sto BTS Plus or Sto BTS Xtra):
a. **Polyurethane Spray Foam Adhesive (Sto TurboStick):** apply adhesive to the back of the insulation board with the dispensing pistol approximately \( \frac{3}{4} \) inch (19 mm) from ends. Apply 5 additional ribbons spaced equally at no greater than 7 inches (177 mm) apart between the end ribbons. Apply uniform ribbons of adhesive parallel with the SHORT dimension of the board so that when boards are placed on the wall the ribbons will be VERTICAL. Apply adhesive ribbons approximately \( \frac{1}{2} \) inch (51 mm) in diameter which will expand to \( \frac{3}{4} - 1 \) inch (19 – 25 mm). Keep adhesive \( \frac{1}{2} \) inch (51 mm) short of board edges. Apply adhesive uniformly so ribbons of adhesive do not converge. Allow adhesive to “dwell” and become “tacky” before placing boards on wall. Adhesive will look smooth, not jagged, when ready to apply to wall surface. Place boards while adhesive is “tacky” and before adhesive “skins”.

Place insulation boards in a running bond pattern on the wall with the long dimension horizontal. Start by inserting the lower edge of the boards inside the starter track at the base of the wall until they contact the bottom of the track. Apply light pressure when placing the boards. After boards have been in place for 5-10 minutes use a straight edge to lightly press the boards inward and keep board joints flush, as post expansion of the adhesive may force boards slightly outward.

b. **Cementitious Adhesive (Sto BTS Plus or Sto BTS Xtra):** apply adhesive to the back of the insulation board with the proper size (1/2 x \( \frac{1}{2} \) x 2 inch [13 x 13 x 51 mm]) stainless steel notched trowel. Apply uniform ribbons of adhesive parallel with the SHORT dimension of the board so that when boards are placed on the wall the ribbons will be VERTICAL. Apply adhesive uniformly so ribbons of adhesive do not converge. Immediately place insulation boards in a running bond pattern on the wall with the long dimension horizontal. Start by inserting the lower edge of the boards inside the starter track at the base of the wall until they contact the bottom of the track. Apply firm pressure over the entire surface of the boards to ensure uniform contact of adhesive. IMPORTANT: do not delay installation once adhesive is applied. If adhesive “skins” remove it and apply fresh adhesive.

4. **Bridge sheathing joints by a minimum of 6 inches (152 mm).** Interlock inside and outside corners.

5. **Butt all board joints tightly together to eliminate any thermal breaks.** Care must be taken to prevent any adhesive from getting between the joints of the boards.

6. **Cut insulation board in an L-shaped pattern to fit around openings.** Do not align board joints with corners of openings.

7. **Check for satisfactory contact of the insulation board with the substrate.** If any boards have loose areas use the spray foam adhesive dispensing pistol to create a hole through the board and inject adhesive to attach the loose area. Allow the adhesive to expand to the outer face of the board while withdrawing the pistol. Cut excess adhesive flush with the surface of the insulation. Do not
use nails, screws, or any other type of non-thermal mechanical fastener.

D. Slivering and Rasping of Insulation Board Surface
   1. Make sure insulation boards are fully adhered to the substrate before proceeding to steps 3.04 E2 and 3.04 E3 below.
   2. Fill any open joints in the insulation board layer with slivers of insulation or the spray foam adhesive.
   3. Rasp the insulation board surface to achieve a smooth, even surface and to remove any ultraviolet ray damage.

E. Trim, Reveals and Projecting Aesthetic Features
   1. Attach features and trim where designated on drawings with adhesive to a base layer of insulation board or to the coated sheathing surface. Fill any gaps between the trim and base layer of insulation with spray foam adhesive and rasp flush with the trim surface. Slope the top surface of all trim/features minimum 1:2 (27°) and the bottom of all horizontal reveals minimum 1:2 (27°).
   2. Cut reveals/aesthetic grooves with a hot-knife, router or groove-tool in locations indicated on drawings.
   3. Offset reveals/aesthetic grooves minimum 3 inches (75 mm) from insulation board joints.
   4. Do not locate reveals/aesthetic grooves at high stress areas.
   5. Ensure minimum ¾ inch (19 mm) thickness of insulation board at the bottom of the reveals/aesthetic grooves.

F. Completion of Backwrapping
   1. Complete the backwrapping procedure by applying base coat to exposed edges of insulation board and approximately 4 inches (100 mm) onto the face of the insulation board. Pull mesh tight around the board and embed it in the base coat with a stainless steel trowel. Use a corner trowel for clean, straight lines. Smooth any wrinkles or gaps in the mesh.

G. Base Coat and Reinforcing Mesh Application
   1. Ensure the insulation board is firmly adhered and free of surface contamination or UV degradation, and is thoroughly rasped before commencing the base coat application.
2. Apply minimum 9x12 inch (225x300 mm) diagonal strips of detail mesh at corners of windows, doors, and all penetrations through the system. Embed the strips in wet base coat and trowel from the center to the edges of the mesh to avoid wrinkles.

3. Apply detail mesh at trim, reveals and projecting architectural features. Embed the mesh in the wet base coat. Trowel from the base of reveals to the edges of the mesh.

4. Ultra-High impact mesh: apply base coat over the insulation board with a stainless steel trowel to a uniform thickness of approximately 1/8 inch (3 mm). Work horizontally or vertically in strips of 40 inches (1016 mm), and immediately embed the mesh into the wet base coat by troweling from the center to the edge of the mesh. Butt ultra-high impact mesh at seams. Allow the base coat to dry.

5. Standard mesh application: Apply base coat over the insulation board, including areas with Ultra-High impact mesh, with a stainless steel trowel to a uniform thickness of approximately 3/4 inch (3 mm). Work horizontally or vertically in strips of 40 inches (1016 mm), and immediately embed the mesh into the wet base coat by troweling from the center to the edge of the mesh. Overlap mesh not less than 2-½ inches (64 mm) at mesh seams and at overlaps of detail mesh. Feather seams and edges. Double wrap all inside and outside corners with minimum 2-½ inch (64 mm) overlap in each direction. Avoid wrinkles in the mesh. The mesh must be fully embedded so that no mesh color shows through the base coat when it is dry. Re-skim with additional base coat if mesh color is visible.

6. Sloped Surfaces: for trim, reveals, aesthetic bands, cornice profiles, sills or other architectural features that project beyond the vertical wall plane more than 2 inches (51 mm) apply waterproof base coat with a stainless steel trowel to the sloped surface and minimum four inches (100 mm) above and below it. Embed standard mesh or detail mesh in the waterproof base coat and overlap mesh seams a minimum of 2-½ inches (65 mm).

7. Allow base coat to thoroughly dry before applying primer or finish.

H. Primer application

1. Ensure the base coat surface is free of surface contamination before commencing the primer application.

2. Apply primer evenly with brush, roller or proper spray
equipment over the clean, dry base coat and allow to dry thoroughly before applying finish.

1. Finish Coat Application
   1. Ensure the base coat surface or primed base coat is free of surface contamination before commencing the finish application.
   2. Apply finish directly over the base coat or primed base coat when dry. Apply finish by spray or stainless steel trowel, depending on the finish specified. Follow these general rules for application of finish:
      a. Avoid application in direct sunlight.
      b. Apply finish in a continuous application, and work to an architectural break in the wall.
      c. Weather conditions affect application and drying time. Hot or dry conditions limit working time and accelerate drying. Adjustments in the scheduling of work may be required to achieve desired results. Cool or damp conditions extend working time and retard drying and may require added measures of protection against wind, dust, dirt, rain and freezing. Adjust work schedule and provide protection.
      d. Do not install separate batches of finish side-by-side.
      e. Do not apply finish into or over sealant joints. Apply finish to outside face of wall only.
      f. Do not apply finish over irregular or unprepared surfaces, or surfaces not in compliance with the requirements of the project specifications.

1.26 PROTECTION
   A. Provide protection of installed materials from water infiltration into or behind them
   B. Provide protection of installed materials from dust, dirt, precipitation, freezing and continuous high humidity until they are fully dry

1.27 CLEANING, REPAIR AND MAINTENANCE
   A. Clean and maintain the EIFS for a fresh appearance and to prevent water entry into and behind the system. Repair cracks, impact damage, spalls or delamination promptly.
   B. Maintain adjacent components of construction such as sealants, windows, doors, and flashing, to prevent water entry into or behind the EIFS and anywhere into the wall assembly
c. Refer to Sto reStore Repair and Maintenance Guide (reStore Program) for detailed information on restoration – cleaning, repairs, recoating, resurfacing and refinishing, or re-cladding
PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Adhered TPO membrane roofing system for installation over new steel deck.

1. Remove existing roofing, insulation, flashings and edge metal.
2. Fasten polyiso insulation and adhere cover board.
3. Adhere JM TPO 60 to cover board.
4. Install new edge metal to be included in manufacturer warranty.
5. Provide 20-year manufacturer warranty.

1.2 REFERENCES

A. Roofing Terminology: Refer to the following publications for definitions of roofing work related terms in this Section:

3. Roof Consultants Institute “Glossary of Building Envelope Terms.”


1.3 DESIGN CRITERIA

A. General: Installed roofing membrane system shall remain watertight; and resist specified wind uplift pressures, thermally induced movement, and exposure to weather without failure.

B. Material Compatibility: Roofing materials shall be compatible with one another under conditions of service and application required, as demonstrated by roofing system manufacturer based on testing and field experience.

C. Installer must comply with current code requirements based on authority having jurisdiction.

D. Wind Uplift Performance: Roofing system shall be identical to systems that have been successfully tested by a qualified testing and inspecting agency to resist wind uplift pressure calculated in accordance with ASCE 7.

   c. Maximum Design Pressure: -45 psf, Lim. 7

E. Fire-Test-Response Characteristics: Provide roofing materials with the fire-test-response characteristics indicated as determined by testing identical products per test method below by UL, FMG or another testing
and inspecting agency acceptable to authorities having jurisdiction. Materials shall be identified with appropriate markings of applicable testing and inspecting agency.

1. Exterior Fire-Test Exposure: Class A; ASTM E 108, for application and roof slopes indicated.

1.4 SUBMITTALS

A. Product Data: Manufacturer’s data sheets for each product to be provided. Florida Product Approval evaluation report and documentation.

B. Detail Drawings: Provide roofing system plans, elevations, sections, details, and details of attachment to other Work, including:

1. Base flashings and membrane terminations.
2. Tapered insulation, including slopes.
3. Crickets, saddles, and tapered edge strips, including slopes.
4. Insulation fastening and adhesive patterns.

C. Verification Samples: Provide for each product specified.

D. Installer Certificates: Signed by roofing system manufacturer certifying that Installer is approved, authorized, or licensed by manufacturer to install roofing system.

E. Maintenance Data: Refer to Johns Manville’s latest published documents on www.JM.com.

F. Guarantees: Provide manufacturer’s current guarantee specimen.

G. Prior to roofing system installation, roofing sub-contractor shall provide a copy of the Guarantee Application Confirmation document issued by Johns Manville Roofing Systems indicating that the project has been reviewed for eligibility to receive the specified guarantee and registered.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer’s product and that is eligible to receive the specified manufacturer’s guarantee.

B. Manufacturer Qualifications: Qualified manufacturer that has UL listing for roofing system identical to that used for this Project.

C. Testing Agency Qualifications: An independent testing agency with the experience and capability to conduct the testing indicated, as documented according to ASTM E 329.

D. Test Reports:

1. Roof drain and leader test or submit plumber’s verification.

E. Source Limitations: Obtain all components from the single source roofing manufacturer guaranteeing the roofing system. All products used in the system must be labeled by the single source roofing manufacturer issuing the guarantee.
1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver roofing materials in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, and directions for storage.

B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer.

C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.

D. Handle and store roofing materials and place equipment in a manner to avoid permanent deflection of deck.

1.7 PROJECT CONDITIONS

A. Weather Limitations: Proceed with installation only when current and forecasted weather conditions permit roofing system to be installed in accordance with manufacturer's written instructions and guarantee requirements.

1.8 GUARANTEE

A. Provide manufacturer's system guarantee equal to Johns Manville’s Peak Advantage No Dollar Limit Roofing System Guarantee.

1. Single-Source special guarantee includes roofing membrane, base flashings, roofing membrane accessories, roof insulation, fasteners, walkway products, manufacturer's edge metal products, and other single-source components of roofing system marketed by the manufacturer.

2. Guarantee Period: 20 years from date of Substantial Completion.

B. Installer’s Guarantee: Submit roofing Installer's guarantee, including all components of roofing system for the following guarantee period:

1. Guarantee Period: Two years from date of Substantial Completion.

C. Existing Guarantees: Guarantees on existing building elements should not be affected by scope of work.

1. Installer is responsible for coordinating with building owner's representative to verify compliance.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

A. Basis of Design: Johns Manville Corporation

B. Substitutions: Products and Systems meeting the performance and quality standards acceptable manufacturers:

1. Firestone Building Products
2. Carlisle Syntec Systems
3. GAF Everguard

2.2 THERMOPLASTIC POLYOLEFIN ROOFING MEMBRANE – TPO
      1. Exposed Face Color: White
      2. Membrane Thickness: 60 mils, nominal

2.3 AUXILIARY ROOFING MATERIALS – SINGLE PLY
   A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with membrane roofing.
      1. Liquid-type auxiliary materials shall meet VOC limits of authorities having jurisdiction.
   B. Sheet Flashing: Manufacturer's internally reinforced or scrim reinforced, smooth backed membrane with same thickness and color as sheet membrane. Basis of Design: JM TPO
   C. Bonding Adhesive: Manufacturer's standard solvent-based bonding adhesive for field of roof and base flashings. Basis of Design: JM Membrane Bonding Adhesive (TPO&EPDM), JM LVOC Membrane Adhesive (TPO & EPDM), JM TPO Water Based Membrane Adhesive
   D. Metal Termination Bars: Manufacturer's standard predrilled stainless-steel or aluminum bars, with anchors. Basis of Design: JM Termination Systems
   E. Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening membrane to substrate, and acceptable to membrane roofing system manufacturer.
   F. Miscellaneous Accessories: Provide pourable sealers, primers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, cover strips, and other accessories required for full installation.

2.4 WALKWAYS

2.5 COVER BOARD
   A. High-Density Polyisocyanurate: ASTM C 1289, Type II, Class 4, Grade 1, High-density Polyisocyanurate technology bonded in-line to inorganic coated glass facers with greater than 80 lbs of compressive strength. Board must be able to achieve a FM 1-90 utilizing a maximum of eight fasteners per 4’x 8’ board with an adhered reinforced single-ply membrane over a minimum 22-gauge steel deck. Basis of Design: ProtectoR HD
      1. Thickness: 1/2 inch (13 mm)
      2. R-value: 2.5
2.6 ROOF INSULATION

A. General: Preformed roof insulation boards that comply with requirements and referenced standards, selected from manufacturer's standard sizes and of thicknesses indicated.

B. Polyisocyanurate Board Insulation: ASTM C 1289, Type II, Class 1, Grade 2 (20 psi), Basis of Design: ENERGY 3
   1. Provide insulation package in 2 layers of 2.4 inches to achieve R-30.

C. Tapered Insulation: ASTM C 1289, Type II, Class 1, Grade 2 (20 psi), provide factory-tapered insulation boards fabricated to slope of 1/4 inch per 12 inches (1:48), unless otherwise indicated. Basis of Design: Tapered ENERGY 3

2.7 INSULATION ACCESSORIES

A. General: Roof insulation accessories recommended by insulation manufacturer for intended use and compatible with membrane roofing.

B. Provide factory preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated.

C. Provide factory preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated. Basis of Design: Diamondback Pre-Cut Cricket, Diamondback Pre-Cut Miter, Tapered Fesco Edge Strip

D. Urethane Adhesive: Manufacturer's two component polyurethane adhesive formulated to adhere insulation to substrate. Basis of Design: JM Two-Part Urethane Insulation Adhesive (UIA)

E. Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening roof insulation to substrate, and furnished by roofing system manufacturer. Basis of Design: UltraFast Fasteners and Plates

F. Wood Nailer Strips: Comply with requirements in Division 06 Section "Miscellaneous Rough Carpentry."

2.8 AUXILIARY ROOFING SYSTEM COMPONENTS

A. Expansion Joints: Provide factory fabricated weatherproof, exterior covers for expansion joint openings consisting of flexible rubber membrane, supported by a closed cell foam to form flexible bellows, with two metal flanges, adhesively and mechanically combined to the bellows by a bifurcation process. Provide product manufactured and marketed by single-source membrane supplier that is included in the No Dollar Limit guarantee. Basis of Design: Expand-O-Flash

B. Coping System: Manufacturer's factory fabricated coping consisting of a base piece and a snap-on cap. Provide product manufactured and marketed by single-source membrane supplier that is included in the No Dollar Limit guarantee. Basis of Design: Presto-Lock Coping

C. Fascia System: Manufacturer's factory fabricated fascia consisting of a base piece and a snap-on cover. Provide product manufactured and marketed by single-source membrane supplier that is included in the No Dollar Limit guarantee. Basis of Design: Presto-Tite Edge One Fascia

D. Metal Flashing Sheet: Metal flashing sheet is specified in Division 07 Section "Sheet Metal Flashing and Trim."
PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions for compliance with the requirements affecting performance of roofing system.

1. General:
   
   a. Verify that roof openings and penetrations are in place and set and braced and that roof drains are securely clamped in place.
   
   b. Verify that wood cants, blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.

2. Steel Decks:
   
   a. Verify that surface plane flatness and fastening of steel roof deck complies with requirements in Division 05 Section "Steel Decking."

3. Ensure general rigidity and proper slope for drainage.

4. Verify that deck is securely fastened with no projecting fasteners and with no adjacent units in excess of 1/16 inch (1.6 mm) out of plane relative to adjoining deck.

B. Unacceptable panels should be brought to the attention of the General Contractor and Project Owner’s Representative and must be corrected prior to installation of roofing system.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean and remove from substrate sharp projections, dust, debris, moisture, and other substances detrimental to roofing installation in accordance with roofing system manufacturer's written instructions.

B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction.

C. If applicable, prime surface of deck with asphalt primer at a rate recommended by roofing manufacturer and allow primer to dry.

3.3 INSULATION INSTALLATION

A. Coordinate installation of roof system components so insulation and cover board is not exposed to precipitation or left exposed at the end of the workday.

B. Comply with roofing system manufacturer's written instructions for installation of roof insulation and cover board.

C. Install tapered insulation under area of roofing to conform to slopes indicated.

D. Install insulation boards with long joints in a continuous straight line. Joints should be staggered between rows, abutting edges and ends per manufacturer’s written instructions. Fill gaps exceeding 1/4 inch (6 mm) with like material.
E. Trim surface of insulation boards where necessary at roof drains so completed surface is flush and does not restrict flow of water.

F. Install tapered edge strips at perimeter edges of roof that do not terminate at vertical surfaces.

G. Loose Laid Insulation with Top Insulation Layer Mechanically Fastened: Loose lay insulation with staggered joints and secure top layer of insulation to deck using mechanical fasteners designed and sized for fastening specified board-type to deck type.
   1. Fasten top layer to resist uplift pressure at corners, perimeter, and field of roof.

H. Adhered Cover Board: Adhere cover board to substrate as follows:
   1. Install in a two-part urethane adhesive according to roofing system manufacturer's instruction.
   2. Install to resist uplift pressure at corners, perimeter, and field of roof.

3.4 ROOFING MEMBRANE INSTALLATION, GENERAL

A. Install roofing membrane in accordance with roofing system manufacturer's written instructions, applicable recommendations of the roofing manufacturer and requirements in this Section.

B. Start installation of roofing membrane in presence of roofing system manufacturer's technical personnel.

C. Cooperate with testing and inspecting agencies engaged or required to perform services for installing roofing system.

D. Coordinate installing roofing system so insulation and other components of the roofing membrane system not permanently exposed are not subjected to precipitation or left uncovered at the end of the workday or when rain is imminent.
   1. Provide tie-offs at end of each day's work to cover exposed roofing membrane sheets and insulation.
   2. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system.
   3. Remove and discard temporary seals before beginning work on adjoining roofing.

3.5 ADHERED ROOFING MEMBRANE INSTALLATION

A. Install roofing membrane over area to receive roofing in accordance with membrane roofing system manufacturer's written instructions.
   1. Unroll roofing membrane and allow to relax before installing.
   2. Install sheet in accordance with roofing system manufacturer's written instructions.

B. Accurately align roofing membrane and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.

C. Bonding Adhesive: Apply solvent-based bonding adhesive to substrate and underside of roofing membrane at rate required by manufacturer and allow to partially dry before installing roofing membrane. Do not apply bonding adhesive to splice area of roofing membrane.

D. Mechanically fasten roofing membrane securely at terminations, penetrations, and perimeter of roofing.
E. Apply roofing membrane with side laps shingled with roof slope, where possible.

F. Seams: Clean seam areas, overlap roofing membrane, and hot-air weld side and end laps of roofing membrane according to manufacturer’s written instructions to ensure a watertight seam installation.
   1. Test lap edges with probe to verify seam weld continuity. Apply lap sealant to seal cut edges of roofing membrane.
   2. Verify field strength of seams a minimum of twice daily and repair seam sample areas.
      a. Remove and repair any unsatisfactory sections before proceeding with installation.
   3. Repair tears, voids, and incorrectly lapped seams in roofing membrane that do not meet requirements.

G. Spread sealant or mastic bed over deck drain flange at deck drains and securely seal roofing membrane in place with clamping ring.

H. Install roofing membrane and auxiliary materials to tie in to existing roofing.

3.6 BASE FLASHING INSTALLATION

A. Install sheet flashings and preformed flashing accessories and adhere to substrates per membrane roofing system manufacturer’s written instructions.

B. Apply solvent-based bonding adhesive at required rate and allow to partially dry. Do not apply bonding adhesive to seam area of flashing.

C. Flash penetrations and field-formed inside and outside corners per manufacturer’s installation instructions.

D. Clean seam areas and overlap and firmly roll sheet flashings into the adhesive. Weld side and end laps to ensure a watertight seam installation.

E. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.

3.7 WALKWAY INSTALLATION

A. Flexible Walkways: Install walkway products in locations indicated. Heat weld and adhere walkway products to substrate according to roofing system manufacturer’s written instructions.

3.8 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to perform roof tests and inspections and to prepare test reports.

B. Final Roof Inspection: Arrange for roofing system manufacturer’s Registered Roof Observer (RRO) to inspect roofing installation on completion and submit report to Architect.
   1. Notify Architect or Owner 48 hours in advance of date and time of inspection.

C. Repair or remove and replace components of roofing system where test results or inspections indicate that they do not comply with specified requirements.
D. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.9 PROTECTION AND CLEANING

A. Protect roofing system from damage and wear during remainder of construction period.

B. Correct deficiencies in or remove roofing system that does not comply with requirements, repair substrates, and repair or reinstall roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.

C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION 075423
SECTION 07620
FLASHING AND SHEET METAL

PART 1 - GENERAL

1.1 DESCRIPTION

A. The extent of each type of flashing and sheet metal work indicated on the drawings and by provisions of this section.

B. The types of work specified in this section include the following:
   1. Metal counter flashing.
   2. Metal wall caps
   3. Metal Scuppers and downspouts.
   4. Exposed metal trip/fascia units
   5. Miscellaneous sheet metal accessories.

C. Integral masonry flashings are Division 4, “Unit Masonry” section.

1.2 SUBMITTALS:

A. Product Data: Submit manufacturer’s product specifications, installation instructions and general recommendations for each specified sheet material and fabricated product.

B. Shop Drawings: Submit shop drawings showing layout, joining, profiles and anchorages of fabricated work, including major counter flashings, scuppers and expansion joint in flashing layouts at ¼” scale, details at 3” scale.

C. Provide 8” square samples of specified sheet materials to be exposed as finished surfaces.

D. Provide 12” long samples of factory-fabricated products exposed as finished work. Provide complete with specified factory finish.

1.3 JOB CONDITIONS

A. Coordinate work of this section with interfacing and adjoining work for proper sequencing of each installation. Ensure best possible weather resistance and durability of the work and protection of materials and finishes.
PART 2 - PRODUCTS

2.1 FLASHING AND SHEET METAL MATERIALS

A. Sheet Metal Flashing/Trim:
   1. Zinc-Coated Steel: Commercial quality with 0.20% copper, ASTM A 525 except
      ASTM A 527 for lock-forming, G90 hot-dip galvanized, mill phosphatized where
      indicated for painting (PNT); 0.0359” thick (20 gauge) except as otherwise
      indicated.

B. Miscellaneous Materials and Accessories:
   1. Solder: For use with steel, provide 50-50 tin/lead solder (ASTM B 32) with rosin flux.
   2. Fasteners: Same metal as flashing/sheet metal or other noncorrosive metal as
      recommended by sheet manufacturer. Match finish of exposed heads with materials
      being fastened.
   3. Mastic Sealant: Polybutylene, non-hardening, non-skinning, nondrying, non-migrating
      sealant.
   4. Elastomeric Sealant: Generic type recommended by manufacturer of metal and fabricator
      of components being sealed; comply with FS TT-S-0027, TT-S-00230, or TT-S-001543.
   5. Metal Accessories: Provide sheet metal clips, straps, anchoring devices and similar
      accessory units as required for installation of work, matching or compatible with material
      being installed and being noncorrosive, size and gauge required for performance.

2.2 FABRICATED UNITS

A. General metal Fabrication: Shop-fabricate work to greatest extent possible. Comply
   with details shown and with applicable requirements of SMACNA “Architectural Sheet
   Metal Manual” and other recognized industry practices. Fabricate for waterproof and
   weather-resistant performance with expansion provisions for running work, sufficient to
   permanently prevent leakage, damage or deterioration of the work. Form work to fit
   substrates. Comply with material manufacturer’s instructions and recommendations.
   Form exposed sheet metal work without excessive oil-canning, buckling and tool
   marks, true to line and levels as indicated with exposed edges folded back to form
   hems.
   1. Seams: Fabricate nonmoving seams in sheet metal with flat-lock seams. Tin edges to be
      seamed, form seams and solder.
   2. Expansion Provisions: Where lapped or bayonet-type expansion provisions in work
      cannot be used or would not be sufficiently water-weatherproof, form expansion joints of
      intermeshing hooked flanges not less than 1” deep, filled with mastic sealant (concealed
      within joints).
   3. Sealant Joints: Where moveable, non-expansion type joints are indicated or required for
      proper installation of elastomeric sealant in compliance with industry standards.
PART 3 - EXECUTION

3.1 INSTALLATION REQUIREMENTS

A. General: Except as otherwise indicated, comply with manufacturer’s installation instructions as recommendation and with SMACNA “Architectural Sheet Metal Manual.” Anchor units of work securely in place by method indicated, providing for thermal expansion of metal units, conceal fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints and seams which will be permanently watertight and weatherproof.

3.2 CLEANING AND PREPERATION

A. Clean exposed metal surfaces, removing substances which might cause corrosion of metal or deterioration of finishes.

B. Protection: Protect flashings and sheet metal work during construction to ensure that work will be without damage or deterioration, other than natural weathering, at time of substantial completion.

END OF SECTION
SECTION 07920
JOINT SEALANTS & WATERPROOFING

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK
A. Work Included: Provide labor, materials and equipment necessary to complete the work of this Section, including but not limited to the following:
   1. Joint sealants and fillers.
   2. Waterproofing membranes.
B. This Section includes joint sealants for the applications specified with the products in this Section and as indicated on the Drawings.
C. Related Work: The following items are not included in this Section and will be performed under the designated Sections:
   1. Section 04200 - UNIT MASONRY for masonry control and expansion joint fillers and gaskets.
   2. Section 08800 - GLAZING for glazing sealants.
   3. Section 09260 - GYPSUM BOARD ASSEMBLIES for sealing perimeter joints of gypsum board partitions to reduce sound transmission.
   4. Section 09511 - ACOUSTICAL PANEL CEILINGS for sealing edge moldings at perimeters of acoustical ceilings.

1.2 PERFORMANCE REQUIREMENTS
A. Provide elastomeric joint sealants that establish and maintain watertight and airtight continuous joint seals without staining or deteriorating joint substrates.
B. Provide joint sealants for interior applications that establish and maintain airtight and water-resistant continuous joint seals without staining or deteriorating joint substrates.

1.3 SUBMITTALS
A. Product Data: For each joint-sealant product indicated.
   1. Manufacturers’ product data for interior sealants, including printed statement of VOC content.
B. Samples for Verification: For each type and color of joint sealant required, provide samples with joint sealants in 1/2 inch wide joints formed between two 6 inch long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.
C. Qualification Data: For Installer.
D. Preconstruction Field Test Reports: Indicate which sealants and joint preparation methods resulted in optimum adhesion to joint substrates based on preconstruction testing specified in “Quality Assurance” Article.
E. Compatibility and Adhesion Test Reports: From sealant manufacturer, indicating the following:
   1. Materials forming joint substrates and joint sealant backings have been tested for compatibility and adhesion with joint sealants.
   2. Interpretation of test results and written recommendations for primers and substrate preparation needed for adhesion.
F. Field Test Report Log: For each elastomeric sealant application.
G. Product Test Reports: Based on comprehensive testing of product formulations performed by a qualified testing agency, indicating that sealants comply with requirements.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer’s authorized Installer who is approved or licensed for installation of elastomeric sealants required for this Project.

B. Source Limitations: Obtain each type of joint sealant through one source from a single manufacturer.

C. Preconstruction Compatibility and Adhesion Testing: Submit to joint sealant manufacturers, for testing indicated below, samples of materials that will contact or affect joint sealants.
   1. Use manufacturer’s standard test method to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.
   2. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.
   3. For materials failing tests, obtain joint sealant manufacturer’s written instructions for corrective measures including use of specially formulated primers.
   4. Testing will not be required if joint sealant manufacturers submit joint preparation data that are based on previous testing of current sealant products for adhesion to, and compatibility with, joint substrates and other materials matching those submitted.

D. Preconstruction Field-Adhesion Testing: Before installing elastomeric sealants, field test their adhesion to Project joint substrates as follows:
   1. Locate test joints where indicated on Project or, if not indicated, as directed by Architect.
   2. Conduct field tests for each application indicated below:
      a. Each type of elastomeric sealant and joint substrate indicated.
      b. Each type of non-elastomeric sealant and joint substrate indicated.
   3. Notify Architect seven days in advance of dates and times when test joints will be erected.
         1) For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.
   4. Report whether sealant in joint connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each type of product and joint substrate. For sealants that fail adhesively, retest until satisfactory adhesion is obtained.
   5. Evaluation of Preconstruction Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing, in absence of other indications of noncompliance with requirements, will be considered satisfactory. Do not use sealants that fail to adhere to joint substrates during testing.

E. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01.

1.5 PROJECT CONDITIONS

A. Do not proceed with installation of joint sealants under the following conditions:
   1. When ambient and substrate temperature conditions are outside limits permitted by joint sealant manufacturer or are below 40 deg F.
2. When joint substrates are wet.
3. Where joint widths are less than those allowed by joint sealant manufacturer for applications indicated.
4. Contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.6 WARRANTY

A. Special Installer’s Warranty: Installer’s standard form in which Installer agrees to repair or replace elastomeric joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Two years from date of Substantial Completion.

B. Special Manufacturer’s Warranty: Manufacturer’s standard form in which elastomeric sealant manufacturer agrees to furnish elastomeric joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion.

C. Special warranties specified in this Article exclude deterioration or failure of elastomeric joint sealants from the following:

1. Movement of the structure resulting in stresses on the sealant exceeding sealant manufacturer’s written specifications for sealant elongation and compression caused by structural settlement or errors attributable to design or construction.
2. Disintegration of joint substrates from natural causes exceeding design specifications.
3. Mechanical damage caused by individuals, tools, or other outside agents.
4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer, based on testing and field experience.

B. VOC Content of Interior Sealants: Provide interior sealants and sealant primers that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):

1. Sealants: 250 g/L.
2. Sealant Primers for Nonporous Substrates: 250 g/L.
3. Sealant Primers for Porous Substrates: 775 g/L.

C. Colors of Exposed Joint Sealants: As indicated by manufacturer’s designations.

2.2 JOINT SEALANTS

A. Elastomeric Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied chemically curing sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.

B. Stain-Test-Response Characteristics: Elastomeric sealants shall be nonstaining to porous substrates. Provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.
C. Single-Component Neutral-Curing Silicone Sealant:

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
   a. Dow Corning Corporation; 790.
   b. GE Silicones; SilPruf LM SCS2700.
   c. Tremco; Spectrem 1.
   d. Pecora Corporation; 864.

2. Extent of Use: Joints in exterior vertical and soffit surfaces.

D. Multicomponent Pourable Urethane Sealant:

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
   b. Meadows, W. R., Inc.; POURTHANE.
   c. Pecora Corporation; Urexpan NR-200.
   d. Tremco; THC-901.

2. Extent of Use: Joints in exterior horizontal surfaces.

E. Single-Component Mildew-Resistant Acid-Curing Silicone Sealant:

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
   a. Dow Corning Corporation; 786 Mildew Resistant.
   b. GE Silicones; Sanitary SCS1700.
   c. Tremco; Tremsil 200.

2. Extent of Use: Sanitary joints at toilet rooms and wet areas.

F. Latex Sealant: Comply with ASTM C 834, Type P, Grade NF.

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
   a. Bostik Findley; Chem-Calk 600.
   b. Pecora Corporation; AC-20+.
   c. Sonneborn, Division of Degussa; Sonolac.
   d. Tremco; Tremflex 834.

2.3 JOINT-SEALANT BACKING

A. General: Provide sealant backings of material and type that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

B. Elastomeric Tubing Sealant Backings: Neoprene, butyl, EPDM, or silicone tubing complying with ASTM D 1056, nonabsorbent to water and gas, and capable of remaining resilient at temperatures down to minus 26 deg F. Provide products with low compression set and of size and shape to provide a secondary seal, to control sealant depth, and to otherwise contribute to optimum sealant performance.

C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or
joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

2.4 MISCELLANEOUS MATERIALS

A. Primer: Material recommended by joint sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.

C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint sealant performance.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint sealant manufacturer’s written instructions and the following requirements:

1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.

2. Clean porous joint substrate surfaces by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include concrete, masonry and unglazed surfaces of ceramic tile.

3. Remove laitance and form-release agents from concrete.

4. Clean nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following metal, glass, porcelain enamel and glazed surfaces of ceramic tile.

B. Joint Priming: Prime joint substrates, where recommended in writing by joint sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint sealant manufacturer’s written instructions. Confine primers to areas of joint sealant bond; do not allow spillage or migration onto adjoining surfaces.

C. Masking Tape: Use masking tape where required to prevent contact of sealant with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.
3.3 INSTALLATION OF JOINT SEALANTS

A. General: Comply with joint sealant manufacturer’s written installation instructions for products and applications indicated, unless more stringent requirements apply.

B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

C. Install sealant backings of type indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
   1. Do not leave gaps between ends of sealant backings.
   2. Do not stretch, twist, puncture, or tear sealant backings.
   3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.

D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.

E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
   1. Place sealants so they directly contact and fully wet joint substrates.
   2. Completely fill recesses in each joint configuration.
   3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified below to form smooth, uniform beads of configuration indicated to eliminate air pockets, and to ensure contact and adhesion of sealant with sides of joint.
   1. Remove excess sealant from surfaces adjacent to joints.
   2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
   3. Provide concave joint configuration per Figure 5A in ASTM C 1193, unless otherwise indicated.

G. Provide caulking at the following locations. This schedule is not to be construed to be complete. Provide caulking at other areas as indicated.
   1. Control joints in masonry surfaces, interior and exterior.
   2. Control joints in concrete surfaces, interior and exterior.
   3. Perimeter of door frames, interior and exterior.
   4. Perimeter of window frames, interior and exterior.
   5. Perimeter of louvers and grilles, interior and exterior.
   6. Perimeter of aluminum sections, interior and exterior.
   7. Setting bed for countertops at prefabricated cabinet locations.
   8. Along wall and cabinet where indicated on drawings.

Note: At interior partitions caulking is required at all joints between dissimilar materials where the joint width exceeds 1/16".

3.4 CLEANING

A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.
3.5 PROTECTION

A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

END OF SECTION
PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. Work Included: Provide labor, materials and equipment necessary to complete the work of this Section, including but not limited to the following:

1. Standard hollow metal steel doors.
2. Standard hollow metal steel frames.

B. Related Work: The following items are not included in this Section and will be performed under the designated Sections:

1. Section 04200 - UNIT MASONRY for building anchors into and grouting steel frames in masonry construction.
2. Section 08710 - DOOR HARDWARE for door hardware for steel doors.
3. Section 08800 - GLASS AND GLAZING for glazed lites.
4. Section 09900 - PAINTING for field painting steel doors and frames.

1.2 SUBMITTALS

A. Product Data: Include construction details, material descriptions, core descriptions, label compliance, fire-resistance rating, temperature-rise ratings, and finishes for each type of steel door and frame specified.

B. Florida Product Approval: Include Florida Product Approval number and evaluation report.

C. Shop Drawings:

1. Elevations of each door design.
2. Details of doors, including vertical and horizontal edge details and metal thicknesses.
3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
4. Locations of reinforcement and preparations for hardware.
5. Details of each different wall opening condition.
6. Details of anchorages, joints, field splices, and connections.
7. Details of accessories.
8. Details of moldings, removable stops, and glazing.
9. Details of conduit and preparations for power, signal, and control systems.
10. 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.

D. Schedule: Provide a schedule of hollow metal work prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with door hardware schedule.

E. Qualification Data: For Installer.

F. Product Test Reports: Based on evaluation of comprehensive fire tests performed by a qualified testing agency, for each type of standard steel door and frame.
1.3 QUALITY ASSURANCE
   A. Installer Qualifications: An employer of workers trained and approved by manufacturer.
   B. Source Limitations: Obtain standard steel doors and frames through one source from a single manufacturer.
   C. Fire-Rated Door, Sidelight and Transom Frame Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated. Identify each fire door or frame with UL labels, indicating the applicable fire rating of both door and frame.
      1. Temperature-Rise Limit: At vertical exit enclosures and exit passageways, provide doors that have a maximum transmitted temperature end point of not more than 450 deg F above ambient after 30 minutes of standard fire-test exposure.

1.4 DELIVERY, STORAGE, AND HANDLING
   A. Deliver doors and frames palletized, wrapped, or crated to provide protection during transit and Project-site storage. Do not use non-vented plastic.
   B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.
   C. General Contractor must inspect and inventory all deliveries within 24 hours of delivery. All freight damage must be signed as damaged on the Bill of Lading document and reported to the freight carrier. General Contractor must report to the supplier any missing, incorrect or damaged goods immediately. Failure to report missing, damaged or incorrect material within 48 hours means the receiver has accepted the shipment as complete and correct.
   D. Store hollow metal work under cover at Project site. Place in stacks of five units maximum in a vertical position with heads up, spaced by blocking, on minimum 4-inch-high wood blocking. Do not store in a manner that traps excess humidity.
      1. Provide minimum 1/4 inch space between each stacked door to permit air circulation.

1.5 PROJECT CONDITIONS
   A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

1.6 COORDINATION
   A. Coordinate installation of anchorages for hollow metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

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. Steelcraft Hollow Metal Door and Frames
      2. Curries Hollow Metal Doors and Frames

2.2 MATERIALS
   A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.
B. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.

C. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum G60 metallic coating.

D. Frame Anchors: ASTM A 591/A 591M, Commercial Steel (CS), 40Z coating designation; mill phosphatized.
   1. For anchors built into exterior walls, steel sheet complying with ASTM A 1008/A 1008M or ASTM A 1011/A 1011M, hot-dip galvanized according to ASTM A 153/A 153M, Class B.

E. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.

F. Powder-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hollow metal frames of type indicated.

G. Grout: ASTM C 476, except with a maximum slump of 4 inches, as measured according to ASTM C 143/C 143M.

H. Mineral-Fiber Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool with 6- to 12-lb/cu. ft. density; with maximum flame-spread and smoke-development indexes of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.

I. Glazing: Comply with requirements in Section 08800 – GLASS AND GLAZING.

J. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities. All bituminous coating to be supplied and installed by the General Contractor.

2.3 STANDARD STEEL DOORS

A. General: Provide doors of design indicated, not less than thickness indicated; fabricated with smooth surfaces, without visible joints or seams on exposed faces, unless otherwise indicated. Comply with ANSI A250.8.

   1. Design: Flush panel.
   2. Core Construction: Manufacturer’s standard kraft-paper honeycomb, polystyrene, polyurethane, mineral-board, or vertical steel-stiffener core that produces doors complying with ANSI A250.8.
      a. Fire Door Core: As required to provide fire-protection and temperature-rise ratings indicated.
      b. Thermal-Rated (Insulated) Exterior Doors: Where indicated, provide doors fabricated with thermal-resistance value (R-value) of not less than 4.0 deg F x h x sq. ft./Btu when tested according to ASTM C 1363.

   3. Top and Bottom Edges: Closed with flush or inverted 0.042-inch-thick end closures or channels of same material as face sheets.

B. Exterior Doors: Face sheets fabricated from metallic-coated steel sheet. Provide doors complying with requirements indicated below by referencing ANSI A250.8 for level and model and ANSI A250.4 for physical-endurance level:
1. Level 3 and Physical Performance Level A (Extra Heavy Duty), Model 1, 1-3/4 inches thick.

C. Interior Doors: Face sheets fabricated from cold-rolled steel sheet, unless otherwise indicated to comply with exterior door requirements. Provide doors complying with requirements indicated below by referencing ANSI A250.8 for level and model and ANSI A250.4 for physical-endurance level:
   1. Level 2 and Physical Performance Level B (Heavy Duty), Model 1, 1-3/4 inches thick.

D. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 with reinforcing plates from same material as door face sheets.

E. Fabricate concealed stiffeners and hardware reinforcement from either cold- or hot-rolled steel sheet.

2.4 STANDARD STEEL FRAMES

A. General: Comply with ANSI A250.8 and with details indicated for type and profile. Combination type with integral stop.

   1. Fabricate frames with mitered or coped and welded face corners and seamless face joints.
   2. Frames for Level 3 Steel Doors: 0.053-inch-thick steel sheet.

C. Interior Frames: Fabricated from cold-rolled steel sheet, unless otherwise indicated to comply with exterior frame requirements.
   1. Fabricate frames with mitered or coped and welded face corners and seamless face joints.
   2. Frames for Level 2 Steel Doors: 0.053-inch-thick steel sheet.
   3. Knock down frames may be used on doors 36” wide or less, and without automatic or power actuated openers.

D. Interior Frame for Hospital Privacy Set at Patient Toilets: Fabricated from cold-rolled steel sheet, unless otherwise indicated to comply with exterior frame requirements.
   1. Fabricate frames without integral stop and prep for jamb mount pivot hinge set per HW Set 30.

E. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 with reinforcement plates from same material as frames.

F. Plaster Guards: Formed from same material as frames, not less than 0.016-inch thick.

2.5 FRAME ANCHORS

A. Jamb Anchors:
   1. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, not less than 0.042 inch thick, with corrugated or perforated straps not less than 2 inches wide by 10 inches long; or wire anchors not less than 0.177 inch thick.
   2. Stud-Wall Type: Designed to engage stud, welded to back of frames not less than 0.042 inch thick.
   3. Compression Type for Drywall Slip-on Frames: Adjustable compression anchors.
   4. Post installed Expansion Type for In-Place Concrete or Masonry: Minimum 3/8 inch diameter bolts with expansion shields or inserts. Provide pipe spacer from frame to wall, with throat reinforcement plate, welded to frame at each anchor location.
B. Floor Anchors: Formed from same material as frames, not less than 0.042 inch (1.0 mm) thick, and as follows:
   1. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.
   2. Separate Topping Concrete Slabs: Adjustable-type anchors with extension clips, allowing not less than 2-inch height adjustment. Terminate bottom of frames at finish floor surface.

2.6 HOLLOW METAL PANELS
   A. Provide hollow metal panels of same materials, construction, and finish as specified for adjoining hollow metal work.

2.7 STOPS AND MOLDINGS
   A. Moldings for Glazed Lites in Doors: Minimum 0.032 inch thick, fabricated from same material as door face sheet in which they are installed.
   B. Fixed Frame Moldings: Formed integral with hollow metal frames, a minimum of 5/8 inch high unless otherwise indicated.
   C. Loose Stops for Glazed Lites in Frames: Minimum 0.032 inch thick, fabricated from same material as frames in which they are installed.

2.8 LOUVERS
   A. Provide louvers for interior doors, where indicated, that comply with SDI 111C, with blades or baffles formed of 0.020-inch-thick, cold-rolled steel sheet set into 0.032-inch-thick steel frame.
      1. Sightproof Louver: Stationary louvers constructed with inverted V-shaped or Y-shaped blades.
      2. Fire-Rated Automatic Louvers: Louvers constructed with movable blades closed by actuating fusible link, and listed and labeled for use in fire-rated door assemblies of type and fire-resistance rating indicated by same testing and inspecting agency that established fire-resistance rating of door assembly.

2.9 ACCESSORIES
   A. Mullions and Transom Bars: Join to adjacent members by welding or rigid mechanical anchors.
   B. Ceiling Struts: Minimum 1/4 inch thick by 1 inch wide steel.
   C. Grout Guards: Formed from same material as frames, not less than 0.016 inch thick.

2.10 FABRICATION
   A. Fabricate hollow metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for thickness of metal. Where practical, fit and assemble units in manufacturer’s plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.
   B. Tolerances: Fabricate hollow metal work to tolerances indicated in SDI 117.
   C. Hollow Metal Doors:
      1. Exterior Doors: Provide weep-hole openings in bottom of exterior doors to permit moisture to escape. Seal joints in top edges of doors against water penetration.
      2. Glazed Lites: Factory cut openings in doors.
3. Astragals: Provide overlapping astragal on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated. Extend minimum 3/4 inch beyond edge of door on which astragal is mounted.

D. Hollow Metal Frames: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.

1. Welded Frames: Weld flush face joints continuously; grind, fill, dress, and make smooth, flush, and not visible.
2. Sidelight and Transom Bar Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.
3. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
4. Plaster/Grout Guards: Weld guards to frame at back of hardware mortises in frames installed in concrete or masonry and to be grouted.
5. Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four spot welds per anchor.
6. Jamb Anchors: Provide number and spacing of anchors as follows:
   a. Masonry Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
      1) Two anchors per jamb up to 60 inches high.
      2) Three anchors per jamb from 60 to 90 inches high.
      3) Four anchors per jamb from 90 to 120 inches high.
      4) Four anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 120 inches high.
   b. Stud-Wall Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
      1) Three anchors per jamb up to 60 inches high.
      2) Four anchors per jamb from 60 to 90 inches high.
      3) Five anchors per jamb from 90 to 96 inches high.
      4) Five anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 96 inches high.
      5) Two anchors per head for frames above 42 inches wide and mounted in metal-stud partitions.
   c. Compression Type: Not less than two anchors in each jamb.
   d. Post installed Expansion Type: Locate anchors not more than 6 inches from top and bottom of frame. Space anchors not more than 26 inches o.c.
7. Door Silencers: Except on weather-stripped doors, drill stops to receive door silencers as follows. Keep holes clear during construction.
   a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
   b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.

E. Fabricate concealed stiffeners, edge channels, and hardware reinforcement from either cold- or hot-rolled steel sheet.

F. Hardware Preparation: Factory prepare hollow metal work to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to the
Door Hardware Schedule and templates furnished as specified in Section 08710 - DOOR HARDWARE.

1. Locate hardware as indicated, or if not indicated, according to ANSI/SDIA250.8.
2. Reinforce doors and frames at the manufacturer’s plant to receive non-templated, mortised and surface-mounted door hardware.
3. Comply with applicable requirements in ANSI/SDIA250.6 and ANSI/DHA115 Series specifications for preparation of hollow metal work for hardware.
4. Coordinate locations of conduit and wiring boxes for electrical connections with Section 16100 - ELECTRICAL.

G. Stops and Moldings: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with butted or mitered hairline joints.
   1. Single Glazed Lites: Provide fixed stops and moldings welded on secure side of hollow metal work.
   2. Multiple Glazed Lites: Provide fixed and removable stops and moldings so that each glazed lite is capable of being removed independently.
   3. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames.
   4. Provide loose stops and moldings on inside of hollow metal work.
   5. Coordinate rabbet width between fixed and removable stops with type of glazing and type of installation indicated.

2.11 STEEL FINISHES
A. Prime Finish: Apply manufacturer’s standard primer immediately after cleaning and pretreating.
   1. Shop Primer: Manufacturer’s standard, fast-curing, lead- and chromate-free primer complying with ANSI/SDIA250.10 acceptance criteria; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

PART 3 - EXECUTION

3.1 EXAMINATION
A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
B. Examine roughing-in for embedded and built-in anchors to verify actual locations before frame installation.
C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION
A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.
B. Prior to installation, adjust and securely brace welded hollow metal frames for squareness, alignment, twist, and plumbness to the following tolerances:
   1. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
2. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
3. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
4. Plumbness: Plus or minus 1/16 inch, measured at jambs on a perpendicular line from head to floor.

C. Drill and tap doors and frames to receive non-templated, mortised, and surface-mounted door hardware.

3.3 INSTALLATION

A. General: Install hollow metal work plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer’s written instructions.

B. Hollow Metal Frames: Install hollow metal frames of size and profile indicated. Comply with ANSI/SDI A250.11.
1. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.
   a. At fire-protection-rated openings, install frames according to NFPA 80.
   b. Where frames are fabricated in sections because of shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.
   c. Install frames with removable glazing stops located on secure side of opening.
   d. Install door silencers in frames before grouting.
   e. Remove temporary braces necessary for installation only after frames have been properly set and secured.
   f. Check plumbness, squareness, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
   g. Field apply bituminous coating to backs of frames that are filled with grout.
   h. Remove shipping bars before installing frames.

2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with post installed expansion anchors.
   a. Floor anchors may be set with powder-actuated fasteners instead of post installed expansion anchors if so indicated and approved on Shop Drawings.

4. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout.
5. Concrete Walls: Solidly fill space between frames and concrete with grout. Take precautions, including bracing frames, to ensure that frames are not deformed or damaged by grout forces.
6. In-Place Concrete or Masonry Construction: Secure frames in place with post installed expansion anchors. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
7. In-Place Gypsum Board Partitions: Secure frames in place with post installed expansion anchors through floor anchors at each jamb. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
8. Ceiling Struts: Extend struts vertically from top of frame at each jamb to overhead structural supports or substrates above frame unless frame is anchored to masonry or to other structural support at each jamb. Bend top of struts to provide flush contact for
securing to supporting construction. Provide adjustable wedged or bolted anchorage to frame jamb members.

9. Installation Tolerances: Adjust hollow metal door frames for squareness, alignment, twist, and plumb to the following tolerances:
   a. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
   b. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
   c. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
   d. Plumbness: Plus or minus 1/16 inch, measured at jambs at floor.

C. Hollow Metal Doors: Fit hollow metal doors accurately in frames, within clearances specified below. Shim as necessary.
   1. Non-Fire-Rated Standard Steel Doors:
      a. Jambs and Head: 1/8 inch plus or minus 1/16 inch.
      b. Between Edges of Pairs of Doors: 1/8 inch plus or minus 1/16 inch.
      c. Between Bottom of Door and Top of Threshold: Maximum 3/8 inch.
   2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
   3. Smoke-Control Doors: Install doors according to NFPA 105.

D. Glazing: Comply with hollow metal manufacturer’s written instructions.
   1. Secure stops with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches o.c. and not more than 2 inches o.c. from each corner.

3.4 ADJUSTING AND CLEANING
   A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow metal work that is warped, bowed, or otherwise unacceptable.
   B. Remove grout and other bonding material from hollow metal work immediately after installation.
   C. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.
   D. Metallic-Coated Surfaces: Clean abraded areas and repair with galvanizing repair paint according to manufacturer’s written instructions.

END OF SECTION
SECTION 08411
ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. Work Included: Provide labor, materials and equipment necessary to complete the work of this Section, including but not limited to the following:
   1. Exterior and interior aluminum-framed storefronts.
   2. Exterior and interior power assisted-swing aluminum doors.

B. Related Work: The following items are not included in this Section and will be performed under the designated Sections:
   1. Section 07920 - JOINT SEALANTS for installation of joint sealants installed with aluminum-framed systems and for sealants to the extent not specified in this Section.
   2. Section 08710 - DOOR HARDWARE for hardware type, lock cylinders and keying.
   3. Section 08800 - GLASS AND GLAZING for glazing requirements to the extent not specified in this Section.
   4. Section 08720 – Automatic door operators
   5. Section 08461 – Sliding automatic entrance doors

1.2 PERFORMANCE REQUIREMENTS

A. General: Provide aluminum-framed systems, including anchorage, capable of withstanding, without failure, the effects of the following:
   1. Structural loads.
   2. Thermal movements.
   3. Wind loads.
   4. Dimensional tolerances of building frame and other adjacent construction.
   5. Failure includes the following:
      a. Deflection exceeding specified limits.
      b. Thermal stresses transferred to building structure.
      c. Framing members transferring stresses, including those caused by thermal and structural movements, to glazing.
      d. Noise or vibration created by wind and thermal and structural movements.
      e. Loosening or weakening of fasteners, attachments, and other components.
      f. Sealant failure.
      g. Failure of operating units to function properly.

B. Structural Loads: Wind and seismic loads as indicated on the Structural Drawings, but not less than that required by Code.

C. Deflection of Framing Members:
   1. Deflection Normal to Wall Plane: Limited to 1/175 of clear span for spans up to 13 feet 6 inches (and to 1/240 of clear span plus 1/4 inch for spans greater than 13 feet 6 inches or an amount that restricts edge deflection of individual glazing lites to 3/4 inch, whichever is less.
   2. Deflection Parallel to Glazing Plane: Limited to 1/360 of clear span or 1/8 inch, whichever is smaller, amount not exceeding that which reduces glazing bite to less than 75 percent of design dimension and that which reduces edge clearance between framing
D. Thermal Movements: Provide aluminum-framed systems that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
   1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

E. Air Infiltration Test: Test unit in accordance with ASTM E 283, as follows:
   1. Static Air Pressure Difference: 6.24 psf for fixed storefront units, and 1.567 psf for doors.
   2. Performance: Maximum air leakage shall not exceed the following: fixed storefront units, 1.0 cfm/sf.: glazed entrance door units, 0.3 cfm/sf of other areas.

