Waste Management

New Hauling Facility

17-3550

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SECTION 01 30 00 - SUBMITTALS

1.00 GENERAL

1.01 SUMMARY

A. General provisions:

1. Provisions in this section are mandatory procedures for preparing and submitting samples, shop drawings, and product data.

2. Job delays occasioned by requirement of resubmission of samples, shop drawings, and product data not in accord with Contract Documents are Contractor's responsibility and will not be considered valid justification for extension of time.

B. Submittal's schedule:

1. Contractor shall submit proposed submittals schedule to the Purchaser for review within ten calendar days following Contract execution.

2. Schedule purpose is to:

a. Demonstrate that submittals, shop drawings, data, samples and mock-ups required for Work are addressed by Contractor.

b. Demonstrate consistency with Contractor's proposed Progress Schedule.

c. Assist the Purchaser in scheduling timely review of submittals.

3. Schedule contents: Description of submitted item, proposed date of submittal or availability for review by the Purchaser, and proposed date of requested return by the Purchaser.

1.02 PREPARATION

A. Product data:

1. Include product manufacturer's standard printed material, dated, with product description and installation instructions indicated; delete data not related to this Project or mark "VOID" as applicable.

2. Number of copies submitted: Number required by Contractor plus two which will be retained by the Purchaser.

B. Shop drawings:

1. Shop drawings shall conform to the following requirements:

a. Number sheets consecutively.

b. Indicate working and erection dimensions and relationships to adjacent work.

c. Indicate:

1) Arrangements and sectional views, as applicable.

2) Material, gauges, thicknesses, finishes, and characteristics.

3) Anchoring and fastening details; include information for making connections to adjacent work.

d. Indicate working and erection dimensions and relationships to adjacent work. Concurrent submittals of different aspects of work may be required by Purchaser as deemed necessary to demonstrate Contractor's ability to understand these relationships and coordinate Work.

e. Provide 6" by 6" clean space in the lower right hand area for entry of the Contractor's stamps.

f. Cross-reference drawing details and specification paragraphs applicable to submitted data.

2. Photocopy, autopositive, or other reproduction of Purchase’s drawings are not acceptable for shop drawings.

C. Samples:

1. Samples shall be prepared in sizes, shapes, and finishes in accord with provisions of individual specification sections.

2. Samples furnished under this section are not to be confused with full size, on-the-site "Mock-Ups" called for in some specification sections.

3. Number of samples submitted: Number required by Contractor, plus two which will be retained by the Purchaser, unless otherwise indicated. Additional samples shall be furnished as requested.

4. Samples requiring color selection:

   a. Submit at earliest practicable time. No color selections will be made until all colors can be chosen and issued at one time in form of color schedule.

1.03 REVIEW

A. Contractor's:

1. Review submittals and stamp with approval action stamp containing Contractor's name, word "Approved," signed initials of approving agent, date of approval action, review notes, comments, and corrections required prior to submission to Purchaser. By so noting, Contractor indicates that he has reviewed and approves materials, equipment, quantities, and dimensions represented by particular submittal.

2. Contractor represents by submitting samples, shop drawings, and product data that he has complied with provisions specified. Submissions made without Contractor's approval indicated thereon will be returned without being reviewed for compliance with this requirement.

3. Date each submittal; indicate name of Project, Purchaser, Contractor, as applicable, description or name of equipment, material, or product and identify work use location.

4. Accompany submittal with transmittal letter containing project name, Contractor's name, number of samples or

drawings, titles, and other pertinent data. Outline deviations, if any, in submittals from requirements of Contract Documents.

B. Purchaser's:

1. Review submittals within two (2) weeks of receipt to cause no delay in Work.

2. Review is only for conformance with design concept of project and information in Contract Documents. Review of separate item shall not indicate approval of an assembly in which item functions.

3. Purchaser will return a minimum of one copy of reviewed shop drawings for printing and distribution by Contractor.

1.04 RESUBMISSION

A. Contractor shall make corrections and changes indicated for rejected submissions; resubmit in same manner specified above until Purchaser no longer requires resubmission.

B. Contractor shall direct specific attention to revisions other than corrections requested by Purchaser on previous submissions, if any, in resubmission transmittal.

1.05 DISTRIBUTION

A. Contractor is responsible for obtaining and distributing copies of submittals to his sub-contractors and material suppliers.

B. Contractor shall maintain orderly file of all approved submittals for Project duration; deliver to the Purchaser as part of Project closeout documents.

+ + END OF SECTION 01 30 00 + +

SECTION 01 63 00 - PRODUCT OPTIONS AND SUBSTITUTIONS

1.00 GENERAL

1.01 PRODUCT OPTIONS AND SUBSTITUTIONS

A. Products are specified by reference standards, by manufacturer's name and model number, or trade name.

1. When specified only by reference standard, Contractor may select any product meeting this standard by any manufacturer.

2. When several products or manufacturers are specified as being equally acceptable, Contractor has option of choosing among those named.

3. When proprietary products are specified, substitutions will be allowed only by substitution provisions specified.

B. If it is desired to use products different from those indicated in Contract Documents, make written application by party requesting substitution as described. Burden of proving equality of proposed substitutions rests on party making request for substitution.

C. Series rating of electrical distribution system will not be accepted.

1.02 CONTRACTOR'S PROCEDURE

A. General:

1. Make requests for substitution as single submittal, prior to contract execution. Base contract sum on products and systems specified in Contract Documents only.

2. The Purchaser will consider reports from independent testing laboratories, verified experience records from previous users, and other printed or written information valid in the circumstances.

3. Indicate in what respects proposed materials or products differ from those specified.

4. Substitution requests after contract execution will not

be reviewed.

B. Include on requests for substitution:

1. Technical data.

2. Manufacturer's dated product data describing installation, use, and care, as applicable, of proposed substitution.

3. Complete cost data, indicate; material cost, installed cost, and savings, if any, resulting from proposed substitution.

C. Determination as to acceptability of proposed substitutions will be based on data submitted only.

D. Appropriate modification will be issued within two (2) weeks after submittal, if proposed substitution is acceptable by the Purchaser. Contractor shall be responsible for furnishing materials and products in accord with Contract Documents at no change in price, unless requests for substitutions are received and approved as described above.

E. If substituted product or equipment requires any redesign of structure, foundation, piping, wiring, or other items, such redesign, including new drawings or details shall be prepared by the Contractor at his expense and submitted to the Purchaser for review. Any additional required engineering performed by Purchaser due to substitution shall be paid by Contractor.

F. If the substituted product affects other work in the project and requires changes in that work as shown on the contract documents, the Contractor shall pay for the required changes.

1.03 TIME SUBSTITUTION

A. In event specified items cannot be delivered to Project and incorporated into Work at such times and in such quantities as to cause no delay, then Contractor may request substitution in manner described above. Should accepted substitution provide cost savings, contract price will be adjusted by Change Order.

B. Contractor's inability to obtain specified items due to Contractor's failure to place timely orders will not be considered reason for authorizing substitutions.

+ + END OF SECTION 01 63 00 + +

SECTION 03 10 00 - CONCRETE FORMWORK

Division 1, General Requirements, are hereby made a part of this section as fully as if repeated herein.

1.00 GENERAL

1.01 SCOPE

1. Formwork for cast-in-place concrete, with shoring, bracing and anchorage.
2. Openings for other work.
3. Form accessories.
4. Form stripping.

B. Related Work in Other Sections: The following items of associated work are included in other sections of these specifications:

1. Section 032000 - Concrete Reinforcing.

2. Section 033000 - Cast-in-Place Concrete.

1.02 CODES AND STANDARDS. Except as modified by the requirements specified herein and/or the details on the drawings, all work included in this section shall conform to the applicable provisions of the following codes and standards with their latest revisions unless indicated otherwise.

A. Governing Local or State Building Code.

B. American Concrete Institute (ACI):
1. ACI 117-06 Specifications for Tolerances for Concrete Construction and Materials.
2. ACI 301-05 Specifications for Structural Concrete.
3. ACI 347-04 Guide to Formwork for Concrete.

C. American Forest and Paper Association (AF&PA):
1. ANSI/AF&PA NDS-2005 “ASD/LRFD National Design

Specification for Wood Construction," 2005 Edition.
2. "2005 NDS Supplement: Design Values for Wood Construction."
3. ANSI/AF&PA SDPWS-2005 "2005 Special Design Provisions for Wind and Seismic."

D. American Plywood Association (APA):
1. APA PDS-04 Plywood Design Specification, Form No. Y510, 1998.
2. APA Design/Construction Guide, Concrete Forming, Form No. V345, December 2003.

1.03 CONTRACTOR RESPONSIBILITY

A. Formwork design and engineering.

B. Construction of formwork, shoring, removal of forms, and reshoring.

C. Providing a safe structure at all times and ensuring safety to human life and property.

1.04 DESIGN REQUIREMENTS:

A. General: In accordance with the references.

B. Design:
1. Design formwork to withstand applicable hydrostatic pressure of concrete plus dead weight, construction loads and vibrations.
2. Limit deflection of studs and whalers to 1/400 of the span for architectural concrete and 1/360 of the span for other concrete. Limit deflection of form facing material exposed to view to 1/240 of the span.
3. Build adequate supports into forms for:
   a. load concentrations
   b. external vibrations

1.05 SUBMITTALS

A. Submit under provisions of Section 01300 Submittals.

B. Shop Drawings:
1. Show:

a. Use the structural member designation system used on the Contract Drawings.
b. Joint locations and details.
c. Size and locations of sleeves, blockouts, and slab penetrations.
d. Shoring and support layout.

2. Indicate:
a. Form materials, types, and thickness.
b. Form tying system and layout.
c. Form accessories.
d. Details to be used at sleeves, blockouts, and slab penetrations.
e. Type and capacity of shores and supports.
f. All shop drawings to be signed, dated and sealed by the formwork designer.

C. Product Data: Manufacturer’s product specifications and installation instructions for manufactured products, including form sealer and release agent.

D. Concrete Strength Tests: Testing Agency's reports for testing required in this Section.

1.06 QUALITY ASSURANCE

A. Perform Work in accordance with ACI 301, ACI 347 and APA V345.

B. Maintain one copy of ACI 301, ACI 347 and APA V345U on site.

1.07 QUALIFICATIONS

A. Form Work Designer: Design formwork under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State of Georgia.

1.08 REGULATORY REQUIREMENTS

A. Conform to ACI 301 for design, fabrication, erection and removal of formwork.

1.09 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle formwork materials and

accessories at the site to prevent any damage.

B. Store formwork materials and accessories off ground in ventilated and protected manner to prevent deterioration from moisture.

1.010COORDINATION

A. Coordinate this Section with other Sections of work, which require attachment of components to formwork.

B. If formwork placed after reinforcement results in concrete cover over reinforcement that is insufficient, request instructions from Architect/Engineer before proceeding.

2.00 PRODUCTS

2.01 WOOD FORM MATERIALS

A. Plywood: APA B-B Plyform Class I, Exterior Grade, mill oiled and edge sealed.

B. Lumber: Southern Pine species; Select Structural # 2 Grade or better with grade stamp clearly visible, and conforming to NDS design values for visually graded lumber.

2.02 PREFABRICATED FORMS

A. Preformed Steel Forms: Minimum 16 gage matched, tight fitting and stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished surfaces.

2.03 FORMWORK ACCESSORIES

A. Form Ties: Removable or Snap-off type, metal, fixed length, plastic cone type, free of defects that could leave holes larger than one inch in concrete surface. Provide ties so that the portion remaining within the concrete after removal of the exterior part is at least 1 1/2 inches from the outer concrete surface.

B. Form Release Agent: Colorless mineral oil, which will

not stain concrete, or absorb moisture.

C. Corners: Chamfered using wooden strip.

D. Dovetail Anchor Slot: Galvanized steel, 22 gage thick, foam filled release tape sealed slots, and anchors for securing to concrete formwork.

E. Flashing Reglets: Galvanized steel 22 gage, longest possible lengths, with alignment splines for joints, foam filled release tape sealed slots, and anchors for securing to concrete formwork.

F. Nails, Spikes, Lag Bolts, Through Bolts, and Anchorages: Sized as required, of strength and character to maintain formwork in place while placing concrete.

G. Waterstop:
   1. Paul Murphy Plastics Co., ribbed, center bulb, 6 inch.
   2. Colloid Environmental Technologies Company (CETCO), Waterstop RX, butyl rubber bentonite compound rope, 25% butyl rubber/75% sodium bentonite composition.
   3. Synko - Flex Products Inc., Synko-Flex, preformed plastic waterstop.
   4. Substitution: Under provisions of Section 01630 Product Options and Substitutions.

H. Inserts:
   1. Adjustable Wedge Inserts:
      a. Malleable cast iron.
      b. Complete with bolts, nuts, and washers.
      c. 3/4 inch diameter bolt unless noted otherwise.
   2. Threaded Inserts:
      a. Malleable cast iron.
      b. Complete with full depth bolts.
      c. 3/4 inch diameter bolt unless noted otherwise.
   3. Ceiling and Soffit Inserts: Used for suspended ceilings and soffits.
      a. 14 Ga. galvanized steel.
      b. Nailer type.

I. Sealer for plywood: Colored polyurethane coating of type acceptable to plywood manufacturer, for sealing cut

edges of plywood.

3.00 EXECUTION

3.01 EXAMINATION

A. Verification of Conditions:
   1. Examine substrate and conditions under which concrete formwork is to be performed.
   2. Have the installer notify the Contractor in writing, with a copy to the Architect, if substrate is unsatisfactory.
   3. Do not begin the work until unsatisfactory conditions have been corrected in a manner acceptable to installer.
   4. Beginning of work indicates acceptance of the substrate as satisfactory by the installer.

3.02 INSTALLATION

A. General:
   1. In accordance with ACI 301 and ACI 347.
   2. Design, erect, support, brace and maintain formwork to support vertical and lateral loads which might be applied until such loads can be supported by the concrete structure.
   3. Construct formwork so that concrete members and structures are of correct size, shape, alignment, elevation and position.

B. Form Construction:
   1. Fabrication:
      a. Fabricate forms for easy removal without hammering or prying against concrete surfaces.
      b. Provide crush plates or wrecking plates where stripping may damage cast concrete surfaces.
      c. Provide top forms for inclined surfaces where slope is too steep to place concrete with bottom forms only.
      d. Form exposed corners of beams and columns with beveled chamfer strips.
      e. Kerf wood inserts for forming keyways, reglets, and recesses to ease removal.

f. Provide camber in formwork as indicated on the Drawings.

2. Support:
   a. Provide bracing to ensure stability of formwork.
   b. Erect and maintain bracing to support vertical, lateral, and asymmetrical loads until such loading can be supported by in-place concrete structures.
   c. Provide shores and struts with means of adjustment capable of taking up formwork settlement occurring during placement of concrete, using wedges, jacks, or a combination thereof.
3. Provisions for Other Trades:
   a. Provide openings in concrete formwork to accommodate work of other trades.
   b. Accurately place and securely support items to be built into forms.
4. Temporary Openings:
   a. Provide temporary openings in formwork where interior area is inaccessible for:
      1) Clean out.
      2) Inspection before concrete placement.
      3) Concrete placement.
   b. Provide temporary openings at the base of column and wall forms.
   c. Position temporary openings in an inconspicuous location.
   d. Brace closures of temporary openings and set tightly to forms to prevent loss of concrete mortar.
5. Preparation and Tightening:
   a. Thoroughly clean forms and adjacent surfaces to receive concrete.
   b. Form Surface Treatment:
      1) Before placing reinforcing steel or concrete, coat the form surfaces with a material that will effectively prevent absorption of moisture, prevent bond with concrete, and not stain concrete.
      2) A field applied form release agent or factory applied non-absorptive liner may be used.

3) Do not allow form release agent to stand in puddles, come into contact with reinforcing steel or hardened concrete against which fresh concrete is to be placed.

c. Remove loose metal, wood chips, sawdust, dirt, trash, and other debris just prior to concrete placement.

d. Re-tighten forms during and immediately after concrete placement to eliminate mortar leaks.

6. Earthcuts:

a. Do not use earthcuts for formed vertical surfaces unless approved by the Architect.

b. Where allowed, hand trim side and bottom of earth form. Remove loose soil prior to placing concrete.

C. Installation Tolerances:

1. Construct formwork in accordance with tolerances specified in ACI 117.

D. Installation of Embedded Items:

1. General:

a. Set and build into the work anchorage devices, inserts, and other embedded items required for material attached to or supported by cast-in-place concrete.

b. Use setting drawings, diagrams, instructions, and directions provided by suppliers of the items to be attached.

c. Do not place embedded items in any manner that will displace or interfere with the reinforcing steel.

E. Conduit: Do not displace reinforcement or increase or decrease concrete cover of reinforcement with conduit.

1. Place conduit between upper and lower layers of reinforcement only.

2. Conduit parallel to reinforcement:

a. Do not attach conduit to reinforcement.

b. Minimum spacing between conduit and reinforcement: 4 inches.

3. Conduit perpendicular to reinforcement:

a. Tie conduit to perpendicular reinforcement.

4. Waterstops:

a. Install in greatest continuous lengths possible.
b. Do not displace concrete reinforcement.
c. Splice waterstop in accordance with manufacturer's recommendations.

5. Junction Boxes:
a. Boxes of any depth may be located in slabs, beam soffits, and headers.
b. Do not locate in joist soffits.
c. Provide header to accommodate junction boxes over 2 1/4 inches deep.

F. Removal of Forms:
1. Formwork supporting weight of concrete:
a. Including but not limited to beam, girder, and slab forms.
b. Remove forms after concrete has attained 70% of its design compressive strength.
c. Do not remove forms until post-tensioned beams have been stressed.
d. Concrete strength is determined using concrete cylinders.
2. Formwork not supporting weight of concrete:
a. Including but not limited to sides of beams, walls, and columns.
b. Remove forms after concrete has been in place and curing at not less than 50 degrees (F) for 24 hours and providing concrete is sufficiently hard so as not to be damaged by form removal.
3. Form Ties: Break back snap ties and remove pull ties.

G. Reshoring and Supports
1. Temporary Wall Supports:
a. Walls to support backfill must be braced to resist lateral loads until:
1) All framed floors and slabs-on-grade providing lateral support to the wall are in place.
2) The concrete in the floors and slabs has attained 75% of its design compressive strength.
3) Concrete strength is determined using

concrete specimens.

H. Re-use of Forms:
1. Re-use forms only when properly maintained and in condition to produce the formed finish required.
2. Do not re-use forms that can not be tightly butted and made watertight.
3. Repair forms between uses.
a. Align and tighten to provide secure and watertight joints and avoid offsets.
b. Do not plug old tie holes that will not be reused.
c. Replace materials containing unused tie holes.
d. Split, frayed, delaminated or otherwise damaged form facing material is not acceptable.
e. Do not use patched forms for exposed concrete surfaces unless approved by the Architect.

3.03 FIELD QUALITY CONTROL

A. Field-testing will be performed in accordance with ACI 301 and under provisions of Section 01400 Quality Requirements.

B. Removal of forms based on strength of concrete specimens: The concrete shall be presumed to have reached its 28 day strength or specified percentage thereof when concrete tests made using either of the following indicates the strength has been achieved.
1. Testing based on field cured test cylinders.
a. Except for field curing and age at test, mold and test specimens as specified in Section 03300, Cast-In-Place Concrete.
b. Field cure specimens under the most unfavorable conditions prevailing for any portion of the concrete represented.
2. Testing based on laboratory cured test cylinders.
a. Except for age at test, mould, cure, and test specimens as specified in Section 03 30 00, Cast-In-Place Concrete.
b. Test specimens at an age that is equal to the length of time that the in-place formed

concrete has been cured as specified in Section 03300, Cast-In-Place Concrete.

c. Determine the length of time the in-place formed concrete has cured by the cumulative number of days or fractions thereof, not necessarily consecutive, during which:
   1) The temperature of the air in contact with the concrete is above 50 degrees (F).
   2) The concrete has been damp or sealed from evaporation and moisture loss by a membrane forming curing compound or in place formwork.

3. The result of a test is based on the average compressive strength of two specimens.
4. Obtaining, curing, and testing of concrete cylinders, other than those required for field quality control in Section 03300 Cast-In-Place Concrete, is at the Contractor's option and expense.

+ + END OF SECTION 03 10 00 + +

SECTION 03 20 00 - CONCRETE REINFORCING

Division 1, General Requirements, are hereby made a part of this section as fully as if repeated herein.

1.00 GENERAL

1.01 SCOPE

1. Reinforcing steel bars, wire fabric and accessories for cast-in-place concrete.

A. Related Work in Other Sections: The following items of associated work are included in other sections of these specifications:

1. Section 031000 - Concrete Formwork.

2. Section 033000 - Cast-in-Place Concrete.

1.02 CODES AND STANDARDS. Except as modified by the requirements specified herein and/or the details on the drawings, all work included in this section shall conform to the applicable provisions of the following codes and standards with their latest revisions unless indicated otherwise.

A. Governing Local or State Building Code.

B. American Concrete Institute (ACI):
1. ACI 301-05 Specifications for Structural Concrete.
2. ACI 318-05 Building Code Requirements for Structural Concrete.
3. ACI SP-66 (04) Detailing Manual.

C. American Society for Testing and Materials (ASTM):

1. ASTM A108-03e1 Standard Specification for Steel Bar, Carbon and Alloy, Cold Finished.
2. ANSI/ASTM A185-02 Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.
3. ASTM A496-02 Standard Specification for Steel Wire, Deformed, for Concrete Reinforcement.
4. ASTM A615-04a Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.
5. ASTM A706-04a Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement.
6. ASTM D1751-04(2008) Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bitumenous Types).

D. American Welding Society (AWS):
1. AWS D1.1-04 Structural Welding Code - Steel.
2. AWS D1.4-05 Structural Welding Code - Reinforcing Steel.

E. Concrete Reinforcing Steel Institute (CRSI):
1. CRSI- Manual of Standard Practice, 27th Edition, 2001.
2. CRSI - Placing Reinforcing Bars, 8th Edition, 2005.
3. CRSI – Reinforcing Bars: Anchorages and Splices, 5th Edition.

1.03 SUBMITTALS

A. Submit under provisions of Section 01300 Submittals.

B. Shop Drawings:
1. Indicate bar sizes, spacing, locations, and quantities of reinforcing steel and wire fabric.
2. Bending and cutting schedules.
3. Supporting and spacing devices.
4. Use the same designation numbers for slabs and footings as used on the Drawings.
5. Detail beams and walls in elevation.
6. Do not make shop drawings using reproductions of or making reference to Contract Drawings.

C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

1.04 QUALITY ASSURANCE

A. Perform Work in accordance with CRSI Manual of Practice ACI 301 and ACI SP-66.

B. Submit certified copies of mill test report of reinforcement materials analysis.

1.05 COORDINATION

A. Coordinate with placement of formwork, formed openings and other Work.

2.00 PRODUCTS

2.01 REINFORCEMENT

A. Reinforcing Steel: ASTM A615, 60-ksi yield grade; deformed billet steel bars.

B. Welded Steel Wire Fabric: ASTM A185 Plain Type; flat sheets.

2.02 ACCESSORY MATERIALS

A. Tie Wire: Minimum 16 gage annealed type.

B. Bar Support: Includes spacers, chairs, bolsters, ties and other devices for spacing, supporting and fastening reinforcement in place.
   1. General: In accordance with CRSI Manual of Standard Practice.
   2. Factory made.
   3. Use bar support heights that produce the concrete cover called for on the Drawings.
   4. Use bar supports capable of supporting construction loads without permanent deflection.
   5. Spacing: At 4 feet maximum with first support 2 feet from end of bar supported.

6. Exposed Concrete: Provide supports in contact with formwork that are:
   a. High density all plastic (CRSI Class 1).
   b. Stainless steel protected (CRSI Class 2).
7. Typical support types and minimum configurations.
   a. Slab bolsters: continuous, type 7-ga. wire or cementitious fiber reinforced.
   b. Individual high chairs:
      1) Legs 5 inch and under: 2-ga. wire, or high density all plastic.
      2) Legs 5 to 12 inches: 0-ga. wire.
      3) Do not use individual high chairs with legs over 12 inches.
   c. Vertical reinforcement: wheel type, high density all plastic.
   d. Supports bearing on earth.
      1) Precast concrete blocks.
      2) Support specifically designed for this purpose, e.g. with sand plates.

C. Slab-On-Grade Expansion Joint Filler: Non-extruded bituminous type conforming to ASTM D1751.

D. Slab-On-Grade Construction Joint: Minimum 24 ga. galvanized steel with formed tongue and groove keyed joint, full depth of slab. Furnish complete with stake pins.

E. Expansion Anchors:
   1. Install in strict accordance with manufacturer's recommendations.
   2. Only anchors evaluated by an independent research report in accordance with Acceptance Criteria 193 with a published Evaluation Report shall be approved for use. All anchors shall be specifically approved for use in cracked concrete. All anchors shall be approved for resisting seismic and wind loads.
   3. Acceptable manufacturers:
      a. Hilti Fastening Systems Inc., Hilti Kwik Bolt TZ, Carbon Steel.
      b. ITW Red Head, Trubolt+ Seismic Wedge Anchor, Carbon Steel.
      c. Simpson Strong-Tie Company, Inc., Strong-Bolt 2 Wedge Anchor.

d. Substitutions: Under provisions of Section 01630 Product Options and Substitutions.

F. Adhesive Anchors:
1. Install in strict accordance with manufacturer's recommendations.
2. Only anchors evaluated by an independent research report in accordance with Acceptance Criteria 308 with a published Evaluation Report shall be approved for use. All anchors shall be specifically approved for use in cracked concrete. All anchors shall be approved for resisting seismic and wind loads.
3. Acceptable manufacturers:
a. Hilti Fastening Systems Inc., HIT-RE 500-SD or HIT-HY 150 MAX-SD Injection Adhesive Anchor.
b. ITW Ramset/Red Head, EPCON S7 Epoxy Anchoring System.
c. Simpson Strong-Tie Company, Inc., SET-XP or AT-XP Adhesive System.
d. Substitutions: Under provisions of Section 01630 Product Options and Substitutions.

G. Screw Anchors:
1. Hilti Fastening Systems., HUS-H Universal Screw Anchor, Carbon Steel.
2. ITW Red Head, LDT Anchor.
3. Simpson Strong-Tie Company, Inc., Titen HD, Carbon Steel.

2.03 FABRICATION

A. Fabricate concrete reinforcing in accordance with CRSI Manual of Standard Practice.

B. Locate reinforcing splices where indicated on Drawings.

3.00 EXECUTION

3.01 PLACEMENT

A. Place, support and secure reinforcement against displacement. Do not deviate from required position.

B. Accommodate placement of formed openings.

C. See drawings for concrete cover over reinforcement.

D. Conduit: Do not displace reinforcement or increase or decrease concrete cover of reinforcement with conduit.
   1. Place conduit between upper and lower layers of reinforcement only.
   2. Conduit parallel to reinforcement:
      a. Do not attach conduit to reinforcement.
      b. Minimum spacing between conduit and reinforcement: 4 inches.
   3. Conduit perpendicular to reinforcement:
      a. Tie conduit to perpendicular reinforcement.

3.02 WELDING

A. Reinforcing Bars: Welding of reinforcing bars is not permitted.

3.03 FIELD QUALITY CONTROL

A. Notify the Architect and Engineer 72 hours, minimum, prior to concrete placement to allow time for review of installation of all concrete reinforcement.

B. The Engineer or his representative will review installation of concrete reinforcement.

C. Correction of reinforcement not installed in accordance with the Contract Documents is the Contractor's responsibility.

+ + END OF SECTION 03 20 00 + +

SECTION 03 30 00 – CAST-IN-PLACE CONCRETE

PART 1.0 - GENERAL

1.1 Scope:

A. The General Conditions, Supplementary Conditions, and Applicable portions of Division 1 are a part of this Section.

B. Related work specified in other sections:

1. Concrete Reinforcing: Section 03 20 00.

1.2 Standard Specifications: Latest Editions of:

A. The "Specifications for Structural Concrete for Buildings" ACI 301 shall govern work under this section to the same extent as if written herein full. Any requirement written herein shall take precedence over any requirement of this standard specification where conflict occurs.

B. A copy of this standard (ACI) plus the following related references to be kept on this site at all times:

1. ACI 318 - Building Code requirements for reinforced concrete.

2. ACI SP - Field reference Manual.

1.3 Submittals:

A. Submit proposed mix designs with substantiating strength tests for review prior to casting concrete. Review does not release the contractor from meeting strength requirements herein specified.

1.4 Notifications:

A. Given owner and his engineer not less than 24 hours in advance of any concrete pour.

PART 2.0 - PRODUCTS:

2.1 Concrete Materials:

A. Portland Cement: ASTM C150; Type I or Type II.

B. Air Entraining Admixture: "Darex AEA" by W.R. Grace, "Sika AER" by Sika Chemical Corp.; or "MB-VR" by Master Builders Company.

C. Water-Reducing Admixture: "WRDA" by W.R. Grace, "Pozzolith" by Master Builders Company; or "Placewel" by Union Carbine Corp.

D. Coarse Aggregate: ASTM C33 Washed Gravel or Brick Stone, Graded 1/4" to 3/4" unless otherwise indicated.

E. Fine Aggregate: ASTM C33 Washed, sharp, natural sand free from loam, clay or other foreign matter.

F. Water: Fresh, clean, potable, free from organic matter, acids, alkalines, or other injurious elements.

2.2 Other Materials:

A. Form Oil: Non-staining, water soluble.

B. Preformed expansion joint filler: "Flexcell" by Barrett / Celotex or "Cane Fiber 13390" by W.R. Grace.

C. Vapor Barrier: ".006" Polyethylene film, "Visqueen" or equal.

D. Hardener: "Hornlith" by A.C. Horn / W.R. Grace, "Saniseal 50" by Master Builders Company, "Lithoplate" by Protex Industries, "Lapidolith" by Sonnenborn Building Products or "RIW Flintox Liquid" by Toch Bros.

E. Form Ties: Approved design, adjustable length, free of devices that will leave hole or depression larger than 7/32 diameter back of exposed concrete surface; such that when forms are removed, leave no metal within 1" of finished surface.

F. Paving Joint Sealant: Two-part sonolastic paving joint sealant urethane self-leveling.

2.3 Concrete Design mixes:

A. The contractor shall submit concrete mix designs in supporting data confirming compliance with Chapter 4 of ACI 318 and this specification. Types and quantities of materials and admixtures used, the fresh unit weight , compressive design, slump, air content, and aggregate analysis in mix design shall be indicated.

B. Ready-Mixed Concrete shall be in accordance with the requirements of "Standard Specifications for Ready - Mixed Concrete:, ASTM Designation C94, Alternate No. 2. Concrete wil develop a Compressive Strength of 4000 PSI in 28 days when tested in accordance with the procedures set forth in "Standard Method of Test for Compressive Strength of Molded Concrete Cylinders", ASTM Designation C39.

C. Unless so stated in the approved concrete mix design (See preceding paragraph A), all concrete shall have the following characteristics:

MINIMUM W/C Ratio Maximum	Cement Factor	28-day strength Characteristics		Maximum Slump in inches
0.45	6	4000 psi	3 +/- 1	

D. During a continuous pour, the interval between loads shall not be greater than twenty

minutes, or in any case be so great as to allow the concrete in place to become partially hardened. Water used to flush the mixer or agitator between loads shall not be allowed to became a part of any concrete in the work.

E. When the temperature is below 40 Degrees F, adequate equipment shall be provided for heating the component materials of the concrete so that the concrete being deposited can be maintained at a temperature of 50 Degrees F Minimum to 90 degrees F Maximum. When the air temperature is above 90 degrees F, the temperature of the concrete being deposited shall not exceed 90 degrees F, and adequate means of cooling the concrete mix shall be provided.

F. Truck Mixers shall be revolving drum type and shall be equipped with a mixing water tank. Only the prescribed amount of mixing water shall be placed in the tank for any one batch, unless the tank is equipped with an approved device by which the amount of water added to each batch can be readily verified by the engineer.

G. Delivery tickets shall be prepared for each load of ready mixed concrete delivered. In the event of a laboratory representative is designated to inspect the batching operation, he shall prepare the ticket. In the event no laboratory representative is required for the project , the batch plant operator shall prepare the ticket. The drivers of the trucks shall deliver the tickets to the engineer's representative at the site at the time of delivery. The tickets shall contain the following information:

1. Number of yards delivered on this truck
2. Quantities of materials in the batch.
3. The time at which the truck left the batching plant.
4. The time at, which the cement was added.
5. The outdoor temperature in the shade.
6. The numerical sequence of the delivery.
7. Date.

H. Admixtures - All admixtures shall be approved by the engineer and shall be added to the concrete in strict accordance with the recommendation of the manufacturer. An air entraining admixture shall be added to all concrete for structures. Admixture shall be added to the concrete to produce a 5% air content. Air content shall not vary more than 1% from the specified amount. An admixture similar to Type B or Type D, ASTM Standard C-494, shall be added to all non-air entrained concrete unless otherwise approved by he engineer. This admixture shall contain no calcium chloride or triethenolamine. Densifying retarders as manufactured by Sike Chemical Company, Master Builders Company or Dewey & Almy Corporation will be considered, provided the contractor obtains the approval of the owner for the type to be used and further provided that they meet the requirements herein after specified.

Water used in mixing and curing concrete shall be fresh, clean and free from injurious amounts of sewage, oil, acid, alkali, organic matter or other deleterious substances. Water shall be approved for human consumption.

Concrete aggregate shall conform to the "Specifications for Concrete Aggregate", ASTM Designation C-33, except as revised. Aggregate shall be certified by an independent commerical testing laboratory to show compliance with the above mentioned specifications.

1. Fine Aggregates: Only clean natural sand shall be used. Artificial or manufactured

sand will not be acceptable.

2. Coarse aggregate: Coarse aggregate shall consist of crushed stone or crushed gravel conforming to the following limits:

   Sodium Sulfate Test - 10% Maximum loss.
   L. A. Abrasion Test - 35% Maximum loss.
   Crushed particles (gravel) - 45% Maximum loss.

3. The sizes of coarse aggregate for the concrete being used in this work shall be ASTM size number 67 or 57.

PART 3.0 - EXECUTION:

3.1 Placing of Accessory Items:

A. Joints and Embedded Items: In accordance with Chapter Six of ACI 301 and as shown on the drawings.

B. Formwork: In accordance with Chapter Four, ACI 301.

C. Provide Vapor Barrier under interior slab on-grade, lapped twelve (12") inches in all directions.

3.2 Mixing:

A. Mixed in accordance with Chapter Seven of ACI 301.

3.3 Placing of Concrete:

A. All concrete shall be placed in accordance with Chapter Eight of ACI 301.

3.4 Finishing Formed Surfaces:

A. Formed Surfaces: Finished in accordance with Chapter Ten of ACI 301.

B. Selection of finishes unless otherwise noted on the drawings of finish schedules: Made in accordance with paragraph 10.4 of ACI 301.

