SECTION 09 21 16

GYPSUM BOARD ASSEMBLIES

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Metal stud wall framing.
B. Metal channel ceiling framing.
C. Shaft wall system.
D. Fire rated area separation walls.
E. Gypsum wallboard.
F. Glass mat faced gypsum board sheathing.
G. Joint treatment and accessories.

1.02 RELATED REQUIREMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections apply to this Section.
B. Section 05 40 00 - Cold-Formed Metal Framing: Exterior wind-load-bearing metal stud framing.
C. Section 06 10 00 - Rough Carpentry: Wood blocking product and execution requirements.
D. Section 07 21 00 - Thermal Insulation: Acoustic insulation.
E. Section 07 24 00 - Exterior Insulation and Finish Systems: Water Resistant Barrier over exterior wall sheathing.
F. Section 07 84 00 - Firestopping: Top-of-wall assemblies at fire rated walls.
G. Section 07 90 05 - Joint Sealers: Acoustic sealant.

1.03 REFERENCE STANDARDS

F. ASTM C954 - Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs From 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness; 2011.


M. GA-216 - Application and Finishing of Gypsum Board; Gypsum Association; 2010.

N. GA-226 - Application of Gypsum Board to Form Curved Surfaces; Gypsum Association; 2008.


1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate special details associated with fireproofing and acoustic seals.

C. Product Data: Provide data on metal framing, gypsum board, glass mat faced gypsum board, accessories, and joint finishing system.

D. Test Reports: For all stud framing products that do not comply with ASTM C645 or C 754, provide independent laboratory reports showing maximum stud heights at required spacings and deflections.

E. LEED Submittals:
   1. For gypsum wallboard, submit documentation of recycled content and location of manufacture.
   2. For steel products, submit documentation of steel mill process, location of mill, and location of manufacture.
   3. Credit MR 4.1: For products having recycled content, documentation indicating percentages by weight of postconsumer and preconsumer recycled content.
   4. Credit MR 5.1 and Credit MR 5.2: For products and materials required to comply with requirements for regional materials indicating location and distance from Project of material manufacturing and point of extraction, harvest, or recovery for each raw material. Include statement indicating cost for each regional material and the fraction by weight that is considered regional.

1.05 QUALITY ASSURANCE

A. Perform in accordance with ASTM C 840. Comply with requirements of GA-600 for fire-rated assemblies.
   1. Maintain one copy of standards at project site.
2. Where indicated, provide materials and construction which are identical with those of assemblies whose fire resistance rating has been determined per ASTM E 119 by a testing and inspecting organization acceptable to authorities having jurisdiction.

B. Installer Qualifications: Company specializing in performing gypsum board application and finishing, with minimum 3 years of documented experience.

C. Single Source Responsibility: Comply with one of the following:
1. Obtain all steel framing and all metal trim, and each type of gypsum board and related joint treatment materials from a single manufacturer.
2. Provide a confirmation letter from both the gypsum board manufacturer and the joint compound manufacturer that their products are compatible and warrantable if used together.

D. Pre-Construction Conference: Prior to beginning work associated with roof system, the Contractor and appropriate subcontractors shall meet to discuss coordination of the work of the trades associated with the installation of the roof system, suspended acoustical and gypsum board ceiling, suspended mechanical ductwork, suspended light fixtures, etc. This work shall be planned and coordinated to provide hanger attachments needed by the various trades in a manner that will minimize conflict with installation of the roof system.

1.06 REGULATORY REQUIREMENTS
A. Conform to applicable code for fire rated assemblies as indicated on drawings.

1.07 DELIVERY, STORAGE AND HANDLING
A. Deliver materials in original packages, containers or bundles bearing brand name and identification of manufacturer or supplier.

B. Store materials inside, under cover, and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic and other causes. Neatly stack gypsum boards flat to prevent sagging.

C. When materials are moved into the building, distribute pallets and loads evenly around work areas so as to avoid overloading structure, causing damage to any materials, interfering with work of other trades, etc.