F. Water Leakage Test: Test fixed framing system in accordance with ASTM E 331.
   1. Test Pressure: 8 psf.
   2. Performance: No leakage as defined in test method at specified test pressure. No uncontrolled water penetrating system or appearing on normally exposed interior surfaces.

G. Solar Heat-Gain Coefficient: Provide units with a whole-unit SHGC maximum as required by Code, determined according to NFRC 200 procedures. Submit proof of compliance with submittals as specified.

H. Thermal Transmittance: Provide window units that have a U-value as required by Code rated in BTU/hour/sq. ft./degrees F at 15-mph exterior wind velocity, when tested in accordance with AAMA 1503.1. Test unit to be 4 ft. x 6 ft. Submit proof of compliance with submittals as specified.

I. Condensation Resistance: Provide aluminum-framed systems with fixed glazing and framing areas having condensation-resistance factor (CRF) of not less than 45 for fixed storefront units and not less than 48 for doors when tested according to AAMA 1503.

1.3 SUBMITTALS

A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of product indicated. Include manufacturer’s specification and other data to provide compliance with specified requirements.

B. Florida Product Approval: Current approval number and evaluation report indicating approval for use as intended.

C. Shop Drawings: For aluminum-framed systems. Include plans, elevations, sections, details, and attachments to other work.
   1. Include structural analysis data signed and sealed by the qualified professional engineer, licensed by the local authorities having jurisdiction, responsible for their preparation.
   2. Include structural analysis of story drift and deflection from anticipated live loads, and determination whether head receptors are required.
   3. Include details of provisions for system expansion and contraction and for draining moisture occurring within the system to the exterior.
   4. For entrances, include hardware schedule and indicate operating hardware types, functions, quantities, and locations.
D. Samples for Verification: For each type of exposed finish required, in manufacturer’s standard sizes.

E. Qualification Data: For Installer.

F. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for aluminum-framed systems.

G. Performance Reports: Based on systems, components and glazing methods proposed for use on this Project, proof that units as glazed for this Project meet or exceed Code requirements for the following:
   1. U-value.
   2. Solar heat-gain coefficient.

H. Maintenance Data: For aluminum-framed systems to include in maintenance manuals.

I. Warranties: Special warranties specified in this Section.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Capable of assuming engineering responsibility and performing work of this Section and who is acceptable to manufacturer.
   1. Engineering Responsibility: Preparation of data for aluminum-framed systems including Shop Drawings based on testing and engineering analysis of manufacturer’s standard units in assemblies similar to those indicated for this Project and submission of reports of tests performed on manufacturer’s standard assemblies.

B. Accessible Entrances: Comply with local Architectural Access Board and the U.S. Architectural & Transportation Barriers Compliance Board’s “Americans with Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities (ADAAG).”

1.5 PROJECT CONDITIONS

A. Field Measurements: Verify actual locations of structural supports for aluminum-framed systems by field measurements before fabrication and indicate measurements on Shop Drawings.
   1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating aluminum-framed systems without field measurements. Coordinate construction to ensure that actual dimensions correspond to established dimensions.

1.6 WARRANTY

A. Upon completion of work and as a condition of its acceptance, deliver to the architect two copies of written warranty agreeing to replace work of this section, which fails due to defective materials or workmanship. This includes failures in operation of components or components leakage, or air infiltration in excess of specified standard; defects which contribute to unsightly appearance; potential safety hazard or potential untimely failure of work of this section; or work as a whole within three years after substantial completion.

B. Special Finish Warranty: Manufacturer’s standard form in which manufacturer agrees to repair or replace components on which finishes fail within specified warranty period. Warranty does not include normal weathering.
   1. Warranty Period: 10 years from date of Substantial Completion.
PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Provide and install glass, aluminum frames and related hardware provided under Section 08710 as shown on architectural drawings.

1. Exterior Storefront, insulated, 2 inch by 4-1/2 inch profile:
   a. Kawneer, VG451T.
   b. Approved equal.
   c. Finish – Match existing

2. Interior Storefront, 2 inch by 4-1/2 inch profile:
   b. Raco Interior OfficeFronts Classic.
   c. Approved equal.
   d. Finish – Fluoropon, Medium Bronze.

3. Exterior Doors, Thermal, Medium Stile (Warm Climates):
   b. Approved equal.
   c. Finish – Match Existing

4. Interior Doors, Medium Stile:
   a. Kawneer, 360.
   c. Approved equal.
   d. Finish – Match Existing

2.2 MATERIALS

A. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.

2. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221.
4. Structural Profiles: ASTM B 308/B 308M.
5. Welding Rods and Bare Electrodes: AWS A5.10/A5.10M.

B. Steel Reinforcement: With manufacturer’s standard corrosion-resistant primer complying with SSPC-PS Guide No. 12.00 applied immediately after surface preparation and pretreatment. Select surface preparation methods according to recommendations in SSPC-SP COM and prepare surfaces according to applicable SSPC standard.

1. Structural Shapes, Plates, and Bars: ASTM A 36/A 36M.
2. Cold-Rolled Sheet and Strip: ASTM A 1008/A 1008M.
3. Hot-Rolled Sheet and Strip: ASTM A 1011/A 1011M.

2.3 FRAMING SYSTEMS

A. Framing Members: Manufacturer’s standard extruded-aluminum framing members of thickness required and reinforced as required to support imposed loads.

B. Brackets and Reinforcements: Manufacturer’s standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.

C. Fasteners and Accessories: Manufacturer’s standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.
   1. Where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration, use self-locking devices.
   2. Reinforce members as required to receive fastener threads.
   3. Use exposed fasteners with countersunk Phillips screw heads, finished to match framing system.

D. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts complying with ASTM A 123/A 123M or ASTM A 153/A 153M requirements.

E. Flashing: Manufacturer’s standard corrosion-resistant, nonstaining, nonbleeding flashing compatible with adjacent materials. Form exposed flashing from sheet aluminum finished to match framing and of sufficient thickness to maintain a flat appearance without visible deflection.

F. Framing System Gaskets and Sealants: Manufacturer’s standard recommended by manufacturer for joint type.

2.4 GLAZING SYSTEMS

A. Glazing: As specified in Section 08800 - GLASS AND GLAZING.

B. Glazing Gaskets: Manufacturer’s standard compression types, replaceable, molded or extruded, that maintain uniform pressure and watertight seal.

C. Spacers and Setting Blocks: Manufacturer’s standard elastomeric types.

2.5 DOORS

A. Doors: Manufacturer’s standard glazed doors, for manual swing operation.
   1. Door Construction: Mechanical clip fastening, SIGMA deep penetration plus welds and 1-1/8 inch long fillet welds inside and outside of all four corners. Glazing stops shall be hook-in type and EPDM glazing gaskets reinforced with non-stretchable cord.

2.6 DOOR HARDWARE

A. General: Provide heavy-duty units in sizes and types indicated in SECTION 08710 – Door Hardware. Coordinate and install hardware in the factory as required. Provide all hardware required for a proper and complete installation.
   1. Opening-Force Requirements:
      a. Egress Doors: Not more than 30 lbf required to set door in motion and not more than 15 lbf required to open door to minimum required width.
      b. Accessible Interior Doors: Not more than 5 lbf.

B. Pivot Hinges: BHMA A156.4, Grade 1.

C. Locking Devices, General: As specified in Section 08710 – Door Hardware. Do not require use of key, tool, or special knowledge for operation.
   1. Opening-Force Requirements:
      a. Delayed-Egress Locks: Lock releases within 15 seconds after applying a force of not more than 15 lbf (67 N) for not more than 3 seconds.
      b. Latches and Exit Devices: Not more than 15 lbf (67 N) required to release latch.
D. Mortise Auxiliary Locks: BHMA A156.5, Grade 1.
E. Panic Exit Devices: As specified in Section 08710 Door Hardware. Listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for panic protection, based on testing according to UL 305.
F. Cylinders: As specified in Section 08710 – Door Hardware.
G. Strikes: As specified in Section 08710 – Door Hardware.
H. Operating Trim: BHMA A156.6.
I. Closers: Refer to Section 08710 and 08720 – Automatic door operators.
J. Concealed Overhead Holders: Refer to Section 08710 BHMA A156.8, Grade 1.
K. Surface-Mounted Holders: Refer to Section 08710 BHMA A156.16, Grade 1.
L. Door Stops: BHMA A156.16, Grade 1, floor or wall mounted, as appropriate for door location indicated, with integral rubber bumper.
M. Weather Stripping: Manufacturer’s standard replaceable components at exterior doors.
   1. Compression Type: Made of ASTM D 2000, molded neoprene, or ASTM D 2287, molded PVC.
N. Weather Sweeps: Manufacturer’s standard exterior-door bottom sweep with concealed fasteners on mounting strip, at exterior doors.
O. Silencers: BHMA A156.16, Grade 1.
P. Finger Guards: Manufacturer’s standard collapsible neoprene or PVC gasket anchored to frame hinge-jamb at center-pivoted doors.
Q. Finishes: Match framing, as indicated below.

2.7 ACCESSORY MATERIALS
A. Insulating Materials: As specified in Section 07210 - INSULATION.
B. Joint Sealants: For installation at perimeter of aluminum-framed systems, as specified in Section 07920 - JOINT SEALANTS.
C. Bituminous Paint: Cold-applied asphalt-mastic paint complying with SSPC-Paint 12 requirements except containing no asbestos, formulated for 30-mil thickness per coat.

2.8 FABRICATION
A. Form aluminum shapes before finishing.
B. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.
C. Framing Members, General: Fabricate components that, when assembled, have the following characteristics:
   1. Profiles that are sharp, straight, and free of defects or deformations.
   2. Accurately fitted joints with ends coped or mitered.
   3. Means to drain water-passing joints, condensation occurring within framing members, and moisture migrating within the system to exterior.
   4. Physical and thermal isolation of glazing from framing members.
5. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
6. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.

D. Mechanically Glazed Framing Members: Fabricate for flush glazing (without projecting stops).
E. Door Frames: Reinforce as required to support loads imposed by door operation and for installing hardware.
   1. At exterior doors, provide compression weather stripping at fixed stops.
   2. At interior doors, provide silencers at stops to prevent metal-to-metal contact. Install three silencers on strike jamb of single-door frames and two silencers on head of frames for pairs of doors.

F. Doors: Reinforce doors as required for installing hardware.
   1. At pairs of exterior doors, provide sliding weather stripping retained in adjustable strip mortised into door edge.
   2. At exterior doors, provide weather sweeps applied to door bottoms.

G. Hardware Installation: Factory install hardware to the greatest extent possible. Cut, drill, and tap for factory-installed hardware before applying finishes.
H. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

2.9 ALUMINUM FINISHES

A. Comply with NAAMM's “Metal Finishes Manual for Architectural and Metal Products” for recommendations for applying and designating finishes.
B. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
C. Class I, Color Anodic Finish: AA-M12C22A42/A44 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class I, integrally colored or electrolytically deposited color coating 0.018 mm or thicker) complying with AAMA 611.
   1. Color: Medium Bronze

PART 3 - EXECUTION

3.1 EXAMINATION
A. Examine areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.
   1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION
A. General:
   1. Comply with manufacturer’s written instructions.
   2. Do not install damaged components.
   3. Fit joints to produce hairline joints free of burrs and distortion.
   4. Rigidly secure non-movement joints.
   5. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration.
6. Seal joints watertight, unless otherwise indicated.
7. Comply with original design and approved shop drawings and governing codes and regulations.

B. Metal Protection:
   1. Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape or installing nonconductive spacers as recommended by manufacturer for this purpose.
   2. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

C. Install components to drain water-passing joints, condensation occurring within framing members, and moisture migrating within the system to exterior.

D. Set continuous sill members and flashing in full sealant bed as specified in Section 07920 - JOINT SEALANTS and to produce weathertight installation.

E. Install components plumb and true in alignment with established lines and grades, without warp or rack.

F. Install glazing as specified in Section 08800 - GLASS AND GLAZING.
   1. Structural-Sealant Glazing:
      a. Prepare surfaces that will contact structural sealant according to sealant manufacturer’s written instructions to ensure compatibility and adhesion. Preparation includes, but is not limited to, cleaning and priming surfaces.
      b. Install weatherseal sealant according to Section 07920 - JOINT SEALANTS and according to sealant manufacturer’s written instructions to produce weatherproof joints. Install joint filler behind sealant as recommended by sealant manufacturer.

G. Entrances: Install to produce smooth operation and tight fit at contact points.
   1. Exterior Entrances: Install to produce tight fit at weather stripping and weathertight closure.
   2. Field-Installed Hardware: Install surface-mounted hardware according to hardware manufacturer’s written instructions using concealed fasteners to greatest extent possible.

H. Erection Tolerances: Install aluminum-framed systems to comply with the following maximum tolerances:
   1. Location and Plane: Limit variation from true location and plane to 1/8 inch in 12 feet; 1/4 inch over total length.
   2. Alignment:
      a. Where surfaces abut in line, limit offset from true alignment to 1/16 inch.
      b. Where surfaces meet at corners, limit offset from true alignment to 1/32 inch.
   3. Diagonal Measurements: Limit difference between diagonal measurements to 1/8 inch.

3.3 FIELD QUALITY CONTROL
A. Testing Agency: Engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.

B. Testing Services: Testing and inspecting of representative areas to determine compliance of installed systems with specified requirements shall take place as follows and in successive stages as indicated on Drawings. Do not proceed with installation of the next area until test results for previously completed areas show compliance with requirements.
1. **Air Infiltration:** Areas shall be tested for air leakage of 1.5 times the rate specified for laboratory testing under Part 1 “Performance Requirements” Article, but not more than 0.09 cfm/sq. ft. of fixed wall area when tested according to ASTM E 783 at a minimum static-air-pressure difference of 6.24 lbf/sq. ft.

2. **Water Penetration:** Areas shall be tested according to ASTM E 1105 at a minimum cyclic static-air-pressure difference of 0.67 times the static-air-pressure difference specified for laboratory testing under Part 1 “Performance Requirements” Article, but not less than 4.18 lbf/sq. ft., and shall not evidence water penetration.

3. **Water Spray Test:** Before installation of interior finishes has begun, a minimum area of 75 feet by 1 story of aluminum-framed systems designated by Architect shall be tested according to AAMA 501.2 and shall not evidence water penetration.

   C. Repair or remove work where test results and inspections indicate that it does not comply with specified requirements.

   D. Additional testing and inspecting, at Contractor’s expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.4 **ADJUSTING**

A. **Entrances:** Adjust operating hardware for smooth operation according to hardware manufacturer’s written instructions.

1. For doors accessible to people with disabilities, adjust closers to provide a 3-second closer sweep period for doors to move from a 70-degree open position to 3 inches from the latch measured to the leading door edge.

**END OF SECTION**
PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

A. This Section includes the following:
   1. Exterior and interior bi-parting/sliding, automatic entrance door assemblies with operator and Motion/Presence sensor control device, and remote control display pad.

B. Related Sections include the following:
   1. Section 00850 - National Accounts.
   2. Section 08411 - Aluminum-Framed Entrances and Storefronts for entrances controlled by automatic door operators furnished separately.
   3. Section 08710 - Door Hardware for hardware to the extent not specified in this Section.
   4. Section 08720 - Automatic Door Operators.
   5. Section 08800 - Glass and Glazing for materials and installation requirements of glazing for automatic entrance doors.
   6. Division 16 - Electrical for electrical connections including conduit and wiring for automatic entrance door operators.
   7. Division 7 - Perimeter sealants, insulation.
   8. Division 4 - Masonry.

1.02 DEFINITIONS

A. Activation Device: Device that, when actuated, sends an electrical signal to the door operator to open the door.

B. Safety Device: Device that prevents a door from opening or closing when pedestrian or object remains in the path of door travel.

1.03 PERFORMANCE REQUIREMENTS

A. General: Provide automatic entrance door assemblies capable of withstanding structural loads and thermal movements based on testing manufacturer’s standard units in assemblies similar to those indicated for this Project.

B. Thermal Movements: Provide automatic entrance doors that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
   1. Temperature Change (Range): 130 deg F, ambient; 180 deg F, material surfaces.

C. Operating Range: Minus 30 deg F to 130 deg F.

D. Opening-Force Requirements:
   1. Egress Doors: Not more than 50 lbf required to manually set door in motion if power fails, and not more than 15 lbf required to open door to minimum required width.
   2. Accessible Interior Doors: Not more than 5 lbf.

E. Closing-Force Requirements: Not more than 30 lbf required to prevent door from closing.

F. Emergency Egress: Slide-swing panels can swing out 90° from any position of slide movement and require no more than 50 lbf. of force applied at the lock stile to open.
1. Breakout mechanism shall provide support across full width of the door in normal operating mode. In breakout mode, door assembly shall support weight of the door to minimize drop during emergency egress.
2. Slide-swing panels and swing-out sidelites shall include intermediate horizontal rail.
3. Units with emergency egress feature are UL listed as an exit way and are compliant with NFPA 101.

1.04 SUBMITTALS

A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for automatic entrance doors.
B. Florida Product Approval: Florida product approval number and current evaluation report.
C. Shop Drawings: Include plans, elevations, sections, details, hardware mounting heights, and attachments to other work.
D. Samples for Initial Selection: For units with factory-applied color finishes.
E. Samples for Verification: For each type of exposed finish required, in manufacturer’s standard sizes.
F. Product Certificates: For each type of automatic entrance door, provided by product manufacturer.
G. Qualification Data: For Installer.
H. Field quality-control test and inspection reports.
I. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for automatic entrance door assemblies.
J. Maintenance Data: For door operators and control systems to include in maintenance manuals.
K. Warranties: Special warranties specified in this Section.
L. AAADM inspection compliance form completed and signed by certified AAADM inspector as proof of compliance with ANSI A156.10.

1.05 QUALITY ASSURANCE

A. Vendors:
1. Sliding Automatic Entrance Doors covered in this Section shall be provided by the General Contractor unless noted otherwise on the Drawings.
2. Required Sliding Automatic Entrance Door Supplier and Installer:
   D.H. Pace Company
   ATTN: Luke Hannan
   FMC@DHPace.com
   (877) 579-2333
   1901 E. 119th Street
   Olathe, KS  66061

B. Installer Qualifications: Manufacturer’s authorized representative who is trained and approved for installation and maintenance of units required for this Project and who employs a certified inspector.
   1. Maintenance Proximity: Not more than four hours’ normal travel time from Installer’s place of business to Project site.

C. Certified Inspector: Certified by AAADM.
D. **Source Limitations:** Obtain both swing and slide automatic entrance door assemblies through one source from a single manufacturer.

E. **Product Options:** Drawings indicate sizes, profiles and dimensional requirements of automatic entrance door assemblies and are based on the specific system indicated. Refer to Division 1 Section “Product Requirements.”
   1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect’s approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.

F. **Welding:** Qualify procedures and personnel according to AWS D1.2, “Structural Welding Code-Aluminum.”

G. **Power-Operated Door Standard:** ANSI A156.10.

H. **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.

I. **Emergency-Exit Door Requirements:** Comply with requirements of authorities having jurisdiction for automatic entrance doors serving as a required means of egress.

1.06 **PROJECT CONDITIONS**

A. **Field Measurements:** Verify openings to receive automatic entrance door assemblies by field measurements before fabrication and indicate measurements on Shop Drawings.
   1. **Established Dimensions:** Where field measurements cannot be made without delaying the Work, establish opening dimensions and proceed with fabricating automatic entrance door assemblies without field measurements. Coordinate construction to ensure that actual opening dimensions correspond to established dimensions.
   2. **Delivery, Storage and Handling:** Comply with factory’s ordering instructions and lead times. Delivery shall be in factory’s original, unopened and undamaged containers with identification labels intact.
   3. **Storage and Protection:** Provide pre-installation protection from exposure to harmful weather conditions and other damages.

1.07 **COORDINATION**

A. Coordinate with the General Contractor the size and location of recesses in concrete floor. Concrete, reinforcement, and formwork requirements are specified in Division 3.

B. **Templates:** Obtain and distribute to the parties involved, templates for doors, frames, and other work specified to be factory-prepared for installing automatic entrance doors. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing automatic entrance doors to comply with indicated requirements.

C. **Electrical System Roughing-in:** Coordinate layout and installation of automatic entrance door assemblies with connections to power supplies.

1.08 **WARRANTY**

A. **Special Assembly Warranty:** Manufacturer’s standard form in which manufacturer agrees to repair or replace components of automatic entrance door assemblies that fail in materials or workmanship within specified warranty period.
   1. Failures include, but are not limited to, the following:
      a. Structural failures including, but not limited to, excessive deflection.
      b. Faulty operation of operators, controls, and hardware.
PART 2 - PRODUCTS

2.01 MANUFACTURER

A. Manufacturer: Subject to compliance with requirements, provide products of the following:
   1. Record-USA of Monroe, NC
      In the event Record-USA does not offer equipment which meets Project Specifications, D.H. Pace is authorized to substitute manufacturer with approval from FMC RECS Department.

2.02 MATERIALS

A. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
   1. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221, Alloy 6063-T5.
   2. Sheet and Plate: ASTM B 209.
   3. Welding Rods and Bare Electrodes: AWS A5.10/A5.10M.

B. Sealants and Joint Fillers: Refer to Section 07920 - Joint Sealants.

C. Nonmetallic, Shrinkage-Resistant Grout: Premixed, nonmetallic, noncorrosive, nonstaining grout, complying with ASTM C 1107, of consistency suitable for application.

2.03 AUTOMATIC ENTRANCE DOOR ASSEMBLIES

A. Product: Record-USA Series 5500 NI Hurricane Rated Slider

B. Manufactured door units shall include operator, header and track, jambs, sliding door panels, remote control panel and sidelites. Units can be mounted within rough opening with sliding panels sliding along interior breakaway sidelite.
   1. Structural Header Sections: Minimum 3/16" thickness.
   2. Structural Frame Sections: Minimum 1/8" thickness.
   3. Structural Panel Sections: Commercial grade.

C. Operator: Shall be a sealed, low voltage class II, 1/8 horsepower 30v DC motor and gearbox with nylon reinforced drive belt, limited to a maximum of 3 amps. Mounted and concealed within the header.
   1. Drive belt to be steel reinforced nylon, 3/4" (19 mm) wide. Idler pulley to be reinforced, metallic material.
   2. Microprocessor Master Control shall have on-board diagnostic display. The control shall have programmable parameters including those functions required by ANSI A156.10. Control shall include separate day and night modes of operation with security override. Adjustable Reversing Circuit will reopen door unit if closing path is obstructed. Maximum force required to prevent sliding panel from closing = 28 lbf.
   3. Finger Safety: When unit slides open, strike rail of sliding panel will stop short of adjacent sidelite; resulting opening is net slide.
   4. Remote control panel for on/off/hold open as well as partial opening shall be installed at location as specified on the Shop Drawings. When switched OFF, unit reverts to free manual operation (likewise during electrical power failure).
D. Security and Safety Power Fail Options: Automatic lock: Automatically locks slide function of door when in closed position. Additional power supply for autolock not acceptable.
   1. Autolock Fail Secure: If power fails the lock engages.

E. Header: Shall be 4-1/2" deep by 7" high aluminum construction with removable faceplate.

F. Header Track: Shall be aluminum and replaceable. Rollers will be non-metallic, high quality ball bearing wheels 1-3/4" diameter. Anti-Derailing shall be accomplished by means of a separate adjustable roller.

G. Sliding Panels and Sidelites: Shall be aluminum, 1-3/4" deep with narrow stile construction. Weatherstripping to be along perimeter of sliding panel and swing-out sidelite. Concealed guides to stabilize bottom of sliding panel. Standard glazing prep to be for 1/4" glass.

H. Jambs/Frame: Shall be aluminum. Jamb dimensions to be 1-3/4" deep by 4" wide.

I. Threshold: Shall be aluminum, 1/2" tall by 7" wide.

J. Hardware: Standard key cylinder on exterior vestibule side of the exterior door and no mechanical-locking device from the exterior side. Interior door to have no mechanical-locking devices on Vestibule or Waiting Room sides. Refer to Section 08710 for door’s sequence of operation. Refer to 2.4.G for activation and safety.

K. Glass and Glazing: 1/4" Glass stops on interior and exterior doors, glazing vinyl and setting blocks for field glazing as per Safety Glazing Standard ANSI Z97.1.2. Contractor to coordinate acquisition of glass in thickness and type in accordance with manufacturer’s recommendations for prescribed design. Refer to Section 08800, Glass and Glazing for requirements.

2.04 FABRICATION

A. General: Fabricate automatic entrance door assembly components to designs, sizes, and thicknesses indicated and to comply with indicated standards.
   1. Form aluminum shapes before finishing.
   2. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.
   3. Use concealed fasteners to greatest extent possible. Where exposed fasteners are required, use countersunk Phillips flat-head machine screws fabricated from stainless steel.
      a. Where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration, use self-locking devices.
      b. Reinforce members as required to receive fastener threads.
   4. Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended by manufacturer for this purpose.

B. Framing: Provide automatic entrance doors as prefabricated assemblies. Complete fabrication, assembly, finishing, hardware application, and other work before shipment to Project site.
   1. Fabricate tubular and channel frame assemblies with manufacturer’s standard welded or mechanical joints. Provide subframes and reinforcement as required for a complete system to support required loads.
   2. Perform fabrication operations in manner that prevents damage to exposed finish surfaces.
   3. Form profiles that are sharp, straight, and free of defects or deformations.
   4. Prepare components to receive concealed fasteners and anchor and connection devices.
5. Fabricate components with accurately fitted joints with ends coped or mitered to produce hairline joints free of burrs and distortion.
6. Fabricate exterior components to drain water passing joints and condensation, and moisture occurring or migrating within the system to the exterior.
7. Provide anchorage and alignment brackets for concealed support of assembly from the building structure.
8. Allow for thermal expansion of exterior units.

C. Doors: Factory fabricated and assembled in profiles indicated. Reinforce as required to support imposed loads and for installing hardware.

D. Door Operators: Factory fabricated and installed in headers, including adjusting and testing.

E. Glazing: Fabricate framing with minimum glazing edge clearances for thickness and type of glazing indicated, according to GANA’s “Glazing Manual.” Glazing requirements are 1/4” on both interior and exterior doors.

F. Hardware: Refer to Section 08710 for door’s sequence of operation. Factory install hardware to the greatest extent possible; remove only as required for final finishing operation, and for delivery to and installation at Project site. Cut, drill, and tap for factory-installed hardware before applying finishes.

1. Provide sliding weatherstripping mortised into door at perimeter of sliding doors and fixed sidelites, at exterior & interior doors.

G. Activation and Safety Devices: Factory install devices on headers. Refer to Section 08710 for door’s sequence of operation.

1. Install photoelectric beams in vertical jambs of fixed sidelites with dimension above finished floor as follows:
   b. Bottom Beam: 24 inches.

H. Alarm Contacts: Shall be provided on interior doors and provide for alarm if broken out or open.

**Non-Secured Hours: (Clinic open for service)**
Motion sensors located on both sides of the exterior vestibule door will actuate the door for two-way pedestrian traffic.

**Secured Hours: (Clinic closed for service)**
The interior sliding door will be turned to the OFF position and will be secured via fail secure electric lock and recessed panic hardware.

The exterior vestibule door will be turned to the OFF position and physically locked to incoming pedestrian traffic via standard MS hook lock with key cylinder, and the motion sensors will be deactivated. This door will be switched to ‘secured mode’ by a key switch, toggle switch or remote control panel.

Refer to interior vestibule door for sliding door in non-vestibule situations.

At all times (secured or unsecured, and in the event of a power failure) emergency panic egress will be permitted.

2.05 **ALUMINUM FINISHES**

A. Comply with NAAMM’s “Metal Finishes Manual for Architectural and Metal Products” for recommendations for applying and designating finishes.
B. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.

C. Class I, Color Anodic Finish: AA-M12C22A42/A44 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class I, integrally colored or electrolytically deposited color coating 0.018 mm or thicker) complying with AAMA 611.
   1. Color: Clear Anodized (class II)

PART 3 - EXECUTION

3.01 EXAMINATION
   A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances, header support, and other conditions affecting performance of automatic entrance doors.
      1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION
   A. General: Do not install damaged components. Fit frame joints to produce hairline joints free of burrs and distortion. Rigidly secure non-movement joints. Seal joints watertight.
      1. Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer, or by applying sealant or tape recommended by manufacturer for this purpose.
      2. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.
   B. Entrances: Install automatic entrance doors plumb and true in alignment with established lines and grades without warp or rack of framing members and doors. Anchor securely in place.
      1. Install surface-mounted hardware using concealed fasteners to greatest extent possible.
      2. Set headers, carrier assemblies, tracks, operating brackets, and guides level and true to location with anchorage for permanent support.
      3. Install components to drain water-passing joints, condensation occurring within framing members, and moisture migrating within the system to exterior.
   C. Door Operators: Connect door operators to electrical power distribution system as specified in Section 16150 - Electrical.
   D. Activation and Safety Devices: Adjust devices to provide detection field and functions indicated and to comply with ANSI A156.10.
   E. Glazing: Install glazing as specified in Section 08800 - Glass and Glazing.
   F. Sealants: Comply with requirements specified in Section 07920 - Joint Sealants to provide weathertight installation.
      1. Set framing members, thresholds, bottom-guide track system, and flashings in full sealant bed.
      2. Seal perimeter of framing members with sealant.
   G. Signage: Provide caution signs on each automatic entrance door, visible from both sides of door. Mount caution signs with centerline 58 inches above finished floor.
      1. Emergency Breakaway Panels: Provide emergency breakaway sign visible to egress side of each automatic entrance door and sidelite that has emergency breakaway capability. Mount signs adjacent to lock stile with centerline between 36 and 60 inches above finished floor.
3.03 ADJUSTING
A. Adjust door operators, controls, and hardware for smooth and safe operation, for weathertight closure, and complying with requirements in ANSI A156.10.
B. Lubricate operating hardware and other moving parts.

3.04 CLEANING AND PROTECTION
A. Clean glass and aluminum surfaces promptly after installation. Remove excess glazing and sealant compounds, dirt, and other substances. Repair damaged finish to match original finish.
   1. Comply with requirements in Section 08800 - Glass and Glazing for cleaning and maintaining glass.

3.05 DEMONSTRATION
A. Engage a certified inspector to train Owner’s maintenance personnel to adjust, operate, and maintain automatic entrance doors and door operators.

END OF SECTION
SECTION 08710

DOOR HARDWARE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
   1. Furnishing and installation of all mechanical and electrical finish hardware necessary for all doors and hardware as specified herein; as enumerated in hardware sets; and as indicated and required by actual conditions at the building. The hardware shall include the furnishing of all necessary screws, bolts, expansion shields, drop plates, and all other devices necessary for the proper application of the hardware. Installation shall include field modification and preparation of existing doors and/or frames for new hardware being installed. Provide necessary fillers, Dutchmen, reinforcements, and fasteners for mounting new hardware and to cover existing door/frame preps.

B. Vendors:
   1. All door hardware covered in this section shall be provided and installed by the General Contractor.
   2. Division 6 Section - FINISH CARPENTRY.
   3. Division 8 Section - HOLLOW METAL DOORS AND FRAMES.
   4. Division 8 Section - WOOD DOORS.
   5. Division 8 Section - ALUMINUM FRAMED STOREFRONTS.
   6. Section 08720 - AUTOMATIC DOOR OPERATORS for doors with low-energy operators.
   7. Division 16 Section - ELECTRICAL for electrical connections including conduit and wiring for electrified hardware.

C. Specific Omissions: Hardware for the following is specified or indicated elsewhere, unless specifically listed in the hardware sets:
   1. Windows.
   2. Cabinets of all kinds, including open wall shelving and locks.

1.3 REFERENCES

A. Applicable state and local building codes and standards.

B. FIRE/LIFE SAFETY
   1. NFPA - National Fire Protection Association
      a. NFPA 70 – National Electric Code
      b. NFPA 80 - Standard for Fire Doors and Fire Windows
      d. NFPA 105 - Smoke and Draft Control Door Assemblies

C. UL - Underwriters Laboratories
   1. UL 10C - Positive Pressure Test of Fire Door Assemblies
   2. UL 1784 - Air Leakage Tests of Door Assemblies
   3. UL 305 - Panic Hardware

D. Accessibility
   1. ADA - Americans with Disabilities Act
2. ICC (CABO) / ANSI A117.1 - Accessible and Usable Buildings and Facilities

E. DHI - Door and Hardware Institute
   1. Sequence and Format for the Hardware Schedule
   2. Recommended Locations for Builders Hardware

F. ANSI - American National Standards Institute
   1. ANSI/BHMA A156.1 - A156.24 - Standards for Hardware and Specialties

1.4 SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract and Division 1 requirements. Prior to submittal, field verify existing doors and/or frames receiving new hardware, and/or existing conditions receiving new openings. Verify new hardware is compatible with the existing door/frame preparation and/or existing conditions. Advise architect within the submittal package of incompatibility or issues.

B. Catalog Cuts: Product data including manufacturers’ technical product data for each item of door hardware, installation instructions, and maintenance of operating parts and finish, and other information necessary to show compliance with requirements.

C. Final Hardware Schedule Content: Submit schedule with hardware sets in vertical format as illustrated by the Sequence of Format for the Hardware Schedule as published by the Door and Hardware Institute. Indicate complete designations of each item required for each door or opening. Include the following information:
   1. Door Index; include door number, heading number, and Architects hardware set number.
   2. Opening Lock Function Spreadsheet; list locking device and function for each opening.
   3. Type, style, function, size, and finish of each hardware item.
   4. Name and manufacturer of each item.
   5. Fastenings and other pertinent information.
   6. Location of each hardware set cross-referenced to indications on Drawings.
   7. Explanation of all abbreviations, symbols, and codes contained in schedule.
   8. Mounting locations for hardware.
   9. Door and frame sizes and materials.
  10. Name and phone number for the local manufacturer’s representative for each product.
  11. Operational Description of openings with any electrified hardware (locks, exits, electromagnetic locks, electric strikes, automatic operators, door position switches, magnetic holders or closer/holder units, and/or access control components). Operational description should include how the door will operate on egress, ingress, and/or fire/smoke alarm connection.

D. Templates: After final approval of the hardware schedule, provide templates for doors, frames, and other work specified to be factory prepared for the installation of door hardware.

E. Riser and Wiring Diagrams: After final approval of the hardware schedule, submit riser and wiring diagrams as required for the proper installation of complete electrical, electromechanical, and electromagnetic products.

F. Operations and Maintenance Data: Provide in accordance with Division 1 and include the following:
   1. Complete information on care, maintenance, and adjustment; data on repair and replacement parts; and information on preservation of finishes.
   2. Catalog pages for each product.
   3. Name, address, and phone number of local representative for each manufacturer.
   4. Parts list for each product.
5. Copy of final approved hardware schedule, edited to reflect “As installed.”
6. Copy of final keying schedule.
7. As installed “Wiring Diagrams” for each opening connected to power, both low voltage and 110 volts.
8. One (1) complete set of special tools required for maintenance and adjustment of hardware, including changing of cylinders.
9. Copy of warranties including appropriate reference numbers for manufacturers to identify the project.

G. Certificates of Compliance: Upon request of Architect or Authority Having Jurisdiction, certificates of compliance for fire-rated hardware and installation instructions shall be made available.

1.5 QUALITY ASSURANCE

A. Items specified as “no substitute” shall be provided exactly as listed.
B. Single Source Responsibility: Obtain each type of hardware (latch and locksets, hinges, exit devices, closers, etc.) from a single manufacturer.
C. Fire-Rated Openings: Provide door hardware for fire-rated openings that complies with NFPA Standard No. 80 and requirements of authorities having jurisdiction. Provide only items of door hardware that are listed and are identical to products tested by Underwriters Laboratories, Intertek Testing Services, Factory Mutual, or other testing and inspecting organizations acceptable to the authorities having jurisdiction for use on types and sizes of doors indicated in compliance with requirements of fire-rated door and door frame labels.
D. Electronic Security Hardware: When electrified hardware is included in the hardware specification, the hardware supplier must employ an individual knowledgeable in electrified components and systems who is capable of producing wiring diagrams and consulting as needed. Coordinate installation of the electronic security hardware with the Architect and electrical engineers, and provide installation and technical data to the Architect and other related subcontractors. Upon completion of electronic security hardware installation, inspect and verify that all components are working properly.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Tag each item or package separately with identification related to the final hardware schedule, and include installation instructions with each item or package.
B. Each article of hardware shall be individually packaged in manufacturer's original packaging.
C. Contractor will provide secure lock-up for door hardware delivered to the Project, but not yet installed. Control handling and installation of hardware items so that completion of Work will not be delayed by hardware losses both before and after installation.
D. Items damaged in shipment shall be replaced promptly and with proper material and paid for by whoever did the damage or caused the damage to occur.
E. Hardware shall be handled in a manner to avoid damage, marring, or scratching. Irregularities that occur to the hardware after it has been delivered to the Project shall be corrected, replaced, or repaired by the Contractor. Hardware shall be protected against malfunction due to paint, solvent, cleanser, or any chemical agent.
F. General Contractor must inspect and inventory all deliveries within 24 hours of delivery. All freight damage must be signed as damaged on the Bill of Lading document and reported to the freight carrier. General Contractor must report to supplier any missing, incorrect or damaged
goods immediately. Failure to report missing, damaged or incorrect material within 48 hours means the receiver has accepted the shipment as complete and correct.

1.7 WARRANTY

A. Provide manufacturer’s warranties as specified in Division 1 and as follows:
   1. Closers: 10 years, except electronic closers, 2 years.
   2. Exit Devices: 3 years, except electrified devices, 1 year.
   3. Locksets: 3 years, except electrified locksets, 1 year.
   4. Other hardware: 1 year.

B. No liability is to be assumed where damage or faulty operation is due to improper installation, improper use, or abuse.

C. Products judged to be defective during the warranty period shall be replaced or repaired in accordance with the manufacturer’s warranty, at no additional cost to the Owner.

1.8 MAINTENANCE

A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner’s continued adjustment, maintenance, and removal and replacement of door hardware.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Approval of manufacturers other than those listed shall be in accordance with paragraph 1.5.A.

B. Note that even though an acceptable substitute manufacturer may be listed, the product must provide all the functions and features of the specified product or it will not be approved.

<table>
<thead>
<tr>
<th>Item</th>
<th>Scheduled Manufacturer</th>
<th>Acceptable Substitute</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hinges</td>
<td>Hager (HAG)</td>
<td>Ives, McKinney</td>
</tr>
<tr>
<td>Emergency Release Pivots</td>
<td>Ives (IVE)</td>
<td>Rixson, Stanley, McKinney</td>
</tr>
<tr>
<td>Double Lipped Strikes</td>
<td>Don-jo (DON)</td>
<td>Hager, McKinney</td>
</tr>
<tr>
<td>Emergency Stop</td>
<td>Hager (HAG)</td>
<td>McKinney, Stanley</td>
</tr>
<tr>
<td>Flush Bolts &amp; Coordinators</td>
<td>Ives (IVE)</td>
<td>Don-jo, Rockwood, Hager</td>
</tr>
<tr>
<td>Locksets</td>
<td>Falcon (FAL)</td>
<td>Schlage (SCH)</td>
</tr>
<tr>
<td>Aluminum Door Locks – Narrow Style</td>
<td>Adams Rite (ADA)</td>
<td>No Substitute</td>
</tr>
<tr>
<td>Hospital Latches</td>
<td>Glynn-Johnson (GLY)</td>
<td>No Substitute</td>
</tr>
<tr>
<td>Exit Devices &amp; Mullions</td>
<td>Adams Rite (ADA) or Falcon (FAL)</td>
<td>No Substitute</td>
</tr>
<tr>
<td>Key Pad Locks</td>
<td>Schlage (SCH)</td>
<td>No Substitute</td>
</tr>
<tr>
<td>Electric Strikes</td>
<td>Adams Rite (ADA) or Von Duprin (VON)</td>
<td>No Substitute</td>
</tr>
<tr>
<td>Door Closers</td>
<td>Falcon (FAL)</td>
<td>No Substitute</td>
</tr>
<tr>
<td>Door Closers Concealed</td>
<td>LCN (LCN)</td>
<td>No Substitute</td>
</tr>
<tr>
<td>Electro-Mechanical</td>
<td>See Section 08720</td>
<td>See Section 08720</td>
</tr>
</tbody>
</table>
# Automatic Operators

<table>
<thead>
<tr>
<th>Manual Operators</th>
<th>Door Pulls at Aluminum Doors</th>
<th>No Substitute</th>
</tr>
</thead>
<tbody>
<tr>
<td>Door Trim</td>
<td>Ives (IVE)</td>
<td>Don-jo, Rockwood</td>
</tr>
<tr>
<td>Protection Plates</td>
<td>Ives (IVE)</td>
<td>Don-jo, Rockwood</td>
</tr>
<tr>
<td>Overhead Stops</td>
<td>Glynn-Johnson (GLY)</td>
<td>Rixson, Sargent</td>
</tr>
<tr>
<td>Stoppers</td>
<td>Ives (IVE)</td>
<td>Don-jo, Rockwood</td>
</tr>
<tr>
<td>Thresholds</td>
<td>Pemco (PEM)</td>
<td>No Substitute</td>
</tr>
<tr>
<td>Weatherstripping</td>
<td>Pemco</td>
<td>National Guard Products</td>
</tr>
<tr>
<td>Silencers</td>
<td>Ives (IVE)</td>
<td>Don-jo, Rockwood</td>
</tr>
<tr>
<td>Magnetic Holders</td>
<td>LCN (LCN)</td>
<td>Rixson, Sargent</td>
</tr>
<tr>
<td>Latch Protector</td>
<td>Ives (IVE)</td>
<td>Don-jo, Rockwood</td>
</tr>
<tr>
<td>Bi-pass Hardware</td>
<td>Hager (HAG)</td>
<td>Henderson, Stanley</td>
</tr>
<tr>
<td>Bi-fold Hardware</td>
<td>Hager (HAG)</td>
<td>Henderson, Stanley</td>
</tr>
<tr>
<td>Robe Hooks</td>
<td>Bobrick (BOB)</td>
<td>No Substitute</td>
</tr>
<tr>
<td>Cylinders &amp; Keying</td>
<td>Schlage (SCH)</td>
<td>No Substitute</td>
</tr>
<tr>
<td>Button Mini Boxes, Cobra Locks</td>
<td>Schlage Electronic Security (SCE)</td>
<td>No Substitute</td>
</tr>
<tr>
<td>Key Cabinets</td>
<td>Telkee (TEL)</td>
<td>HPC, Lund</td>
</tr>
<tr>
<td>Auto Operators</td>
<td>Record-USA (REC)</td>
<td>Besam</td>
</tr>
<tr>
<td>Keypad Locksets</td>
<td>Yale (YAL)</td>
<td>No Substitute</td>
</tr>
</tbody>
</table>

## C. Hand of Door: Drawings show direction of slide, swing, or hand of each door leaf. Furnish each item of hardware for proper installation and operation of door movement as shown.

## D. Where the hardware specified is not adaptable to the finished shape or size of the members requiring hardware, furnish suitable types having the same operation and quality as the type specified, subject to the Architect's approval.

### 2.2 MATERIALS

#### A. Fasteners

1. Provide hardware manufactured to conform to published templates, generally prepared for machine screw installation.
2. Furnish screws for installation with each hardware item. Finish exposed (exposed under any condition) screws to match hardware finish, or, if exposed in surfaces of other work, to match finish of this other work as closely as possible including “prepared for paint” surfaces to receive painted finish.
3. Provide concealed fasteners for hardware units that are exposed when door is closed except to the extent that no standard units of type specified are available with concealed fasteners. Do not use thru-bolts for installation where bolt head or nut on opposite face is exposed in other work unless their use is the only means of reinforcing the work adequately to fasten the hardware securely. Review door specification and advise Architect if thru-bolts are required.
4. Hardware shall be installed with the fasteners provided by the hardware manufacturer.

#### B. Hinges

1. Provide five-knuckle, ball bearing hinges of type, material, and height as outlined in the following guide for this specification:
   a. 1-3/4 inch thick doors, up to and including 36 inches wide:
Exterior: standard weight, BB1191 stainless steel, 4-1/2 inches high
Interior: standard weight, BB1279 steel, 4-1/2 inches high
b. 1-3/4 inch thick doors over 36 inches wide:
   Exterior: heavy weight, BB1199 stainless steel, 4-1/2 inches high
   Interior: heavy weight, BB1168 steel, 4-1/2 inches high

2. Provide three hinges per door leaf for doors 90 inches or less in height, and one additional
   hinge for each 30 inches of additional door height.

3. Provide continuous hinges on doors with lead lining and as scheduled.

4. Hinge Pins: Except as otherwise indicated, provide hinge pins as follows:
   a. Steel Hinges: Steel pins
   b. Non-Ferrous Hinges: Stainless steel pins
   c. Out-Swinging Exterior Doors: Non-removable pins
   d. Out-Swinging Interior Lockable Doors: Non-removable pins
   e. Interior Non-lockable Doors: Non-rising pins

5. Adjust hinge width as required for door, frame, and/or wall conditions to allow proper degree
   of opening.

6. Provide hinges with electrified option where specified. Provide with sufficient number and
   gage of concealed wires to accommodate electric function of specified hardware. Locate
   electric hinge nearest to the electrified locking component.

7. Provide mortar guard for each electrified hinge specified, unless specified in hollow metal
   frame specification.

C. Emergency Release Pivots
1. Provide emergency release pivot sets, where specified, offset-hung to allow door to swing
   open in opposite direction unless detailed otherwise.

D. Double Lipped Strike
1. Provide double lip strike, where specified, offset-hung to allow door to swing open in
   opposite direction unless detailed otherwise. Size for specific frame depth. Coordinate
   special latchbolt-hole location and/or special template, as required, to operate with the
   mortise lock being used as specified.

2. Provide a compatible emergency stop/release as recommended by the manufacturer of the
   double lip strike or engineered to operate with the double lip strike.

E. Emergency Stop/Release
1. Provide emergency stop/release, where specified, for doors with double lip strikes offset-
   hung to allow door to swing open in opposite direction unless detailed otherwise.

F. Flush Bolts
1. Provide automatic and manual flush bolts with stainless steel face plates, levers, and guides
   and strikes. Provide 12 inch steel rods at doors up to 90 inches in height. Top rods at
   manual flush bolts for doors over 90 inches in height shall be increased by 6 inches for each
   additional 6 inches of door height. Provide dust-proof strikes at each bottom flush bolt.

G. Coordinators
1. Provide a bar-type coordinating device, surface applied to the underside of the stop at the
   frame head where pairs of doors are equipped with automatic flush bolts, an astragal, or
   other hardware that requires synchronized closing of the doors.

2. Provide a filler bar of the correct length for the unit to span the entire width of the opening,
   and appropriate brackets for parallel arm door closers and surface vertical rod exit device
   strikes. Factory-prep coordinators for vertical rod devices if required.
H. Aluminum Door Locks - Narrow Style
   1. Provide narrow style aluminum door locks as specified. Cylinders: Refer to 2.4 KEYING.
   2. Provide locks with a 1-1/8 inches, or 1-1/2 inches backset as required for door detail with a full 5/8" throw latchbolt.
   3. Provide manufacturers’ standard strikes unless extended lip strikes are necessary to protect trim.

I. Cylindrical Locks - Grade 1
   1. Provide Grade 1 cylindrical locks, where specified, conforming to ANSI A156.2 Series 4000, Grade 1. Cylinders: Refer to 2.4 KEYING.
   2. Provide locksets able to withstand 1500 inch pounds of torque applied to the locked outside lever without gaining access per ANSI A156.2 Abusive Locked Lever Torque Test and cycle tested to 3 million cycles per ANSI A156.2 Cycle Test.
   3. Provide locks with a standard 2-3/4 inches backset, unless noted otherwise, with a 1/2 inch latch throw. Provide proper latch throw for UL listing at pairs.
   4. Provide locksets with separate anti-rotation through-bolts, and shall have no exposed screws. Levers shall operate independently, and shall have two external return spring cassettes mounted under roses to prevent lever sag.
   5. Provide standard ASA strikes unless extended lip strikes are necessary to protect trim.
   6. Provide electrical options as scheduled. Provide power supplies, recommended and approved by the manufacturer of the electrified lock and other components requiring a power supply.
   7. Lever trim shall be solid cast levers without plastic inserts, and wrought roses on both sides. Locksets shall be through-bolted to assure proper alignment.
      a. Lever design shall be Falcon Dane.
      b. Lever trim on the secure side of doors serving rooms considered by the authority having jurisdiction to be hazardous shall have a tactile warning.

J. Mortise Locks - Push/Pull Trim
   1. Provide mortise locks with push/pull trim, where specified, certified as ANSI A156.13, Grade 1 Operational, Grade 1 Security, and manufactured from heavy gauge steel, containing components of steel with a zinc dichromate plating for corrosion resistance. Lock case shall be multi-function and field reversible for handing without opening the case. Cylinders: Refer to 2.4 KEYING.
   2. Provide locks with a standard 2-3/4 inches backset with a full 3/4 inch throw stainless steel mechanical anti-friction latchbolt. Deadbolt shall be a full 1 inch throw, constructed of stainless steel.
   3. Provide standard ASA strikes unless extended lip strikes are necessary to protect trim.
   4. Trim shall be push paddle mounted up and pull paddle mounted down except at psychiatric or security areas provide both paddles mounted down for safety, unless noted otherwise.
      a. Trim on the secure side of doors serving rooms considered by the authority having jurisdiction to be hazardous shall have a tactile warning.

K. Exit Devices – Heavy Duty
   1. Exit devices shall be tested to ANSI/BHMA A156.3 Grade 1, and UL listed for Panic Exit and/or Fire Exit Hardware. Cylinders: Refer to 2.4 KEYING.
   2. Provide touchpad type exit devices, fabricated of stainless steel, or aluminum, plated to the standard architectural finishes to match the balance of the door hardware.
   3. Exit devices shall incorporate a fluid damper or other device that eliminates noise associated with exit device operation. Touchpad shall extend a minimum of one half of the door width, but not the full length of the exit device rail. End-cap will have two-point attachment to door. For all other finishes, the touch-pad finish shall be of compatible finish.
to exit device. Only compression springs will be used in devices, latches, and outside trims or controls.

4. Devices to incorporate a dead-latching feature for security and/or for future addition of alarm kits and/or other electrical requirements.

5. Vertical rod devices shall be capable of being field modified to less bottom rod devices by removal of bottom rod and adding firing pin(s), if required at fire rated openings.

6. Provide manufacturer’s standard strikes.

7. Provide exit devices cut to door width and height. Locate exit devices at a height recommended by the exit device manufacturer, allowable by governing building codes, and approved by the Architect.

8. Mechanism case shall sit flush on the face of all flush doors, or spacers shall be furnished to fill gaps behind devices. Where glass trims or molding projects off the face of the door, provide glass bead kits.

9. Non-fire-rated exit devices shall have hex key dogging.

10. Where lever handles are specified as outside trim for exit devices, provide heavy-duty lever trims with forged or cast escutcheon plates. Provide vandal-resistant levers that will travel to a 90-degree down position when more than 35 pounds of torque are applied, and which can easily be reset.

   a. Lever style will match the lever style of the locksets.

11. Exit devices for fire rated openings shall be UL labeled fire exit hardware.

12. Provide electrical options as scheduled.

13. Provide power transfer sufficient for number and gage of wires to accommodate electric function of specified hardware. Electric power transfer is to be located per manufacturer’s template and UL requirements, unless interference with operation of door or other hardware items.

14. Provide power supplies, recommended and approved by the manufacturer of the electrified exit device and other components requiring a power supply.

L. Key Pad Locks

1. Provide manually programmable locks conforming to ANSI A156 standards. Cylinders: Refer to 2.4 KEYING.

2. Provide manufacturer’s standard strikes.

3. Provide keypad product with a minimum of 100 users.

M. Electric Strikes

1. Provide electric strikes, as specified, designed for use with the type locks shown at each opening.

2. Provide electric strikes UL Listed as burglary-resistant electric door strikes and, where required, shall be UL Listed as electric strikes for fire doors and frames. Provide fail-secure type electric strikes unless specified otherwise.

3. Provide transformers and rectifiers for each strike as required. Verify voltage with electrical contractor.

N. Door Closers – Heavy Duty

1. Provide heavy-duty door closers at exterior doors where specified, certified to ANSI/BHMA A156.4 Grade 1 requirements by a BHMA certified independent testing laboratory. Surface mounted mechanical closers shall be certified to exceed ten million (10,000,000) full load cycles by a recognized independent testing laboratory. Closers shall be ISO 9000 certified. Units shall be stamped with date of manufacture code.

2. Door closers shall have fully hydraulic, full rack and pinion action with a high strength cast iron cylinder and shall utilize full complement bearings at shaft. Cylinder body shall be 1-1/2 inch diameter, and double heat-treated pinion shall be 11/16 inch diameter.
3. Provide hydraulic fluid requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to -30 degrees F. Fluid shall be fireproof and shall pass the requirements of the UL10C “positive pressure” fire test.

4. Spring power shall be continuously adjustable over the full range of closer sizes, and allow for reduced opening force as required by accessibility codes and standards. Hydraulic regulation shall be by tamper-proof, non-critical valves. Closers shall have separate adjustment for latch speed, general speed, and back check.

5. Provide closers with a solid forged steel main arms and factory assembled heavy-duty forged forearms for parallel arm closers. When closers are parallel arm mounted, provide closers which mount within a 6 inch top rail without the use of a mounting plate so that closer shall not be visible through vision panel from pull side.

6. Provide special templates, drop plates, mounting brackets, or adapters for arms as required for details, overhead stops, and other finish hardware items interfering with closer mounting.

7. Mount closers inside of exterior and vestibule doors.

8. Door closers meeting this specification: As scheduled.

O. Electro-Mechanical Automatic Operators
   1. Specified in Section 08720.

P. Door Trim
   1. Provide flush pulls as specified. Where required, provide back-to-back mounted model.
   2. Provide wire pulls of solid bar stock, diameter and length as scheduled.