C. Finishing - Flatwork: (Concrete Floors and Slabs)

1. Cast in accordance with Chapter Eleven of ACI 301.

2. Rake floor slabs in place and thoroughly compact by vibrating or tamping. Strike off surface at elevations shown. thoroughly float surface until sufficient mortar is brought to the surface to fill voids. Test surfaces with straight edge and eliminate high and low spots to bring surface within allowable tolerances

3. Finish interior floor slabs and other walking surfaces by steel troweling to a hard

dense surface free from pin holes and blemishes. All surfaces to receive broom finish or as noted on drawings.

3.5 Curing and Protection:

A. Concrete: Cured and protected in accordance with Chapter Twelve of ACI 301 with the following additional requirements.

1. Curing compounds not permitted.

2. Polyethylene Film, ".004" minimum thickness, may be used for final curing .

3. When paper or polyethylene film is used for final curing, all adjoining edges: lapped 4" and sealed with waterproof tape: perimeter edges: weighted to hold covering in place.

4. For hot weather curing when covering is subject to direct sunlight, paper or polyethylene: white.

3.6 Hardening Treatment:

A. Apply hardener to all concrete surfaces.

B. Apply hardener in accordance with the manufacturer's printed instructions.

3.7 Field Quality Control:

A. Concrete Strength Tests: Made for each class of concrete for each day's pour if less than 100 cubic yards or for each 150 cubic yards or fraction thereof on larger pours.

Test: Made in accordance with ASTM C31-69; 6 cylinders required for each test, 3: tested at 7 days and 3 tested at 28 days; all cylinders; lab cured.

B. Concrete slump tests: made at the time strength tests are made, as required in ASTM C94, paragraph 13 and made in accordance with ASTM C143.

C. Report results of all slump and strength tests to owner and his engineer in duplicate.

D. Testing: Arranged for by the contractor at an independent testing laboratory approved by the engineer; costs of testing: borne by the contractor.

3.8 Patching:

A. Repair surface defects in concrete in accordance with Chapter Nine of ACI 301 subject to the engineer's approval.

END OF SECTION 03 30 00

SECTION 04 10 00 - MORTAR

Division 1, General Requirements, are hereby made a part of this section as fully as if repeated herein.

1.00 GENERAL

1.01 SUMMARY

A. Related sections:

1. Section 041500: Masonry Accessories.

2. Section 042200: Concrete Unit Masonry.

3. Section 081100: Steel Doors and Frames.

4. General notes on structural drawings.

1.02 REFERENCES

A. Standards of the following as referenced:

1. American Society for Testing and Materials (ASTM).

2. Portland Cement Association (PCA).

1.03 DEFINITIONS

A. Terms:

1. CMU: Concrete unit masonry or concrete masonry unit.

1.04 SUBMITTALS

A. Product data: Submit manufacturer's product specifications and mixing and installation instructions for each manufactured product.

B. Samples: Submit actual mortar samples for colored mortar; indicate color range of each color selected.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials, except aggregate, in original unopened containers displaying product name, type, grade, and mixing instructions.

B. Store cement, lime and air setting mortars in water-tight sheds with elevated floors.

1.06 QUALITY ASSURANCE

A. Use only one brand of cement for each type specified throughout Project.

B. Provide sand for ACMU Work from single source and pit, consistent in color.

2.00 PRODUCTS

2.01 MATERIALS

A. Portland cement:

1. Meeting ASTM C150-86, natural color, domestic manufacturer.

2. Normal weather and conditions: Type I.

3. Cold weather: Type III.

B. Hydrated lime: Meeting ASTM C207-79, Type S.

C. Masonry cement:

1. Acceptable manufacturers:

a. Blue Circle, Inc.

b. Giant Cement Company.

c. U.S. Cement Company.

d. Lime Putty: Putty shall be stiff mixture of lime and water, keep putty moist until used.

2. Characteristics:

a. Meeting ASTM C91-87a, non-staining, 22% maximum air content by volume.

b. Color:

1) Normal CMU: Natural, similar to Giant Cement Company; Giant Dark Gray.
2) Pre-colored mortar at ground faced block.

D. Aggregate:

1. Mortar: Clean, hard, natural, washed sand meeting ASTM C144 and ASTM C404, Size No. 2, Natural.

2. Cement grout: Meeting ASTM C404, fine aggregate, Size No. 1.

E. Water reducing and plasticizing admixture:

1. Acceptable products:

a. Chem-Masters Corp.; WR-77.

b. Dur-O-Wal, Inc.; Dur-O-Guard.

c. Sonneborn-Rexnord; Trimix8.

2. Characteristics:

a. Admixtures containing calcium chloride are prohibited.

b. Meet ASTM C494.

3. Cold weather additives for set acceleration may be used with written permission from the engineer.

F. Non-shrink grout:

1. Acceptable products:

a. Gifford-Hill and Company; Supreme Grout.

b. W.R. Meadows Company; 588.

c. Master Builders; Set Grout.

d. U.S. Grout Corp.; Five Star Grout.

2. Meet requirements of C.O.E. Spec. CRD-621-82 for non-shrink grout at all flow levels with no bleeding.

G. Water: Clean, potable, free from deleterious amounts of alkalies, acids, and organic materials.

H. Waterproofing additive: Anti-Hydro Waterproof Mortar as manufactured by Anti-Hydro International or an approved equal.

2.02 MIXES

A. Mortar proportions:

1. Type "S" job mixed or bag mixed mortar:

a. Proportion materials by volume in accord with ASTM C270- OR;

b. One part Portland cement and over 1/4 to 1/2 parts Type "S" hydrated lime to aggregate proportioned at not less than 2-1/4 nor more than three times combined volume of cement and lime used OR;

c. 1/2 part Portland cement to one part Type N masonry cement to aggregate proportioned at not less than 2-1/4 nor more than three times volumes of cementitious materials used OR;

d. One part Type S premixed masonry cement to aggregate proportioned at not less than 2-1/4 nor more than three times volumes of cementitious materials used.

B. Grout proportions:

1. Fine grout: Proportion materials by volume in accord with ASTM C476 at one part Portland cement to 0.0 to 1/10 part hydrated lime to fine aggregate proportioned at not less than 2-1/4 nor more than three times sum of volumes of cement and lime used.

2. Grout slump – between 8” and 11”. Grout compressive

strength – 2000 PSI.

C. Mixing:

1. Mix mortar and cement grout in power driven, drum type mixers. Operate mixer minimum of five minutes after addition of all materials.

2. Add water reducing and plasticizing admixture in accord with admixture manufacturer's product data for job mixed mortars except when premixed masonry cement is used.

3. Addition of other admixtures including anti-freeze ingredients is prohibited.

4. Measure materials for job mixed mortars in containers with known volume; measurement by shovels is prohibited.

D. Masonry/mortar combination:

1. CMU: Type "S".

3.00 EXECUTION

3.01 INSTALLATION

A. General:

1. Place mortar as directed in Concrete Unit Masonry sections.

2. Use masonry/mortar combination indicated above.

3. Retemper mortar as necessary to keep plastic.

4. Use of mortar after setting has begun or after 2-1/2 hours has elapsed since initial mixing is prohibited.

B. Grouts: Place as specified in other sections.

+ + END OF SECTION 04 10 00 +
+

SECTION 04 15 00 - MASONRY ACCESSORIES

Division 1, General Requirements, are hereby made a part of this section as fully as if repeated herein.

1.00 GENERAL

1.01 SUMMARY

A. Related sections:

1. Section 032000: Concrete Reinforcing.

2. Section 041000: Mortar.

3. Section 042200: Concrete Unit Masonry.

1.02 REFERENCES

A. Standards of the following as referenced:

1. American Concrete Institute (ACI).

2. American Society for Testing and Materials (ASTM).

1.03 SUBMITTALS

A. Product data:

1. Submit complete list of products for use; indicate compliance with specified requirements.

2. Indicate manufacturer, product, and correlation to specified item if from other manufacturer than specified item.

3. Intent to use specified products does not relieve responsibility of submitting product line.

2.00 PRODUCTS

2.01 MANUFACTURERS

A. Acceptable manufacturers:

1. Products specified as standard of quality are manufactured by Dur-O-Wal, Inc. and House Net.

2. Products of the following manufacturers similar in type and quality are acceptable, subject to compliance with specified requirements.

a. Hohmann & Barnard, Inc..

b. Heckmann Building Products, Inc.

c. Masonry Reinforcing Corp. of America.

d. National Wire Products Corp.

2.02 MANUFACTURED UNITS

A. Masonry joint reinforcement:

1. Fabricate from cold drawn wire meeting ASTM A82-85.

2. Galvanize all items as follows, minimum:

a. Exterior walls: In accord with ASTM A153-82, Class B-2.

b. Interior walls, both wall surfaces on interior: In accord with ASTM A641-82, Class 3.

3. Longitudinal rods: Nine gauge deformed wires.

4. Cross wires: Nine gauge wire; butt weld to longitudinal rods.

5. Type:

a. Single wythe CMU walls: Dur-O-Wal, Inc.; Truss with two longitudinal rods, DA3100.

6. Reinforcement width:

a. Single wythe CMU walls: 2" less than total wall width.

7. Provide reinforcement in 10'-0" lengths with prefabricated "L" and "T" units at intersecting walls of same design and finish as joint reinforcement.

B. Reinforcement bar positioners:

1. Horizontal bars: Dur-O-Wal DA 812; nine gauge basic brite finish steel wire meeting ASTM A82-85.

2. Vertical bars: Dur-O-Wal DA 817; nine gauge basic brite finish steel wire meeting ASTM A82-85.

C. Adjustable veneer anchors:

1. Dur-O-Wal DA213; 14 ga., hot-dipped galvanized, pintle leg length as required to provide minimum 2½" embedment in veneer mortar joint, anchor spacing 16" Horizontally x 24" Vertically

D. Brick weeps:

1. Hohmann & Barnard Quadro-Vent weeps/vents made of polypropylene, honeycomb design mesh at 4'-0" o.c.

E. Mortar trap:

1. Dur-O-Wal DA1008; high density polyethylene (HDPE) strands woven into a 90% open mesh, 10" high x 1" thick x continuous.

D. Through wall flashing:

1. Hohmann & Barnard Textroflash flashing, surface mounted, 40 mil thick composite membrane, factory laminated adhesive to polyethylene sheeting. Use with manufacturers recommended primer, stainless steel drip plate, and stainless steel termination bar.

3.00 EXECUTION

3.01 INSTALLATION

A. General: Install accessories in accord with manufacturer's product data.

B. Masonry joint reinforcement:

1. Install in single wythe masonry walls at 1'-4" O.C. vertically unless otherwise indicated on drawings. Lap side rods 6" minimum at splices.

2. Fully embed longitudinal rods in mortar for entire length with 5/8" minimum cover on exterior wall side and 1/2" minimum cover at other locations.

3. Stop reinforcement 1" back from expansion and control joints and openings in masonry walls.

4. Masonry openings over 1'-0" wide: Install reinforcement in first and second bed joint above and under openings with non-continuous reinforcement; extend 2'-0" beyond jamb, each side; bridge control joints.

5. Build in prefabricated "L" and "T" sections to provide continuity at corners and intersections.

6. Cut and bend units as indicated in manufacturer's installation instructions for continuity at returns, offsets, pipe enclosures, and special conditions.

7. Parapets: Space reinforcing at 8" O.C. vertically, unless otherwise indicated.

C. Reinforcement bar positioners:

1. Vertical type: Install in accord with ACI Committee 531 Code recommendations.

2. Horizontal type: Install in U-block or lintel block in accord with code requirements.

D. Brick Wall Ties: Install over wall sheathing, two screws per anchor into metal studs, spacing = 16” x 16”.

+ + END OF SECTION 04 15 00 + +

SECTION 04 22 00 - CONCRETE UNIT MASONRY

Division 1, General Requirements, are hereby made a part of this section as fully as if repeated herein.

1.00 GENERAL

1.01 SUMMARY

A. Related Sections:

1. Section 041000: Mortar.
2. Section 041500: Masonry Accessories.
3. Section 081100: Steel Doors and Frames.
4. General notes on structural drawings.

1.02 REFERENCES

A. Standards of the following as referenced:

1. American Society for Testing and Materials (ASTM).
2. National Concrete Masonry Association (NCMA).
3. Portland Cement Association (PCA).
4. Underwriters' Laboratories, Inc. (UL).

1.03 DEFINITIONS

A. Terms:

1. CMU: Concrete unit masonry or concrete masonry unit.
2. Bed joint: Horizontal mortar joint between two CMUs.
3. Head joint: Vertical mortar joint between two CMUs.

1.04 SUBMITTALS

A. Submit certificates from CMU manufacturer prior to

delivery of CMUs to Project site.

1. Certify CMUs for compliance with specification requirements, including compressive strength, moisture content, and linear drying shrinkage.

2. Basis of certification: Laboratory tests on like CMUs tested in past twelve months for linear shrinkage; and past six months for other requirements. Submit copies of tests.

3. Certificates:

   a. Submit certificates from masonry manufacturer, prior to delivery of concrete masonry units to Project site.

   b. Each certificate shall be signed by an authorized officer of manufacturing company; and contain name and address of Subcontractor, Project location, quantities, date or dates of shipment or delivery to which certificate applies, and time rated fire resistance where indicated.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver CMUs to Project site on pallets. Offload CMUs with pallets resting on ground. No CMUs are allowed to be set on ground.

B. Cover CMUs with non-staining waterproof membrane covering. Keep units dry. Allow air circulation around stacked units. Installation of wet or stained CMUs is prohibited.

1.06 PROJECT CONDITIONS

A. Environmental requirements:

1. Laying masonry when temperature of surrounding air has dropped below 45 degrees F., unless temperature is rising; and at no time when temperature has dropped below 40 degrees F. is prohibited, except by written permission from Facility Design Group Inc.

2. Cold weather precautions:

   a. Authorized masonry Work during temperatures below 40 degrees F., but above freezing: Provide and

maintain mortar at temperature between 40 degrees F. and 120 degrees F. until placed.

b. Maintain air temperature above 40 degrees F. on both sides of masonry for at least 72 hours after laying.

c. Use windbreaks to protect masonry construction from direct exposure to winds in excess of 15 MPH when constructed in temperatures below 32 degrees F.

3. Protect masonry construction from direct exposure to wind and sun when erected in ambient air temperatures 95 degrees F. and above in the shade with relative humidity less than 50%.

1.07 SEQUENCING AND SCHEDULING

A. Install and inspect mechanical and electrical work prior to enclosing or covering with masonry. Cut away web of masonry unit without disturbing face or bond where runs of piping or conduit are required.

B. Coordinate installation of masonry anchors with structural system when masonry is attached.

2.00 PRODUCTS

2.01 MANUFACTURED UNITS

A. Concrete unit masonry:

1. Hollow load bearing units:

a. Meeting ASTM C90-85, lightweight, Grade N-II.

b. Nominal face dimensions: 8" by 1'-4".

c. Nominal thickness: 8” or 12” per drawings.

2. Compressive strength: 2000 psi, minimum, based on net area.

B. Ground faced architectural concrete unit masonry:

1. Acceptable manufacturers:

   a. E. Dillon & Company

   b. ACME Block & Brick Inc.

   c. Trenwyth

2. Materials:

   a. Aggregates: Selected to provide specific color appearance and complying with normal weight CMU ASTM C33.

   b. Water Repellent: Liquid integral polymeric admixture.

3. Hollow and solid, load bearing concrete masonry units With faces ground to expose carefully selected aggregates complying with ASTM C90, Grade N, Type I Moisture controlled.

4. Weight: Normal weight type manufactured with concrete weighing over 125 PCF.

5. Maximum linear shrinkage: 0.065 percent.

6. Conform to ASTM C744 when tested for:

   a. Crazing resistance: No evidence of crazing, cracking, or spalling.

   b. Abrasion resistance.

   c. Resistance to color change: No significant change in color, gloss, or texture after 500 hours of accelerated weatherometer testing.

7. Face pattern: Polished, smooth, flat face.

2.02 ACCESSORIES

A. Masonry cleaning compound:

1. Acceptable products:

   a. L&M Construction Chemicals; Quik Kleen.

b. ProSoCo, Inc.; Sure Klean 600 Heavy Duty Concrete Cleaner.

2. Type: Inorganic acid.

B. Mortar: Type "S"; specified in Mortar section.

C. Joint reinforcing: Masonry joint reinforcing specified in Masonry Accessories section.

3.00 EXECUTION

3.01 PREPARATION

A. Protection of Work:

1. Keep walls dry during erection by covering at end of each work period with non-staining waterproof membrane covering. Protect partially completed walls not being worked on with non-staining waterproof membrane until Work of other trades completes protection of walls. Covering shall overhang at least 2'-0" on each side of wall; anchor on each side of wall.

2. Protect finished exposed Work from stains.

3.02 INSTALLATION

A. Workmanship:

1. Lay only dry masonry units.

2. Lay masonry plumb, level, and true to line with accurate coursing indicated on drawings.

3. Lay units in running bond with head joints centered in alternate courses.

4. Cut CMUs with abrasive power saw or wet cut with power saw with clean water only. Use of re-circulated water is prohibited. Lay out units to minimize cutting. Refrain from use of units less than 1/3 original length.

B. Building in other Work:

1. Build in Work of other trades indicated to be built-in with CMUs as Work progresses; include anchors, wall plugs, expansion joints, and accessories. Space and align built-in parts; exercise care not to disturb other materials from position. Fill in spaces around built-in items with coarse grout.

2. Fill hollow metal frames in masonry walls with fine grout as wall is laid. Rake back 1/2" joint between hollow metal frame and adjacent masonry to receive sealant.

3. Lay masonry to receive flashing with smooth joints without projections that could puncture flashing materials. Provide mortar on both sides of flashing in masonry joints.

4. Provide minimum 8" solid end bearing full height of wall from floor to bearing points for lintels, beams, and other load supporting members by either use of solid block or filling cores with cement grout unless otherwise indicated.

5. Provide lintels and bond beams where indicated using lintel blocks laid with joints matching adjacent Work; reinforce as indicated; fill block with concrete.

6. Reinforcing installation: Specified in Masonry Accessories section.

7. Through wall flashing: Specified in Flexible Flashing section.

8. No lintels are required at masonry openings of 3'-4" or less where support is provided by metal door frames and grouted with mortar or concrete.

9. Reinforce vertical concrete masonry cells, grouting solid with coarse grout where indicated on drawings; reinforce as indicated.

C. Mortar joints:

1. Bed joints for unreinforced partitions:

a. Lay first course in full bed of mortar.

b. Apply mortar on face shell only of CMU already

laid on all other bed joints.

c. Apply beveled buttering to face shell to insure full bed joints on masonry unit to be laid.

2. Bed joints for reinforced and fire rated partitions:

a. Lay all courses in full bed of mortar.

b. Head joints: Apply mortar to vertical face shells on both CMU already laid and unit to be laid to ensure full head joint.

3. Make adjustment while mortar is still soft and plastic by tapping to plumb and bringing to alignment.

4. Check each CMU as laid with mason's level for level and plumb with wall below.

5. Remove and replace mortar with fresh mortar, where adjustment must be made after mortar has started to set.

6. Keep bed and head joints uniform in width, except for minor variations required to maintain bond and locate returns.

7. Standard thickness for both horizontal and vertical mortar joints: 3/8".

8. Take particular care to avoid spreading mortar on exposed face of CMU. Only normal mortar droppings will be accepted on face of CMU; remove only after mortar has dried enough not to smear.

D. Joint treatment:

1. Tool all CMU mortar joints in some manner. Do not cut or strike mortar joints on exposed faces until "thumb print" hard.

2. Tooled joints: Strike exposed joints in standard CMUs flush and, when partially set, tool using concave tool; strike interior joints of CMU with concave tool.

E. Acceptable tolerances:

1. Maximum variation from plumb: 1/4" in 10'-0"; not

exceeding 3/8" in 20'-0".

2. Maximum variation from level: 1/4" in 20'-0"; not exceeding 1/2" in 40'-0" or more.

3. Maximum variation in linear building line from location indicated: 1/4" in 20'-0".

3.03 CLEANING AND POINTING

A. Keep masonry Work free of mortar droppings as Work progresses and, at completion of Work, rub masonry to remove excess mortar.

B. Point mortar joints. Remove and replace units with excessive spalls or chips.

+ + END OF SECTION 04 22 00 + +

SECTION 05 10 00 – MISCELLANEOUS METALS

PART I - GENERAL

1.1 SCOPE:

A. The general conditions, supplementary conditions and applicable portions of Division 1 are a part of this section.

1.2 WORK: Included but not necessarily limited to the following:

A. Miscellaneous anchor bolts, plates, angles, etc.

B. Brackets, bolts.

C. Access ladders, platforms, railings, nosings, stairs.

1.3 SHOP DRAWINGS:

A. Provide as required in Section 01 30 00.

1.4 GENERAL REQUIREMENTS:

A. Metals: Free from defects impairing strength, durability, appearances, best commercial quality for purposes specified made with structural properties to withstand safety strains, stress to which they will normally be subjected.

B. Protect metals from injury at shops, in transit to job until erected in place, inspected, accepted.

PART 2 - PRODUCTS

2.1 FABRICATED MATERIALS:

A. Steel:

1. Structural Steel, ASTM A-36.

2. Architectural, Miscellaneous steel, unless otherwise specified: mild steel.

3. Bolts, nuts: ASTM A-325, High strength bolts: ASTM A-325.

4. Filler electrodes or welding rods; ASTM A-233.

B. Paint: (Shop coat and touch-up), See painting section.

2.1 FABRICATION:

A. Make work in ample time not to delay job progress, deliver to job at such time as required for proper coordination. Fabricate, erect work in thorough, workmanlike manner.

B. Make joints of such character, assemble to be strong, rigid as adjoining sections. Welded joints: Continuous or spot welds as per best practice of trade: Continuous welds, ground smooth for exposed work.

C. Do cutting , punching , drilling, tapping required for attachment of work coming in contact with miscellaneous metal work so indicated or where directions for same are given prior to or with approval of shop drawings. Do necessary cutting, drilling, fitting, required for installation of miscellaneous metal work. Execute drilling, cutting, fitting carefully; when required, fit work at job before finishing.

D. All items of miscellaneous metals; except those encased in concrete: Receive on shop coat before delivery to job.

PART 3 - EXECUTION:

3.1 FIELD CONDITIONS:

A. Verify measurements in field, as required, for work fabricated to fit job conditions.

B. Before starting work, examine adjoining work on which work is in any way dependent for perfect workmanship, fit.

3.2 INSTALLATION:

A. Anchor and anchor bolts as required by various trades: set secured as required for particular installation in accordance with best practices acceptable in the trade.

END OF SECTION 05 10 00

SECTION 05 12 00 – STRUCTURAL STEEL

PART I - GENERAL

1.1 REFERENCES

A. Reference specification shall be part of these specifications the same if fully written herein and shall constitute minimum requirements for structural steel, unless modified herein.

1. Specification for Structural Steel Buildings (March 9, 2005) by The American Institute of Steel Construction, Inc. (AISC)

2. Seismic Provisions for Structural Steel Buildings (March 9, 2005) including Supplement No. 1 (November 16, 2005) (These provisions are applicable when the seismic response modification coefficient, R, is greater than 3, regardless of the seismic design category).

3. Specification for Structural Joints using ASTM A325 or A490 bolts (June 30, 2004) by Research Council of Structural Connections (RCSC)

4. Code of Standard Practice for Steel Buildings and Bridges (March 18, 2005) by The American Institute of Steel Construction, Inc. (AISC)

5. Welding; AWS D1.1-2004 Structural Welding Code-Steel by American Welding Society (AWS)

1.2 SUMMARY OF WORK:

A. Refer to the drawings for locations and quantity of structural steel required in this project.

1.3 SUBMITTALS:

A. Shop Drawings:

1. Clearly show all dimensions, typical and special details. Fabrication shall not begin until after the Architect's review and approval. Shop drawings will not be reviewed prior to Contractor's review and approval.

2. All details and notes appearing on the contract drawings and giving information for the erection of structural steel shall be shown. Shop drawings will not be reviewed without such information.

3. Provide complete connection information.

PART 2 - PRODUCTS

2.1 FABRICATED MATERIALS:

A. Structural steel rolled W Shapes shall conform to ASTM A992 Grade 50. All other structural steel rolled shapes and plates shall conform to ASTM A36 as a minimum.

B. All hollow structural sections (HSS Rectangular, Square or Round) shall conform to ASTM A 500, Grade B.

C. Structural steel Pipe shall conform to ASTM A53, Type E or S, Grade B.

D. Anchor bolts shall conform to ASTM F1554 Grade 36, unless noted otherwise.

E. Connection bolts, nuts and washers for structural members shall conform to ASTM A325 unless noted otherwise. Bolts specified as A307 shall conform to ASTM A307.

PART 3 - EXECUTION:

3.1 Installation: Structural steel shall be erected in accordance with approved shop drawings and in conformance with the referenced specifications.

3.2 Structural steel detailing shall conform to the AISC Specification, AISC Steel Construction Manual, AISC Code of Standard Practice and as applicable. The Seismic Provisions for Structural Steel Buildings (2005) including Supplement No. 1 (2005)

3.3 Welding shall conform to the Standards of the American Welding Society. All welding shall be performed by AWS Qualified, Certified Welders. If a fillet weld is shown or implied, the minimum size shall be 3/16" unless noted otherwise. Electrodes for shop and field welds shall conform to AWS D1.1 for matching filler metal requirements, with E70XX as minimum. All weld filler metal shall be capable of producing welds that have a minimum charpy V-notch toughness of 20 ft-lb at 0 degrees F.

3.4 Splicing of structural steel members where not detailed on the contract documents is prohibited without the prior approval of the Structural Engineer as to location, type of splice and connection to be made.

3.5 Any fully restrained (FR) moment connection, noted as "FR" connection on the drawings shall be designed and detailed in accordance with Part 12 of The AISC Steel Construction Manual (13th Edition).

3.6 Where members are shown framing into each other but no connection is specified, the connection shall be accomplished with a 3/16" fillet welded all around. (ie: Where angle bracing is shown but no end connection specified)

3.7 If a deformed reinforcement bar is to be welded to a structural steel member or plate, the bar material shall conform to ASTM A706 (Weldable rebar).

3.8 Deformed bar anchors (DBA) shall conform to ASTM A496 and shall be automatically end welded with suitable welding equipment in the shop or in the field.

3.9 Headed concrete anchors (HCA) shall conform to ASTM A108 and shall be automatically end welded with suitable welding equipment in the shop or in the field.

3.10 Steel shall be cleaned of rust, loose mill scale and other foreign materials where required for proper fabrication, fitting up or welding.

3.11 All steel that is directly exposed to the wetting effects of weather and all steel that is to be permanently exposed to view shall be shop painted with a standard rust inhibiting primer that is compatible with the final coat of paint. Surface preparation and painting shall be in accordance with the provisions in AISC Code of Standard Practice for Steel Buildings and Bridges and as specified in The Steel Structures Painting Council (SSPC) Manuals. Steel areas to be welded or to be contact surfaces of friction type connections shall not be painted until after connections have been made. Touch up all areas damaged prior to final placement. All steel that is to be fire protected with spray-applied material should not be painted.

3.12 Structural steel connections not detailed on the contract documents shall be designed and detailed in accordance with the AISC Construction Manual and AISC Detailing for Steel Construction.

3.13 All connection bolts shall be 3/4" diameter unless noted otherwise. All beam connections shall be snug-tightened joints unless noted otherwise. All bracing connections shall be slip-critical joints unless noted otherwise. Use Twist-off-type Tension-Bolt Pre-tensioning for slip-critical joints.

3.14 Shop and field testing of welded and bolted connections shall be done by an independent testing agency and the following shall be minimum testing criteria as applicable:

A. All welds shall be visually inspected.

B. Fillet welds for beam and girder shear connection plates or angles (10% at random) shall be checked by magnetic particle method for final pass only.

C. Ultrasonically test 100% of all full penetrations welds.

D. Check 25% of bolts in each shear connection (2 minimum).

E. Check 25% of column splice fillet welds by magnetic particle on last layers.

F. All bolted connections shall be tested in accordance with the AISC Specification for Structural Joints using ASTM A325 or A490 Bolts.

G. The structural steel fabricator and erector shall schedule all work to allow the above testing requirements to be completed.

3.15 All steel stairs shall be designed and detailed by the stair manufacturer for the live load of 100 psf as well as all applicable life safety codes. Steel drawings shall bear the seal of a Professional Engineer registered in the same state as the project location.

END OF SECTION 05 12 00

SECTION 061053- MISCELLANEOUS ROUGH CARPENTRY

PART 1-GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Wood blocking and nailers.
2. Wood furring and grounds.
3. Plywood backing panels.

PART 2- PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.

2.2 WOOD-PRESERVATIVE-TREATEDMATERIALS

A. Preservative Treatment by Pressure Process: AWPA C2, 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 containing no arsenic or chromium.
2. For exposed items indicated to receive a stained or natural finish, use chemical formulations that do not require incising, contain colorants, bleed through, or otherwise adversely affect finishes.

B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or does not comply with requirements for untreated material.

C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.

D. Application: Treat all miscellaneous carpentry, unless otherwise indicated.

2.3 FIRE-RETARDANT-TREATED MATERIALS

A. General: Comply with performance requirements in AWPA C20 (lumber) and WPA C27 (plywood).

I. Use treatment that does not promote corrosion of metal fasteners.
2. Use Exterior 1ype for exterior locations and where indicated.
3. Use Interior Type A, unless otherwise indicated.

B. Identify fire-retardant-treated wood with appropriate classification marking of testing and inspecting agency acceptable to authorities having jurisdiction.

C. Application: Treat all miscellaneous carpentry, unless otherwise indicated.

2.4 MISCELLANEOUS LUMBER

A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:

I. Blocking.
2. Nailers.
3. Rooftop equipment bases and support curbs.
4. Furring.
5. Grounds.
6. Utility shelving.

B. For items of dimension lumber size, provide Construction or No. 2, Standard, Stud, or No. 3 grade lumber with 15 percent maximum moisture content of any species.

C. For exposed boards, provide lumber with 15 percent maximum moisture content and any of the following species and grades:

I. Eastern white pine, Idaho white, lodge pole, ponderosa, or sugar pine; Premium or 2 Common (Sterling) grade; NELMA, NLGA, WCLIB, or WWPA.
2. Mixed southern pine, No.1 grade; SPIB.
3. Hem-fir or hem-fir (north), Select Merchantable or No. I Common grade; NLGA, WCLIB, or WWPA.
4. Spruce-pine-fir (south) or spruce-pine-fir, Select Merchantable or No. 1 Common grade; NELMA, NLGA, WCLIB, or WWPA.

D. For concealed boards, provide lumber with 15 percent maximum moisture content and any of the following species and grades:

I. Mixed southern pine, No. 2 grade; SPIB.
2. Hem-fir or hem-fir (north), Construction or 2 Common grade; NLGA, WCLIB, or WWPA.
3. Spruce-pine-fir (south) or spruce-pine-fir, Construction or 2 Common grade; NELMA, NLGA, WCLIB, or WWPA.
4. Eastern softwoods, No. 2 Common grade; NELMA.
5. Northern species, No.2 Common grade; NLGA.
6. Western woods, Construction or No. 2 Common grade; WCLIB or WWPA.

E. For blocking not used for attachment of other construction Utility, Stud, or No.3 grade lumber of any species may be used provided that it is cut and selected to eliminate defects that will interfere with its attachment and purpose.

F. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.

G. For furring strips for installing plywood or hardboard paneling, select boards with no knots capable of producing bent-over nails and damage to paneling.

2.5 PLYWOOD BACKING PANELS

A. Telephone and Electrical Equipment Backing Panels: DOC PS 1, Exposure 1, C-D Plugged, fire-retardant treated, in thickness indicated or, if not indicated, not less than 1/2-inch (13-mm) nominal thickness.

2.6 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and manufacture.

B. Nails, Brads, and Staples: ASTM F 1667.

C. Power-Driven Fasteners: NES NER-272.

D. Wood Screws: ASME Bl8.6.1.

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. Lag Bolts: ASME 818.2.1 (ASME Bl8.2.3.8M).

G. Bolts: Steel bolts complying with ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with ASTM A 563 (ASTM A 563M) hex nuts and, where indicated, flat washers.

H. 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.

1. Material: Carbon-steel components, zinc plated to comply with ASTM B 633, Class Fe/Zn 5.
2. Material: Stainless steel with bolts and nuts complying with ASTM F 593 and ASTM F 594, Alloy Group I or 2 (ASTM F 738M and ASTM F 836M, Grade AI or A4).

SECTION 07 20 00 – VAPOR BARRIER

PART I-GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Vapor barrier below concrete slabs on grade.

PART 2- PRODUCTS

2.1 MATERIALS

A. Vapor Barrier: Kraft paper and glass fiber sandwich with polyethylene or heavy treated Kraft paper faces with penn rating Jess than 0.15 when tested in compliance with ASTM E 96, Procedure A.:

1. Glas-Kraft, Inc.; Ply-Bar Plus.
2. Fortifiber Corporation; Moistop.
3. Raven Industries; Rufco Super Sampson SS-400 Vapor Retarder.
4. Reef Industries, Inc.; Griffolyn Type-85.

B. Tape: Self-sealing polyethylene tape, 4 inches wide, or as recommended by vapor barrier manufacturer.

PART 3- EXECUTION

3.1 INSTALLATION

A. Place vapor barrier directly over properly leveled and compacted sub-grade occurring below floor slabs on grade in compliance with ASTM E 1463.

B. Prior to placing concrete over vapor barrier, completely remove all foreign materials, inspect for tears, holes, punctures, open joints and perform repairs with new sheeting or tape as directed by Architect

End of Section 07 20 00

SECTION 07 92 00 - SEALANTS AND CAULKING

Division 1, General Requirements, are hereby made a part of this section as fully as if repeated herein.