D. Handle gypsum boards to prevent damage to edges, ends and surfaces. Do not bend or otherwise damage metal corner beads, trim, etc.

PART 2 - PRODUCTS

2.01 METAL FRAMING MATERIALS

A. Manufacturers - Metal Framing, Connectors, and Accessories:
5. United States Gypsum Company
6. Substitutions: See Section 01 60 00 - Product Requirements.

B. Non-Loadbearing Framing System Components: ASTM C 645; galvanized sheet steel, of size and properties necessary to comply with ASTM C 754 for the spacing indicated, with maximum deflection of wall framing of L/240 at 5 psf. Install with flange edges bent back 90 deg. and doubled over to form 3/16-inch minimum lip (return), and complying with the following
requirements for minimum thickness of base (uncoated) metal and minimum depth as follows:

1. Metal studs at interior partitions shall be 3-5/8-inches x 20 gauge (362 S162-33), 6-inches x 20 gauge (600 S162-33), or 8-inches x 18 gauge (800 S162-43) at locations indicated on the Drawings, spaced at 16-inches o.c., unless otherwise indicated below or otherwise shown on drawings or required by project conditions. Stud width shall be 1-5/8-inches unless otherwise indicated.

2. Jamb studs shall be no less than 20 gauge.
   a. Studs shall be joined together at 4'-0" intervals.

3. Use double studs or 6-inch studs, as indicated or as otherwise required, for chase walls, piping, conduits, or etc.

4. Metal studs at shaft wall or similar construction shall be type, thickness, depth and configuration indicated, or if not indicated, not less than the studs used in the tested assembly. Minimum thickness of 3-5/8-inch studs shall be 22 gauge, and of 6-inch studs shall be 20 gauge.

5. Special stud tracks for curved walls shall be equivalent to "Flex-C Trac" galvanized flexible segmented track with slidable side straps, as manufactured by Flex-Ability Concepts, Inc.; Oklahoma City, OK.


7. Ceiling Channels: C shaped.


9. Resilient Furring Channels: 1/2 inch depth, for attachment to substrate through one leg only.

C. Exterior Non-Loadbearing Studs and Furring for Application of Gypsum Board: As specified in Section 05400.

D. Loadbearing Studs for Application of Gypsum Board: As specified in Section 05 40 00.
   1. Studs: "C" shaped with flat or formed webs.
   2. Any interior load-bearing studs shall be at least 6-inches depth x 18 gauge (600S162-43), or 8-inches x 18 gauge (800S162-43), unless otherwise indicated on Drawings - galvanized C-studs spaced at 16-inches o.c.

E. Shaft Wall Studs and Accessories: ASTM C645; galvanized sheet steel, of size and properties necessary to comply with ASTM C754 and specified performance requirements.
   1. Metal studs at interior partitions shall be 3-5/8-inches x 20 gauge (362 S162-33), 6-inches x 20 gauge (600 S162-33), or 8-inches x 18 gauge (800 S162-43) at locations indicated on the Drawings, spaced at 16-inches o.c., unless otherwise indicated below or otherwise shown on drawings or required by project conditions. Stud width shall be 1-5/8-inches unless otherwise indicated.

F. Steel Framing Components for Suspended and Furred Ceilings:
   1. General: Provide components which comply with ASTM C 754 for materials and sizes, unless otherwise indicated.
   2. Wires for Hangers and Ties: ASTM A 641, Class 1 zinc coating, soft temper.
   3. Flat Hangers: Mild steel, zinc coated or protected with rust-inhibitive paint.
   4. Steel Studs for Furring Channels: ASTM C 645, with flange edges bent back 90 deg. and doubled over to form 3/16-inch minimum lip (return), minimum thickness of base (uncoated) metal and minimum depth as follows:
      a. Thickness: 20 gauge, unless otherwise indicated.
      b. Depth: As indicated.
      c. Spacing: As indicated in referenced standard and on drawings, but no less than at all edges and 24-inches o.c.
   5. Steel Rigid Furring Channels: ASTM C645, hat-shaped, depth of 7/8-inch, and minimum
thickness of base (uncoated) metal as follows:

a. Thickness: 20 gauge at interior and 18 gauge at exterior, unless otherwise indicated.