Q. Protection Plates
   1. Provide kick plates and armor plates minimum of 0.050 inch thick and beveled 4 edges as scheduled. Furnish with machine or wood screws, finished to match plates. Sizes of plates shall be as follows:
      a. Kick Plates – 10 inches high x 2 inches less width of door on single doors, 1 inch less width of door on pairs
      b. Armor Plates – 30 inches high x 2 inches less width of door on single doors, 1 inch less width of door on pairs. If labeled door doesn’t allow 30 inch high armor plate, provide 16 inch high kick plate.
   2. Acceptable manufacturers and/or products: Ives, Don-Jo, Rockwood.

R. Overhead Stops and Overhead Stop/Holders
   1. Provide heavy duty concealed, mounted overhead stop or overhead stop/holder as specified for exterior and interior vestibule single acting doors.
   2. Provide medium duty, concealed mounted overhead stop as specified for double acting doors with emergency release hardware.
   3. Provide heavy- or medium duty and concealed or surface mounted overhead stop, or overhead stop/holder for interior doors as specified. Provide medium duty, surface mounted overhead stop for interior doors and at any door that swings more than 140 degrees before striking a wall; opens against equipment, casework, sidelights, and/or where conditions do not allow a wall stop; or a floor stop presents a tripping hazard.
   4. Where overhead holders are specified, provide friction type at doors without a closer and positive type at doors with a closer.

2.3 FINISHES

   A. Finish of all hardware shall be satin chrome plated US26D (BHMA 626) with the exceptions as follows:
      1. Door Closers: Metallic Powder Coat to Match.
2. Latch Protectors: To match.

2.4 KEYING

A. Provide cores for the Owner’s Existing Schlage key system conforming to the following requirements:
   1. Provide removable core cylinders at all keyed devices. Provide construction cores with construction master keying for use during construction. The temporary construction cores are to be returned to the hardware supplier.
   2. Provide permanent cores keyed by the manufacturer or authorized distributor into the existing key system as directed by the Owner. Provide owner with a copy of the bitting list, return receipt requested.
   3. Provide keys as follows:
      a. GM - Grand Master opens all doors (Provide 2 non-duplicating keys).
      b. M - Interior Master opens all doors (Provide 2 non-duplicating keys)
      c. K1 - Keyed alike, exterior doors only (Provide 6 non-duplicating keys).
      d. K - Keyed differently, opens assigned office (Provide 2 keys for each office).
      e. K2 - Keyed different, exterior door with interchangeable core- Vacuum Room
   4. Visual key control:
      a. Keys shall be stamped with their respective key set number and stamped “DO NOT DUPLICATE”.
      b. All keys shall be stamped with their respective key set letters.
      c. Do not stamp any keys with the factory key change number.
      d. Do not stamp any cores with key set on face (front) of Core. Stamp on back or side of cores so not to be visible when core is in cylinder.
   5. Deliver all keys and/or key blanks from the factory or authorized distributor directly to the Owner in sealed containers, return receipt requested. Failure to comply with these requirements may be cause to require replacement of all or any part of the keying system that was compromised at no additional cost to the Owner.

2.5 KEY CONTROL SYSTEM

A. Provide a key control system, including envelopes, labels, tags with self-locking key clips, receipt forms, 3-way visible card index, temporary markers, permanent markers, and standard metal cabinet; all as recommended by system manufacturer, with capacity for 150% of the number of locks required for the Project.
   1. Provide complete cross index system set up by the hardware supplier, and place keys on markers and hooks in the cabinet as determined by the final key schedule.
   2. Provide hinged-panel type cabinet for wall mounting.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Prior to installation of any hardware, examine all doors, frames, walls and related items for conditions that would prevent proper installation of finish hardware. Correct all defects prior to proceeding with installation.

3.2 INSTALLATION

A. Coordination:
1. Prior to installation of hardware, General Contractor will schedule and hold a meeting with the installer for the purpose of instructing installers on proper installation and adjustment of finish hardware.

2. Prior to ordering electrified hardware, General Contractor will schedule and hold a meeting with the installer for the purpose of coordinating finish hardware with security, electrical, doors and frames, and other related suppliers.

B. Hardware will be installed by qualified tradesmen, skilled in the application of commercial grade hardware.

C. Mount hardware units at heights indicated in “Recommended Locations for Builders Hardware for Standard Steel Doors and Frames” by the Door and Hardware Institute.

D. Install each hardware item in compliance with the manufacturer’s instructions and recommendations, using only the fasteners provided by the manufacturer.

E. Do not install surface mounted items until finishes have been completed on the substrate. Protect all installed hardware during painting.

F. Set units level, plumb and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.

G. Operating parts shall move freely and smoothly without binding, sticking, or excessive clearance.

H. Existing Doors and/or Frames: Remove existing hardware being replaced, tag, and store according to contract documents. Field modifies and prepares existing door and/or frame for new hardware being installed. Provide necessary fillers, Dutchmen, reinforcements, and fasteners for mounting new hardware and to cover existing door/frame preps.

I. Wire (including low voltage), conduit, junction boxes, and pulling of wire are by Division 16, Electrical. Electrical Contractor shall connect wire to door position switches and run wire to central room or area as directed by the Architect. Wires shall be tested and labeled with the Architect’s opening number. Connections to/from power supplies to electrified hardware and any connection to fire/smoke alarm system, and/or smoke evacuation system where specified is by Division 16 Electrical.

3.3 ADJUSTING, CLEANING, AND DEMONSTRATING

A. Adjust and check each operating item of hardware and each door, to ensure proper operation or function of every unit. Replace units which cannot be adjusted to operate freely and smoothly.

B. Where door hardware is installed more than one month prior to acceptance or occupancy of a space or area, return to the installation during the week prior to acceptance or occupancy and make a final check and adjustment of all hardware items in such space or area. Clean operating items as necessary to restore proper function and finish of hardware and doors. Adjust door control devices to compensate for final operation of heating and ventilating equipment.

C. Clean adjacent surfaces soiled by hardware installation.

D. Instruct Owner’s personnel in the proper adjustment, lubrication, and maintenance of door hardware and hardware finishes.

3.4 PROTECTION

A. Provide for the proper protection of complete items of hardware until the Owner accepts the project as complete. Damaged or disfigured hardware shall be replaced or repaired by the responsible party.

3.5 HARDWARE SCHEDULE
A. Provide hardware for each door to comply with requirements of Section “Finish Hardware,” hardware set numbers indicated in door schedule, and in the following schedule of hardware sets.

B. It is intended that the following schedule includes complete items of finish hardware necessary to complete the work. If a discrepancy is found in the schedule such as a missing item, improper hardware for a frame, door or fire codes, the preamble will be the deciding document.

C. Locksets, exit devices, and other hardware items are referenced in the Hardware Sets for series, type, and function. Refer to the preamble for special features, options, cylinders/keying, and other requirements.

D. Hardware Sets

HW SETS 01-05 NOT USED

HW SET: 06 NON-SECURE ENTRANCE - ALUM STOREFRONT OR EXISTING- SGLE WITH PANIC DEVICE – EMERGENCY EGRESS FROM PRE/POST OP

<table>
<thead>
<tr>
<th></th>
<th>Item</th>
<th>Description</th>
<th>Supplier</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>EA HINGES</td>
<td>AS SPECIFIED</td>
<td>HAG</td>
</tr>
<tr>
<td>1</td>
<td>EA ALUMINUM DOOR PANIC</td>
<td>8400 SERIES</td>
<td>‘ADA</td>
</tr>
<tr>
<td></td>
<td>DEVICE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>EA CYLINDER</td>
<td>80-103 X 626</td>
<td>SCH</td>
</tr>
<tr>
<td>1</td>
<td>EA LOCK GUARD</td>
<td>LG1</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>EA OFFSET DOOR PULL</td>
<td>CO-9 BY ALUMINUM DOOR SUPPLIER</td>
<td>AW</td>
</tr>
<tr>
<td>1</td>
<td>EA SURFACE CLOSER</td>
<td>SC81 HD X 689</td>
<td>FAL</td>
</tr>
<tr>
<td>1</td>
<td>EA OVERHEAD STOP</td>
<td>CONCEALED HEAVY DUTY 100S SERIES</td>
<td>GLY</td>
</tr>
<tr>
<td>1</td>
<td>SET SEALS</td>
<td>BY ALUMINUM DOOR SUPPLIER</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>EA DOOR SWEEP</td>
<td>368DN BY ALUMINUM DOOR SUPPLIER</td>
<td>PEM</td>
</tr>
<tr>
<td>1</td>
<td>EA THRESHOLD</td>
<td>273 X 3DFG BY ALUMINUM DOOR SUPPLIER</td>
<td>PEM</td>
</tr>
</tbody>
</table>

HW SET: 07 SECURE ENTRANCE - ALUM SGLE WITH ACCESS CONTROL PANIC DEVICE – STAFF ENTRANCE

<table>
<thead>
<tr>
<th></th>
<th>Item</th>
<th>Description</th>
<th>Supplier</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>EA HINGES</td>
<td>AS SPECIFIED</td>
<td>HAG</td>
</tr>
<tr>
<td>1</td>
<td>EA ELECTRONIC TRIM</td>
<td>CO-100-993R-70-KP RHO 4B BD</td>
<td>SCE</td>
</tr>
<tr>
<td>1</td>
<td>EA PERMANENT CORE</td>
<td>80-036 B123 KEYWAY</td>
<td>SCH</td>
</tr>
<tr>
<td>1</td>
<td>EA CONSTRUCTION CORE</td>
<td>80-035</td>
<td>SCH</td>
</tr>
<tr>
<td>1</td>
<td>EA PANIC DEVICE</td>
<td>24-R-EO</td>
<td>FAL</td>
</tr>
<tr>
<td>1</td>
<td>EA SURFACE CLOSER</td>
<td>SC81 RW/PA X 689</td>
<td>FAL</td>
</tr>
<tr>
<td>1</td>
<td>EA CLOSER MOUNTING PLATE</td>
<td>SC80 18-PA</td>
<td>FAL</td>
</tr>
<tr>
<td>1</td>
<td>EA OVERHEAD STOP</td>
<td>CONCEALED HEAVY DUTY 100S SERIES</td>
<td>GLY</td>
</tr>
<tr>
<td>1</td>
<td>SET SEALS</td>
<td>BY ALUMINUM DOOR SUPPLIER</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>EA DOOR SWEEP</td>
<td>BY ALUMINUM DOOR SUPPLIER</td>
<td>PEM</td>
</tr>
<tr>
<td>1</td>
<td>EA THRESHOLD</td>
<td>BY ALUMINUM DOOR SUPPLIER</td>
<td>PEM</td>
</tr>
</tbody>
</table>

HW SET: 07A SECURE ENTRANCE - ALUM SGLE WITH ACCESS CONTROL – MECH ROOM

<table>
<thead>
<tr>
<th></th>
<th>Item</th>
<th>Description</th>
<th>Supplier</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>EA HINGES</td>
<td>AS SPECIFIED</td>
<td>HAG</td>
</tr>
<tr>
<td>1</td>
<td>EA ELECTRONIC TRIM</td>
<td>CO-100-993R-70-KP RHO 4B BD</td>
<td>SCE</td>
</tr>
<tr>
<td>1</td>
<td>EA PERMANENT CORE</td>
<td>80-036 B123 KEYWAY</td>
<td>SCH</td>
</tr>
<tr>
<td>1</td>
<td>EA CONSTRUCTION CORE</td>
<td>80-035</td>
<td>SCH</td>
</tr>
<tr>
<td>1</td>
<td>EA SURFACE CLOSER</td>
<td>SC81 RW/PA X 689</td>
<td>FAL</td>
</tr>
<tr>
<td>1</td>
<td>EA CLOSER MOUNTING PLATE</td>
<td>SC80 18-PA</td>
<td>FAL</td>
</tr>
<tr>
<td>1</td>
<td>EA OVERHEAD STOP</td>
<td>CONCEALED HEAVY DUTY 100S SERIES</td>
<td>GLY</td>
</tr>
<tr>
<td>1</td>
<td>SET SEALS</td>
<td>BY ALUMINUM DOOR SUPPLIER</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>EA DOOR SWEEP</td>
<td>BY ALUMINUM DOOR SUPPLIER</td>
<td>PEM</td>
</tr>
</tbody>
</table>
HW SET: 08 SECURE MAIN ENTRANCE - ALUM SGLE WITH PANIC DEVICE, ELEC STRIKE, AND AUTO OPERATOR - PATIENT ENTRANCE

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Item Description</th>
<th>Specification/Model</th>
<th>Manufacturer</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Hinges</td>
<td>As Specified</td>
<td>HAG</td>
</tr>
<tr>
<td>1</td>
<td>Aluminum Door Panic Device</td>
<td>8400 Series</td>
<td>ADA</td>
</tr>
<tr>
<td>1</td>
<td>Cylinder Housing</td>
<td>80-103 X 626</td>
<td>SCH</td>
</tr>
<tr>
<td>1</td>
<td>Permanent Core</td>
<td>80-036 B123 KEYWAY</td>
<td>SCH</td>
</tr>
<tr>
<td>1</td>
<td>Construction Core</td>
<td>80-035</td>
<td>SCH</td>
</tr>
<tr>
<td>1</td>
<td>Electric Strike</td>
<td>7100 FAIL SECURE</td>
<td>ADA</td>
</tr>
<tr>
<td>1</td>
<td>Lock Guard</td>
<td>LG11</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>Offset Door Pull</td>
<td>CO-9</td>
<td>KAW</td>
</tr>
<tr>
<td>1</td>
<td>Auto. Operator</td>
<td>8100 Series (As Specified in 08720)</td>
<td>REC</td>
</tr>
<tr>
<td>1</td>
<td>Overhead Stop</td>
<td>Concealed Heavy Duty 100S Series</td>
<td>GLY</td>
</tr>
<tr>
<td>1</td>
<td>Seals</td>
<td>By Aluminum Door Supplier.</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Door Sweep</td>
<td>By Aluminum Door Supplier</td>
<td>PEM</td>
</tr>
<tr>
<td>2</td>
<td>Wall Plate Switch</td>
<td>As Specified in 08720</td>
<td>REC</td>
</tr>
<tr>
<td>2</td>
<td>Button Mini Box</td>
<td>660-PB</td>
<td>REC</td>
</tr>
</tbody>
</table>

All wiring and connections by Division 16.

Operational Description:

For controlled entry (toggle in secure position) -
Immediate egress always allowed. Manual access by key. Automatic operation for access by remote release at receptionist and nurse station, or automatic operation for egress by actuator in waiting area which signals automatic operator to release electric strike and open door. Locate remote release and actuators as directed by architect.

For non-controlled entry (toggle in non-secure position) -
Immediate egress always allowed. Toggle (by others) in automatic operator head to release and hold electric strike and enable outside automatic operator actuator. Manual operation by push n’ go feature or automatic operation by pushing either actuator which will signal automatic operator to open door. Locate actuators as directed by architect.

A. Power on, fire alarm quiet:  
- Door operator is secure/unsecured via rocker switch located in door operator.

B. Power out, fire alarm quiet:  
- Door operator is inoperable due to loss of power. Electric strike “fail secure”. Hardware will allow egress from waiting room but not gain entry from outside without key.

C. Power on, fire alarm active:  
- Fire alarm de-energizes electric strike and door operator. Door operator is inoperable due to loss of power. Electric strike “fail secure”. Hardware will allow egress from waiting room but not gain entry from outside without key.

HW Sets: 9-17 – Not used
HW SET: 18 SECURE ENTRANCE - HOLLOW METAL SGLE WITH ACCESS CONTROL PANIC DEVICE – STAFF ENTRANCE-HOLLOW METAL

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Model/Code</th>
<th>Brand</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 EA</td>
<td>Hinges</td>
<td>B1191 4-1/2 X 4-1/2 NRP</td>
<td>HAG</td>
</tr>
<tr>
<td>1 EA</td>
<td>Panic Device</td>
<td>25-R-EO SERIES</td>
<td>FAL</td>
</tr>
<tr>
<td>1 EA</td>
<td>Surface Closer</td>
<td>SC71 SS</td>
<td>FAL</td>
</tr>
<tr>
<td>1 EA</td>
<td>Panic Device</td>
<td>LG11</td>
<td>IVE</td>
</tr>
<tr>
<td>1 EA</td>
<td>Permanent Core</td>
<td>80-036 B123 KEYWAY</td>
<td>SCH</td>
</tr>
<tr>
<td>1 EA</td>
<td>Construction Core</td>
<td>80-035</td>
<td>SCH</td>
</tr>
<tr>
<td>1 SET</td>
<td>Seals</td>
<td>290AV</td>
<td>PEM</td>
</tr>
<tr>
<td>1 EA</td>
<td>Door Sweep</td>
<td>368 DN</td>
<td>PEM</td>
</tr>
<tr>
<td>1 EA</td>
<td>Threshold</td>
<td>2001 AT</td>
<td>PEM</td>
</tr>
</tbody>
</table>

HW SET: 18EX SECURE SNGL EXTERIOR DOOR - HOLLOW METAL SGLE – SPRINKLER, VACUUM

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Model/Code</th>
<th>Brand</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 EA</td>
<td>Hinges</td>
<td>B1191 4-1/2 X 4-1/2 NRP</td>
<td>IAG</td>
</tr>
<tr>
<td>1 EA</td>
<td>Lockset</td>
<td>B581BD D X 626</td>
<td>HAG</td>
</tr>
<tr>
<td>1 EA</td>
<td>Permanent Core</td>
<td>80-036 B123 KEYWAY</td>
<td>SCH</td>
</tr>
<tr>
<td>1 EA</td>
<td>Construction Core</td>
<td>80-035</td>
<td>SCH</td>
</tr>
<tr>
<td>1 EA</td>
<td>Surface Closer</td>
<td>SC71 SS</td>
<td>AL</td>
</tr>
<tr>
<td>1 SET</td>
<td>Seals</td>
<td>303AS</td>
<td>MEM</td>
</tr>
<tr>
<td>1 EA</td>
<td>Drip Cap</td>
<td>346C</td>
<td>MEM</td>
</tr>
<tr>
<td>1 EA</td>
<td>Threshold</td>
<td>2005AT</td>
<td>MEM</td>
</tr>
</tbody>
</table>

HW SET: 19 EMERGENCY EXIT/EGRESS DOOR - HOLLOW METAL SGLE WITH RIM PANIC HARDWARE – EMERGENCY EXIT OFF PRE-POST RECOVERY ROOM

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Model/Code</th>
<th>Brand</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 EA</td>
<td>Hinges</td>
<td>B1191 4-1/2 X 4-1/2 NRP</td>
<td>HAG</td>
</tr>
<tr>
<td>1 EA</td>
<td>Panic Hardware</td>
<td>25-R-L-NL x 510L-NL DANE X US26D</td>
<td>AL</td>
</tr>
<tr>
<td>1 EA</td>
<td>Cylinder Housing</td>
<td>80-129 X 626</td>
<td>SCH</td>
</tr>
<tr>
<td>1 EA</td>
<td>Construction Core</td>
<td>80-035 X GRN</td>
<td>SCH</td>
</tr>
<tr>
<td>1 EA</td>
<td>Cylinder Core</td>
<td>80-036 X 626 X B123 KEYWAY</td>
<td>SCH</td>
</tr>
<tr>
<td>1 EA</td>
<td>Lock Guard</td>
<td>LG11</td>
<td>IVE</td>
</tr>
<tr>
<td>1 EA</td>
<td>Surface Closer</td>
<td>SC81 RW/PA</td>
<td>AL</td>
</tr>
<tr>
<td>1 SET</td>
<td>Seals</td>
<td>290AV</td>
<td>PEM</td>
</tr>
<tr>
<td>1 EA</td>
<td>Door Sweep</td>
<td>368DN</td>
<td>PEM</td>
</tr>
<tr>
<td>1 EA</td>
<td>Threshold</td>
<td>273 X 3DFG</td>
<td>PEM</td>
</tr>
</tbody>
</table>

HW SET: 20 SECURE ENTRANCE - HOLLOW METAL PR WITH PANIC DEVICE NIGHT LATCH FUNCTION X FLUSH BOLT – DOUBLE DELIVERY DOORS

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Model/Code</th>
<th>Brand</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 EA</td>
<td>Hinges</td>
<td>B1191 4-1/2 X 4-1/2 NRP</td>
<td>HAG</td>
</tr>
<tr>
<td>2 EA</td>
<td>Auto Flush Bolt</td>
<td>FB31B</td>
<td>IVE</td>
</tr>
<tr>
<td>1 EA</td>
<td>Dust Proof Strike</td>
<td>DP1</td>
<td>IVE</td>
</tr>
<tr>
<td>1 EA</td>
<td>Panic Device</td>
<td>9875EO</td>
<td>VON</td>
</tr>
<tr>
<td>1 EA</td>
<td>Lock Guard</td>
<td>LG12</td>
<td>IVE</td>
</tr>
<tr>
<td>2 EA</td>
<td>Closer (Hold Open)</td>
<td>SC71 HO/DS</td>
<td>FAL</td>
</tr>
<tr>
<td>1 EA</td>
<td>Panic Trim</td>
<td>CO-100-993M-70-KP-RHO</td>
<td>SCE</td>
</tr>
<tr>
<td>2 EA</td>
<td>Armor Plate</td>
<td>8400 30&quot; X 1&quot; LDW</td>
<td>IVE</td>
</tr>
<tr>
<td>1 SET</td>
<td>Seals</td>
<td>290AV</td>
<td>PEM</td>
</tr>
<tr>
<td>2 EA</td>
<td>Door Sweep</td>
<td>368DN</td>
<td>PEM</td>
</tr>
<tr>
<td>1 EA</td>
<td>Threshold</td>
<td>1715</td>
<td>PEM</td>
</tr>
<tr>
<td>1 SET</td>
<td>Door Coordinator</td>
<td>COR72</td>
<td>IVE</td>
</tr>
<tr>
<td>1 SET</td>
<td>Coor. Mounting Bracket</td>
<td>MB1 SP28</td>
<td>IVE</td>
</tr>
<tr>
<td>2 EA</td>
<td>Astragal</td>
<td>18041CNB</td>
<td>PEM</td>
</tr>
</tbody>
</table>
## HW SET: 20A NON-SECURE ENTRANCE - HOLLOW METAL WITH PANIC DEVICE NIGHT LATCH FUNCTION - SINGLE DELIVERY DOOR

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Item</th>
<th>Model/Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>hinges</td>
<td>B1191 4-1/2 X 4-1/2 NRP</td>
</tr>
<tr>
<td>1</td>
<td>dust proof strike</td>
<td>280X</td>
</tr>
<tr>
<td>1</td>
<td>panic device</td>
<td>25-R-EO</td>
</tr>
<tr>
<td>1</td>
<td>elec trim</td>
<td>CO-100-993M-70-KP-RHO</td>
</tr>
<tr>
<td>1</td>
<td>lock guard</td>
<td>LG12</td>
</tr>
<tr>
<td>1</td>
<td>closer (hold open)</td>
<td>SC71 HO/DS</td>
</tr>
<tr>
<td>1</td>
<td>armor plate</td>
<td>8400 30&quot; X 1&quot; LDW</td>
</tr>
<tr>
<td>1</td>
<td>seals</td>
<td>290AV</td>
</tr>
<tr>
<td>1</td>
<td>door sweep</td>
<td>368DN</td>
</tr>
<tr>
<td>1</td>
<td>threshold</td>
<td>1715</td>
</tr>
</tbody>
</table>

## HW SET: 21 INTERIOR - NON-RATED SGLE BI-FOLD – CLOSET (48" OPENING)

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Item</th>
<th>Model/Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>bi-fold kit</td>
<td>9860-4H</td>
</tr>
<tr>
<td>1</td>
<td>door pull</td>
<td>8102-G</td>
</tr>
</tbody>
</table>

## HW SET: 22 INTERIOR - NON-RATED SGLE WITH PASSAGE – STAFF LOUNGE, DOUBLE OCCUPANCY TOILET, CORRIDORS, SOILED UTILITY, CLEAN UTILITY, STERILE SUPPLY, MED WASTE, RECEIVING

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Item</th>
<th>Model/Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>hinges</td>
<td>BB1279 4-1/2 X 4-1/2 NRP</td>
</tr>
<tr>
<td>1</td>
<td>passage set</td>
<td>B101S D</td>
</tr>
<tr>
<td>1</td>
<td>kick plate</td>
<td>194S 10&quot; X 2&quot; LDW</td>
</tr>
<tr>
<td>1</td>
<td>stop</td>
<td>236W/242F AS SPECIFIED</td>
</tr>
<tr>
<td>3</td>
<td>silencer</td>
<td>307D</td>
</tr>
<tr>
<td>1</td>
<td>closer with hold open</td>
<td>SC80-3049PA</td>
</tr>
</tbody>
</table>

## HW SET: 23 INTERIOR - NON-RATED SGLE WITH PASSAGE – EXAM ROOM

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Item</th>
<th>Model/Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>hinges</td>
<td>BB1279 4-1/2 X 4-1/2 NRP</td>
</tr>
<tr>
<td>1</td>
<td>passage set</td>
<td>B101S D</td>
</tr>
<tr>
<td>1</td>
<td>kick plate</td>
<td>194S 10&quot; X 2&quot; LDW</td>
</tr>
<tr>
<td>1</td>
<td>stop</td>
<td>236W/242F AS SPECIFIED</td>
</tr>
<tr>
<td>3</td>
<td>silencer</td>
<td>307D</td>
</tr>
<tr>
<td>1</td>
<td>coat hook</td>
<td>BOBRICK B670</td>
</tr>
</tbody>
</table>

## HW SET: 24 INTERIOR - NON-RATED SGLE WITH OFFICE LOCKSET – OFFICES RECEPTION

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Item</th>
<th>Model/Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>hinges</td>
<td>BB1279 4-1/2 X 4-1/2 NRP</td>
</tr>
<tr>
<td>1</td>
<td>office lock</td>
<td>B511BD D</td>
</tr>
<tr>
<td>1</td>
<td>permanent core</td>
<td>80-036 B123 KEYWAY</td>
</tr>
<tr>
<td>1</td>
<td>construction core</td>
<td>80-035</td>
</tr>
<tr>
<td>1</td>
<td>stop</td>
<td>WS407/FS436 AS SPECIFIED</td>
</tr>
<tr>
<td>3</td>
<td>silencer</td>
<td>SR64/SR65</td>
</tr>
<tr>
<td>2</td>
<td>coat hook</td>
<td>BOBRICK B670</td>
</tr>
</tbody>
</table>

## HW SET: 25 NOT USED
<table>
<thead>
<tr>
<th>HW SET: 26 NOT USED</th>
</tr>
</thead>
<tbody>
<tr>
<td>HW SET: 27 NOT USED</td>
</tr>
<tr>
<td>HW SET: 28 INTERIOR - RATED OR NON-RATED SGLE WITH PASSAGE X CLOSER – CORRIDORS, MED GAS, JANITOR</td>
</tr>
<tr>
<td>3 EA HINGES BB1279 4-1/2 X 4-1/2 NRP</td>
</tr>
<tr>
<td>1 EA PASSAGE SET B101S D</td>
</tr>
<tr>
<td>1 EA PERMANENT CORE 80-036 B123 KEYWAY</td>
</tr>
<tr>
<td>1 EA CONSTRUCTION CORE 80-035</td>
</tr>
<tr>
<td>1 EA SURFACE CLOSER SC81 RW/PA AS SPECIFIED</td>
</tr>
<tr>
<td>NOTE: PROVIDE HOLD-OPEN ARM AT NON-RATED DOORS</td>
</tr>
<tr>
<td>1 EA KICK PLATE 194S 10&quot; X 2&quot; LDW</td>
</tr>
<tr>
<td>1 EA STOP 236W/242F AS SPECIFIED</td>
</tr>
<tr>
<td>3 EA SILENCER 307D</td>
</tr>
<tr>
<td>HW SET: 29 INTERIOR - RATED OR NON-RATED SGLE WITH PRIVACY X CLOSER – STAFF TOILET</td>
</tr>
<tr>
<td>3 EA HINGES BB1279 4-1/2 X 4-1/2 NRP</td>
</tr>
<tr>
<td>1 EA PRIVACY SET B301S D</td>
</tr>
<tr>
<td>1 EA SURFACE CLOSER SC81 RW/PA</td>
</tr>
<tr>
<td>1 EA KICK PLATE 194S 10&quot; X 2&quot; LDW</td>
</tr>
<tr>
<td>1 EA STOP 236W/242F AS SPECIFIED</td>
</tr>
<tr>
<td>3 EA SILENCER 307D</td>
</tr>
<tr>
<td>1 EA COAT HOOK BOBRICK B670</td>
</tr>
<tr>
<td>HW SET: 30 INTERIOR - RATED OR NON-RATED SGLE WITH HOSPITAL PRIVACY X CLOSER – IN/OUT SWINGING PATIENT TOILET AND CHANGING ROOM</td>
</tr>
<tr>
<td>1 PR HINGES EP-5J PIVOT SET</td>
</tr>
<tr>
<td>1 EA HOSPITAL PRIVACY LOCK AL44</td>
</tr>
<tr>
<td>1 EA COMBO STOP &amp; STRIKE CSS-9 (CENTER HUNG)</td>
</tr>
<tr>
<td>1 EA CONCEALED CLOSER 6030 DOUBLE ACTING</td>
</tr>
<tr>
<td>1 EA KICK PLATE 8400 10&quot; X 2&quot; LDW</td>
</tr>
<tr>
<td>1 EA STOP 236W/242F AS SPECIFIED</td>
</tr>
<tr>
<td>1 EA EDGE GASKET 369P</td>
</tr>
<tr>
<td>1 EA COAT HOOK BOBRICK B670</td>
</tr>
<tr>
<td>HW SETS 31– NOT USED</td>
</tr>
<tr>
<td>HW SET: 32 INTERIOR - RATED OR NON-RATED SGLE W/ TOUCH PAD CLASSROOM LOCKSET X CLOSER – TREATMENT TO MECHANICAL/ STORAGE</td>
</tr>
<tr>
<td>3 EA HINGES BB1279 4-1/2 X 4-1/2 NRP</td>
</tr>
<tr>
<td>1 EA NEX-TOUCH LOCK B-AU-NTB620-NR-626-1-3/4</td>
</tr>
<tr>
<td>1 EA PERMANENT CORE 80-036 B123 KEYWAY</td>
</tr>
<tr>
<td>1 EA CONSTRUCTION CORE 80-035</td>
</tr>
<tr>
<td>1 EA SURFACE CLOSER SC81 RW/PA AS SPECIFIED</td>
</tr>
<tr>
<td>1 EA ARMOR PLATE 194S 30&quot; X 2&quot; LDW</td>
</tr>
<tr>
<td>1 EA STOP 236W/242F AS SPECIFIED</td>
</tr>
<tr>
<td>3 EA SILENCER 307D</td>
</tr>
<tr>
<td>HW SETS 33– NOT USED</td>
</tr>
</tbody>
</table>
HW SET: 34 INTERIOR - NON-RATED SGLE WITH CLASSROOM LOCKSET X CLOSER – CONTROLLED ENTRY – WAITING TO PRE-POST

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Description</th>
<th>Mfr. Code</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>EA HINGES</td>
<td>BB1279 4-1/2 X 4-1/2 NRP</td>
<td>HAG</td>
</tr>
<tr>
<td>1</td>
<td>EA CLASSROOM LOCK</td>
<td>B561BD D</td>
<td>FAL</td>
</tr>
<tr>
<td>1</td>
<td>EA ELECTRIC STRIKE</td>
<td>7440 FAIL SAFE (12V or 24V)</td>
<td>ADA</td>
</tr>
<tr>
<td>1</td>
<td>EA PERMANENT CORE</td>
<td>80-036 B123 KEYWAY</td>
<td>SCH</td>
</tr>
<tr>
<td>1</td>
<td>EA CONSTRUCTION CORE</td>
<td>80-035</td>
<td>SCH</td>
</tr>
<tr>
<td>1</td>
<td>EA AUTO. OPERATOR</td>
<td>8100 SERIES (AS SPECIFIED IN 08720)</td>
<td>REC</td>
</tr>
<tr>
<td>1</td>
<td>EA ARMOR PLATE</td>
<td>194S 30&quot; X 2&quot; LDW</td>
<td>HAG</td>
</tr>
<tr>
<td>1</td>
<td>EA STOP</td>
<td>236W/242F AS SPECIFIED</td>
<td>HAG</td>
</tr>
<tr>
<td>2</td>
<td>EA WALL PLATE SWITCH</td>
<td>AS SPECIFIED IN 08720</td>
<td>LCN</td>
</tr>
<tr>
<td>3</td>
<td>EA SILENCER</td>
<td>307D</td>
<td>HAG</td>
</tr>
<tr>
<td>2</td>
<td>EA BUTTON MINI BOX</td>
<td>660-PB</td>
<td>SCE</td>
</tr>
</tbody>
</table>

ALL WIRING AND CONNECTIONS BY DIVISION 16.

OPERATIONAL DESCRIPTION:

FOR CONTROLLED ENTRY (TOGGLE IN SECURE POSITION) - IMMEDIATE EGRESS ALWAYS ALLOWED. MANUAL ACCESS BY KEY. AUTOMATIC OPERATION FOR ACCESS BY REMOTE RELEASE AT RECEPTIONIST AND NURSE STATION OR AUTOMATIC OPERATION FOR EGRESS BY ACTUATOR IN TREATMENT AREA WHICH SIGNALS AUTOMATIC OPERATOR TO RELEASE ELECTRIC STRIKE AND OPEN DOOR. LOCATE REMOTE RELEASE AND ACTUATORS AS DIRECTED BY ARCHITECT.

FOR NON-CONTROLLED ENTRY (TOGGLE IN NON-SECURE POSITION) - IMMEDIATE EGRESS ALWAYS ALLOWED. TOGGLE (BY OTHERS) IN AUTOMATIC OPERATOR HEAD TO RELEASE AND HOLD ELECTRIC STRIKE AND ENABLE OUTSIDE AUTOMATIC OPERATOR ACTUATOR. MANUAL OPERATION BY PUSH N' GO FEATURE OR AUTOMATIC OPERATION BY PUSHING EITHER ACTUATOR OR REMOTE RELEASE WHICH WILL SIGNAL AUTOMATIC OPERATOR TO OPEN DOOR. LOCATE ACTUATORS AS DIRECTED BY ARCHITECT.

A. POWER ON, FIRE ALARM QUIET
   - DOOR OPERATOR IS SECURE/UNSECURED VIA ROCKER SWITCH LOCATED IN DOOR OPERATOR.

B. POWER OUT, FIRE ALARM QUIET
   - DOOR OPERATOR IS INOPERABLE DUE TO LOSS OF POWER. ELECTRIC STRIKE "FAIL SAFE". HARDWARE WILL ALLOW EGRESS FROM TREATMENT AREA AND ALLOW ENTRY FROM WAITING ROOM.

C. POWER ON, FIRE ALARM ACTIVE
   - FIRE ALARM DE-ENERGIZES ELECTRIC STRIKE AND DOOR OPERATOR. DOOR OPERATOR IS INOPERABLE DUE TO LOSS OF POWER. ELECTRIC STRIKE "FAIL SAFE". HARDWARE WILL ALLOW EGRESS FROM TREATMENT AREA AND ALLOW ENTRY FROM WAITING ROOM.

HW SET: 35 INTERIOR - RATED OR NON-RATED SGLE WITH POWERED OPENER– PRE-POST TO SEMI-RESTRICTED COORIDOR

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Description</th>
<th>Mfr. Code</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>EA HINGES</td>
<td>BB1279 4-1/2 X 4-1/2 NRP</td>
<td>HAG</td>
</tr>
<tr>
<td>1</td>
<td>EA PASSAGE SET</td>
<td>B101S D</td>
<td>SCH</td>
</tr>
<tr>
<td>1</td>
<td>EA ELECTRIC STRIKE</td>
<td>7440 FAIL SAFE (12V OR 24V)</td>
<td>ADA</td>
</tr>
<tr>
<td>1</td>
<td>EA CONSTRUCTION CORE</td>
<td>80-035</td>
<td>SCH</td>
</tr>
<tr>
<td>1</td>
<td>EA AUTO. OPERATOR</td>
<td>8100 SERIES (AS SPECIFIED IN 08720)</td>
<td>REC</td>
</tr>
<tr>
<td>1</td>
<td>EA ARMOR PLATE</td>
<td>194S 30&quot; X 2&quot; LDW</td>
<td>HAG</td>
</tr>
<tr>
<td>1</td>
<td>EA STOP</td>
<td>236W/242F AS SPECIFIED</td>
<td>HAG</td>
</tr>
<tr>
<td>2</td>
<td>EA WALL PLATE SWITCH</td>
<td>AS SPECIFIED IN 08720</td>
<td>LCN</td>
</tr>
<tr>
<td>3</td>
<td>EA SILENCER</td>
<td>307D</td>
<td>HAG</td>
</tr>
<tr>
<td>1</td>
<td>EA BUTTON MINI BOX</td>
<td>660-PB</td>
<td>SCE</td>
</tr>
</tbody>
</table>
ALL WIRING AND CONNECTIONS BY DIVISION 16.
OPERATIONAL DESCRIPTION:
FOR ENTRY (TOGGLE IN SECURE POSITION) - IMMEDIATE INGRESS OR EGRESS ALWAYS ALLOWED. AUTOMATIC OPERATION FOR ACCESS BY REMOTE RELEASE AT NURSE STATION OR AUTOMATIC OPERATION FOR EGRESS BY ACTUATOR ON EITHER SIDE OF DOOR WHICH SIGNALS AUTOMATIC OPERATOR TO RELEASE ELECTRIC STRIKE AND OPEN DOOR. LOCATE REMOTE RELEASE AND ACTUATORS AS DIRECTED BY ARCHITECT.

FOR NON-CONTROLLED ENTRY (TOGGLE IN NON-SECURE POSITION) - IMMEDIATE EGRESS ALWAYS ALLOWED. TOGGLE (BY OTHERS) IN AUTOMATIC OPERATOR HEAD TO RELEASE AND HOLD ELECTRIC STRIKE AND ENABLE OUTSIDE AUTOMATIC OPERATOR ACTUATOR. MANUAL OPERATION BY PUSH N’ GO FEATURE OR AUTOMATIC OPERATION BY PUSHING EITHER ACTUATOR OR REMOTE RELEASE WHICH WILL SIGNAL AUTOMATIC OPERATOR TO OPEN DOOR. LOCATE ACTUATORS AS DIRECTED BY ARCHITECT.

A. POWER ON, FIRE ALARM QUIET
- DOOR OPERATOR IS SECURE/UNSECURED VIA ROCKER SWITCH LOCATED IN DOOR OPERATOR.

B. POWER OUT, FIRE ALARM QUIET
- DOOR OPERATOR IS INOPERABLE DUE TO LOSS OF POWER. ELECTRIC STRIKE "FAIL SAFE". HARDWARE WILL ALLOW DOOR OPERATION FROM EITHER SIDE.

C. POWER ON, FIRE ALARM ACTIVE
- FIRE ALARM DE-ENERGIZES ELECTRIC STRIKE AND DOOR OPERATOR. DOOR OPERATOR IS INOPERABLE DUE TO LOSS OF POWER. ELECTRIC STRIKE "FAIL SAFE". HARDWARE WILL ALLOW EGRESS FROM EITHER SIDE.

HW SET: 36 INTERIOR - RATED OR NON-RATED SGLE WITH ACCESS CONTROL LOCKSET X CLOSER – WAITING ROOM TO ADMINISTRATIVE AREA

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>EA HINGES</td>
<td>BB1279 4-1/2 X 4-1/2 NRP</td>
</tr>
<tr>
<td>1</td>
<td>EA NEX-TOUCH LOCK</td>
<td>B-AU-NTB620-NR-626-1-3/4</td>
</tr>
<tr>
<td>1</td>
<td>EA PERMANENT CORE</td>
<td>80-036 B123 KEYWAY</td>
</tr>
<tr>
<td>1</td>
<td>EA CONSTRUCTION CORE</td>
<td>80-035</td>
</tr>
<tr>
<td>1</td>
<td>EA SURFACE CLOSER</td>
<td>SC81 RW/PA AS SPECIFIED</td>
</tr>
<tr>
<td>1</td>
<td>EA KICK PLATE</td>
<td>8400 10&quot; X 2&quot; LDW</td>
</tr>
<tr>
<td>1</td>
<td>EA STOP</td>
<td>WS407/FS436 AS SPECIFIED</td>
</tr>
<tr>
<td>3</td>
<td>EA SILENCER</td>
<td>SR64/SR65</td>
</tr>
</tbody>
</table>

HW SET: 37-40 – NOT USED

HW SET: 41 INTERIOR - NON-RATED STOREFRONT -TYPE DOOR – NO LOCKSET – PRE-POST LONG TERM

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>EA HINGES</td>
<td>PER MANUFACTURER SPECIFICATIONS</td>
</tr>
<tr>
<td>1</td>
<td>EA PUSH BAR</td>
<td>PER MANUFACTURER SPECIFICATIONS</td>
</tr>
<tr>
<td>1</td>
<td>EA CLOSER</td>
<td>SC81 RW/PA AS SPECIFIED</td>
</tr>
<tr>
<td>1</td>
<td>EA ADAPTER PLATE</td>
<td>SC80-18PA</td>
</tr>
<tr>
<td>1</td>
<td>EA PULL</td>
<td>PER MANUFACTURER SPECIFICATIONS</td>
</tr>
</tbody>
</table>

HW SET: 42 – INTERIOR – SGNL – HOSPITAL LATCH – SEMI-RESTRICTED TO PROCEDURE ROOM
<table>
<thead>
<tr>
<th>Quantity</th>
<th>Item Description</th>
<th>Model/Specification Details</th>
<th>Manufacturer</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Continuous Hinge</td>
<td>790-905</td>
<td>HAG</td>
</tr>
<tr>
<td>1</td>
<td>Hospital Latch Set</td>
<td>HL6 Push/Pull Latch</td>
<td>GLN</td>
</tr>
<tr>
<td>1</td>
<td>Electric Strike</td>
<td>7440 Fail Safe (12V or 24V)</td>
<td>ADA</td>
</tr>
<tr>
<td>1</td>
<td>Auto. Operator</td>
<td>8100 Series (AS Specified IN 08720)</td>
<td>REC</td>
</tr>
<tr>
<td>1</td>
<td>Stop</td>
<td>236W/242F AS Specified</td>
<td>HAG</td>
</tr>
<tr>
<td>2</td>
<td>Wall Plate Switch</td>
<td>AS Specified IN 08720</td>
<td>LCN</td>
</tr>
<tr>
<td>1</td>
<td>Surface Closer</td>
<td>SC81 RW/PA As Specified</td>
<td>FAL</td>
</tr>
<tr>
<td></td>
<td><strong>NOTE:</strong> PROVIDE HOLD-OPEN ARM AT NON-RATED DOORS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Armor Plate</td>
<td>194S 30&quot; X 2&quot; LDW</td>
<td>HAG</td>
</tr>
<tr>
<td>1</td>
<td>Stop</td>
<td>236W/242F AS Specified</td>
<td>HAG</td>
</tr>
<tr>
<td>3</td>
<td>Silencer</td>
<td>307D</td>
<td>HAG</td>
</tr>
</tbody>
</table>

**END OF SECTION**
SECTION 08800
GLASS AND GLAZING

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. Work Included: Provide labor, materials and equipment necessary to complete the work of this Section, including but not limited to the following:

1. Glass and glazing for the following products and applications:
   a. Steel doors, frames and sidelights specified in Section 08111 - STEEL DOORS AND FRAMES.
   b. Wood doors specified in Section 08211 - FLUSH WOOD DOORS.
   c. Glass doors specified in Section 08320 - SLIDING GLASS DOORS.
   d. Glazed entrances and storefronts specified in Section 08411 - ALUMINUM-FRAMED ENTRANCES AND STOREFRONT.
   e. Interior borrowed lites.
   f. Glazing film.
   g. 3form Translucent Resin Panel System

B. Related Work: The following items are not included in this Section and will be performed under the designated Sections:

1. Section 08320 - SLIDING GLASS DOORS for factory glazing for sliding doors.
2. Section 13090 – RADIATION SHIELDING PROTECTION

1.2 DEFINITIONS

A. Manufacturers of Glass Products: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.

B. Glass Thicknesses: Indicated by thickness designations in millimeters according to ASTM C 1036.

C. Interspace: Space between lites of an insulating-glass unit that contains dehydrated air or a specified gas.

D. Deterioration of Coated Glass: Defects developed from normal use that are attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in metallic coating.

E. Deterioration of Insulating Glass: Failure of hermetic seal under normal use that is attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning insulating glass contrary to manufacturer’s written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.

F. Deterioration of Laminated Glass: Defects developed from normal use that are attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning laminated glass contrary to manufacturer’s written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.
1.3 PERFORMANCE REQUIREMENTS

A. General: Provide glazing systems capable of withstanding normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, and installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.

B. Glass Design: Glass thickness designations indicated are minimums and are for detailing only. Confirm glass thicknesses by analyzing Project loads and in-service conditions. Provide glass lites in the thickness designations indicated for various size openings, but not less than thicknesses and in strengths (annealed or heat treated) required to meet or exceed the following criteria:

1. Glass Thicknesses: Select minimum glass thicknesses to comply with ASTM E 1300, according to the following requirements:
   b. Probability of Breakage for Vertical Glazing: 8 lites per 1000 for lites set vertically or not more than 15 degrees off vertical and under wind action.
      1) Load Duration: 60 seconds or less
   c. Maximum Lateral Deflection: For the following types of glass supported on all 4 edges, provide thickness required that limits center deflection at design wind pressure to 1/50 times the short side length or 1 inch, whichever is less.
      1) For monolithic-glass lites heat treated to resist wind loads.
      2) For insulating glass.
      3) For laminated-glass lites.
   d. Minimum Glass Thickness for Exterior Lites: Not less than 6 mm.

C. Thermal Movements: Provide glazing that allows for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures acting on glass framing members and glazing components. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

D. Thermal and Optical Performance Properties: Provide glass with performance properties specified based on manufacturer’s published test data, as determined according to procedures indicated below:

1. For monolithic-glass lites, properties are based on units with lites 6.0 mm thick.
2. For laminated-glass lites, properties are based on products of construction indicated.
3. For insulating-glass units, properties are based on units with lites 6.0 mm thick and a nominal 1/2-inch-wide interspace.
4. Center-of-Glass Values: Based on using LBL-44789 WINDOW 5.0 computer program for the following methodologies:
   a. U-Factors: NFRC 100 expressed as Btu/ sq. ft. x h x deg F.

1.4 SUBMITTALS

A. Product Data: For each glass product and glazing material indicated.

B. Samples: For the following products, in the form of 12-inch- square samples for glass.
1. Wired glass.
2. Tempered glass.
3. Insulating glass for each designation indicated.
5. For each color (except black) of exposed glazing sealant indicated.

C. Glazing Schedule: Use same designations indicated on Drawings for glazed openings in preparing a schedule listing glass types and thicknesses for each size opening and location.

D. Product Certificates: Signed by manufacturers of glass and glazing products certifying that products furnished comply with requirements.
   1. For solar-control low-e-coated glass, provide documentation demonstrating that manufacturer of coated glass is certified by coating manufacturer.

E. Qualification Data: For installers.

F. Preconstruction Adhesion and Compatibility Test Report: From glazing sealant manufacturer indicating glazing sealants were tested for adhesion to glass and glazing channel substrates, and for compatibility with glass and other glazing materials.

G. Product Test Reports: For each of the following types of glazing products:
   1. Coated float glass.
   2. Insulating glass.
   5. Glazing gaskets.

H. Warranties: Special warranties specified in this Section.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has completed glazing similar in material, design, and extent to that indicated for this Project whose work has resulted in glass installations with a record of successful in-service performance.

B. Source Limitations for Glass: Obtain the following through one source from a single manufacturer for each glass type: clear float glass, laminated glass and insulating glass.

C. Source Limitations for Glass Sputter-Coated with Solar-Control Low-E Coatings: Where solar-control low-e coatings of a primary glass manufacturer that has established a certified fabricator program is specified, obtain sputter-coated solar-control low-e-coated glass in fabricated units from a manufacturer that is certified by coated-glass manufacturer.

D. Source Limitations for Glazing Accessories: Obtain glazing accessories through one source from a single manufacturer for each product and installation method indicated.

E. Elastomeric Glazing Sealant Product Testing: Obtain sealant test results for product test reports in “Submittals” Article from a qualified testing agency based on testing current sealant formulations within a 36-month period.
   1. Sealant Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated, as documented according to ASTM E 548.
   2. Test elastomeric glazing sealants for compliance with requirements specified by reference to ASTM C 920 and, where applicable, to other standard test methods.

F. Preconstruction Adhesion and Compatibility Testing: Submit to elastomeric glazing sealant manufacturers, for testing indicated below, samples of each glazing material type, tape sealant,
gasket, glazing accessory, and glass-framing member that will contact or affect elastomeric glazing sealants:

1. Use ASTM C 1087 to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of glazing sealants to glass, tape sealants, gaskets, and glazing channel substrates.

2. Submit not fewer than eight pieces of each type of material, including joint substrates, shims, joint-sealant backings, secondary seals, and miscellaneous materials.

3. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.

4. For materials failing tests, obtain sealant manufacturer’s written instructions for corrective measures, including the use of specially formulated primers.

5. Testing will not be required if elastomeric glazing sealant manufacturers submit data based on previous testing of current sealant products for adhesion to, and compatibility with, glazing materials matching those submitted.

G. Glazing for Fire-Rated Door Assemblies:  Glazing for assemblies that comply with NFPA 80 and that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 252.

H. Safety Glazing Products:  Comply with testing requirements in 16 CFR 120 and, for wired glass, ANSI Z97.1.

1. Subject to compliance with requirements, obtain safety glazing products permanently marked with certification label of the Safety Glazing Certification Council or another certification agency] acceptable to authorities having jurisdiction.

2. Where glazing units, including Kind FT glass and laminated glass, are specified in Part 2 articles for glazing lites more than 9 sq. ft. in exposed surface area of one side, provide glazing products that comply with Category II materials, for lites 9 sq. ft. or less in exposed surface area of one side, provide glazing products that comply with Category I or II materials, except for hazardous locations where Category II materials are required by 16 CFR 1201 and regulations of authorities having jurisdiction.

I. Glazing Publications:  Comply with published recommendations of glass product manufacturers and organizations below, unless more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.

1. GANA Publications:  GANA Laminated Division’s “Laminated Glass Design Guide” and GANA’s “Glazing Manual”.


J. Insulating-Glass Certification Program:  Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of the following testing and inspecting agency:

1. Insulating Glass Certification Council.

K. Preinstallation Conference:  Conduct conference at Project site to comply with requirements in Division 01.

L. Comply with pertinent codes and regulations.
1.6 DELIVERY, STORAGE, AND HANDLING
A. Protect glazing materials according to manufacturer’s written instructions and as needed to prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.
B. For insulating-glass units that will be exposed to substantial altitude changes, comply with insulating-glass manufacturer’s written recommendations for venting and sealing to avoid hermetic seal ruptures.

1.7 PROJECT CONDITIONS
A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers, and when glazing channel substrates are wet from rain, frost, condensation, or other causes.
   1. Do not install liquid glazing sealants when ambient and substrate temperature conditions are outside limits permitted by glazing sealant manufacturer or below 40 deg F.

1.8 WARRANTY
A. Manufacturer’s Special Warranty for Coated-Glass Products: Manufacturer’s standard form, made out to the Owner and signed by coated-glass manufacturer, agreeing to replace coated-glass units that deteriorate as defined in “Definitions” Article, f.o.b. the nearest shipping point to Project site, within specified warranty period indicated below.
   1. Warranty Period: Ten years from date of Substantial Completion.
B. Manufacturer’s Special Warranty on Laminated Glass: Manufacturer’s standard form, made out to the Owner and signed by laminated-glass manufacturer, agreeing to replace laminated-glass units that deteriorate as defined in ‘Definitions” Article, f.o.b. the nearest shipping point to Project site, within specified warranty period indicated below.
   1. Warranty Period: Five years from date of Substantial Completion.
C. Manufacturer’s Special Warranty on Insulating Glass: Manufacturer’s standard form, made out to the Owner and signed by insulating-glass manufacturer, agreeing to replace insulating-glass units that deteriorate as defined in “Definitions” Article, f.o.b. the nearest shipping point to Project site, within specified warranty period indicated below.
   1. Warranty Period: Ten years from date of Substantial Completion.

PART 2 - PRODUCTS
2.1 INSULATING-GLASS UNITS
A. Insulating-Glass Units for Vertical Glazing: 1 inch thick insulating glass consisting of two lites of 1/4 inch glass, low-e coating on the No. 2 surface and argon gas filled. Provide one of the following or equal, Match existing color and tint:
   1. VE1-2M by Viracon.
      a. Visible Light Transmittance: 70 percent.
      b. Reflectance Visible Light: 11 percent.
      c. U Value (Winter): 0.25.
      d. Shading Coefficient: 0.43.
      e. Solar Heat Gain Coefficient: 0.37.
   2. Solarban 60 by PPG Industries.
      a. Visible Light Transmittance: 70 percent.
3. SN-68 by Guardian Industries.
   b. Reflectance Visible Light: 10 percent.
   c. U Value (Winter): 0.29.
   d. Shading Coefficient: 0.43.
   e. Solar Heat Gain Coefficient: 0.37.

2.2 INTERIOR GLAZING

A. Tempered Float Glass: ASTM C 1048, Type I (transparent flat glass), Quality-Q3, Kind FT, 1/4 inch thick unless indicated otherwise.

B. Wired Glass: ASTM C 1036, Type II (patterned and wired flat glass), Class 1 (clear), Quality-Q-6, form 1 and square mesh pattern.

C. Radiation Shielding Glazing: Meeting requirements as specified by Owner’s radiation shielding report
   1. Refer to 13090 – Radiation Shielding Protection.