1.0 GENERAL

1.01 RELATED SECTIONS

A. Section 042200: Concrete Unit Masonry.

B. Section 081100: Steel doors and frames.

C. Section 084000: Storefront & Curtain Wall Window Systems.

D. Section 084330: Wind/Impact resistant Windows.

1.02 REFERENCES

A. Standards of the following as referenced:

1. American Society for Testing and Materials (ASTM).

2. Federal Specifications (Fed. Spec.).

3. Sealant and Waterproofer's Institute (SWI).

B. Industry standards:

1. SWI: Association quality standard guidelines for sealant installation.

1.03 DEFINITIONS

A. Terms:

1. Caulk: Process of filling joints, without regard to type of material.

2. Caulking compound: Material used in filling joints and seams, having properties of adhesion and cohesion; not be required to have extensibility and recovery properties, usually applied to joints at interior of structures.

3. Joint failure: Caulked joint exhibiting one or more of the following characteristics:

   a. Leaks air or water.

   b. Sealant:

      1) migrates.

      2) loses adhesion or cohesion.

      3) does not cure.

      4) discolors.

      5) stains adjacent Work.

      6) develops bubbles, air pockets, or voids.

5. Sealant: Weatherproof elastomer used in filling and sealing joints, having properties of adhesion, cohesion, extensibility under tension, compressibility, and recovery; designed to make joints air and watertight. Material is designed generally for application to joints at exterior of structures and for other joints subject to movement.

1.04 SUBMITTALS

A. Product data: Submit manufacturer's product description, indicating conformance with specified requirements and installation instructions for each type sealant. Indicate preparation requirements for each substrate condition.

B. Samples:

1. Material colors: Submit samples of manufacturer's standard caulking material colors and special colors indicated.

1.05 PROJECT CONDITIONS

A. Weather conditions:

1. Installation of materials under adverse weather

conditions is prohibited; install only within manufacturer recommended temperature range.

2. Proceed with Work only when forecasted weather conditions are favorable for joint cure and development of high early bond strength.

3. Install materials only when temperatures are in lower third of manufacturer's recommended installation temperature, wherever joint width is affected by ambient temperature variations.

1.06 WARRANTY

A. Warrant Work to be free from defects in materials and workmanship, including joint failure, for two year period; begin at Date of Substantial Completion.

2.00 PRODUCTS

2.01 MATERIALS

A. Silicone bath sealant:

1. Acceptable products:

a. Dow Corning Corp.; #786 Mildew Resistant Silicone Sealant.

b. GE Silicones; Sanitary 1700 Sealant.

c. Pecora Corp.; #863.

d. Sonneborn-Rexnord; Omniplus.

e. Tremco, Inc.; Proglaze.

2. Characteristics:

a. Type: One part silicone rubber; mildew and stain resistant, meeting ASTM C920-86, Type S, Grade NS, Class 25.

b. Color: White.

B. One-part polyurethane sealant:

1. Acceptable products:

    a. Pecora Corp.; Dynatrol I.

    b. Sika Corp.; Sikaflex 1a.

    c. Sonneborn-Rexnord; NP-I.

    d. Tremco, Inc.; Dymonic.

2. Characteristics:

    a. Meet ASTM C920-86, Type S, Grade NS, Class 25.

    b. Colors: Selected from manufacturer's standard colors.

C. Butyl caulk:

1. Acceptable products:

    a. Pecora Corp.; BC-158.

    b. Tremco, Inc.; Butyl Sealant.

2. Characteristics:

    a. Type: One part butyl rubber caulk meeting Fed. Spec. TT-S-001657, Type I.

    b. Color: Selected from manufacturer's standard colors.

2.02 ACCESSORIES

A. Joint cleaner: Type recommended by sealant manufacturer for substrates indicated.

B. Joint primer/sealer: Type recommended by sealant manufacturer for conditions encountered.

C. Bond breaker tape: Plastic tape applied to contact surfaces where bond to substrate or joint filler must be avoided for sealant material performance.

D. Sealant backer rod:

1. Type: Compressible rod stock polyethylene foam, polyethylene jacketed polyurethane foam, butyl rubber foam, or neoprene foam; open or closed cell; type recommended by sealant manufacturer for compatibility with material.

2. Provide size and shape of rod to control joint depth, break bond at joint bottom, form optimum shape of bead on back side, and minimize possibility of extrusion when joint is compressed.

E. Tooling agent: Agent recommended by sealant or caulk manufacturer to ensure contact of material with inner joint faces.

F. Divider strips: Synthetic rubber or closed cell synthetic foam not less than 1/16" thick and full depth of caulking material; approved by manufacturers of dissimilar materials as being compatible with each other.

3.00 EXECUTION

3.01 PREPARATION

A. Protection of adjacent surfaces:

1. Protect by applying masking material or manipulating application equipment to keep materials in joint. Allowing tape to touch cleaned surfaces to receive sealant if masking materials are used is prohibited.

2. Remove misapplied caulking materials from surfaces using solvents and methods recommended by manufacturer.

3. Restore surfaces to original condition and appearance where caulking materials have been removed.

B. Surface protection:

1. Clean joint surfaces immediately before caulking joints. Remove dirt, insecure coatings, moisture, and

other substances interfering with bond.

2. Etch concrete and masonry joint surfaces to remove alkalinity, unless caulking material manufacturer's product data indicates alkalinity does not interfere with bond and performance. Etch with sealant manufacturer's recommended materials in accord with sealant manufacturer's reviewed installation instructions and product data.

3. Roughen joint surfaces on vitreous coated and similar non-porous materials, unless caulking material manufacturer's data indicates equal bond strength as porous surfaces. Rub with fine abrasive cloth or wool to produce dull sheen.

3.02 APPLICATION

A. General: Comply with sealant material manufacturer's printed installation instructions, except where more stringent requirements are required, indicated, or specified.

B. Primer: Prime or seal joint surfaces where recommended by caulking material manufacturer. Do not allow primer/sealer to spill or migrate onto adjacent surfaces.

C. Backer rod: Install for all caulking materials, except where recommended to be omitted by material manufacturer for application indicated.

D. Sealant:

1. Employ installation techniques which will insure caulking materials are deposited in uniform, continuous ribbons without gaps or air pockets, with complete wetting of joint bond surfaces.

2. Fill joint to form slight cove, so joint will not trap moisture and debris where horizontal joints are between horizontal and vertical surface.

3. Do not allow materials to overflow or spill onto adjacent surfaces. Use masking tape or other precautionary devices to prevent staining of adjacent surfaces.

4. Remove excess and misplaced materials as Work progresses. Clean adjoining surfaces to eliminate evidence of misplaced materials, without damage to adjacent surfaces or finishes.

5. Cure caulking materials in accord with manufacturer's product data to obtain high early bond strength, internal cohesive strength, and surface durability.

3.03 SCHEDULE

A. Schedule below indicates general sealant locations and usage type. Reviewed submittals indicate exact location of each sealant.

B. Silicone bath sealant:

1. Perimeter of all plumbing fixtures mounted on walls and adjacent materials.

2. Top and edges of backsplashes at all countertops.

C. One part polyurethane sealant:

1. Exterior vertical masonry joints.

2. Exterior and interior perimeter of all door and window frames to adjacent materials.

D. Butyl caulk: Use double bead at sill or threshold of all exterior swinging doors.

+ + END OF SECTION 07 92 00 + +

SECTION 08 11 00 - STEEL DOORS AND FRAMES

Division 1, General Requirements, are hereby made a part of this section as fully as if repeated herein.

1.00 GENERAL

1.01 SUMMARY

A. Related sections:

1. Section 042200: Concrete Unit Masonry.
2. Section 079200: Sealants and Caulking.
3. Section 087100: Door Hardware.
4. Section 088000: Glass and Glazing.
5. Section 092600: CR Studs & Gypsum Board Systems.
6. Section 099000: Painting.

1.02 REFERENCES

A. Standards of the following as referenced:

1. American Society for Testing and Materials (ASTM).
2. American National Standards Institute (ANSI).
3. Factory Mutual (FM).
4. National Fire Protection Association (NFPA).
5. Steel Door Institute (SDI).
6. Underwriters’ Laboratories, Inc. (UL).

B. Industry standards:

1. NFPA: National Fire Codes, Volume 4.
2. SDI: Technical Data Series.

1.03 SUBMITTALS

A. Product data: Submit manufacturer's standard product data.

B. Shop drawings: Indicate door and frame elevations, sections, materials, gauges, finishes, fabrication and erection details, location of finish hardware by dimension, and details of openings and louvers.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Packing and shipping: Deliver Work packaged for protection.

B. Acceptance at site: Inspect Work upon delivery for damage; reject damaged items.

C. Storage and protection: Store materials under cover, 4" off floor, minimum, raised platforms, in vertical position with minimum 1/4" space between doors. Avoid use of non-vented plastic or canvas shelters which create humidity chambers. Immediately remove wet wrappers.

2.00 PRODUCTS

2.01 MANUFACTURERS

A. Acceptable manufacturers: Manufactured units of the following manufacturers are acceptable for use. Other regional and local manufacturers are acceptable, provided units are manufactured and certified to SDI standards and meet specified criteria.

1. The Ceco Corp., Ceco Door Division.

2. Republic Builders Products Corp.

3. Steelcraft.

4. North American Door Corp.

2.02 MANUFACTURED UNITS

A. General: Fabricate members in accord with SDI-100-85, except where more stringent requirements are specified.

B. Finish:

1. One coat manufacturer’s standard rust-inhibitive primer.

2. Two coats manufacturer’s standard rust-inhibitive primer, after treatment of galvanized surfaces for paint adhesion.

C. Frame construction:

1. General: Provide pressed steel construction frames for doors, sidelights, transoms, mullions, borrowed lights, and other indicated openings.
2. Welded type:

a. Provide welded steel construction; joints fully welded; dress and grind face smooth.

b. Provide welded frames with temporary spreaders during shipment, handling, and installation.

c. Gauge: 16 gauge, 14 gauge at shelter door.

D. Frame anchors:

1. Wall anchors for frame attachment to masonry construction (shelter doors):

a. Type: Adjustable, T-shaped, 10 gage steel. See detail on drawings.

b. Provide anchors at 1'-4" O.C., maximum, each jamb, track welded to frame four spots.

2. Wall anchors for frame attachment to interior gypsum board partitions:

a. Provide manufacturer’s standard adjustable type for attachment to studs; 18 gauge, minimum.

b. Provide anchors at 2'-0" O.C., maximum, each jamb.

3. Wall anchors for frame attachment to studs at exterior walls:

a. Provide manufacturer's standard existing or prepared opening anchors.

b. Provide anchors at 2'-0" o.c., maximum, each jamb.

c. Screws to be countersunk into frame, bondo and ground smooth.

4. Floor anchors: Provide clip type to receive two fasteners per clip, weld to bottom of jambs and mullions; 18 gauge steel, minimum.

5. Existing opening anchors: Provide 3/8" dia. countersunk, flat head screws; space 6" maximum from top and bottom of frame, 2'-0" maximum between.

E. Door construction:

1. Classification:

a. Exterior units:

1) Insulating type: Grade II, Heavy Duty, Model 1, continuous weld seam; 18 gauge material; with polystyrene core.

2) 18 gauge top channel flush with top of door.

b. Interior units:

1) Grade II, Heavy Duty, Model 1, continuous weld seam; 18 gauge material; ¾" cell honeycomb core.

2) 18 gage top channel flush with top of door. full welded seam.

c. Shelter Unit:

1) Extra Heavy Duty, steel stiffened core welded on 5" centers; 14 gauge material.

2) 14 gauge inverted top and bottom channels projection welded to both skins at 2½" on center.

3) Lock edge shall be non-beveled and reinforced with a continuous 14 gauge channel with additional 12 gauge full height tubular reinforcement, lock reinforcements shall be integral 14 gauge.

4) Doors shall be FEMA 361 rated.

2. Thickness: 1-3/4", unless otherwise indicated on drawings.

F. Louvers:

1. Grille type: Sightproof, minimum 22 gauge fin type, providing not less than 80% free air movement.

2.03 FABRICATION

A. Shop assembly:

1. Fabricate doors and frames to sizes and profiles indicated on reviewed shop drawings.
2. Hardware preparation:

a. Factory prepare units for hardware in accord with templates furnished under Door Hardware section and in accord with SDI-100.

b. Reinforcement: Reinforce components for hardware installation in accord with SDI-107.

c. Punch single leaf frames to receive three silencers; double frames to receive one silencer per leaf, at head. Install silencers.

B. Shop finishing: Finish doors in accord with finish specified above.

C. Tolerances:

1. Frames:

a. Overall dimensions: +3/64" in opening height;

+1/16", -1/32" in opening width.

b. Throat opening: +1/16".

c. Frame depth: +1/32".

2. Doors:

a. Overall dimensions: +3/64" maximum variation in width and length; +1/16" variation in thickness.

b. Door squareness: +1/16" variation in diagonal dimension.

c. Flatness: +3/32" when measured with straight edge from corner to corner; each face.

3. Other tolerances: Indicated in SDI-117.

3.00 EXECUTION

3.01 INSTALLATION

A. Setting frames:

1. General: Install in accord with SDI-105 and as follows:

2. Welded frames:

a. Set welded frames in position prior to beginning partition Work. Brace frames until permanent anchors are set.

b. Set anchors for frames as Work progresses. Install anchors at hinge and strike levels. Provide mortar guards at frame mortises in masonry walls.

c. Remove temporary braces and spreaders after wall construction is complete.

d. Fire-rated frames: Install in accord with requirements of NFPA #80.

e. Install welded frames in prepared openings in

concrete and masonry walls using countersunk bolts or expansion shields and anchors in accord with SDI-111-F; fill or plug frame hole completely after doors and hardware are installed.

B. Door installation:

1. Install steel doors in frames, use hardware specified in Door Hardware section.

2. Edge clearances at doors:

a. Between door and frame, at head and jambs: 1/8". b.

Meeting edges of door pairs and at mullions: 1/8".

c. Sills:

1) Without thresholds: 3/8" maximum above finish floor.

2) With thresholds: 3/4" maximum above finish floor.

+ + END OF SECTION 08 11 00 + +

SECTION 08 33 00 Insulated Rolling Steel Doors

PART I-GENERAL

1.1 Summary

A. All Rolling Insulated Service Doors shall be as manufactured by The Cookson Company, Phoenix, Arizona. Furnished materials shall include all curtains, bottom bars, guides, brackets, hoods, operating mechanisms and any special features.

B. Work not to be included by The Cookson Company includes design of, material for, and preparation of door openings but not limited to structural or miscellaneous iron work, access panels, finish painting, electrical wiring, conduit and disconnect switches.

1.2 Quality Assurance

A. Exterior rolling insulated service doors shall be design to withstand at least a twenty (20) pounds per square foot wind-load. Wind-locks shall be installed on the doors over 16'-1" wide.

B. All rolling insulated service doors shall be designed to a standard maximum of 25 cycles per day and an overall maximum of 50,000 operating cycles for the life of the door.

PART 2- PRODUCTS

2.1 MATERIALS

A. The door curtain shall be constructed of interconnected strip steel slats conforming to ASTM A 653. The slats shall be designated by The Cookson Company as No. 45 (measuring 3" high by 7/8" deep) consisting of a 22 gauge exterior slat and a 22 gauge interior slat separated by 13/16" of rigid insulation for doors up to 24' wide, and 20 gauge exterior slat and a 22 gauge interior slat separated by 13/16" of rigid insulation for doors over 24 ' wide.

B. The finish on the door curtain shall be Cookson FinalCote consisting of the following:

1. Hot dipped galvanized G-90 coating consistent with ASTM A 653.

2. Bonderized coating for prime coat adhesion.

3. Corrosion inhibiting primer .2 mil per side.

4. Thermosetting gray polyester top coat with a minimum thickness of .6 mils each side.

C. The bottom bar shall consist of two 1/8" angles mechanically joined together with a 1" diameter vinyl covered foam edge astragal continuous along the bottom, The finish on the bottom bar shall be one (1) coat of thermosetting bronze color cote.

D. The guides shall consist of 3 steel angles bolted together with 3/8" fasteners to form a channel for the curtain to travel. Extruded vinyl snap-on weather-stripping shall be furnished continuously along the exterior leg of each guide. The wall angle portion shall be continuous

and fastened to the surrounding structure with either minimum 1/2" fasteners or welds, both on 36" centers. The finish on the guide angles shall be one (1) coat of thermosetting bronze color cote.

E. The brackets shall be constructed of steel not less than 1/4" thick and shall be bolted to the wall angle with minimum 1/2" fasteners. The finish on the brackets shall be one (1) coat of thermosetting bronze color cote.

F. The barrel shall be steel tubing of not less than 6" in diameter. Oil tempered torsion springs shall be capable of correctly counter balancing the width of the curtain. The barrel shall be designed to limit the maximum deflection to .03" per foot of opening width. The springs shall be adjusted by means of an exterior wheel. The finish on the barrel shall be one (1) coat of thermosetting bronze color cote.

G. the hood shall be fabricated from 24 gauge galvanized steel and shall be formed to fit the curvature of the brackets. the hood shall contain a waterproof baffle to control air infiltration. The finish on the hood shall be The Cookson Final Cote finish as indicated in the curtain section.

2.2 OPERATION

A. Supply Cookson Model MG Electric Motor Operator, industrial duty - rated for a maximum of 20 cycles per hour, cULus listed, Totally Enclosed Non Ventilated gear head operator (s) rated (1/3) (1/2) or (3/4) hp as recommended by door manufacturer for size and type of door, TBD Volts, TBD Phase. Provide complete with electric motor and factory pre-wired motor control terminals, maintenance free solenoid actuated brake, (emergency manual chain hoist) (Provisions for auxiliary push-up operation) and control station (s). Motor shall be high starting torque, industrial type, protected against overload with an auto-reset thermal sensing device. Primary speed reduction shall be heavy duty, lubricated gears with mechanical braking to hold the door in any position. Operator shall be equipped with (an emergency manual chain hoist assembly that safely cuts operator power when engaged. A disconnect chain shall not be required to engage or release the manual chain hoist.) (a disconnect cable for auxiliary push-up operation.) Operator drive and door driven sprockets shall be provided with #50 roller chain. (Provide an integral Motor Mounted Interlock system to prevent damage to door and operator when mechanical door locking device are provided.) Operator shall be capable of driving the door at a speed of 8 to 9 inches per second (20 to 23 cm/sec). Fully adjustable, driven linear screw type cam limit switch mechanism shall synchronize the operator with the door. The electrical contractor shall mount the control station (s) and supply the appropriate disconnect switch, all conduit and wiring per the overhead door wiring instructions.

B. Entrapment Protection: Provide the following primary entrapment protection device to enable momentary contact close operation.

1. Provide NEMA 4X photo eye sensors consisting of a transmitter and receiver that are to be mounted within 6" (152.4 mm) of the floor, projecting an IR beam across the entire width of the door. Interruption of beam before door fully closes shall cause door to immediately stop downward travel and reverse direction to the fully opened

position. Electrical contractor to provide low voltage wiring from the transmitter and receiver to the door operator.

PART 3- EXECUTION

3.1 INSTALLATION

A. All Cookson Rolling Insulated Service doors shall be installed by an authorized Cookson distributor.

3.2 WARRANTY

A. All Cookson Rolling Insulated Service Doors shall be warranted for a period of 2 years from the time of shipment against defects in workmanship and materials.

End of Section 08 33 00

SECTION 08 40 00 - STOREFRONT & CURTAIN WALL WINDOW SYSTEMS

Division 1, General Requirements, are hereby made a part of this section as fully as if repeated herein.

1.00 GENERAL

1.01 SUMMARY

A. This section includes all aluminum and glass windows and doors, and sun shade outrigger system.

1.02 RELATED SECTIONS

A. Section 087100 – Door Hardware

B. Section 088000 – Glass & Glazing

C. Section 092600 - CR Studs & Gypsum Board Systems.

1.03 REFERENCES

A. Standards of the following as referenced:

1. American Architectural Manufacturers Association (AAMA).

2. Aluminum Association (AA).

3. American Iron and Steel Institute (AISI).

4. American National Standards Institute (ANSI).

5. American Society for Testing and Materials (ASTM).

6. American Welding Society (AWS).

1.04 SYSTEM DESCRIPTION

A. Design requirements:

1. Design completed system to withstand wind pressure loads normal to wall plane indicated.

a. Exterior walls:

1) Positive pressure: meet local code requirements.

2) Negative pressure: meet local code requirements.

b. Interior walls: Ten PSF acting in either direction.

c. Maximum allowable deflection: L/175 in any member when tested in accord with ASTM E330.

2. Provide for thermal movement caused by surface temperature range of 180BF, without causing buckling stresses on glass, joint seal failure, undue stress on structural elements, damaging loads on fasteners, reduction of performance, or other detrimental effects.

B. Performance requirements for glazed framing without doors or operable walls:

1. Static pressure air infiltration: Completed storefront shall have maximum allowable infiltration of 0.06 CFM when tested in accord with ASTM E283 at differential static pressure of 1.57 PSF.

2. Static pressure water infiltration: No uncontrolled water other than condensation on indoor face of any component when tested in accord with ASTM E331 at test pressure equal to 10% of positive wind pressure design but not less than 6.24 PSF.

3. Contain water penetrating storefront system within system by gutters; drain to exterior through weep holes. No uncontrolled water infiltration is allowable.

1.05 SUBMITTALS

A. Product data: Provide complete product data; indicate system or systems used.

B. Shop drawings:

1. Submit indicating elevations; with sections and details at full scale. Include glass and metal thicknesses, joining details, field connections, anchorage, provisions for expansion, fastening and sealing methods, reinforcement, metal finishes, and glazing accessories. Indicate compliance with specified design criteria.

2. Provide shop drawings bearing seal of professional engineer, licensed to practice in state where Project is located.

C. Samples:

1. Submit minimum 6" by 6" samples on actual substrates indicating full color range expected in finished Work. Provide separate finish samples for each aluminum temper; indicate temper on sample.

2. Submit 6" by 6" door corner bottom indicating construction and color selected.

3. Submit 6" by 6" curtain wall corner indicating construction and color selected.

4. Test each sample above as required in Article 2.05 below.

D. Quality control submittals:

1. Design data: Provide indicating compliance with required criteria bearing seal of professional engineer, licensed to practice in state where Project is located.

2. Test reports: Submit certified copies of test reports on specified wall systems and components performance on request in lieu of conducting repeat tests.

3. Certificates: Indicate on shop drawings or by letter prior to submission of shop drawings stating authorized representative of selected glass manufacturer has reviewed and approved details, including glass bite, clearances, and glazing methods.

1.06 QUALITY ASSURANCE

A. Mock-ups: Requirements specified in Glass and Glazing section.

B. Pre-installation conferences: Requirements specified in Glass and Glazing section.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Storage and protection:

1. Store material in location and manner to avoid damage. Stack to prevent bending.

2. Store aluminum materials and components in clean, dry location, away from uncured concrete and masonry. Cover with waterproof breathable cover allowing air circulation.

2.00 PRODUCTS

2.01 MANUFACTURERS

A. Acceptable manufacturers:

1. Except as otherwise noted, products specified as standard of quality are indicated in Article 2.02.

2. Products of manufacturers listed below similar in types, colors, and quality listed in Article 2.02 are acceptable for use, subject to approval of product list and samples.

B. Entrances and storefronts:

1. Kawneer Company, Inc.

2. PPG Industries, Inc.

3. Vistawall Architectural Products.

4. YKK Corp.

2.02 MATERIALS

A. Extrusions: 6063-T5 aluminum alloy meeting ASTM B221-83.

B. Aluminum sheet: 5005-H34 aluminum alloy meeting ASTM B209, minimum 0.050" thickness.

C. Thermal barrier: Kawneer Isolock consisting of a two-part, chemically curing, high density polyurethane which is mechanically and adhesively bonded to the aluminum.

D. Finish:

1. Painted Permafuor 70% flouropolymer coating. Custom color to be selected by the architect.

E. Accessories:

1. Fasteners: Hardened aluminum alloys or AISI 300 series stainless steel; countersink exposed fasteners; match entrances and storefronts in color.

2. Storefront sealant: Non-skinning type meeting AAMA 803.3-85, color to match storefronts.

3. Provide setting blocks, edge blocks, and spacers meeting ASTM C864-79; Shore durometer hardness as follows:

a. Setting blocks: 85 +5 Shore A durometer hardness.

b. Edge blocks: 65 +5 Shore A durometer hardness.

c. Spacers: 50 +5 Shore A durometer hardness.

4. Provide other materials required for complete installation.

5. Sill Flashing: Provide manufacturers standard high performance sill flashing/drainage pan.

2.03 COMPONENTS

A. Entrances:

1. Medium stile design:

a. Kawneer Company, Inc.; #350 Series.

b. Minimum 3-1/2" wide stiles and top rail, and 10" wide bottom rail.

2. Door construction: Fabricate of extruded aluminum sections with door corners joined by concealed reinforcement secured with bolts, screws, and sigma deep penetration welding.

3. Glazing:

   a. Snap-in stops with neoprene glazing to prevent water infiltration; square style.

   b. Provide for 1" glazing.

4. Provide doors with drip cap at head and bottom rail to prevent water infiltration, where exposed to direct weather.

5. Adjustment: Equip doors with adjustable mechanism located in top rail near lock stile to provide for minor clearance adjustments after installation.

6. Weatherstripping: Manufacturer's standard pile type in replaceable rabbets for stiles and rails.

7. Hardware: Provide manufacturer’s standard closer, push/pull, threshold, hinges, lockset. See Hardware specification for doors that receive electronic access strikes.

B. Storefront System (exterior “punch” windows):

1. Acceptable system: Kawneer Company, Inc.; 451T.

2. Framing characteristics:

   a. Member size: Tri-Fab VG – 2″ x 4-1/2″.

   b. System construction: 6063-75 Alloy.

   c. Glazing pocket depth: One-inch (1″).

   d. Glazing gaskets: Manufacturer's standard glazing gaskets for specified system.

C. Curtain Wall System:

1. Acceptable System: Kawneer Company, Inc.; 1600

Wall System.

2. Framing Characteristics:

a. Member size: 2 ½″ x 6″.

b. System construction: 6063-75 Alloy.

c. Glazing pocket depth: One-inch (1″).

d. Glazing gaskets: Manufacturer's standard glazing gaskets for specified system.

D. Sun Shade Outrigger System:

1. Acceptable system: Kawneer Company, Inc.; Versoleil SunShade Outrigger System.

2. 36″ Outrigger.

3. The assembled sunshade shall be capable of supporting the code required combined load without damage, permanent deformation, or disengagement from the glazed system mullion.

4. Blade deflection shall not exceed L/120 of span length.

5. Design of standard configurations shall allow for negligible direct sunlight to show through the blade based on project location, latitude, altitude, building orientation, surrounding conditions, and aesthetic requirements.

6. Aluminum Extrusions: Alloy and temper recommended by glazed aluminum curtain wall and storefront system manufacturer for strength, corrosion resistance, and application of required finish and not less than 0.070″ wall thickness at any location for the main frame and complying with ASTM B 221: 6063-T6, 6105-T5, or 6061-T6 alloy and temper.

7. Thermal Barrier: When applied on a thermally broken captured system, sunshade shall be thermally isolated from the interior aluminum mullions by a nominal 0.25″ thick low conductance material.

2.04 FABRICATION

A. Shop assembly:

1. Fabricate and assemble framing with joints only at intersections of members with uniform hairline connections; rigidly secure.

2. Drill and cut to template for finish hardware. Reinforce frames and door stiles and rails to receive finish hardware in accord with door manufacturer's product data.

3. Weld in accord with AWS recommendations or methods recommended by selected manufacturer. Conceal welds from view.

B. Shop finishing: Prepare surfaces for specified finish; apply in accord with:

1. Fluoropolymer coatings: AAMA 605.2 requirements to obtain specified finish and uniform color.

C. Tolerances:

1. Material cuts: Square to 1/32" off square, maximum, over largest dimension; proportionate amount of 1/32" on other two dimensions.

2. Maximum offset in alignment between two consecutive members in line, end to end: 1/64".

3. Maximum offset between framing members at glazing pocket corners: 1/64".

4. Joints between adjacent members in same assembly: Hairline and square to adjacent member.

5. Variation in squaring diagonals for doors and other fabricated assemblies: 1/16".

6. Flatness for doors and other fabricated assemblies: +1/16" off neutral plane.

2.05 SOURCE QUALITY CONTROL

A. Tests, finish:

1. Apply 50% solution NaOH, sodium hydroxide, to small area of finished sample surface; leave in place for 15 minutes; lightly wipe off NaOH; DO NOT CLEAN AREA FURTHER.

2. Submit samples with test area noted on each required sample indicated in Article 1.04.

B. Inspection: Inspect areas around welds; reject items showing welding bloom or discoloration on finish or material distortion.

3.00 EXECUTION

3.01 EXAMINATION

A. Verification of conditions:

1. Verify locations of preset anchorages and block-outs have been installed in accord with reviewed shop drawings.

2. Examine conditions and substrates where products specified in this section are installed.

3. Submit written notification of unacceptable conditions or substrates.

4. Proceeding with construction activity of this section:

a. Prior to correction of unacceptable conditions or substrates are prohibited.

b. Indicates installers acceptance of conditions and substrates; subsequent removal and reinstallation of products and related damaged items to correct substrate is at no additional cost.

3.02 PREPARATION

A. Surface protection: Protect aluminum surfaces from contact with lime, mortar, cement, acids, and other harmful surfaces.

3.03 INSTALLATION

A. General:

1. Install entrances and storefronts in accord with manufacturer's product data and reviewed shop drawings, plumb, level, and true to line, within specified tolerances.

2. Protect aluminum in contact with masonry, steel, concrete, or other dissimilar materials from contact using neoprene gaskets or bituminous coating.

3. Shim and brace Work plumb, level, and in designated location, before anchoring to structure.

4. Provide sill flashing at all exterior storefronts. Extend flashing continuous with lapped joints; set in two continuous beads of butyl sealant full width.

5. Verify during installation, storefront system allows water entering system to be collected in gutters and weeped to exterior. Verify weep holes are open and metal to metal joints are tightly sealed.

6. Locate expansion mullions where indicated on reviewed shop drawings.

7. Seal metal to metal storefront joints using storefront sealant. Install in accord with Sealants and Caulking section; take care not to seal system weeps.

B. Caulk juncture perimeter of frame and adjoining material at jambs and head with sealant specified in Sealants and Caulking section. Set thresholds in two continuous beads of butyl sealant full width of threshold.

C. Install entrances in frames for uniform contact, to operate throughout full swing without binding or sticking.

D. Repair or replace Work damaged or stained by subsequent construction activities. Clean exposed aluminum surfaces at completion of Work just prior to Date of Substantial Completion in accord with finish manufacturer's recommendations.

E. Tolerances:

1. Material cuts: Square to 3/64" off square, maximum, over largest dimension; proportionate amount of 3/64" on other two dimensions.

2. Maximum variation from plumb, level, or designated position: 1/8" in 12'-0", not exceeding 1/4" in total run.

3. Maximum offset in alignment between two consecutive members in line, end to end: 1/16".

4. Maximum offset between framing members at glazing pocket corners: 1/32".

5. Joints between adjacent members in same assembly: Hairline and square to adjacent member.

6. Variation in squaring diagonals for assemblies: 1/8".

3.04 FIELD QUALITY CONTROL

A. Tests:

1. Field tests: Conduct tests to determine storefront system is watertight. Conduct in accord with NAAMM FC-1-76, at locations selected by Facility Design Group Inc. Perform minimum of ten (10) tests; perform in Facility Design Group Inc.'s presence.

+ + END OF SECTION 08 40 00 + +

SECTION 08 43 30 WIND/IMPACT RESISTANT WINDOWS

Division 1, General Requirements, are hereby made a part of this section as fully as if repeated herein.

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Impact and Wind Resistant Aluminum Storefront Framing and Glazing

1.2 ACTION SUBMITTALS

A. Product Data: For each type of framing and glazing including manufacturer recommended installation instructions.

B. Shop Drawings: Include plans, elevations, sections, details, attachment to other work and glazing details for field-glazed units.

C. Samples: For each exposed finish.

1.3 INFORMATIONAL SUBMITTALS

A. Product Test Reports: Indicating compliance with requirements

B. Warranty: Sample of finish warranty

C. Delegated Design: For assembly indicated to comply with performance requirements and design criteria, including structural calculations signed and sealed by the qualified professional engineer responsible for their preparation.

1.4 WARRANTY

A. Framing: Manufacturer’s warranty against defects in material and workmanship under normal use for a period of 1 year from the date of invoice.

B. Finish Warranty: Manufacturer's warranty against deterioration of factory finishes for the period of **5** years from the date of complete installation.

C. Glass Warranty: Manufacturer's warranty against defects in material and workmanship resulting in edge separation or delamination for a period of 5 years from the date of invoice.

PART 2 – PRODUCTS

2.1 FRAMING

A. Basis of Design: StormDefend SD-TH600 Aluminum FEMA Tornado Window Framing System by Protective Structures.

B. Acceptable Manufacturers:

1. Protective Structures.
2. Winco Window Company.
3. Survivalite.

C. Description:

1. Factory fabricated framing constructed from either 6005-T5 or 6105-T5 extruded aluminum with integral weep design to allow water to vent to the exterior along horizontal members.
2. Dimensions: Head, Jamb, Sill, Mullion and Intermediate Horizontal Members: 2-1/2 inches by 6 inches.

2.2. GLAZING

A. Glazing Material: Insulating Glass Clad Polycarbonate

1. Wind and Impact Laminated Insulating Units: TOR-GARD NBR-IG tinted.

2.3 PERFORMANCE CRITERIA

A. Indicated areas of this project have been designed for occupancy as a storm shelter. The Work identified in this Section is a component of that security occupancy as follows:

1. Type of Shelter: Both Tornado and Hurricane.

A. Shelter Design Wind Speeds

1. Tornado: 200 MPH
2. Hurricane: 160 MPH

B. Debris Hazard

1. FEMA 361 Compliant: Pass missile-impact tests according to FEMA 361 / ICC 500-2008 in accordance with:

   a. ASTM E1886 - Standard Test Method For Performance Of Exterior Windows, Curtain Walls, Doors And Impact Protective Systems Impacted By Missiles and Exposed To Cyclic Pressure Differentials
   b. ASTM E1996 - Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors and Impact Protective Systems Impacted by Windborne Debris in Hurricanes.