b. Spacing: As indicated in referenced standard and on drawings, but not less than at all edges and 16-inches o.c.
   1) At ceilings and soffits indicated to receive more than a single layer of gypsum board, spacing shall be not less than at all edges and 16-inches o.c.

6. Grid Suspension System: ASTM C 645, manufacturer's standard grid suspension system composed of main beams and cross furring members which interlock to form a modular supporting network.

   a. Locations for Use: Provide grid type suspension systems for sloped and horizontal ceiling applications of interior gypsum board products which are not attached directly to primary framing system; Minimum 4-feet x 4-feet grid and cross tees at 2-feet o.c., with minimum installation requirements as required by manufacturer's current written instructions, referenced standards, and as indicated in this Section and Section 09511 - "Acoustical Panel Ceilings". Provide and comply with manufacturer's published requirements for accessories, trim and hanger wire, and as otherwise required to provide flat ceilings without deflection or sag.

   b. Product/Manufacturer: Provide suspended modular grid furring system equivalent to standard drywall suspension system for flat ceilings, with 1-1/2-inch grid faces, and as follows:
      1) Equivalent to "Drywall Suspension System", as manufactured by USG Interiors, or one of the other above named manufacturers.

G. Ceiling Hangers: Type and size as specified in ASTM C754 for spacing required.

H. Partition Head To Structure Connections: Provide track fastened to structure with legs of sufficient length to accommodate deflection, for friction fit of studs cut short and screwed to secondary deflection channel set inside but unattached to top track.

   1. Bottom Track: Unless otherwise indicated or required by project conditions, fire-ratings, etc., provide manufacturer's standard Deep Leg Tracks, unpunched unless otherwise indicated, of size, shape and gauge indicated, with 1-5/16-inch flange.

   2. Deflection Track: Typical at stud walls up to slab or similar fixed structure at top of walls: Provide for no less than 1" of vertical movement, equivalent to one of the following:
      a. Dietrich Double Track System
      b. Dietrich Track-Over-Track System
      c. Dietrich SLP-TRK slotted track system
      d. Dietrich TR-Series with Spazzer 9200 Bar (SPZD)

   3. Special stud tracks for all curved walls shall be equivalent to "Flex-C Trac" galvanized flexible segmented track with slidable side straps, as manufactured by Flex-Ability Concepts, Inc.; Oklahoma City, OK.

   4. Special stud tracks for all arched walls shall be equivalent to "Flex-C Arch" galvanized flexible segmented track with slidable straps, as manufactured by Flex-Ability Concepts, Inc.; Oklahoma City, OK.

   5. Provide deflection track at exterior wall and floor-to-floor walls - typical.

I. Continuous Horizontal Bridging/bracing:

   1. 1-1/2-inch cold-rolled channels (galvanized).

   2. Spacing: 4'-0" or 4'-6" o.c. vertically, through pre-punched slots in studs.


   4. Anchors (bridging channels to studs): 1-1/2-inches x 2-inches x 16 gauge clip angle, 1/4-inch less than stud width, secured with four (4) 5/8-inch S-14 screws. (Anchors required at ends
of runs, where snap-in fit to stud slots is not snug or allows stud to move/slide on channels, and at studs on each side of splices in bridging channels).

2.02 BOARD MATERIALS

A. Manufacturers - Gypsum-Based Board:
6. Substitutions: See Section 01 60 00 - Product Requirements.

B. Gypsum Wallboard: Paper-faced as defined in ASTM C 1396/C 1396M. Sizes to minimize joints in place; ends square cut, and as follows:
1. Application: Use for vertical surfaces and horizontal surfaces, unless otherwise indicated.
2. Fire Resistant Type: Type X at all locations, unless other type is required by indicated tested assembly.