D. Glazing Film: Frosted type, to be selected by Architect.

2.3 GLAZING SEALANTS

A. General: Provide products of type indicated, complying with the following requirements:
   1. Compatibility: Verify glazing sealants that are compatible with one another and with other materials they will contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
   2. Suitability: Comply with sealant and glass manufacturer’s written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
   3. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer’s full range.

B. Elastomeric Glazing Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied chemically curing sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.
   1. Single-Component Neutral- and Basic-Curing Silicone Glazing Sealants:
      a. Dow Corning Corporation; 790.
      b. GE Silicones; SilPruf LM SCS2700.
      c. Tremco; Spectrem 1 (Basic).

2.4 GLAZING TAPES

A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based elastomeric tape with a solids content of 100 percent; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; packaged on rolls with a release paper backing; and complying with ASTM C 1281 and AAMA 800 for project conditions.
B. Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; packaged on rolls with release liner protecting adhesive; and complying with AAMA 800 for the following types:

1. Type 1, for glazing applications in which tape acts as the primary sealant.
2. Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

2.5 MISCELLANEOUS GLAZING MATERIALS

A. General: Provide products of material, size, and shape complying with referenced glazing standard, requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.

B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.

C. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.

D. Spacers: Elastomeric blocks or continuous extrusions with a Shore, Type A durometer hardness required by glass manufacturer to maintain glass lites in place for installation indicated.

E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).

2.6 FABRICATION OF GLAZING UNITS

A. Fabricate glazing units in sizes required to glaze openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.

B. Clean-cut or flat-grind vertical edges of butt-glazed monolithic lites in a manner that produces square edges with slight kerfs at junctions with outdoor and indoor faces.

C. Grind smooth and polish exposed glass edges and corners.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine framing glazing, with Installer present, for compliance with the following:

1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
2. Presence and functioning of weep system.
3. Minimum required face or edge clearances.
4. Effective sealing between joints of glass-framing members.
5. Do not remove labels from glass until so directed by the architect.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.
3.3 GLAZING, GENERAL

A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.

B. Glazing channel dimensions, as indicated on Drawings, provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances. Adjust as required by Project conditions during installation.

C. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.

D. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction sealant-substrate testing.

E. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.

F. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.

G. Provide spacers for glass lites where length plus width is larger than 50 inches as follows:
   1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
   2. Provide 1/8-inch minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.

H. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.

I. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.

3.4 TAPE GLAZING

A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.

B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.

C. Cover vertical framing joints by applying tapes to heads and sills first and then to jambs. Cover horizontal framing joints by applying tapes to jambs and then to heads and sills.

D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.

E. Do not remove release paper from tape until just before each glazing unit is installed.

F. Center glass lites in openings on setting blocks and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.
3.5 SEALANT GLAZING (WET)
   A. Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.
   B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.
   C. Tool exposed surfaces of sealants to provide a substantial wash away from glass.

3.6 CLEANING AND PROTECTION
   A. Protect exterior glass from damage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove nonpermanent labels, and clean surfaces.
   B. Protect glass from contact with contaminating substances resulting from construction operations, including weld splatter. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended by glass manufacturer.
   C. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains; remove as recommended in writing by glass manufacturer.
   D. Remove and replace glass that is broken, chipped, cracked, or abraded or that is damaged from natural causes, accidents, and vandalism, during construction period.
   E. All loose lights shall be removed and reset before acceptance.
   F. Final cleaning shall be done by the contractor under supplementary general conditions.

END OF SECTION
SECTION 09260
GYPSUM BOARD ASSEMBLIES

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. Work Included: Provide labor, materials and equipment necessary to complete the work of this Section, including but not limited to the following:

1. Interior gypsum wallboard.
2. Tile backing panels.
3. Paperless mold and mildew resistant wallboard.
4. Acoustic insulation in gypsum wallboard assemblies.

B. Related Work: The following items are not included in this Section and will be performed under the designated Sections:

1. Section 06100 – Rough carpentry for installation of wood blocking.
2. Section 09900 – For wallboard priming and finishing.
3. Division 15 - FIRE PROTECTION for installation of access doors in gypsum board assemblies.
4. Division 15 - PLUMBING for installation of access doors in gypsum board assemblies.
5. Division 15 - HEATING, VENTILATING, AND AIR CONDITIONING for installation of access doors, pipes and duct sleeves in gypsum board assemblies.
6. Division 16 - ELECTRICAL for installation of access doors in gypsum board assemblies.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Samples: Full-size Sample in 12-inch-long length for each trim accessory indicated.

1. Manufacturers’ product data for adhesives used to laminate gypsum board panels to substrates, including printed statement of VOC content.

1.3 QUALITY ASSURANCE

A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.

B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 413 by an independent testing agency.

1.4 STORAGE AND HANDLING

A. Store materials inside under cover and keep them dry and protected against damage from weather, condensation, direct sunlight, construction traffic, and other causes. Stack panels flat to prevent sagging.

1.5 PROJECT CONDITIONS

A. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer’s written recommendations, whichever are more stringent.

B. Do not install interior products until installation areas are enclosed and conditioned.
C. Do not install panels that are wet, those that are moisture damaged, and those that are mold damaged.
   1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
   2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

1.6 STANDARD WALL TYPES
A. Refer to drawings for wall types.

PART 2 - PRODUCTS

2.1 NON-LOAD-BEARING STEEL FRAMING, GENERAL
A. Framing Members, General: Comply with ASTM C 754 for conditions indicated.
   1. Steel Sheet Components: Comply with ASTM C 645 requirements for metal, unless otherwise indicated.
   2. Protective Coating: manufacturer's standard corrosion-resistant zinc coating, unless otherwise indicated.

2.2 SUSPENSION SYSTEM COMPONENTS
A. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.0625-inch-diameter wire, or double strand of 0.0475-inch-diameter wire.
B. Hanger Attachments to Concrete:
   1. Anchors: Fabricated from corrosion-resistant materials with holes or loops for attaching wire hangers and capable of sustaining, without failure, a load equal to 5 times that imposed by construction as determined by testing according to ASTM E 488 by an independent testing agency.
      a. Type: Post-installed, expansion anchor.
C. Wire Hangers: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.162-inch diameter.
D. Carrying Channels: Cold-rolled, commercial steel sheet with a base-metal thickness of 0.0538 inch and minimum 1/2 inch wide flanges with depth as required for span and loading and indicated on Drawings.
E. Furring Channels (Furring Members): 0.0538-inch bare-steel thickness, with minimum 1/2 inch wide flanges, 3/4 inch deep.
F. Grid Suspension System for Ceilings: ASTM C 645, direct-hung system composed of main beams and cross-furring members that interlock.
   1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
      b. Chicago Metallic Corporation; Drywall Furring System.
      c. USG Corporation; Drywall Suspension System.

2.3 STEEL FRAMING FOR FRAMED ASSEMBLIES
A. Steel Studs and Runners: ASTM C 645.
   1. Minimum Base-Metal Thickness: 25 GA for walls less than 13'-0" in height
   2. Minimum Base-Metal Thickness: 20 GA for walls greater than 13'-0" in height and less than 20'-0" in height.
3. For walls greater than 20'-0" in height, structural engineers shall consider doubling 20 GA studs and/or decreasing the stud spacing to achieve height requirement as opposed to decreasing the gauge of the studs.
4. At all corner guard locations, provide doubled 20 GA metal studs run continuously from floor to structure above.

B. Slip-Type Head Joints: Where indicated, provide one of the following:
   1. Single Long-Leg Runner System: ASTM C 645 top runner with 2 inch deep flanges in thickness not less than indicated for studs, installed with studs friction fit into top runner and with continuous bridging located within 12 inches of the top of studs to provide lateral bracing.
   2. Double-Runner System: ASTM C 645 top runners, inside runner with 2 inch deep flanges in thickness not less than indicated for studs and fastened to studs, and outer runner sized to friction fit inside runner.
   3. Deflection Track: Steel sheet top runner manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above; in thickness not less than indicated for studs and in width to accommodate depth of studs.
      a. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
         1) Steel Network Inc. (The); VertiClip Series.
         2) Superior Metal Trim; Superior Flex Track System (SFT).

C. Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length and width indicated.
   1. Minimum Base-Metal Thickness: 0.021 inch.

D. Cold-Rolled Channel Bridging: 0.0538-inch bare steel thickness, with minimum 1/2 inch wide flanges.
   1. Depth: 1-1/2 inches.
   2. Clip Angle: Not less than 1-1/2 by 1-1/2 inches, 0.068 inch-thick, galvanized steel.

E. Hat-Shaped, Rigid Furring Channels: ASTM C 645.
   1. Minimum Base Metal Thickness: 0.021 inch.
   2. Depth: 1-1/2 inches.

F. Resilient Furring Channels: 1/2 inch deep, steel sheet members designed to reduce sound transmission.
   1. Configuration: Asymmetrical or hat shaped.

G. Z-Shaped Furring: With slotted or non-slotted web, face flange of 1-1/4 inches wall attachment flange of 7/8 inch, minimum bare-metal thickness of 0.0179 inch, and depth required to fit insulation thickness indicated.

H. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power and other properties required to fasten steel members to substrates.

I. Isolation Strip at Exterior Walls: Adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement, 1/8 inch thick, in width to suit steel stud size.

2.4 INTERIOR GYPSUM BOARD

A. General: Complying with ASTM C 36/C 36M or ASTM C 1396/C 1396M, as applicable to type of gypsum board indicated and whichever is more stringent.
1. 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:
   a. USG Corporation.
   b. Georgia Pacific.
   c. National Gypsum Company.

B. Regular Type:
   1. Thickness: 5/8 inch.
   2. Long Edges: Tapered.

C. Fire-Resistant Type X:
   1. Thickness: 5/8 inch.
   2. Long Edges: Tapered.

D. Flexible Type: Manufactured to bend to fit radii and to be more flexible than standard regular type gypsum board of same thickness.
   1. Thickness: 1/4 inch.
   2. Long Edges: Tapered.

E. Mold and Moisture Resistant Type – Gold Bond eXP Tile Backer
   1. Thickness: Per Wall Type – TYPE X
   2. Long edges: Square
   3. Facer: Fiberglass Mat, moisture resistant, acrylic coated water barrier on front

2.5 TRIM ACCESSORIES

A. Interior Trim: ASTM C 1047.
   1. Material: Galvanized or aluminum-coated steel sheet or rolled zinc.
   2. Shapes:
      a. Cornerbead.
      b. Bullnose bead.
      c. LC-Bead: J-shaped; exposed long flange receives joint compound.
      d. Expansion (control) joint.
      e. Curved-Edge Cornerbead: With notched or flexible flanges.

B. Aluminum Trim: Extruded accessories of profiles and dimensions indicated.
   1. 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:
      a. Fry Reglet Corp.
      b. Gordon, Inc.
      c. Pittcon Industries.
   2. Aluminum: Alloy and temper with not less than the strength and durability properties of ASTM B 221, Alloy 6063-T5.
   3. Finish: Corrosion-resistant primer compatible with joint compound and finish materials specified.

2.6 JOINT TREATMENT MATERIALS

A. General: Comply with ASTM C 475/C 475M.
B. Joint Tape:
   1. Interior Gypsum Wallboard: Paper Tape: 2-1/16” wide
   2. Interior Gypsum Wallboard Corners: Paper Tape: 2” wide with metal strips laminated along center to form inside and outside corners.

C. Joint Compound for Interior Gypsum Wallboard: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.
   1. Prefilling: At open joints, rounded or beveled panel edges, and damaged surface areas, use setting-type taping compound.
   2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting-type taping compound.
   3. Fill Coat: For second coat, use setting-type, sandable topping compound.
   4. Finish Coat: For third coat, use setting-type, sandable topping compound.
   5. Skim Coat: For final coat of Level 4 finish, use setting-type, sandable topping compound.

2.7 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.

B. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.
   1. Use adhesives that have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

C. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.
   1. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch thick.
   2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.

D. Sound Attenuation Blankets: ASTM C 665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.
   1. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.
   2. Thickness: 3” nominal.

E. Acoustical Sealant: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
   1. Acoustical Sealant for Exposed and Concealed Joints:
      a. Pecora Corp.; AC-20 FTR Acoustical and Insulation Sealant.
   2. Acoustical Sealant for Concealed Joints:
      a. Ohio Sealants, Inc.; Pro-Series SC-170 Rubber Base Sound Sealant.
      b. Pecora Corp.; BA-98.
F. Access Doors: Provide access doors in gypsum wallboard ceilings where required for access to mechanical and electrical units (i.e., fire dampers, electrical boxes). Access doors shall be of the size indicated on the drawings or as required for proper access to equipment beyond. Provide mounting straps, concealed hinges and screwdriver locks. Door panel should open to 180 degrees. All doors to be constructed from 16 gauge. Door and frame to have prime coat finish.

1. Fire Rated Walls and Ceilings

2. Non-Fire Rated Walls and Ceilings

PART 3 - EXECUTION

3.1 EXAMINATION
   A. Examine areas and substrates, with Installer present, and including welded hollow metal frames and framing, for compliance with requirements and other conditions affecting performance.
   B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.
   C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION
   A. Suspended Assemblies: Coordinate installation of suspension systems with installation of overhead structure to ensure that inserts and other provisions for anchorages to building structure have been installed to receive hangers at spacing required to support the Work and that hangers will develop their full strength.
      1. Furnish concrete inserts and other devices indicated to other trades for installation in advance of time needed for coordination and construction.
   B. Coordination with Sprayed Fire-Resistive Materials:
      1. Before sprayed fire-resistive materials are applied, attach offset anchor plates or ceiling runners (tracks) to surfaces indicated to receive sprayed fire-resistive materials. Where offset anchor plates are required, provide continuous plates fastened to building structure not more than 24 inches o.c.
      2. After sprayed fire-resistive materials are applied, remove them only to extent necessary for installation of non-load-bearing steel framing. Do not reduce thickness of fire-resistive materials below that required for fire-resistance ratings indicated. Protect adjacent fire-resistive materials from damage.

3.3 INSTALLATION, GENERAL
   A. Installation Standard: ASTM C 754. Also comply with requirements in ASTM C 840 that apply to framing installation.
   B. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.
   C. Install bracing at terminations in assemblies.
   D. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.
### 3.4 INSTALLATION, MOLD AND MOISTURE RESISTANT TILE BACKER

A. Install in accordance with manufacturer recommendations, ASTM C 840 and GA-216

B. Install with acrylic coated water barrier side facing away from framings, so that finishes shall be applied to coated side.

C. Caulk or seal penetrations and abutments to dissimilar materials.

D. Installation for walls with Tile Finish.
   1. Install panels horizontal or vertical to supports spaced a maximum of 16” on center without blocking or 24” on center with blocking at all joints.
   2. Space fasteners 8’ on center along all supported members. Drive fasteners flush with panel surface, do not countersink.

E. Installation for non-tile applications
   1. Tape joints with fiberglass mesh tape and embed with setting type joint compound.
   2. Skim surface with a setting or ready-mix joint compound.

### 3.5 INSTALLING SUSPENSION SYSTEMS

A. Install suspension system components in sizes and spacings indicated on Drawings, but not less than those required by referenced installation standards for assembly types and other assembly components indicated.

B. Isolate suspension systems from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement.

C. Suspend hangers from building structure as follows:
   1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or suspension system.
      a. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
   2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with locations of hangers required to support standard suspension system members, install supplemental suspension members and hangers in the form of trapezes or equivalent devices.
      a. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced installation standards.
   3. Wire Hangers: Secure by looping and wire tying, either directly to structures or to inserts, eye screws, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause hangers to deteriorate or otherwise fail.
   4. Flat Hangers: Secure to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices and fasteners that are secure and appropriate for structure and hanger, and in a manner that will not cause hangers to deteriorate or otherwise fail.
   5. Do not attach hangers to steel roof deck.
   6. Do not attach hangers to permanent metal forms. Furnish cast-in-place hanger inserts that extend through forms.
   7. Do not attach hangers to rolled-in hanger tabs of composite steel floor deck.
   8. Do not connect or suspend steel framing from ducts, pipes, or conduit.

D. Fire-Resistance-Rated Assemblies: Wire tie furring channels to supports.
E. Seismic Bracing: Sway-brace suspension systems with hangers used for support.

F. Grid Suspension Systems: Attach perimeter wall track or angle where grid suspension systems meet vertical surfaces. Mechanically join main beam and cross-furring members to each other and butt-cut to fit into wall track.

G. Installation Tolerances: Install suspension systems that are level to within 1/8 inch in 12 feet measured lengthwise on each member that will receive finishes, and transversely between parallel members that will receive finishes.

3.6 INSTALLING FRAMED ASSEMBLIES

A. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.

B. Install studs so flanges within framing system point in same direction.

C. Install tracks (runners) at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings, except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts penetrating partitions above ceiling.

1. Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.

2. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.

   a. Install two studs at each jamb, unless otherwise indicated.
   b. Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2 inch clearance from jamb stud to allow for installation of control joint in finished assembly.
   c. Extend jamb studs through suspended ceilings and attach to underside of overhead structure.

3. Other Framed Openings: Frame openings other than door openings the same as required for door openings, unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.

4. Fire-Resistance-Rated Partitions: Install framing to comply with fire-resistance-rated assembly indicated and support closures and to make partitions continuous from floor to underside of solid structure.

   a. Firestop Track: Where indicated, install to maintain continuity of fire-resistance-rated assembly indicated.

5. Sound-Rated Partitions: Install framing to comply with sound-rated assembly indicated.

6. Curved Partitions:

   a. Bend track to uniform curve and locate straight lengths so they are tangent to arcs.
   b. Begin and end each arc with a stud, and space intermediate studs equally along arcs. On straight lengths of not less than 2 studs at ends of arcs, place studs 6 inches o.c.

D. Direct Furring: Attach to concrete or masonry with stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches o.c.

E. Z-Furring Members:
1. Erect insulation vertically and hold in place with Z-furring members spaced 24 inches o.c.
2. Except at exterior corners, securely attach narrow flanges of furring members to wall with concrete stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches o.c.
3. At exterior corners, attach wide flange of furring members to wall with short flange extending beyond corner; on adjacent wall surface, screw-attach short flange of furring channel to web of attached channel. At interior corners, space second member no more than 12 inches from corner and cut insulation to fit.

3.7 APPLYING AND FINISHING PANELS, GENERAL

A. Comply with ASTM C 840.
B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.
C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place.
D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.
E. Form control and expansion joints with space between edges of adjoining gypsum panels.
F. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.

G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments, except floors. Provide 1/4- to 1/2-inch wide spaces at these locations, and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.

H. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.

3.8 APPLYING INTERIOR GYPSUM BOARD

A. Single-Layer Application:

1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing, unless otherwise indicated.
2. On partitions/walls, apply gypsum panels to minimize end joints.
3. On Z-furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.
4. Fastening Methods: Apply gypsum panels to supports with steel drill screws.

B. Multi-Layer Application:
1. On ceilings, apply gypsum board indicated for base layers before applying base layers on walls/partitions; apply face layers in same sequence. Apply base layers at right angles to framing members and offset face-layer joints 1 framing member, 16 inches minimum, from parallel base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly.

2. On partitions/walls, apply gypsum board indicated for base layers and face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.

3. On Z-furring members, apply base layer vertically (parallel to framing) and face layer either vertically (parallel to framing) or horizontally (perpendicular to framing) with vertical joints offset at least one furring member. Locate edge joints of base layer over furring members.

4. Fastening Methods: Fasten base layers and face layers separately to supports with screws.

C. Laminating to Substrate: Where gypsum panels are indicated as directly adhered to a substrate (other than studs, joists, furring members, or base layer of gypsum board), comply with gypsum board manufacturer's written recommendations and temporarily brace or fasten gypsum panels until fastening adhesive has set.

D. Curved Surfaces:
   1. Install panels horizontally (perpendicular to supports) and unbroken, to extent possible, across curved surface plus 12-inch-long straight sections at ends of curves and tangent to them.
   2. For double-layer construction, fasten base layer to studs with screws 16 inches o.c. Center gypsum board face layer over joints in base layer, and fasten to studs with screws spaced 12 inches o.c.

3.9 APPLYING TILE BACKING PANELS

A. Areas Not Subject to Wetting: Install regular-type gypsum wallboard panels to produce a flat surface except at showers, and all wet walls sink base cabinets, and other locations indicated to receive water-resistant panels.

B. Where tile-backing panels abut other types of panels in same plane, shim surfaces to produce a uniform plane across panel surfaces.

3.10 INSTALLING TRIM ACCESSORIES

A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.

B. Control Joints: Install control joints according to ASTM C 840 and in specific locations approved by Architect for visual effect.

C. Interior Trim: Install in the following locations:
   1. Cornerbead: Use at outside corners, unless otherwise indicated.
   2. LC-Bead: Use at exposed panel edges.
   3. Curved-Edge Cornerbead: Use at curved openings.

D. Aluminum Trim: Install in locations indicated on Drawings.
3.11 FINISHING GYPSUM BOARD

A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.

B. Prefill open joints, rounded or beveled edges, and damaged surface areas.

C. Apply joint tape over gypsum board joints, except those with trim having flanges not intended for tape.

D. Gypsum Board Finish Levels: Finish panels to levels indicated below:
   1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
   2. Level 2: Panels that are substrate for tile.
   3. Level 4: At panel surfaces that will be exposed to view, unless otherwise indicated.

E. Tile Backer Units: Finish according to manufacturer’s written instructions.

3.12 PROTECTION

A. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.

B. Remove and replace panels that are wet, moisture damaged, or exhibit mold growth. Repair of damaged panels in place is not acceptable.
   1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
   2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION
PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. Work Included: Provide labor, materials and equipment necessary to complete the work of this Section, including but not limited to the following:

1. Field painting of exposed interior items and surfaces.
2. Field painting of exposed exterior items and surfaces.

B. Related Work: The following items are not included in this Section and will be performed under the designated Sections:

1. Section 05500 - METAL FABRICATIONS for shop priming ferrous metal.
2. Section 06402 - INTERIOR ARCHITECTURAL WOODWORK for shop priming interior architectural woodwork.
3. Section 08111 - STEEL METAL DOORS AND FRAMES for factory priming steel doors and frames.
4. Section 08211 - FLUSH WOOD DOORS for factory finishing.
5. Section 09260 - GYPSUM BOARD ASSEMBLIES for surface preparation of gypsum board.

1.2 DEFINITIONS AND EXTENT

A. General: Standard coating terms defined in ASTM D 16 apply to this Section.

1. Flat refers to a lusterless or matte finish with a gloss range below 15 when measured at an 85-degree meter.
2. Eggshell refers to low-sheen finish with a gloss range between 20 and 35 when measured at a 60-degree meter.
3. Semi-gloss refers to medium-sheen finish with a gloss range between 35 and 70 when measured at a 60-degree meter.
4. Full gloss refers to high-sheen finish with a gloss range more than 70 when measured at a 60-degree meter.

B. This Section includes surface preparation and field painting of exposed exterior and interior items and surfaces.

1. Surface preparation, priming, and finish coats specified in this Section are in addition to shop priming and surface treatment specified in other Sections.

C. Paint exposed surfaces, except where these Specifications indicate that the surface or material is not to be painted or is to remain natural. If an item or a surface is not specifically mentioned, paint the item or surface the same as similar adjacent materials or surfaces. If a color of finish is not indicated, Architect will select from standard colors and finishes available.

1. Painting includes field painting of exposed bare and covered pipes and ducts (including color coding), hangers, exposed steel and iron supports, and surfaces of mechanical and electrical equipment that do not have a factory-applied final finish.
2. All dialysis counter interior cavities and back prime underside of countertop lip.

D. Whenever possible, paint should match the corner guard that will be applied over it for the lowest contrast possible.
E. Do not paint prefinished items, concealed surfaces, finished metal surfaces, operating parts, and labels – unless noted otherwise.

1. Prefinished items include the following factory-finished components:
   a. Architectural woodwork.
   b. Acoustical wall panels.
   c. Metal toilet enclosures.
   d. Metal lockers.
   e. Kitchen appliances.
   f. Elevator entrance doors and frames.
   g. Elevator equipment.
   h. Finished mechanical and electrical equipment.
   i. Light fixtures.
   j. Ceiling grid.

2. Concealed surfaces include walls or ceilings in the following generally inaccessible spaces:
   a. Foundation spaces.
   b. Furred areas.
   c. Ceiling plenums.
   d. Utility tunnels.
   e. Pipe spaces.
   f. Duct shafts.
   g. Elevator shafts.

3. Finished metal surfaces include the following:
   a. Anodized aluminum.
   b. Stainless steel.
   c. Chromium plate.
   d. Copper and copper alloys.
   e. Bronze and brass.

4. Operating parts include moving parts of operating equipment and the following:
   a. Valve and damper operators.
   b. Linkages.
   c. Sensing devices.
   d. Motor and fan shafts.

5. Labels: Do not paint over UL, FMG, or other code-required labels or equipment name, identification, performance rating, or nomenclature plates.

F. Manufacturers Abbreviations:
3. SW – The Sherwin-Williams Company

1.3 SUBMITTALS

A. Product Data: For each paint system indicated. Include block fillers and primers.

1. Material List: An inclusive list of required coating materials. Indicate each material and cross-reference specific coating, finish system, and application. Identify each material by manufacturer's catalog number and general classification.
2. Manufacturer's Information: Manufacturer's technical information, including label analysis and instructions for handling, storing, and applying each coating material.
3. Manufacturers' product data for paints, including printed statement of VOC content and chemical components.

B. Samples for Verification: For each color and material to be applied, with texture to simulate actual conditions, on representative Samples of the actual substrate.
   1. Provide stepped Samples, defining each separate coat, including block fillers and primers. Use representative colors when preparing Samples for review. Resubmit until required sheen, color, and texture are achieved.
   2. Provide a list of materials and applications for each coat of each Sample. Label each Sample for location and application.
   3. Submit two eight inch by 12 inch Samples for each type of finish coating for Architect's review of color and texture only.

C. Qualification Data: For Applicator.

D. Samples for Section 01700 Contract Closeout: For each type and color to be applied with attached fire resistance classification.

E. Coating Maintenance Manual: Upon conclusion of the project, the Contractor or paint manufacturer/supplier shall furnish a coating maintenance manual, such as Sherwin-Williams “Custodian Project Color and Product Information” report or equal. Manual shall include an Area Summary with finish schedule, Area Detail designating where each product/color/finish was used, product data pages, Material Safety Data Sheets, care and cleaning instructions, touch-up procedures, and color samples of each color and finish used.

1.4 QUALITY ASSURANCE

A. Applicator Qualifications: A firm or individual experienced in applying paints and coatings similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance.

B. Source Limitations: Obtain block fillers and primers for each coating system from the same manufacturer as the finish coats.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to Project site in manufacturer's original, unopened packages and containers bearing manufacturer's name and label and the following information:
   1. Product name or title of material.
   2. Product description (generic classification or binder type).
   3. Manufacturer's stock number and date of manufacture.
   4. Contents by volume, for pigment and vehicle constituents.
   5. Thinning instructions.
   6. Application instructions.
   7. Color name and number.
   8. VOC content.

B. Store materials not in use in tightly covered containers in a well-ventilated area at a minimum ambient temperature of 45 deg F. Maintain storage containers in a clean condition, free of foreign materials and residue.
   1. Protect from freezing. Keep storage area neat and orderly. Remove oily rags and waste daily.
1.6 PROJECT CONDITIONS

A. Apply waterborne paints only when temperatures of surfaces to be painted and surrounding air are between 50 and 90 deg F.

B. Apply solvent-thinned paints only when temperatures of surfaces to be painted and surrounding air are between 45 and 95 deg F.

C. Do not apply paint in snow, rain, fog, or mist; or when relative humidity exceeds 85 percent; or at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

1. Painting may continue during inclement weather if surfaces and areas to be painted are enclosed and heated within temperature limits specified by manufacturer during application and drying periods.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, manufacturers and products listed in this Section or approved equal.

1. Paints
   a. Benjamin Moore & Co. (herein “Moore”)
   b. Dunn Edwards Paints (herein “DE”)
   c. Sherwin Williams (herein “SW”)

2. Sealers
   a. Benjamin Moore & Co. (herein “Moore”)
   b. Sherwin Williams (herein “SW”)
   c. BASF

2.2 PAINT MATERIALS, GENERAL

A. Material Compatibility: Provide block fillers, primers, and finish-coat materials that are compatible with one another and with the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.

B. Material Quality: Provide manufacturer's best-quality paint material of the various coating types specified that are factory formulated and recommended by manufacturer for application indicated. Paint-material containers not displaying manufacturer's product identification will not be acceptable.

1. Proprietary Names: Use of manufacturer's proprietary product names to designate colors or materials is not intended to imply that products named are required to be used to the exclusion of equivalent products of other manufacturers. Furnish manufacturer's material data and certificates of performance for proposed substitutions.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Applicator present, for compliance with requirements for paint application.

1. Proceed with paint application only after unsatisfactory conditions have been corrected and surfaces receiving paint are thoroughly dry.

2. Start of painting will be construed as Applicator's acceptance of surfaces and conditions within a particular area.
B. Coordination of Work: Review other Sections in which primers are provided to ensure compatibility of the total system for various substrates. On request, furnish information on characteristics of finish materials to ensure use of compatible primers.

1. Notify Architect about anticipated problems when using the materials specified over substrates primed by others.

3.2 PREPARATION

A. General: Remove hardware and hardware accessories, plates, machined surfaces, lighting fixtures, and similar items already installed that are not to be painted. If removal is impractical or impossible because of size or weight of the item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations in each space or area, reinstall items removed using workers skilled in the trades involved.

B. Cleaning: Before applying paint or other surface treatments, clean substrates of substances that could impair bond of the various coatings. Remove oil and grease before cleaning.

1. Schedule cleaning and painting so dust and other contaminants from the cleaning process will not fall on wet, newly painted surfaces.

C. Surface Preparation: Clean and prepare surfaces to be painted according to manufacturer's written instructions for each particular substrate condition and as specified.

1. Provide barrier coats over incompatible primers or remove and reprime.
2. Cementitious Materials: Prepare concrete, concrete unit masonry, cement plaster, and mineral-fiber-reinforced cement panel surfaces to be painted. Remove efflorescence, chalk, dust, dirt, grease, oils, and release agents. Roughen as required to remove glaze. If hardeners or sealers have been used to improve curing, use mechanical methods of surface preparation.
   a. Use abrasive blast-cleaning methods if recommended by paint manufacturer.
   b. Determine alkalinity and moisture content of surfaces by performing appropriate tests. If surfaces are sufficiently alkaline to cause the finish paint to blister and burn, correct this condition before application. Do not paint surfaces if moisture content exceeds that permitted in manufacturer's written instructions.
   c. Clean concrete floors to be painted with a 5 percent solution of muriatic acid or other etching cleaner. Flush the floor with clean water to remove acid, neutralize with ammonia, rinse, allow to dry, and vacuum before painting.
3. Wood: Clean surfaces of dirt, oil, and other foreign substances with scrapers, mineral spirits, and sandpaper, as required. Sand surfaces exposed to view smooth and dust off.
   a. Scrape and clean small, dry, seasoned knots, and apply a thin coat of white shellac or other recommended knot sealer before applying primer. After priming, fill holes and imperfections in finish surfaces with putty or plastic wood filler. Sand smooth when dried.
   b. Prime, stain, or seal wood to be painted immediately on delivery. Prime edges, ends, faces, undersides, and back sides of wood, including cabinets, counters, cases, and paneling.
   c. If transparent finish is required, backprime with spar varnish.
   d. Backprime paneling on interior partitions where masonry, plaster, or other wet wall construction occurs on back side.
   e. Seal tops, bottoms, and cutouts of unprimed wood doors with a heavy coat of varnish or sealer immediately on delivery.
4. Ferrous Metals: Clean ungalvanized ferrous-metal surfaces that have not been shop coated; remove oil, grease, dirt, loose mill scale, and other foreign substances. Use solvent or mechanical cleaning methods that comply with SSPC's recommendations.
   a. Blast steel surfaces clean as recommended by paint system manufacturer and according to [SSPC-SP 6/NACE No. 3] [SSPC-SP 10/NACE No. 2].
   b. Treat bare and sandblasted or pickled clean metal with a metal treatment wash coat before priming.

5. Galvanized Surfaces: Clean galvanized surfaces with nonpetroleum-based solvents so surface is free of oil and surface contaminants. Remove pretreatment from galvanized sheet metal fabricated from coil stock by mechanical methods.

D. Material Preparation: Mix and prepare paint materials according to manufacturer's written instructions.
   1. Maintain containers used in mixing and applying paint in a clean condition, free of foreign materials and residue.
   2. Stir material before application to produce a mixture of uniform density. Stir as required during application. Do not stir surface film into material. If necessary, remove surface film and strain material before using.
   3. Use only thinners approved by paint manufacturer and only within recommended limits.

E. Tinting: Tint each undercoat a lighter shade to simplify identification of each coat when multiple coats of same material are applied. Tint undercoats to match the color of the finish coat, but provide sufficient differences in shade of undercoats to distinguish each separate coat.

3.3 APPLICATION

A. General: Apply paint according to manufacturer's written instructions. Use applicators and techniques best suited for substrate and type of material being applied.
   1. Paint colors, surface treatments, and finishes are indicated in the finish schedule.
   2. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to formation of a durable paint film.
   3. Provide finish coats that are compatible with primers used.
   4. The term "exposed surfaces" includes areas visible when permanent or built-in fixtures, grilles, convector covers, covers for finned-tube radiation, and similar components are in place. Extend coatings in these areas, as required, to maintain system integrity and provide desired protection.
   5. Paint surfaces behind movable equipment and furniture the same as similar exposed surfaces. Before final installation of equipment, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
   6. Paint interior surfaces of ducts with a flat, nonspecular black paint where visible through registers or grilles.
   7. Paint back sides of access panels and removable or hinged covers to match exposed surfaces.
   8. Finish exterior doors on tops, bottoms, and side edges the same as exterior faces.
   9. Sand lightly between each succeeding enamel or varnish coat.

B. Scheduling Painting: Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.
   1. The number of coats and film thickness required are the same regardless of application method. Do not apply succeeding coats until previous coat has cured as recommended by
manufacturer. If sanding is required to produce a smooth, even surface according to manufacturer's written instructions, sand between applications.

2. Omit primer over metal surfaces that have been shop primed and touchup painted.

3. If undercoats, stains, or other conditions show through final coat of paint, apply additional coats until paint film is of uniform finish, color, and appearance. Give special attention to ensure that edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.

4. Allow sufficient time between successive coats to permit proper drying. Do not recoat surfaces until paint has dried to where it feels firm, and does not deform or feel sticky under moderate thumb pressure, and until application of another coat of paint does not cause undercoat to lift or lose adhesion.

C. Application Procedures: Apply paints and coatings by brush, roller, spray, or other applicators according to manufacturer's written instructions.

1. Brushes: Use brushes best suited for type of material applied. Use brush of appropriate size for surface or item being painted.
2. Rollers: Use rollers of carpet, velvet-back, or high-pile sheep's wool as recommended by manufacturer for material and texture required.
3. Spray Equipment: Use airless spray equipment with orifice size as recommended by manufacturer for material and texture required.

D. Minimum Coating Thickness: Apply paint materials no thinner than manufacturer's recommended spreading rate to achieve dry film thickness indicated. Provide total dry film thickness of the entire system as recommended by manufacturer.

E. Mechanical and Electrical Work: Painting of mechanical and electrical work is limited to items exposed in equipment rooms and occupied spaces. Paint all exposed ceilings and structural elements in the mechanical and storage areas.

F. Mechanical items to be painted include, but are not limited to, the following:

1. Uninsulated metal piping.
2. Uninsulated plastic piping. (excluding R.O. piping)
3. Pipe hangers and supports.
4. Tanks that do not have factory-applied final finishes.
5. Visible portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets.
6. Duct, equipment, and pipe insulation having "all-service jacket" or other paintable jacket material.
7. Mechanical equipment that is indicated to have a factory-primed finish for field painting.

G. Electrical items to be painted include, but are not limited to, the following:

1. Switchgear.
2. Panelboards.
3. Electrical equipment that is indicated to have a factory-primed finish for field painting.

H. Block Fillers: Apply block fillers to concrete masonry block at a rate to ensure complete coverage with pores filled.

I. Prime Coats: Before applying finish coats, apply a prime coat, as recommended by manufacturer, to material that is required to be painted or finished and that has not been prime coated by others. Recoat primed and sealed surfaces where evidence of suction spots or unsealed areas in first coat appears, to ensure a finish coat with no burn-through or other defects due to insufficient sealing.
J. Pigmented (Opaque) Finishes: Completely cover surfaces as necessary to provide a smooth, opaque surface of uniform finish, color, appearance, and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections will not be acceptable.

K. Transparent (Clear) Finishes: Use multiple coats to produce a glass-smooth surface film of even luster. Provide a finish free of laps, runs, cloudiness, color irregularity, brush marks, orange peel, nail holes, or other surface imperfections.

   1. Provide satin finish for final coats.

L. Completed Work: Match approved samples for color, texture, and coverage. Remove, refinish, or repaint work not complying with requirements.

3.4 FIELD QUALITY CONTROL

A. The Owner reserves the right to invoke the following test procedure at any time and as often as the Owner deems necessary during the period when paint is being applied:

   1. The Owner will engage a qualified independent testing agency to sample paint material being used. Samples of material delivered to Project will be taken, identified, sealed, and certified in the presence of Contractor.

   2. Testing agency will perform appropriate tests for the following characteristics as required by the Owner.

   3. The Owner may direct Contractor to stop painting if test results show material being used does not comply with specified requirements. Contractor shall remove non-complying paint from Project site, pay for testing, and repaint surfaces previously coated with the non-complying paint. If necessary, Contractor may be required to remove non-complying paint from previously painted surfaces if, on repainting with specified paint, the two coatings are incompatible.

3.5 CLEANING

A. Cleanup: At the end of each workday, remove empty cans, rags, rubbish, and other discarded paint materials from Project site.

   1. After completing painting, clean glass and paint-spattered surfaces. Remove spattered paint by washing and scraping without scratching or damaging adjacent finished surfaces.

3.6 PROTECTION

A. Protect work of other trades, whether being painted or not, against damage from painting. Correct damage by cleaning, repairing or replacing, and repainting, as approved by Architect.

B. Provide "Wet Paint" signs to protect newly painted finishes. After completing painting operations, remove temporary protective wrappings provided by others to protect their work.

   1. After work of other trades is complete, touch up and restore damaged or defaced painted surfaces. Comply with procedures specified in PDCA P1.

3.7 PAINT SCHEDULE

A. Schedule: Provide products and number of coats specified. Use of manufacturer's proprietary product names to designate colors, materials, generic class, standard of quality and performance criteria and is not intended to imply that products named are required to be used to the exclusion of equivalent performing products of other manufacturers.

   1. Paint Type P-1: Interior Gypsum Wallboard and Plaster for Latex Eggshell Finish for Offices:
a. One Coat
   1) Moore Ultra Spec 500 Acrylic Zero VOC Primer Sealer (N534)
   2) DE Ultra-Grip Zero VOC Multi Surface Primer (UGPR00)
   3) SW Harmony Zero VOC Interior Latex Primer (B11W001000)

b. Two Coats
   1) Moore Ultra Spec 500 Acrylic Zero VOC Eggshell Enamel (N538)
   2) DE Everest Zero VOC Eggshell Enamel (EVER30)
   3) SW Harmony Interior Latex Eg-Shel (B09-1000 Series)

2. Paint Type P-2: Reserved

3. Paint Type P-2A: Interior Gypsum Wallboard and Plaster for Eggshell Finish (Ceilings):
   a. One Coat
      1) Moore Ultra Spec 500 Acrylic Zero VOC Primer Sealer (N534)
      2) DE Ultra-Grip Zero VOC Multi Surface Primer (UGPR00)
      3) SW Harmony Zero VOC Interior Latex Primer (B11W001000)
   b. Two Coats
      1) Moore Ultra Spec 500 Acrylic Zero VOC Eggshell Enamel (N538)
      2) DE Everest Zero VOC Eggshell Enamel (EVER30)
      3) SW Harmony Interior Latex Eg-Shel (B09-1000 Series)

4. Paint Type P-3: Interior Galvanized Metals, for Latex Eggshell Finish:
   a. One Coat
      1) Moore Acrylic Metal Primer (P04)
      2) DE Ultra-Grip Zero VOC Multi Surface Primer (UGPR00)
      3) SW Multi-Purpose Latex Primer (B51W8020)
   b. Two Coats
      1) Moore Ultra Spec 500 Acrylic Zero VOC Eggshell Enamel (N538)
      2) DE Everest Zero VOC Eggshell Enamel (EVER30)
      3) SW Harmony Interior Latex Eg-Shel (B09-500 Series)

5. Paint Type P-4: Interior Unprimed Metals, for Latex Eggshell Finish:
   a. One Coat
      1) Moore Super Spec HP Acrylic Metal Primer (P04)
      2) DE Ultrashield Zero VOC Gray Metal Metal Primer (ULDM00-GR-0)
      3) SW Multi-Purpose Latex Primer (B51W8020)
   b. Two Coats
      1) Moore Ultra Spec 500 Acrylic Zero VOC Eggshell Enamel (N538)
      2) DE Everest Zero VOC Eggshell Enamel (EVER30)
      3) SW Harmony Interior Latex Eg-Shel (B09-500 Series)

6. Paint Type P-5: Interior Architectural Woodwork and Finish Carpentry for Opaque Finish (chair rail, wood trim, exposed framing, adjustable shelving, and miscellaneous backboards):
   a. One Coat
      1) Moore Fresh Start Interior 100% Acrylic Superior Primer (046)
      2) DE Ultra-Grip Zero VOC Multi Surface Primer (UGPR00)
      3) SW Harmony Zero VOC Interior Latex Primer (B11W001000)
b. Two Coats
   1) Moore Ultra Spec 500 Acrylic Zero VOC Eggshell Enamel (N538)
   2) DE Everest Zero VOC Eggshell Enamel (EVER30)
   3) SW Harmony Interior Latex Eggshell (B09-1000 Series)

7. Paint Type P-7: Interior Primed Metals (door frames, exposed grilles, louvers, panels, un-insulated HVAC sheet metal):
   a. Two Coats
      1) Moore Advance Waterborne Acrylic Alkyd Semi-Gloss Enamel (793)
      2) DE - Aristowall Alkyd Emulsion Semi-Gloss Enamel (AWLL50)
      3) SW Harmony Interior Latex Eggshell (B09-1000 Series)

8. Paint Type P-8: Exterior Primed Painted Metals:
   a. One Coat
      1) Moore Super Spec HP DTM Acrylic Low Luster Enamel (P25)
      2) DE Ultrashield Zero VOC Gray Metal Metal Primer (ULDM00-GR-0)
      3) SW Metalatex DTM Acrylic Modified S/Gloss Enamel (B55-600 series)

b. Two Coats
   1) Moore Super Spec HP DTM Acrylic Low Luster Enamel (P25)
   2) DE Ultrashield Zero VOC Low Sheen (ULSH40)
   3) SW Metalatex DTM Acrylic Modified S/Gloss Enamel (B55-600 series)

9. Paint Type P-9: Exterior Unprimed Metals
   a. One Coat
      1) Moore Super Spec HP DTM Acrylic Low Luster Enamel (P25)
      2) DE Ultrashield Zero VOC Gray Metal Metal Primer (ULDM00-GR-0)
      3) SW Metalatex DTM Acrylic Modified S/Gloss Enamel (B55-600 series)

b. Two Coats
   2) DE Ultrashield Zero VOC Low Sheen (ULSH40)
   3) SW Metalatex DTM Acrylic Modified S/Gloss Enamel (B55-600 series)

10. Paint Type P-10: Exposed Concrete Floor Sealer: Mechanical Rooms:
    a. Primer/Etcher – One Coat
       1) Moore – Super Spec HP 100% Solids Floor Epoxy (P41-00, Clear)
       2) SW – H & C Concrete Etcher

    b. Finish – Two Coats
       1) Moore – Super Spec HP 100% Solids Floor Epoxy (P40-00, Clear)
       2) SW - H & C High Performance Industrial Clear Sealer
       3) H&C SharkGrip Slip Resistant Additive

11. Paint Type P-11: Exposed ceilings and structural:
    a. One Coat
       1) Moore Super Spec Sweep-Up Spray Latex Flat (153)

12. Paint Type P-12: Not used
13. Paint Type P-13: Traffic Marking Coatings (as indicated on Drawings intended to keep aisle ways clear and identify areas emergency eye wash showers).
   a. One Coat
      1) Moore TP-23XX Insl-X Acrylic Fast Set Traffic Marking Paint.

   a. One Coat
      1) Moore N023 All Purpose Latex Primer
   b. Two Coats
      1) Moore #LFR insl-X Latex Fire Retardant Paint

15. Mechanical and Electrical Work (Paint all exposed items throughout the project except factory finished items with factory-applied baked enamel finishes which occur in mechanical rooms or areas, and excepting chrome or nickel plating, stainless steel, and aluminum other than mill finished. Paint all exposed ductwork and inner portion of all ductwork: Same as specified for other interior metals, here-in-above.

   END OF SECTION
SECTION 10520
FIRE-PROTECTION SPECIALTIES

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK
A. Work Included: Provide labor, materials and equipment necessary to complete the work of this Section, including but not limited to the following:
   1. Portable fire extinguishers.
   2. Fire-protection cabinets for portable fire extinguishers, fire hose valves, and fire hoses.
   3. Mounting brackets for fire extinguishers.
B. Related Work: The following items are not included in this Section and will be performed under the designated Sections:
   1. Section 09900 - PAINTING for field painting fire-protection cabinets.
   2. Division 15 - FIRE PROTECTION for fire hose valves and standpipes.

1.2 SUBMITTALS
A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each item.
   1. Fire Extinguishers: Include rating and classification.
   2. Fire-Protection Cabinets: Include roughing-in dimensions, details showing mounting methods, relationships of box and trim to surrounding construction, door hardware, cabinet type, trim style, and panel style.
   3. Show location of knockouts for hose valves.
B. Maintenance Data: For fire extinguishers and fire-protection cabinets to include in maintenance manuals.

1.3 QUALITY ASSURANCE
A. Source Limitations: Obtain fire extinguishers and fire-protection cabinets through one source from a single manufacturer.
B. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, “Portable Fire Extinguishers.”
C. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to authorities having jurisdiction.
D. Fire-Rated Fire-Protection Cabinets: Listed and labeled to comply with requirements of ASTM E 814 for fire-resistance rating of walls where they are installed.

1.4 COORDINATION
A. Coordinate size of fire-protection cabinets to ensure that type and capacity of fire extinguishers indicated are accommodated.
B. Coordinate size of fire-protection cabinets to ensure that type and capacity of fire hoses, hose valves, and hose racks indicated are accommodated.

PART 2 - PRODUCTS

2.1 PORTABLE FIRE EXTINGUISHERS
A. General: Provide fire extinguishers of type, size, and capacity for each fire-protection cabinet and mounting bracket indicated.
B. Multipurpose Dry-Chemical Type in Steel Container: UL-rated 3A:40B:C, 6-lb nominal capacity, with monoammonium phosphate-based dry chemical in enameled-steel container.

2.2 FIRE-PROTECTION CABINET

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. JL Industries, Inc.
   2. Larsen's Manufacturing Company.
   3. Potter Roemer; Div. of Smith Industries, Inc.

B. Cabinet Type: Suitable for fire extinguisher, and hose and hose valve where applicable.


D. Semi-Recessed Cabinet: Cabinet box recessed in walls of sufficient depth to suit style of trim indicated.
   1. Trimless with Plaster Stop: Surface of surrounding wall finishes flush with exterior finished surface of cabinet frame and door, without overlapping trim attached to cabinet. Provide recessed flange, of same material as box, attached to box to act as plaster stop.

E. Door Material: Steel sheet with baked enamel finish, color as selected.

F. Door Style: Vertical duo panel with frame.

G. Door Glazing: Tempered break glass.

H. Door Hardware: Manufacturer’s standard door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated.

I. Accessories:
   1. Mounting Bracket: Manufacturer’s standard steel, designed to secure fire extinguisher to fire-protection cabinet, of sizes required for types and capacities of fire extinguishers indicated, with plated or baked-enamel finish.
   2. Break-Glass Strike: Manufacturer’s standard metal strike, complete with chain and mounting clip, secured to cabinet.
   3. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as indicated by Architect.

2.3 MOUNTING BRACKETS

A. Mounting Brackets: Manufacturer’s standard steel, designed to secure fire extinguisher to wall or structure, of sizes required for types and capacities of fire extinguishers indicated, with plated or baked-enamel finish.

B. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as indicated by Architect.

2.4 FABRICATION

A. Fire-Protection Cabinets: Provide manufacturer’s standard box (tub), with trim, frame, door, and hardware to suit cabinet type, trim style, and door style indicated.
   1. Weld joints and grind smooth.
   2. Construct fire-rated cabinets with double walls fabricated from 0.0428-inch-thick, cold-rolled steel sheet lined with minimum 5/8-inch-thick, fire-barrier material.
      a. Provide factory-drilled mounting holes.
B. Cabinet Doors: Fabricate doors according to manufacturer’s standards, from materials indicated and coordinated with cabinet types and trim styles selected.
   1. Fabricate door frames with tubular stiles and rails and hollow-metal design, minimum 1/2 inch thick.
   2. Miter and weld perimeter door frames.
C. Cabinet Trim: Fabricate cabinet trim in one piece with corners mitered, welded, and ground smooth.

2.5 FINISHES, GENERAL
A. Comply with NAAMM’s “Metal Finishes Manual for Architectural and Metal Products” for recommendations for applying and designating finishes.
B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
C. Finish fire-protection cabinets after assembly.
D. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION
3.1 EXAMINATION
A. Examine roughing-in for hose valves and cabinets to verify actual locations of piping connections before cabinet installation.
B. Examine walls and partitions for suitable framing depth and blocking where recessed cabinets will be installed.
C. Examine fire extinguishers for proper charging and tagging.
   1. Remove and replace damaged, defective, or undercharged units.
D. Proceed with installation only after unsatisfactory conditions have been corrected.
3.2 PREPARATION
A. Prepare recesses for recessed fire-protection cabinets as required by type and size of cabinet and trim style.
3.3 INSTALLATION
A. General: Install fire-protection specialties in locations and at mounting heights indicated on the Drawings and acceptable to authorities having jurisdiction.
B. Fire-Protection Cabinets: Fasten fire-protection cabinets to structure, square and plumb.
   1. Unless otherwise indicated, provide recessed fire-protection cabinets. If wall thickness is not adequate for recessed cabinets, provide semi-recessed fire-protection cabinets.
   2. Provide inside latch and lock for break-glass panels.
   3. Fasten mounting brackets to inside surface of fire-protection cabinets, square and plumb.
C. Mounting Brackets: Fasten mounting brackets to surfaces, square and plumb, at locations indicated.
D. Identification: Apply vinyl lettering at locations indicated.
E. Signage: All signs must be installed perpendicular to the path of egress.

3.4 INSTALLATION OF FIRE-RATED CABINETS

A. Install cabinet with not more than 1/16-inch tolerance between pipe OD and knockout OD. Center pipe within knockout.

B. Seal through penetrations with firestopping sealant as specified in Section 07841 - PENETRATION FIRESTOPPING.

3.5 ADJUSTING AND CLEANING

A. Remove temporary protective coverings and strippable films, if any, as fire-protection specialties are installed, unless otherwise indicated in manufacturer’s written installation instructions.

B. Adjust fire-protection cabinet doors to operate easily without binding. Verify that integral locking devices operate properly.

C. On completion of fire-protection cabinet installation, clean interior and exterior surfaces as recommended by manufacturer.

D. Touch up marred finishes, or replace fire-protection cabinets that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by fire-protection cabinet manufacturer.

E. Replace fire-protection cabinets that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

F. Service, charge, tag and obtain local fire department certification for each F.E. not more than 5 calendar days prior to the date of substantial completion of the work, as that date is established by the architect.

END OF SECTION
SECTION 10731
OVERHEAD SUPPORTED CANOPY

Part 1: General

1.1 Related Documents

A. The requirements of Division 1 specifications shall apply to work specified in the section.

1.2 Engineering Design Criteria

B. ASCE 7-10, Minimum Design Loads for Buildings and Other Structures
C. Aluminum Design Manual 2015
D. AWS D1.2 – 2014, Structural Welding Code - Aluminum
E. Local governing codes and standards for site location

1.3 General Description of Work

A. Work in this section shall include design, fabrication, and installation of aluminum protective covers. All work shall be in accordance with the shop drawings and this specification section.

1.4 Submittals

A. Shop Drawings – Submit complete shop drawings including:
   1) Overall canopy layout dimensions
   2) Cut section details including elevation, bent layout dimensions, canopy connection details, and wall connection details
   3) Flashing details pertaining to aluminum canopy
   4) Canopy anchorage details
B. Product Data – Submit manufacturer’s product information, specifications, and installation instructions for the aluminum canopy.
C. Samples – Submit color selection samples of actual coated aluminum material or actual anodized aluminum material.
D. Certification – Provide Professional Engineer certification that the proposed canopy design and layout meets or exceeds all applicable loadings (ex: wind load, rain live load, dead load, snow load) for the job location (city & state) in accordance with IBC 2015 and ASCE 7-10.

1.5 Quality Assurance

A. Manufacturer Qualifications: Minimum five years experience in design, fabrication, and production of aluminum protective covers.
B. Components shall be assembled in shop to greatest extent possible to minimize field
assembly.
C. Aluminum protective cover, including material and workmanship, shall be warranted from defects for a period of one year from date of completion of aluminum protective cover installation.

Part 2: Products and Materials

2.1 Acceptable Manufacturers

A. Mitchell Metals, LLC
1761 McCoba Drive
Smyrna, GA 30080
Phone: 770.431.7300
www.mitchellmetals.net

B. Dittmer Architectural Aluminum
1006 Shepard Road
Winter Springs, FL 32708
Phone: 407.699.1755
www.dittdeck.com

C. Equivalent systems by other manufacturers will be approved for substitution by addendum if the following conditions are met:
   1) Other manufacturers must have submitted requested information and have been qualified to bid no less than 10 days prior to bid closing date.
   2) Manufacturer must submit complete company literature and information to the architect for review
   3) Manufacturer must submit complete proposed canopy system details, including sizes and strength values of all members to be used.