2. Tornado: Resists impact of a 15 pound 2 by 4 at **90** MPH.

3. Hurricane: Resists impact of a 9 pound 2 by 4 at 90 MPH.

C. Pressure Testing

1. FEMA 361 Compliant: Pass static pressure tests and cyclic tests according to FEMA 361/ICC 500-2008 in accordance with:

   a. ASTM E330 - Standard Test Method For Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference

2.4 FABRICATION

A. Tolerances: All joints and connections shall be tight, providing hairline joints and true alignment of adjacent members

2.5 FRAMING FINISH

A. Factory-applied finish:

1. Clear Anodic Finish: Architectural Class I, clear coating AA-M10C22A41 Mechanical Finish Chemical Finish: etched, medium matte; 0.70 mils minimum complying with AAMA 611

"Voluntary Specification for Anodized Architectural Aluminum".

2.6 ACCESSORIES

A. Anchors: Fully concealed in accordance with requirements of delegated design requirements.

1. Steel extension anchor plates as required by delegated design.

PART 3 – EXECUTION

3.1 PREPARATION

A. Verify field dimensions of opening prior to fabrication of windows.

B. Prepare openings to be in tolerance, plumb, level, provide for secure anchoring, and in accordance with approved shop drawings.

C. Coordinate structural requirements to ensure proper attachment and support.

3.2 INSTALLATION

A. Install windows in accordance with manufacturer's recommendations and approved shop drawings.
B. Provide required support and securely fasten and set windows plumb, square, and level without twist or bow.

C. Apply sealant per window and sealant manufacturer's recommendations at all specified areas as shown on shop drawings and detailed in installation instructions. Wipe off excess, and leave exposed sealant surfaces clean and smooth.

3.3 ADJUSTING AND CLEANING

A. Leave windows clean and free of construction debris. Strictly adhere to the manufacturer’s recommended cleaning and maintenance instructions.

3.4 PROTECTION

A. Protect window glazing and frames from damage during subsequent construction activities. If damage occurs, remove and replace as required at no additional cost to the Owner to provide windows in their original, undamaged condition.

+ + END OF SECTION 08 43 30 + +

Section 08 71 00 Door Hardware

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Commercial door hardware for Swinging and other doors to the extent indicated.
2. Cylinders for doors specified in other Sections.
3. Electrified door hardware.

PART 2 - PRODUCTS

2.1 HINGES

A. Acceptable Manufacturers:

1. Hager Hinge Company (HAG).
2. McKinney Products Company; an ASSA ABLOY Group company (MCK).
3. Stanley Commercial Hardware; Div. of The Stanley Works (STH)*.

B. Template Requirements: Provide only template-produced units.

C. Hinge Weight: Unless otherwise indicated, provide the following:

1. Entrance Doors: Heavy-weight hinges.
2. Doors with Closers: Antifriction-bearing hinges.
3. Interior Doors: Standard-weight hinges.

D. Size: Size hinges in accordance with specified manufacturer's published recommendations.

E. Quantity: Provide the following, unless otherwise indicated:

1. Two Hinges: For doors with heights up to 60 inches (1524 mm).
2. Three Hinges: For doors with heights 61 to 90 inches (1549 to 2286 mm).
3. Four Hinges: Fordoorswithheights91 to 120 inches (2311 to3048mm).
4. For doors with heights more than 120 inches (3048 mm), provide 4 hinges, plus 1 hinge for every 30 inches (750 mm) of door height greater than 120 inches (3048 mm).

F. Hinge Options: Where indicated in door hardware sets or on Drawings:

1. Non-removable Pins: Provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for out swinging exterior doors and out swinging corridor doors with Jocks.
2. Interior Doors: Non-rising pins.
3. Tips: Flat button with matching plug. Finished to match leaves.

G. Fasteners: Comply with the following:

1. Screws: Phillips flat-head screws. Finish screw heads to match surface of hinges.
2. For metal doors and frames install into drilled and tapped holes.
3. For wood doors and frames install threaded-to-the-head wood screws.
4. For frre rated wood doors install #12 x I \4 inch, threaded-to-the-head steel wood screws.
5. Finish screw heads to match surface of hinges or pivots.

H. Electrified Functions for Hinges: Comply with the following:

1. Power Transfer: Concealed PTFE-jacketed wires, secured at each leaf and continuous through hinge knuckle.
2. Monitoring: Concealed electrical monitoring switch.
3. Power Transfer and Monitoring: Concealed PTFE-jacketed wires, secured at each leaf and continuous through hinge knuckle, and with concealed electrical monitoring switch.

I. Pivot Sets:

1. Acceptable Manufacturers:

a. Dor-0-Matic; an Ingersoll-Rand Company (DOM).
b. Glynn-Johnson; an Ingersoll-Rand Company (GJ).
c. LCN Closers; an Ingersoll-Rand Company (LCN).*

2. Characteristics:

a. Pivots to be high strength forged bronze with top pivot housing with spring activated bronze retracting pin. Pivots to have tilt-on bearing and bearing pin.
b. Offset and intermediate pivots to be handed at factory. Pivot set to support doors to 200 pounds. With intermediate pivot to support 300 pounds. Centerline of pivots to be% inch from face of door, *Y.* inch from edge of door.

2.2 LOCKS AND LATCHES

A. Accessibility Requirements: Where indicated to comply with accessibility requirements, comply with the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities (ADAAG)."

1. Provide operating devices that do not require tight grasping, pinching, or twisting of the wrist and that operate with a force of not more than 5 lbf (22 N).

B. Latches and Locks for Means of Egress Doors: Comply with NFPA 101. Latches shall not require more than 15 lbf (67 N) to release the latch. Locks shall not require use of a key, tool, or special knowledge for operation.

C. Lock Trim: Levers:

a. Basis of Design: Schlage Commercial Lock Division; an Ingersoll-Rand Company (SCH), L Series, 07A Design.
b. Other Acceptable Manufacturer's

1) Corbin Russwin Architectural Hardware; an ASSA ABLOY Group company (CR).
2) SARGENT Manufacturing Company; an ASSA ABLOY Group company (SGT).

D. Cylinders:

1. Except as otherwise indicated, provide new grand master key system for Project.
2. Equip locks with manufacturer's standard 6-pin tumbler.
3. Construct lock cylinder parts from brass or bronze, stainless steel, or nickel silver.
4. Comply with owner's instructions for master keying and, except as otherwise indicated, provide individual change key for each lock that is not designated to be keyed alike with a group of related locks.

    a. Permanently inscribe each key with number of lock that identifies cylinder manufacturer's key symbol and notation, "DO NOT DUPLICATE."

5. Key Material: Provide keys of nickel silver only.
6. Key Quantity: Furnish 3 change keys for each lock, 5 master keys for each master system and 5 grand master keys for each grand master system.

    a. Furnish 1 extra blank for each lock.
    b. Deliver keys to Owner.

E. Mortise Locksets and Latchsets:

1. Chassis: Cold-rolled steel, handing field-changeable without s;disassembly.
2. Latchbolts: % inch throw stainless steel anti-friction type.
3. Lever Trim: Through-bolted, accessible design, cast or solid rod lever with independent break-away spindles.
4. Thumbturns: Accessible design not requiring pinching or twisting motions to operate.
5. Deadbolts: Stainless steel, 1 inch throw.
6. Electric Operation: Manufacturer-installed continuous duty solenoid.
7. Strikes: 16 gauge curved stainless steel, bronze or brass with 1 inch deep box construction, lips of sufficient length to clear trim and protect clothing.

F. Electrified Locking Devices: BHMA A156.25.

G. Tactile warning: Provide tactile warning on doors that lead to areas that might prove dangerous to a person with a vision disability (for example, doors to loading docks, platforms, boiler rooms, mechanical equipment rooms, electrical closets, stairs, stages and the like). These doors shall be made identifiable to the touch by a textured surface on the door handle, level, pull, or other operating hardware. The textured surface may be made by knurling or roughening or by a material applied to the surface.

2.3 DOOR BOLTS AND COORDINATORS

A. Characteristics:

1. Flush bolts to be forged brass 6 % inch x I inch, with Yz inch diameter bolts. Plunger to be supplied with milled surface one side which fits into matching guide.
2. Automatic flush bolts to be UL Listed as top and bottom bolts on a pair of classified fire doors. Bolt construction to be of rugged steel and brass components.
3. Self latching flush bolts to be UL Listed as top and bottom bolts on a pair of classified fire doors. Bolt construction to be of rugged steel and brass components.
4. Coordinators to be soffit mounted non-handed fully-automatic UL Listed coordinating device for sequential closing of paired doors with or without astragals.
5. Provide filler piece to close header. Provide brackets as required for mounting of soffit applied hardware.

B. Dustproof Strikes: BHMA Al56.16.

C. Surface Bolts: BHMA Al56.!6.

D. Manual Flush Bolts: BHMA Al56.16; designed for mortising into door edge.

E. Automatic and Self-Latching Flush Bolts: BHMA Al56.3; designed for mortising into door edge.

F. Acceptable Manufacturers:

1. Glynn-Johnson; an Ingersoll-Rand Company (GJ).
2. IVES Hardware; an Ingersoll-Rand Company (IVS).
3. Rockwood Manufacturing Company (RM).

2.4 EXIT DEVICES

A. Accessibility Requirements: Where handles, pulls, latches, locks, and other operating devices are indicated to comply with accessibility requirements, comply with the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities (ADAAG)."

1. Provide operating devices that do not require tight grasping, pinching, or twisting of the wrist and that operate with a force of not more than 5 lb f (22 N).

B. Exit Devices for Means of Egress Doors: Comply with NFPA 101. Exit devices shall not require more than 15 lb f (67 N) to release the latch. Locks shall not require use of a key, tool, or special knowledge for operation.

C. Panic Exit Devices: Listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for panic protection, based on testing according to UL 305.

D. Fire Exit Devices: Devices complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire and panic protection, based on testing according to UL 305 and NFPA 252.

E. Characteristics:

1. All exit devices mounted on labeled wood doors shall be through-bolted on the door per the door manufacturer's requirements.
2. All trim shall be through-bolted to the lock stile case.
3. All exit devices shall be made of brass, bronze, stainless steel, or aluminum material, plated to the standards architectural finishes to match the balance of the door hardware. Painted or anodized aluminum finishes are not acceptable.
4. Provide glass bead conversion kits to shim exit devices on doors with raised glass heads.
5. All series exit devices shall incorporate a fluid damper, which decelerates the touchpad on its return stroke and eliminates noise associated with exit device operation.
6. All exit devices shall be non-handed.
7. Touchpad shall extend a minimum of 'h of door width and shall be a minimum of 2-3/16 inch in height. Plastic touchpads are not acceptable.
8. Latchbolts shall have a self-lubricating coating to reduce wear. Plated or plastic coated latchbolts are not acceptable.
9. Outside Trim: Match design for locksets and latchsets, unless otherwise indicated.

F. Acceptable Manufacturer:

I. Von Duprin; an Ingersoll-Rand Company (VD).

2.5 ELECTRIC STRIKES

A. Standard: BHMA A156.31, Grade I. Use fail-secure electric strikes with fire-rated devices.

B. Acceptable Manufacturers:

I. Adams Rite Manufacturing Co.(ARM).
2. Folger Adam Security Inc.; an ASSA ABLOY Group company (FAS).
3. Locknetics; an Ingersoll-Rand Company (LSE).
4. Von Duprin; an Ingersoll-Rand Company (VD).

2.6 CLOSERS AND DOOR CONTROL DEVICES

A. Accessibility Requirements: Where handles, pulls, latches, locks, and other operating devices are indicated to comply with accessibility requirements, comply with the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities (ADAAG)" and ANSI A-117.I.

I. Comply with the following maximum opening-force requirements:

a. Interior, Non-Fire-Rated Hinged Doors: 5 lbf (22.2 N) applied perpendicular to door.
b. Sliding or Folding Doors: 5 lbf (222 N) applied parallel to door at latch.
c. Fire Doors: Minimum opening force allowable by authorities havingjurisdiction.

B. Door Closers for Means of Egress Doors: Comply with NFPA 101. Door closers shall not require more than 30 lbf (133 N) to set door in motion and not more than 15 lbf (67 N) to open door to minimmn required width.

C. Hold-Open Closers/Detectors: Coordinate and interface integral smoke detector and closer device with fire alarm system.

D. Size of Units: Unless otherwise indicated, comply with manufacturer's written recommendations for size of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Provide factory-sized closers, adjustable to meet field conditions and requirements for opening force.

E. Characteristics:

1. Door closers shall have fully hydraulic, full rack and pinion action with a high-strength cast iron cylinder.
2. Hydraulic fluid shall, be of a type requiring no seasonal closure adjustment for temperatures ranging from 120 degrees F (49 degrees C) to -30 degrees F (-35 degrees C).
3. Spring power shall be continuously adjustable over the full range of closer sizes, and allow for reduced opening force for the physically handicapped. Hydraulic regulation shall be by tamper-proof, non-critical valves. Closers shall have separate adjustment for latch speed, general speed and back check.
4. All closers shall have solid forged steel main arms (and forearms for parallel arm closers) and where specified or required, shall have a cast-in solid stop on the closer shoe ("cush"). Where door travel on outswing doors must be limited, use "cush" type closers. Auxiliary stops are not required when "cush" type closers are used.
5. Overhead spring closers shall have spring adjustable for 50 percent increase in closing power and fully mortised door tracks.
6. All closers shall be certified to exceed ten million (10,000,000) full load cycles by a recognized independent testing laboratory. All closers (overhead, surface and concealed) shall be of one manufacturer and carry manufacturer's warranty as specified herein.
7. Closers shall be installed to allow door swing as shown on Drawings. Doors swinging into exit corridors shall provide for corridor clear width as required by code. Wherever possible, mount closers inside rooms.
8. Powder coating finish to be certified to exceed I00 hours salt spray testing by ETL, an independent testing laboratory used by BHMA for ANSI certification.
9. Combination Door Closers and Holders: Provide units designed to hold door in open position under normal usage and to release and automatically close door under frre conditions. Incorporate an integral electromagnetic holder mechanism designed for use with UL listed fire detectors, provided with normally clused switching contacts. Where combination door closers, holder and detectors are scheduled or required, provide UL Listed photo-electric 24 V detector module.

F. Acceptable Manufacturer: LCN Closers; an Ingersoll-Rand Company (LCN).

2.7 PROTECTIVE TRIM UNITS

A. Size: 1-112 inches (38 mm) Jess than full door width on stop side and I inch (13 mm) less than full door width on hinge side, by height specified in door hardware sets.

B. Fasteners: Manufacturer's standard exposed fasteners consisting of machine or self-tapping screws.

C. Metal Protective Trim Units: BHMA A156.6; beveled top and 2 sides; fabricated from the following material:

1. Material: 0.050-inch- (1.3-mm-) thick stainless steel.
2. Acceptable Manufactnrers:

a. NES Hardware; an Ingersoll-Rand Company (NS).
b. Rockwood Manufacturing Company (RM).
c. Trimco (TBM).

2.8 FLOOR STOPS AND WALL BUMPERS

A. Stops and Bumpers: BHMA Al56.16, Grade 1. Provide floor stops for doors unless wall or other type stops are scheduled or indicated. Do not mount floor stops where they will impede traffic. Where floor or wall stops are not appropriate, provide overhead holders.

B. AcceptableManufacturers:

1. Glynn-Johnson; an Ingersoll-Rand Company (GJ).
2. NES Hardware; an Ingersoll-Rand Company (IVS).
3. Rockwood Manufacturing Company (RM).

2.9 OVERHEAD DOOR HOLDERS

A. Mechanical Door Holders: BHMA Al56.16.

1. Characteristics:

a. Provide heavy-duty door holders concealed and surface mounted of stainless steel.
b. Concealed holders to be installed with jamb bracket mortised flush with the bottom of the jamb. The arm and channel to be mortised into the door.
c. Surface holder to be installed with the jamb bracket mounted on the stop.

B. Combination Floor and Wall Stops and Holders: BHMA A156.8, Combination Overhead Stops and Holders: BHMA Al56.8.

C. Electromagnetic Door Holders: BHMA Al56.15. Coordinate with fire detectors and interface with ftre alarm system for labeled ftre door assemblies.

D. AcceptableManufacturers:

1. Glynn-Johnson; an Ingersoll-Rand Company (GJ).
2. Rixson Specialty Door Controls; an ASSA ABLOY Group company (RIX).

2.10 SILENCERS FOR DOOR FRAMES

A. BHMA Al56.16, Grade 1; neoprene or rubber, minimum diameter 1/2 inch (13 mm); fabricated for drilled-in application to frame. Provide three for each single door; four for pairs of doors.

B. AcceptableManufacturers:

I. Glynn-Johnson; an Ingersoll-Rand Company (GJ).
2. IVES Hardware; an Ingersoll-Rand Company (IVS).
3. Rockwood Manufacturing Company (RM).

2.11 DOORGASKETING

A. Standard: BHMA A156.22.

B. General: Provide continuous weather-strip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated or scheduled. Provide noncorrosive fasteners for exterior applications and elsewhere as indicated.

I. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.
2. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.
3. Door Bottoms: Apply to bottom of door, forming seal with threshold when door is closed.

C. Air Leakage: Not to exceed 0.50 cfin per foot (0.000774 cu. rnls perm) of crack length for gasketing other than for smoke control, as tested according to ASTM E 283.

D. Smoke-Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke-control ratings indicated, based on testing according to UL 1784.

I. Provide smoke-labeled gasketing on 20-minute-rated doors and on smoke-labeled doors.

E. Fire-Labeled Gasketing: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to NFPA 252.

F. Sound-Rated Gasketing: Assemblies that are listed and labeled by a testing and inspecting agency, for sound ratings indicated, based on testing according to ASTM E 1408.

G. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.

H. Gasketing Materials: ASTM D 2000 and AAMA 701/702.

I. Acceptable Manufacturers:

1. National Guard Products (NGP).
2. Reese Enterprises (RE).
3. Zero International (ZRO).

2.12 THRESHOLDS

A. Standard: BHMAA156.21.

B. Accessibility Requirements: Where thresholds are indicated to comply with accessibility requirements, comply with the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines fur Buildings and Facilities (ADAAG)" and ANSI AJ17.1.

1. Bevel raised thresholds with a slope of not more than I:2. Provide thresholds not more than 1/2 inch (13 mm) high.

C. Thresholds for Means of Egress Doors: Comply with NFPA 101. Maximum 1/2 inch (13 mm) high.

D. Acceptable Manufacturers:

1. National Guard Products (NGP).
2. Reese Enterprises (RE).
3. Zero International (ZRO).

2.13 MISCELLANEOUS DOOR HARDWARE

A. Boxed Power Supplies: Modular unit in NEMA ICS 6, Type 4 enclosure; filtered and regulated; voltage rating and type matching requirements of door hardware served; and listed and labeled for use with fire alarm systems.

2.14 FINISHES

A. The designations used to indicate hardware finishes are those listed in ANSIIBHMA A156.18, Materials and Finishes, including coordination with the traditional U.S. finishes shown by certain manufacturers for their products, and are as follows:

1.	Hinges (Exterior)	630 (US32D) Satin Stainless Steel.
2.	Hinges (Interior Wood Doors)	652 (USP) Satin Chrome Plated Steel.
3.	Hinges (Interior Metal Doors)	600 (USP) Prime Coat Paint.
4.	Flush Bolts	626 (US26D) Satin Chrome Plated Brass/Bronze.
5.	Locks	630 (US32D) Satin Stainless Steel.
6.	Exit Devices	626 (US26D) Satin Chrome.
7.	Door Closers	689 (AL) Powder Coat Paint.

8.	Push Plates	630 (US32D) Satin Stainless Steel.
9.	Pull Plates	630 (US32D) Satin Stainless Steel.
I0.	Protective Plates	630 (US32D) Satin Stainless Steel.
11.	Door Stops	626 (US26D) Satin Chrome Plated Brass/Bronze.
12.	Overhead Holders	630 (US32D) Satin Stainless Steel.
13.	Weatherstripping	628 (US28) Clear Anodized Aluminum.
14.	Thresholds	627 (US27) Mill Finish Aluminum.

PART 3 -EXECUTION

3.1 PREPARATION

A. Steel Doors and Frames: Comply with DHI A115 Series.

B. Wood Doors: Comply with DID AII5-W Series.

END OF SECTION 08 71 00

SECTION 08 80 00 - GLASS AND GLAZING

Division 1, General Requirements, are hereby made a part of this section as fully as if repeated herein.

1.00 GENERAL

1.01 SUMMARY

A. Related sections:

1. Section 081100: Steel Doors and Frames.

2. Section 084000: Storefront & Curtain Wall Window Systems.

3. Section 084330: Wind/Impact Windows.

1.02 REFERENCES

A. Standards of the following as referenced:

1. American National Standards Institute (ANSI).

2. American Society for Testing and Materials (ASTM).

3. Associated Laboratories, Inc. (ALI).

4. Consumer Products Safety Commission (CPSC).

5. Flat Glass Marketing Association (FGMA).

6. Glass Tempering Association (GTA).

7. Insulated Glass Certification Council (IGCC).

8. National Association of Mirror Manufacturers. (NAMM).

9. Sealed Insulating Glass Manufacturer's Association (SIGMA).

10. Safety Glass Certification Council (SGCC).

11. Underwriters' Laboratories, Inc. (UL).

12. Warnock Hersey International, Inc. (WHI).

B. Industry standards:

1. ANSI: Safety Performance Standards and Methods of Tests for Safety Glazing Materials Used in Buildings, Z97.1.

2. ALI: Directory, March 1981 edition.

3. CPSC: Safety Standard for Architectural Glazing Materials, 16CFR Part 1201.

4. GTA: Engineering Standards Manual.

5. IGCC: Certified Products Directory.

6. NAMM: Mirrors, Handle with EXTREME Care.

1.03 DEFINITIONS

A. Terms:

1. Glass materials: Raw glass in clear color or tints in annealed, heat-strengthened, or fully tempered state.

2. Clear glass: Colorless glass with light transmittance of 75% to 92%.

3. Annealed glass: Basic flat raw glass material.

4. Float glass: Same as annealed glass.

5. Tinted/heat absorbing glass: Add various colorants to normal clear glass batch creating desired color; visible light transmittance varies from 14% to 83% depending on color and thickness.

6. Heat-strengthened glass: Fabricating annealed glass material by special heat treating process with rapid cooling to impart approximately twice the strength of same thickness annealed glass under uniform loading. Recognized in ANSI Z97.1-1984.

7. Tempered glass: Fabricating annealed glass material by special heat treating process with rapid cooling to impart approximately four times the strength of same thickness annealed glass under uniform loading. Recognized in ANSI Z97.1-1984.

8. Manufactured units: Using basic glass materials, industry standard accessories and glass treatment such as coatings, combine with fabrication techniques, forming product with combinations of desirable performance characteristics.

9. Reflective glass: Clear or tinted glass material coated with thin layer of metal or metallic oxide reducing light transmittance having certain performance characteristics.

10. Insulated glass: Unit manufactured from two glass lites enclosing hermetically sealed air space.

1.04 SYSTEM REQUIREMENTS

A. Design requirements:

1. Comply with wind load criteria

a. specified in Aluminum Window section.

b. required by local code.

2. Maximum allowable deflection: Not exceed L/175 or 3/4", whichever is less at rated loads.

B. Performance requirements:

1. General:

a. Heat-strengthen or fully temper glazing materials, whether in monolithic state or as lite of insulating unit when required by glass fabricator's design calculations to resist tension stress caused by glass orientations, sizes and configurations, heat and wind loading, glazing conditions, temperature differential, inside window treatments, or other conditions affecting breakage probability.

b. Maximum allowable breakage probability: Eight lites per thousand.

2. Safety Glazing: Install safety glazing in the following hazardous locations:

a. Glazing in swinging doors.

b. Glazing in an individual fixed or operable panel adjacent to a door where the nearest exposed edge of the glazing is within a 24-inch arc of either vertical edge of the door in a closed position and where the bottom exposed edge of the glazing is less than 60 inches above the walking surface.

1.05 SUBMITTALS

A. Product data: Submit for each type glazing material and accessory product specified. Include technical data, storage and handling procedures, and performance characteristics.

B. Shop drawings:

1. Coordinate shop drawing submittal with major related sections.

2. Indicate location of each lite according to size, thickness, required fabrication, color or coating, heat treatment, safety glazing and other items specified below.

C. Quality control submittals:

1. Framing manufacturer's approval: Indicate by letter prior to submission of shop drawings stating authorized representative of storefront framing manufacturer has reviewed and approved details, including glass bite, clearances, and glazing methods.

2. Certificates:

a. Provide certifications from glass fabricators indicating compliance with specified requirements.

b. Submit certificates indicating materials supplied or installed are asbestos free.

4. Submit list of fabricators for tempered, and insulating units; indicate capability of complying with specified requirements.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Storage and protection:

1. Store glazing materials indoors in cool, dry area, off floor, equally supported to prevent stress and breakage.

2. Movement of partially unpacked cases is prohibited. Unpack glazing materials in accord with manufacturer's product data for type of material being handled. Stack individual lites as recommended by manufacturer.

3. Handle insulating units without rotating, warping, or "cartwheeling" units. Prevent damage to glazing material or edge seal.

1.07 WARRANTY

A. Thermal insulating units: Warrant from failure due to loss of edge seal for a ten year period; begin at Date of Substantial Completion.

2.00 PRODUCTS

2.01 MANUFACTURERS

A. General:

1. Except as otherwise noted, products specified as standard of quality are indicated in Articles 2.02 and 2.03.

2. Products of manufacturers listed below similar in type, color, and quality listed in Article 2.02 are acceptable for use, subject to approval of product list and samples.

3. Products of fabricators listed below similar in type to specified fabricated products listed in Article 2.03 are acceptable for use, subject to following requirements:

a. Product list approval.

b. Sample approval.

c. Use of specified materials in fabrication, or, in absence of certain minor materials, using industry accepted standards and reference standard accepted materials and procedures.

B. Clear and tinted glass manufacturers:

1. PPG.

2. Ford Motor Company, Glass Division.

3. Guardian Industries, Corp.

4. Libby-Owens-Ford Company.

C. Acrylic glazing manufacturers:

1. Plaskolite.

2. Polygal.

3. Piedmont Plastics.

D. Glass products fabricators:

1. Heat-strengthened or tempered glass:

a. American Flat Glass Distributors, Inc.

b. Cardinal IG.

c. Falconer Glass Industries.

d. Glasstemp, Inc.

e. Guardian Industries, Corp.

f. Spectrum Glass Products Div. of H.H. Robertson Company.

g. Tempglass, Inc., a Division of Indal.

h. Viracon.

E. Insulating glass fabricators:

1. American Flat Glass Distributors, Inc.

2. Cardinal IG.

3. Falconer Glass Industries.

4. Glasstemp, Inc.

5. Globe Amerada Glass Company.

6. Guardian Industries, Corp.

7. Independent Insulating Glass Company.

8. Spectrum Glass Products Div. of H.H. Robertson Company.

9. Tempglass, Inc., a Division of Indal.

10. Viracon.

F. Special glass fabricators:

1. Low-E glass:

a. PPG.

b. Libby-Owens-Ford Company.

c. Ford Motor Company, Glass Division.

d. Guardian Industries, Corp.

2.02 MATERIALS

A. General: Glass products specified below are basic glass materials required for Project. Article 2.03 may require materials indicated below as basis to manufacture or fabricate additional final products required in Article 2.03.

B. Clear glass:

1. Float: 1/4" thickness, ASTM C1036-85, Type I, Class 1, Quality q3.

2. Tempered:

a. Thickness: 1/4" thickness, ASTM C104885, Grade B, Style I, Type I, Quality q3; fully temper in accord with ANSI Z97.1-1984.

b. Provide SGCC certification label. Position on unit so final position in framed opening occurs consistently in lower right hand corner of unit, parallel to floor in inconspicuous location.

with a 1″ to 2″ air space between the glass and insulation. The air space shall be vented to the outside with 3/16″ weep holes min. 3 per lite.

C. Tinted glass:

1. Float: 1/4" thickness, ASTM C1036-85, Type I, Class 2, Quality q3.

3. Tempered:

a. Thickness: 1/4" thickness, ASTM C104885, Grade B, Style I, Type I, Quality q3; fully temper in accord with ANSI Z97.1-1984.

b. Provide SGCC certification label. Position on unit so final position in framed opening occurs consistently in lower right hand corner of unit, parallel to floor in inconspicuous location.

D. Spandrel glass

1. Monolithic glass shall be ¼″ thick, float glass, with opacifying coating on the number two (inboard) surface.

2. Glass shall be heat strengthened or fully tempered flat glass in accordance with the current Glass Tempering Association, Engineering Standard Manual.

3. The opacifying coating shall be silicone, water-base, elastomer with a minimum thickness of 8 mils wet

4. Sealants, gaskets, and setting blocks compatible with the opacifying coating shall be used.

5. Rigid insulation, minimum 1 ½″ thick, with foil vapor barrier shall be used behind the spandrel glass.

2.03 MANUFACTURED UNITS

A. Reflective Solarcool Gray over Solarban 60 Low-E by PPG.

1. Unit Overall Thickness: 1″.

2. Visible Light Transmittance: 42 percent minimum.

3. Winter Nighttime U-Factor: 0.29 maximum.

4. Summer Daytime U-Factor: 0.27 maximum.

5. Solar Heat Gain Coefficient: 0.26 maximum.

6. Outdoor Visible Light Reflectance: 20 percent maximum.

2.04 ACCESSORIES

A. Setting blocks and edge cushions: Neoprene, 70-90 durometer hardness; meeting ASTM D1056-78.

1. Setting blocks:

a. Neoprene, EPDM, or silicone, 85 +5 Shore A durometer hardness.

b. Width: 1/16" less than full channel width.

c. Height: Sufficient height to provide recommended nominal bite and minimum edge clearance.

d. Length: 0.1" length per SF glass, but not less than 4" long.

2. Edge cushions: Neoprene 65 +5 Shore A durometer hardness, 3" long minimum.

B. Spacer shims: Neoprene, 40-50 durometer hardness, meeting ASTM D1056-78.

C. Glazing sealant:

1. Acceptable products:

a. Dow Corning Corp.; #999 Silicone Rubber Sealant.

b. General Electric Company, Silicone Products Dept.; Silicone Construction 1200 Sealant.

c. Tremco, Inc.; Proglaze.

2. Characteristics: One part silicone rubber. Colors selected by Facility Design Group Inc. from manufacturer's standard selection.

D. Glazing tape:

1. Acceptable products:

a. Pecora Corp.; Extru-Seal Glazing Tape.

b. Protective Treatments, Inc.; PTI-303.

c. Tremco, Inc.; 440 Tape.

d. Pecora Corp.; 863.

2. Characteristics: Preformed butyl or butylpolyisobutylene tape, 100% solids, aluminum color.

E. Preshimmed glazing tape:

1. Acceptable products:

a. Pecora Corp.; Preshimmed Extru-Seal Glazing Tape.

b. Protective Treatments, Inc.; PTI-303 Spacer Rod Glazing Tape.

c. Tremco, Inc.; Preshimmed 440 Tape.

2. Characteristics: Preformed butyl or butylpolyisobutylene tape encasing continuous rubber shim, 100% solids, aluminum color.

F. Molded glazing gaskets and wedges: Molded or extruded shapes meeting ASTM D2000-80, Designation 2BC 415 to 3BC 620, black color. Provide exterior gaskets for curtain-wall system with factory molded corners; wedge-in type interior gaskets.

G. Polyvinyl chloride foam tape: Closed cell, self-adhesive tape meeting ASTM D1667-76.

2.05 FABRICATION

A. Shop fabrication:

1. Certain products fabrication techniques are implied based on specified products, and as such, are not addressed in this Paragraph. Fabrication or techniques indicated are intended to be general in nature.

2. Rollwave distortion parallel with bottom edge of glass as installed.

3. Fabricate glass units to sizes and configurations indicated on reviewed shop drawings for glazed openings. Provide edge clearances and tolerances complying with glass or framing manufacturer requirements. Provide indicated thicknesses, or if not indicated, provide thicknesses recommended by glass manufacturer.

4. Preselect side for coated units to provide uniform appearance in final product in accord with other tolerances.

5. Fabricate insulating units to provide uniform appearance as viewed from exterior, i.e., same direction of bow and rollwave distortion.

B. Tempered glass for butt glazed interior glass partitions: Grind edges; polish edges exposed to view and butt edges.

C. Tolerances:

1. General: Provide glass products in accord with standards listed above and tolerances below.

2. Heat strengthened glass:

a. 3'-0" runs: 1/16" bow.

b. 8'-0" runs: 1/8" bow.

3. Tempered glass units:

a. 2'-0" runs: 1/16" bow.

b. 5'-0" runs: 1/8" bow.

c. 10'-0" runs: 1/4" bow.

4. Rollwave peak to valley: Not exceeding 0.005" with target of 0.003" deviation from flatness.

5. Surface compression:

    a. Tempered glass, range: Not less than 10,000 PSI.

    b. Heat strengthened glass, range: 3,500 to 7,500 PSI.

2.06 SOURCE QUALITY CONTROL

A. Tests: Perform required tests to provide units ready for installation in accord with above specified requirements.

B. Inspection: Subject glass to periodic mechanical and visual checks verifying compliance with above quality standards.

3.00 EXECUTION

3.01 EXAMINATION

A. Verify compliance with following requirements prior to beginning glazing Work.

1. Framing is anchored in position, plumb and square within 1/8" of nominal dimensions indicated.

2. Fastener heads and other projections are removed from glazing rabbets.

3. Corners and fabrication intersections are sealed; framing is weathertight.

4. Rabbets at sills weep to outside; rabbets are sufficient depth and width to receive glazing material and provide required overlap of glazing material.

3.02 APPLICATION

A. Preliminary work:

1. Clean glazing channel of debris and protective coating immediately prior to glazing. Use material acceptable to framing, glazing material, and glazing sealant manufacturers.

2. Inspect glazing material prior to installation. Eliminate lites having face or edge damage.

B. Cutting or altering lites of tempered insulating glass in field is prohibited.

C. Performance requirements:

1. Install glazing in accord with FGMA "Glazing Manual" requirements, storefront or window manufacturer requirements, glass manufacturer's or fabricators requirements, and other coordinated specified requirements.

2. Install glazing materials to obtain airtight and watertight installation to withstand temperature changes and windloads without failure.

3. Protect glazing material faces and edges during handling and installation.

4. Size glazing materials for each opening to ensure bite on glazing material, without imposing strain, in accord with manufacturer's product data.

5. Maintain minimum bed clearance between glazing material and sash of 1/8", both sides, except where greater clearance is required by either glazing material or framing manufacturer.

D. Glazing procedures:

1. Install glazing materials in accord with manufacturer's product data and applicable standards, except where more stringent requirements are specified.

2. Install setting blocks for all glazing materials over six SF area. Install at sill rabbet at quarter points. Size setting blocks in proportion to glass weight; minimum 4" length.

3. Shim all lites over 100 united inches, inboard and outboard, on all sides using continuous shims.

4. Storefront glazing: Install glazing in accord with entrances and storefronts manufacturer's approved installation instructions.

5. Storefront glazing:

a. Apply continuous gasket to exterior rabbet with joint at center top of frame. Notch wedge portion of gasket at corners to form neat corners.

b. Center glazing material in rabbet. Apply gasket to inside, mitering at corners.

c. Oversize gasket to compress miter joint into positive seal.

6. Exterior channel glazing:

a. Glaze using butylpolyisobutylene tape outboard; glazing sealant inboard. Cut tape to size and apply to exterior stop, maintaining top edge flush with sight line. Apply tape to horizontal members first, then verticals, with butted joints.

b. Center glazing material in rabbet. Apply stop shim and glaze with sealant. Apply heel bead for minimum 3/16" bite and positive bond with sash.

c. Strike sealant to sight line.

7. Exterior channel glazing:

a. Glaze using preshimmed butyl polyisobutylene tape outboard; glazing gasket inboard. Cut tape to size and apply to exterior stop, maintaining top edge flush with sight line. Apply tape to horizontal members first, then to verticals, with tight butted joints.

b. Center glazing material in rabbet. Apply stop and install continuous sealant seal. Secure glazing material with continuous gasket, miter at corners.

8. Interior channel glazing: Glaze using polyvinylchloride tape applied to both sides, all stops. Place tape with butted joints. Compress tape approximately 30%. Center glazing material in rabbet.

9. Glazing sealant installation: Comply with applicable provisions of Sealants and Caulking section. Prevent filling of weep holes with sealant.

3.03 CLEANING AND PROTECTION

A. Protect glazing materials subject to damage during construction from breakage by attachment of crossed streamers to framing. Do not mark on surfaces.

B. Remove and replace broken, cracked, chipped, or otherwise damaged glazing materials prior to Date of Substantial Completion.

+ + END OF SECTION 08 80 00 + +

SECTION 09 26 00 - CR STUDS & GYPSUM BOARD SYSTEMS

1.00 GENERAL

1.01 SUMMARY

A. Related sections:

1. Section 061000: Miscellaneous Rough Carpentry.

2. Section 095100: Acoustical Ceilings.

6. Section 099000: Painting.

B. Section Includes:

1. Gypsum Products and Accessories.

2. Sheathing.

3. Cold Rolled Metal Studs, load bearing and non-load bearing.

1.02 REFERENCES

A. Standards of the following as referenced:

1. American Society for Testing and Materials (ASTM).

2. Federal Specification (Fed. Spec.).

3. Gypsum Association (GA).

4. Underwriters' Laboratories, Inc. (UL).

5. Warnock Hersey International (WHI).

1.03 SUBMITTALS

A. Product data: Indicate product description, including compliance with specified requirements and installation requirements. Mark manufacturer's brochures to include

only those products proposed for use.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Storage:

1. Stack gypsum board off floor, on pallets providing continuous support for gypsum board to prevent sagging. Stack gypsum board in manner to prevent long lengths over short lengths.

2. Store adhesives in dry area; provide protection against freezing at all times.

1.05 PROJECT CONDITIONS

A. Install gypsum board only after building is enclosed.

B. Ventilation:

1. Provide ventilation during and following adhesive and joint treatment application.

2. Use temporary air circulators in enclosed areas lacking natural ventilation.

3. Allow additional drying time between coats of joint treatment, under slow drying conditions.

4. Protect installed materials from drafts during hot, dry weather.

2.00 PRODUCTS

2.01 MANUFACTURERS

A. Acceptable manufacturers:

1. Except as otherwise noted, products specified as standard of quality are indicated in Article 2.02.

2. Products of manufacturers listed below similar in types and quality listed in Article 2.02 are acceptable for use subject to approval of product list

and samples.

3. Certain manufacturer's products may be required for use in particular tested and rated assemblies. Use ONLY those products indicated as acceptable by testing agency in rated construction.

4. Framing members, gypsum products, accessories, and systems:

   a. Domtar Gypsum.

   b. Georgia-Pacific Corp.

   c. Gold Bond Building Products/ National Gypsum Company.

   d. U.S. Gypsum Company.

   e. Dietrich.

2.02 COMPONENTS

A. Framing members:

1. Standard interior metal studs:
   a. Size: 25 gauge or as required by vertical span uncoated thickness minimum, electro-galvanized steel, meeting ASTM C645; 1-1/4" minimum face width by required depths and lengths indicated; 1 5/8”, 3-5/8” and 6” deep (see drawings). Install two 20 gauge studs at all door jambs.

   b. Actual gauge required by partition height in accord with stud manufacturer's product data for height/gauge limitations.

2. Load Bearing exterior metal studs:

   a. Size: 6” or 8” (see drawings) depth, 18 gauge, 1 5/8” flange.

3. Floor and ceiling runners: Electro-galvanized steel, 1" deep, minimum, by widths to receive studs, same

gauge uncoated thickness as studs.

B. Gypsum board:

1. Regular gypsum board: Meeting ASTM C36 and Fed. Spec. SS-L-30D, Type III, Grade R, Class 1, forms A and C; 5/8" thickness, tapered edges.

2. Water-resistant gypsum board: Meeting ASTM C630 and Fed. Spec. SS-L-30D, Type VII, Grade W or X, Class 2; 5/8" thickness, tapered edges.

3. Fire-resistance rated gypsum board: Meeting ASTM C 1396, Flame Spread rating of 15 and Smoke Developed rating of 0, in accordance with ASTM E 84, (UL 723, UBC 8-1, NFPA 255, CAN/ULC-S102). “UL Classified for Fire Resistance (ANSI/UL 263; ASTM E 119) and listed under UL File No. CKNX.R3660; 5/8" thickness, tapered edges.

C. Fasteners:

1. Fasteners for metal framing:

a. Attaching metal runners and furring channels to concrete and masonry: Powder actuated type capable of withstanding 193 lbs. single shear and 200 lbs. bearing force without exceeding allowable stress design of fastener or member being fastened.

b. Fastening to metal decking and fastening framing members together: Type S, pan head, in sizes recommended by gypsum board manufacturer for applications indicated.

2. Screws for gypsum board application:

a. Application of single layer of gypsum board to metal framing: Meet ASTM C100283, Type S, or ASTM C954, 1" length minimum, bugle head.

b. Applications not listed: Conform to gypsum board manufacturer's product literature for conditions encountered.

D. Joint materials and adhesives:

1. Joint tape: Meeting ASTM C475 and Fed. Spec. SS-J-570B, Type II; asbestos free and perforated; type required for board type use.

2. Joint compound: Meeting ASTM C475 and Fed Spec. SS-J-570B, Type I; vinyl base asbestos free, ready-mixed tape embedment and topping compounds; type required for board type use.

E. Accessories:

1. Corner reinforcement: Galvanized steel with 1-1/4" wide flanges, similar to U.S. Gypsum Company Dur-A-Bead No. 800.

2. Metal jamb, ceiling, and casing trim: Manufacturer's standard "U" and "L" shaped galvanized members providing edge protection and neat finished edges; similar to U.S. Gypsum Company, No. 801-A and No. 801-B, respectively.

3. Control joints: Roll-formed zinc alloy; similar to U.S. Gypsum Company, No. 093.

4. Furring channels: 18 gauge uncoated thickness minimum, electro-galvanized steel, meeting ASTM C645; 1-1/2" deep by 1-1/4" face width.

5. Furring channel clips: Manufacturer's standard type for attachment of furring channels to cold-rolled runner channels.

6. Deflection Connectors:

   a. Manufacturers standard for all load bearing and non load bearing framing systems.

7. Sheathing:

   a. Fiberglass-mat faced gypsum sheathing, ½″ thick, DensGlass Gold manufactured by Georgia-Pacific.

3.00 EXECUTION

3.01 INSTALLATION

A. Framing and furring:

1. Install steel framing members in accord with ASTM C754, tolerances indicated in Article 3.02, and as follows:

2. Runners:

a. Accurately align runners at floor and ceiling or structure; anchor securely with specified fasteners approximately 2" from runner ends and not exceeding 2'-0" O.C.

b. Attach at floor and underside of structural deck for full height partitions with specified fasteners; space at 2'-0" O.C., maximum.

c. Attach to ceiling suspension system for partitions indicated to terminate at ceiling; use 1/8" toggle bolts or sheet metal screws into "Tee", spline, or other members; space at 2'-0" O.C., maximum.

d. See drawings for attachment at shear walls.

3. Studs:

a. Position full length studs vertically; indicated spacing, or, if not indicated, at 1'-4" O.C., maximum, engaging floor and ceiling runners. Attach with specified fasteners at floor and ceiling runners; attach each side of runner.

b. Provide double studs at interior and exterior corners, expansion joints, partition termination, and within 2" of door openings in partitions. Locate next stud not more than 6" from double studs. At interior door jambs, double studs to be minimum 20 gauge.

c. Secure abutting and intersecting walls with fasteners through stud flanges.

d. Horizontal reinforcement between studs and at door frame head: Install cut-to-length runner sections with web-flange bent at each end horizontally; secure to adjacent vertical studs.

4. Furring:

a. Attach to masonry or concrete substrate with appropriate fasteners; space at 2'-0" O.C. on alternating furring channel flange.

b. Position channels vertically, space at 2'-0" O.C., maximum.

B. Gypsum board, general:

1. Install gypsum board in accord with manufacturer's product data, GA-216, and ASTM C840, except where more stringent requirements are specified.

2. Use gypsum board of maximum lengths to minimize end joints. Stagger end joints.

3. Abut gypsum boards without forcing. Fit ends and edges of gypsum board. Do not place butt ends against tapered edges.

4. Support ends and edges of gypsum board panels on framing or furring members.

5. Install water resistant board on wet or shower surrounds, and walls receiving thin-set tile application.

6. Install gypsum board accessories in accord with gypsum board manufacturer's product data or as follows:

a. Control joints: Install in walls and ceilings at locations indicated, not exceeding 50'-0" O.C.

b. Corner beads: Install at all external corners.

c. Metal trim shapes: Provide at exposed edge of gypsum board at door and window openings, intersections with other materials, and intersection of walls with ceilings.

7. Specialty accessories: Install in accord with accessory manufacturer's installation instructions.

8. Install sound attenuation blankets at indicated locations.

C. Gypsum board, single layer installation:

1. Ceilings: Apply gypsum board with long dimension at right angle to framing. Terminate ends and edges of gypsum board on furring members.

2. Walls:

a. Apply gypsum board vertically or horizontally at Subcontractor's option.

b. Stagger end joints in opposite sides of partitions.

c. Terminate long edges or ends of gypsum board on framing or furring members.

3. Fastening: Screw attach gypsum board to metal studs at 12" O.C., maximum at intermediate studs, 8" O.C. at ends; use specified fasteners.

D. Gypsum board joint treatment:

1. Apply joint compound to joints and angles in gypsum board and embed joint tape. Apply two additional coats of compound over tape, allow drying between coats, feather-edge and sand or damp sponge smooth each coat.

2. Apply three coats, minimum, compound over fastener depressions; sand or damp sponge smooth each coat; bring to level plane of gypsum board surface.

3. Fastener pop:

   a. Repair fastener pop by installing second fastener approximately 1-1/2" from fastener pop and re-seat fastener.

   b. Where face paper is punctured, drive new fastener approximately 1-1/2" from defective fastener and remove defective fastener.

   c. Fill damaged surface with compound and sand or damp sponge smooth to level of plane of gypsum board.

4. Fill cracks with compound; sand or damp sponge smooth and flush.

5. Dust surfaces; leave ready for decoration.

3.03 APPLICATION

A. Allowable tolerances for framing, unless indicated otherwise:

   1. Variation from plumb: 1/4" in 10'-0" height, non-cumulative.

   2. Variation in room horizontal squaring diagonals: 1/4".

   3. Variation in walls from tangent line (straightness): 1/4" in 10'-0" non-cumulative.

   4. Variation in location of walls from dimension: +1/4".

   5. Location of dimensioned openings: +3/8".

   6. Variation in rough opening size: +1/4",-1/8".

+ + END OF SECTION 09 26 00 +
+

SECTION 09 30 00 - TILE

Division 1, General Requirements, are hereby made a part of this section as fully as if repeated herein.

1.00 GENERAL

1.01 SUMMARY

A. Related sections:

1. Section 09 26 00: CR Studs & Gypsum Board Systems.

1.02 REFERENCES

A. Standards of the following as referenced:

1. American National Standards Institute (ANSI).

2. American Society for Testing and Materials (ASTM).

3. Marble Institute of America (MIA).

4. Tile Council of America (TCA).

B. Industry standards:

1. ANSI:

a. Recommended Standard Specifications for Ceramic Tile, TCA 137.1.

2. TCA: Handbook for Ceramic Tile Installation, 2009 edition.

1.03 DEFINITIONS

A. Terms:

1. Ceramic mosaic tile: Tile formed by dust-pressed or plastic method, usually 1/4" to 3/8" thick, having

facial area less than six square inches; may be of either porcelain or natural clay composition and may be plain or abrasive mixture throughout.

2. Glazed tile: Tile with fused impervious facial finish composed of ceramic materials, fused to body which may be non-vitreous, semi-vitreous, or impervious.

3. Impervious tile: Tile with water absorption of less than 0.5%.

4. Semi-vitreous: Tile with water absorption of more than 3.0%, but not more than 7.0%.

5. Unglazed tile: Hard, dense tile of uniform composition throughout deriving color and texture from body materials.

6. Vitreous: Tile with water absorption of more than 0.5%, but not more than 3.0%.

1.04 SUBMITTALS

A. Product data: Submit manufacturer's printed product description and installation instructions for use of manufactured mortars and grouts and other items specified.

B. Quality control submittals:

1. Certificates: Submit Master Grade Certificates; indicate materials conform to TCA 137.1; indicate grade, kind of tile, identification for tile packages, and name and location of Project. Provide tile manufacturer signature on issued certificates at time of shipping.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Packing and shipping:

1. Deliver materials in original containers with labels legible and intact, identifying brand name and

contents.

2. Provide materials in original unopened containers, bags, and cartons with manufacturer's labels intact and legible.

   a. Grade-seal tile cartons by manufacturer in accord with TCA 137.1 with grade seals unbroken.

   b. Provide manufactured mortars, adhesives, and grouts bearing hallmarks certifying compliance with specified standards.

B. Acceptance at site:

1. Unload materials; visually check for damage.

2. Open, punctured, or opened damaged containers or wet materials will not be accepted.

3. Damaged materials determined by visual inspection will not be accepted.

4. Remove rejected materials from site immediately.

C. Storage and protection:

1. Store materials in dry area in manufacturer's protective packaging; in original containers with labels and installation instructions intact.

2. Store materials under cover, off ground; protect from moisture.

3. Remove wet, damaged, or deteriorated materials.

1.06 PROJECT CONDITIONS

A. Environmental requirements:

1. Set and grout tile in Portland cement mortar and grout when ambient temperature is at least 50 degrees F. minimum during tile work and for seven days after completion.

2. Comply with minimum temperature recommendations of manufacturers for setting and grouting materials in other than Portland cement mortar.

3. Vent temporary heaters to outside to avoid carbon dioxide damage to new tile Work.

2.00 PRODUCTS

2.01 MANUFACTURERS

A. Acceptable manufacturers:

1. Except as otherwise noted, products specified as standard of quality are indicated in Article 2.02.

2. Products of manufacturers listed below similar in types, colors, and quality listed in Article 2.02 are acceptable for use, subject to approval of product list and samples.

B. Tile:

1. Ceramic tile:

a. Florida Tile.

b. Dal-Tile Corp.

c. American Olean Tile Company Div., National Gypsum Company.

d. Mid-State Tile Company.

e. Summitville Tiles, Inc.

f. United States Ceramic Tile Company.

C. Latex admixtures:

1. American Olean Tile Company Div., National Gypsum Company.

2. W.R. Bonsal Company.

3. Bostik Construction Products.

4. Laticrete International, Inc.

5. L & M Manufacturing Company.

6. Southern Grouts and Mortars, Inc.

7. Summitville Tiles, Inc.

8. Syracuse Adhesives Company.

D. Mortars and grouts, typical, unless specifically indicated below:

1. American Olean Tile Company Div. National Gypsum Company.

2. W.R. Bonsal Company.

3. Bostik Construction Products.

4. Southern Grouts and Mortars, Inc.

5. Summitville Tiles, Inc.

6. Syracuse Adhesives Company.

2.02 MANUFACTURED UNITS

A. Porcelain floor tile:

1. Meeting TCA 137.1, Section 5.1, Standard Grade Porcelain type, impervious, maximum absorption 0.5%.

2. Edges: Cushion.

3. Colors: See drawings.

4. Nominal face size: 12" by 12".

5. Thickness: 1/4".

6. Glaze hardness: 7.0 Mohs.

7. Break strength: 325 lbs. avg.

7. Slip resistance: In accord with TCA 137.1.

8. Trim shapes: Match unglazed mosaic tile color and size for thin-set application. Include required 5" high coved, bullnose base, bullnose caps, beads, and corner units.

9. Threshold: Marble 2″ wide x 3/8″ thick.

10. Base: 6″ x 12″ matching cove base and cove base corner.

2.03 COMPONENTS

A. Setting materials; provide setting materials and admixtures from same manufacturer or compatible with grouting materials:

1. Latex-Portland cement dry-set mortar for ceramic tile:

a. Presanded Portland cement and additives meeting ANSI A118.4 with latex additive added to all mortar at proportions recommended by additive manufacturer's product data.

b. Acceptable additive product: American Olean Tile Company Div., National Gypsum Company; AO Acrylic Thin-Set Additive.

B. Grouting materials; provide grouting materials and admixtures from same manufacturer and compatible with setting materials:

1. Dry-set grout for tile joints 1/8" or less.

a. Acceptable product: American Olean Tile Company Div. National Gypsum Company; Dry Wall Grout.

b. Latex additives, acceptable product: American Olean Tile Company Div. National Gypsum Company;

AO Acrylic Grout Additive.

c. Characteristics: Portland cement with additives; color selected by Purchaser from manufacturer's standard colors.

2. Commercial Portland cement grout:

a. Acceptable product: American Olean Tile Company Div. National Gypsum Company; AO Sanded Floor Grout.

b. Latex additives, acceptable product: American Olean Tile Company Div. National Gypsum Company; AO Acrylic Grout Additive.

c. Characteristics: Portland cement and additives, including colorfast mineral oxide pigments; colors selected by Purchaser from manufacturer's standard colors.

C. Expansion joint materials:

1. Acceptable products:

a. Bostik Construction Products; Hydroment 550.

b. Pecora; Dynatred One Part.

c. Toch Div./Carboline Company; Polytok Sealant.

d. Tremco, Inc.; THC-900, NR200.

2. Characteristics:

a. Material: Self leveling polyurethane sealant.

b. Color: Selected by Purchaser from manufacturer's standard selection.

3. Back-up material: Flexible, non-compressive foam type.

D. Thresholds:

1. Marble: Meeting Marble Institute of America (MIA) Group A, honed finish; sizes and shapes indicated; color selected by Purchaser.

2.04 ACCESSORIES

A. Sealant at tile/plumbing fixture: Silicone bath sealant, specified in Sealants and Caulking section.

B. Grout release agents:

1. Acceptable manufacturers:

a. American Olean Tile Company Div., National Gypsum Company.

b. Klein Company, Inc.

2. Type, based on Klein Company, Inc. products; use for cleaning following conditions:

a. Ceramic tile: Grout Guard 2 or Super Grout Release.

C. Cleaners:

1. Acceptable manufacturers:

a. American Olean Tile Company Div., National Gypsum Company.

b. Klein Company, Inc.

c. Summitville Tiles, Inc.

2. Type, based on Summitville Tiles, Inc. products; use for cleaning following conditions:

a. Ceramic tile (acidic cleaner): SL-7.

b. Latex grout: SL-66.

c. Non-acid latex grout cleaner: SL-44.

3.00 EXECUTION

3.01 EXAMINATION

A. Verification of conditions:

1. Verify grounds, anchors, plugs, hangers, bucks, electrical, and mechanical Work in or behind tile are in proper place.

2. Examine conditions and substrates where products specified in this section are installed; submit written notification of unacceptable conditions or substrates.

3. Submit copy of installer's report to Facility Design Group Inc. within 72 hours of report receipt.

4. Proceeding with construction activities of this section:

a. Prior to correction of unacceptable conditions or substrates are prohibited.

b. Indicates acceptance of conditions or substrates.

c. Additional work required in this section due to pre-existing conditions not properly noted will not be paid as extra.

3.02 INSTALLATION

A. General:

1. Install tile Work in accord with following ANSI standards:

a. A108.1: Glazed wall tile, ceramic mosaic tile, quarry tile, and paver tile installed with Portland cement mortar.

b. A108.5: Dry-set Portland cement mortar or latex

modified Portland cement mortar.

c. A108.10: Installation of grout in tilework.

2. Install tile in accord with the following TCA Handbook standards:

a. Floors, interior, concrete:

1) F116-89: Organic Adhesive or Epoxy Adhesive. (thinset)

b. Walls, interior, masonry or concrete:

1) W202-89: Dry-set Mortar or Latex-Portland Cement Mortar. (thinset)

c. Walls, interior, metal studs:

1) W242-89: Gypsum Board, Organic Adhesive. (thinset)

d. Shower receptors, walls, wood or metal studs:

1) B416-89: Gypsum Board, Organic Adhesive.

B. Tile:

1. Center tile in spaces with equal width tiles at opposite walls, with no tiles less than 1/4 tile wide.

2. Cut and drill tile and trim shapes without damage to exposed faces. Rub cut edges smooth with carborundum stone.

3. Locate accessories before tile is installed.

4. Joints:

a. Floor tile: Perpendicular and parallel to walls, unless skewed walls are indicated.

b. Wall tile: Vertical and horizontal, unless otherwise indicated.

c. Width:

1) Glazed wall tile: Width determined by spacer lugs.

d. Provide joints flush with tile face.

5. Align joints in floor and base units.

6. Thresholds: Install using same method specified for adjacent floor tile.

7. Edge strips: Install at door openings not having thresholds and at intersections of tile with other flooring materials where thresholds are not indicated.

8. Grind and fit tiles at intersections, against trim, and at built-in fixtures and accessories. Fit around outlets, pipes, fixtures, and fittings so plates, escutcheons, and collars overlap Work.

C. Caulk perimeter of plumbing fixtures at tile with silicone bath sealant in accord with requirements of Sealants and Caulking section.

D. Allowable tolerances: Plumb, level, and true to line within +1/2" in an undivided space and +1/16" maximum in a running foot.

3.03 CLEANING AND PROTECTION

A. Cleaning:

1. Clean tile as Work progresses, preventing accumulation of setting and grouting materials or debris on tile faces.

2. Clean glazed tile and thresholds using solution of detergent and water only. Cleaning glazed tile and thresholds with acids is prohibited.

3. Utilize specified cleaning solution and clean water for cleaning. Work in areas not exceeding 20 SF., scrubbing tile surfaces to remove residue. Do not

scrub grout joints.

4. Flush cleaned areas with water immediately after cleaning. Scrub surfaces with clean water to remove remaining film.

5. Do not reuse cleaning solutions. Discard solutions containing residue and debris from cleaning operations in proper manner to prevent contamination or staining of adjacent Work.

B. Protection:

1. Protect installed tile Work until Date of Substantial Completion by covering with kraft paper; tape joints and edges.

2. Remove just prior to Date of Substantial Completion; final clean tile.

+ + END OF SECTION 09 30 00 + +

SECTION 09 51 00 - ACOUSTICAL CEILINGS

1.00 GENERAL

1.01 SUMMARY

A. Related sections:

1. Section 092600: CR Studs & Gypsum Board Systems.

1.02 REFERENCES

A. Standards of the following as referenced:

1. American Society for Testing and Materials (ASTM).

2. Underwriters' Laboratories, Inc. (UL).

1.03 SUBMITTALS

A. Product data: Include product descriptions and installation instructions for each material.

B. Shop drawings; include:

1. Lay-out including locations of lighting fixtures and grilles.

2. Insert and hanger spacing and fastening details.

3. Splicing method for main and cross runners.

4. Change in level details.

5. Access panel dimensions and locations.

6. Support at lighting fixtures.

C. Samples; submit following:

1. 6" by 6" samples of each type acoustical material specified.

2. 1'-0" length of each suspension member.

D. Quality control submittals:

1. Certificates:

a. Submit certificates indicating materials supplied or installed are asbestos free.

b. Indicate compliance with specified requirements, including UL fire-resistance ratings.

1.04 QUALITY ASSURANCE

A. Mock-ups:

1. Install complete ceiling of each type specified in space designated. Notify Purchaser when spaces are ready for observation.

2. Following Purchaser’s acceptance, retain mock-up as standard of quality for ceiling installation. Accepted mock-up may remain as part of finished Work.

1.05 PROJECT CONDITIONS

A. Environmental requirements:

1. Relative humidity: Maintain within manufacturer's recommended range for specified materials.

2. Maintain uniform temperature in range of 60 degrees F. to 85 degrees F. for at least 48 hours prior to installation and after installation for Project duration.

1.06 SEQUENCING AND SCHEDULING

A. Schedule acoustical material installation to minimize need for removal and replacement of acoustical units to accommodate Work of other trades.

2.00 PRODUCTS

2.01 MANUFACTURERS

A. Acceptable manufacturers:

1. Except as otherwise noted, products specified as standard of quality are indicated in Article 2.02.

2. Products of manufacturers listed below similar in type and quality listed in Article 2.02 are acceptable for use, subject to approval of product list and samples.

B. Ceiling suspension systems:

1. Chicago Metallic Corp.

2. Donn Corp.

3. Eastern Products, Div. of Armstrong World Industries, Inc.

4. National Rolling Mills Company.

C. Aluminum suspension system:

1. Alumax Magnolia Division, Alumax Aluminum Corp.

2. Donn Corp.

3. National Rolling Mills, Inc.

4. Technical Ceiling Systems, Inc.

D. Acoustical panels and tile:

1. Armstrong World Industries, Inc.

2. Celotex Corp.

3. USG Interiors, Inc.

2.02 COMPONENTS

A. Standard exposed ceiling suspension grid system:

1. Structural characteristics: Heavy Duty, meeting ASTM C635-86.

2. Modules:

   a. 24" by 24".

3. Main and cross tees:

   a. Tee material:

      1) Normal applications: Cold-rolled steel, electro-galvanized.

   b. Cap material:

      1) Normal applications: Cold-rolled steel, electro-galvanized.

   c. Design: Double web or single web.

   d. Tee size: 15/16" flange width; 1-1/2" height main tees; cross tees heights and material thicknesses required to meet specified structural classifications.

4. Edge molding:

   a. Normal: Minimum 0.020" thickness steel, channel or angle shaped with minimum 3/4" flange width, hemmed edge.

5. Finish on exposed components: Chemically treated for paint adhesion with factory applied, low gloss, white paint.

B. Standard acoustical ceiling panels (ACT-1):

1. Acceptable product: Armstrong World Industries, Inc.;

   a. Fine Fissured.

2. Characteristics:

   a. Size: 24" by 24".

   b. Thickness: 5/8".

c. Edges: Angled Tegular.

d. Finish: Factory applied washable paint.

C. Cleanable Ceiling Panels (ACT-2):

1. Acceptable product: Armstrong World Industries, Inc.

a. Clean Room Mylar.

2. Characteristics:

a. Size: 24" by 24".

b. Thickness: 3/4".

c. Edges: Square.

d. Finish: White mylar facing, two mil thickness.

D. Sound control ceiling panels (ACT-3):

1. Acceptable product: Armstrong World Industries, Inc.;

a. Optima Tegular.

2. Characteristics:

a. Size: 24" by 24".

b. Thickness: 1".

E. Accessories:

1. Hold down clips: Suspension system manufacturer's standard design compatible with ceiling panels specified and required fire rating.

2. Hanger wire: Minimum 12 gauge, galvanized, soft-annealed, mild steel wire.

3. Hanger rod: 1/4" dia., threaded galvanized steel rod.

4. Hanger strap: 3/16" thickness by 1" wide, galvanized steel strap for fixture support.

5. Wire ties: 18 gauge, galvanized, annealed steel wire.

6. Hanger clips: Prefabricated metal clamps for fastening to building structure.

7. Carrying channels: 16 gauge, cold-rolled steel, 1-1/2" deep.

2.03 ACCESSORIES

A. Acoustical sealant: Non-hardening, non-skinning, synthetic rubber.

1. Acceptable products:

a. Pecora Corp.; BA-98.

b. Tremco, Inc.; Tremco Acoustical Sealant.

3.00 EXECUTION

3.01 INSTALLATION

A. Suspension system installation:

1. Install suspension system in accord with applicable portions of ASTM C636-86 except for paragraph 2.3.1 level tolerance. Use level tolerance indicated below.

2. Hangers:

a. Suspension system shall conform to seismic zone 3 requirements.

b. Space hangers for main tees at 4'-0" O.C. Secure to building structure.

c. Install additional hangers at ends of each suspension member and at each corner of lighting fixtures.

d. Splay wires no more than 5" in 4'-0" vertical drop.

e. Where spacing of hangers for main tees exceeds maximum specified spacing due to interference of adjacent construction, indirect hang tees using

carrying channels to maintain maximum hanger spacing.

f. Wrap wire tightly, minimum three times horizontally, turning ends upward.

3. Direct hung, exposed grid system, 2'-0" by 4'-0" module:

a. Space main tees at 4'-0" O.C., maximum.

b. Space cross tees at 2'-0" O.C. perpendicular to main tees to form 2'-0" by 4'-0" grid module. Connect to main tees through slots in main tees.

4. Level and square suspension system components within specified tolerances prior to beginning ceiling material installation.

5. Install cross tees adjacent to lighting fixtures and grilles on each side not supported by main tees.

6. Wall moldings:

a. Install wall molding at intersection of suspended ceiling and vertical surfaces.

b. Miter corners where wall moldings intersect or install corner caps.

c. Attach to vertical surfaces with mechanical fasteners.

7. Where grid system exists in unrestrained condition, brace back to building structure using hanger wire, main tee, or carrying channel braces at 4'-0" O.C., maximum.

B. Acoustical unit installation:

1. Locate and mark access tiles prior to beginning installation.

2. Install acoustical units in level plane in straight line courses, within allowable tolerances; use three carton mix.

3. Place materials to lay flush on all suspension members.

4. Install in symmetrical pattern about centerline of area, unless otherwise indicated. Lay out units having directional pattern in same direction.

5. Seal joints in acoustical units around pipes, ducts, and electrical outlets with acoustical sealant.

6. Where cutting of acoustical units is required, cut in manner to conceal cut or damaged edges in finished Work.

7. Hold down clips:

   a. Install acoustical units surrounding recessed troffer lights with hold down clips to prevent movement or displacement of units.

C. Tolerances:

1. Maximum deflection for suspension system components, hangers, and fastening devices supporting lighting fixtures, ceiling grilles, and acoustical units: L/360 of span, tested in accord with ASTM C635-83.

2. Bow, camber, and twist: Not exceeding tolerances established by ASTM C635-83.

3. Variation from level in finished ceiling: +1/8" in 12'-0".

3.02 CLEANING

A. Clean soiled or discolored unit surfaces after installation.

B. Touch-up scratches, abrasions, voids, and other defects in painted metal surfaces.

C. Remove and replace damaged and stained acoustical units with new units; use of stockpiled units is prohibited.

+ + END OF SECTION 09 51 00 + +

SECTION 09 65 00 - RESILIENT TILE FLOORING

Division 1, General Requirements, are hereby made a part of this section as fully as if repeated herein.

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Resilient Tile Flooring

1.2 SUBMITTALS

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

1.3 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to Project site in manufacturer's original, unopened cartons and containers, each bearing names of product and manufacturer, Project identification, and shipping and handling instructions.

B. Store products in dry spaces protected from the weather, with ambient temperatures maintained between 50 and 90 deg F.

C. Store tiles on flat surfaces.

D. Move products into spaces where they will be installed at least 48 hours before installation, unless longer conditioning period is recommended in writing by manufacturer.

1.4 PROJECT CONDITIONS

A. Maintain a temperature of not less than 70 deg F or more than 95 deg F in spaces to receive products for at least 48 hours before installation, during installation, and for at least 48

hours after installation, unless manufacturer's written recommendations specify longer time periods.

B. Do not install products until they are at the same temperature as the space where they are to be installed.

C. Close spaces to traffic during flooring installation and for time period after installation recommended in writing by manufacturer.

D. Install tiles and accessories after other finishing operations, including painting, have been completed.

E. Do not install flooring over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive, as determined by flooring manufacturer's recommended bond and moisture test.

1.5 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed, are packaged with protective covering for storage, and are identified with labels describing contents.

1. Furnish not less than one box for each 50 boxes or fraction thereof, of each type, color, pattern, class, wearing surface, and size of resilient tile flooring installed.
2. Furnish not less than 5%, of each type, color, pattern, and size of resilient accessory installed.
3. Deliver extra materials to Owner.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Subject to compliance with requirements,

Armstrong Manufacturing

2.2 RESILIENT TILE

A. Resilient Tile Flooring: Armstrong Excelon Imperial Texture, 12″ x 12″, 1/8″ thick.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions where installation of resilient products will occur, with Installer present, for compliance with manufacturer's requirements.

B. Verify that substrates and conditions are satisfactory for resilient product installation and comply with requirements specified.

C. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. General: Comply with resilient product manufacturer's written installation instructions for preparing substrates indicated to receive resilient products.

B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, and depressions in substrates.

C. Remove coatings, including curing compounds, and other substances that are incompatible with flooring adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.

D. Broom and vacuum clean substrates to be covered immediately before product installation.

1. After cleaning, examine substrates for moisture, alkaline salts, carbonation, or dust.
2. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.3 VINYL COMPOSITION TILE INSTALLATION

A. General: Comply with tile manufacturer's written installation instructions.

B. Lay out tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width.

1. Adjust as necessary to avoid using cut widths that equal less than one-half of a tile at perimeter.
2. Lay tiles square with room axis, unless otherwise indicated.
3. Discard broken, cracked, chipped, or deformed tiles.
4. Lay tiles with grain running in one direction.

C. Scribe, cut, and fit tiles to butt neatly and tightly to vertical surfaces and permanent fixtures, including built-in furniture, cabinets, pipes, outlets, edgings, door frames, thresholds, and nosings.