2.2 Design & Assembly

A. Canopy shall use perimeter extruded gutter and extruded decking running perpendicular to wall being attached to. Extruded Decking shall be a roll-locked design where the extruded cap and pan shall interlock to make a rigid structure.
B. Crimped decking is not allowed.
C. Canopy gutter frame shall be welded into a single frame unless shipping does not allow. If shipping does not allow, canopy frame shall be riveted together at the corners and caulked inside to make a water-tight frame.
D. Canopy shall be secured to the wall using a 6”x6” extruded wall bracket. A 2”x2” OHS square tube shall be used to connect the canopy frame to the extruded wall bracket. The 2”x2” OHS square tube shall be secured to the canopy frame using an extruded saddle bracket. The extruded saddle bracket shall connect to a 2”x2” frame support tube that sides inside of the decking pan. The 2”x2” frame support tube shall connect to the gutter frame using 4 – 300 series stainless steel fasteners, 2 at each end.
E. Canopies shall drain from the decking to the perimeter gutter, and discharge from the
bottom of the gutter out of a drain scupper. Downspouts can be used to drain the 
water from the overhead supported canopy to the ground per Architects drawings. 
F. Canopy shall be pitched toward the scupper/downspout to allow proper drainage out 
of the canopy frame.

2.3 Materials

A. Overhead Support Tubes
   1) Overhead support tubes shall be 2”x2” square tubing (minimum of 0.125” 
      thick).
B. Frame Support Tubes
   1) Frame support tubes shall be 2”x2” square tubing (minimum of 0.125” thick).
C. Decking
   1) Decking shall be a rigid roll-locked design that is self flashing and utilizes 
      interlocking sections.
   2) Extruded decking shall exceed loading requirements in section 1.2 – 
      Engineering Design Criteria. Minimum 3” x 6” cap and pan.
D. Gutter
   1) Gutter shall be radius cornered aluminum extrusion that exceeds loading 
      requirements in section 1.2 – Engineering Design Criteria. Minimum gutter 
      size shall be 4”x 6” at 0.093” thick.
E. Flashing
   1) Flashing shall be made of aluminum sheet painted to match the color of the 
      canopy. Minimum flashing thickness shall be 0.040” thick.

2.4 Fasteners

A. All framing fasteners shall be 300 series stainless steel with neoprene washers. All 
rivets are 3/16” aluminum. All decking fasteners shall be long life coated steel with a 
300 series stainless steel cap and neoprene washer.

2.5 Finishes

A. Factory applied baked enamel
   1) Enamel is to comply with AAMA 2603.
   2) Color is to be as selected by architect from manufacturer’s standard color 
      chart.

Part 3: Installation and Execution

3.1 Erection

A. Canopies are to be installed according to approved shop drawings and plans.
B. The entire structure shall be installed straight, true, and plumb according to standard 
   construction procedures.
C. All fasteners penetrating the building’s face shall be caulked.
D. Any blocking necessary to install the overhead supported canopy shall be installed by 
   the General Contractor according to the approved shop drawings prior to canopy
installation.
E. Canopies shall be installed with minimal slope to allow water flow from top of canopy to draining scuppers/downspouts and eliminate ponding.
F. All joints, corners, and connections shall be tight and clean.
G. All exposed fasteners are to be painted to match the canopy color.
H. Decking is to be aligned and secured to aluminum frame structure.

3.2 Cleaning

A. All canopy surfaces exposed are to be cleaned after installation is complete.
B. Surplus materials and debris shall be removed from the jobsite after installation is complete.

3.3 Protection

A. General Contractor shall ensure protection of installed aluminum canopies from other construction so that canopies are without damage at time of substantial completion of project.
1.0  GENERAL

1.01  SUMMARY

A. Division 15 includes Division 15000 of the Specifications and Mechanical Drawings (HVAC, Plumbing, and Fire Protection). Elements of the Scope of Work include, but are not limited to, labor, materials, equipment, supplies, storage, transportation and all required permits, fees and licenses. Division 15 does not stand alone, but is part of the complete project and its Documents. Requirements of the General Conditions and Division 1 apply to all work in the Division.

B. Provide the necessary interface with other Divisions to provide a complete project. Carefully check the Documents of this Division with those Documents of other Divisions. Determine the requirements of any interfacing materials or equipment being furnished and/or installed by those Sections and Divisions, and provide proper installation and required interface.

C. No deviation from the Contract Documents shall be made without the written consent of the Architect and Engineer.

D. All Specifications and Drawings are to be considered together as the Contract Documents. Any work shown in one and not the other, or is implied by either, shall be provided to make a complete project. Should conflicts exist between the Specifications and Drawings or there is an item shown or noted for which is not clearly defined, immediately submit a request for clarification. Under no circumstance will conflicts between the Specifications and Drawings be grounds for additional cost to the Contract after the Contract is established.

E. The Drawings are schematic and are not intended to show the exact location of duct, piping, equipment, etc.

F. Dimensions and information regarding accurate locations of equipment, and structural limitations and finish shall be coordinated and verified with other Divisions of Work. Be prepared to furnish dimensions and information regarding the Work of this Division to other trades.

G. The right is reserved to relocate any device (thermostat, temperature sensor, humidity sensor, diffuser, register, grille, etc.) a maximum of 10'-0" before it is permanently installed without incurring additional cost to the Contract.

1.02  REFERENCE STANDARDS

A. All work shall comply with the most recently revised versions of all local, state and federal codes, ordinances of the authority having jurisdiction, laws, rules and regulations. Any modifications required by any of the above shall be
made without any additional cost to the Owner. Where requirements between governing Codes and Regulations vary, the more restrictive provision shall apply.

B. Nothing contained in the Contract Documents shall be construed as authority or permission to disregard legal requirements and regulations. The Contractor shall thoroughly review the Documents and bring any such conflicts to the attention of the Architect and Engineer prior to Installation.

C. All materials, installation, and workmanship shall comply standards and/or codes of the following:

9. ANSI - American National Standards Institute
10. ASTM - American Society of Testing and Materials
11. NEMA - National Electrical Manufacturer’s Association
12. OSHA - Occupational Safety and Health Act
13. UL - Underwriter’s Laboratories
14. ASHRAE - American Society of Heating and Air Conditioning Engineers
15. SMACNA - Sheet Metal and Air Conditioning Contractors’ Nat’l Assoc.

D. All materials shall be new and shall bear the label of UL.
1.03 EXISTING CONDITIONS

A. Where work is to be performed in an existing facility, the contractor shall visit the site prior to bid and be familiar with all existing conditions. Special attention shall be given to work to be performed above an existing ceiling.

B. Where existing slabs are to be cut or core drilled, the contractor shall x-ray the existing slabs to avoid cutting or disrupting existing conduits, cables, plumbing or structural members.

C. HVAC systems, plumbing systems, and electrical service to the building shall not be interrupted without written consent of the building owner.

D. No allowance will be made for lack of knowledge of existing conditions.

E. At the completion of the project, all work under this Division shall be completely integrated with the existing systems and left in perfect operating condition.

F. Where work under this Division disrupts the continuity of any existing to remain electrical circuit or feeder, the Contractor shall repair/replace as necessary to return to a perfectly functional and safe operating condition.

G. Prior to any demolition or construction the Contractor shall have the existing conditions inspected by an EPA, OSHA certified asbestos abatement agency to identify the presence of asbestos. Should any asbestos be found, it shall be brought to the immediate attention of the Architect and Owner and specifically identified in writing.

1.04 DEFINITIONS

A. Provide: to furnish, install and connect.

B. Furnish: to supply all materials, labor, equipment, testing apparatus, controls, tests, accessories and all other items customarily required for the proper and complete application.

C. Install: to join, unite, fasten, link, attach, set-up or connect together, complete, tested, and ready for normal satisfactory operation.

D. Engineer: the Engineer of record.

E. Contract Documents: the complete set of Specifications and Drawings of all Divisions.

F. Work: labor, materials, equipment, accessories, controls and other items required for a complete installation.
G. Concealed: embedded in masonry or other construction, installed in furred spaces, within double partitions or hung ceilings, in trenches, in crawl spaces or in enclosures.

H. Exposed: not installed underground or concealed.

I. Equal: equal in quality, workmanship, materials, weight, size, design and efficiency of the specified product, conforming with manufacturers.

J. Supply: to purchase, procure, acquire and deliver complete with related accessories.

K. Authority Having Jurisdiction (AHJ): applicable local, state and federal authorities having jurisdiction over any part of the Scope within this Division and other Divisions.

2.0 PRODUCTS

2.01 MANUFACTURERS

A. Manufacturer’s names and catalog numbers specified in the Contract Documents are intended to describe the material and set the standard of quality. All bids shall be based on material specified. Request for approval of material not specified shall be considered if the request is in written form and submitted to the Architect no later than fourteen (14) days prior to the bid date. All requests shall conform to the provisions of the general and supplementary conditions.

B. When specific names are not stated, only the best available quality of material or equipment shall be submitted for review and used in the installation.

2.02 BASIS OF DESIGN

A. Where a product is designated as "BASIS OF DESIGN", the Contractor is notified that mechanical, electrical, structural, architectural, space conditions and/or other features of the overall project design have been based on the requirements of the "BASIS OF DESIGN" product.

B. Where a product is substituted for a "BASIS OF DESIGN" product, the Contractor is notified that changes in project design may be mandatory in order to permit use and installation of the substitute product. Shop drawing submittal for a substitute product shall include a complete schedule of changes in project design, if any, which must be made in order to permit use and installation of the substitute product. The Contractor shall bear all expenses related to the use of a substitute product.

2.03 SHOP DRAWINGS AND PRODUCT DATA
A. The Contractor shall obtain complete shop drawings, product data and samples from the manufacturers, suppliers, vendors, and all Division 15 Subcontractors, for all materials and equipment as specified herein in various Sections of the Specifications, and shall submit data and details of such materials and equipment for review by the Architect and Engineer. Prior to submission of the shop drawings, product data and samples to the Architect and Engineer, the Contractor shall thoroughly review the shop drawings, product data and samples and certify they are in compliance with the Contract Drawings. Further, the Contractor shall check all materials and equipment upon their arrival on the Project site and verify their condition and compliance with the Contract Drawings. Any Work which proceeds prior to receiving reviewed shop drawings shall be modified as required to comply with the Contract Documents and the shop drawings. A minimum period of ten (10) working days, exclusive of transmittal time, will be required in the Engineer’s office each time a shop drawing, product data and/or sample is submitted or resubmitted for review. This time period shall be considered by the Contractor when scheduling his Work. The initial shop drawing review for equipment and materials may be expedited through the mutual consent of the Contractor, Architect, Engineer, and Owner providing the Contractor agrees to submit complete, certified, documented, and coordinated shop drawings for review in accordance with the requirements of the Contract Documents.

B. The review of shop drawings, product data, and samples by the Architect and Engineer shall not relieve the Contractor of the responsibility for dimensions or errors that may be contained therein, or for deviations from requirements in the Contract Documents. It shall be clearly understood that the noting of some errors by the Engineer but overlooking others does not grant the Contractor permission to proceed in error.

C. All shop drawings and product data/submittals shall be submitted in compliance with the requirements of the general and supplementary conditions. No more than four (4) copies of submittal data will be reviewed. Any additional copies will be returned unmarked. The responsibility of copying review comments on any additional copies will rest solely with the Contractor.

D. All product data/submittals shall bear the name of the manufacturer to be used.

E. All shop drawings and submittals shall include a stamped indication signifying that the submittal has been reviewed for compliance with the Contract Documents by the Contractor. This stamped indication also represents the fact that the Contractor has checked this submittal for its interaction with all other Divisions and certifies by his signature or initials that all coordination has taken place. The stamp shall include the date, name of the Contracting Firm, the signature of the Contractor, certification of compliance and approval. This stamp shall be on the submittal before the Engineer will review it.
F. The Engineer will review an individual submittal not more than twice. If the submittal is rejected again on the second review, the Contractor will bare all responsibility for paying for the Engineer’s time for additional reviews. Such payments to the Engineer shall be withheld from the next monthly pay application.

G. Shop drawings and/or product data shall be submitted for the following for review:

1. HVAC duct system layouts, including supply air, return air, exhaust air, and outside air. HVAC piping system layouts. Plumbing piping system layouts. These drawings must include associated equipment, drawn to scale based on submittals for that equipment, must be dimensioned, and must include duct, piping and equipment elevation tags (distance above finished floor to bottom).

The Contractor is encouraged to develop their own shop drawings, without having have the Engineer’s CAD files (as previously stated, the Engineer’s drawings are schematic/diagrammatic in nature). Should the Contractor insist on using the Engineer’s CAD files in the procurement of shop drawings, the Contractor must pay the Engineer $150.00 per sheet for the CAD files.

The Contractor shall give the Engineer a written release, acceptable to the Engineer, signed by a corporate officer of the Contractor. This release shall also include a copyright statement indicating that these drawings or electronic data contained will not be used on any other project. The release and payment for the files must be received PRIOR to delivery of the CAD files.

2. Equipment, including but not limited to: chillers, cooling towers, boilers, pumps, heat exchangers, rooftop units, split systems, fans, heaters, water-cooled self-contained units, water-source heat pumps, coils, air distribution devices (diffusers, etc.), air terminal units (PIU’s, etc.), ductwork accessories, louvers, hoods, water heaters, plumbing fixtures, booster systems, lift stations, heat tracing, insulation, piping specialties, etc.

2.04 AS-BUILT DRAWINGS

A. The Contractor shall maintain on a daily basis at the Project site a complete set of “Record Drawings”. The “Record Drawings” shall consist of a set of black-line or blue-line prints or AutoCAD files of the Contractor Coordination Drawings for this Division. The prints shall be marked or the AutoCAD file electronically updated to show the precise location of all work and equipment, and all changes and deviations in the work from that shown on the Contract Documents. This requirement shall not be construed as authorization for the Contractor to make changes in the layout or work without definite instructions.
from the Architect or Engineer. The continuously updated coordination drawings (shop drawings previously described) shall be used to produce the final “Record Drawings” which shall be delivered to the Owner in AutoCAD electronic format (CD) upon Project completion.

B. Record dimensions shall clearly and accurately delineate the work as installed; locations shall be suitably identified by at least two dimensions to permanent structures.

C. The Contractor and Subcontractor shall mark all “Record Drawings” on the drawings with a rubber stamp impression or an AutoCAD image that states such.

3.0 EXECUTION

3.01 INSTALLATION

A. The equipment selections used in the preparation of the Contract Documents will fit into the physical spaces provided and indicated, allowing ample room for access, servicing, removal and replacement of parts, etc. Adequate space shall be allowed for clearance in accordance with the Code requirements and the requirements of the local Authorities having jurisdiction, and the equipment manufacturer’s recommendations.

B. In the preparation of Drawings, a reasonable effort to accommodate acceptable equipment manufacturer's space requirements has been made. However, since space requirements and equipment arrangement vary according to each manufacturer, the responsibility for initial access, maintenance access, code required access, and proper fit rests with the Contractor.

C. Physical dimensions and arrangements of equipment to be installed shall be subject to the Architect’s and Engineer’s review.

D. The General Contractor and all Subcontractors shall coordinate the installation of ductwork, conduit, busway, piping, cable trays, etc., installation with lighting fixtures, special ceiling construction, air distribution equipment, and the structure. Provide additional rises, drops and offsets as required. If after installed, new ductwork, conduit, busway, piping or cable is found to be in conflict with the architecture, structure, or other trade Work which is either existing or shown on the Contract Documents, the ductwork, conduit, busway, piping or cable shall be relocated without additional cost to the Owner.

E. No ductwork, piping, equipment, etc., shall be installed in contact with fire protection/sprinkler piping.

F. Accessibility and Clearance:
1. Mechanical equipment, ductwork, piping, etc. shall be installed in accessible locations, avoiding obstructions, preserving headroom, and keeping openings and passageways clear.

2. Minor adjustments in the locations of equipment shall be made where necessary, providing such adjustments do not adversely affect functioning of the equipment.

G. Scaffolds and staging for installation of mechanical work shall be provided under the work of this Division.

3.02 STRUCTURAL FITTINGS

A. Furnish and install the necessary sleeves, inserts, hangers, anchor bolts, and related structural items. Install at the proper time.

B. Openings may have been indicated on the Architectural and Structural drawings. Should any additional openings or holes be required, the same shall be provided at no additional cost to the Owner.

C. Location: At a time in advance of the work, verify openings shown on the Architectural and Structural drawings, and coordinate any additional openings.

D. If the work of this Section requires modification of the Architectural or Structural drawings, furnish new instructions as to requirements for these openings. Submit for review and coordination to Architect.

E. Sleeves shall be supplied for mechanical piping passing through walls or slabs and shall be placed before concrete is poured.

F. Equipment supports for mechanical work shall be fastened to the structure by inserts, anchor bolts, bolting to drilled and tapped structural members, or shall be welded to the structure.

1. Welding shall be done by the electric arc method with fully competent welders. Supporting members shall be shop coated with a suitable primer.

2. Surfaces damaged by installation of supports shall be touched up with primer to match shop coat. Any drilling of structural members shall be approved by the Architect.

G. Flashing:

1. Wherever ductwork and/or piping pass through the roof or outer walls, base flashing and counter-flashing shall be provided.
2. Such flashing shall be properly installed by skilled workmen, and shall include grouting, mastic or tar application, or other means to insure a permanent, waterproof, neat and workmanlike installation.

3. Insofar as possible, flashing shall comply with and be similar to requirements for flashing in General Construction Work.

H. Anchor bolts and inserts shall be galvanized and of adequate size and strength for installation of electrical work and shall be placed in forms before concrete is poured.

1. Placement of bolts in bases shall be done under other Division. Furnish detail drawings, templates, and anchor bolts for bases to the General Contractor in time to avoid delaying work schedules.

2. Expansion shields shall only be used with specific approval of the Architect. Wooden or soft metal plugs shall not be used.

I. Cutting and patching:

1. All additional cutting, patching and reinforcement of construction of building, subject to review by the Architect, shall be performed under this Section.

2. Refer to appropriate Division for requirements.

WEATHERPROOF EQUIPMENT

A. Mechanical devices or equipment located in damp, semi-exposed areas shall be weather-resistant. Enclosures shall comply with NEMA Type 3R requirements.

B. Air distribution devices located in damp areas our outside shall be weather-resistant (aluminum, etc.).

CLEANING

A. Brush and clean work prior to concealing, painting and acceptance. Perform in stages if directed.

B. Painted exposed work soiled or damaged: Clean and repair to match adjoining work before final acceptance.

C. Remove dust and debris from inside and outside of material and equipment.

TESTS AND DEMONSTRATIONS

A. All systems shall be tested in the presence of the Owner or an Owner designated representative upon completion of the Work. Contractor shall
demonstrate that the installation is in accordance with the Contract Documents.

B. All motors shall be checked and adjusted for correct direction of rotation.

C. Any work found not to be in compliance with the Contract documents shall be repaired or replaced without incurring additional cost to the Contract price.

D. Provide all instruction to the Owner on maintenance and operation of all systems and equipment provided under this Division.

WARRANTIES

A. The warranty period for all systems, equipment, components, work, etc. shall be no less than one (1) year, unless specified otherwise hereinafter and shall include at least one (1) full heating season and one (1) full cooling season. The warranty shall include parts and labor.

B. The Contractor shall, without cost to the Owner, remedy any defects within a reasonable time to be specified in notice from the Architect. In default thereof, the Owner may have such work done and charge all costs to the Contractor.

C. The start of the Contractor's warranty period, as defined in the General Conditions, shall commence on the issue of a “Certificate of Substantial Completion”, by the Owner or the Owner’s Representative for each item of material, equipment or system.

D. The Subcontractor shall confer with the General Contractor prior to the bid date concerning the project schedule and determine if there is a need to operate any items of equipment or systems for temporary heating and/or cooling or other reasons prior to “Substantial Completion”. All required extended warranty costs for equipment, materials, and systems shall be included in the Subcontractor’s bid.

END OF SECTION 15010
1.0 GENERAL

1.01 RELATED DOCUMENTS

A. The Conditions of the Contract and applicable requirements of Division 1, “General Requirements”, and Section 15010 “General Mechanical Requirements”, govern this Section.

1.02 DESCRIPTION OF WORK

A. Work Included: Provide pipe hangers, supports, and required appurtenances as specified and indicated.

1.03 QUALITY ASSURANCE

A. MSS Standard Compliance: Provide pipe hangers and supports of materials, design, and manufacture which comply with ANSI/MSS SP-58, SP-59, SP-89, and SP-90.

B. Acceptable Manufacturers: The model numbers listed in the Specification establish a level of quality and material. Subject to compliance with requirements, provide products and materials by the following:
1. ITT Grinnell Corporation,
2. Fee and Mason,
3. Central Iron Manufacturing Company, and
4. F& S Manufacturing Company

PART 2 – PRODUCTS

2.01 PIPE HANGERS AND SUPPORTS:

A. General: Provide pipe hangers and supports as specified. Comply with local codes and standards for pipe and equipment support and anchorage. Pipe supports shall be of material that will prevent electrolytic action.


C. Piping in Multiple Parallel Runs: Provide Grinnell No. 45 or No. 50 with Grinnell No. 137 U-bolt pipe clamps or structural channels or angles with U-bolt clamps, supported as trapeze hangers where multiple parallel runs of piping are shown. Select and size members for weights to be carried and span dimensions between supports.
D. Piping in Single Runs: Provide Fee and Mason Fig. 239 or Grinnell No. 260 clevis hanger.

E. Hanger Rod: Provide hanger rods of required length. Rod diameters shall be as listed in the following table. Rod diameters may be adjusted after consultation with the Structural Engineer concerning the building framing system, the method of attachment to the structure and the support rod spacing.

<table>
<thead>
<tr>
<th>Pipe Sizes</th>
<th>Rod Diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/4&quot; - 2&quot;</td>
<td>3/8&quot;</td>
</tr>
<tr>
<td>2-1/2&quot; - 3</td>
<td>1/2&quot;</td>
</tr>
<tr>
<td>4&quot; - 5</td>
<td>5/8&quot;</td>
</tr>
<tr>
<td>6&quot;</td>
<td>3/4&quot;</td>
</tr>
<tr>
<td>8&quot; - 12&quot;</td>
<td>7/8&quot;</td>
</tr>
</tbody>
</table>

F. Riser Clamps: Provide Fee and Mason Figure 241 riser clamps. Riser clamps for copper tube shall be copper-plated.

G. Saddles and Shields:
1. Saddles for Horizontal Insulated Piping Without Vapor Barrier: At each hanger or support on horizontal runs, provide Grinnell No. 160 or Fee and Mason Figure 171, 1710, 1712, or 172 saddles, as applicable. Shields as described below may be used instead of the saddles. On heating water systems below 140°F (60°C), hangers may be sized for the pipe size and of a material compatible with the pipe. Where dissimilar materials are used, provide dielectric separation. Carry insulation over the hanger and seal where hanger is sized for pipe.

2. Shields for Horizontal Insulated Water Piping With Vapor Barrier: At each hanger or support for water piping, provide a half section of preformed 6 PCF density fiberglass or rigid calcium silicate, with jacket of adjacent insulation brought across unbroken, supported on semicircular 16 gauge shields. Shields for pipe 4" and smaller shall be 12" long; shields for pipe 5" to 8" shall be 18" long; and shields for larger pipe shall be 24" long.

H. Piping on Roof: Roof mounted pipe supports are discouraged. If roof supports are necessary, installation methods must be approved by the design team, general contractor and the Roofing Contractor.

PART 2 – EXECUTION

3.01 INSTALLATION:

A. Independent Support: Support fire sprinkler and standpipe piping independently of other piping in accordance with NFPA-approved methods and local codes and standards.
B. Provisions for Movement:
1. Movement: Install hangers and supports to allow controlled movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate the action of expansion joints, expansion loops, expansion bends, and similar units.
2. Load Distribution: Install hangers and supports so piping live and dead loading stresses from movement will not be transmitted to any pipe or connected equipment. Pipe supports shall properly transmit the weight of the pipe and its contents to the building structure, or to independent posts, piers, or foundations.
3. Pipe Slopes: Install hangers and supports to provide the indicated pipe slopes so maximum pipe deflections allowed by ANSI B31 are not exceeded.

C. Insulated Piping: Comply with the following installation requirements:
1. Clamps: Attach clamps, including spacers (if any), to piping with clamps projecting through the insulation; do not exceed pipe stresses allowed by ANSI B31.
2. Shields: Where low-compressive-strength insulation of vapor barriers are indicated on cold, chilled, or heating water piping, install coated protective shields. For pipe 8” and over, install rigid calcium silicate insulation between saddles and pipe.

D. Spacing: Install hangers and supports in piping systems to remove stress from equipment flanges and rotating equipment. Space hangers and supports as shown in the following table. Rod spacing may be adjusted after consultation with the Structural Engineer concerning the building framing system, the method of attachment to the structure and the support rod diameters.

<table>
<thead>
<tr>
<th>Trade Pipe Size</th>
<th>Maximum Spacing</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/2&quot;</td>
<td>5'</td>
</tr>
<tr>
<td>3/4&quot;</td>
<td>6'</td>
</tr>
<tr>
<td>1&quot; and 1-1/4&quot;</td>
<td>7'</td>
</tr>
<tr>
<td>1-1/2&quot;</td>
<td>9'</td>
</tr>
<tr>
<td>2&quot;</td>
<td>10'</td>
</tr>
<tr>
<td>2-1/2&quot;</td>
<td>11'</td>
</tr>
<tr>
<td>3&quot;</td>
<td>12'</td>
</tr>
<tr>
<td>4&quot;</td>
<td>14'</td>
</tr>
<tr>
<td>5&quot;</td>
<td>16'</td>
</tr>
<tr>
<td>6&quot;</td>
<td>17'</td>
</tr>
<tr>
<td>8&quot;</td>
<td>19'</td>
</tr>
</tbody>
</table>

E. Saddles: Where insulation without vapor barrier is indicated, install protection saddles, or use hangers as indicated in Paragraph 2.0/H.1.

F. Guides: Install pipe guides complying with the manufacturer’s published product literature. Where not otherwise indicated, install pipe guides near expansion loops, expansion joints, and ball joints.
G. Anchors: Install anchors at the proper locations to prevent stresses from exceeding those permitted by ANSI B31 and to prevent the transfer of loading and stresses to connected equipment. Anchors shall include vibration isolation in accordance with the pipe support system specified. Where the piping system is floating, the anchors shall be termed restraints or braces.
   1. Where expansion compensators are indicated, install anchors in accordance with the expansion unit manufacturers written instructions, to limit movement of piping and forces to the maximums recommended by the manufacturer of each unit.
   2. Where not otherwise indicated, install anchors at the ends of principal pipe runs and at intermediate points in pipe runs between expansion loops and bends. Make provisions for preset of anchors as required accommodating both expansion and contraction of piping.

H. Leveling: Adjust hangers and supports and place grout as required under supports to bring piping to proper levels and elevations.

I. Hangers: Refer to Section 15210, “Vibration Isolation”, for additional information and support requirements. Pipe hangers made of wood, wire, or sheet iron shall not be permitted.

J. Riser Supports: Vertical piping shall be secured at sufficiently close intervals to keep the pipe in alignment and carry the weight of the pipe and contents.
   1. Cast iron soil pipe shall be supported at the base and at each story level, but in no case at intervals greater than 10’.
   2. Steel pipe shall be supported at the base and at no less than every other story level, but in no case at intervals greater than 25’.
   3. Copper tube shall be supported at each story level, but in no case at intervals greater than 10’.
   4. Plastic pipe shall be supported at mid point between floors and at ceiling to prevent movement, but in no case at intervals greater than 8’.

END OF SECTION 15140
1.0 GENERAL

1.01 SUMMARY

A. The General Provisions, Supplemental General Provisions, section 15010, Division 1 Specifications and Special Provisions apply to all Work specified in this Section.

B. This section describes the basic materials and installation methods for the identification of equipment and piping. Comply with other Division 15 sections and drawings as applicable. Refer to other divisions for coordination of work.

C. Furnish and install all components of the identification of equipment and piping specified herein and/or as indicated on the drawings.

1.02 DESCRIPTION OF WORK

A. Work Included: Identification of mechanical equipment shall consist of equipment labeling, pipe marking, and valve tagging as specified hereinafter.

1. In general, all equipment shall be labeled. This shall include all central plant, air handling or air conditioning equipment, and other similar and miscellaneous equipment.

2. Pipe markings shall be applied to all piping.

3. Each valve shall be identified with a stamped tag. Valves and tagging shall be scheduled typewritten on 8 ½” x 11” paper, tabulating valve number, piping system, system abbreviation, location of valve (Room or area), and service (e.g. – 2nd Floor North Domestic Hot Water). The valve schedule shall be submitted to the Engineer for approval prior to ordering or installing valve tags. See Section 15010, “General Mechanical Requirements” for information and requirements regarding Operation and Maintenance Manuals.

4. Labels, tags, and markers shall comply with ANSI A13.1 and other applicable state and local standards for lettering size, colors, and length of color field.

5. Equipment and device identification specified in other sections shall be provided as a part of those requirements.

1.03 ACCEPTABLE MANUFACTURERS

Azura Surgery Center Renalus Crestview
A. Labels, markings, and tags shall be manufactured by W.H. Brady, Seton, Allen, or Industrial Safety Supply.

2.0 PRODUCTS

2.01 EQUIPMENT LABELING

A. Equipment labeling shall be one of the following, unless noted or specified otherwise:

1. Permanently attached engraved brass or plastic laminated signs with 1” high lettering. Signs on exterior equipment shall be brass.

2. Stencil painted identification, 2” high letters, with standard fiberboard stencils and standard black (or other appropriate color) exterior stencil enamel.

2.02 PIPE MARKINGS

A. On piping less than 6” diameter, install plastic semi-rigid snap-on type, manufacturer’s standard pre-printed color-coded pipe markers extending fully around the pipe and insulation or pressure-sensitive vinyl pipe markers similar to the above. Pipe markings can also be applied with the stick type backing in lieu of the semi-rigid snap-on-type.

B. On piping and insulation 6” and greater diameter, full band as specified above or strip-type markers fastened to the pipe or insulation with laminated or bonded application or by color-coded plastic tape not less than 1 ½” wide, full circle at both ends of the marker. Pipe markings can also be applied with the stick type backing in lieu of the semi-rigid snap-on-type.

C. Arrows for direction of flow provided integral with the pipe marker or separate at each marker.

2.03 VALVE TAGS

A. Valve tags shall be polished brass or plastic laminate with solid brass S hook and chain. Tags shall be stamped or engraved with the appropriate abbreviation for the type of service (e.g. – CHW, HW), as well as the designated valve number.

B. A valve schedule is to be provided to the Owner. For each page of valve schedules, a glazed display frame, with screws for removable mounting on masonry walls. Provide frames of finished hardwood or extruded aluminum, with SSB-grade sheet glass.

3.0 EXECUTION

3.01 GENERAL

Azura Surgery Center Renalus Crestview
A. Identification labeling, marking, and tagging shall be applied after insulation and painting has been completed.

B. Coordinate names, abbreviations, and other designations used in mechanical identification work with corresponding designations shown, specified, or scheduled on drawings. Prior to ordering any labels, markings, or tags, obtain the approval of the Engineer regarding names, abbreviations, etc.

C. The Plumbing, HVAC, and Fire Protection Contractors shall coordinate labeling, marking, and tagging to ensure consistent and coordinated identification. In existing buildings, utilize similar names, abbreviations, and other designations that are currently in use to remain consistent with existing identification.

D. Equipment labeling shall consist of unit designation as shown on the drawings. Exhaust fan labeling shall also indicate service or the room or area of service.

E. Pipe and ductwork markers shall be placed on piping and ductwork on 25’ centers in mechanical rooms and concealed spaces. In locations where piping and ductwork is exposed, place markers on 50’ centers. Flow directional arrows should be marked on the piping at taps from the main and riser.

F. Valve tags shall be placed on each valve except those intended for isolation of individual heat pumps or terminal units (e.g. - VAV boxes, fan coil units, unit heaters, etc.). Valve tag schedules shall be prepared as specified hereinbefore. Copies of one schedule shall be laminated in clear plastic and placed where directed by the Owner. Other sets shall be included in the Operating and Maintenance Manuals.

END OF SECTION 15190
1.0 GENERAL

1.01 SUMMARY

A. The General Provisions, Supplemental General Provisions, section 15010, Division 1 Specifications and Special Provisions apply to all Work specified in this Section.

B. This section describes the basic materials and installation methods for the insulation of HVAC and Plumbing piping, duct, and equipment. Comply with other Division 15 sections and drawings as applicable. Refer to other divisions for coordination of work.

C. Furnish and install all components of the insulation system specified herein, as indicated on the drawings, and as required to provide complete and operating systems.

1.02 QUALITY ASSURANCE

A. Manufacturer: Approved manufacturers are Armstrong, Calsite, Cell-U-Foarm Corp, Ceelco, Certainteed Corp, Dow Chemical Company, Forrest Mfg Co, Foster / Chilers, Gemco, Johns Manville, Knauf Fiberglass, Midwest Fastners, Owens Corning Fiberglass, Pittsburg Corning Fiberglass, Rubatex, Trymer, and Venture Tape.

B. All insulation, jacket and adhesive shall have a fire and smoke hazard ratings as tested under ASTM E 84, NFPA 255, and UL 723 not exceeding:

   Flame Spread: 25
   Fuel Contributed: 50
   Smoke Developed: 50

Exceptions: Type B Insulation and PVC Fitting Covers

1.03 SUBMITTALS

A. Per Section 15010.

B. Product Data

   1. Type A Insulation
   2. Type B Insulation
   3. Type D Insulation
   4. Type E Insulation
   5. Type F Insulation
   6. Vinyl Lacquer Paint for Type B Insulation

Azura Surgery Center Renalus Crestview
7. Metal Jacket

1.04 DEFINITIONS

A. The phrase "Storm Drainage Conductor" refers to that portion of the storm drain interior to the building, between the roof drain body and where the pipe goes below grade.

B. The word “plenum” shall mean a ceiling space or mechanical room used for the transfer of conditioned return and/or outside air.

2.0 PRODUCTS

2.01 PIPING INSULATION

A. Type A – Fiberglass (indoor)

1. One Piece glass fiber, rigid molded sectional pipe covering with factory applied aluminum foil and white craft paper flame retardant vapor barrier jacket, conforming to ASTM C547, Class II, Mineral Fiber Preformed Pipe Insulation.

2. Thermal Conductivity (k) equals approximately 0.23 (BTU/HR., SF., Degree F, IN) at 75 °F.

3. Similar to Johns Manville Corp “Micro Lox 650 AP T”, or approved equal.

B. Type B - Closed Cell (indoor)

1. Closed cell, flexible foamed plastic conforming to ASTM C534, "Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form." Insulation shall be suitable for a temperature range from –40 degrees F to 220 degrees F.

2. Conductivity (k) equals approximately 0.27 (BTU/HR., SF., Degree F, IN) at 75 °F.

3. Similar to Armstrong “Armaflex”, or approved equal.

C. Type E

1. Calcium silicate block conforming to ASTM C 553, Type I (1200 degrees F. max), asbestos free.

2. Conductivity (k) equals approximately 0.42 (BTU IN/HR., SF., degree F) per inch thickness at 200 °F.

3. Similar to Calsilite, or approved equal.
2.02 DUCTWORK INSULATION

A. Type F – Duct Wrap

1. Duct insulation shall be 2” thick, minimum 3/4 lb. density fiberglass with an FSKL aluminum foil jacket, reinforced with fiberglass scrim.

2. Conductivity (k) equals approximately 0.27 (BTUHR., SF., degrees F, IN) at 75 °F.

3. Integral UL rated vapor barrier of:
   a. Aluminum foil reinforced with fiberglass scrim laminated to 30-lb. kraft paper.
   b. Class I white vinyl 0.004 inch thick, where specified.

4. Similar to Johns Manville Corp “Microlite”, or approved equal.

2.03 METAL JACKET

A. Smooth aluminum jacket 0.016 inch thick.

B. Integral polykraft or poly-surlyn moisture barrier.

C. Banded locking joints with field applied silicone weatherproof sealant.

D. Similar to Johns Manville Corp, or approved equal.

2.04 INSULATION ACCESSORIES

A. The following accessories shall be used in the application of the thermal insulations specified under this Section:

1. PVC Fittings Covers: similar to Johns Manville Corp “Zeston”, or approved equal.

2. Pressure Sensitive polyester film tape to secure pipe insulation up to 12” outside diameter: Similar to 3M 30-80, or approved equal.

3. Vapor Seal Mastic: Similar to Childers CP-35, or approved equal.

4. Lagging Adhesive: Similar to Childers CP-52, or approved equal.

5. Wire: 16 gauge soft stainless steel.

6. Insulation Bonding Adhesive (To Metal): Similar to Childers CP-82, or approved equal.
7. Insulating and Finishing Cement: Similar to Insulco Smooth Kote, or approved equal.

8. Mechanical Fasteners - Welded or adhered pins with speed clip washers: Similar to Gemco Midwest Fasteners, or approved equal.

9. Bands for Equipment:
   a. Outside diameter of insulation is less than 24 inch: 1/2 inch x 0.020-inch (25 ga.) stainless steel.
   b. Where diameter is 36 inches or larger: 3/4 inch x 0.020 inch.

10. Bands for Piping: 1/2 inch x 0.020-inch stainless steel.


3.0 EXECUTION

3.01 INSULATION APPLICABILITY

A. Condensate Drains (except in plenums and fire partitions/floors) – Type B insulation required:

<table>
<thead>
<tr>
<th>Insulation Thickness (in)</th>
<th>Pipe Sizes (in)</th>
</tr>
</thead>
<tbody>
<tr>
<td>½</td>
<td>all</td>
</tr>
</tbody>
</table>

B. Condensate Drains (inside plenums and fire partitions/floors) – Type A insulation required:

<table>
<thead>
<tr>
<th>Insulation Thickness (in)</th>
<th>Pipe Sizes (in)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/2</td>
<td>up to 1</td>
</tr>
<tr>
<td>3/4</td>
<td>1-1/4 and up</td>
</tr>
</tbody>
</table>

C. Underside of drains receiving condensate from cooling coils – Type F insulation required:

<table>
<thead>
<tr>
<th>Insulation Thickness (in)</th>
<th>Pipe Sizes (in)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>all</td>
</tr>
</tbody>
</table>

D. Horizontal waste piping from electric water coolers – Type A insulation required:

<table>
<thead>
<tr>
<th>Insulation Thickness (in)</th>
<th>Pipe Sizes (in)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/2</td>
<td>all</td>
</tr>
</tbody>
</table>

E. Refrigerant Suction Lines & Valves (except in plenums and fire partitions/floors) – Type B
F. Refrigerant Suction Lines & Valves (in plenums and fire partitions/floors), and hot gas bypass piping – Type A insulation required:

<table>
<thead>
<tr>
<th>Insulation Thickness (in)</th>
<th>Pipe Sizes (in)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>all</td>
</tr>
</tbody>
</table>

G. Domestic Cold Water – Type A insulation required:

<table>
<thead>
<tr>
<th>Insulation Thickness (in)</th>
<th>Pipe Sizes (in)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>all</td>
</tr>
</tbody>
</table>

H. Domestic Hot Water and Tempered Water – Type A insulation required:

<table>
<thead>
<tr>
<th>Insulation Thickness (in)</th>
<th>Pipe Sizes (in)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>all</td>
</tr>
</tbody>
</table>

I. Emergency Generator Exhaust Piping and Muffler – Type E insulation required:

<table>
<thead>
<tr>
<th>Insulation Thickness (in)</th>
<th>Pipe Sizes (in)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>all</td>
</tr>
</tbody>
</table>

J. Medium Pressure Supply Ducts – Type F insulation required

<table>
<thead>
<tr>
<th>Insulation Thickness (in)</th>
<th>Duct Sizes (in)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>all</td>
</tr>
</tbody>
</table>

K. Low Pressure Supply Ducts – Type F insulation required

<table>
<thead>
<tr>
<th>Insulation Thickness (in)</th>
<th>Duct Sizes (in)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>all</td>
</tr>
</tbody>
</table>

L. Outside air ductwork – Type F insulation required (see Note G below):

<table>
<thead>
<tr>
<th>Insulation Thickness (in)</th>
<th>Duct Sizes (in)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>all</td>
</tr>
</tbody>
</table>

M. Domestic Water Heaters shall be factory insulated.

Notes:

a. Exhaust ductwork, stairwell pressurization and dedicated smoke evacuation ductwork is not insulated, unless otherwise noted.

b. Exposed supply and return ductwork will be double wall, internally lined.
c. The above thicknesses are the minimum required. All local codes and local energy codes shall be complied with.

d. All piping exposed to outdoors shall be insulated. All piping subject to freezing shall be provided with heat tracing. Coordinate insulation with heat trace cable and controls.

e. Insulation types and thickness are a minimum standard. Each application shall be carefully considered and insulation product type and thickness shall be appropriate for each specific application. Submit all insulation products with verification of their service intent.

f. No type of duct liner shall be used for any unit associated with the ASC.

3.02 PIPING INSULATION GENERAL REQUIREMENTS

A. Preparation

1. Do not apply insulation until piping has been leak tested.

2. All surfaces to be insulated shall be dry and free of loose scale, rust, dirt, oil or water.

B. Application:

1. Insulation shall be installed in a smooth, clean workmanlike manner. Joints shall be tight and finished smooth without fish-mouths.

2. Insulation shall fit tightly against the surface to which it is applied to prevent air circulation between the insulation and the pipe or equipment to which it is applied.

3. Insulation applied to cold piping or equipment shall be completely vapor sealed, free of pinholes or other openings.

4. Do not use wet insulation materials.

5. All longitudinal joints on vertical pipe runs shall be staggered.

6. Apply insulation so as to permit expansion or contraction of pipelines without causing damage to insulation or surface finish.

7. Do not apply mastic or adhesive until all previous applications of mastic and adhesives have thoroughly dried.

8. No bands or staples shall be provided on covering.
9. The adhesive used in connection with all covering work shall contain an approved vermin and rodent proof ingredient.

10. Provide 24-gauge sheet-metal saddle between the pipe hanger/support and the exterior of the insulation. Saddle length shall be the same as insulation inserts.

C. Application at Fittings:

1. Insulation of flanges and flanged fittings shall overlap adjacent pipe covering at least 1 inch. Valves shall be insulated up to the gland only.

2. Pipeline strainers shall be insulated in such a manner as to permit removal of strainer basket without disturbing insulation of the strainer body.

3. Insulation adjacent to un-insulated flanges shall be tapered back and neatly finished so as to allow access to and removal of bolts without injury to covering.

3.03 TYPE A INSTALLATION

A. Tightly butt together sections of insulation on pipe runs sealing longitudinal seams of jacket with a self-sealing adhesive. Seal end joints with 4-inch wide straps of matching vapor barrier tape. Seal off ends of insulation with vapor seal mastic at valves, fittings and flanges. No further finish required. Mastic shall extend onto the bare pipe and over the insulation O.D.

B. PVC fitting jackets shall be used when they are available for the particular application. When molded or routed coverings are not available, the coverings shall be fabricated in the field similar to equipment insulation. Molded or routed fitting covers are highly recommended. Order PVC precurled.

C. Cold Piping:

1. Cover valves, fittings and flanges with insulation having the same thickness as adjacent pipe covering, securing in place reforming tape up to 12” O.D. and ½” wide SST bands on larger O.D. Apply a PVC jacket and seal joints with PVC cement (solvent welding).

D. Hot Piping:

1. Covers shall overlap the pipe insulation by the thickness of the insulation or 2” min. Cover valves, fittings and flanges with insulation similar to the adjacent pipe covering, securing in place with reforming tape up to 12” O.D. and ½” wide SST bands on larger O.D. Apply a PVC jacket and tape end joints to adjacent pipe insulation.
2. Do not use PVC fitting jackets where the surface of the insulation is above 150 degrees F.

E. Exterior Piping:

1. Exterior above grade water piping shall be finished with a weatherproof jacket and an aluminum jacket. Lap and seal joints as per manufacturer's instructions. Place laps to shed water.

3.04 TYPE B INSTALLATION

A. Type B insulation shall be slipped on the pipe prior to connection, and the butt joints shall be sealed. Where the slip on technique is not possible, the insulation shall be carefully slit and applied to the pipe.

B. All joints shall be completely butt sealed with the manufacturer's recommended adhesive.

C. Do not apply Type B insulation in multiple layers.

D. Type B insulation shall not be used in plenums nor firewall penetrations.

E. This Contractor shall paint Type B insulation exterior to the building with two coats of a vinyl acrylic paint recommended by the insulation manufacturer for protection against ultraviolet degradation and shall be flexible with no cracking. It is recommended in high humid areas to coat the insulation with a vapor barrier mastic to .037 min. DFT.

3.05 TYPE C INSTALLATION

A. Exterior

1. Butter joints of insulation with non-setting adhesive. Secure with factory applied Self-Seal laps. Installation shall be as per manufacturer's guidelines.

2. Finish shall be factory applied All Service Jackets. All fittings shall be finished with vapor seal mastic reinforced with white glass mesh. Minimum 0.037 thick DFT of mastic.

3. Piping exposed in machine rooms shall be finished with vapor seal mastic and open weave membrane 10 x 10.

4. Piping exposed to weather shall be finished with all service jacket and additional finish of 0.16 thick aluminum jacket. Aluminum jacket shall be secured with stainless bands located on maximum centers of 12 inches and at the overlap. No screws or pop rivets shall be used.
5. Fittings and valves shall be finished with vapor seal mastic, reinforced with minimum 0.037” DFT of mastic, glass mesh and aluminum preformed fitting covers.

3.06 TYPE D AND E INSTALLATION

A. Equipment Insulation Application:

1. Apply insulation to fit as closely as possible to equipment.
2. Stagger joints where possible.
3. Bevel insulation around nameplates, ASME stamp and access plates.
4. Insulation on equipment that must be opened periodically shall be constructed so insulation can be removed and replaced without damage.
5. Do not install Type E insulation on aluminum surfaces or with aluminum jacket.

3.07 TYPE F INSTALLATION

A. Ductwork Insulation Application:

1. Apply insulation tightly and smoothly to duct.
2. Secure insulation on the bottom of ducts and plenums and on the sides of plenums and other places where the insulation will sag and max 3” from any corner.
3. Impale insulation over pins or anchors located not more than 18 inches apart and hold in place with washers and clips.
4. Cut off protruding pin after clips are secured and seal with 2-mil. aluminum foil backed pressure sensitive tape.
5. Apply insulation with joints tightly butted.
6. Seal all ductwork joints, punctures and fittings with a mastic type sealant containing a vapor barrier.
7. Cover all breaks, joints, punctures and voids with a vapor seal mastic and cover with a vapor barrier material identical to vapor barrier on the insulation, where gaps exceed 2”.
8. Bevel insulation around nameplates, access plates and doors.
9. Insulation shall be continuous through walls and floors except at fire dampers.

3.08 METAL JACKET INSTALLATION
A. Cover all piping insulation exposed to the exterior with metal jacket as specified herein.

3.09 HANGERS

A. Continue insulation through pipe hangers. Provide either rigid insulation inserts or sheet metal inserts at all outside pipe hangers. Provide rigid insulation inserts for piping operating below 60 °F. and sheet metal inserts for piping above 60 °F.

B. Provide rigid insulation (on non-insulated piping) or sheet metal inserts (on insulated piping) between the pipe and pipe hanger - shall be of a thickness equal to the adjoining insulation and shall be provided with vapor barrier where required. Insulation insert shall not be less than the following lengths:

<table>
<thead>
<tr>
<th>Pipe Size</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/2&quot; to 2 1/2&quot;</td>
<td>10 Inches Long</td>
</tr>
<tr>
<td>3&quot; to 6&quot;</td>
<td>12 Inches Long</td>
</tr>
<tr>
<td>8&quot; to 10&quot;</td>
<td>16 Inches Long</td>
</tr>
</tbody>
</table>

C. Inserts for cold piping shall have a vapor barrier facing of the same material as the adjacent pipe insulation. Seal inserts into insulation with vapor seal mastic.

D. Sheet metal inserts shall be of steel sheet. Gauge shall conform to manufacturer's recommendation for pipe size. Sheet metal inserts shall have insulation filler of the same material as the adjacent pipe insulation.

3.10 PIPE SLEEVES

A. Pipe insulation and vapor barrier shall be continuous through sleeves in walls and floors.

B. Type B insulation shall not be used in sleeves through firewalls or fire rated (2-hour) floor systems. Use Type A or Type C through the sleeve instead and vapor seal the joint between the two insulations.

C. Provide 26 gauge galvanized steel or 0.020 inch aluminum jacket over insulation on pipe passing through sleeves where sealant is required.

D. Where penetrating interior walls, extend the metal jacket 2 inches out either side of the wall and secure each end with a metal band compressing the insulation slightly.

E. Where penetrating floors, extend the metal jacket 2 inches below the floor and 5 inches above the floor. Secure with metal bands.

END OF SECTION 15200
1.0 GENERAL

1.01 SUMMARY

A. The General Provisions, Supplemental General Provisions, section 15010, Division 1 Specifications and Special Provisions apply to all Work specified in this Section.

B. This section describes the basic materials and installation methods for the vibration isolation systems. Comply with other Division 15 sections and drawings as applicable. Refer to other divisions for coordination of work.

C. Furnish and install all components of the vibration isolation systems specified herein, as indicated on the drawings, and as required to provide complete and operating systems.

1.02 DESCRIPTION OF WORK

A. Work Included: Provide vibration isolation work as specified and indicated, including the following:

1. Support isolation for motor-driven mechanical equipment

2. Inertia base frames in conjunction with equipment isolation

3. Support isolation of air-handling housings

4. Isolation including support isolation for piping risers

5. Support isolation of piping

6. Flexible ductwork connections

1.03 QUALITY ASSURANCE

A. General: Except as otherwise indicated, obtain support isolation units from a single manufacturer.

B. Supervision: Manufacturer shall provide technical supervision of the installation of support isolation units produced by him and of associated inertia bases.

C. Manufacturers: Provide vibration isolation support units manufactured by one of the following or an approved equal: Amber-Booth, Vibrations Mounting and Controls, Inc., Korfund Dynamics Corporation, Consolidated Kinetics Corporation.

Azura Surgery Center Renalus Crestview
2.0 PRODUCTS

2.01 MATERIALS

A. Chilled, Condenser and Heating Hot Water Pumps: Provide concrete inertia bases with structural steel pouring forms sized and reinforced as required for the intended service. Size bases to support the piping elbow supports and furnish with Type RSW recessed spring isolators properly sized for one-inch static deflection. Mount springs on concrete bases 3-1/2" high. Inertia base is not required for pumps installed on slabs on grade.

B. Suspended Fans: Isolate with not less than four combination spring and rubber-in-shear vibration isolators.

C. Suspended Heat Pump Units: Unit shall be isolated with hanger and vibration isolation kit supplied by unit manufacturer or a vibration isolation manufacturer.

D. Suspended Fan & Coil Unit: Isolate with not less than four combination spring and rubber “in-shear” vibration isolators.

E. Flexible Pipe Connections at Cooling Tower: Isolate supply and return piping to the cooling tower with flanged rubber, spherical double-arch expansion joints.

F. Flexible Pipe Connections at Rotating Equipment: Isolate supply and return piping to each pump with braided metal hose connectors between pump and valve.

G. Flexible Ductwork Connections to Equipment: Install flexible connections between sheet metal ductwork and equipment or fan collar. Locate as close to fan as possible. Isolate the duct system from the equipment by at least 1”.

H. Roof Mounted Air Handling Units: Provide housed spring type isolators with vertical limit stops. Provide with 1” deflection (0 to 500 rpm) or .75” deflection (501 and over rpm).

3.0 EXECUTION

3.01 ISOLATOR PERFORMANCE

A. General: Comply with the minimum static deflections recommended by the American Society of Heating, Refrigerating and Air Conditioning Engineers, including the definitions of critical and non-critical locations, for the selection and application of vibration isolation materials and units as indicated.
B. Manufacturer's Recommendations: Except as otherwise indicated, comply with manufacturer's instructions for selection and application of vibration isolation materials and units.

3.02 RELATED WORK EXAMINATION

A. Examination and Reporting: Installer of vibration isolation work shall observe the installation of other work related to and connected to vibration isolation work. After completion of other related work (but before equipment start-up), installer shall furnish a written report to the Contractor, with a copy to the Engineer, listing observed inadequacies for proper operation and performance of vibration isolation work.

B. Correction and Start-up: Do not start-up equipment until inadequacies have been corrected in a manner acceptable to the vibration isolation Installer.

3.03 EQUAL LOADING

A. General: Equipment installed on vibration isolating mountings shall be level after load is applied. Further vibration isolating mountings shall be selected and installed to compensate for unequal loading. Spring isolators with coils touching during equipment start-up or operation will not be acceptable.

END OF SECTION 15210
1.0 GENERAL

1.01 SUMMARY

A. The General Provisions, Supplemental General Provisions, section 15010, Division 1 Specifications and Special Provisions apply to all Work specified in this Section.

B. This section describes the basic materials and installation methods for the plumbing piping systems. Comply with other Division 15 sections and drawings as applicable. Refer to other divisions for coordination of work.

C. Furnish and install all components of the plumbing piping systems specified herein, as indicated on the drawings, and as required to provide complete and operating systems.

1.02 DESCRIPTION OF WORK

A. Work Included: Provide complete operating plumbing piping systems including pipe, tube, fittings, and appurtenances as indicated and in compliance with these Specifications.

B. Applications: Applications of piping systems include, but are not limited to, the systems as listed below:

<table>
<thead>
<tr>
<th>System</th>
<th>Working Pressure</th>
<th>Operating Temperatures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domestic Cold Water</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>350 psig</td>
<td>55 to 80°F</td>
</tr>
<tr>
<td>Medium</td>
<td>300 psig</td>
<td>55 to 80°F</td>
</tr>
<tr>
<td>Low</td>
<td>150 psig</td>
<td>55 to 80°F</td>
</tr>
<tr>
<td>Domestic Hot Water</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>350 psig</td>
<td>90 to 120°F</td>
</tr>
<tr>
<td>Medium</td>
<td>300 psig</td>
<td>90 to 120°F</td>
</tr>
<tr>
<td>Low</td>
<td>150 psig</td>
<td>90 to 120°F</td>
</tr>
<tr>
<td>Makeup Water</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>350 psig</td>
<td>55 to 80°F</td>
</tr>
<tr>
<td>Medium</td>
<td>300 psig</td>
<td>55 to 80°F</td>
</tr>
<tr>
<td>Low</td>
<td>150 psig</td>
<td>55 to 80°F</td>
</tr>
<tr>
<td>Condensate Drainage</td>
<td>--</td>
<td>40 to 60°F</td>
</tr>
</tbody>
</table>
1.03 QUALITY ASSURANCE

A. Welding: Qualify welding procedures, welders, and operators in accordance with ANSI B31.1, Paragraph 127.5, for shop and job site welding of piping work. Make welded joints on the piping system with continuous welds, without backing rings and with pipe ends beveled before welding. Gas cuts shall be true and free from burned metal. Before welding, surfaces shall be thoroughly cleaned. The piping shall be carefully aligned and no weld metal shall project inside the pipe.

2.0 PRODUCTS

2.01 PIPING MATERIALS

A. General: Provide pipe and tube of type, joint, grade, size, and weight (wall thickness, schedule or class) indicated for each service. Comply with applicable governing regulations and industry standards.

1. Steel Pipe: ASTM A53, ASTM A106, or ASTM A120, black or hot-dipped galvanized as specified.

2. Copper Tube: ASTM B88, Types "K", Type "L", or Type "M" copper water tube as defined by the Copper and Brass Research Association.


6. Polyvinyl Chloride (PVC) Pipe: Sewer main SDR 41, ASTM D3034 with bell ends and pre-inserted gasket joints.


8. Polyvinyl Chloride (PVC) Water Pipe: Class 150, thickwall, Schedule 80, AWWA C90 mechanical joint.

10. Polyvinyl Chloride (PVC) Drainage Pipe: Schedule 40 PVC.

11. Chlorinated Polyvinyl Chloride (CPVC) Drainage Pipe: Schedule 40 CPVC. Type IV Grade I with cell classification of 23447 as defined in ASTM D1784. Rated for temperatures up to and including 200°F.

2.02 PIPE / TUBE FITTINGS

A. General: Provide factory-fabricated fittings of type, materials, grade, class, and pressure rating indicated for each service and pipe size. Provide sizes and types matching pipe, tube, valve, and equipment connections. Where not otherwise indicated, comply with governing regulations, industry standards, and where applicable, with pipe manufacturer's instructions for selections.

1. Cast Iron Flanged Fittings: ANSI B16.1, Class 125 or Class 250, black or galvanized as specified, including bolting and gasketing.

2. Cast Iron Threaded Fittings: ANSI B16.4 or ASTM A126, Class 125 or Class 250, black or galvanized as specified.

3. Malleable Iron Threaded Fittings: ANSI B16.3, Class 150 or Class 300, black or galvanized as specified.

4. Malleable Iron Threaded Unions: ANSI B16.39, select for proper piping fabrication and service requirements including style, end connections, and metal-to-metal seats (iron, bronze, or brass), plain or galvanized as specified.


6. Steel Flanges/Fittings: ANSI B16.5, including bolting, gasketing, and butt weld end connections.

7. Forged Steel Socket-welding and Threaded Fittings: ANSI B16.11, rated to match schedule of connected pipe.

8. Wrought Steel Butt-welding Fittings: ANSI B16.9, except ANSI B16.28 for short radius elbows and returns; rated to match connected pipe.


10. Pipe Nipples: Fabricated from same pipe as used for connected pipe, except do not use less than Schedule 80 pipe where length remaining unthreaded is less than 1/2”. Do not thread nipples full length (no all-thread nipples).


15. Lead/Oakum Joint Materials: Comply with governing regulations for service use indicated.

16. Grooved End Fittings: ASTM A47 or ASTM A536 joined with Victaulic Style 77 couplings and Grade "E" gaskets.


18. Flange Bolts: Bolts shall be carbon steel ASTM A307 Grade A hexagon head bolts and hexagonal nuts. Where one or both flanges are cast iron, furnish Grade B bolts. Cap screws utilized with flanged butterfly valves shall be ASTM A307 Grade B with hexagon heads.

19. Flange Bolt Thread Lubricant: Lubricant shall be an anti-seize compound designed for temperatures up to 1000°F and shall be Crane Anti-Seize Thread Compound or approved equal.

20. Polyvinyl Chloride (PVC) Fittings: ASTMD-2665, Lasco or Spears Manufacturing high strength sewer fittings.

21. Copper Drainage Fitting: DWV copper drainage fittings.

B. Miscellaneous Piping Materials/Products:


3. Gaskets for Flanged Joints: 1/8" thick gaskets. Ring-type shall be used between raised face flanges and full face-type between flat face flanges with punched bolt holes and pipe opening. Gaskets shall be Garlock Style 3400 compressed non-asbestos or equal.

4. Insulating (Dielectric) Unions: Provide dielectric unions at all pipe connections between ferrous and nonferrous piping. Unions shall be
"Delvin" as made by Pipeline Seal and Insulator Company or "EPCO" as made by Epco Sales, Inc. and shall have nylon insulation or equal.


7. Hub-less Cast Iron Joints: CISPI 310, stainless steel corrugated shield and clamp assembly over one piece neoprene sealing sleeve.

3.0 EXECUTION

3.01 PIPING INSTALLATION

A. General:

1. Industry Practices: Install pipe, tube, and fittings in accordance with recognized industry practices which will achieve permanently leak-proof piping systems, capable of performing each indicated service without failure or degradation of service. Install each run with a minimum of joints and couplings, but with adequate and accessible unions or flanged connections to permit disassembly for maintenance/ replacement of valves and equipment. Reduce sizes (where indicated) by use of reducing fittings. Align accurately at connections. Coordinate piping locations with other trades to avoid conflict. Give ductwork preference unless directed otherwise by the Engineer.

2. Systems: Install piping parallel or perpendicular to lines of building, true to line and grade, and with sufficient hangers to prevent sags between hangers. Provide fittings at changes in direction. Piping in finished areas shall be concealed, except in mechanical rooms. Where pipes of different sizes join, provide reducing elbows, tees, or couplings. Bushings will not be acceptable.

3. Expansion and Contraction: Install loops, offsets, sizing joints, and expansion joints, as necessary, to avoid strain resulting from expansion and contraction of piping systems on fixtures and equipment. Provide mechanical grooved connections required by the application to reduce vibration at equipment connections. Provide expansion joints in piping systems by mechanical grooved connections where required.

C. Steel Pipe: Ream steel pipe after cutting and before threading. Thread with clean-cut taper threads of length to engage all threads in fittings and leave no full-cut threads exposed after make-up.

D. Copper Pipe: Cut copper pipe square and ream to remove burrs. Clean fitting socket and pipe ends with sand cloth or wire brush.
E. PVC Pipe: Cut PVC pipe square and remove all burrs. Clean fitting and pipe butt prior to installation. Install all PVC piping in accordance with the manufacturer’s recommendations. PVC piping shall not be installed in return air plenums unless wrapped with 25/50 flame spread complaint plenum rated wrap.

F. Final Connections to Equipment Furnished by Owner or Under Other Divisions of These Specifications: Where equipment is to be furnished under other Divisions of these Specifications or by the Owner, such equipment will be delivered to the site, uncrated, assembled, and set in-place under those other Divisions of these Specifications or under the separate contracts. Any required automatic control valves shall also be provided under those other Divisions of these Specifications or other separate contracts. Make all final connections of hot water, condenser water, gas, domestic water, waste, and vent as required. Provide valves, unions, strainers, check valves, and traps as required for proper operation of systems and equipment. Equipment not shown on the Architectural Drawings or noted by the Architect and/or Engineer shall not be included in the scope of this requirement.

G. Excavation, Installation, and Backfill for Underground Pipe:

1. Layout: Pipes shall be laid and pipe joints made in presence of the General Contractor and field measurements, layouts, batter board alignment, grade establishments, and similar locations shall be performed by a Professional Engineer in the employ of the Contractor. The Contractor's engineer shall be on the job during all underground work. A "Bench-Mark" reference shall be provided by the General Contractor.

2. Pipe Grading: Lay and maintain all pipes at required lines and grades during the course of the Work.

3. Trench: Excavate the trench to the depth required. Properly brace and de-water the trench and keep it free of water during installation, testing pipe, and backfilling. No water shall be discharged onto the street or freeway without approval by the Owner.

4. Excavation: The trench shall be at least 18" wider than the maximum diameter of the pipe or largest bell and the pipe shall be laid in the center of the trench. The trench shall be excavated to a depth sufficient to provide for pipe cushions or supports as specified. Trench width may be increased as required and piling left in place until sufficient compacted backfill is in place. Properly sheet and brace all open trenches to render them secure and remove all such sheeting and bracing before completing the backfill. Comply with all applicable national, state, and local codes and regulations. The quantity of excavation required to install sheeting and the installation and removal of sheetings and bracings will not be regarded as Extra Work. All costs incurred for this excavation and the installation of sheeting shall be included in the Contract Price.
5. Grading: Upon completion of excavation and prior to the laying of the pipe, the trench bottom shall be brought up to the required elevation with a pipe cushion, except where the cushion has been eliminated by the General Contractor. Pipe cushions shall be select material deposited in the trench and shall be compacted, leveled off, and shaped to obtain a smooth compacted bed along the laying length of the pipe. Pipe cushion material shall be as follows:

a. Domestic Water Pipes: Material for pipe cushion shall comply with local codes and conform with the geo-technical report. In absence of local code requirements and/or geo-technical report, the cushion shall be bank sand or select backfill material approved by the General Contractor. Any material used shall pass a one-inch screen.

b. Sanitary and Storm Sewers: Material for pipe cushion shall comply with local codes and conform with the geo-technical report. In absence of local code requirements and/or geo-technical report, the cushion shall be bank sand or select backfill material approved by the General Contractor. Any material used shall pass a one-inch screen.

6. Anchors: Cast iron pipes shall have concrete anchors at each change in direction and/or as directed. Any change in direction exceeding 15 degrees shall be anchored. Concrete anchors shall rest against solid (virgin) ground with the required area of bearing on pipe and ground to provide suitable anchoring.

7. Backfill: Backfill trenches only after piping has been inspected, tested, and approved by the General Contractor. Backfill shall be provided as recommended in the geo-technical report included in these Contract Documents, or in the absence of a geo-technical report, as required by site conditions. Refer to Division 2 or elsewhere in the Contract Documents for additional trenching and backfill requirements.

8. Existing Surfaces: Restore existing streets, driveways, and sidewalks damaged during the excavation work to acceptable condition, subject to approval by the Owner.

9. Safety: Provide street and sidewalk excavations with approved barricades, warning lights, and cover plates as required by the local authorities.

3.02 PLUMBING SERVICES

A. Scope:

1. This Contractor shall provide the building sanitary sewer to 5 feet outside the building and shall extend the domestic water service from the main shutoff valve stubbed above floor in the building.
2. Provide storm drainage system as required to 5 feet outside the building.

3. Verify locations and conditions.

B. General: Install the various piping systems as described hereinafter, and as required by the local plumbing inspection department.

1. Slope domestic hot and cold water piping to drain and provide with hose valves (drain valves) at low points.

2. Install soil, waste, and vent piping with horizontal lines pitched in accordance with local codes, but in no case less than 1/4" per foot for pipe 2-1/2" and smaller, and 1/8" per foot for pipe 3" and larger. Install soil, waste, and vent piping with hubs of each length of piping in the upstream position.

3. Make-up lead and oakum joints with molten lead run into hubs in one continuous pour, to a minimum depth of one inch.

4. Make-up "Ty-Seal" or "Dual-Tite" gasketed joints using lubrication and joining tools as instructed by the manufacturers. Base of stacks, horizontal runs under pressure, and gasketed pipe 5" and larger shall be made up using "Lubrifast" joining material.

5. Torque "No-Hub" joints in accordance with manufacturer's instructions. Do not install "No-Hub" joints below ground.

6. Provide chrome-plated piping at each fixture installed in a finished space. Install with proper strap wrenches to avoid marking or defacing.

7. Provide proper restraints on riser and stack offsets.

C. Plumbing Connections to Fixtures and Equipment:

1. General: Provide necessary pipe and fittings. Make final connections to provide cold water make-up and natural gas supply to mechanical equipment. Locate cold water make-up and gas supply where shown and connect with suitable stop valves.

2. Cold Water Make-up: Provide cold water make-up to closed loop condenser water circulating systems, cooling tower system, and hot water heating systems.

3. Gas Supply: Provide gas supply separately metered to an approved location for future routing to kitchen locations.

D. The domestic water service shall be Class 150 AWWA cement lined C.I. with Class 250 fittings, mechanical joints or push-on rubber ring gaskets, ASTM
A377-66 or PVC AWWA C900 with solvent welded fittings. Provide tie rods and thrust blocks as required.

3.03 MAKE-UP WATER PIPING SYSTEMS

A. Connections: Connect domestic water to automatic fill and manual quick-fill connections on each piping system as indicated on Drawings. Provide reduced pressure backflow preventers at each system.

B. Compatibility: Use piping and fittings of same material type as materials of the domestic water supply.

3.04 CONDENSATE DRAINAGE

A. General: Provide a condensate drain pipe to connect each cooling unit drain pan or funnel and to extend to and discharge into an open type drain in the sanitary plumbing system. Funnel type floor drain requirements are to be coordinated with the Plumbing Contractor. Provide union or solder joint at connection to HVAC equipment.

B. Assembly: Use hard drawn Type “M” or DWV copper tubing with matching fittings. Assemble fittings to form a trap with depth equal to or greater than operating pressure of the unit served. Drains shall be of the size not less than the full size of the drain pan connection. Air handling unit drains shall have deep seal traps to permit unit pan drainage. The deep seal trap shall be installed for each blow-through or draw-through air handling unit to maintain the water seal.

C. Contractor Options:
   1. No-hub cast iron
   2. PVC (except in return air plenums)

3.05 DOMESTIC HOT AND COLD WATER PIPING SYSTEMS

A. Interior Hot and Cold Water Piping:

   3. Piping 3" and smaller, Type "L" copper tubing with wrought copper solder end fittings. At the Contractor's option, this piping may be as specified for piping 4" and larger.

   4. Piping 4" and larger, Schedule 10, stainless steel pipe, ASTM A312 with stainless steel fittings, or stainless steel flanged fittings.

   5. Provide isolation fitting whenever dissimilar materials are used.

   6. Option: At the Contractor's option, for piping 3" or larger, Victaulic Style 77 couplings, Victaulic fittings and tees may be used instead of the
above, if Victaulic groove depth control tool is used for field grooving. Victaulic flanges and reducing couplings shall not be installed.

7. Piping Run-outs to Fixtures: Provide piping run-outs to fixtures sized to comply with governing regulations. Each fixture shall be provided with a shut-off valve for each supply line. Provide all shutoff valves necessary to isolate mains to each restroom. Exposed lines shall be chromium-plated.

D. Air Chambers: Provide the necessary air chambers, shock absorbers, or water hammer arrestors, specifically sized for the application to prevent water hammer.

3.06 UNDERGROUND DOMESTIC WATER SERVICE & FIRE PROTECT. PIPING

A. Piping Two-and-a-half Inches and Smaller: Type "K", copper tubing with wrought copper brazed end fittings.

B. Piping Three Inches and Larger: Ductile iron bell and spigot, push-on joint, pressure water pipe. Joints shall be of the push-on-type employing a molded rubber gasket retained in a ring recessed into the inside of the bell. Pipe and joints shall be manufactured by Tyler Pipe and Foundry Company or equal. Coat pipe and fittings inside and outside with the manufacturer's standard coal tar enamel suitable for domestic water service. PVC AWWA C900 piping with solvent welded fittings can be used where acceptable by the local authorities.

3.07 SANITARY DRAINAGE PIPING SYSTEMS

A. Soil, Waste, and Vent Piping Underground: Service weight cast iron soil pipe and fittings with lead and oakum joints or neoprene gasket joints made up with "Lubrifast" joining material or PVC piping with solvent welded joints. Provide and install code-approved manholes as required.

B. Soil, Waste, and Vent Piping Above Ground: Service weight cast iron soil pipe and fittings with neoprene gasket joints or hub-less cast iron pipe and fittings with coupling assembly.

1. Option: At the Contractor's option, for branch piping only, galvanized steel, Schedule 40, ASTM A53 pipe with galvanized malleable iron fittings for vent piping and galvanized cast iron drainage fitting for soil and waste piping may be used instead of the above. NOTE: Use of PVC piping with solvent welded joints only where allowed by code and approved by owner. PVC used in return air plenums shall be wrapped with UL listed plenum wrap (UL 910 & 1887).

C. Pump Discharge Piping: Discharge from pumps to the horizontal gravity main shall be Schedule 40 galvanized steel with galvanized cast iron drainage fittings, or Schedule 40 PVC piping and fittings where code allows. PVC used in return air plenums shall be wrapped with UL listed plenum wrap...
(UL 910 & 1887). Each pump discharge shall be carried separately to the horizontal gravity main and shall discharge into the top of the horizontal gravity main.

D. Cleanouts:

1. General: Care shall be used when locating cleanouts. Wherever possible, do not place cleanouts in “finished” areas. All locations shall be approved by the Architect.

2. Finished Floor: Jay R. Smith No. 4434, cast iron adjustable assembly with nickel bronze cover and tapered thread bronze plug. Provide clamping collar when installed in floors having waterproof membrane.

3. Unfinished Areas: Jay R. Smith No. 4434 cleanout with cadmium-plated, cast iron plug.

4. Walls: Jay R. Smith No. 4434, cast iron with nickel bronze, square, smooth, access cover, vandal-proof screws.

5. Outside: Jay R. Smith No. 4434, non-slip, vandal-proof cover.

6. Locations:
   a. At base of every drainage stack
   b. Maximum distance between cleanouts is 90 feet.
   c. At turns greater than 45 degrees.
   d. Other locations required by local code.

3.08 CLEANING, FLUSHING, TESTING, AND INSPECTING

A. Cleaning: Clean exterior surfaces of installed piping systems and prepare surface for application of any required coatings.

B. Flushing: Flush piping systems with clean water prior to performing any required tests.

C. Piping Tests:

1. General: Blank off equipment during tests. Perform tests before piping is enclosed in walls, floors, partitions or in any other way concealed from view. Tests may be performed in sections. Tests shall be witnessed by the General Contractor and local inspectors and the test results presented to the Engineer for acceptance and approval prior to concealing piping from view. Provide all necessary equipment for testing,
including pumps and gauges. Note: All test results are to be submitted to the Engineer as specified in Section 15995.

2. Domestic Water Systems: Test hot and cold water systems hydrostatically to a pressure of 150 psig or 1-1/2 times working pressure, whichever is greater, for a period of 4 hours. Repair all leaks, replacing materials as necessary, and repeat tests until systems are proven tight.

3. Soil, Waste, and Vent Piping System: Test soil, waste, and vent piping by plugging all openings and filling system to height required by City Plumbing Inspector, but not less than 10'. Inspect all joints for leaks, repair all leaks found, and retest until piping is demonstrated to be free from leaks. In addition to water test, apply peppermint or smoke tests, if required by local code. All underground main piping shall be inspected with a camera and the taped test results submitted to the Owner.


5. Natural Gas Piping System: Test natural gas piping with compressed air or nitrogen at 5 times service pressure but not less than 100 psig for 24 hours and in accordance with the requirements of the local codes and the serving utility company. Repair all leaks, replacing materials as necessary, and repeat test until systems are proven tight.

6. Disinfecting of Water Systems: Disinfect as required by code. Where code does not dictate tests to be conducted, at a minimum disinfect the hot and cold water systems as follows: Fill systems with water solution containing 50 ppm available chlorine; allow to stand for 4 hours, opening and closing all valves several times during this period; thoroughly flush; refill and place system in service; ensure a chlorine content of 2.5 ppm.

7. Cleaning and Adjusting: Thoroughly clean and disinfect all plumbing fixtures, including all exposed trim. Adjust all flush valves for proper flushing, but without excess use of water.

E. Inspecting: Visually inspect each run of each system for completion of joints, adequate hangers, supports, and inclusion of accessories.

F. Chemical Treating: Refer to Section 15970, "Water Treatment Systems", for flushing and cleaning systems.

G. Identification: Refer to Section 15190, “Equipment and Piping Identification” for nameplates and labeling requirements.

END OF SECTION 15400
1.0 GENERAL

1.01 SUMMARY

A. The General Provisions, Supplemental General Provisions, section 15010, Division 1 Specifications and Special Provisions apply to all Work specified in this Section.

B. This section describes the basic materials and installation methods for the plumbing fixtures. Comply with other Division 15 sections and drawings as applicable. Refer to other divisions for coordination of work.

C. Furnish and install all components of the plumbing fixtures specified herein, as indicated on the drawings, and as required to provide complete and operating systems.

1.02 DESCRIPTION OF WORK

A. Acceptable Manufacturers: The model numbers listed in the Specifications establish a level of quality and material. The following manufacturers are acceptable subject to compliance with the requirements of these Specifications.

1. Fixtures
   a. American Standard
   b. Kohler Company
   c. Crane Company
   d. Toto
   e. Zurn

2. Faucets
   a. Chicago Faucet Company
   b. Speakman Company
   c. T & S Brass and Bronze Works, Inc.
   d. Delta
   e. Zurn Industries, Inc.
3. Flush Valves
   a. Sloan Valve Company
   b. Delany Flush Valves
   c. Zurn Industries, Inc.

4. Seats
   a. Church Products, Forbes-Wright Ind., Inc.
   b. Olsonite Corporation
   c. Beneke Corporation
   d. Bemis

5. Carriers
   a. Zurn Industries, Inc.
   c. Wade Div./Tyler Pipe

6. Drinking Fountains
   b. Elkay Mfg. Company
   c. Ebco/Oasis

7. Stainless Steel Sinks
   a. Elkay Mfg. Company
   b. Just Mfg. Company

2.0 PRODUCTS

1. See drawings for Fixture Schedule
2. All handwashing sinks must be no less than 144 square inches with a minimum dimension in either direction of 9". Discharge point of the faucet to the sink basin must be no less than 10". Wrist blades must be at least 4" long. Substitution of the Basis of Design fixtures must comply with these dimensional requirements and verification of compliance is the burden of the contractor.

3.0 EXECUTION

3.01 INSTALLATION

A. Heights: Set fixtures at heights as shown on the Architect's Drawings.

B. Caulking: This Contractor shall caulk the joint between the finished wall surface and all plumbing fixtures. Verify colors with the Architect. Caulking material shall comply with the appropriate section of these Specifications.

C. Emergency Shower: Install an emergency shower and eye wash adjacent to the chemical treatment feeder system, and in other locations as required by code or as indicated on the drawings. Pipe domestic cold water to shower.

D. Each fixture shall be provided with a shut-off valve for each supply line. All exposed lines shall be chromium-plated.

END OF SECTION 15410
PART 1 - GENERAL

1.01 SUMMARY

A. The General Provisions, Supplemental General Provisions, section 15010, Division 1 Specifications and Special Provisions apply to all Work specified in this Section.

B. This section describes the basic materials and installation methods for the fire protection system. Comply with other Division 15 sections and drawings as applicable. Refer to other divisions for coordination of work.

C. Furnish and install all components of the fire protection system specified herein, as indicated on the drawings, and as required to provide complete and operating systems.

1.02 DESCRIPTION OF WORK

A. Work Included: Modify the existing sprinkler system.

B. Related Work by Others: The following work shall be provided by the Contractor:
   1. The Electrical/Fire Alarm Contractor will provide a complete fire alarm system and will make connections to flow switches and gate supervisory switches from the fire panel.

C. Applications: Application of the fire protection system shall include, but are not limited to, the systems as listed below:
   1. Hydraulically designed sprinkler system.

D. Quality Assurance:
   1. Materials shall be installed in accordance with NFPA 13. Valves, fittings, sprinkler heads, and equipment shall be UL listed and FM approved.
   2. Hose threads shall conform to local fire department requirements.
   3. Coordination Drawings: The following supplements, and does not replace, the provisions for submittals called for in Section 23 01 00, "Basic Mechanical Requirements", of this Specification.
      a. Before starting fabrication or installation of equipment, the Contractor shall submit to Architect, for his consideration, three sets of Shop Drawings noted as reviewed by the ISO for insurance rate making purposes only.
      b. After Contract award and prior to releasing any equipment orders for fabrication, six sets of Shop Drawings showing dimensions, weights, performance data, structural details, and physical appearance of valves, and controls shall be submitted to the Architect for review and approval.

Azura Surgery Center Renalus Crestview
4. Acceptable Manufacturers: The model numbers listed in the Specifications establish a level of quality and material. The following manufacturers are acceptable subject to compliance with the requirements of these Specifications:
   a. Sprinkler Equipment
      1) Viking Corporation
      2) Tyco Fire Protection Products
      3) Victaulic Corporation
      4) Reliable Automatic Sprinkler Company

E. Pipe Hangers and Supports: Support fire protection pipe with UL-listed and FM approved hangers and support devices. Provide any special hangers or supports that may be required. The design, selection, spacing, and application of horizontal pipe hangers, supports, restraints, anchors, and guides shall be in accordance with the NFPA 13 and NFPA 14. Support vertical pipes at least every other floor with approved riser clamps.

F. Sprinkler System:
   1. System piping shall be hydraulically designed throughout areas in accordance with the rules and regulations of NFPA 13, using design densities of:
      a. Light hazard areas: 0.10 gpm per 1,500 square feet with maximum Sprinkler head spacing of 225 square feet per sprinkler head.
      b. All ordinary hazard areas: 0.20 gpm per 1,500 square feet with maximum sprinkler head spacing of 130 square feet.
   2. Cross main pipe sizes shall be a minimum of 2" diameter for loop systems and 2 1/2" for single main (non-loop) systems. Generally, provide coverage at the rate required by NFPA and applicable state and local codes.
   3. System shall include required drain lines, drum drip (for maintenance), test connections, spare heads, tools, fire department inlet connections, water motor alarms, circuit closers, monitor switches, alarm valves, isolation valves and similar items.
   4. Sprinkler heads, valves, alarms, and similar items shall be as manufactured by Viking, Grinnell, or other approved manufacturer. Sprinkler heads shall be plain brass, up-right type in unfinished areas and concealed pendant sprinklers in areas with ceilings. Material and equipment used in the installation of the sprinkler systems and standpipes shall be listed and approved by the Underwriters’ Laboratories, Inc., and shall be the latest design of the manufacturer.

G. Valves: Valves shall be UL-listed and FM approved for the pressures at which they are installed.
   1. Check valves shall be swing type with iron body, bronze trim, cast iron disc, bolted cover, and screwed or flanged ends. Check valves in the discharge may be spring loaded, quiet type, and shall be UL-listed and FM approved. Swing check valves may be installed in horizontal pipe only.
   2. Gate valves 2" and smaller shall be bronze body, OS&Y, and screwed ends. 150 psig valves shall have bronze trim, single disc, screwed
bonnet, and bronze seats. 300 and 400 psig valves shall have bronze wedge disc, union bonnet, and bronze body seat rings.

3. Gate valves over 2" shall be iron body, OS&Y, bolted bonnet, bronze seats, ANSI 16.1, flanged ends. 150 psig valves shall have double or single disc, and bronze trim. 300 and 400 psig valves shall have wedge disc and brass stem.

4. Butterfly valves 2" and larger shall be grooved type. Furnish with built-in supervisory switches.

5. Supervised valves shall include valve tamper switches. Valve tamper switches shall be double-pole single-throw type with cast aluminum housing and tamperproof cover. Switch rating shall be at least 7 amperes at 125/250 volts.

PART 2 - PRODUCTS

2.01 PIPING

A. Pipe: Standpipe and sprinkler piping shall be ASTM A135, Schedule 40 black steel for pipe sizes 2" and smaller. Thin-wall pipe (schedule 10), ASTM A135, may be used for sprinkler piping larger than 2". All code approvals shall be secured before shop drawing submittal to Architect.

B. Fittings: Fittings shall be cast iron threaded sprinkler fittings ANSI B16.4 or grooved ends fittings joined by grooved couplings Victaulic Firelock or equal or welded fittings, ANSI B16.9. Flanges shall be screwed or welded neck type ANSI B16.5.

2.02 EQUIPMENT

A. Sprinkler Heads: Brass up-right or pendant heads as required with ordinary temperature rating, except in specially designated areas of high-temperature where heads shall be rated per NFPA 13. Heads in public and tenant space shall be concealed pendent with flat cover plate installed at finished ceiling height. Verify color of sprinkler cover plate with Architect. Pendent heads exposed to weather or freezing conditions shall be dry pendant type. Furnish spare heads equal to 1% of total number of heads installed. The heads shall be representative of, and in proportion to, the number of each type and temperature rating of heads installed. Furnish spare head cabinet and wrench for each riser. Locate cabinets as directed by Architect.

PART 3 - EXECUTION

3.01 INSTALLATION OF PIPING SYSTEMS

A. General: Comply with the requirements of the piping section of this Specification, NFPA 13 and NFPA 14 for installation and testing of piping system and per local code.

1. Piping shall be concealed, except in mechanical equipment rooms, stairwells, or where otherwise required.

Azura Surgery Center Renalus Crestview
2. Grade piping to eliminate traps and pockets. Where air pockets or water traps cannot be avoided, provide hose bibs for drainage.

3. The Sprinkler Contractor shall arrange with the General Contractor to notch or pre-drill the occasional beam in order to maintain the sprinkler mains as high as possible.

4. All required sprinkler heads shall be individually dropped from the main to the ceiling. Provide each drop with a horizontal swing arm type branch run to allow future movement of the head.

5. All sprinkler heads in areas to be finished shall be installed at finished ceiling height only where the ceiling is to be installed at this time such as elevator lobbies and restrooms. In future tenant spaces, install upright heads at a maximum of 100 square feet per sprinkler head, pending development of the areas. Also, in future tenant spaces, a 1” outlet shall be provided with a temporary 1” nipple and 1” x ½” reducer and a temporary sprinkler head. Coordinate locations to ensure sprinkler heads are centered in ceiling tiles.

6. Sprinkler piping shall be installed and coordinated with the duct and other mechanical and electrical services in the ceiling cavities by this Contractor, to provide the clearances for lighting fixtures as required.

7. Sprinkler piping shall be installed so as not to impede access to mechanical, electrical, or plumbing equipment.

8. Refer to Section 15190, “Equipment and Piping Identification” for painting, nameplates, and labeling requirements. Painting is not part of this contract scope unless otherwise specified within the contract documents.

9. Sprinkler piping shall be flushed to remove excess oils and contaminants that support the growth of microorganisms.

B. No other trade shall come in contact with fire protection piping. All piping shall be suspended in the ceiling cavity as to not come in contact with ductwork, domestic water piping, conduit, etc.

C. Protection during Construction: Provide necessary fire protection during construction and initial occupancy in accordance with NFPA and Local Codes. Provide active sprinkler systems in areas requiring sprinklers during this period before tenant finish-out. If specifically approved for this Project by the local inspector, this Contractor may install active sprinklers only in areas designated as storage areas, in public areas to be finished with the base building, mechanical spaces, and limited other areas required by the inspector during construction. Coordinate these areas with the General Contractor.

D. Inspections and Tests: All inspections, examinations, and tests required by the authorities and/or agencies specified hereinbefore shall be arranged and paid for by this Contractor, as necessary, to obtain complete and final acceptance of the system as installed. The certificates of inspection shall be in quadruplicate, and shall be delivered to the Architect for distribution.

END OF SECTION 15500
1.0 GENERAL

1.01 SUMMARY

A. Division 16 includes Division 16000 of the Specifications and Electrical Drawings. Elements of the Scope of Work include, but are not limited to, labor, materials, equipment, supplies, storage, transportation and all required permits and licenses. Division 16 does not stand alone, but is part of the complete project and its Documents. Requirements of the General Conditions and Division 1 apply to all work in the Division.

B. Provide the necessary interface with other Divisions to provide a complete project. Carefully check the Documents of this Division with those Documents of other Divisions. Determine the requirements of any interfacing materials or equipment being furnished and/or installed by those Sections and Divisions, and provide proper installation and required interface.

C. No deviation from the Contract Documents shall be made without the written consent of the Architect and Engineer.

D. All Specifications and Drawings are to be considered together as the Contract Documents. Any work shown in one and not the other, or is implied by either, shall be provided to make a complete project. Should conflicts exist between the Specifications and Drawings or there is an item shown or noted for which is not clearly defined, immediately submit a request for clarification.

E. The Drawings are schematic and are not intended to show the exact location of outlets, devices, etc. or the routing of conduit.

F. Dimensions and information regarding accurate locations of equipment, and structural limitations and finish shall be coordinated and verified with other Divisions of Work. Be prepared to furnish dimensions and information regarding the Work of this Division to other trades.

G. The right is reserved to relocate any device (receptacle, switch, fire alarm, audio/visual, junction box, outlet, etc.) a maximum of 10'-0” before it is permanently installed without incurring additional cost to the Contract.

1.02 REFERENCE STANDARDS

A. All work shall comply with the most recently revised versions of all local, state and federal codes, ordinances of the authority having jurisdiction, laws, rules and regulations. Any modifications required by any of the above shall be made without any additional cost to the owner. Where requirements between
governing Codes and Regulations vary, the more restrictive provision shall apply.

B. Nothing contained in the Contract Documents shall be construed as authority or permission to disregard legal requirements and regulations. The Contractor shall thoroughly review the Documents and bring any such conflicts to the attention of the Architect and Engineer prior to Installation.

C. All materials shall comply with standards of the following:
   1. NEC – National Electrical Code
   2. NFPA – National Fire Protection Association
   3. ANSI – American National Standards Institute
   4. ASTM – American Society of Testing and Materials
   5. NEMA – National Electrical Manufacturer’s Association
   6. IEEE – Institute of Electrical and Electronic Engineers
   7. CBM – Certified Ballast Manufacturers
   8. FAA – Federal Aviation Administration
   9. FCC – Federal Communications Commission
  10. IES – Illuminating Engineering Society
  11. OSHA – Occupational Safety and Health Act
  12. NETA – National Electrical Testing Association
  13. IBC – International Building Codes
  14. U.L. – Underwriter’s Laboratories

D. All materials shall be new and shall bear the label of U.L.

1.03 EXISTING CONDITIONS

A. Where work is to be performed in an existing facility, the contractor shall visit the site prior to bid and be familiar with all existing conditions. Special attention shall be given to work to be performed above an existing ceiling.

B. Where existing slabs are to be cut or core drilled, the contractor shall x-ray the existing slabs to avoid cutting or disrupting existing conduits, cables, plumbing or structural members.

C. The electrical service to the building shall not be interrupted without written consent of the building owner.

D. No allowance will be made for lack of knowledge of existing conditions.

E. At the completion of the project, all work under this Division shall be completely integrated with the existing systems and left in perfect operating condition.

F. Where work under this Division disrupts the continuity of any existing to remain circuit or feeder, the Contractor shall repair/replace as necessary to return to a perfectly functional and safe operating condition.

G. Prior to any demolition or construction the Contractor shall have the existing conditions inspected by an EPA, OSHA certified asbestos abatement agency
to identify the presence of asbestos. Should any asbestos be found it shall be brought to the immediate attention of the Architect and Owner and specifically identified in writing.

1.04 DEFINITIONS

A. Provide: to furnish, install and connect.

B. Furnish: to supply all materials, labor, equipment, testing apparatus, controls, tests, accessories and all other items customarily required for the proper and complete application.

C. Install: to join, unite, fasten, link, attach, set-up or connect together, complete, tested, and ready for normal satisfactory operation.

D. Engineer: the Engineer of record.

E. Contract Documents: the complete set of Specifications and Drawings of all Divisions.

F. Work: labor, materials, equipment, accessories, controls and other items required for a complete installation.

G. Concealed: embedded in masonry or other construction, installed in furred spaces, within double partitions or hung ceilings, in trenches, in crawl spaces or in enclosures.

H. Conduit: rigid steel; intermediate metal conduit (IMC), plastic conduit (PVC), electrical metallic tubing (EMT), or flexible steel conduit.

I. Manufactured Cable: pre-wired metal clad manufactured cable bearing a U.L. label; metal clad cable (MC), health care (HCF).

J. Wiring/Wired: all wire installed in conduit to equipment, device, junction box, light fixture, etc. from panel board or switchgear with all required boxes, connectors, couplings, etc.

K. Exposed: not installed underground or concealed.

L. Equal: equal in quality, workmanship, materials, weight, size, design and efficiency of the specified product, conforming with manufacturers.

M. Supply: to purchase, procure, acquire and deliver complete with related accessories.

N. Authority Having Jurisdiction (AHJ): applicable local, state and federal authorities having jurisdiction over any part of the Scope within this Division and other Divisions.

2.0 PRODUCTS
2.01 MANUFACTURERS

A. Manufacturer’s names and catalog numbers specified in the Contract Documents are intended to describe the material and set the standard of quality. All bids shall be based on material specified. Request for approval of material not specified shall be considered if the request is in written form and submitted to the Architect no later than fourteen (14) days prior to the bid date. All requests shall conform with the provisions of the general and supplementary conditions.

B. When specific names are not stated, only the best available quality of material or equipment shall be submitted for review and used in the installation.

2.02 SHOP DRAWINGS AND PRODUCT DATA

A. The Contractor shall obtain complete shop drawings, product data and samples from the manufacturers, suppliers, vendors, and all Division 16 Subcontractors, for all materials and equipment as specified herein in various Sections of the Specifications, and shall submit data and details of such materials and equipment for review by the Architect and Engineer. Prior to submission of the shop drawings, product data and samples to the Architect and Engineer, the Contractor shall thoroughly review the shop drawings, product data and samples and certify they are in compliance with the Contract Drawings. Further, the Contractor shall check all materials and equipment upon their arrival on the Project site and verify their condition and compliance with the Contract Documents. Any Work which proceeds prior to receiving reviewed shop drawings shall be modified as required to comply with the Contract Documents and the shop drawings. A minimum period of ten (10) working days, exclusive of transmittal time, will be required in the Engineer’s office each time a shop drawing, product data and/or sample is submitted or resubmitted for review. This time period shall be considered by the Contractor when scheduling his Work. The initial shop drawing review for equipment and materials may be expedited through the mutual consent of the Contractor, Architect, Engineer, and Owner providing the Contractor agrees to submit complete, certified, documented, and coordinated shop drawings for review in accordance with the requirements of the Contract Documents.

B. The review of shop drawings, product data, and samples by the Architect and Engineer shall not relieve the Contractor of the responsibility for dimensions or errors that may be contained therein, or for deviations from requirements in the Contract Documents. It shall be clearly understood that the noting of some errors by the Engineer but overlooking others does not grant the Contractor permission to proceed in error.

C. All shop drawings and product data/submittals shall be submitted in compliance with the requirements of the general and supplementary conditions. No more than four (4) copies of submittal data will be reviewed. Any additional copies will be returned unmarked. The responsibility of
copying review comments on any additional copies will rest solely with the contractor.

D. All product data/submittals shall bear the name of the manufacturer to be used.

E. All shop drawings and submittals shall include a stamped indication signifying that the submittal has been reviewed for compliance with the Contract Documents by the Contractor. This stamped indication also represents the fact that the Contractor has checked this submittal for its interaction with all other Divisions and certifies by his signature or initials that all coordination has taken place. The stamp shall include the date, name of the Contracting Firm, the signature of the Contractor, certification of compliance and approval. This stamp shall be on the submittal before the Engineer will review it.

F. The engineer will review an individual submittal not more than twice. If the submittal is rejected again on the second review, the contractor will bear all responsibility for paying for the Engineer's time for additional reviews. Such payments to the engineer shall be withheld from the next monthly pay application.

G. Shop drawings and/or product data shall be submitted for the following for review:
   1. Switchboards, panelboards, transformers, busway, motor control centers, ground fault system and other equipment associated with the main distribution.
   2. Disconnect switches, fuses, motor starters.
   4. Lighting fixtures, lighting control system, dimming system, emergency batteries and other equipment associated with lighting.
   5. Transient voltage surge protection.
   6. Generator, UPS, transfer switches, batteries, static switches, transition switches, switchgear and other equipment associated with emergency and/or standby back-up power systems.
   7. Devices, receptacles, switches, coverplates, motion sensors. The product data shall include the manufacturers name, model number, size and color.
   8. Conduit, wire, boxes, fittings.

2.03 AS-BUILT DRAWINGS

A. The Contractor shall maintain on a daily basis at the Project site a complete set of “Record Drawings”. The “Record Drawings” shall consist of a set of blueline prints or AutoCAD files of the Contractor Coordination Drawings for this Division. The prints shall be marked or the AutoCAD file electronically updated to show the precise location of all buried or concealed work and equipment, including embedded conduit and junction boxes, and all changes and deviations in the Electrical work from that shown on the Contract Documents. This requirement shall not be construed as authorization for the Contractor to make changes in the layout or work without definite instructions
from the Architect or Engineer. Prior to commencing work, the Contractor shall obtain from the Architect or Engineer a set of AutoCAD Release 2004 or compatible format Architectural and Engineering Drawings on CD, to be used only to produce the Contractor’s Coordination Drawings. The continuously update coordination drawings shall be used to produce the final “Record Drawings” which shall be delivered to the Owner in AutoCAD electronic format (CD) upon Project completion. The Contractor shall give to the Engineer a written release acceptable to the Engineer signed by a corporate officer of the Contractor prior to receipt of the Engineer’s Drawings.

B. Record dimensions shall clearly and accurately delineate the work as installed; locations shall be suitably identified by at least two dimensions to permanent structures.

C. The Contractor and Subcontractor shall mark all “Record Drawings” on the drawings with a rubber stamp impression or an AutoCAD image that states such.

3.0 EXECUTION

3.01 INSTALLATION

A. The equipment selections used in the preparation of the Contract Documents will fit into the physical spaces provided and indicated, allowing ample room for access, servicing, removal and replacement of parts, etc. Adequate space shall be allowed for clearance in accordance with the Code requirements and the requirements of the local Authorities having jurisdiction, and the equipment manufacturer’s recommendations.

B. In the preparation of Drawings, a reasonable effort to accommodate acceptable equipment manufacturer’s space requirements has been made. However, since space requirements and equipment arrangement vary according to each manufacturer, the responsibility for initial access, maintenance access, code required access, and proper fit rests with the Contractor.

C. Physical dimensions and arrangements of equipment to be installed shall be subject to the Architect’s and Engineer’s review.

D. The General Contractor and all Subcontractors shall coordinate the installation of ductwork, conduit, busway, piping, cable trays, etc., installation with lighting fixtures, special ceiling construction, air distribution equipment, and the structure. Provide additional rises, drops and offsets as required. If after installed, new ductwork, conduit, busway, piping or cable is found to be in conflict with the architecture, structure, or other trade Work which is either existing or shown on the Contract Documents, the ductwork, conduit, busway, piping or cable shall be relocated without additional cost to the Owner.
E. No conduit, equipment, busway, etc., shall be installed in the eight (8) inch high zone directly above the ceiling in tenant areas to allow for tenant build-out and flexibility unless otherwise specifically shown on the Drawings or prior written authorization is received from the Engineer.

F. Accessibility and Clearance:
   1. Electrical equipment, outlets, junction and pull boxes shall be installed in accessible locations, avoiding obstructions, preserving headroom, and keeping openings and passageways clear.
   2. Minor adjustments in the locations of equipment shall be made where necessary, providing such adjustments do not adversely affect functionality of the equipment.

G. Scaffolds and staging for installation of electrical work shall be provided under the work of this Division.

3.02 STRUCTURAL FITTINGS

A. Furnish and install the necessary sleeves, inserts, hangers, anchor bolts, and related structural items. Install at the proper time.

B. Openings may have been indicated on the Architectural and Structural drawings. Should any additional openings or holes be required, the same shall be provided at no additional cost to the Owner.

C. Location: At a time in advance of the work, verify openings shown on the Architectural and Structural drawings, and coordinate any additional openings.

D. If the work of this Section requires modification of the Architectural or Structural drawings, furnish new instructions as to requirements for these openings. Submit for review and coordination to Architect.

E. Sleeves shall be supplied for electrical conduits passing through walls or slabs and shall be placed before concrete is poured.

F. Equipment supports for electrical work shall be fastened to the structure by inserts, anchor bolts, bolting to drilled and tapped structural members, or be welding to the structure.
   1. Welding shall be done by the electric arc method with fully competent welders. Supporting members shall be shop coated with a suitable primer.
   2. Surfaces damaged by installation of supports shall be touched up with primer to match shop coat. Any drilling of structural members shall be approved by the Architect.

G. Flashing:
   1. Wherever conduits pass through the roof or outer walls, base flashing and counterflashing shall be provided.
2. Such flashing shall be properly installed by skilled workmen, and shall include grouting, mastic or tar application, or other means to insure a permanent, waterproof, neat and workmanlike installation.

3. Insofar as possible, flashing shall comply with and be similar to requirements for flashing in General Construction Work.

H. Anchor bolts and inserts shall be galvanized and of adequate size and strength for installation of electrical work and shall be placed in forms before concrete is poured.
   1. Placement of bolts in bases shall be done under other Division. Furnish detail drawings, templates, and anchor bolts for bases to the General Contractor in time to avoid delaying work schedules.
   2. Expansion shields shall only be used with specific approval of the Architect. Wooden or soft metal plugs shall not be used.

I. Cutting and patching:
   1. All additional cutting, patching and reinforcement of construction of building, subject to review by the Architect, shall be performed under this Section.
   2. Refer to appropriate Division for requirements.

3.03 WEATHERPROOF EQUIPMENT

A. Electrical devices or equipment located in damp, semi-exposed areas shall be weather-resistant. Enclosures shall comply with NEMA Type 3R requirements.

B. Surface mounted outlet boxes shall be cast metal with threaded bolts. Pull or junction boxes shall be cast metal with bolted and gasketed covers.

C. Outlet box covers shall be of a suitable weatherproof type with gaskets, packing glands, weatherproof doors, or other required means to prevent entry of moisture.

D. Lighting fixtures shall be installed with suitable gasket, and UL labeled for location.

3.04 CLEANING

A. Brush and clean work prior to concealing, painting and acceptance. Perform in stages if directed.

B. Painted exposed work soiled or damaged: Clean and repair to match adjoining work before final acceptance.

C. Remove dust and debris from inside and outside of material and equipment.

3.05 IDENTIFICATION OF CIRCUITS AND EQUIPMENT
A. Numbered adhesive strip tags shall be attached to branch circuit wiring in conduits at every point where runs are broken or terminated. Also tag pull wires in empty conduits.

B. Junction and Pull boxes shall have covers stenciled with box number when shown on the drawings, or circuit numbers according to panel schedules. Data shall be lettered in a conspicuous manner with a color contrasting to finish.

3.06 TESTS AND DEMONSTRATIONS

A. All systems shall be tested in the presence of the Owner or an Owner designated representative upon completion of the Work and demonstrate that the installation is in accordance with the Contract Documents.

B. All motors shall be checked and adjusted for correct direction of rotation.

C. Loading of circuits and feeders in panelboards shall be checked and balanced.

D. Any work found not to be in compliance with the Contract documents shall be repaired or replaced without incurring additional cost to the Contract price.

E. Provide all in instruction to the Owner on maintenance and operation of all systems and equipment provided under this Division.

3.07 WARRANTIES

A. The warranty period for all systems, equipment, components, work, etc. shall be no less than one (1) year, unless specified otherwise hereinafter and shall include at least one (1) full heating season and one (1) full cooling season.

B. The Contractor shall, without cost to the Owner, remedy any defects within a reasonable time to be specified in notice from the Architect. In default thereof, the Owner may have such work done and charge all costs to the Contractor.

C. The start of the Contractor’s warranty period, as defined in the General Conditions, shall commence on the issue of a “Certificate of Substantial Completion”, by the Owner or the Owner’s Representative for each item of material, equipment or system.

D. The Subcontractor shall confer with the General Contractor prior to the bid date concerning the project schedule and determine if there is a need to operate any items of equipment or systems for temporary heating an/or cooling or other reasons prior to “Substantial Completion”. All required extended warranty costs for equipment, materials, and systems shall be included in the Subcontractor’s bid.

END OF SECTION
1.0 GENERAL

1.01 SUMMARY

A. The General Provisions, Supplemental General Provisions, section 16010, Division 1 Specifications and Special Provisions apply to all Work specified in this Section.

B. This Section describes the basic materials and installation methods for raceways and wiring of which are acceptable. Comply with other Division 16 Sections and Drawings as applicable. Refer to other Divisions for coordination of Work.

C. Furnish and install all raceways and wiring specified herein and as required to provide a complete system throughout the project as indicated on the Drawings.

2.0 PRODUCTS

2.01 CONDUIT

A. Galvanized Rigid Steel Conduit (GRC): Rigid steel conduit shall be galvanized, constructed of high-grade raw steel piping, galvanized inside and outside with threaded joints.

B. Intermediate Metal Conduit (IMC): IMC shall be constructed of high-grade steel tubing, galvanized inside and outside with threaded joints. Zinc coating shall be applied by the hot-dip, galvanized process.

C. Electrical Metallic Tubing (EMT): EMT shall be constructed of high-grade steel, zinc coated and galvanized inside and outside.

D. Rigid Plastic Conduit (PVC): PVC conduit shall be polyvinyl chloride rigid scheduled to heavy wall type. PVC conduit shall be joined with PVC couplings of the solvent cement type to provide complete watertight joints. Conduit systems shall be UL listed for direct burial and exposed use.

E. Flexible Metal Conduit: Shall be flexible steel conduit tubing spirally wound having a hot-dip galvanized coating and meeting requirements of UL for flexible metal conduit.

F. Liquidtight Flexible Metal Conduit: Shall be flexible steel conduit spirally wound and shall have a copper grounding strand and factory-applied
neoprene jacket. Liquidtight flexible conduit shall meet the requirements of UL.

G. PVC coated galvanized rigid conduit: Shall be UL listed. The PVC coating must have been approved by UL as providing the primary corrosion protection for the rigid conduit. The PVC coated conduit must be ETL Verified to the Intertek ETL SEMKO High Temperature H2O PVC Coating Adhesion Test Procedure for 200 hours. The PVC coated conduit must bare the ETL Verified PVC-001 label to signify compliance to the adhesion performance standard. Ferrous fittings for general service locations must be UL Listed with PVC as the primary corrosion protection. Hazardous location fittings, prior to the plastic coating must be UL Listed. All conduit and fittings must be new, and unused material. Applicable UL standards may include: UL6 Standard for Safety. Rigid Metal Conduit, UL514B Standard for Safety, Fittings for Conduit and Outlet Boxes, Conduit and Fittings shall be evaluated for reliability and performance. Certified test results and the respective test data that have been witnessed and certified to be accurate by an independent, recognized third party.

2.02 CONDUIT FITTINGS

A. GRC and IMC: shall be factory-made taper threaded and of the same material as the conduit. Provide with molded nylon insulating bushing or throat at all boxes and cabinets with locknuts inside and outside. Provide watertight hubs in wet locations for terminations into enclosures. Provide insulated grounding bushing where required.

B. EMT: shall be of the same material as the conduit and shall be hexnut compression or steel setscrew. Provide with molded nylon insulating bushing or throat at all boxes and cabinets. Provided insulated grounding bushing where required.

C. PVC: shall be Schedule 40 and of the same manufacturer as the conduit.

D. Flexible Metal Conduit and Liquidtight Flexible Metal Conduit: Provide couplings at connections between flexible and rigid conduit suitable for that application. Provide with nylon-insulated busing or throat at all boxes and cabinets with locknuts.

E. Expansion Joints: Provide O.Z./Gedney, Type AX expansion joint fittings for all conduit which crosses an expansion joint. Provide with internal ground and external bonding jumper.

F. PVC Coated Galvanized rigid conduit: Acceptable conduit and fitting PVC bonds shall be confirmed with a minimum average of 30 days in a heat and humidity test (ASTM D1151 and D2247) with the temperature at 150 degrees F AND 95% relative humidity. Acceptable seal performance shall be confirmed at 15 psig (positive) and 25 in. of mercury (vacuum) for 72 hours.

G. Wire Support Bushings: Provide for vertical runs as required by the NEC.
2.03  PRE-WIRED MANUFACTURED CABLE

A. Pre-wired manufactured cable may be used for branch circuit wiring for receptacle and lighting circuits where acceptable by the AHJ.

B. Pre-wired manufactured cables shall NOT be used for:
   1. Mechanical equipment branch circuits
   2. Feeders
   3. Homeruns
   4. Exposed

C. Conduits connecting receptacle and switch circuits to lighting and power homerun boxes in finished areas, type “MC” cable consisting of one (1), two (2), three (3) or four (4) copper “THW”, “THHN” or “THHN/THWN” insulated phase, neutral and ground conductors. Ground shall be of minimum size required by NEC, as specified in other Sections and as noted on the Drawings.

D. Pre-wired cables used for receptacle and equipment throughout a “health-care facility” shall be type “HCF” type MC cable with second ground wire, with a continuous green colored metal sheath UL approved for grounding purposes.

E. Pre-wired manufactured cable may be used where concealed in walls or in millwork only. Cable shall run from the first device in the wall or millwork or first light fixture to a structurally mounted junction box no more than 10'-0” from the point which the cable enters the ceiling space or from first light fixture.

F. Cable shall not pass through a fire rated wall or assembly.

G. Acceptable cable manufactures are AFC, Alflex and Southwire.

H. Cable termination fittings shall be T&B # 3131-TB, Steel City Series XC-730, Bridgeport AMC-50 or approved equal clamp-type, malleable iron fittings. Die-cast fittings are not acceptable.

2.04  JUNCTION BOXES AND PULL BOXES

A. Junction boxes and Pull boxes shall be galvanized steel with mode size and gauge as required by the NEC in accordance with voltage parameters. Covers shall be of the same gauge as the box as shall be screw fastened. Boxes shall be sized as required but no smaller than 4 inches square and 1-1/2 inches deep.