D. Extend tiles into toe spaces, door reveals, closets, and similar openings.

E. Adhere tiles to flooring substrates using a full spread of adhesive applied to substrate to comply with tile manufacturer's written instructions, including those for trowel notching, adhesive mixing, and adhesive open and working times.

F. Provide completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

G. Hand roll tiles according to tile manufacturer's written instructions.

3.4 CLEANING AND PROTECTING

A. Perform the following operations immediately after installing VCT flooring:

1. Remove adhesive and other surface blemishes using cleaner recommended by resilient product manufacturers.
2. Sweep or vacuum floor thoroughly.
3. Do not wash floor until after time period recommended by flooring manufacturer.
4. Damp-mop floor to remove marks and soil.

B. Protect flooring against mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use

protection methods indicated or recommended in writing by flooring manufacturer.

C. Clean floor surfaces not more than 4 days before dates scheduled for inspections intended to establish date of Substantial Completion in each area of Project.

1. Clean products according to manufacturer's written recommendations.
2. After cleaning, reapply polish to floor surfaces to restore protective floor finish according to flooring manufacturer's written recommendations.
3. Coordinate with Owner's maintenance program.

+ + END OF SECTION 09 65 00 + +

SECTION 09 65 30 - RESILIENT WALL BASE

Division 1, General Requirements, are hereby made a part of this section as fully as if repeated herein.

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Resilient Wall Base

1.2 SUBMITTALS

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

1.3 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to Project site in manufacturer's original, unopened cartons and containers, each bearing names of product and manufacturer, Project identification, and shipping and handling instructions.

B. Store products in dry spaces protected from the weather, with ambient temperatures maintained between 50 and 90 deg F.

C. Store base on flat surfaces.

D. Move products into spaces where they will be installed at least 48 hours before installation, unless longer conditioning period is recommended in writing by manufacturer.

1.4 PROJECT CONDITIONS

A. Maintain a temperature of not less than 70 deg F or more than 95 deg F in spaces to receive products for at least 48 hours before installation, during installation, and for at least 48

hours after installation, unless manufacturer's written recommendations specify longer time periods.

B. Do not install products until they are at the same temperature as the space where they are to be installed.

C. Close spaces to traffic during flooring installation and for time period after installation recommended in writing by manufacturer.

D. Install base and accessories after other finishing operations, including painting, have been completed.

1.5 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed, are packaged with protective covering for storage, and are identified with labels describing contents.

1. Furnish not less than one box for each 50 boxes or fraction thereof, of each type, color, pattern, class, wearing surface, and size of resilient tile flooring installed.
2. Furnish not less than 10 linear feet for each 500 linear feet or fraction thereof, of each type, color, pattern, and size of resilient accessory installed.
3. Deliver extra materials to Owner.

PART 2 - PRODUCTS

2.1 RESILIENT WALL BASE

A. Vinyl Wall Base: Products complying with FS SS-W-40, Type II, with matching end stops and preformed or molded inside and outside corner units as follows:

B. Manufacturer: Johnsonite or Roppe

1. Height: 4 inches.
2. Thickness: 1/8" gage.
3. Standard top-set cove.

2.2 INSTALLATION ACCESSORIES

A. Adhesives: Water-resistant type recommended by manufacturer to suit resilient products and substrate conditions indicated.
   1. Application-1/8” trowel notch

B. Vinyl transition strip: Vinyl transition strips from carpet to hard surface flooring where indicated on drawings.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions where installation of resilient products will occur, with Installer present, for compliance with manufacturer's requirements.

B. Verify that substrates and conditions are satisfactory for resilient product installation and comply with requirements specified.

C. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. General: Comply with resilient product manufacturer's written installation instructions for preparing substrates indicated to receive resilient products.

B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, and depressions in substrates.

C. Remove coatings, including curing compounds, and other substances that are incompatible with flooring adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.

D. Clean substrates to be covered immediately before product installation.

   1. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.3 RESILIENT WALL BASE INSTALLATON

A. General: Install vinyl wall base according to manufacturer's written installation instructions.

B. Apply vinyl wall base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.

1. Install wall base in lengths as long as practicable without gaps at seams and with tops of adjacent pieces aligned.
2. Tightly adhere wall base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
3. Do not stretch base during installation.
4. Install premolded outside corners before installing straight pieces.

3.4 CLEANING AND PROTECTING

A. Perform the following operations immediately after installing VCT flooring:

1. Remove adhesive and other surface blemishes using cleaner recommended by resilient product manufacturers.
2. Sweep or vacuum floor thoroughly.

B. Protect against mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by flooring manufacturer.

+ + END OF SECTION 09 65 30 + +

SECTION 09 68 00 - CARPETING

PART 1 -GENERAL

1.1 QUALITY ASSURANCE:

A. General requirements:
1. Manufacturer:
a. Carpet manufacturer shall have no less than ten years of production experience with carpet similar to type specified in this document; and whose published product literature clearly indicates compliance of products with requirements of this section.
b. Single source responsibility - provide product material by a single manufacturer for each carpet type specified.
2. Trade Contractor - firm with not less than five (5) years of successful carpeting experience similar to work of this section and recommended and approved by the carpet manufacturer. Upon request, submit letter from carpet manufacturer stating certification qualifications and acceptance.
3. Substitutions - where a selected manufacturer or product has been specified, an equal or superior product may be accepted only upon review and written acceptance by the Architect. It is mandatory that such review and approval be obtained prior to bidding, or the substitution will not be considered. All such proposed substitutions shall be submitted to the architect with all appropriate manufacturer's specifications and literature, and independent testing laboratory data. The architect's decision as to whether a product is equal or superior to the one specified shall be final. This section applies to any "or equal" noted in the specifications.
4. Installer qualifications: Mill trained, skilled mechanics supervised by experienced superintendent with 50,000 yards experience.

1.2 SUBMITTALS:

A. Shop drawings.
   1. Carpet pattern and edging drawings, seam diagram, pattern direction, indicate location of different patterns of carpet, indicate locations of any threshold conditions.
   2. Submit shop drawings showing carpet tile layout clearly indicating carpet tile direction, placement of cut tiles and locations and types of edge strips required. Indicate millwork and building elements, including perimeter walls, that will require cutting of tile. Show all installation details at any special condition.

B. Product data. Include test reports verifying that carpet meets design criteria.
   1. Provide LEED qualifications to include:
      Materials and Resources: Recycled Content Credit 4.1 and 4.2
      Materials and Resources: Local/Regional Materials Credit 5.1 and 5.2
      Indoor Environmental Quality: Low Emitting Materials Credit 4.3
      NSF 140 2007 Platinum EPP certification
      Greenguard Plus certified
      Any other LEED compliant qualification

C. Samples:
   1. Provide samples (min. 8” x 8”) of carpet, pad & accessories for color verification.

D. Contract closeout information:
   1. Guarantee/warranty.
   2. Maintenance data.
   3. Letter stating extra material has been delivered.

1.3 PRODUCT DELIVERY, STORAGE AND HANDLING:

A. Deliver with mill register numbers attached; from style, color, pattern, dye lot, pile direction, size and quantity.

B. Tag and mark accessory items for identification.

1.4 JOB CONDITIONS:

A. Install after wall and other floor finishing operations in area are complete.

B. Install after lighting system in area is complete.

C. Do not install carpet over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive and concrete slabs have pH range recommended by carpet manufacturer.

D. Maintain temperature of 60 deg F minimum to 95 deg F maximum, minimum 48 hours seven days prior to, and during installation. Relative humidity not more than 65 percent carpet and adhesive must be stored at a minimum temperature of 68 degrees.

1.5 GUARANTEE/WARRANTY:

A. Guarantee entire carpet installation complies with specifications, and damaged or defective carpet or carpet stained by adhesives will be removed and replaced.

B. Guarantee carpet color consisting of thermally pigmented yarns will not show significant change when exposed to normal light for period of 15 years.
1. AATCC-16E.

C. Guarantee carpet color will not show significant change when exposed to normal atmospheric contaminates for period of 15 years.

D. Guarantee carpet will not show excessive wear for period of 15 years.
1. Excessive wear is defined as wearing away of face yarns which reduces pile height by more than 10 percent in any area or pulling out of nap.

E. Guarantee carpet backing structure will not delaminate from face structure and there will be no shrinkage or stretching affecting performance of face or backing structure for period of 15 years when installed and maintained in accordance with published procedures. Guarantee when installed and maintained in accordance with published procedures that carpet will not edge ravel for a period of 15 years. Guarantee ability of the carpet to lay flat; that it will not curl or dome.

F. Guarantee entire cost of replacement, including removal, replacement, and disposal of defective carpet.

G. For direct glue down Broadloom carpet, guarantee when installed as recommended using recommended adhesives will maintain ease of removal and releasability for a period of 10 years.

H. Written guarantee to be jointly signed by Contractor, installer and manufacturer.

PART 2 PRODUCTS

2.1 MATERIALS:

A. Acceptable manufacturers: Refer to Owner’s Finish Schedule
B. Consult Owner’s Finish Schedule for Carpet types and colors.

2.2 CARPET TYPES:

A. Consult Owner’s Finish Schedule for Carpet types and colors.

2.3 EXTRA MATERIAL:

A. Furnish Owner with minimum of 2 percent additional material (5 percent for CPT-4 through 8) of each type, pattern and color for maintenance purposes.

PART 3 EXECUTION

3.1 PRE-INSTALLATION REQUIREMENTS AND PREPARATORY WORK

A. The Trade Contractor shall measure carefully and check all dimensions and other conditions in the field to insure proper fit in the areas designated. Trade Contractor shall be totally responsible for the accuracy of his measurements on total yardage requirements, individual floor yardage requirements and dye lot yardage requirements. No request for carpet or installation extras from the Owner will be considered due to measurement or takeoff errors by the Trade Contractor. The Trade Contractor shall confirm total yardage required, including 2 percent attic stock along with bid.

B. Trade Contractor shall coordinate all his installation activities with the Construction Manager.

C. Sequence carpeting with other work so as to minimize possibility of damage and soiling of carpet during remainder of construction period. Do not commence carpet installation until painting and finishing work is complete and ceiling and other overhead work has been tested, approved and completed, unless specifically approved by Owner's project manager, in writing.

D. Trade Contractor and manufacturer's representative must examine substrates for conditions under which carpeting is to be installed.

E. Store carpet tile modules and adhesive in a room with a minimum temperature of 68 degrees F for at least three days prior to and during installation.

3.2 EXAMINATION:

A. Verify suitability of substrate to accept installation.

B. Verify concrete is sealed, fully cured. Remove all materials incompatible with carpet adhesive. A new floor requires approximately 90 days to cure.

C. Check moisture content of substrate.

1. Test for moisture with a hygrometer or a moisture test unit (developed by Rubber Manufacturers Association). Hygrometer readings should not be greater than 65 percent at 60 degF or above. If the moisture test is used the emission of moisture vapor from the floors shall not be more than 3 lbs per 1000 square feet per 24 hours.

D. Examine substrate for alkalinity, corrective measures are required if PH reading is greater than 10. Test by wetting floor and using PH test papers.

3.3 PREPARATION:

A. General: Comply with CRI 104, Section 6.2, "Site Conditions; Floor Preparation," and carpet manufacturer's written installation instructions for preparing substrates indicated to receive carpet installation. Verify that concrete slabs comply with ASTM F 710 and the following:

1. Slab substrates are dry and free of curing compounds, sealers, hardeners, and other materials that may interfere with adhesive bond. Determine adhesion and dryness characteristics by performing bond and moisture tests recommended by the following:

a. Carpet manufacturer.

C. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, and depressions in substrates. Must be compatible with adhesive.

D. Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by the following:

a. Carpet manufacturer.

E. Provide Moisture Guard 2.0 system moisture barrier per Manufacturer’s instructions.

F. Broom and vacuum clean substrates to be covered immediately before installing carpet. After cleaning, examine substrates for moisture, alkaline salts, carbonation, or dust. Proceed with installation only after unsatisfactory conditions have been corrected.

E. Before commencing work, test an area with adhesive and carpet to determine "open-time" and bond.

F. Layout Broadloom:
1. Arrange seams symmetrically about centerline of rooms and as indicated on seaming diagrams.
2. Use minimum of cross seams or visible side seams.
3. Lay so pile and pattern of adjacent pieces have same direction.
4. Do not piece.
5. Install in longest practicable lengths.

G. Lay out carpet tiles in accordance with reviewed shop drawings.

H. Carefully check dimensions and carefully fit and install carpet.

F. Store carpet and adhesive in a heated room at a minimum temperature of 60 degF at least 3 days prior to installation. Maximum temperature of 95 degF.

3.4 INSTALLATION:

A. General:
1. Comply with manufacturer's instructions and recommendations for installation.
2. Install carpet under open-bottom obstructions and under removable flanges and furnishings, and into alcoves and closets of each space.
3. Provide cut outs where required. Conceal cut edges with protective edge guards or overlapping flanges.
4. Run carpet under open-bottom items such as heating convectors and install tight against walls, columns and cabinets so entire floor area is covered with carpet. Cover over all floor type door closers.

5. Install edging guard at all openings and doors wherever carpet terminates, unless indicated otherwise. Prior to installation, report to the Construction Manager all other obstructions which may occur.
6. Cutting shall be done in accordance with the manufacturer's recommendation, using the tools designed for the carpet being installed, making sure carpet knives are sharp.
7. Edges shall be butted together with the proper pressure to produce the tightest join possible without distortion.
8. All carpet shall be installed per the installation direction method specified.
9. Use leveling compound where necessary. Any floor filling or leveling shall have a minimum of 4 FT - 0 IN of feather.
10. Expansion joints - do not bridge building expansion joints with continuous carpeting. Provide for movements.

B. Carpet Tile: Install in accordance with manufacturer's instructions.

1. Determine center of room using standard tile laying methods. The center chalk lines, dividing room into quadrants, should be off-center, if necessary, to ensure that perimeter modules will be half-size or larger
2. On both sides of chalk line, apply a strip of adhesive at least 9” in width, using a twist-textured paint roller. When adhesive is ready, lay modules firmly along these anchor lines. Fill in each quadrant section using the “stair step” technique, completing the installation from center to corner of room in each quadrant, then moving to the next quadrant.
3. As each module is installed, ensure that the installation remains square and conforms to chalk lines.
4. Adhere perimeter tiles and cut tiles with a full spread of adhesive. Dry fit all cut tiles with a full spread of adhesive. Dry fit all cut tiles and apply adhesive to tile back after tile has

been cut. In corridor areas, use full tiles down the center and cut perimeter tile borders.

5. Adhere all carpet tile pieces less than 4″ in width with full underneath them.

C. Where carpet terminates at non-carpeted floor surface, install reducer strip.
   1. Install with contact adhesive.

D. Install according to Architects directions for overall patterns and borders. Install carpet patterns according to drawings with no deviation. Develop templates as necessary.

3.5 CLEAN:

A. Remove any spillage of glue or adhesive from face or seam using remover provided by manufacturer. Remove excess adhesive with white cloth and fresh water.

B. Clean spots; remove loose threads or protruding yarns with sharp shears.

C. At completion of work, review with Owner pieces or remnants of carpet.
   1. Turn over to Owner such pieces that he may require for repair.
   2. Remove other scraps from site.

D. Save all cuts over 9 IN for Owner stock.

E. Advise maintenance personnel regarding care and maintenance.

3.6 PROTECTION:

A. After cleaning and prior to final completion, protect all carpeting subject to traffic with vinyl runners or other approved material.

B. Protect carpeting against damage during construction. Cover with 6-mil thick polyethylene covering with taped joints during the construction period, wherever protection is required, so carpet will be without any indication of deterioration, wear, or damage at the time of substantial completion. Damaged carpeting will be rejected. As the carpet is laid, remove all trimmings, excess pieces of carpet and laying materials from each area as it is completed.

C. Protection of carpeting shall be maintained on each floor or area until accepted, without waiting until the entire project is complete.

3.7 INSPECTION

A. Upon completion of the installation inspect installation and verify that work is complete properly installed and acceptable.

B. Remove and replace all work not found acceptable at the installers expense, and to the satisfaction and acceptance of the Architect.

+ + END OF SECTION 09 68 00 +
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SECTION 09 90 00 - PAINTING

Division 1, General Requirements, are hereby made a part of this section as fully as if repeated herein.

1.00 GENERAL

1.01 SUMMARY

A. SECTION INCLUDES:

1. Touching up shop applied prime coats.

2. Surface preparation to receive finishes.

3. Painting, staining or otherwise finishing of all surfaces, as otherwise indicated below and on drawings.

1.02 REFERENCES:

A. Standards of the following as referenced:

1. Steel Structures Painting Council (SSPC).

1.03 DEFINITIONS:

A. Terms:

1. DFT: Dry film thickness.

2. WFT: Wet film thickness.

3. VOC: Volatile Organic Compounds

1.04 SUBMITTALS:

A. Product Data:

1. Submit complete list of products for use; indicate compliance with VOC limits if required.

2. Submit copy of manufacturers MSDS sheet for each product and thinner.

3. Indicate manufacturer, brand name, quality and type of paint for each surface to be finished.

4. Intent of Contractor to use product specified does not relive him from responsibility of submitting product line.

B. Samples:

1. Color Samples: Submit two sets of color samples from proposed paint manufacturer for verification by Facility Design Group Inc.

2. Brush-outs:

a. Prepare actual brush-out samples for each color paint, stain, or finish specified and indicated on drawings.

b. Submit 8”X11” brush-outs in duplicate.

c. Apply products in number of coats specified for actual work.

d. Provide following substrates for brush-outs:

1) Concrete unit masonry: Paint one face to simulate concrete and masonry.

2) Hardboard to simulate drywall, lumber, board products, and metals for paint finish.

C. Quality control submittals:

1. Certificates: Submit indicating compliance with applicable VOC limits if required.

1.05 DELIVERY, STORAGE AND HANDLING

A. Packing and shipping:

1. Deliver materials to Project site ready mixed in original containers with labels intact.

2. Indicate Mfg.’s name, paint, color, and recommended application and reducing procedures on labels.

B. Storage and protection:

1. Store Materials in an acceptable location.

2. Maintain neat and clean conditions in storage area. Remove rags at end of each day’s Work.

3. Close containers at the end of each day’s Work. Leave no materials open.

4. Safety precautions:

a. Provide temporary fire protection equipment in materials storage area.

b. Prohibit smoking in storage area.

1.06 PROJECT CONDITIONS

A. Environmental Requirements: Comply with Mfg.’s recommendations regarding environmental conditions for materials application.

1.07 SEQUENCING AND SCHEDULING

A. Schedule and coordinate all Work with other trades; do not proceed with Work until job conditions are proper to achieve satisfactory results.

B. Examine specification sections for various other trade; be thoroughly familiar with Work required in other sections regarding painting.

2.00 PRODUCTS

2.01 MATERIALS

A. Acceptable Manufacturers:

1. Except as otherwise noted, products specified as standard of quality are manufactured by Porter Paints and Sherwin-Williams Co.

2. Products of the following manufacturers that are similar in type, color selected, solids, and quality are acceptable upon prior approval from Facility Design Group Inc.

a. Duron Inc.

b. ICI Paints

c. Pratt & Lambert Inc.

d. Pittsburg Paints, division of PPG Industries Inc.

e. The Glidden Company.

B. Paint and stain systems indicated in Article 3.03, SCHEDULES.

C. Where products other than those of the Mfg.’s listed above as standard of quality are specified in Article 3.03, such products have been selected to achieve specific results and substitutions will be allowed only in accord with Product Options and Substitutions section.

D. Provide products for all specified paints from single manufacturer; and all specified stains from a single manufacturer, except items indicated in Article 2.01, Paragraph C.

E. Miscellaneous materials:

1. Paint thinners and tints: Products of the same manufacturer as paints, or approved by him for use with his products.

2. Shellac, turpentine, patching compounds and similar materials required for execution of Work:

   Pure, best quality products.

F. Paint and Stain colors:

1. Selected by Purchaser from manufacturer's standard color range with final approval based on brushed-out submittal.

3.00 EXECUTION

3.01 PREPARATION

A. Protection: Cover finished Work of other trades, surfaces not being painted concurrently, and pre finished items.

B. Application of materials in spaces where dust is being generated is prohibited.

C. Verify surfaces to receive finishes are dry, free of debris, dust or other deleterious materials.

3.02 APPLICATION

A. Substrate Preparation:

1. Lumber, plywood and veneered surfaces:

   a. Apply shellac, maximum 4lb. cut to knots, pitch and resinous sapwood prior to application of first paint coat; seal for stain coat in accord with stain manufacturer's recommendations.

   b. Surfaces to be painted: Fill nail holes, cracks, joints and defects with spackling compound. Apply after first coat of paint.

c. Surfaces to receive transparent finish: Fill nail holes, cracks and defects with wood filler matching finish color.

d. Sand surfaces smooth, except where rough-sawn surfaces are indicated. Dust to remove debris.

e. Treat mildew surfaces with a solution of one quart hypochlorite bleach, one tablespoon laundry detergent and three quarts of water. Rinse well and allow to dry before painting.

f. Previously painted surfaces: Remove dirt, debris and chalking by washing with detergent and water or low pressure cold water spray. Dull glossy surfaces by light sanding. Remove loose paint and blisters by scraping and sanding.

2. Gypsum board:

a. Fill narrow, shallow cracks and small holes with patching plaster or non-shrinking spackling compound. Allow to dry and sand smooth with out raising the nap on the gypsum board.

3. Concrete:

a. In general, prepared in accordance with Section 03300. Fill cracks, holes and irregularities with cement grout. Grind ridges, high spots, etc. to match adjacent surfaces.

b. Remove laitance, oil, grease dirt and debris from surfaces. Verify concrete cure time prior to coating application.

c. Concrete floors: clean in accordance with ASTM D4259-83 for abrasive blast or ASTM D4290-83 for acid etch.

5. Concrete masonry units: Rub to remove any loose mortar and debris. Fill any irregularities with cement grout.

6. Previously painted masonry:
   a. Remove existing loose or blistered paint by scraping or brushing.

   b. Remove debris and chalking from surface after scraping and washing with detergent and water; flush with clean water. Touch up with material specified for finish.

7. Galvanized metal: Wash with xylol to remove grease, oil and contaminants; wipe dry with dry cloth.

8. Aluminum: Sand to remove oxides. Wash with xylol to remove grease, oil and contaminants; wipe dry with dry cloth.

9. Ferrous metals: Solvent clean with xylol to remove grease, oil and contaminants after preparing the surface in accord with SSPC-SP3, power tool cleaning. Wipe dry with cloth.

B. Coating Application:

1. Apply coating material in accord with manufacturer’s approved product data to achieve specified DFT.

2. Apply coating only when moisture content of surfaces is within manufacturer’s recommended range.

3. Apply paint materials using clean brushes, rollers or spray equipment. Limit spraying of paints only to those materials recommended by manufacturer to be sprayed with no loss of performance, durability or color.

4. Apply materials at a rate not to exceed manufacturer’s recommendation for the surfaces being coated, less ten (10) percent for losses.

5. Comply with manufacturer’s product data for drying times between coats.

6. Sand and dust between coats to remove defects visible from 5’-0” distance.

7. Finish coats: Smooth, free of brush marks, streaks, laps or pile-up of paint, skips or missed areas.

8. Application of additional coats until completed coat has been inspected is prohibited; only inspected coats of paint will be considered in determining the number of coats applied.

9. Make coating edges adjoining other materials or colors sharp and clean with out over lapping.

10. Primer coats may be omitted for surface specified to receive factory applied primer if finish coats are compatible with primer. Substitute barrier coat recommended by paint manufacturer for specified primer coat if finish coats are not compatible.

11. Refinish entire partition surface where portion of finish on gypsum board partition is damaged or unacceptable.

12. Back prime exterior and interior finish carpentry and mill work with material specified for prime coat with out runs on face; finish cut edges just prior to installation.

13. Paint inside duct work flat black for entire area visible through ceiling openings. Paint underside of duct work and other above ceiling items flat black for entire visible area through ceiling openings.

14. Seal interior doors’ tops and bottoms with prime coat only; side edges same as face.

15. Finish exterior door edges same as exterior faces.

16. Paint exposed pipes and duct work in occupied areas same as adjacent wall surfaces.

17. Paint construction on roof top; include mechanical and electrical equipment unless otherwise indicated.

18. Surfaces not requiring painting:

    a. Prefinished surfaces and items.

    b. Concealed duct work, conduit and piping.

3.03 SCHEDULES

A. Exterior:

1. Traffic Markings:

    a. 1st Coat: Porter Paints - Porter Guard Acrylic Zone Marking Paint (2408 white, 2412 yellow) @ 320 lineal feet of standard 4″ stripe per gallon. Sherwin-Williams: Setfast Acrylic Waterborne Traffic Marking Paint (TM226 white, TM225 yellow) @ 320 lineal feet of standard 4″ stripe per gallon.

2. Alkyd enamel paint on ferrous metals:

    a. Primer: Porter Paints – Porter Guard Alkyd Metal Primer (272/276) @ 2.0 mils DFT. Sherwin-Williams - Kem Kromik Universal Metal Primer (B50 series) @ 3.5 mils DFT.

    b. 1st Coat: Porter Paints – Porter Guard Alkyd Gloss Enamel (2749) @ 1.5 mils DFT. Sherwin-Williams - Industrial Enamel HS (B54WZ400 series) @ 3.0 mils DFT.

    c. 2nd Coat: Porter Paints – Porter Guard Alkyd Gloss Enamel (2749) @ 1.5 mils DFT. Sherwin-Williams - Industrial Enamel HS (B54WZ400 series) @ 3.0 mils DFT.

3. Alkyd enamel paint on galvanized metal:

   a. Primer: Porter Paints – Porter Guard DTM Acrylic Metal Primer (215) @ 3.0 mils DFT. Sherwin-Williams - DTM Acrylic Primer/Finish (B66W1) @ 3.0 mils DFT.

   b. 1st Coat: Porter Paints – Porter Guard Alkyd Gloss Enamel (2749) @ 1.5 mils DFT. Sherwin-Williams - Industrial Enamel HS (B54WZ400 series) @ 3.0 mils DFT.

   c. 2nd Coat: Porter Paints – Porter Guard Alkyd Gloss Enamel (2749) @ 1.5 mils DFT. Sherwin-Williams - Industrial Enamel HS (B54WZ400 series) @ 3.0 mils DFT.

4. Elastomeric paint on concrete:

   a. Primer: Loxon Exterior Masonry Acrylic Primer (A24W300) @ 3.1 mils DFT.

   b. 1st Coat: Elastomeric Waterproofing Coating (A5 series) @ 5.0 mils DFT.

   c. 2nd Coat: Elastomeric Waterproofing Coating (A5 series) @ 5.0 mils DFT.

B. Interior:

1. Alkyd enamel paint on cement:

   a. Primer: Porter Paints – Porter Painters Friend PVA Latex Primer Sealer (767) @ 1.1 mils DFT. Sherwin-Williams - ProMar 200 Interior Latex Wall Primer (B28W200) @ 1.1 mils DFT.

   b. 1st Coat: Porter Paints – Porter Alkyd Enamels (129 satin, 149 semi gloss, 2749 gloss) @ 1.6 mils DFT. Sherwin-Williams - ProMar 200 Alkyd Paint (B32W201 ser.-flat, B33W200 ser.-eg-shel, B34W200 ser.-semi-gloss, B35W200 ser.-gloss) @ 1.8 mils DFT.

c. 2nd Coat: Porter Paints – Porter Alkyd Enamels (129 satin, 149 semi gloss, 2749 gloss) @ 1.6 mils DFT. Sherwin-Williams - ProMar 200 Alkyd Paint (B32W201 ser.-flat, B33W200 ser.-eg-shel, B34W200 ser.-semi-gloss, B35W200 ser.-gloss) @ 1.8 mils DFT.

2. Epoxy polyamide on concrete:

a. 1st Coat: Porter Paints – Aquapon High Build Epoxy (97-130) @ 3.0-5.0 mils DFT. Sherwin-Williams - Tile Clad II Epoxy (B62 series) @ 3.5 mils DFT.

b. 2nd Coat: Porter Paints – Aquapon High Build Epoxy (97-130) @ 3.0-5.0 mils DFT. Sherwin-Williams - Tile Clad II Epoxy (B62 series) @ 3.5 mils DFT.

3. Epoxy polyamide on concrete masonry units:

a. Primer: Porter Paints – Acri Fil Acrylic Block Filler (896) filled to pinhole free surface. Sherwin-Williams - Heavy Duty Blockfiller (B42W46) @ 10.0 mils DFT.

b. 1st Coat: Porter Paints – Aquapon High Build Epoxy (97-130) @ 3.0-5.0 mils DFT. Sherwin-Williams - Tile Clad II Epoxy (B62 series) @ 3.5 mils DFT.

c. 2nd Coat: Porter Paints – Aquapon High Build Epoxy (97-130) @ 3.0-5.0 mils DFT. Sherwin-Williams - Tile Clad II Epoxy (B62 series) @ 3.5 mils DFT.

4. Alkyd enamel paint on concrete masonry units:

a. Primer: Porter Paints – Pro Master 2000 Acrylic Latex Block Filler (6223) filled to pinhole free surface. Sherwin-Williams - Heavy Duty Blockfiller (B42W46) @ 10.0 mils DFT.

b. 1st Coat: Porter Paints – Porter Alkyd Enamels (129 satin, 149 semi gloss, 2749

gloss) @ 1.6 mils DFT. Sherwin-Williams - ProMar 200 Alkyd Paint (B32W201 ser.-flat, B33W200 ser.-eg-shel, B34W200 ser.-semi-gloss, B35W200 ser.-gloss) @ 1.8 mils DFT.

c. 2nd Coat: Porter Paints – Porter Alkyd Enamels (129 satin, 149 semi gloss, 2749 gloss) @ 1.6 mils DFT. Sherwin-Williams - ProMar 200 Alkyd Paint (B32W201 ser.-flat, B33W200 ser.-eg-shel, B34W200 ser.-semi-gloss, B35W200 ser.-gloss) @ 1.8 mils DFT.

5. Latex paint on concrete masonry units:

a. Primer: Porter Paints – Pro Master 2000 Acrylic Latex Block Filler (6223) filled to pinhole free surface. Sherwin-Williams - Heavy Duty Blockfiller (B42W46) @ 10.0 mils DFT.

b. 1st Coat: Porter Paints – Porter Interior Acrylic Latex (6109 flat, 6129 eggshell, 6139 semi gloss, 6149 gloss) @ 1.4 mils DFT. Sherwin-Williams - ProMar 200 Latex Paint (B30W200 ser.-flat, B20W200 ser.-eg-shel, B31W200 ser.-semi-gloss, B21W200 ser.-gloss) @ 1.7 mils DFT.

c. 2nd Coat: Porter Paints – Porter Interior Acrylic Latex (6109 flat, 6129 eggshell, 6139 semi gloss, 6149 gloss) @ 1.4 mils DFT. Sherwin-Williams - ProMar 200 Latex Paint (B30W200 ser.-flat, B20W200 ser.-eg-shel, B31W200 ser.-semi-gloss, B21W200 ser.-gloss) @ 1.7 mils DFT.

6. Alkyd enamel paint on gypsum board:

a. Primer: Porter Paints – Porter Painters Friend PVA Interior Primer (767) @ 1.1 mils DFT. Sherwin-Williams - ProMar 200 Interior Latex Wall Primer (B28W200) @ 1.1 mils DFT.

b. 1st Coat: Porter Paints – Porter Alkyd Enamels (129 satin, 149 semi gloss, 2749 gloss) @ 1.6 mils DFT. Sherwin-Williams - ProMar 200 Alkyd Paint (B32W201 ser.-flat,

B33W200 ser.-eg-shel, B34W200 ser.-semi-gloss, B35W200 ser.-gloss) @ 1.8 mils DFT.

c. 2nd Coat: Porter Paints – Porter Alkyd Enamels (129 satin, 149 semi gloss, 2749 gloss) @ 1.6 mils DFT. Sherwin-Williams - ProMar 200 Alkyd Paint (B32W201 ser.-flat, B33W200 ser.-eg-shel, B34W200 ser.-semi-gloss, B35W200 ser.-gloss) @ 1.8 mils DFT.

7. Latex paint on gypsum board:

a. Primer: Porter Paints – Porter Pro Vantage PVA Interior Primer Sealer (767) @ 1.1 mils DFT. Sherwin-Williams - ProMar 200 Interior Latex Wall Primer (B28W200) @ 1.1 mils DFT.

b. 1st Coat: Porter Paints – Porter Interior Acrylic Latex (6109 flat, 6129 eggshell, 6139 semi gloss, 6149 gloss) @ 1.4 mils DFT. Sherwin-Williams - ProMar 200 Latex Paint (B30W200 ser.-flat, B20W200 ser.-eg-shel, B31W200 ser.-semi-gloss, B21W200 ser.-gloss) @ 1.7 mils DFT.

c. 2nd Coat: Porter Paints – Porter Interior Acrylic Latex (6109 flat, 6129 eggshell, 6139 semi gloss, 6149 gloss) @ 1.4 mils DFT. Sherwin-Williams - ProMar 200 Latex Paint (B30W200 ser.-flat, B20W200 ser.-eg-shel, B31W200 ser.-semi-gloss, B21W200 ser.-gloss) @ 1.7 mils DFT.

8. Epoxy on gypsum board:

a. Primer: Porter Paints – Porter 1129 Blank It Acrylic Primer @ 1.4 mils DFT. Sherwin-Williams - ProMar 200 Interior Latex Wall Primer (B28W200) @ 1.1 mils DFT.

b. 1st Coat: Porter Paints – Porter Dura Glaze Waterborne Polyamide Epoxy (9371) @ 2.0 mils DFT. Sherwin-Williams - Tile Clad II Epoxy (B62 series) @ 3.5 mils DFT.

c. 2nd Coat: Porter Paints – Porter Dura Glaze Waterborne Polyamide Epoxy (9371) @ 2.0 mils DFT. Sherwin-Williams - Tile Clad II Epoxy (B62 series) @ 3.5 mils DFT.

9. Alkyd paint on ferrous metal:

a. Primer: Porter Paints – Porter Guard Alkyd Metal Primer (272/276) @ 2.0 mils DFT. Sherwin-Williams - Kem Kromik Universal Metal Primer (B50 series) @ 3.5 mils DFT.

b. 1st Coat: Porter Paints – Porter Alkyd Enamels (129 satin, 149 semi gloss, 2749 gloss) @ 1.6 mils DFT. Sherwin-Williams - ProMar 200 Alkyd Paint (B32W201 ser.-flat, B33W200 ser.-eg-shel, B34W200 ser.-semi-gloss, B35W200 ser.-gloss) @ 1.8 mils DFT.

c. 2nd Coat: Porter Paints – Porter Alkyd Enamels (129 satin, 149 semi gloss, 2749 gloss) @ 1.6 mils DFT. Sherwin-Williams - ProMar 200 Alkyd Paint (B32W201 ser.-flat, B33W200 ser.-eg-shel, B34W200 ser.-semi-gloss, B35W200 ser.-gloss) @ 1.8 mils DFT.

10. Alkyd paint on galvanized metal:

a. Primer: Porter Paints – Porter Guard DTM Acrylic Metal Primer (215) @ 3.0 mils DFT. Sherwin-Williams - Galvite Paint (B50W3) @ 2.5 mils DFT.

b. 1st Coat: Porter Paints – Porter Alkyd Enamels (129 satin, 149 semi gloss, 2749 gloss) @ 1.6 mils DFT. Sherwin-Williams - ProMar 200 Alkyd Paint (B32W201 ser.-flat, B33W200 ser.-eg-shel, B34W200 ser.-semi-gloss, B35W200 ser.-gloss) @ 1.8 mils DFT.

c. 2nd Coat: Porter Paints – Porter Alkyd Enamels (129 satin, 149 semi gloss, 2749 gloss) @ 1.6 mils DFT. Sherwin-Williams - ProMar 200 Alkyd Paint (B32W201 ser.-flat,

B33W200 ser.-eg-shel, B34W200 ser.-semi-gloss, B35W200 ser.-gloss) @ 1.8 mils DFT.

+ + END OF SECTION 09 90 00 + +

SECTION 10 15 50 - TOILET COMPARTMENTS

Division 1, General Requirements, are hereby made a part of this section as fully as if repeated herein.

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. This Section includes:

1. Solid-polymer toilet compartments configured as toilet enclosures and urinal screens.
2. Toilet Enclosures: Floor anchored.
2. Urinal screens: Wall hung.

B. Related Sections

1. Section 042200: Concrete Unit Masonry.
2. Section 092600: CR Studs & Gypsum Board Systems.
3. Section 108010: Toilet & Bath Accessories.

1.3 SUBMITTALS

A. Product Data: For each type and style of toilet compartment and screen specified. Include details of construction relative to materials, fabrication, and installation. Include details of anchors, hardware, and fastenings.

B. Shop Drawings: For fabrication and installation of toilet compartment and screen assemblies. Include plans, elevations, sections, details, and attachments to other work.

1. Show locations of reinforcement and cutouts for compartment-mounted toilet accessories.

C. Samples for Initial Selection: Manufacturer's color charts consisting of sections of actual units showing the full range of colors, textures, and patterns available for each type of compartment or screen indicated.

1.4 PROJECT CONDITIONS

A. Field Measurements: Verify dimensions in areas of installation by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

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. Accurate Partitions Corporation.
2. Ampco, Inc.
3. Bradley Corporation; Mills Partitions.
4. Comtec Industries/Capitol Partitions.
5. General Partitions Mfg. Corp.
6. Global Steel Products Corp.
7. Hadrian Manufacturing Inc.
8. Knickerbocker Partition Corporation.
9. Metpar Corp.
10. Partition Systems Incorporated of South Carolina.
11. Rockville Partitions Incorporated.
12. Santana Products, Inc.
13. Sanymetal; a Crane Plumbing company.
14. Weis-Robart Partitions, Inc.

2.2 MATERIALS

A. General: Provide materials that have been selected for surface flatness and smoothness. Exposed surfaces that

exhibit pitting, seam marks, roller marks, stains, discolorations, telegraphing of core material, or other imperfections on finished units are unacceptable.

B. Solid-Polymer Door, Panel, Screen, and Pilaster Construction: Solid, high-density polyethylene (HDPE) panel material, not less than 1 inch thick, seamless, with eased edges, and with homogenous color and pattern throughout thickness of material.

1. Color: One different color in each room as selected by Owner and Architect from manufacturer's full range of colors.

C. Pilaster Shoes and Sleeves (Caps): ASTM A 666, Type 302 or 304 stainless steel, not less than 0.0312 inch thick and 3 inches high, finished to match hardware.

D. Wall Brackets: Manufacturer's full height brackets for attaching panels and screens to walls and pilasters of the following material:
1. Material: Stainless steel.

E. Hardware and Accessories: Manufacturer's standard design, heavy-duty operating hardware and accessories of the following material:
1. Material: Stainless steel.

F. Anchorages and Fasteners: Manufacturer's standard exposed fasteners of stainless steel or chrome-plated steel or brass, finished to match hardware, with theft-resistant-type heads. Provide sex-type bolts for through-bolt applications. For concealed anchors, use hot-dip galvanized or other rust-resistant, protective-coated steel.

G. Headrail (Overhead Braced) shall be satin finish, extruded anodized aluminum (.125″ / 5-mm thick) with anti-grip profile.

2.3 FABRICATION

A. General: Provide standard doors, panels, screens, and pilasters fabricated for compartment system. Provide units with cutouts and drilled holes to receive compartment-mounted hardware, accessories, and grab bars,

as indicated.

B. Floor-Anchored Compartments: Provide manufacturer's standard corrosion-resistant supports, leveling mechanism, fasteners, and anchors at pilasters to suit floor conditions. Make provisions for setting and securing continuous head rail at top of each pilaster. Provide shoes at pilasters to conceal supports and leveling mechanism.

C. Wall-Hung Screens: Provide units in sizes indicated of same construction and finish as compartment panels, unless otherwise indicated.

D. Doors: Unless otherwise indicated, provide 24-inch- wide in-swinging doors for standard toilet compartments and 36-inch- wide out-swinging doors with a minimum 32-inch- wide clear opening for compartments indicated to be handicapped accessible.

1. Hinges: Manufacturer's continuous self-closing type that can be adjusted to hold door open at any angle up to 90 degrees.
2. Latch and Keeper: Manufacturer's standard surface-mounted latch unit with combination rubber-faced door strike and keeper designed for emergency access. Provide units that comply with accessibility requirements of authorities having jurisdiction at compartments indicated to be handicapped accessible.
3. Coat Hook: Manufacturer's standard combination hook and rubber-tipped bumper, sized to prevent door from hitting compartment-mounted accessories.
4. Door Pull: Manufacturer's standard unit that complies with accessibility requirements of authorities having jurisdiction at out-swinging doors. Provide units on both sides of doors at compartments indicated to be handicapped accessible.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Comply with manufacturer's written installation instructions. Install units rigid, straight, plumb, and level. Provide clearances of not more than 1/2 inch

between pilasters and panels and not more than 1 inch between panels and walls. Secure units in position with manufacturer's recommended anchoring devices.

1. Secure panels to walls and panels with full height brackets. Locate wall brackets so holes for wall anchors occur in masonry or tile joints.

B. Floor-Anchored Compartments: Secure pilasters to floor and level, plumb, and tighten. Secure continuous head rail to each pilaster with not less than 2 fasteners. Hang doors and adjust so tops of doors are parallel with overhead brace when doors are in closed position.

C. Screens: Attach with full height anchoring devices according to manufacturer's written instructions and to suit supporting structure. Set units level and plumb and to resist lateral impact.

D. Clean all measurement marks off walls and floors once installation is complete.

3.2 ADJUSTING AND CLEANING

A. Hardware Adjustment: Adjust and lubricate hardware according to manufacturer's written instructions for proper operation. Set hinges on in-swinging doors to hold open approximately 30 degrees from closed position when unlatched. Set hinges on out-swinging doors and swing doors in entrance screens to return to fully closed position.

B. Provide final protection and maintain conditions that ensure toilet compartments and screens are without damage or deterioration at the time of Substantial Completion.

+ + END OF 10 15 50 + +

SECTION 10 42 60 – IDENTIFYING DEVICES (SIGNS)

PART I - GENERAL

1.1 Scope:

A. The general conditions, supplementary conditions and applicable portions of Division 1 are a part of this section.

1.2 QUALIFICATIONS:

A. Products shall be of manufacturer and type as herein listed:

1. Engraved plastic laminate signs:

Allen Marking Products, Inc. - "Redi-Cut", N-2 and custom made.

Best Manufacturing Company - "Econ-o-Signs" and custom made.

1.3 SUBMITTALS:

A. Submit four (4) copies of manufacturer's color charts and letter styles of plastic laminate engraved signs.

PART 2 -PRODUCTS

2.1 MATERIALS:

A. Engraved plastic laminate room name signs 1/8" thick, 2" high x length required, with beveled edges, pressure sensitive adhesive backing for mounting . Letters, when engraved: "white", 7/8" or 1" high. Background color as selected by owner. Furnish room name signs for each door. Signs to meet ADA.

PART 3 - EXECUTION:

3.1 INSTALLATION:

A. Engraved plastic laminate room name signs Installed per ADA Standards.

3.2 CLEANING:

A. Clean all surfaces of signs and directory, and leave in perfect condition.

END OF SECTION 10 42 60

SECTION 10 51 13 – METAL LOCKERS

PART I - GENERAL

1.1 Scope:

A. The general conditions, supplementary conditions and applicable portions of Division 1 are a part of this section.

1.2 QUALIFICATIONS:

A. Products shall be of manufacturer and type as herein listed:

1. Republic Storage Systems Company
2. Art Metal Products, Div. of Fort Knox Storage Co.
3. General Storage Systems, Div. of North American Steel
4. Hadrian Inc.; Emperor
5. Or, Approved Equal Metal Products Company

1.3 SUBMITTALS:

A. Submit four (4) copies of manufacturer's color charts and shop drawings including all accessory items.

PART 2 -PRODUCTS

2.1 MATERIALS:

A. Lockers: Single tier, sloping tops, Body: Size per drawings with "Z" type base 4"high, Doors and Door Frames: Cold rolled leveled sheet steel, Other Parts: Mild cold rolled steel.
B. Doors: 16-gauge steel, flanged, Formations: to right angles at lock and hinge sides of door; one right angle at top and bottom.
C. Door Frames: 16-gauge steel. Channel formation securely welded. Sides of frames form continuous door strike.
D. Locking Device: Padlock attachment with 3/8" diameter hole, fixed handle case provides padlock strike.
E. Hinges: 2" side, full loop, tight pin style, welded to frame riveted to door three hinges per door.
F. Body: Body of locker 24-gauge steel rigid tight joints between bolts. All bolts and nuts zinc plated.
G. Finish: Surfaces phosphatized, finished with heavy coat of baked enamel. Body parts finished in standard colors: Color selected by owner.
H. Number Plates: Polished aluminum number plate black numerals ½" high. Plates attached with split rivets. Number as shown on drawings (shop).
I. Equipment: Hat shelf with rolled front, 9" below top of locker, one double prong ceiling hook, one single prong wall hook each side and back.
J. Ventilation: Door louvered top and bottom.
K. Size: 18" x 21" x 72".

PART 3 - EXECUTION:

3.1 INSTALLATION:

A. Install lockers where shown on the drawings, in accord with manufacturer's instructions. Install filler strips, closures where required. Provide end panels where exposed ends occur.
B. Exercise care to prevent damage of finished surfaces.

END OF SECTION 10 51 13

SECTION 10 80 00 - TOILET AND BATH ACCESSORIES

Division 1, General Requirements, are hereby made a part of this section as fully as if repeated herein.

1.00 GENERAL

1.01 SUMMARY

A. Related sections:

1. Section 042200: Concrete Unit Masonry.

2. Section 092600: CR Studs & Gypsum Board Systems.

3. Section 101550: Toilet Compartments.

1.02 SUBMITTALS

A. Product data:

1. Submit complete list of products for use.

2. Include catalog cuts and data sheets indicating size, material and finish, complete parts list, and installation procedures for each accessory.

3. Intent of Subcontractor to use products specified does not relieve him from responsibility of submitting product line.

B. Samples: Submit one actual sample of each accessory for approval, if requested by Facility Design Group Inc.

1.03 DELIVERY, STORAGE, AND HANDLING

A. Packing and shipping: Deliver accessories in manufacturer's protective packaging.

B. Storage and protection:

1. Store materials in packaging to prevent soiling or physical damage.

2. Handle accessories in manner to prevent damage to finished surfaces and operating mechanisms.

3. Maintain manufacturer's protective covering on accessories until final clean-up or installation.

1.04 SEQUENCING AND SCHEDULING

A. Coordinate this Work with work of other trades into which accessories are to be installed.

1.05 WARRANTY

A. Mirrors: Warrant mirrors for ten years against silver spoilage.

2.00 PRODUCTS

2.01 MANUFACTURERS

A. Acceptable manufacturers:

1. Except as otherwise noted, products specified as standard of quality are manufactured by Bobrick Washroom Equipment, Inc.

2. Products of following manufacturers, similar in terms of design, size, function, materials, and quality are acceptable for use, subject to Facility Design Group Inc.'s prior approval of proposed product list.

a. Accessory Specialties, Inc.

b. Bradley Wash Fountain Company.

c. Sloan (soap dispensers).

B. Provide all accessories as product of one manufacturer except where certain special items are indicated. Key keyed accessories alike with exception of coin receiving boxes on vending equipment. Key vending equipment in

accord with Owner's requirements.

C. Toilet and bath accessories are scheduled in Article 3.04, Schedules.

3.00 EXECUTION

3.01 INSPECTION

A. Check openings scheduled to receive recessed or semi-recessed accessories for correct dimensions, depth, plumbness of blocking for frames, and preparation affecting accessories installation.

3.02 INSTALLATION

A. General: Install accessories level, plumb, in indicated locations. Installation methods indicated in manufacturer's literature for substrates encountered.

B. Mounting heights: Except as otherwise indicated, heights are given above finish floor (AFF) to top of accessory.

1. Combination towel dispenser and waste: 48" AFF to towel slot.

2. Multipurpose unit: 48" AFF to towel slot.

3. Toilet tissue dispenser: 19″ min. to centerline.

4. Multi-roll toilet tissue dispenser: 19″ min. to centerline.

5. Framed mirror units: 40″ max. to bottom of reflecting surface.

6. Liquid soap dispenser: 44″ AFF to spout.

7. Mop and broom holder: 48”.

8. Grab bars: 36” AFF to centerline.

9. Shower Seat: 19” to top surface.

C. Wall conditions:

1. Stud walls:

a. Attach grab bars to stud wall system using minimum 12 gauge steel anchor plate, 3" wide by continuous length required for attachment of flanges of grab bar.

b. Where grab bar flanges mount on separate walls, provide anchor plate sufficient length to span between studs at individual flange locations.

c. Attach anchor plate at studs on grab bar side of wall.

2. Masonry walls: Attach grab bars to masonry walls using concealed mounting plate, minimum 1/4" diameter through-bolt and minimum ten gauge steel back-up plate.

3. Toilet compartment: Attach grab bars to toilet compartments using tapped steel spacers welded to minimum 16 gauge stainless steel back-up plate.

4. Provide stainless steel exposed mounting screws.

D. Conceal evidence of drilling, cutting, and fitting adjacent finishes.

3.03 ADJUST AND CLEAN

A. Adjust operating parts of accessories for proper operation.

B. Clean and polish exposed surfaces prior to Date of Substantial Completion.

C. Deliver accessory schedule, keys, and parts manual as part of Project Close-out documents.

3.04 SCHEDULES

A. Accessories:

1. Paper Towel Automatic Dispenser/Disposal Unit:

a. Recessed: Bobrick #B-3974.

2. Mirror units:

a. Framed without shelf: Bobrick #B-165 2436.

b. Tilted: Bobrick #B-293 2436.

3. Grab bars:

a. Toilet: Bobrick #B-6806 18″(vertical), 36″ and 42″.

4. Mop and broom holder: Bobrick #B-223 x 36″.

5. Toilet Tissue Dispenser: Bobrick #B-2740.

6. Soap Dispenser (Sensor-Activated AC-Powered): Sloan # ESD-300.

+ + END OF SECTION 10 80 00 +
+

SECTION 12 05 00 – FURNISHINGS

PART I - GENERAL

1.1 Scope:

A. The general conditions, supplementary conditions and applicable portions of Division 1 are a part of this section.

1.2 QUALIFICATIONS:

A. Products shall be supplied by the owner and shipped to the project location. The contractor shall "receive, store and move" the furnishings to its location within the building.

1.3 SUBMITTALS:

A. Submit four (4) copies of manufacturer's color charts and shop drawings including all accessory items.

PART 2 -PRODUCTS

2.1 MATERIALS:

A. As written in the Contract between the Owner and the Contractor.

PART 3 - EXECUTION:

3.1 INSTALLATION:

A. Contractor will "receive, store and move" shop furnishings where shown on the drawings or in accordance with the owner's directives and instructions. All unpacking, uncrating, and disposal of packing materials will be the responsibility of the owner.

B. Exercise care to prevent damage of finished surfaces.

END OF SECTION 12 05 00

SECTION 13 12 10 – PRE-ENGINEERED BUILDINGS

PART I - GENERAL

1.1 Section includes:

A. Primary pre-engineered building per plans and specifications.
B. Structural steel framing system, including crane support beams and bracing.
C. Complete roof and wall covering system consisting of exterior roof and wall panels, panel attachments, sealants, mastics, trim and flashings as required.
D. Accessories, including :
    1. Gutters and downspouts
    2. Mechanical penetrations through roof or wall.
    3. Door and window framing.
E. Roof and wall insulation.

1.2 Related Sections:

A. Section 03 30 00 – Cast-in-Place Concrete
B. Section 09 91 13 – Exterior Painting: Finish painting of structural members.

1.3 References:

A. ASTM A 36, ASTM A36M – Standard Specification for Carbon Structural Steel.

B. ASTM A 307 – Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.

C. ASTM A 325 – Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.

D. ASTM A 529 / A 529M – Standard Specification for High Strength Carbon-Manganese Steel of Structural Quality.

E. ASTM A 570 / A 570M – Standard Specification for Steel Sheet and Strip, Carbon, Hot-Rolled Structural Quality.

F. ASTM A 572 / A 572M – Standard Specification for High-Strength Low-Alloy Columbium- Vanadium Steel.

G. ASTM A 653 / A 653 M – Standard Specification for Steel Sheets, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvanized) by the Hot-Dip Process.

H. ASTM A 792 / A 792M – Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.

I. ASTM D 635 – Standard Test Method of Rate of Burning and/or Extent and Time of Burning of Self-Supporting Plastics in a Horizontal Position.

J. ASTM D 1929 – Standard Test Method for Ignition Properties of Plastics.

K. ASTM D 2843 – Standard Test Method for Smoke from the Burning or Decomposition of Plastics.

L. ASTM E 84 – Standard Test Method for Surface Burning Characteristics of Building Materials.

M. ASTM E 774 – Standard Specification for Sealed Insulating Glass Units.

N. SDI 100 – Recommended Specifications for Standard Doors and Frames; Steel Door Institute.

O. UL 580 – Tests for Wind Uplift Resistance of Roof Assemblies; Underwriters Laboratories, Inc.

1.4 Definitions:

A. Building Width: Measured from outside to outside of wall system (Verify with Architectural Drawings).
B. Building Length: Measured from outside to outside of wall system.
C. Building Line: Outside face of wall system.
D. Building Eave Height: Measured from the top of the cave member at the outside of the wall system to the bottom of the sidewall column base plate.
E. Bay Spacing: Measured from centerline to centerline of primary frames for interior bays and from centerline of the first interior frame to outside of wall system for end-bays.
F. Roof Pitch: The ratio of the vertical rise to the horizontal run.

1.5 Design Requirements:

A. General: Design structural systems according to professionally recognized methods and standards.
B. Design under supervision of professional engineer licensed in South Carolina. Provide signed and sealed erection drawings, calculations and letter of certification.

1.6 Design Loads:

A. Applicable Building Code: IBC 2015
B. Roof Live Load: 20 PSF
C. Roof Snow Load: 5 psf., ground

D. Wind Load: Calculate in accordance with applicable code, using – 130 mph Basic Wind Speed, Exposure Category C, and Importance Factor of 1.0.
E. Collateral Loads: 8 psf for Office and 5psf for Shop.
F. Seismic Loads: Calculate in accordance with applicable code.
G. Dead Loads, including the weight of all indicated permanent construction.
H. Frame maximum drift due to wind: H/240 at Office and Shop, in accordance with applicable code.
I. Design roof system to withstand Dead Loads and Live loads with deflection of L/240 of span, maximum for Office; L/180 of span, maximum for Shop.
J. Anchor Bolts: Prior to Fabrication/Construction, submit final PEMB Anchor Bolt/Base Plate drawings and reactions to Structural Engineer for review.

1.7 Submittals:

A. Design Data: Provide detailed design criteria and calculations
B. Certifications:
    1. Manufacturer certification that the building conforms to the contract documents and manufacturer's standard design procedures.
    2. Manufacturer must provide evidence of AIS certification.
C. Shop Drawings: Show building layout, primary and secondary framing member sizes and location, cross-sections, and product and connection details.
D. Product Data: Information on manufactured products to be incorporated into the project.
E. Color Charts: For selection of colors.
F. Anchor Bolt Installation Drawings: Layouts with minimum bolt diameters and locations and steel structural framing plans with member sizes, dimensions and locations indicated.
G. Specimen Warranty.

1.8 Qualifications:

A. Manufacturer must be regularly engaged in projects of similar scope for a period of not less than 10 years.

B. Installer must be a factory trained and authorized, and in good standing, builder of the manufacturer and regularly engaged in projects of similar scope for a period of not less than 5 years.

1.9 Warranty:

A. Provide the following warranties:

B. The metal building manufacturer shall warrant that the material shall be of good quality and in conformance with these specifications. The manufacturer's liability under this warranty shall be to repair or provide replacement material, at the manufacturer's option, for the material proven to be defective. This warranty shall be in effect for a period of 3 years from the date of substantial completion.
C. Durability of metallic coated unpainted roof panels due to rupture, structural failure or perforation shall be warranted for a period of twenty (25) years by the manufacturer.
D. The exterior color finish for painted wall panels shall be warranted by the manufacturer for twenty (25) years against blistering, peeling, cracking, flaking, checking and chipping.
E. Excessive color change and chalking shall be warranted for twenty (25) year Color change shall not exceed 5 NBS units per ASTM D 2244, Chalking shall not be less than rating of 8 per ASTM D 659.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS:

A. American
B. Butler
C. VP Buildings
D. Other manufacturers must be submitted to and approved by the designer at least 10 days prior to bid date.
E. Manufacturer must be AIS certified, and provide letter of certification restating design criteria shown in this section. Letter of certification to bear seal of licensed SC P.E.

2.2 METAL MATERIALS:

A. Select materials and material yield strengths based on building design requirements; use the following unless required otherwise.
B. Structural Steel Plate, Bar, Sheet, and Strip for Use in Bolted and Welded Constructions: ASTM A 572 / A 527M, A 529 / A 529M, or A36 / A36M Modified 50, with minimum yield strength of 50,000 psi.
C. Structural Steel Material for Use in Roll Formed or Press Broken Secondary Structural Members: ASTM A 570 / A 570M, with minimum yield strength of 55,000 psi.
D. Galvanized Steel Sheet for Roof Formed or Press Broken Roof and Wall Coverings, trim and Flashing: ASTM A 653 / A 653M, with minimum yield strength of 50,000 psi.

E. Galvalume Steel Sheet Used in Roll Formed or Press Broken Roof Covering: Aluminum - Zinc alloy – coated steel sheet, ASTM A 792 / A 792M, with minimum yield strength of 50,000 psi (345 Mpa); nominal coating weight of 0.5 oz. per square foot (152 kg/sq. m.) both sides, equivalent to an approximate coating thickness of 0.0018 (0.05 mm) both sides.
F. Hot Rolled Steel Shapes: W. M. and S shapes, angles, rods, channels and other shapes; ASTM A 572 / A 572M or ASTM A 36 / A 36M as applicable, with minimum yield strengths required for the design.
G. Structural Bolts and Nuts Used with Primary Framing: High strength, ASTM A 325.
H. Bolts and Nuts Used with Secondary Framing Members: ASTM A 307.
I. Shop Coat: Manufacturer's standard rust inhibitive primer paint; manufacturer's standard color.
J. Pre-Painted Wall Finish: 1 mil (0.25mm) Kynar 500 coating on exterior surface of wall panels and trim.
K. Color: As selected from manufacturer's full line.
L. Interior Finish: Off white 0.5 mil (0.01 mm) wash-coat.

2.3 FRAMING COMPONENTS:

A. Primary Framing: Rigid Frame solid web framing consisting of tapered or uniform depth rafters rigidly connected to tapered at Shop and uniform 12" depth columns at Office. Provide a modular span that supports the loads at bay spacing indicated.
B. Endwall Framing: Non-expandable half-loaded rigid frames or post and beam frames.
C. Purlins: Zee-shaped; depth as required, with minimum yield strength of 55,000 psi; simple span or continuous span as required for design.
D. Wind Beams: Built-up shape or Cee-shaped; depth as required, with minimum yield strength of 55,000 psi; simple span as required for design.
E. Wind Bracing: Portal or diagonal bracing in accordance with manufacturer's standard design practices; utilizing rods, angles, and other members, with minimum yield strengths as required for design.
F. Primary Frame Flange Bracing: Attached from purlins to the primary framing, minimum yield strength as required for design
G. Sag Angles and Bridging: Steel angles, with minimum yield strength of 36,000 psi.
H. Fabrication: Fabricate according to manufacturer's standard practice.
    1. Fabricate structural members made of welded plate sections by jointing the flanges and webs by continuous automatic submerged arc welding process.

2. Use AWS certified welders for shop welding.
3. Weld shop connections. Prepare members for bolted field connections by making punched, drilled, or reamed holes in the shop.

I. Component Identification: Mark all fabricated parts, either individually or by lot or group, using an identification marking corresponding to the marking shown in the shop drawings, using a method that remains visible after shop planting.

J. Shop Coating: Finish all structural steel members using one coat of manufacturer's standard shop coat, after cleaning of oil, dirt, loose scale and foreign matter, minimum SP-3 steel prep.

K. Package building components for shipping by common carrier.

2.4 EXTERIOR COVERING SYSTEMS:

A. Roof Panels:
1. Roof panels shall be of standing seam interlocking design and secured to the supports with a concealed structural fastening system.
2. The concealed attachment system shall eliminate all through fastener penetrations of the exposed roofing surface into structural supports and allow the roof covering to move independently of any differential thermal movement by the framing system.
3. The panel-structural clips shall be designed to accommodate two (2) inches of thermal movement in both expansion and contraction (two inches total). The clip shall incorporate a self-centering feature to assure one (1) inch movement capability in both directions.
4. The standing seams shall have integral male and female interlocking ribs with a plant applied, non-hardening sealant, and the seams shall be continuously locked or crimped together by mechanical means during installation.
5. Roof panels shall be manufacturers standard trapezoidal standing seam, 24 inches wide x 3" high, 24 gauge.
6. Roof panels shall be fastened to the support framing members with concealed clips. Through penetrations of the roofing surface by exposed fasteners shall occur only for non-structural connections such as panel termination and roof perimeter flashing locations. Such fasteners shall be corrosion resistant aluminum-zinc alloy die cast head steel screws with weather seal washers.
7. Panel termination and perimeter flashing (attached to roof panels) shall be sealed with sealant recommended and furnished by the manufacturer.
8. Required closures shall be the manufacturers standard.

B. Wall Panels:
    1. Wall panels shall be corrugated design attaching to structural supports by means of exposed fasteners.
    2. Wall panels shall be 24 gauge, have 1 1/4" high ribs 12" on center and provide 36" net coverage. Side laps shall be one full major rib. Panels to be continuous from base to eave up to a height of 40'. End laps. When required, shall occur at a secondary structural member.
    3. Exposed wall fasteners shall be self-drilling, hex head carbon steel, painted to match wall finish. Location and quantities of fasteners to be manufacturer's standards based on building design and/or finished appearance.

C. Flashing and Trim: Match material, finish, and color of adjacent components. Provide, trim at rakes, including peak and corner assemblies, high and low eaves, corners, bases, framed openings and as required or specified to provide a weather-tight and finished appearance.

D. Plastic Parts: Glass fiber reinforced resin or thermoformed ADS (Acrylonitrile-Butidene-Styrene).
    1. ABS: Minimum 1/8 inch (3 mm) thick
    2. Color: Manufacturer's standard color

E. Sealants:
    1. Mastics and Closures: Manufacturer's standard type.
    2. Provide at wall panel rakes, eaves, transitions and accessories.
    3. Closures: Formed to match panel profiles; closed cell elastic material, manufacturer's standard color.
    4. Tape Mastic: Pre-formed butyl rubber-based, non-hardening, non-corrosive to metal; white or light gray.
    5. Gunnable Sealant: Non-skinning synthetic elastomer based material; gray or bronze.

F. Blanket Insulation: Glass fiber, with factory laminated facing material.
    1. Glass fiber: Odorless, neutral colored, long filament, flexible resilient, 0.8 pef (12.8 kg/cu m) density material.
    2. Conductivity (k): 0.29 at 40 degF (0.50 at 4 degC) mean temperature and 0.31 at 70 degF (0.54 at 21 degC) mean temperature.
    3. Flame Spread Index: 25 or less, when tested in accordance with ASTM E 84.
    4. Smoke Developed Index: 50 or less, when tested in accordance with ASTM E 84.
    5. UL Classified.

6. Facing: white vinyl reinforced vinyl; 0.0016 inch thick embossed vinyl film, glass fiber scrim reinforcing, 0.0016 inch thick embossed vinyl film; permeance 0.90 perms.
7. Provide facing 3 inches (75 mm) wider on both edges than blanket.
8. Width: As required for insulation.
9. Thickness: As indicated on plans

2.5 ROOF ACCESSORIES:

A. Eave Gutters: Roll-formed 26 gauge steel sheet, with gutter straps, fasteners and joint sealant; manufacturer's standard color.

1. Downspouts: 4 x 5 inches in 10 foot (3050 mm) lengths, with downspout elbows and downspout straps spaced at 6' o.c. maximum.

C. Multi-Gutters and Valley Gutters: 0.059 inch (1.5 mm) thick cold-formed steel sheet.
1. Finish: G901-75 galvanized coated.
2. Joints: Field welded or mechanically fastened.

D. Translucent Roof Panels: UV stabilized thermosetting polyester resin reinforced with chopped and woven roving glass fiber; manufacturer's standard configuration.
1. Color: White, with textured exterior surface and minimum 50% light transmittance.
2. Self-Ignition Temperature: 650 degrees (343 degrees C) or greater, when tested in accordance with ASTM D 1929.
3. Smoke Density Index: 450 or less, when tested in accordance with ASTM E 84, or 75 or less, when tested in accordance with ASTM D 2843.
4. Extent of Burning: 2.5 inches (64 mm) per minute or less, when tested in accordance with ASTM D 635.
5. Rate of Burning: 2.5 inches (64mm) per minute or less, when tested in accordance with ASTM D 635.
6. Condensation Control Pan: bonded to interior surface.

E. Roof Curbs: Welded units fabricated for shingled installation with roof panels; 0.060 aluminum; minimum 18 gauge (1.22 mm) Galvalume coated steel, with welds cleaned and treated with protective coating compatible with Galvalume substrate.
1. Top of curbs horizontal with 1 1/2 inch (38 mm) perimeter flange.
2. Curb walls insulated with 1 1/2 inch (38 mm), 3 pef (48 kg cu m) density rigid glass fiber insulation.

3. Water Diversion: integral 4 inch (100 mm) high by full length cricket on up slope side.
4. Up slope and down slope curb flanges in integral welded inside and outside rig closures compatible with the roof panel profile if required.
5. Curb Framing: Mounted on secondary structural members and installed from the top; compatible with the thermal expansion and contraction properties of the roof on which it is used.
6. Opening Size: As indicated on drawing.
7. All roof curbs for standing seam roof system to be one-piece type.

PART 3 - EXECUTION:

A. Examination:
   1. Verify that anchor bolts are installed as indicated on anchor bolts shop drawings.
   2. Inspect installed work of other trades and verify that such work is complete to a point where this work may commence.

B. Erection:
   1. Erect pre-engineered building in accordance with manufacturer's instructions, erection drawings, and other erection documents.
   2. Provide temporary bracing, shoring, blocking, bridging and securing of components as required during the erection process.

END OF SECTION 13 12 10

SECTION 13 91 50 Fire Suppression Piping

PART I - GENERAL

1.1 Description:

A. This Section covers the fire sprinkler systems.
B. The building shall be protected by pre-action automatic sprinklers as defined by NFPA 13-2002.
C. Mechanical commissioning is specified in Section 26 90 00, Mechanical Systems Commissioning. This Section includes responsibilities and obligations in support of the commissioning process specified therein.
D. Manufacturers: Subject to compliance with the requirements herein, manufacturers offering products that may be incorporated into the work include, but are not limited to, manufacturers specified. Manufacturers and/or brand/model names are only indicated for the purpose of describing the standard of quality of quality, performance and characteristics desired and is not intended to limit or restrict competition (unless they have been pre-approved to be sole sourced).

1.2 Quality Assurance:

A. Conform to the following:
   1. Latest edition of International Fire Code.
   2. NFPA 13-2002.
B. Systems shall comply with the South Carolina Rules and Regulations of safety fire Commissioner.
C. Products and components installed in the system shall be listed by Underwriters Laboratories (UL).
D. Fire protection systems shall be installed by a company regularly engaged in the installation of sprinkler systems and which holds a current sprinkler contractor's license from the State of South Carolina. Submittals shall bear the stamp or the licensing number of the installing contractor.
E. Installation shop drawings shall be prepared under the supervision of a NICET Level III technician certified in Fire Protection Engineering Technology and Automatic Sprinkler system Layout. Submittals, drawings, and hydraulic calculations shall bear the NICET technician's certification number.
F. Minimum service pressure rating for above ground pipe, valves, fittings shall be 175 psig unless otherwise specified herein or indicated on the Drawings.
G. See SP.9 – Fire Protection for Contractor requirements.

1.3 Basis of Design:

A. Drawings and calculations shall show hydraulic reference points from the source to the remote design areas and shall indicate losses for meters and backflow preventers.
B. Sprinkler spacing shall not exceed 225 ft squared for light Hazard areas and 130 ft squared for Ordinary Hazard areas.
C. Contractor shall develop coordinate installation drawings and hydraulic calculations including the following:
   1. Piping plans showing offsets, pipe elevations, sizes, and lengths; hanger types and locations; hydraulic calculation reference points; and remote area location and density.

2. Hydraulic calculations shall be performed by a computer program specifically designed for the analysis of fire sprinkler systems. Calculations shall use the area/density method described in NFPA 13-2002.