B. Covers shall be accessible.

C. Provide galvanized cast iron or aluminum with threaded hubs and gaskets for outdoor and damp locations.

D. Boxes in grade or underwater shall be cast brass or bronze.
2.05 OUTLET BOXES

A. Outlet boxes shall be UL listed, and of sizes and types required for the application.

B. Boxes Recessed in Construction: Sheet steel boxes, unless noted or required otherwise. Boxes shall be no lighter than 14 gauge and shall be galvanized after fabrication. Set so face of box will finish flush with building surface.
   1. For Lighting Fixture Outlets: 4-inch square with raided fixture ring.
   2. For Wall Switches, Receptacles, and Communication Use: 4 inch square, one-piece; no sectional boxes permitted. Use boxes with plaster rings in all plastered walls where wall thickness permits. Use boxes less than 1-1/2 inch deep only in locations where deep boxes cannot be accommodated by construction.

C. Boxes Used Outdoors or in Damp/Wet Locations: Cast metal boxes (iron and alloy) with gasketed covers and threaded hubs.

D. Boxes in Hazardous Areas: Approved cast metal boxes with appropriate sealing fittings.

E. Provide blank cover for boxes without fixture or device.

F. Boxes in grade or underwater shall be cast brass or bronze.

G. Cycolac: Per code for pools and fountains only.

2.06 WIREWAYS AND AUXILLARY GUTTERS

A. Wireways shall be constructed in accordance with UL 870. Every component including lengths, connectors, and fittings shall be UL listed and labeled. Provision shall be included in the construction to allow screwing the hinged cover closed without the use of parts other than the standard lengths, fittings, and connectors. It shall also be possible to seal the cover in the closed position with a sealing wire.

B. Wireways shall be constructed with/without knockouts, as required. Enclosure type shall be as required by conditions encountered.

C. Gutters and Wireways shall be suitable for “lay-in” conductors. Connector covers shall be permanently attached so that removal is not necessary to utilize the lay-in feature.

D. All sheet metal parts shall be provided with a rust-inhibiting phosphatizing coating and gray baked enamel finish. All hardware shall be plated to prevent corrosion. All screws installed toward the inside shall be protected by spring nuts or otherwise guarded to prevent wire insulation damage.
E. All connectors shall be slip-in type with self-retaining mounting screws. All hangers shall be two-piece with hook-together feature to permit pre-assembly of wireway and hanger bottom plate before hanging on pre-installed upper bracket.

2.07 SURFACE METAL RACEWAY

A. Surface metal raceway shall be UL listed and labeled; shall be used together with couplings, clips, bushings, straps, connectors, connection covers, elbows, extension boxes, fixture boxes, extension adapters, blank covers and all other required fittings; shall be of the proper size to accommodate the conductors to be installed therein in each case.

2.08 CONDUCTORS – 600 VOLTS OR LESS

A. Provide conductors of stranded copper, 98% conductivity, new building wire, insulated in accordance with the requirements of the NEC. Insulation shall be rated no less than 600-volt. Conductors shall be Type “THWN” or “THHN/THWN”. Conductors used for service and distribution feeders shall be “XHHW”. Solid conductors terminating in a breaker or device shall be utilized for wire size No. 12. Sizes specified are AWG gauge for No. 4/0 and smaller and circular mils (kcmil) for sizes larger than No. 4/0. Minimum wire size shall be No. 12.

B. Connectors: Make splices and connections in conductors using UL connectors.
   1. Stranded Conductors: UL listed, solderless, bolted pressure or compression connectors. Connectors shall be of proper sizes to match conductor sizes.
   2. Solid Conductors: UL listed, bolted pressure or spring connectors. Connectors shall be of proper sizes to match conductor sizes.
   3. Motor Lead Pigtails: UL listed, crimp lugs with through-bolt fasteners between lugs. Lugs shall be of proper sizes to match conductors. Proper sized dies and tools shall be furnished to apply connectors.
   4. Lighting Fixture Taps: Electrical spring connectors as specified for solid conductors.
   5. Ground connections: Burndy ground clamps or connectors of a type suitable for and having a UL listing for grounding applications.

C. All conductor sizes shown on the Drawings are copper unless specifically noted otherwise. All ground conductors shall be copper.

2.09 MANUFACTURERS

A. Conduit (GRC, IMC, EMT)
   1. Allied
   2. Republic
   3. Triangle
   4. Wheatland

B. Conduit Fittings (GRC, IMC, EMT)
1. Appleton
2. O.Z. Gedney
3. Steel City
4. Thomas and Betts
5. Raco

C. Flexible Metal Conduit
1. AFC
2. Alflex
3. Anaconda
4. International Metal Hose

D. Liquidtight Flexible Metal Conduit
1. American Brass Company
2. Anaconda
3. Electri-Flex Company

E. PVC coated Galvanized Rigid Conduit
1. Plasti-Bond
2. Permicoat

F. PVC Conduit and Fittings
3. Thomas & Betts
4. Prime Conduit
5. Cantex
6. Certainteed
7. Triangle

G. Conductors, Copper, 600 Volts or less
1. American Insulated Wire
2. Southwire

H. Conductors, Aluminum, 600 volt or less (where specified)
1. Alcan Cable
2. Southwire

I. Outlets and Boxes
1. Appleton
2. Raco
3. Steel City
4. Midland

3.0 EXECUTION

3.01 CONDUIT

A. PVC (encased in 4” concrete on all sides) or Galvanized Rigid Steel (GRC) meeting corrosion resistant protection of NEC 300.6 shall be used for underground service entrance and underground feeders. When PVC is used,
a transition to metal conduit shall be made below grade using GRC 90
degree fitting such that only metal conduit exits concrete or ground.

B. GRC or Intermediate Metal Conduit (IMC) shall be used where exposed and
subject to physical damage, or installed in damp or wet locations.

C. PVC shall be used for underground branch circuits, underground feeders
where run below the slab on grade, 1” maximum in the slab on grade, 1”
maximum in the slabs above grade, in concrete columns and concrete wall
and in masonry walls.

D. PVC Schedule 80 (or GRC meeting corrosion resistant protection of NEC
300.6) may be used for direct burial for branch circuits only. When PVC is
used, a transition to metal conduit shall be made below grade using GRC 90
degree fitting such that only metal conduit exits concrete or ground.

E. Electrical Metallic Tubing (EMT) shall be used for branch circuits concealed in
walls and ceilings. EMT may be used for feeders where not exposed to
damage and/or not installed in wet or damp locations.

F. Flexible Metal Conduit shall be used for connections to rotating or vibrating
equipment. The lengths shall be as short as possible, in no case longer than
6’ or shorter than 12”.

G. Liquidtight Flexible Metal Conduit shall be used for connections to rotating or
vibrating equipment where located outdoors or in damp or wet locations. The
lengths shall be as short as possible but in no case longer than 6’ or shorter
than 12”. Liquidtight Flexible Metal Conduit shall NOT be located above a
ceiling, in an air shaft or in a mechanical room utilized as a return air plenum.

H. Raceways shall be installed as a complete and total wiring enclosure system
from outlet to outlet, to junction box, pull box, panel or cabinet prior to the
installation of the conductors.

I. All conduit shall be run concealed (except in electrical, mechanical and
similar area) unless shown otherwise. Where conduit is run exposed it shall
be run in a net and orderly manner. All conduit shall be run parallel and
perpendicular to the building structure.

J. Conduits shall be secure to all boxes, cabinets, panels and equipment with
locknuts and bushings and shall be securely fastened in place on intervals
required by the Code and local codes; hangers, supports or fastenings shall
be provided at each elbow and at the end of each straight run within 3’ of a
termination to a box or cabinet. All supports shall be independent and shall
not use ceiling supporting system wires.

K. Use threaded rods and hangers for supporting single conduit. Multiple
conduits shall be supported using a trapeze of Unistrut (or Kindorf) channels
and threaded rods with double nut/washer.
L. Provide pullboxes as shown and/or as required by Code and where necessary in the raceway system to avoid excessive runs or too many bends. Boxes shall have removable hinged or screw covers and shall be accessible.

M. The minimum size conduit shall be ½” diameter. Homeruns shall extend from the first outlet or device to the panel designated and shall be a minimum ¾” diameter.

N. Provide non-hardening elastic type duct seal compound for each conduit entering the building from the outside and from one space to another having a normal operating temperature differential greater or less than 10 degrees F.

O. Provide seals around all conduit and sleeves penetrating through walls, partition or ceilings. Provide UL approved fire resistant seal around all penetrations through fire rated barriers to maintain the barrier rating.

P. Provide pull wire or nylon rope in all empty conduits.

3.02 CONDUIT PROTECTION

A. Install underground conduit with a top cover at least 30” below finished grade and no more than 48”.

B. Mark all duct bank runs with a detectible warning tape specifically formulated for prolonged use underground, resistant to alkalis and acids found in soil, installed no less than 8 inches and no more than 12 inches above the top of the duct bank concrete. Place warning tape along the approximate center line of the duct bank run. Warning tape shall be permanent, red in color, continuous printed, aluminum backed tape, compounded for direct burial not less than 3 inches wide and 4 mils thick. Printed legend shall be indicative of general type of underground line below.

C. Mark all underground conduit runs with a detectible warning tape specifically formulated for prolonged use underground, resistant to alkalis and acids found in soil, installed no less than 6 inches and no more than 10 inches above the top of the conduit. Place warning tape along the approximate center line of the conduit run. Warning tape shall be permanent, red in color, continuous printed, aluminum backed tape, compounded for direct burial not less than 3 inches wide and 4 mils thick. Printed legend shall be indicative of general type of underground line below.

3.03 CONDUCTORS – 600 VOLS OR LESS

A. No conductor shall be smaller than No. 12 except for signal or control circuits.

B. All conductors shall be installed in conduit.

C. Where a connection is made to any terminal of 40 amperes or more and/or conductors No. 8 or larger, copper terminal lugs shall be bolted to the conductors. Where multiple terminal lugs are made, individual lugs for each
A conductor shall be used. Where aluminum conductors are accepted in this Section or noted on the drawings, the terminations shall be made with high compression lugs as manufactured by Ideal or MAC.

D. A maximum of six (6) current carrying conductors shall be run in a conduit. The neutral shall be considered a current carrying conductor.

E. For homeruns of 120 Volt, 20 amp circuits, where the length of run from the panelboard to the center of the load exceeds 100'-0" the conductors shall be No. 10 minimum. If that length exceeds 200'-0" the conductors shall be No. 8 minimum.

F. For homeruns of 277 Volt, 20 amp circuits where the length of run from the panelboard to the center of the load exceeds 200'-0" the conductors shall be No. 10 minimum.

G. Multiple branch circuits homeruns serving computer loads, electronic lighting ballasts and/or H.I.D. lighting ballasts shall utilize a neutral conductor one trade size larger than the phase conductors or use separate neutrals for each circuit. Neutral conductors for individual branch circuits may the same size as the phase conductor but not less.

H. Provide an equipment grounding conductor in all feeder and branch circuit conduits. Size per code unless shown otherwise.

I. Conductors shall have color coded jackets the entire length for sizes No. 6 and smaller. The conductors No. 4 and larger shall have color coded conductor jackets the entire length. Colors shall be as follows:

<table>
<thead>
<tr>
<th>120/208 Volt System</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase A – Black</td>
</tr>
<tr>
<td>Phase B – Red</td>
</tr>
<tr>
<td>Phase C – Blue</td>
</tr>
<tr>
<td>Neutral – White</td>
</tr>
<tr>
<td>Ground – Green</td>
</tr>
</tbody>
</table>

J. Where phase marking tape is used it shall be wrapped 2" wide and located at two (2) locations 6" and 18" from the termination. Phase marking tape for the neutral and grounding conductors shall be provided where visible at any point where the conductor is accessible.

K. Before pulling any wire into conduit, thoroughly swab the conduit and clean the boxes of debris.

L. Run feeders in continuous lengths, without joints or splices. Joints shall occur in branch circuits only in locations where they divide.

M. Run conductors for emergency power in conduits separate from all other wiring.

Azura Surgery Center Renalus Crestview
N. Bundle conductors in switchboards and panelboard cabinets and similar using nylon straps made for the purpose. Conductors No. 8 and larger shall be bundled in individual circuits.

3.04 JUNCTION BOXES, PULL BOXES, AND OUTLET BOXES

A. All junction boxes and pullboxes shall be size in accordance with the Code.

B. All boxes shall be rigidly secured in position to building structure. Boxes larger than 4” shall be secured at two points.

C. Outlet boxes shall be flush with the finished wall or ceiling, or not more than ¼” back, unless specifically shown as surface mounted or its purpose is to be above the ceiling.

D. Provide galvanized steel or cast type outlet boxes. Where exposed GRC or IMC terminates in a box, provide cast box with threaded hubs.

E. All boxes shall be provided with a cover plate.

F. All outlet boxes shall be mounted vertically unless noted otherwise.

G. Where outlets are shown at the same location but at different heights, they shall be mounted one above the other along the same centerline.

H. The exact mounting height of an outlet may be adjusted slightly to align with masonry joint where approved by the Architect.

I. Verify outlet locations in finished spaces with Drawings of interior details and finishes.

J. Outlets shall NOT be located back to back. Where outlets are shown on opposite sides of a wall, they shall be located in separate stud spaces.

K. Protect floor boxes from entering debris during construction using temporary covers approved by the floor box manufacturer.

L. Provide barriers in outlet boxes for switches separating different phases for voltages exceeding 150 volts to ground.

M. Boxes shall not be supported from a suspended ceiling.

END OF SECTION
1.0 GENERAL

1.01 SUMMARY

A. The General Provisions, Supplemental General Provisions, section 16010, Division 1 Specifications and Special Provisions apply to all Work specified in this Section.

B. This Section describes the basic materials and installation methods for devices of which are acceptable. Comply with other Division 16 Sections and Drawings as applicable. Refer to other Divisions for coordination of Work.

C. Furnish and install all devices specified herein, as indicated on the Drawings and as required to provide complete and operating systems.

D. The wiring devices shall be designed, manufactured and tested in accordance with the latest version of the following standards:
   1. NEMA WD-1
   2. NEMA WD-5
   3. Underwriters Laboratories
   4. NEC

E. All devices (Outlets, Switches, Cover Plates, etc) shall be provided by the same manufacturer to ensure all devices match in appearance and color.

2.0 PRODUCTS

2.01 GENERAL

A. The color of all devices, wall plates and coverplates shall be as selected by the Architect.

2.02 SWITCHES

A. Wall switches, unless noted otherwise, shall be flush mounted, commercial grade 120/277 volt, 20 amp, toggle switches:
   1. Single Pole: Leviton No. 1221 Series or equal by Hubbell, P&S or Cooper
   2. Double Pole: Leviton No. 1222 Series or equal by Hubbell, P&S or Cooper
   3. 3-way: Leviton No. 1223 Series or equal by Hubbell, P&S or Cooper
   4. 4-way: Leviton No. 1224 Series or equal by Hubbell, P&S or Cooper

C. Dimmer switches, unless specified otherwise in the Drawings or by the Architect, shall be Lutron Nova T-star series with wattage and type as
required by the load and color/finish as selected by the Architect. Provide 3-way and 4-way dimmers where multiple dimmers as shown to control the same lights. Where on/off switches are indicated adjacent to dimmer switches they shall be ganged together and the on/off switches shall also be Lutron Nova T-star series to match the look of the dimmer switches.

D. Motor rated switches and switches indicated as pilot switches, unless noted otherwise, shall be flush mounted industrial grade, red pilot light “on” with overload protection as follows (note: wire per manufacturers recommendation):
1. 120V, 20 amp Circuits – Hubbell HBL1221PL
2. 277V, 20 amp Circuits – Hubbell HBL1221PL7
3. 120V, 30 amp Circuits – Hubbell HBL3031PL

E. Key switches, unless noted otherwise, shall be flush mounted, commercial grade, 120/277V, 20 amp:
1. Single Pole: Leviton No. 1221-2L Series or equal by Hubbell, P&S or Cooper
2. Double Pole: Leviton No. 1222-2L Series or equal by Hubbell, P&S or Cooper
3. 3-Way: Leviton No. 1223-2L Series or equal by Hubbell, P&S or Cooper
4. 4-Way: Leviton No. 1224-2L Series or equal by Hubbell, P&S or Cooper

F. Wall switches in back of house areas, unless noted otherwise, shall be commercial grade 120/277 volt, 20 amp, toggle switch Leviton No. 1221 Series or equal by Hubbell, P&S or Cooper.

G. Timer switches, unless noted otherwise, shall be digital time switch 24VAC or 120/277VAC as required. Timeout adjustments from 5 minutes to 12 hours. Set timer in the field to 4 hours for equipment rooms and 30 minutes for all other areas. For timer setting greater than 2 hours select the visual flash option and audible sound option. Color shall match that selected for the switches unless noted otherwise.

H. Wall mounted motion sensors, unless noted otherwise, shall be Wattstopper WS-250 Series for wall mounted applications at switch height and Wattstopper CI-200 for ceiling mounts. Provide power packs, relays, etc. as required to provide a complete system per area. Color as selected by Architect. Adjust interval to 15 minutes at project completion unless noted otherwise. (Coordinate sensor type with lighting ballasts and provide accessories as required). Approved equals by Leviton and Cooper.

2.03 RECEPTACLES

A. Receptacles shall be plastic, 2P, 3W, grounded as follows:
1. Duplex receptacles - for multi-outlet circuits, 125 volt, 15 amp rating Leviton 5262 Series or equal by Hubbell, P&S or Cooper.
2. Duplex receptacles - for dedicated, single-outlet circuits, 125 volt, 20 amp rating Leviton 5362 series or equal by Hubbell, P&S or Cooper.
3. Duplex isolated ground receptacle -125 volt, 20 amp rating Leviton 5362-IG series (provide color alternate of color for standard receptacles as selected by Architect) or equal by Hubbell, P&S or Cooper.

4. Simplex (single) receptacles -125 volt, 20 amp rating Leviton 5361 series or equal by Hubbell, P&S or Cooper.

C. Ground Fault Interrupter Receptacles (GFCI) shall be plastic, 2P, 3W, 125 volt, 20 amp, self protecting type Leviton 8898 series or equal by Hubbell, P&S or Cooper. Hospital GFCI receptacles shall be Leviton 8898-HG or equal by Hubbell, P&S or Cooper.

D. Weatherproof receptacles shall have a duplex GFCI receptacle as specified above with a gasketed extra-duty in-use weatherproof coverplate T&B CKLSVU or approved equal by P&S, Leviton or Hubbell.

E. Arc Fault Interrupter Receptacles (AFCI) shall be plastic, 2P, 3W, 125 volt, 20 amp, self protecting type Leviton AFTR2 or equal by Hubbell, P&S or Cooper.

F. **Hospital Grade receptacles shall be Leviton 8300 (duplex) and T7899 (GFCI) as applicable. Approved equals by Hubbell, P&S or Cooper.**

G. Controlled Devices shall be permanently marked (imprinted) with the word “controlled” and power symbol to clearly identify which receptacles are turned off when the workspace is vacant per ASHERA 90.1 2013. Leviton CR020 series or equal by Hubbell, P&S or Cooper.

2.04 COVERPLATES

A. Coverplates shall be satin finish 302 stainless steel standard size (provide jumbo size for concrete and masonry walls) by Leviton or equal by Hubbell, P&S or Cooper.

B. Provide multigang plates for devices shown at the same location. Coordinate gang configuration with the Architect where more than 3 devices are shown at one location.

C. Coverplates for all back-of-house equipment rooms (i.e. mechanical, electrical, loading dock, service corridor, etc.) shall be stainless steel.

3.0 EXECUTION

3.01 INSTALLATION

A. Provide appropriate outlet box for each device or multi-ganged devices.

B. Provide plaster ring reducer for boxes larger than the device plate.

C. Provide dimmer switch type and size to match load.
D. Coordinate locations of all devices with the Architect and the interior detail Drawings.

E. Coordinate cutting, obtain pre-cut openings from manufacturer for door switches, metal partitions and furniture mounted devices.

F. In general, devices in finished spaces shall be flush mounted. Verify the requirements of all spaces with the Architect.

G. Each device shall have a coverplate as is appropriate for the application. Coverplates shall be installed true and plumb with building lines, mortar joints and architectural features.

H. Mount receptacles and special systems outlets vertical and 18” above the finished floor to the device centerline, unless noted or required otherwise.

I. Mount switches vertical and 48” above the finished floor to the device centerline and 6” from a door strike, unless noted or required otherwise.

J. All exterior devices shall be provided with a weatherproof cover/enclosure. Exterior receptacles shall be GFCI type.

K. Coordinate mounting heights for devices indicated to be mounted over counter with the Architect.

L. Install a green insulated bonding jumper for all grounded devices and bond to the outlet box.

M. Each outlet used as a junction box, or for future device or fixture, shall be fitted with a blank coverplate to match other device coverplates.

N. Floor outlets shall be of the necessary type suitable for the application and installed per the manufacturers recommendation. Fire ratings shall be maintained. Where the installation of a specified or required floor box effects the elevated slab/floor fire rating, the necessary fire assembly (approved by the Architect) shall be constructed below the slab.

O. Do not locate junction boxes or voice/data conduit stub downs for poke-thru devices above a non-accessible ceiling. In these cases extend the poke-thru conduit to an accessible ceiling.

END OF SECTION
1.0 GENERAL

1.01 SUMMARY

A. The General Provisions, Supplemental General Provisions, section 16010, Division 1 Specifications and Special Provisions apply to all Work specified in this Section.

B. This Section describes the materials and methods required for identification of electrical equipment and related accessories.

C. Furnish and install all equipment, materials, tools and labor to properly identify electrical equipment and related accessories as specified in this Section, other relation Division 16 Sections and the Drawings.

D. Provide identification for the following:
   1. Switchgear, switchboards, distribution panels, panelboards, disconnect switches, circuit breakers, motor starters, motor control switches, start/stop buttons, EPO switches, and other electrical equipment.
   2. Junction boxes and pullboxes.
   3. Wiring devices.
   4. Wiretags for wiring.
   5. Raceways.

2.0 PRODUCTS

2.01 IDENTIFICATION

A. Nameplates
   1. Nameplates shall have the surface color and core color for engraved letters as follows:
      a. Normal distribution
         1) 120/208V. equipment – black surface with white core
      b. Emergency distribution
         1) 120/208V. equipment – red surface with white core
   2. Provide a nameplate for each switchgear, switchboard, panelboard, distribution panel, motor starter, disconnect switches, motor control center and similar distribution equipment clearly identifying the equipments’ name to match that indicated in the Drawings.
   3. Provide a nameplate for each feeder protective device in each switchgear, switchboard, distribution panel, motor control center and any other similar equipment. Identify the specific load it serves.
   4. Nameplates shall be bakelite, 1/16” thick minimum with 3/8” high letters.

B. Junction Boxes and Pullboxes
1. Provide identification with permanent ink marking pen on the cover of junction boxes noting the branch circuits and systems within the conduit.
2. Pullboxes shall be marked using stenciled paint noting the voltage and systems served. Letters shall be appropriate height so that they can be read from the floor.
3. Boxes containing Emergency systems: write the abbreviation “EMER” above the circuit number on junction box covers. Write “EMERGENCY” in stenciled “RED” paint on pullboxes above other markings.

C. Disconnect switches and motor starters
1. Provide nameplates as described above for all disconnect switches and motor starters located 8'-0” above finished floor or less. Identify equipment served.
2. Provide identification with permanent ink marking pen on all disconnect switches and motor starters mounted over 8'-0” above finished floor. Write marking clearly and in a location that can be read from the floor when the area is finished (e.g. marking for disconnects serving mechanical equipment that will be above the ceiling when the area is finished shall be located on the bottom or bottom front of the disconnect so it can be read when a ceiling tile is removed).

D. Wiring device wall plates
1. For critical care outlets in health care facilities provide identification on the face of the coverplate with red printed lettering on a white adhesive background as to the panel and circuit the outlet is served. Characters shall be ¼” high.

E. Push button switches
1. Provide nameplates as described above for all push button switches. Letters shall be ¼” high.

F. Emergency power off buttons (EPO)
1. Provide nameplates as described above for EPO switches. Nameplate shall have a red surface and a white core. The letter shall be ½” high reading “EMERGENCY POWER OFF”.

G. Wire markers
1. Wire markers for identification of wiring shall be self-adhesive type having letters and numerals indicating feeder or branch circuit number. Locate markings on wiring where visible near the terminations and taps in all junction boxes, outlet boxes, panelboards, distribution panel boards, switchboards and motor control centers.

H. Electrical services
1. Where multiple electrical services are provided to a building, provide nameplates as described above identifying the appropriate service number. Letters shall be 1” high.
2. Where the multiple electrical services are in different locations, provide a nameplate at each service noting the locations of the other service(s) as required by the NEC and the AHJ.
3.0 EXECUTION

A. Nameplates shall be applied to a cleaned surface and shall be plum and level.

END OF SECTION
1.0 GENERAL

1.01 SUMMARY

A. The General Provisions, Supplemental General Provisions, section 16010, Division 1 Specifications and Special Provisions apply to all Work specified in this Section.

B. This Section describes the basic materials and methods for service and distribution equipment rated 600 volts or less of which are acceptable. Comply with other Division 16 Sections and Drawings as applicable. Refer to other Divisions for coordination of Work.

C. Furnish and install all distribution switchgear as specified herein, as indicated on the Drawings and as required to provide a complete and operating system. All distribution equipment shall be of the same manufacturer including, but not limited to, switchboards, panelboards, transformers, disconnects, and busway.

D. The distribution equipment shall be designed, manufactured and tested in accordance with the latest version of the following standards:
   1. NFPA 70
   2. NEMA AB1
   3. NEMA KS1
   4. NEMA PB2
   5. NEMA PB1
   6. NEMA PB1.1
   7. NEMA PB2.1
   8. NEMA PB1.1
   9. NEMA 250
   10. NEMA TP-1-2002
   11. ANSI/IEEE C12.1
   12. ANSI C39.1
   13. ANSI C57.13
   14. UL 50, 67, 89, 98, 489
   15. ASTM

E. Provide nameplates for all distribution equipment as specified herein and per Section 16175.

1.02 SUBMITTALS

A. The following data shall be submitted according to the General Condition, Division 1 and Section 16010 and shall include but not limited to:
1. Physical dimensions, nameplate data, voltage, amperage, plan views, elevations, schematic wiring diagrams, bus capacities, circuit schedule, short circuit ratings, etc.

2. Over current protection devices serving life safety systems and elevators shall be fully rated with selective coordination when applied in series with other devices.

3. The switchgear manufacturer shall provide an ARC flash study. Provide labels on all switchboards, panels, and other electrical equipment as required per NEC 110.16.

4. The ARC flash and coordination studies shall be performed in SKM software. A working SKM file shall be provided as part of the study so the owner can update study in the future with SKM software.

B. A ¼” scale dimensioned floor plan shall be provided with the switchgear submittals for all equipment rooms identifying actual size, clearance, access and spacing of the electrical equipment.

1.03 DELIVERY, STORAGE AND HANDLING

1. Deliver, store, protect, and handle products in conformance with manufacturer’s recommended practices as outlined in application installation and Maintenance Manuals.

2. Each switchboard section shall be delivered in individual shipping splits for ease of handling. They shall be individually wrapped for protection and mounted on shipping skids.

3. Inspect and report concealed damage to carrier within their required time period for repair or replacement.

4. Store in a clean, dry space. Maintain factory protection and/or provide an additional heavy canvas or heavy plastic cover to protect structure from dirt, water, construction debris, and traffic. Where applicable, provide adequate heating within enclosures to prevent condensation.

5. Handle in accordance with NEMA PB 2.1 and manufacturer’s written instructions. Lift only by lifting means provided for this express purpose. Handle carefully to avoid damage to switchboard internal components, enclosures, and finish.

1.04 ELECTRICAL SERVICE

A. Furnish and install the building electrical service from the Power Company transformer(s) to the main service distribution equipment as shown on the Drawings. Any charges required by the Power Company for permanent power shall be included in this Contract.

B. Coordinate all installation requirements with the Power Company prior to bid and include all trenching, conduits, vaults, equipment pads, current transformers, potential transformers, potential taps as required. Coordinate all Work with the Power Company.

C. Provide conduit, C.T. enclosures, switchgear metering compartments, etc. as required by the Power Company for metering. Contractor shall coordinate all
meter requirements with the Power Company prior to proceeding with this Work.

D. The secondary service to the building shall be 120/208 volts, 3 phase, 4 wire, 60 Hertz AC

E. Provide (1) 1” conduit from each power company transformer to the telephone room and main service distribution equipment for pulse metering interface if available.

2.0 PRODUCTS

2.02 PANELBOARDS

A. System Description
   1. Short circuit rating of panelboards shall be the interrupting rating of lowest rated device in the panel or application UL series for proper main and branch device combinations.
   2. Panelboards shall have a maximum of 42 protective devices per panel, including sub-feeders and excluding main overcurrent protective devices. For more than 42 devices, 2 or more panelboards are required.
   3. With 2 or more panelboards, sub-feed lug or thru-feed lugs shall be used in all by 1 section of each panelboard. Lugs shall have same capacity as incoming mains.
   4. Protective devices shall be molded case circuit breakers.

B. Enclosure
   1. Boxes shall be a nominal 20 inches wide and 6 inches deep with wire bending space per the National Electric Code.
   2. Fronts shall be door-in-door construction with reinforced steel with concealed hinges and concealed trim adjusting screws. Trim clamps are unacceptable.
   3. All door locks shall be corrosion proof Valox (or equal) with retractable latches. All door locks shall be keyed for a single key.
   4. Clean Lexan (or equal) directory card holders shall be permanently mounted on front door.
   5. All panelboard series ratings shall be prominently displayed on dead front shield.
   6. Interiors shall permit top or bottom incoming cables.

C. Bus bars
   1. Bus bars shall be copper, phase sequenced, fully insulated and supported by high impact Noryl (or equal) interior base assemblies.
   2. Bus bars shall be mechanically supported by zinc finished galvanneal steel frames to prevent vibration and damage from short circuits.
   3. Terminations shall be UL tested and listed and suitable for UL copper.
   4. Provide 1 continuous bus bar per phase. Each bus bar shall have sequentially phased branch circuit connectors for bolt-on branch circuit breakers. Bus bars shall be rated as indicated in Drawings.
5. Split solid neutral bus shall be plated and located in main compartment for all incoming neutral cables to be same length. 200% rated solid neutral shall be provided as indicated on the Drawings and shall be plated copper for non-linear load applications subject to harmonics. 200% rated solid neutral shall be self-certified by Manufacturer.

6. Lugs shall be rated for 75 degree C terminations.

7. Interiors shall be field convertible for top or bottom incoming feed. Main lug interiors up to 400 amperes shall be field convertible to main breaker. Interior leveling provisions shall be provided for flush mounted applications.

8. Lug bodies shall bolt in place.

D. Circuit Breakers

1. Molded case circuit breakers shall be bolt-in devices for 120/208V panels and 277/480V panels.

2. All circuit breakers shall have thermal and magnetic trip elements in each pole.

3. Multiple pole breakers shall have internal common trip crossbars for simultaneous tripping of each pole.

4. Circuit breakers rated below the panel ratings shall not be restricted to any mounting location within a panel due to physical size.

5. All branch breakers 15 to 100 amperes shall be able to be mounted in any panel position for twin or double mounting without space penalty. Sum of ratings for 2 such twin mounted devices shall not exceed 180 amperes.

6. Main and sub-feed circuit breakers may be vertically or horizontally mounted.

7. Branch breaker panelboard connections shall be copper to copper.

8. All panelboard terminations shall be rated as indicated in Drawings.

9. All breakers shall have an over center mechanism and be quick make and quick break.

10. All breakers shall have handle trip indication and a trip indicator in window of circuit breaker housing.

11. Breaker handle and faceplate shall indicate rated ampacity.

12. Circuit breaker escutcheon shall have standard ON/OFF markings.

13. Main breakers shall be UL listed for use with: Shunt, Under Voltage, and Ground Fault Shunt Trips; Auxiliary and Alarm Switches; and Mechanical Lug Kits.

14. Branch breakers shall be UL listed for use with: Shunt Trips, Auxiliary and Alarm Switches.

E. Finish

1. Boxes shall be corrosion resistant, zinc finish galvanneal.

2. Fronts shall be powder finish painted ANSI 61 gray.

3. Panels shall be manufactured by General Electric, Square D, Cutler-Hammer or Siemens.

2.03 DISTRIBUTION PANELBOARDS
A. System Description
1. Equipment shall be indoor deadfront power panelboards for molded-case circuit breakers.
2. Panelboards shall meet service entrance equipment where indicated on the Drawings.
3. Panelboards shall have integrated short circuit rating. Fully rated panel rating is that of lowest rated device in panelboard. Series ratings are for the UL tested main-branch combination.

B. Enclosures
1. Panel box shall be galvanized code gauge sheet steel with removable end walls.
2. Enclosures shall be surface mounted.

C. Fronts
1. Provide a four-piece front to cover wiring gutter and wiring access areas. Provide a lockable hinged door with semi-concealed hinges to cover access to circuit breakers.
2. Hinged door fronts, when specified, shall be provided with a lockable inner door with leaf hinges. An inner door shall cover the circuit protective devices and shall be able to be locked.
3. Door hinges shall be continuous piano hinges, welded to door(s) and bolted on front.
4. Door locks shall be Yale #511.

D. Interiors
1. Panelboard interior shall be symmetrically designed and assembled such that circuit protective modules are connected onto bus bar with positive gripping jaw assemblies and locked pressure connections.
2. Circuit-protective modules shall be designed for removal or replacement without disturbing adjacent protective devices and without removing main bus and branch circuit connections.
3. Interiors shall allow installation of molded-case circuit breakers in same panelboard.
4. Lugs shall be UL listed to accept solid or stranded copper cables. Lugs shall be bolted in place.
5. Panelboards shall be rated as indicated in Drawings. Main devices shall have maximum rating of 1200 amperes.
6. Panelboards shall have flat, stacked, vertically aligned bus bars.
7. Bus bars shall be copper. The bus bars shall have sufficient cross sectional area to meet UL 67 temperature rise requirements through actual tests. The bus bars shall be standard density rated for 1000 amperes per square inch.
8. Bus bars shall be phase-sequenced and rigidly supported by high impact resistant, insulated bus supporting assemblies to prevent vibration or short circuit mechanical damage.
9. Neutral bus shall be fully rated and able to be located in either corner of enclosure at line end to facilitate conductor termination. Furnish 200% rated neutral bus, if required by plans or another specification section.
10. All solderless terminations shall be suitable for copper UL listed wire or cable and shall be tested and listed in conjunction with appropriate UL
standards. Terminations shall be rated for use with conductor ampacity as assigned in the NEC 75 degree C table.

11. Ground wire terminations shall be provided as an optional kit for installation by panelboard installer without voiding UL label.

E. Main and Branch Devices

1. Circuit breakers
   a. Main and branch circuit breaker shall be quick-make, quick-break, and trip indicating, low voltage molded-case.
   b. Circuit breaker case shall have ON/OFF and International I/O position indicators.
   c. Breaker faceplate shall list current rating, UL and IEC certification standards, and AIC ratings.
   d. Circuit breakers shall be factory sealed and shall be date coded on breaker case.
   e. Breakers shall be UL listed for reverse connection without restrictive line or load markings. Circuit breakers shall be able to mount in any operating position.
   f. 3-pole breakers with ampere ratings greater than 150 ampere shall have rating plugs.
   g. All circuit protective devices shall have the following minimum symmetrical current interrupting capacity of 18kA. Interrupting rating of breakers shall not be less than maximum short circuit current available at incoming line terminals as shown on plans.
   h. Breakers shall have UL listed series ratings, if specified in Drawings.
   i. Main breakers and lugs shall be convertible by installer for top or bottom incoming feed.
   j. Where indicated on the drawings, elsewhere in the specifications, or as required for coordination, the main breaker shall be provided with integral ground pick-up and delay settings and adjustable long time, instantaneous and short time settings.

F. Series Ratings

1. Panelboard series-connected ratings shall be attached to the panelboard enclosure.

G. Distribution panels shall be manufactured by General Electric, Square D, Cutler-Hammer or Siemens.

2.04 TRANSFORMERS

A. System Description

1. Power transformers shall be 2 winding dry type for general power and lighting applications. Transformers rated 1000 KVA or below shall be UL listed, DOE 2016 efficiency standard, and bear required UL Listing Mark.

B. Dry-type general purpose transformers shall be rated as indicated in Drawings.
C. Transformers shall use properly classified UL approved temperature ratings. Temperature rise ratings shall be in accordance with UL 506. Insulation ratings shall be as indicated in Drawings.

D. Transformers shall be UL recognized 220 degree insulation system and shall be designed so that under full load the average conductor temperature rise does not exceed 115 degrees C rise above a 40 degree C ambient and the enclosure does not exceed a 50 degree C rise at any point.

E. Transformers 5 KVA and above shall be able to meet ANSI/IEEE C57.96 daily overload requirement listed in Drawings. Transformers loaded in accordance with this paragraph shall be capable of long service life under thermal conditions specified. There shall be no need for derating.

F. Transformers shall have sound levels equal to or lower than those established in latest revision of ANSI/IEEE C89.2 as shown in drawings.

G. Enclosures shall meet UL 506 requirement for the following characteristics:
   1. Ventilation Openings;
   2. Corrosion Resistance;
   3. Cable Bending Space;
   4. Surface Temperature Rise;
   5. Wiring Compartment Temperature Rise;
   6. Terminations.

H. Transformer Construction
   1. Transformer cores shall be constructed of high grade, non-aging silicon steel with high magnetic permeability and low hysteresis and eddy current losses. Magnetic flux densities shall be kept well below core saturation point. Core laminations above 112.5 KVA shall be miter cut at core corners to reduce hot spots, core loss, current and sound level. Core laminations shall be clamped together with steel angles. Cores for transformers above 300 KVA shall be clamped using insulated bolts through core laminations to provide proper pressure throughout core length. Completed core and coil shall be bolted to enclosure base and isolated from base by rubber vibration-absorbing mounts. There shall be no metal-to-metal contact between core and coil and enclosure. Sound isolation systems requiring complete removal of all fastening devices is not acceptable.
   2. Transformer core shall be visibly grounded to enclosure by flexible grounding conductor meeting UL and NEC size requirements.
   3. Enclosure shall be constructed of heavy gauge steel.
   4. Coils shall be copper.

I. Load Taps
   1. Transformers shall have following high voltage load tap arrangements unless noted otherwise in plans:
      a. Through 2 KVA – no taps;
      b. Through 23 KVA – no taps;
      c. 3 though 23 KVA 2 above, 2 below nominal 4, 2-1/2 percent taps voltage;
d. Through 500 KVA – 6, 2-1/2 percent taps, 2 above, 4 below nominal voltage.

J. Finish
   1. Finish shall consist of degreasing, phosphate cleaning, and electrodeposits ANSI gray enamel paint.

H. Transformers – standard shall be as manufactured by General Electric or Square D, Cutler-Hammer or Siemens.

2.05 BUSWAY

A. System Description
   1. Busway shall be a totally enclosed, indoor low-impedance system.
   2. Material and installation shall comply with all applicable codes, recommended practices, and standards of ANSI, IEEE, NEMA, UL, CSA, and ASTA. All busway components shall be UL listed. Arrangements, details, and location shall be as indicated in Drawings. Busway shall be tested and conform to Seismic Zone 4 requirements.
   3. Short circuit rating of fittings with protective devices shall be equal to the lower short circuit rating of the protective device or the busway. Short circuit rating of busway plugs equals the rating of the fuses of circuit breaker used in the plug.

B. Busway housing shall be extruded aluminum for maximum protection against corrosion from water and other contaminants normally encountered during construction. Housing shall be totally enclosed for protection against mechanical damage and dust accumulation. All hardware shall be plated to prevent corrosion.

C. All bus insulation material shall be epoxy NEMA Class B (130 degree C). Insulation shall be UL rated as self-extinguishing and shall be impervious to acids, alkalis, acetones, machine oils and lubricants commonly found in industrial environments. Manufacturer shall provide test data documenting insulation’s impact resistance, chemical resistance, and expected life (50 years).

D. Busway shall be rated as indicated in Drawings.

E. Bus bars shall be 98% conductivity copper or aluminum. The aluminum bus bars shall be silver or tin plated. Temperature rise at any point in busway shall not exceed 55 degrees C above ambient when operating at rated load current.

F. If housing ground path is used, system connections shall be silver plated.

G. Hanger System
   1. Horizontal busway runs shall be UL listed to hang on 10 foot centers in any position. Vertical busway riser runs shall be supported with spring hangers.
H. Where busway passes through walls or floors, manufacturers shall, at user’s request, provide UL-Listed three-hour firestop system [No. 539], GE PENSIL 100 or 500 (or equal).

I. Joints shall have plus or minus 5/8 inch adjustability and be the one-bolt removable type. Joints shall be able to be made from one side when busway is installed against a wall or ceiling. Plug-in and feeder shall use identical parts. All multi-stack shall be phase collected.

J. Plug-in busway shall be identical to feeder construction and performance except it shall have 5 dead-front hinged cover type plug outlets per side per 10 foot length. All outlets shall be usable simultaneously.

K. Plug-In Unit Safety Device
   1. Busway plugs shall be of the type(s) and rating listed in Contract. Switching device(s) shall be completely enclosed in sheet steel housing.
   2. Shields shall protect stabs and ground plug body and shielding to prevent access to live parts when cover is open. A ground stab shall engage ground tab on busway and internal ground bus shall be provided when required.
   3. Cover and operating handle shall have provision to padlock in OFF position. Operating handle shall be easily moved from end to side or vice versa.
   4. A releasable cover interlock shall prevent opening cover except when switch is OFF.
   5. Operation switch type plugs shall have a positive quick-made, quick-break interrupter. Circuit breaker plugs shall have true RMS electronic sensing and an interrupting rating of at least the available amperes RMS indicated on the plans, with interchangeable rating of at least the available amperes RMS indicate don the plans, with interchangeable rating plugs.

L. Short Circuit Ratings
   1. The short circuit rating of the busway, including its integral fittings and protective devices, shall be the lowest of the short circuit ratings of the busway, its fittings or protective devices. For example, a fusible power takeoff rated 200,000 amperes with Class J fuses is installed on a 65,000 ampere rated busway. The rating of this system is 65,000 amperes.

M. Accessories
   1. Thermal expansion fittings for:
      a. Runs longer than 150 feet when busway is not free to move at ends of run;
      b. When busway run crosses building expansion joint.
   2. Reducer cubicles and special adapter cubicles, as required in Drawings.
   3. Furnish Joint-Guard Protective System that uses a “torque sensing bolt”. The system shall measure the “elongation of the busway joint bolt”. When the bolt loosens proper torque, a “red indication shall appear in the bolt head”. After re-torquing the bolt, the red indication shall recede and

Azura Surgery Center Renalus Crestview
the bolt head shall return to normal color. The system shall be “self renewing” without bolt replacement.

N. Finish
   1. ANSI-61 gray enamel.

O. Installation
   1. Provide floor or wall flanges at all fire separations as required. Coordinate installation of floor flanges and firestop systems with waterproof curbs.
   2. All busway joints shall be torqued as recommended by the manufacturer. A recheck of torque setting shall be made by the Electrical Subcontractor after the busway has been in service and subjected to varying load conditions. The Electrical Subcontractor shall submit a report of this recheck to the Owner upon completion.
   3. All connections to bus switches shall be made with flexible meal conduit. No “hard-pipe” connections to bus switches are allowed. All bus switch connections shall be in place prior to final adjustment and isolation of all vertical bus risers.

P. Busway Hangers and Supports
   1. All horizontal busways throughout the building shall be thoroughly and substantially supported in accordance with the National Electrical Code. Busways may be supported individually with approved hangers or in groups using Unistrut and hangers. Hangers shall not be spaced more than ten (10) feet apart. Additional hangers shall be provided where required by the manufacturer or the local Authority having jurisdiction. Busway shall be attached to the hanger supports. Perforated extension hangers will not be accepted in any part of the Work.
   2. All vertical busways shall be substantially supported at each floor line to carry the weight of the busway in a satisfactory manner, with allowance for expansion and contraction. Installation shall comply with the manufacturer’s requirements including maximum and minimum spring hangar deflection, expansion section tolerances, and torque settings. Coordinate installation of hangers and supports with waterproof curbs provided under another Division.
   3. Special hangers and supports shall be provided where they may be required because of any peculiarities of construction. Adequate space shall be provided between adjacent busways to provide for maintenance of joints.
   4. Hanger rod sizes shall be recommended by the hanger and/or busway manufacturer for the service intended.

Q. Busway shall be as manufactured by General Electric, Square D, Cutler-Hammer or Siemens.

2.06 DISCONNECT SWITCHES
A. Switches shall be heavy-duty type. The switch blades shall be visible when the switch is OFF and the cover is open. Lugs shall be front removable and UL listed for 75 degrees C conductor. Provide removable arc suppressor to facilitate easy access to line side up.

B. Switches shall have provisions for a field installable electrical interlock.

C. The switch operating mechanism shall be quick-make, quick-break.

D. Provide padlock provisions for locking in the OFF position.

E. Provide NEMA type enclosure suitable for the application (indoor, outdoor, wet or damp, corrosive, etc.). Type 3R enclosure shall contain no knockouts (supply watertight hubs).

F. Enclosure shall have ON and OFF markings stamped on the enclosure.

G. Switches shall be horsepower rated.

H. Fused disconnect switches shall have rejection type fuse clips with dual element current limiting fuses of rating shown or required by the Manufacturer’s nameplate of the equipment being supplied. The UL short circuit rating shall be 200,000 amps RMS SYM when used with Class R or J fuses.

2.07 FUSES

A. Fuses shall have 200,000 Amp RMS SYS rating.

B. Fuses for circuits 1 to 600 amperes shall be dual element, current limiting time delay (500% of rated current for minimum of 10 seconds) with separate overload and short circuit clearing chamber. Bussman “Low Peak” or equal by Littlefuse or Ferraz Shawmut. UL Class J.

C. Fuses for circuits above 600 amperes shall be current limiting, time delay (500% of rated current for minimum of 4 seconds, clear 20 times rated current in 0/1 seconds or less). Bussman, “Hi-Cap” or equal by Littlefuse or Ferraz Shawmut. UL Class L.

D. Provide one (1) set of spare fuses for each set of three (3). A maximum of three (3) sets of fuses is required to be provided for the same type and rating.

3.0 EXECUTION

2.01 GENERAL

A. Clean all enclosures free of all foreign matter and dust.

B. Remove all rust marks and repaint to new condition.
C. Provide all necessary hardware to level and secure all switchgear.

D. Provide engraved nameplates on all switchgear per Section 16175 including but not limited to, switchboards, switchboard overcurrent protection devices, panelboards, distributor panelboards, disconnects, contactors, busway, busplugs.

E. Provide a typewritten directory for all panelboards. Make spares in pencil.

3.02 FIELD TESTING

A. Infra-red Testing
1. After the electrical distribution system has been checked, adjusted, calibrated and under load just prior to substantial complete, it shall be subjected to an infra-red thermograph test by a NETA certified technician. The test shall be performed with a minimum load of 20% of the rating of the equipment/connection being tested. Load banks shall be supplied if necessary to provide this load factor.

2. Two (2) copies of the test report shall be furnished to the Engineer upon completion of the test. Connections indicated having higher temperatures than acceptable shall be tightened or corrected as required. After corrections have been made, the connections shall be subjected to an addition thermograph test and rechecked to confirm the problem has been corrected.

3. The following components and connections shall be included in the thermograph testing:
   a. Service entrance
   b. Switchboards
   c. Switchboard main and feeder devices
   d. Feeder taps
   e. Busway cable terminations
   f. Busway joints
   g. Bustaps and busplug connections
   h. Emergency distribution system
   i. UPS system
   j. Motor control centers
   k. Distribution panels
   l. Panelboards
   m. Mechanical equipment connections (over 100 amps)
   n. Transformers

END OF SECTION
1.0 GENERAL

1.01 SUMMARY

A. The General Provisions, Supplemental General Provisions, section 16010, Division 1 Specifications and Special Provisions apply to all Work specified in this Section.

B. This Section describes the materials and methods required for the operation of motors and motorized equipment.

C. Furnish and install all equipment, materials, tools and labor to provide a complete system for motor operation. Refer to other related Sections of Division 15 and 16 and the Mechanical, Electrical and Plumbing Drawings.

D. A Motor starter shall be proved by Division 16 for each motor except for those specified in Division 15 to be furnished by that Division. All motor starters not integral to the equipment served shall be installed and connected by Division 16.

E. All low voltage control wiring shall be provided by Division 15 unless specifically noted otherwise on the Drawings.

F. Provide 120 volt line voltage for controls as required. Provide 120 volt to all line voltage motor operated dampers. Provide fire alarm connections to all fire and smoke dampers. Coordinate with Division 15.

2.0 PRODUCTS

2.01 MOTOR STARTERS

A. All motor starters shall be UL listed.

B. The motor starters shall be front wired with all terminals accessible for wiring directly from the front. All contacts shall be solid silver cadmium oxide alloy. Bare copper or silver-flashed type shall not be permitted. Operating coils shall be pressure molded and so designed that if accidentally connected to excessive voltage they will not expand, bubble, or melt. When a coil fails under over-voltage conditions, the motor controller shall definitely drop out and not freeze the contacts in the “ON” position.

C. All three-phase full voltage magnetic motor starters shall have overload protection in all three phases. All single phase full voltage magnetic motor controllers shall have overload protection in ungrounded phases. All two-
speed full voltage magnetic motor controllers shall have overload protection in all six (6) legs of the controller. Overload relays shall be furnished for each phase and shall be of the hand-reset trip-free variety so that blocking the reset mechanism in the reset position will not prevent the motor controller from dropping out if the motor is overloaded. This specifically excludes those overload relays which change to automatic reset from hand-reset when the reset mechanism is blocked. Accidentally depressing the reset button or mechanism will not shut-off the motor. Overload relays shall NOT be field convertible from hand to automatic reset type. Overload relays shall be the thermal bi-metallic type. Circuit breaker disconnects for combination motor starters shall be thermal magnetic only.

D. Motor starters shall be provided with auxiliary dry contacts as follows:
1. NEMA size 3 and larger: two (2) N.O. and two (2) N.C.
2. NEMA size 2: two (2) N.O. and one (1) N.C.
3. NEMA size 1 and 0: one (1) N.O. and one (1) N.C.

E. Provide necessary terminal strips and relays as required for interface with the motor operation, the Building Automation System, Fire Alarm System, and Fireman’s Override Panel (if applicable). Coordinate with Division 15.

F. In general, motor starter enclosures shall be NEMA Type 1, general purpose unless exposed to the weather or unless otherwise specified on the Drawings. Motor starters exposed to the weather shall be NEMA Type 3R watertight.

G. Generally, holding coils in full voltage magnetic motor starters shall be suitable for use on 120 volt, AC control voltage. Each controller shall have a control power transformer with primary and secondary fuses. Control power transformer shall have at least 50 VA capacity over and above the standard capacity required for holding coil and LED pilot light duty. Sizing of control transformers shall be coordinated with Division 15.

H. Two-speed motor starters for two-speed motors shall have “decelerating relay” between high and low speed.

I. Each motor starter shall be equipped with a handoff-automatic or start-stop push-button, as required by Division 15. Provide green LED light for “RUNNING”, red LED light for “STOPPED”. Provide amber LED light reading “TRIPPED” and interfaced with overload relay alarm contacts. Two-speed motor starters shall have “fast-slow” LED lights as well as a fast-slow selector switch in conjunctions with the HOA as required by Division 15. LED lights will be operated by an interlock in the motor starters not placed across the operating coil. In addition to the holding interlock and LED light interlocks, each starter shall have four extra interlock contacts – two normally open and two normally closed.

J. Where indicated on the Drawings at individual motor starters, provide surge protection on the load side of the motor controller. Surge protection shall consist of one protective capacitor and one secondary arrester.

2.02 MOTOR CONTROL CENTERS

A. A combination starter shall be provided in the motor control center for each motor and shall be plug-in circuit breaker with voidable cover interlock. Provide provision for padlocking the cover and operating handle. Provide interrupting capacity as required, minimum 65KA RMS SYM.

B. Motor starters shall be mounted in individual compartment below the breaker associated with it.

C. Provide a mechanical interlock to prevent opening the starter compartment door unless it is in the “off” position.

D. Provide an individual control circuit transformer in each section of the motor control center with fused secondary.

E. Provide a control terminal strip in the Motor Control Center. The control wiring from these terminal strips, external to the Motor Control Center, to the respective control device, shall be included in Division 15.

F. Acceptable manufacturers are General Electric, Square ‘D’, Cutler-Hammer, and Siemens. All circuit breakers, motor starters, push buttons and pilot lights shall be of the same manufacturer as the electrical distribution equipment (switchboards, panelboards, etc.).

3.0 EXECUTION

3.01 INSTALLATION

A. All motor starters shall be installed by Division 16 unless an integral part of a piece of equipment.

B. Provide all power wiring to motors unless prewired as part of a packaged unit.

C. Provide line voltage power wiring through a control device (i.e. fire stats, thermostat, aqua stat) where required. Coordinate with Division 15.

D. Where multiple mechanical terminal units (e.g. PIU's) containing multi-phase heating elements and single phase motors are connected together on the same multi-phase homerun/circuit, the single-phase motors shall be connected to alternate phases to balance the load. Coordinate with Division 15. Provide a neutral conductor of equal size to the phase conductors unless noted otherwise on the Drawings.

END OF SECTION
1.0 GENERAL

1.01 SUMMARY

A. The General Provisions, Supplemental General Provisions, section 16010, Division 1 Specifications and Special Provisions apply to all Work specified in this Section.

B. This Section describes the materials and methods required to provide a complete grounding system. Comply with other Division 16 Sections and Drawings as applicable. Refer to other Divisions for coordination of Work.