D. System design densities and remote area of sprinkler operation shall be as indicated on the Drawings.

1.4 Underground Pipe, Fittings and Accessories:

A. Underground pipe: Ductile iron, thickness Class 50 with cement lining and bituminous coating, conforming to AWWA C151/A21.51-2002. Joints shall be gasketed slip-on type meeting AWWA C111/A211.53-2007.
B. Underground fittings: cement-lined ductile iron with mechanical joint connections. Working pressure shall be 350 psig. Fittings shall comply with AWWA C104/A21.4-2003 and AWWA C153/A211.53-2006.
C. Tie rods and clamps: carbon steel rods with socket clamps, bolts, and washers.
D. Thrust blocks: concrete, poured-in-place. Minimum 200 psi compressive strength.

1.5 Above Ground Pipe and Fittings:

A. Steel pipe: Use galvanized pipe where indicated on the Drawings or specified herein. Piping 2" and smaller shall be schedule 10. Piping 2.5" and larger shall be schedule 10 conforming to NFPA 13-2007.
B. Cast iron fittings: standard weight fittings shall be UL classified for 175 psig. Fittings shall comply with ASTM A126-2004. Threaded fittings shall comply with ASME B16.4-1998 (R2006). Flanged fittings shall comply with ASME B16.1-2005. Gaskets for flanged fittings shall be full-faced type of red sheet rubber. Fittings on galvanized piping systems shall be galvanized.
C. Welding fittings: UL listed class 150 factory-fabricated welded outlets, with foundry mark. No other type of welded outlet shall be used.
D. Grooved couplings and fittings: grooved mechanical fittings and couplings using an elastomeric gasket enclosed by split malleable or ductile iron housing. Malleable iron shall comply with ASTM A47/47M-1999 (2004). Ductile iron shall comply with ASTM A536-1984 (2004). Self-grooving couplings and fittings employing set screws or plain end pipe shall not be used. Segment-welded fittings shall not be used. Fittings on galvanized piping system shall be galvanized.

1.6 Valves:

A. Valve size, working pressure, and the manufacturer's name or trademark shall be permanently affixed to valve bodies. Drain, test and gauge valves are exempt from this requirement.
B. Indicating control valves shall be OS&Y gate or indicating butterfly type.
C. Valves for service pressure up to and including 175 psig:
    1. Gate valves smaller that 2.5" shall be UL listed OS&Y (rising stem) design with bronze body and mountings, and threaded connections.
    2. Gate valves 2.5" and larger for above ground service shall be UL listed OS&Y (rising stem) design with cast iron body, bronze mountings and flange connections. Opened counterclockwise.
    3. Check valves smaller than 2.5" shall be y-pattern clapper type with renewable seat and disc, bronze body, and threaded connections. Minimum water working pressure 200 psig.
    4. Check valves 2.5" and larger shall be UL listed with cast iron body and bronze mountings, and rubber faced disc.
    5. Trim valves: gate, globe, angle, and check valves used for trim shall have bronze construction and threaded connections, with a minimum 200 psig working pressure.

6. Provide two sets of valve stem packings of each OS&Y gate valves.

1.7 Back flow Preventers:

A. UL listed and ASSE approved double check valve backflow preventer assembly with two main-line spring loaded check valves, inlet and outlet OS&Y gate valves with tamper switches, and test cocks. Main line check valves shall be in-line serviceable. The assembly shall be approved for installation in the vertical position.

1.7 Backflow Preventers:

A. Rough brass, 2.5" x 2.5" x 4", projecting type, double-clapper Siamese with matching threaded caps and chains. Provide matching escutcheon lettered "Auto Spklr."

1.8 Sprinkler Heads:

A. General:
   1. Sprinkler heads shall be the product of one manufacturer.
   2. Sprinkler heads shall have a 0.5" orifice and 0.5" threaded connection.
B. Upright sprinklers: quick response type with rough brass body.
C. Pendant sprinklers: recessed or quick response type with chrome body and chrome ceiling cup.
D. Sidewall sprinklers: horizontal or quick response type with chrome body, UL listed for extended coverage up to 16' x 20'.

1.9 Alarm and Supervisory Devices:

A. Alarm switches for wet pipe systems: vane type with flexible vane, SPDT contacts, a tamperproof cast aluminum housing with red enamel finish, and a steel U-bolt. The switch shall have an instantly recycling pneumatic retard mechanism field adjustable from 0 to 60 seconds.
B. Valve tamper switches: designed for OS&Y valves or valves with indicator posts as indicated on the Drawings. The switch shall mount without the use of blocks and shall not interfere with valve operation. A signal shall be initiated before the valve stem moves more than 20% of its total travel or if the housing cover is removed. This section of work shall include mounting a tamper switch on the post indicator valve. Wiring is specified in another Division of the work.
C. Manufacturer: Potter Electric, or system sensor.

1.10 Accessories:

A. UL listed flat band swivel ring type with galvanized finish.
B. Pressure gauges: bourdon tube type with metal case, 4.5" dials, accuracy within 1% of full scale range, equipped with snubbers and brass needle valves. Maximum gauge

limit shall be approximately twice the normal working pressure where the gauge is installed.

C. Automatic ball drip valves: ball check type, closed when inlet is pressured, with bronze body and threaded connections.

D. Test and drain connections: UL listed, FM approved, factory-assembled unit consisting of a control valve, sight glass, and 0.5" orifice. The device shall be tapped for a pressure gauge. The drain connection shall allow unobstructed flow through the device.

1. Manufacturer: AGF 1000, or Victaulic 718.

E. Flexible sprinkler connections may be used at the Contractor's option. Flexible sprinkler connections shall be UL listed, factory –assembled units including a 1" diameter braided stainless steel hose with threaded adaptors at each end, a ceiling mounting bracket, and an adjustable sprinkler clamping device.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION

3.1 Above Ground Pipe and Fittings:

A. Run pipe parallel to column centerlines. Pipe shall be installed as high as possible to maintain maximum head room. Provide auxiliary drains to drain the piping system.

B. Fittings and joints shall be assembled using threaded, flanged, or grooved connections. No welded joints or weld formations, either shop or field fabricated, shall be used except as specified herein.

C. Threads cut into galvanized pipe shall be painted with zinc-rich paint.

D. Threads on fittings and bolts shall be fully engaged. Threads shall be made up using joint compound or Teflon tape.

E. Drains outside the building.

F. Torch cutting is not permitted as a means of modifying sprinkler systems.

3.2 Sprinkler Heads:

A. Install sprinkler guards on sprinklers located lower than 7' above the floor, and on sprinklers located in electrical rooms.

B. Install near the fire service water entrance a painted steel cabinet containing 12 extra sprinkler heads and one sprinkler wrench. Proportion heads as to type and temperature rating.

C. No sprinkler head shall be located closer that 6" from an adjacent wall.

D. Sprinkler heads shall be aligned on the ceiling and centered in the ceiling tiles. Head escutcheon plates shall be set tight against the ceiling.

E. Locate sprinkler heads under exposed ductwork over 48" wide.

3.3 Alarm and Supervisory Devices:

A. The retard mechanism of vane type flow switches shall be adjusted to 30 seconds.
B. Valves shall be monitored in the open position unless indicated normally closed on the Drawings.

3.4 Accessories:

A. Hangers and Supports:
   1. The installation and spacing of hangers for sprinklers shall conform to NFPA 13-2002.
B. Hydraulic identification nameplates: Provide nameplates for each sprinkler system recording data required by NFPA 13-2002, Chapter 7.

3.5 Painting:

A. Interior: fire protection pipe and fittings exposed to view without the removal ceilings shall be cleaned to remove grease, oil, and scale and then painted 1 coat of metal primer followed by 1 coat of red, high gloss finish. Do not paint copper, brass, or glass surfaces, sprinkler heads, valve stems, or name plates.

3.6 Tests:

A. Prior to covering the joints of underground pipe, the pipe shall be hydrostatically tested for 2 hours at a pressure of 200 psig. Leakage allowance shall be within the limit specified in NFPA 13-2002.
B. Prior to being concealed by walls or ceilings, each portion of the interior piping shall be hydrostatically tested for 2 hours at 200 psig measured at the bottom of the system. Leaks shall be repaired until the system test pressure is maintained for 2 hours. Hydrostatic tests shall be made after drop nipples have been cut back and sprinkler heads have been installed. Submit a Contractor's material and Test Certificate for Above Ground Piping in accordance with NFPA 13-2007.

END OF SECTION 13 91 50

SECTION 15400 PLUMBING

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, apply to this Section.

1.2 SUMMARY

A. Provide a complete plumbing system with all accessories. Provide hot water, cold water, waste and vent system. Provide a complete system of gas piping as indicated.

B. Install equipment and material in compliance with manufacturer's recommendations.

C. Comply with applicable local laws and ordinances. Secure any pay for permits required for work.

D. Visit site and examine existing conditions before submitting bid. No allowance will be made for lack of knowledge of existing conditions.

E. All material shall fit the space available. Verify dimensions and clearances at buildings before commencing work.

1.3 GUARANTEE

A. Contractor shall guarantee work for a period of one year after acceptance. Perform perform emergency service to correct any problems encountered.

1.4 SHOP DRAWINGS

A. Submit shop drawings on the following items. Provide two file copies (minimum) for the owner.

1. Fixtures
2. Fixture Trim
3. Water Heaters

PART II - PRODUCTS

2.1 PLUMBING FIXTURES AND TRIM

A. All fixtures, except for special types, shall be the product of the same manufacturer.

B. All vitreous china fixtures shall be white (unless otherwise noted).

C. All exposed waste and supply piping shall be chrome plated.

D. Fixtures, faucets and drains shall be as indicated, Crane, Eljer, Kohler, Speakman or similar.

E. Review mill work existing and drawings. Confirm location and size of fixtures and openings before rough-in, connection to existing systems and installation.

G. For designated handicapped units provide water closet and wall hung lavatory with Approved trim.

2.2 SANITARY WASTE AND VENT PIPING

A. Sanitary, waste and vent piping shall be PVC, DWV schedule 40 or heavier with solvent joints. Extension of existing shall match existing or be provided with compatible couplings.

B. Provide traps at all equipment and drains connected to sanitary system.

C. Traps, other than those furnished as a part of plumbing fixture, shall be of the same material and size as pipe into which they discharge, unless specified otherwise hereinafter. Where not underground, traps shall be provided with clean out plugs on the bottom.

2.3 WATER PIPING

A. Type “M” copper or PVC, fittings shall be suitable for the type utilized.

2.4 WATER HEATER

A. Water heater shall have working pressure of 150 PSIG. The unit shall consist of lined tank with high density insulation and a steel jacket with an enameled finish. All models shall be provided with P&T relief valve.

B. Controls shall consist of an adjustable thermostat to reset water temperature and overheat safety protection.

PART III - EXECUTION

A. Furnish, set and connect all fixtures and supports.

B. All spaces between fixtures and walls or floors shall be sealed with a white non-hardening caulking compound.

C. All branch piping to fixtures shall be braced in the construction so that there is no horizontal or vertical movement in piping.

D. All mounting holes provided in fixtures shall be used for support.

D. Adjust stops or valves for intended water flow rate to fixtures without splashing, noise or overflow. Provide fixture flows as follows:

1. Water Closets - 1/6 gallons per flush
2. Faucets: - 2.0 gallons per minute.

END OF SECTION

SECTION 15800____ HEATING AND VENTILATION SYSTEMS

PART 1.00 - GENERAL

1.01 Description:

A. Scope of Work:

1. The subcontractor shall furnish all labor, tools, materials, equipment, utilities, and services necessary to provide, construct, erect, install, and test the complete H&V systems and related work, as indicated on the plans and specified herein.
2. Shop drawings shall be prepared by the Subcontractor and shall show the scope of the work, location, type of equipment and capacity requirements.

B. As-Built Drawings: Subcontractor shall keep a record of the locations of all work and upon completion of the job, shall submit reproducible as-built drawings showing any deviations from the approved drawings. As-built drawings shall indicate dimensions of piping, and other devices including valves and controls including locations from building walls and depth of bury of utility lines, where applicable.

1.02 Codes, Standards, and Fees:

A. Materials and equipment shall conform to all requirements of the current issues and amendments of the following applicable codes and standards:

1. Local governing HVAC, Mechanical, Building, and Energy codes.
2. NFPA-70, -90A, and -90B.
3. American Society for Testing and Materials (ASTM) standards referenced herein.
4. Heating, air conditioning and ventilation equipment specified herein is required to bear the Underwriters' Laboratories label and the ARI Label for refrigeration equipment, and to other standards specified herein.

B. The subcontractor shall obtain and pay for all permits and inspections required by building and safety codes, and ordinances, and the rules and regulations of any legal body having jurisdiction.

1.03 Existing Conditions:

A. Review site limitations of spaces available for installation of all work and materials furnished and installed under this Section. All parts of this work requiring service, inspection, or maintenance shall be accessible. All materials shall fit into the space available. Verify dimensions and clearances before commencing work.

B. Submittal of a bid shall indicate subcontractor has examined the drawings provided and has included all required allowances in his bid. No allowance shall be made for any error resulting from failure to review drawings or to visit the site to ensure and determine all details of the work.

1.04 Workmanship, Delivery, and Storage:

A. Subcontractor shall inspect all installation conditions and request the General Contractor to correct any conditions that may affect this work. Commencement of work under this section will be considered as approval of surfaces and interfaces provided by the other trades.

B. All work shall be installed with piping and accessories perpendicular and / or parallel to building walls. All systems shall be cleaned and left in proper working order.

C. Make provisions for the delivery and safe storage of all materials. Arrange to have materials delivered to the job at such stages of the work as will expedite the project completion. Materials and equipment delivered to the job and not installed immediately shall be stored in a safe, dry location and protected against damage or loss. Mechanical equipment and valves shall be stored with protective coverings as recommended by the manufacturer. Cover duct and conduit connections.

D. Rig and lift equipment using methods approved by the manufacturer.

1.05 Related Work in Other Divisions:

A. Painting except as specified hereinafter.

B. Flashing.

C. The following electrical work will be performed under DIVISION 16:
   1. Wiring and installation of all motor starters.
   2. Power wiring to condensing units, indoor air handlers, heaters and fans.
   3. Power wiring of all motors, and furnishings, installation and wiring of all safety switches, except as otherwise noted.

1.06 Shop Drawings Submittals:

A. Submit for review four (2) copies of data and shop drawings consisting of: rough-in drawings, manufacturer's shop drawings, field drawings, cuts, bulletins, and method of installation for material and equipment shown on approved project drawings or specified, prior to procurement or fabrication. Verify all dimensions before submitting shop drawings.

B. Manufacturer's Data Sheets: Brochure's and other standard printed data descriptive of products or procedures. Clearly state the name, model and full description of equipment, including capacities.

C. Certificates and Affidavits: Substantiating evidence-indicating compliance with specified qualifications of product, supplies, manufacturer, installer, or procedures.

D. Manufacturer's Instructions: Instructions issued by manufacturer as pertinent and critical to achieve final results manufacturer intends, including but not necessarily limited to the following:

1. Site storage.
2. Product handling.
3. Environmental requirements before, during and after executing work.
4. Installations, when not completely covered on shop drawings.
5. Maintenance.
6. Recommended spare parts and their source.

1.07 Progress Schedule:

A. The subcontractor shall conform to the progress schedules of all other sections and shall work in accordance with the schedule for completion.

1.08 Operation and Maintenance Instructions:

A. Instruct personnel in the operation and maintenance of all equipment furnished in this Division of the work.

1.09 Guarantee:

A. Guarantee all work under this Section in writing, to be free of defective work, materials, or parts for a period of one year after acceptance of work by Owner.

1.10 HVAC Test and Balance:

A. The subcontractor shall be responsible for initial start-up.

PART 2.00 - PRODUCTS

2.01 General Requirements:

A. Materials and equipment furnished under this specification shall be standard cataloged products of manufacturers regularly engaged in production of such materials or equipment and shall be manufacturer's latest design that complies with local governing codes and the specification requirements. Each major component of equipment shall have manufacturer's name, address, model, and serial number on a nameplate permanently affixed in a conspicuous place.

2.02 HVAC Equipment:

A. Systems shall be gas heat, electric split type, mini-split electric, gas radiant or as indicated on the drawings.

B. Units shall be as follows:

1. As indicated on drawings or approved equal, prior to bid.

C. Thermostat and control shall be electric furnished for each unit and mounted as indicated for service required. Air condition units shall be provided with 7 day programable

2.03 Exhaust Fans:

A. Exhaust shall wall mounted, provide backdraft damper and bird screen. Provide minimum capacity scheduled. Fans shall be Greenheck, Cook and / or as indicated on drawings

2.04 Louvers:

A. Louvers shall be as indicated on drawings and of the operable type where indicated.

2.05 Gas Piping:

A. Piping shall be steel schedule 40 with screw joints.

2.06 Supporting Devices:

A. Provide hangers, protection shields, collars, rests and brackets for complete installation of piping. Piping shall be supported, secured and allowance included for proper swings for movement of pipe and to prevent telegraphing of vibration. Where vibration cannot be

isolated by piping methods install suitable vibration isolation connections.

PART 3.00 - EXECUTION

3.01 Installation:

A. All materials and equipment shall be installed in accordance with the approved drawings prepared by the subcontractor and approved recommendations of the manufacturer.

B. Gas piping shall be leak and pressure tested prior to placing in service.

3.02 Cleaning:

A. Exposed surfaces of piping or equipment and/or equipment that have become covered with plaster, dirt or other material during handling and construction shall be cleaned before such surfaces are prepared final painting or enclosure within the building structure.

B. Before final acceptance all mechanical equipment will be free of dirt, grease and finger marks.

End of Section

SECTION 16000 ELECTRICAL REQUIREMENTS

PART 1.00 - General

1.01 Scope of Work:

A. The Subcontractor shall install all electrical work in accordance with the approved construction drawings and as specified herein. Provide all material, labor, transportation, tools, supervision, etc. necessary to complete the total electrical job.

B. Subcontractor shall keep a record of the locations of all work and upon completion of the job, shall submit reproducible as-built drawings showing any deviations from the approved drawings. The Subcontractor shall be fully responsible for any changes made to the approved drawings that have not been approved in writing by the Architect.

1.02 Applicable Standards and Codes:

A. All work shall be done in accordance with the requirements of the National Electrical Code, N.F.P.A. No: 70, all local and state codes and any regulations of the utility company providing service. The subcontractor shall obtain and pay for all permits and inspections required by the building and safety codes and ordinances, and the rules and regulations of any legal body having jurisdiction.

1.03 Submittals:

A. The Subcontractor shall provide the Architect with submittals before purchasing materials or fabricating equipment. Submit two copies of shop drawings, cuts and performance data or material list to the Architect for approval. Each item as listed below shall be submitted in brochure with title page and index giving each piece of equipment submitted and catalog number followed by cuts and performance data. Each item as listed under "material list" shall give the manufacturer, a complete description including type, catalog number, etc. Items to be submitted are listed below:

1. Conductors
2. Raceways
3. Outlet boxes
4. Plaster rings
5. Flexible metal conduit
6. Lighting fixtures
7. Switches - material list only
8. Receptacles - material list only
9. Smoke detector
10. Safety switches

11. Panel boards with layouts
12. Enclosed circuit breakers

1.04 WORKMANSHIP, DELIVERY AND STORAGE:

A. All work shall be installed with conduits, panels, boxes, switches, etc., perpendicular and / or parallel with the principal structural members, and shall be left in proper working order.

B. Arrange to have materials delivered to the job at such stages of the work as will expedite the work.

C. Mark and store all materials in such a manner as to be easily checked or inspected. Assume full responsibility for the safekeeping of same until such time the installation has been approved and accepted.

1.05 EQUIPMENT CONNECTIONS:

A. All equipment requiring electrical connections shall be connected under this Section of these Specifications. Where electrical connections to equipment require specific locations such location shall be obtained from shop drawings.

B. Equipment furnished to be connected under this Section of the Specifications shall consist of, but not be limited to the following:
1. Electrical equipment for Heating and Ventilating.

C. The Subcontractor shall review other sections of these specifications, where equipment requiring electrical service is specified to be aware of the scope of the work under this section of these specifications requiring electrical service and connections to equipment specified elsewhere.

1.05 Other Divisions:

A. Review HVAC drawings and Division 15 of these specifications for mechanical equipment requiring electrical service. Provide service to and make connections to all such mechanical equipment requiring electrical service.

1.06 Cooperation:

A. Subcontractor shall coordinate his electrical activities with the other trades so as to avoid delays, interferences, and any unnecessary work.

1.08 Guarantee:

A. The subcontractor shall guarantee to the owner all work performed under this contract to be free from defects in workmanship and materials for a period of one year from date of final acceptance.

B. Defects arising during this period shall be promptly remedied by the subcontractor at his own expense upon notice by the Owner.

C. All lamps for lighting fixtures are to be excluded from this guarantee but one complete and operative set of lamps for lighting fixtures shall be in place at time of final acceptance.

PART 2.00 - PRODUCTS

2.01 Standards for Material:

A. All materials shall be new and shall conform to the standards of the Underwriter's Laboratories, Inc., established for the particular type of material in question. All material shall be UL labeled and listed for the purpose used.

2.02 Name Plates:

A. Provide for each safety switch, pull and junction box, and for each starter or controller, a nameplate. The usage of each switch and starter shall be stamped on the plate in letters 1/2" high and the plate mounted on the switch and starter cover after all painting has been completed.

2.03 Raceways:

A. Conduit, where required by codes, shall be continuous and shall be rigid steel, intermediate metal conduit, flexible metal conduit, electrical metallic tubing and/or Schedule 40 PVC plastic as specified herein. Steel conduit shall be the galvanized type.

B. Service, service lateral and feeder raceways shall be as follows:

1. Underground raceways, under or outside buildings shall be PVC, Type EPC, Schedule 40, or rigid or intermediate steel conduit.
2. Raceways concealed in masonry walls or concrete floors shall be PVC, Type EPC, Schedule 40 heavy wall, or rigid or intermediate steel conduit.
3. Raceways concealed inside non-masonry walls, ceilings and floors shall be rigid galvanized, intermediate metal conduit, or EMT.
4. Flexible metal conduit shall have UL label.

2.04 Conductors:

A. Conductors shall be copper and/or aluminum as herein specified.
   1. Feeder conductors larger than No. 2 shall be copper or aluminum, copper and aluminum conductors shall be insulated power cable, type XHHW.
   2. Branch circuit to lighting, convenience outlets, fractional horsepower heating, ventilating and air conditioning motors, and control and interlock wiring shall be copper type "NM" ground, or other approved copper conductor.
   3. Branch circuit conductors to motors and air conditioning equipment 1 HP and larger, shall be copper type "SEER" with ground, or other approved copper conductor.

B. No wire shall be smaller than No. 12 AWG, except No. 14 wire shall be permitted on switch legs, outlet circuits (except kitchen and bath), and lighting of circuits within units only if allowed by codes.

C. Provide grounding conductor according to Table 250-95 of the National Electrical Code in all PVC raceways. The grounding conductor shall be continuous from the grounding bus in the panel board to each and every outlet.

D. All feeder and branch circuit wiring shall be color-coded in accordance with the latest edition of the National Electrical Code and as specified herein:
   1. For 120 / 240 volt, single phase, 3W systems, black and red shall be used for phase conductors with white for neutral conductors and green for grounding conductors.
   2. Color coding shall be consistent throughout all systems.

E. Cable connectors shall be mechanical clamp Type 0.Z. or approved equal, appropriate for the particular application involved.

F. Cable for private water meter system shall be as specified and approved by system vendor if so indicated to be provided by other divisions.

2.05 Outlet Boxes:

A. All concealed outlets for electric lights, switches, wall receptacles, telephones, etc., standard galvanized steel or U.L. listed plastic outlet boxes shall be provided. Boxes and covers shall not be less than 1/16" thick and in every instance of such form and dimensions as to be adapted to its specific use and location, kind of fixtures to use, number, size and arrangements of conduit connecting thereto.

B. Outlet boxes shall be firmly anchored in place and shall be provided with 3/8" fixture studs where required. Outlet, switch and other flush

mounted boxes shall be set with the edge flush with finished surface. Provide U.L. rated boxes where in rated walls.

C. Where multiple wall switches are indicated at one location switches shall be installed in multi-gang boxes with multi-gang cover plates.

2.06 Lighting Fixtures:

A. Furnish and install all lighting fixtures as indicated on the drawings or as specified herein. Unless otherwise indicated light fixture type is based on Lithonia, Progress or approved similar.

2.07 Switches:

A. Wall switches shall be Eagle series, Arrow-Hart series, or Pass and Seymour series. Unless other wise indicated 15 AMP devices are acceptable.

2.08 Receptacles:

A. Receptacles shall be by Bryant, Hubbell or P&S or equal.

B. Duplex outlets shall be 15 AMP 125 volts AC 3-wire straight blade with white face minimum or as indicated in panel board schedules.

2.09 Device Plates:

A. Oversized device plates shall be provided for all wall switches, telephone outlets and receptacles; faceplates for concealed outlets shall be smooth nylon white finish. Industrial areas shall have stainless steel covers.

2.11 Safety Switches:

A. Safety switches shall be normal duty with padlocking provisions. They shall be non-fusible except where required to be fusible by code. Enclosures shall be NEMA 1 for indoor use and NEMA 3R for outdoor use.

2.12 Panel Boards:

A. Provide panel boards of the automatic circuit breaker type. Panel boards shall be new and the manufacturer's latest standard catalog design. Panel boards shall be Square D, General, Cutler-Hammer, Westinghouse, Siemens or similar.

B. Panel boards shall be load-center type with the number of the branch circuits of capacity as required and shall conform to the following:
   1. Panels shall be constructed for service voltage as required and with the number of branch circuits as required. All shall have UL approved interrupting capacity of 10,000 amps RMS SYM, minimum, at 120/240V.
   2. Boxes shall have side and end gutters sized as per the code, constructed of galvanized steel as per the code and minimum of 14" wide.
   3. Panel board trims shall be flush mounted. Door shall have flush type catch and directory of clean plastic.
   4. Panel assembly shall be of the distributed (sequence) bussing type throughout. Circuit numbering shall be such that circuits 1 and 3 shall be connected different phases of supply.
   5. All circuit breakers shall be plug-in type. They shall be full sized thermal-magnetic molded case type quick-make and quick-break both on manual and automatic operations. All multi-pole breakers shall be single handle, internal common trip. GFCI (Ground Fault Circuit Interrupter) breakers shall be provided where required.

PART 3.00 - EXECUTION

3.01 Temporary Power:

A. The electrical contractor shall furnish and install temporary construction power wiring in the name of general contractor as required providing sufficient power and lighting for all construction needs. Temporary electrical service shall be obtained in the name of the general contractor and will be the general contractor's responsibility to pay all power company charges. All receptacles shall be grounding type with ground fault protection.

3.02 Protection of Work:

A. The electrical contractor shall protect his work at all times from danger by freezing, breakage, dirt, foreign materials, etc., and shall replace all work so damaged. The electrical contractor shall use every precaution to protect the work of others, and he will be held responsible for all damage to other work caused by his work or through the neglect of his workmen.

3.03 Workmanship:

A. All work shall be executed in code compliance, when completed. All exposed conduit, line, boxes, and fittings shall be installed parallel or perpendicular with principal structural members of the buildings in

which they are installed. All offsets, bends, fittings and pull boxes, etc., for the complete installation is the Subcontractor's responsibility to furnish and install. Wiring installed in panels and other enclosures shall be looped and laced and not bundled.

3.04 Tests:

A. At final inspection, a test will be made and the entire system shall be shown to be in proper working order as per these specifications and the approved drawings.

B. Subcontractor shall provide all instruments, labor and materials for any essential intermediate and final testing.

C. Tests shall indicate full compliance with specifications, drawings and the National Electrical Code. All tests will be observed by the Owner's representative.

3.05 Coordination Other Divisions:

A. The Subcontractor shall cooperate with other Divisions in providing for installation of this work. This shall not relieve him of the cost of cutting, chasing, providing anchors, etc., when such is required.

3.06 Installation of Conductors:

A. No wires shall be pulled until the conduit system is complete. No grease, oil or lubrication other than an approved pulling compound, shall be used to facilitate pulling of wires.

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B. Eliminate splicing of conductors wherever possible. Where necessary, make all splices in readily accessible outlet or junction boxes or outlet fittings of conventional types.

C. Leave at each fixture outlet a loop or end of wire not less than eight inches long.

3.07 Wiring Connections:

A. Make connection to all panels, switches, receptacles, fixtures; install finish plates and make all systems complete and ready for use.

3.08 Grounding:

A. In general, all wiring systems shall be grounded in accordance with the rules of Article 250 of the National Electrical Code.

B. Ground each building service as required.

C. Where non-metallic sheathed cables are used in conjunction with armored cables or wiring in metallic raceways, the grounding shall be continuous. All metallic raceways and enclosures shall be grounded

D. Wiring systems, with outlet devices and boxes, shall be grounded as required by the governing codes. The system shall be bonded metal conduits may be used for bonding.

3.09 Installation of Outlet Boxes:

A. Outlet boxes shall be of size and type to properly accommodate the size, location, and number of raceways entering boxes.

B. Boxes shall be selected to suit the particular devices to be installed at outlets and to have sufficient wiring spaces as required by the National Electrical Code.

C. Mount all boxes so that covers and plates will finish flush with wall or ceiling finished surfaces. Furnish and install plaster rings where necessary. In lighting fixture outlet boxes, install 3/8" fixture studs when the fixtures to be installed require such studs.

D. Properly center outlets in architectural features and clear trims and corners by 4 inches.

E. Where outlets at different levels are shown adjacent, they shall be installed in one vertical line.

F. Install all outlet boxes flush with wall or ceiling flush and plumb.

3.10 Installation of Light Fixtures:

A. Furnish, install and connect all lighting fixtures complete with lamps as required.

B. Where more than one flush switch occurs at the location, arrange in gangs, covered with one faceplate.

C. All mounting heights for switches and receptacles shall be as follows except as noted:

Outlets - 18" AFF (minimum to top of plate)
Switches - no higher than 46" AFF

3.11 Installation of Electrical Equipment:

A. All detached electrical control devices such as motor controllers; wall thermostats, control transformers, relay, etc. will be furnished to the electrical contractor at the job site for installation and connection. Furnish and install all disconnect switches as required.

B. The location of outlets, etc. as indicated on plans are approximate only and it shall be the electrical contractor's responsibility to verify all dimensions with the appropriate subcontractor before rough-in.

C. Use of short length of neoprene jacketed UL labeled flexible conduit in the connection to each motor and to each piece of equipment mounted on vibration eliminators.

E. Make all connections to exhaust fans required for proper operation.

3.12 Clean Up:

A. Keep the premises free from accumulation of waste materials or rubbish caused by employees of work under this division of the specifications. At the completion of the work, remove all surplus materials, tools, etc., and leave the premises "broom-clean".

B. At the completion of the work, clean up all electrical work thoroughly. Remove all foreign matter, which has accumulated in all fixtures, equipment and enclosures. Clean all fixture lenses, glassware and reflectors. Clean all other surfaces that are not to be painted so that they present a new and acceptable appearance.

End of Section

SECTION 16120 PACKAGED Generator Systems

PART 1.00- General

1.01 Scope of Work:

A. Emergency or standby generator and transfer system shall be provided and installed by the subcontractor in accordance with the approved construction drawings and as specified herein. Provide all materials, labor, transportation, tools, supervision, etc. necessary to a complete and operable back up system as specified and detailed in the plans.
B. Subcontractor shall comply with Section 16100 and all applicable codes as relates to emergency systems for the service specified.

1.02 Submittal:

A. The subcontractor shall provide the Architect with submittals before purchasing materials in accordance with Section 16100. Items to be submitted are as followers:
   1. Generator
   2. Transfer Switch
B. The submittals shall include the rated capacity and all included accessories. Submit statement of compliance with EPA for the location and application. Submit statement of compliance with NFPA 37, 70 and 110 as applicable.

PART 2.00 Products

2.01 Standard of Material:

A. All material shall be new and conform applicable codes and standards as well as the requirements of the drawings.
B. The generator shall be factory assembled and mounted on permanent skid type base. Where specified, auxiliary fuel tank and acoustical / weather housing shall be provided and mounted by the manufacturer.

2.02 Generator:

A. The generator shall be Cummings, Caterpillar, Kohler or Generac.

B. Unit shall be designed for emergency / standby usage and capable of operating under stated conditions for up to 200 hours per year with the stated procedures as prescribed by the manufacturer. Fuel shall be diesel, natural gas or LP as indicated on the drawings. Engine shall be emission-certified (EPA) industrial grade. Engine shall be

closed loop liquid cooled and designed for high-ambient operation conditions. Unit shall meet NEMA MG1, IEEE ad ANSI standards.

C. Unit shall have a battery charging alternator mounted on engine.
D. Provide automated system of starting, monitoring, protection and control functions of the unit. System shall have overcurrent and fault protection.

2.02 Auxiliaries:

A. Provide a factory installed acoustical housing where indicated.
B. For indoor installations provide flexible radiator duct adaptor flange.
C. Auxiliary fuel "day" tank shall be unit mounted on skid base for diesel units.

2.03 Transfer Switch:

A. Automatic transfer switch shall be standard any breaker rated. Switch shall be UL listed for the indicated VAC. Unit shall be electrically operated with internal operating handle. Design shall be suitable for emergency and standby applications on all classes of load. Enclosure shall be NEMA type 3R or 4, unless specifically indicated for indoor service.
B. The switch shall meet NFPA 70 and 110 for the use indicated.
C. Switch shall be of same manufacturer or compatible with and approved by the generator manufacturer. Manufacturer shall certify the use of switch utilized in shop drawing submittals requested herein
D. Unit shall be load tested at factory prior to shipping and so certified shop drawings.

Part 3.00 Execution

3.01 Installation:

A. The generator and transfer system shall be installed and placed in operation by the sub-contractor in conjunction with a manufacturer's representative. The manufacturer of the generator shall provide a representative for a period of eight hour's maximum for start-up and test of installed system and provide a letter of acceptance to the general contractor for the owner.
B. As a minimum the generator shall demonstrate a full load run, voltage regulation, steady state governing, simulated safety shutdowns.
C. Equipment shall be install on housekeeping concrete pad as indicated and permanently fastened with applicable vibration isolation and if required seismic applications.
D. Contractor and generator manufacturer shall certify startup and testing and connections to designated loads. Owner shall be notified of any power interruptions during startup testing. Provide letter of startup certification to owner with completion documents.

END OF SECTION