C. Furnish and install all equipment, materials, tools, and labor to provide a complete grounding system.

D. Ground all metallic parts of the electrical system which are not intended to carry current such as conduit, busduct, switchgear, panelboards, cabinets and enclosures, motor frames, device boxes, etc., in accordance with the NEC and applicable codes.

E. In non-metallic conduits, maintain continuity of equipment grounding by installing an insulated grounding conductor and connected by an acceptable method.

2.0 PRODUCTS

2.01 GENERAL

A. All equipment and materials provided under this Section of the Specifications shall be new, UL listed, and bear the UL label.

B. All switchboards, panelboards, motor control centers, transformers, busway, etc. shall be provided with a copper equipment ground bar bolted, brazed, or riveted to the associated enclosure or cabinet. All receptacles, switches, disconnects, individual motor controllers, etc. shall be provided with a grounding terminal connected to the device frame or enclosure.

C. All conduit, cable tray, manufactured wiring systems, raceways, junction boxes, pull boxes, etc. shall be made electrically continuous by means of grounding conductors, bonding jumpers, grounding bushings, etc. as required by the NEC and the authorities having jurisdiction.

D. Refer to other Sections for additional grounding requirements.

2.02 GROUNDING CONDUCTORS
A. All grounding electrode conductors shall be bare or green insulated copper conductors sized per the NEC, unless noted on the Drawings. Where the authorities having jurisdiction or local code requires grounding electrode conductor sizing in excess of that shown on the Drawings or specified herein, the larger size conductor shall be installed.

B. All equipment grounding conductors shall be green insulated copper conductors sized as indicated on the Drawings. Where the authorities having jurisdiction or local code requires equipment grounding conductor sizing in excess of that shown on the Drawings or specified herein, the larger size conductor shall be installed.

C. All bonding conductors shall be flexible copper bonding jumpers sized in accordance with the NEC for grounding electrode conductors.

2.03 GROUND RODS

A. All ground rods shall be a minimum of ¾" x 10'-0" copper clad steel unless otherwise indicated on the Drawings.

3.0 EXECUTION

3.01 INSTALLATION

A. Provide adequate and permanent service neutral and equipment grounding in accordance with the NEC and as follows.

B. Each system of electrically continuous metallic piping and ductwork shall be electrically grounded in accordance with the requirements of the NEC for “bonding” as they apply to the “bonding of piping systems”. Isolated metallic piping and duct systems shall be bonded to the building equipment grounding system.

C. Bonding and grounding conductors shall be sized, shall be run in conduit, and shall be connected to various services in accordance with the requirements of the authorities having jurisdiction and the NEC.

D. Grounding Electrode System
   1. Provide a made electrode consisting of three (3) ground rods spaced 6’ apart in the form of an equilateral triangle. Each rod shall be installed a minimum of 12” below finished grade and a minimum of 36” clear of the foundation with No. 3/0 bare stranded copper conductors bonded together 24” below finished grade to form a loop (grounding triad).
   2. Extend from the made electrode a No. 3/0 insulated stranded copper conductor in a 1 1/4” conduit to a single point ground bar (Erico EGBA144**GG Length as required) at each main service disconnect and connect to the main disconnect neutral bar, housing and frame using No. 3/0 stranded conductor.
   3. Provide a building grounding riser as follows:
a. Provide a single point ground bar in the main electrical room connected to the made electrode and each service main disconnect with a No. 3/0 insulated stranded copper conductor in a 1" conduit.
b. Provide a ground bar (TGBA16L08PT) in each communications room (and other rooms as noted on the Drawings) connected back to the closest electrical room ground bar on the same floor with a #2 insulated stranded copper conductor in a 1" conduit.

5. The following electrodes shall be bonded together with a No. 3/0 insulated stranded copper conductor in 1" conduit to form a grounding electrode system:
   a. Made electrode described above.
   b. Underground main metallic water pipe. Connect ahead of the first valve and provide a bonding jumper across the water meter.
   c. Structured steel building frame.
   d. Where the above electrodes are not available or feasible, provide suitable grounding electrodes per NEC.

6. Where nonmetallic insulating coupling, dielectric flanges or similar are used in metallic water piping, provide a No. 3/0 insulated stranded copper conductor across the couplings with the conductor attached to the water line with clamps on each side of the coupling.

7. Provide exothermic type chemical welded type connectors (Cadweld or approved equal) for the joining of conductors to ground rods, grounding plates and splicing. Provide compression and bolted type connectors for the joining of grounding electrode conductors to the ground bars.

8. Provide a separate green-insulated equipment grounding conductor, with insulation of the same rating as the phase conductors, for all feeders and branch circuits. Install the grounding conductors in the raceway with related phase and neutral conductors. Where parallel conductors in separate raceways occur, provide a grounding conductor in each raceway. Connect all grounding conductors to ground terminals at each end of the run so that there will be no uninterrupted grounding circuit from the point of ground fault back to a point of connection of the equipment ground and system neutral.

9. Connect the secondary neutral point and the enclosure in each dry type transformer together and run a grounding electrode conductor from their common point of connection to the building grounding electrode system.

10. Provide grounding bushings on all raceways terminating within all electrical enclosures. Provide grounding conductors from such bushings to the frame of the enclosure, ground bus and equipment grounding strap where one occurs.

11. Connect the unit substation neutrals where applicable and equipment ground to a common point within the metallic enclosure containing the main service disconnecting means. Equipment grounds and the identified neutral of the wiring system shall not be interconnected beyond this point in the interior wiring system.

12. Assure the electrical continuity of all metallic raceway systems, pulling up all conduits and/or locknuts wrench-tight. Where expansion joints or telescoping joints occur, provide bonding jumpers. Wherever flexible metallic conduit is employed, provide a green insulated ground jumper installed in the flexible conduit.
13. Provide an insulated green bonding jumper from the grounding screw in the outlet box. Do not install behind the device mounting screws.
14. Provide a No. 6 copper ground to the telephone company main distribution frame and to each telephone backboard.

3.02 TESTS

A. Provide ground continuity tests at all switchboards, transformers, panel boards, distribution panels, motor control centers, main disconnects, transfer switch equipment.

B. After completion of the grounding system measure the system ground resistance. If the resistance to ground exceeds 5 ohms, additional ground rods, or other method approved by the Engineer, shall be provided until a reading of 5 ohms or less is achieved.

C. Perform tests in dry weather and not less than 48 hours after rainfall.

D. Test instruments: Null balance type, Biddle Meggar Earth Tester or approved equal.

E. Provide a report with all resistance readings, calculations and performed corrections and submit two (2) copies to the Architect.

END OF SECTION
1.0 GENERAL

1.01 SUMMARY

A. The General Provisions, Supplemental General Provisions, section 16010, Division 1 Specifications and Special Provisions apply to all Work specified in this Section.

B. This Section describes the materials and methods required for lighting fixtures. Comply with other Division 16 Sections and Drawings as applicable. Refer to other Divisions for coordination of Work.

C. Furnish and install lighting fixtures complete with all lamps as specified on the Electrical, Architectural, Interior and Lighting Designer Drawings. Furnish and install all supports, brackets, connectors, materials, tools, wiring, controls and labor to provide a complete and operating lighting system.

D. All blemished, damaged or unsatisfactory fixtures shall be replaced in a satisfactory manner as directed by the Architect.

E. Where a fixture type designated has been omitted, cannot be determined or is in conflict with other Drawings or Specifications, request a clarification from the Architect, prior to bid, and provide suitable fixture type as directed.

F. All lamps shall be operating at project completion and for a period of six (6) months after the final acceptance by the Owner.

G. Confirm exact locations of lighting fixtures with the Architectural Reflected Ceiling Plan and mechanical equipment above or on the ceiling.

H. All recessed lighting fixtures shall match the ceiling type and be tested and certified by the fixture manufacturer for the type of mounting.

1.02 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Handle lighting fixtures carefully to prevent breakage, denting and scoring the fixture finish. Do not install damaged lighting fixtures; replace and return damaged units to equipment Manufacturer.

B. Store lighting fixtures in clean, dry space. Store in original cartons and protect from dirt, physical damage, weather and construction traffic.

1.03 SUBMITTALS
A. The following submittal data shall be furnished according to the Conditions of the Construction Contract, Division 1 Specifications, and Section 16010 and shall include by not be limited to:
   1. Lighting fixtures complete with physical dimensions, materials, connector details, voltage, current, installation details, air handling capability, etc.
   2. Lamps, complete with base or pin configuration, lumen rating, life expectancy, color temperature, starting characteristics, etc.

2.0 PRODUCTS

2.01 LIGHTING FIXTURES

A. Base bid lighting fixtures shall be based on manufacturer and descriptions listed. Alternate fixture manufacturers not specified and proposed by the Contractor shall be submitted for approval prior to base bid.

B. Fixtures are designated on the Drawings by “type” as indicated by a letter that corresponds to a lighting fixture description and specification on the lighting fixture schedule.

C. Each lighting fixture shall comply with local codes and the authority having jurisdiction.

D. Provide a lighting fixture complete with lamps, ballasts and required accessories for each lighting fixture shown. Provide all mounting and trim hardware to suit the specific installation and location.

E. All lighting fixtures shall bear a U.L. label.

F. Where fixtures are specified with acrylic lenses, provide virgin acrylic with 0.125 inch thickness.

G. Exit lighting fixtures shall meet the requirements of all federal, state and local codes.

2.02 LAMPS

A. All lamps shall be as specified on the Lighting Fixture Schedule.

B. Acceptable manufacturers are General Electric, Osram-Sylvania or Philips.

2.03 BALLASTS

A. General
   1. All ballasts shall be UL listed and CBM certified. Ballasts shall be CSA certified where applicable.
   2. Ballast shall be approved for operating with specified lamp. Ballast shall provide normal rated lamp life as stated by acceptable lamp manufacturer.
3. Ballast shall be suitable to operate on the voltage system they are connected to and maintain correct lamp operation with 10% fluctuation of rated input voltage with no damage to ballasts or lamps.

4. Ballast shall have the lowest sound rating available for the lamps specified. Replace noisy ballasts as directed by Engineer at no cost to the Owner.

5. Ballast shall contain no PCBs.

6. Ballasts shall be identical within each fixture type. All ballasts within the same luminaire shall be from the same manufacturer.

7. Ballast shall support a sustained short to ground on open circuit of any output leads without damage to the ballast and without blowing fuses either inside the ballast or in line with the ballast.

8. Ballast shall be suitable to operate in:
   a. Indoor heated or air conditioned spaces: 50°F to 150°F ambient.
   b. Outdoor or in unheated spaces: 0°F to 105°F.
   c. Un-air-conditioned spaces: 50°F to 150°F at rated life in pendant mounted industrial type fixture.
   d. Recess mounted fixtures: in maximum 140°F ceiling cavity.
   e. With fire-rated covering, clear air space between fixture and covering minimum of 3 inches.

9. Ballast for T-4 and T-5 lamps shall have lamp fault interrupter for end of life failure.

10. Manufacturer shall have been manufacturing ballasts for at least 5 years.

B. Drivers for LED Fixtures

1. Electronic Driver for LED Fixtures: Comply with UL 1310 Class 2 requirements for dry and damp locations. Include the following features unless otherwise indicated:
   a. Rated for 50,000 hours of life, unless otherwise noted.
   b. Sound Rating: Class A.
   c. Total Harmonic Distortion Rating: 15 percent or less.
   d. Current Crest Factor: 1.5 or less.
   e. 0-10V Dimming Standard (Step Dimming does not qualify)

2.04 EMERGENCY BATTERY LIGHTING

A. Lighting fixtures indicated on the drawings to be provided with an emergency battery ballast shall provide emergency lighting by using standard fluorescent lamp or lamps and an emergency battery ballast. The ballast shall consist of a field replaceable high temperature, maintenance free nickel cadmium battery, charger and electronic circuitry contained in one metal case. Provide a solid state charging indicator light to monitor the charger and battery, double pole test switch and installation hardware. The battery ballast shall provide power to the fluorescent lamp upon failure of the normal supply to the fixture.
B. The test button and indicator light shall be integral in the fixture reflector and shall be positioned within or on the surface of the fixture so as to be accessible and identifiable.

C. Under normal mode the battery ballast shall keep the batteries at full charge. Upon loss of normal power the battery ballast shall operate the fluorescent lamp or lamps for 90 minutes.

D. Battery recharge time shall not exceed 16 hours to fully recharge and shall not exceed 225 milliamperes charging current.

E. The lumen output of the lamp or lamps powered by battery unit shall be not less than 1100 lumens initially for a four foot fluorescent lamp.

F. The battery ballast shall meet or exceed all the requirements set forth in UL924 “Emergency Lighting and Power Equipment” and shall be UL listed for installation on top of or remote from the fixture. Emergency illumination shall meet or exceed the requirements set forth in the National Electric Code, Life Safety Code and UL 90-Minute Requirements.

2.05 LED FIXTURES

A. Except as otherwise indicated, provide LED luminaires, of types and sizes indicated on fixture schedules.

B. Include the following features unless otherwise indicated:

1. Each Luminaire shall consist of an assembly that utilizes LEDs as the light source. In addition, a complete luminaire shall consist of a housing, LED array, and electronic driver (power supply).
2. Each luminaire shall be rated for a minimum operational life of 50,000 hours utilizing a minimum ambient temperature of (25°C).
3. Light Emitting Diodes tested under LM-80 Standards for a minimum of 12,000 hours.
4. Color Rendering Index (CRI) of 82 at a minimum.
5. Color temperature shall be 3500K unless otherwise indicated.
6. Rated lumen maintenance at 70% lumen output for 50,000 hours, unless otherwise indicated.
7. Fixture efficacy of 60 Lumens/Watt, minimum.
8. 5 year luminaire warranty, minimum.
10. The individual LEDs shall be constructed such that a catastrophic loss of the failure of one LED will not result in the loss of the entire luminaire.
11. Luminaire shall be constructed such that LED modules may be replaced or repaired without the replacement of the whole fixture.
C. Technical Requirements

1. Luminaire shall have a minimum efficacy of 60 lumens per watt. The luminaire shall not consume power in the off state.
2. Operation Voltage: The luminaire shall operate from a 50 HZ to 60 HZ AC line over a voltage ranging from 120 VAC to 277 VAC. The fluctuations of line voltage shall have no visible effect on the luminous output.
3. Power Factor: The luminaire shall have a power factor of 0.9 or greater.
4. THD: Total harmonic distortion (current and voltage) induced into an AC power line by a luminaire shall not exceed 15 percent.
5. Operational Performance: The LED circuitry shall prevent visible flicker to the unaided eye over the voltage range specified above.

D. Thermal Management

1. The thermal management (of the heat generated by the LEDs) shall be of sufficient capacity to assure proper operation of the luminaire over the expected useful life.
2. The LED manufacturer’s maximum thermal pad temperature for the expected life shall not be exceeded.
3. Thermal management shall be passive by design. The use of fans or other mechanical devices shall not be allowed.
4. The luminaire shall have a minimum heat sink surface such that LED manufacturer’s maximum junction temperature is not exceeded at maximum rated ambient temperature.

3.0 EXECUTION

3.01 GENERAL

A. Locations on the Drawings are diagrammatic. Verify exact locations with Architectural Reflected Ceiling Plans and coordinate space conditions with other trades.

B. Modify locations in mechanical equipment rooms to suit the conditions of the mechanical equipment while maintaining a sufficient and uniform lighting level equal to that provided by the layout shown on the Drawings.

C. Fixtures of the same type and in the same ceiling shall have lamps, socket assembling and door hinges oriented in the same direction.

D. Reflector cones, baffles, aperture plates, light controlling element for air handling fixtures and decorative elements shall be installed after completion of ceiling tiles, painting and general cleanup.

E. Target and focus adjustable lighting fixtures after regular working hours and before building acceptance. Permanently indicate targeting on fixture and provide positive locking devices to preclude mis-focus relamping. Target and focus in the presence of the Architect and Lighting Designer.
F. Relamp all incandescent and low-voltage fixtures immediately prior to Owner's acceptance of building. Replace non-operating, damaged or darkened fluorescent and high intensity discharge lamps immediately to Owner's acceptance of building.

G. Clean all fixture reflectors, lenses, louver, decorative accessories and lamps immediately prior to Owner's acceptance of building. Destaticize plastic lenses and diffusers after cleaning.

H. Lighting fixtures mounted within, under, on or integral with millwork shall be given special consideration. Fixture counting and sizes shall be coordinated with the applicable space and adjusted accordingly. This coordination shall occur prior to ordering fixtures. Refer to Architectural Drawings for details.

3.02 SUPPORT OF LIGHT FIXTURES

A. Support directly from building structure, any lighting fixture which weighs in excess of the capacity of the suspended ceiling on which it is installed. Support each such fixture with the quantity of threaded rods or fixture support wires required to prevent fixture warping; however provide no less than two rods or wire per fixture.

B. Outlets, which are recessed in a suspended ceiling and support the weight of surface-mounted or suspended fixtures, shall be supported from a channel spanning and secured to the ceiling support system. Support each end of the channel with a fixture support wire attached to structure.

C. Installation in grid-type suspended ceiling:
   1. Support each corner of a grid opening, in which a lay-in fixture is located, with a fixture support wire attached to structure. Provide a support clip, securely fastened to the ceiling grid, at or near each corner of each lay-in fixture.
   2. Support fixtures, which are smaller than the ceiling grid opening and which are recessed in the acoustical panel, with at least two metal channels spanning, and secured to, the ceiling grid. Support each end of each channel or each corner of the grid opening with a fixture support wire attached to structure. Do no support fixtures by ceiling acoustical panels.

D. Provide additional supports as required by local codes and seismic zone.

END OF SECTION
1.0 GENERAL

1.01 SUMMARY

A. The General Provisions, Supplemental General Provisions, section 16010, Division 1 Specifications and Special Provisions apply to all Work specified in this Section.

B. This Section describes the basic materials and installation methods for Emergency Stand-by Systems of which are acceptable. Comply with other Division 16 Sections and Drawings as applicable. Refer to other Divisions for coordination of Work.

C. Provide all labor and material necessary to install a standby diesel engine generator set in accordance with the contract documents and manufacturer’s drawings and installation instructions in a complete and operating condition.

D. The engine – generator set shall be suitable for outdoor use and complete with weather-protective enclosure and components as identified in this specification.

E. Generator and Fuel tank supplied shall the UL 2200 listed.

1.02 SUBMITTALS

A. Furnish a comprehensive component list and manufacturer produced data sheets showing the following information:

1. Technical Data - Manufacturer produced generator set specification or data sheets identifying make and model of engine and generator, and including relevant component design and performance data.

2. Engine:
   a. Make and model of engine and generator
   b. Type, aspiration, compression ratio, and combustion cycle
   c. Bore, stroke, displacement, and number of cylinders
   d. Engine lubricating oil capacity
   e. Engine coolant capacity without radiator
   f. Engine coolant capacity with radiator
   g. Coolant pump external resistance (maximum)
   h. Coolant pump flow at maximum resistance

3. Alternator:
   a. Model
   b. Frame
   c. Insulation class
16610
EMERGENCY STANDBY GENERATOR 16610-2
6/27/19

d. Number of leads
c. Weight, total
f. Weight, rotor
g. Air flow
4. Technical Data at rated voltage:
a. Efficiency at 0.8 power factor for: 50%, 75%, 100% load
b. Time constants, short circuit transient (T'D)
c. Time constants, armature short circuit (TA)
d. Reactance, subtransient - direct axis (X"D),
e. Reactance, transient - saturated (X'D)
f. Reactance, synchronous - direct axis (XD)
g. Reactance, negative sequence (X2)
h. Reactance, zero sequence (X0)
i. Fault current, 3 phase symmetrical
j. Decrement curve
5. Radiator:
a. Model
b. Type
c. Fan drive ratio
d. Coolant capacity, radiator
e. Coolant capacity, radiator and engine
f. Weight: dry & wet
   Weight: dry & wet
7. Performance - Based on SAE J1349 standard conditions of 100kPa (29.61 in hg) and 25C (77F); also at conditions of ISO 3046/1, DIN 6271 and BS 5514. Fuel rates are based on ISO 3046 and on fuel oil of 35 degrees API (16C or 60F) gravity having a LHV of 42780 kJ/kg (18,390 Btu/lb) when used at 29C (85F) and weighing 838.9 g/l (7.001 lbs/U.S. gal). Performance of the genset shall also meet the design site conditions.
8. Auxiliary Equipment – Specification and data sheets, including switchgear, transfer switch, vibration isolators, enclosure, muffler, battery charger, batteries, cooling system and fuel tank.
9. Drawings - General dimensions drawings showing overall generator set measurements, mounting location, and interconnect points for load leads, fuel, exhaust, cooling and drain lines.
10. Wiring - Wiring diagrams, schematics and control panel outline drawings published by the manufacturer in Joint Industrial Council (JIC) format for controls and switchgear showing interconnected points and logic diagrams for use by contractor and owner.
11. Warranty Statements - Warranty verification published by the manufacturer.

1.03 SYSTEM DESCRIPTION

A. The electric power generating system shall have a site capability of that shown on the drawings. This power shall be applied for Standby operation.
B. The system shall consist of generator set(s) which include all controls, protection, wiring, and accessories for automatic start-stop operation. After starting, the unit(s) will attain rated speed and voltage, and accept rated load. Generator set speed shall be controlled by the engine governor, while generator output voltage regulation shall be a function of the generator automatic voltage regulator. Manual adjustment of generator speed and voltage shall be provided.

C. The set shall immediately shut down in the event of overspeed, low oil pressure, high water temperature and overcrank. Cause of shutdown shall be indicated by a light annunciator. System logic shall prevent restart until fault is cleared. There shall also be a provision for manual shutdown.

1.04 SYSTEM PERFORMANCE

A. The generator output kW shall be as identified in this specification and shall take into consideration all generator mounted parasitic and external loads such as radiator fans.

B. The kW rating shall be for continuous electrical service during interruption of the normal utility source and shall be certified by the manufacturer for the actual shipped unit. The output rating shall be capable of the design conditions identified in this specification. The genset shall also meet the following minimum industry standards: ISO 3046; BS 5514, DIN 6271, SAE J1349 and API 7B-11C.

C. Diesel engines shall be able to deliver rated power at design ambient when operating on No. 2 diesel fuel having 35 degree API (16C, 60F) specific gravity. Fuel rates shall be based on a low heating value of 42,780 kJ/kg (18,390 Btu/lb) when used at 29C (85F) and weighing 838.9 g/l (7.001 lbs/U.S. gal).

D. Generators shall start, achieve rated voltage and frequency, and be capable of accepting load within 10 seconds when properly equipped and maintained.

E. The generator set shall be capable of accepting a 100% block load as applied in a single step and shall be able to recover to a steady state condition within the timeframe identified in the following paragraph. Generator transient response performance shall conform to ISO 8528. No other definition of transient response shall be accepted.

F. The maximum voltage dip shall be no greater than that identified in the following paragraph. The voltage dip shall be identified as that recorded by a light beam oscilloscope and strip chart recorder. No other definition of voltage dip shall be accepted.

G. The power generating system shall satisfy the following performance criteria at site conditions:
Total of Power Capability: as shown
Frequency: 60 Hz
3 Phase Volts: as shown
Allowable Voltage Dip: 25%
Average Power Factor: 0.8
Altitude: per site location
Design Ambient Temperature: 110 F
Fuel Type: Diesel
Total air restriction 0.75” (for use with enclosures)

The bidding manufacturer is required to provide a product that meets the designed power capability at the design ambient and air restrictions. If the manufacturer’s product and output rating is not based on the above ambient conditions, than they are responsible for providing a product that is capable for producing the specified rating at the design conditions. Any de-rating requirements must be clearly identified on page one of the Bidder’s bill of materials.

1.05 EQUIPMENT ALTERNATIVES

A. In additional to submittal requirements contained in other parts of this specification, data for substitute equipment shall be made a minimum of ten (10) days prior to bid date and include the following:
1. Plan Drawing - Verification that substitute equipment will fit into the space allocated and allow for removal and service.
2. Air Flow Requirements - Provision for combustion, ventilating, and radiator cooling air.
3. Product Rating conditions and any required de-rating for operating conditions other than design conditions noted in this specification shall be clearly noted and highlighted by the bidder.
4. Connections - Wiring and piping diagrams describing interconnect changes.
5. Load Study - Complete load review to confirm that generating equipment operates satisfactory and complies to original specification during all phases of operation, including motor starting and transient loading capabilities.
6. Specifications - Specification sheets and support literature to show that alternate equipment is in compliance with all specifications.
7. Certification - List of projects using similar equipment operating under similar design conditions for the last five years. Copies of certified site test reports shall also be provided with ambient conditions listed on the reports.
8. Exceptions - All deviations from these specifications shall be clearly highlighted and noted in the bill of materials.

2.0 MATERIALS

2.01 MANUFACTURER
A. The equipment shall be as manufactured by Caterpillar Kohler, Generac or Cummins provided the product being offered meets this specification as defined within the content.

B. All components shall have been designed to achieve optimum physical and performance compatibility and prototype tested to prove integrated design capability. The complete system shall have been factory fabricated, assembled and production tested by the manufacturer.

C. Special ratings and non-standard consists will not be accepted. Published specification sheets must be produced for the product being offered. The manufacturer shall have the product being offered installed in a minimum of 20 sites.

D. Prototype and production testing must be performed for the specific rating and consist being offered and certified test reports shall be provided.

2.02 ENGINE

A. The engine shall be water cooled, in-line or vee-type, four stroke compression ignition diesel. It shall meet specifications when operation on number 2 diesel fuel. Diesel engines requiring premium fuels will not be considered. The engine shall be equipped with air filters, fuel filters, oil filters, fuel pressure gauge, lube oil, lube oil cooler, fuel transfer pump, 50/50 glycol mixture, pressure gauge, water pump, water temperature gauge, service hour meter, flywheel, and flywheel housing.

B. The engine block shall be of one piece design and cast of high tensile strength iron in the system manufacturer's own foundry. The crankshaft shall be a one piece forging with regrind able wear surfaces hardened through heat treat methods. The cylinder wear surfaces shall be induction hardened over their entire length. Main and rod bearings shall consist of aluminum bonded by copper to a steel backing.

2.03 LUBRICATION SYSTEM

A. The lubrication oil pump shall be a positive displacement type that is integral with the engine and gear driven from the engine gear train. The system shall incorporate full flow filtration with bypass valve to continue lubrication in the event of filter clogging. The bypass valve must be integral with the engine filter base or receptacle. The oil filter shall incorporate a self-lubricating, free rotating seal and have a nonmetallic core sufficiently rigid to minimize movement or shifting of the filtration media.

2.04 DIESEL FUEL SYSTEM

A. The engine fuel system shall consist of a fuel filter, engine mounted fuel transfer pump, injection pumps, lines, and nozzles. The fuel transfer pump, injection pumps, rack and pinion assembly, and timing mechanism shall be maintenance and adjustment free for the life of the equipment. The fuel filter
shall not require changing more frequently than once per year or every 250 hours, whichever comes first.

B. The engine transfer pump shall deliver fuel under low pressure to individual injection pumps - one for each cylinder. External, high pressure (greater than 5,000 psi) fuel systems will not be accepted.

C. Racor brand fuel/water separator shall protect the fuel system from water damage. A manual fuel priming pump shall facilitate priming and bleeding air from the system. Flexible fuel lines between engine and fuel supply shall be installed to isolate vibration.

D. A primary fuel filter shall also be provided to protect the fuel transfer pump from impurities and debris in the fuel system.

2.05 FUEL STORAGE SYSTEM

A. Sub-base Fuel Tank - UL142 listed, double wall, sub-base fuel tank shall be provided with the generator set. The tank shall have a low level alarm, critical low shutoff, high level alarm, leak detection and shall have flexible supply and return line connections. The sub-base fuel tank shall be furnished with a stub up area for mechanical and electrical connections. Steel cross members shall support genset and add rigidity to the base with vibration isolators install between the generator set and supports. Fuel tank shall be sized for 24 hours of run time.

2.06 GOVERNOR

A. The engine governor shall control engine speed and transient load response within commercial and ISO 8528 tolerances. It will be selected, installed, and tested by the generator set manufacturer.

B. The engine governor shall be a minimum quality of a Caterpillar ADEM or Woodward 2301 Governor. Speed droop shall be externally adjustable from 0 (isochronous) to 10% from no load to full rated load. Steady state frequency regulation shall be +/- 0.25 percent. Speed shall be sensed by a magnetic pickup off the engine flywheel ring gear. A provision for remote speed adjustment shall be included. In the event of a DC power loss, the forward acting actuator will move to the minimum fuel position.

2.07 COOLING SYSTEM

A. A radiator with blower fan shall be provided to maintain safe operation at the specified ambient temperature. Air flow restriction through the radiator shall not exceed 0.5” H2O. Provide ductwork with flexible connection between radiator and discharge louver frame.

B. A radiator with blower fan shall be provided to maintain safe operation at the specified ambient temperature. Air flow restriction through the radiator shall not exceed 0.5” H2O. Provide ductwork with flexible connection between
radiator and discharge louver frame.

C. The radiator shall be sized to cool the engine continuously while operating at full rated load and at site conditions based on a site air flow restriction of 0.5" and a minimum ambient temperature of 110-degrees F. Any required additional de-rations of the radiator resulting from placing the genset inside a standard enclosure, sound attenuated enclosure or inside a building, shall be taken into consideration by the system supplier.

D. The radiator shall be supplied with a 50/50 glycol mixture.

E. Provide an engine jacket water heater with thermostat to maintain coolant temperature at not lower than 90 degrees F. Manual shutoff valves shall be incorporated to isolate the jacket water heater during servicing.

2.08 INLET AIR SYSTEM

A. The engine air cleaner shall be engine mounted with dry element requiring replacement no more frequently than 250 operating hours or once each year. If external ducting is required, maximum restriction to the combustion air inlet shall be 27 in H2O with air flow of 932 cfm. Design inlet air restriction shall be based on 0.75" H2O for use with an enclosure or 0.50" for use inside a building.

2.09 EXHAUST SYSTEM

A. Outdoor Exhaust System – A critical grade exhaust silencer, companion flanges and flexible stainless steel exhaust fittings shall be provided according to the manufacturer’s recommendations. The silencer shall be mounted so that its weight is not supported by the engine. Exhaust pipe size shall be sufficient to ensure that exhaust back-pressure does not exceed the maximum limitations specified by the engine manufacturer.

For non-sound attenuated enclosures, the muffler shall be designed for mounting on top of the enclosure. For sound attenuated enclosures, the muffler shall be designed for mounting inside the enclosure and the manufacturer shall provide insulation for the muffler and flexible connection.

2.10 WIRING AND CONDUIT

A. Engine and generator control wiring shall be multi-strand annealed copper conductors encased by cross-linked polyethylene insulation resistant to heat, abrasion, oil, water, antifreeze, and diesel fuel. Wiring shall be suitable for continuous use at 120C (250F) with insulation not brittle at -50C (-60F). Cables shall be enclosed in nylon flexible conduit which is slotted to allow easy access and moisture to escape. Reusable bulkhead fittings will attach the conduit to generator set mounted junction boxes.

2.11 ELECTRICAL STARTING SYSTEMS

Azura Surgery Center Renalus Crestview
A. The engine starting system shall include 24 volt DC starting motor(s), starter relay, and automatic reset circuit breaker to protect against butt engagement.

B. A belt driven battery charging alternator shall be provided with transistorized voltage regulator. Voltage shall match the electric starting system.

C. Batteries shall be maintenance free, lead acid type mounted near the starting motor and supplied with a corrosion resistant battery rack. Required cables will be furnished and sized to satisfy circuit requirements. The system shall be capable of starting a properly equipped engine within 10 seconds at ambient temperatures greater than –10 Degrees F. For gensets above 1000kW, the batteries shall have a 2600 CCA, 380 AH rating and shall be rated for operation in ambient temperatures of –10-degrees F.

D. For generators rated 800kW and below, 10 ampere, dual rate, constant voltage charger shall be provided. For generators over 800kW, a 20 ampere dual rate, constant voltage, battery charger shall be provided. The charger shall accept 120 - 208 - 240 volt AC single phase input to provide 24 volt DC output. It shall be fused on the AC input and DC output, and incorporate current limiting circuitry to avoid the need for a crank disconnect relay. An AC voltage power switch shall be mounted on the face of the charger and shielded from accidental switching. The charger shall include an AC ammeter and voltmeter, a failure malfunction alarm switch, and be housed in a NEMA 1 enclosure suitable for wall mounting.

2.12 GENERATOR

A. The generator shall be close coupled, drip proof and guarded, constructed to NEMA 1 and IP 22 standards, single bearing, salient pole, revolving field, synchronous type with amortisseur windings in the pole faces of the rotating field.

B. The generator shall in inherently capable of parallel operation with other power sources of equivalent electrical characteristics.

C. The generator shall be brushless, permanent magnet, and shall be capable of withstanding a three phase plaid of 300% rated current for 10 seconds, and sustaining 150% of continuous load current for 2 minutes with field set for normal rated load excitation. It shall exhibit less than 5% waveform deviation at no load.

D. The generator terminal box shall provide generous space for entrance and installation of power cables.

E. Generator shall be equipped with an AC single phase space heater to minimize condensation while the generator set is idle. The heaters shall be capable of easily mounting in the assembled alternator.

2.13 VOLTAGE REGULATOR
A. The automatic voltage regulator shall maintain alternator output voltage by controlling the current applied to the exciter field of the alternator.

B. The regulator shall be a solid state design which includes electronic voltage buildup and overcurrent protection. The voltage regulator shall be equivalent to either a Caterpillar VR3 or DVR. It shall incorporate 1:1 volts per Hertz characteristics with the regulated voltage a linear function proportional to frequency over a 30 to 70 Hz range.

C. The regulator shall be suitable for mounting within or external to the alternator assembly, and have provision for remote voltage level control, using 16 ga shielded wire.

D. As installed, the voltage regulator shall meet the applicable sections of the Canadian Standards Association (CSA), International Electrotechnical Commission (IEC), Institute of Electrical and Electronic Engineers (IEEE), National Electrical Manufacturers Association (NEMA).

2.14 MOUNTING

A. The engine and generator shall be assembled to a common base by the engine-generator manufacturer. The generator set base shall be designed and built by the engine-generator manufacturer to resist deflection, maintain alignment, and minimize resonant linear vibration.

B. The generator set shall be mounted to the sub-base fuel tank with spring type vibration isolators between the generator rails and sub-base fuel tank. Flexible fuel lines shall be connected from the sub-base fuel tank to the generator fuel supply and return connections.

2.15 WEATHERPROOF ENCLOSURE

A. The package generators set shall be supplied with a weatherproof enclosure integrally mounted to the sub-base fuel tank. The enclosure shall be constructed to allow full access to the engine for maintenance without exposing personnel to any moving machinery and shall have two personnel doors.

B. Exhaust muffler shall be mounted on top of the enclosure with mounting brackets and designed with a flexible exhaust fitting that prevents the weight of the muffler is not supported by the engine.

C. Enclosure shall have oil drain, coolant drain and crankcase breather lines extended to exterior of enclosure.

2.16 AUTOMATIC LOAD TRANSFER SWITCHES

A. The amperage rating of the automatic load transfer switch shall be as shown. Each transfer switch shall be 4-pole or 3-pole with cross-over neutral. Manufacturer shall be ASCO, Russell or Zenith.
B. The automatic transfer switch shall be mechanically held on both the emergency and the normal side. The switch shall be double throw with the main contacts rigidly and mechanically interlocked to insure only two possible positions: Normal or Emergency. A manual operator must be provided to enable manual operation without having to assemble the handle.

C. The automatic load transfer control shall be open transition and rated for continuous duty when enclosed in a non-ventilated NEMA 1 enclosure. It shall be rated for all classes of load, including inductive and non-inductive, at 600 volts and tungsten lamp load at 250 volts. The transfer switch portion of the control shall be designed, built and tested to close on an inrush current up to and including twenty (20) times the continuous rating of the switch without welding or excessive burning of the contacts. The transfer switch shall be capable of enduring six thousand (6000) cycles of operation, at rated current, at a rate of six (6) cycles per minute, without failure. One cycle shall consist of one complete opening and closure of both sets of contacts on an inrush current of ten (10) times the continuous rating of the switch.

D. The transfer switch shall be as listed under U.L. 1008. Switch utilizing reversing contactor mechanisms as a means to transfer load are disallowed and will not be considered.

E. The automatic load transfer switch shall include the following accessories:
   1. Engine starting contacts to provide for generator starting.
   2. Full phase protection. Three-phase relays shall be field adjustable, close differential type with 92-95% pickup and 82-85% drop out. Relays are to be connected across live lines.
   3. Test switch, to simulate a power outage.
   4. Adjustable time delay on engine starting to override momentary outages and nuisance voltage dips.
   5. Adjustable time delay on transfer of load to emergency source. Adjustable time delay to open transfer switch contact to allow motor loads to decay.
   6. Adjustable time delay on retransfer of load to normal with 5 minute cool-down timer wherein the generator set runs unloaded after transfer to line.
   7. Plant exerciser to start and run the generator set with or without load each 168 hours for a 30 minute interval. Selector switch will be provided for with-load or without-load testing.
   8. Two auxiliary contacts closed on emergency and two auxiliary contact open on emergency.
   9. Pilot lights to indicate the normal and emergency position of the transfer switch.
   10. Isolated (un-grounded) neutral bar.
   11. Disconnect plug.

2.17 CONTROLS, PROTECTION & MONITORING

A. The controls, protection, and monitoring systems of the generator set and its operation shall be the responsibility of the generator set manufacturer. All
subsystem components, interfaces, and logic shall be compatible with engine mounted devices.

B. The control panel shall be shock mounted on the generator and have the capability to face either side or the rear of the generator and shall control, protect, meter and annunciate all functions necessary to confirm the operational status of the generator set.

C. The control panel shall be sealed in a dust tight and watertight module with sealed wire entries into the enclosure so as to protect the circuitry and internal components from oil, soot, fumes, diesel fuel, dirt, moisture and debris. The panel module shall comply with NEMA 4 for environmental protection, while the total panel shall qualify for IEC 144 and NEMA 12.

D. The 24 volt DC system shall incorporate energize to run logic and include:

Control:

Alternator voltage level rheostat and ammeter/voltmeter phase selector switch shall be mounted on the panel door.

The engine start-stop switch shall be door mounted and include positions for off/reset, run, start and automatic mode. Start-stop logic shall have provisions for cycle cranking programmable from 5-60 second cycles, for total crank time of 5-120 seconds. Cooldown operation shall be programmable from 0-30 minutes with a signal to allow removal of the load from the generator set during cooldown.

Shutdowns/Annunciation:

The generator set shall shut down and red flashing LEDs shall signal operational faults of overcrank, overspeed, high water temperature, and low oil pressure. High water temperature, low coolant level, and low oil pressure shall be programmable for shutdown or alarm. A minimum of three (3) spare fault inputs shall be available which can be programmed for alarm or shutdown, with 0-250 second time delay. There shall be a lamp test switchpad accessible from the front of the panel.

Monitor:

Monitoring devices shall include AC voltmeter, AC ammeter, ammeter/voltmeter phase select switch, frequency meter, electric hour-meter, oil pressure, water temperature, engine RPM, battery DC volts, oil pressure, and jacket water temperature.

Safety Devices:

ISO red emergency stop pushbutton shall be provided, and all controls, annunciation, and monitors labeled with ISO symbols.
Protection:

A lockable door shall be included which is bottom hinged to allow full panel exposure when open.

E. A cycle crank timer shall provide five 10 second cranking periods separated by 10 second rest periods. A cool down timer shall provide an adjustable 0-30 minute engine running period before shutdown after removal of load.

2.18 ALARM - NFPA 99

A. NFPA-99 requirements for local annunciation shall be satisfied by a solid state panel which includes a common red indicating light and silencable alarm horn to annunciate all alarms and shutdowns provided by the generator set control panel when equipped with the NFPA-99 alarm module.

2.19 REMOTE ANNUNCIATOR PANEL - NFPA 110

A. NFPA-110 requirements for remote annunciation shall be satisfied by a remote mounted solid state panel which includes a common red indicating light and silencable alarm horn to annunciate all alarms and shutdowns provided by the generator set control panel when equipped with the NFPA-110 alarm module. The remote annunciator shall have a minimum of 16 lights.

B. Locate the annunciator panel as directed by the Owner.

2.20 GENERATOR MAIN CIRCUIT BREAKER

A. The generator main circuit breaker(s) shall be mounted inside the weatherproof enclosure and on the generator in a termination box. The main breaker and distribution breakers shall be sized according to the drawings.

B. The circuit breaker shall be sized such that the generator will be capable of producing the 100% rated kW of the genset at a 0.8 power factor for a minimum of 4 hours. If a molded case breaker is provided, the breaker shall be have a breaker frame size with a minimum of 120% of the full load amperage of the generator. If an insulated case breaker is provided, the breaker can be sized for 100% of the full load amperage of the generator.

3.0 EXECUTION

3.01 GENERAL

A. The following articles and paragraphs are intended to define acceptable procedures and practices of manufacturing, inspecting, installing, and testing the generator set and associated equipment.
B. The genset shall be subjected to a full load, resistive load test prior to shipment to the jobsite. The tests shall demonstrate at a minimum the full rated load capability of the genset, voltage, amperage, fuel consumption shall be recorded.

3.02 SHIPMENT TO JOBSITE

A. Delivery shall be FOB to the jobsite by the system manufacturer's authorized dealer.

3.03 INSTALLATION

A. The installation shall be performed in accordance with shop drawings, specifications, and the manufacturer's instructions.

3.04 FIELD QUALITY CONTROL

A. The system supplier shall perform a pre-startup inspection. The complete installation shall be checked for procedural and operational compliance and any deficiencies shall be noted and corrected by the Contractor.

3.05 POST INSTALLATION TESTING

A. Following installation, the following tests shall be performed by the system supplier in the presence of the owner's engineer or designated appointee:

PRESTART CHECKS:
- oil level
- water level
- day tank fuel level
- battery connection and charge condition
- air start supply pressure (if so equipped)
- engine to control interconnects
- engine generator intake/exhaust obstructions
- engine room ventilation obstructions
- removal of all packing materials

OPERATION:
Load - 1-hours operation at 50% of full load rating, 1 hours at 75% full load rating, 1- hours operation at 100% of full load rating. 0 to 100% step load, 0 to 50% step load, 0 to 75% step load and 15 minute intervals. The following shall be recorded at fifteen minute intervals:

- Voltage and amperage (3 phase), frequency
- Fuel pressure, oil pressure and water temperature
- Exhaust gas temperature at engine exhaust outlet
- Ambient temperature

Upon successful completion of the above test, the generator set shall be
subjected to a 100% block load test and the recovery timeframe to steady state recorded. This test shall be repeated a total of 4 times.

Proper operation of controls, engine shutdown, and safety devices shall be demonstrated and all testing requirements of NFPA 110 shall be met. A resistive type load bank shall be used for this testing and a test report shall be provided at the successful conclusion of the above test.

3.05 MINIMUM SERVICE AND WARRANTY QUALIFICATIONS

A. The manufacturer's warranty shall in no event be for a period of less than five (5) years from date of initial start-up of the system or 1500 operating hours, whichever comes first.

B. The warranty shall include repair parts, labor, reasonable travel expense necessary for repairs at the jobsite, and expendables (lubricating oil, filters, antifreeze, and other service items made unusable by the defect) used during the course of repair. Applicable deductible costs shall be specified in the manufacturer's warranty.

C. The system supplier shall provide factory trained servicemen and shall have sufficient parts inventory to maintain over the counter availability of at least 90% of any required parts and shall guarantee 100% parts availability within 48 hours from the time an order is entered with the dealer. Manufacturers who do not meet this qualification will be rejected in their entirety.

3.06 ORIENTATION

A. The system supplier shall provide a complete orientation for the owner's engineering and maintenance personnel. Orientation shall include both classroom and hands-on instruction. Topics covered shall include control operation, schematics, wiring diagrams, meters, indicators, warning lights, shutdown system and routine maintenance.

3.07 SERVICE MANUALS AND PARTS BOOKS

A. The system manufacturer's authorized local dealer shall furnish one copy each of the manuals and books listed below for each unit under this contract:

1. OPERATING INSTRUCTIONS - with description and illustration of all switchgear controls and indicators and engine and generator controls.
2. PARTS BOOKS - that illustrate and list all assemblies, subassemblies and components, except standard fastening hardware (nuts, bolts, washers, etc.).
3. PREVENTATIVE MAINTENANCE INSTRUCTIONS - on the complete system that cover daily, weekly, monthly, biannual, and annual maintenance requirements and include a complete lubrication chart.
4. ROUTINE TEST PROCEDURES - for all electronic and electrical circuits and for the main AC generator.
5. TROUBLESHOOTING CHART - covering the complete generator set showing description of trouble, probable cause, and suggested remedy.
6. **RECOMMENDED SPARE PARTS LIST** - showing all consumables anticipated to be required during routine maintenance and test.

7. **WIRING DIAGRAMS AND SCHEMATICS** - showing function of all electrical components.

END OF SECTION
1.0 GENERAL

1.01 DESCRIPTION

A. The Surge Protection Device (SPD) covered under this section includes all service entrance type surge protection devices suitable for use as Type 1 or Type 2 devices per UL1449 3rd Edition, applied to the line or load side of the utility feed inside the facility.

B. A SPD is located at Service Entrance (see plans for additional SPD devices).

C. Contractor shall provide all labor, materials, equipment and incidentals as shown, specified and required to finish and install surge protection devices.

1.02 QUALITY ASSURANCE

A. Reference Standard: Comply with the latest edition of the applicable provisions and recommendations of the following, except as otherwise stated in this document:
   2. UL 1283.
   5. UL96A

1.03 SUBMITTALS/QUALITY ASSURANCE – SUBMIT THE FOLLOWING:

A. Package must include show drawings complete with all technical information, unit dimensions, detailed installation instructions, maintenance manual, recommended replacement parts list and wiring configuration.

B. Copies of Manufacturer’s catalog data, technical information and specifications on equipment proposed for use.

C. Copies of documentation stating that the Surge Protection Device is listed by UL to UL1449 3rd Edition, category code VZCA.

D. Copies of actual let through voltage data in the form of oscillograph results for both ANSI/IEEE C62.41 Category C3 (combination wave) and B3 (Ring wave) tested in accordance with ANSI/IEEE C6245.
E. Copies of Noise Rejection testing as outlined in NEMA LS1-1992 (R2000) Section 3.11. Noise rejection is to be measured between 50kHz and 100MHz verifying the devices noise attenuation. Must show multiple attenuation levels over a range of frequencies.

F. Copies of test reports from a recognized independent testing laboratory, capable of producing 200kA surge current waveforms, verifying the suppressor components can survive published surge current rating on a per mode basis using the ANSI/IEEE C62.41 impulse waveform C3 (8 x 20 microsecond, 20kV/10kA). Test data on an individual module is not acceptable.

G. Copy of warranty statement clearly establishing the terms and conditions to the building/facility owner/operator.

2.0 PRODUCTS

2.01 APPROVED MANUFACTURER:

A. Current Technology – Transguard3 or TG3 Series 200kA per mode surge rating or approved equal by Liebert, General Electric.

2.02 MANUFACTURED UNITS/ELECTRICAL REQUIREMENTS

A. Refer to drawing for operating voltage, configuration and surge current capacity per mode for each location, or you may list locations and information here.

B. Declared Maximum Continuous Operating Voltage (MCOV) shall be greater than 115 percent of the nominal system operating voltage and in compliance with test and evaluation procedures outlined in the nominal discharge surge current test of UL1449 3rd Edition, section 37.7.3. MCOV values claimed based on the component’s value or on the 30-minute 115% operational voltage test, section 38 in UL1449 will not be accepted.

C. Unit shall have no more than 10% deterioration or degradation of the UL1449 3rd Edition Voltage Protection Rating (VPR) when exposed to a minimum of 5,000 repeated category C3 (20kV/10kA) surges. The SPD manufacturer must provide a test report validating the repetitive surge test was performed.

D. Protection Modes UL1449 3rd Edition VPR(6kV, 3kA) for grounded WYE/delta and High Leg Delta circuits with voltages per the contract documents shall be as follows and comply with test procedures outlined in UL1449 3rd Edition section 37.6:

<table>
<thead>
<tr>
<th>System Voltage</th>
<th>Mode</th>
<th>MCOV</th>
<th>B3 Ringwave 6kV, 500A</th>
<th>C3 Comb. Wave 20kV, 10kA</th>
<th>UL 1449 Third Edition VPR Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>120/240, 120/208</td>
<td>L-N</td>
<td>150</td>
<td>490</td>
<td>980</td>
<td>700</td>
</tr>
<tr>
<td></td>
<td>L-G</td>
<td>150</td>
<td>570</td>
<td>980</td>
<td>700</td>
</tr>
<tr>
<td></td>
<td>N-G</td>
<td>150</td>
<td>640</td>
<td>1170</td>
<td>700</td>
</tr>
<tr>
<td></td>
<td>L-L</td>
<td>300</td>
<td>500</td>
<td>1600</td>
<td>1200</td>
</tr>
<tr>
<td>277/480</td>
<td>L-N</td>
<td>320</td>
<td>450</td>
<td>1420</td>
<td>1200</td>
</tr>
<tr>
<td></td>
<td>L-G</td>
<td>320</td>
<td>540</td>
<td>1540</td>
<td>1200</td>
</tr>
<tr>
<td></td>
<td>N-G</td>
<td>320</td>
<td>570</td>
<td>1600</td>
<td>1000</td>
</tr>
<tr>
<td></td>
<td>L-L</td>
<td>552</td>
<td>530</td>
<td>2600</td>
<td>2000</td>
</tr>
</tbody>
</table>
E. Electrical Noise Filter - each unit shall include a high performance EMI/RFI noise rejection filter with a maximum attenuation of 54dB per MIL-STD-220B.
   1. SPD shall include a EMI/RFI noise rejection filter for all L-N modes as well as a removable filter in the N-G mode.

F. Integral Disconnect Switch
   1. The device shall have an optional NEMA compliant safety interlocked integral disconnect switch with an externally mounted metal manual operator.
   2. The switch shall disconnect all underground circuit conductors from the distribution system to enable testing and maintenance without interruption to the facility’s distribution system.
   3. The switch shall be rated for 600Vac.
   4. The SPD device shall be tested to UL1449 3rd Edition listed with the integral disconnect switch and the UL1449 VPR ratings shall be provided.
   5. The integral disconnect switch shall be capable of withstanding, without failure, the published maximum surge current magnitude without failure or damage to the switch.
   6. The line side of the integral disconnect shall be blocked off so that when the SPD is opened there is no direct access to the voltage present on the line side of the disconnect.

G. The UL1449 Voltage Protective Rating (VPR) shall be permanently affixed to the SPD unit.

H. The UL1449 Nominal Discharge Surge Current Rating shall be 20kA.

I. The SCCR rating of the SPD shall be 200kAIC without the need for upstream over current protection.

J. The SPD shall be listed as Type 1 SPD, suitable for use in Type 1 or Type 2 applications.

K. The SPD shall have the following monitoring options.
   1. Time Date stamp, duration and magnitude for the following power quality events (sags, swells, surges, dropouts, outages, THD, frequency, Volts RMS per phase)
   2. SPD monitoring shall track surge protection and display it as a percentage.
   3. SPD shall provide a surge counter with three categories to be defined as Low Level surge (100A-500A) Medium Level surge (500A-3,000A) High Level surge (>3,000A)
   4. Remote communications via ModBus or Ethernet
3.0 EXECUTION/INSTALLATION

3.01 The SPD manufacturer’s technician shall perform a system checkout and start-up in the field to assure proper installation, operation and to initiate the warranty of the system. The technician will be required to do the following:

A. Verify voltage clamping levels utilizing a diagnostic test kit, comparing factory readings to installed readings.

B. Verify N-G connection.

C. Record information to a product signature card for each product installed.

3.02 Unit may be installed on either the line or load side of the main service disconnect. If installed on the line side unit shall be installed with an integral disconnect. If installed on the load side the unit shall be installed on the largest breaker size available. If installed lead length exceeds 5’ installer shall use a low impedance (HPI) cable to reduce the lead lengths effect on the installed performance of the SPD.

4.0 PRODUCT WARRANTY

4.01 Warranty on defective material and workmanship shall be for 15 years.

4.02 Copy of Warranty to be sent with submittal.

END OF SECTION 16650
1.0 GENERAL

1.01 SUMMARY

A. The General Provisions, Supplemental General Provisions, section 16010, Division 1 Specifications and Special Provisions apply to all Work specified in this Section.

B. This Section describes the material and methods required for all UL Master label lightning protection system for the Generator.

C. All work shall be in compliance with the following:
   1. Underwriters Laboratories (UL)
   2. NFPA 780
   3. Lightning Protection Institute (LPI)

D. The UL “Mater Label” shall be furnished with LPI certification.

1.02 SHOP DRAWINGS

A. The shop drawings shall be complete including all system components, wiring diagrams, devices, parts, installation details, etc.

B. Provide 1/8”=1'-0” scaled plans (minimum 24”x36” sheet) indicating all air terminal locations, downleads, horizontal conductors, grounding locations, bi-metal taps, and the like and all associated details and specifications.

C. Provide 8 1/2” x 11” submittal with cutsheet of all components to be used.

2.0 PRODUCTS

2.01 CONDUCTORS

A. Conductors shall be copper.

B. Aluminum conductors of equivalent capacity may be used for horizontal conductors on the roof. UL approved bi-metal components shall be used where aluminum to copper taps occur.

C. The angle of any turn shall not exceed 90 degrees nor have a radius smaller than 24”.

D. Conductor fasteners shall be non-corrosive metal with ample strength to support the conductor.
E. Fasten conductors on not more than 3'-0".

2.02 AIR TERMINALS

A. Air terminals shall be copper or aluminum and extend a minimum 10" above the object it protects.

B. Air terminals shall have a proper base support for the surface on which they are used and shall be securely anchored to the surface.

3.0 EXECUTION

3.01 INSTALLATION

A. Ground connections shall be provided as required to comply with NFPA, LPI, and local codes and as necessary for the soil conditions.

B. Provide a counterpoise loop for buildings more than 100 feet above finished grade.

C. Bond lightning protection system grounding to building grounding electrode per NEC.

END OF SECTION