C. Gypsum Exterior Sheathing Board: Glass Mat gypsum sheathing board consisting of noncombustible gypsum core incorporating a water-resistant material, surfaced on face, back and long edges with glass mats; complying with ASTM C 1177 and requirements indicated below:
1. Type: Type X at all locations. (Noncombustible.)
2. Edge and End Configuration: Square.
3. Thickness: 5/8-inch, unless indicated otherwise.
4. Size: 4'-0" x 8'-0" or 9'-0" as required for coordination with framing.
5. Products:
   a. Georgia Pacific "DensGlass Sheathing".
   b. CertainTeed Gypsum "GlasRoc Sheathing".
   c. Gold Bond "eXP Extended Exposure Sheathing".
   d. Lafarge North America "Weather Defense Platinum Type X".
   e. Temple-Inland "GreenGlass Exterior Sheathing".
   f. USG "Securock Exterior Sheathing".
7. Extent: For Exterior sheathing, where plywood or other wood sheathing is not indicated.

D. Exterior Soffit Board: Exterior gypsum soffit board as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
1. Application: At showers, and elsewhere where indicated.
2. Core Type: Type X.
3. Thickness: 5/8 inch, unless indicated otherwise.
4. Edges: Tapered, except square for vertical applications.

E. Shaftwall and Coreboard: Type X; 1 inch thick by 24 inches wide, beveled long edges, ends square cut.
1. Paper Faced Type: Gypsum shaftliner board or gypsum coreboard as defined ASTM C 1396/C 1396M; water-resistant faces.
2. Products:
   a. National Gypsum Company; Gold Bond Brand 1" Fire-Shield Shaftliner XP (mold-resistant).
   b. Temple-Inland Inc; GreenGlass Liner Panel.
c. USG Corporation; Sheetrock Gypsum Liner Panels--Enhanced (mold-resistant).
d. For Substitutions: See Section 01600 - Product Requirements.

2.03 ACCESSORIES

A. Finishing Accessories: ASTM C1047, galvanized steel or rolled zinc, unless otherwise indicated.
   1. Types: As detailed or required for finished appearance.
   2. Special Shapes: In addition to conventional cornerbead and control joints, provide U-bead, L-bead, and LC-bead at exposed panel edges.

B. Extruded Moldings and Reveal Moldings: Provide manufacturer's standard alloy 6063-T5 extruded units with 70% resin 2-coat "Kynar 500" baked enamel finish, and as follows:
   1. Design: Provide shapes and configurations as indicated on the Drawings.
      a. Form reveal moldings to cover at least two sides and rear of reveal.
      b. At drywall (or plaster) edge, provide continuous expanded metal edge, designed for mudding-in.
      c. At ceiling grid edge, provide continuous edge designed for compatibility with lay-in ceiling grid.
   2. Color: To match ceiling grid in same room where occurs, unless indicated otherwise, and color as selected by Architect at any exterior locations.

C. Joint Materials: ASTM C475 and as recommended by gypsum board manufacturer for project conditions.
   1. Tape: 2 inch wide, coated glass fiber tape for joints and corners of glass-mat faced boards, and where recommended by manufacturer. Joint material shall be compatible with and approved by air barrier manufacturer, where applicable.
   2. Tape: 2 inch wide, creased paper tape for joints and corners of paper faced boards, and where recommended by manufacturer.
   4. Chemical hardening type compound.

D. Level 5 Surface System Options:
   1. High Build Drywall Surfacer: Vinyl acrylic latex-based coating for spray application, designed to take the place of skim coating and separate paint primer in achieving Level 5 finish.

E. Screws for Attachment to Steel Members Less Than 0.03 inch In Thickness, to Wood Members, and to Gypsum Board: ASTM C1002; self-piercing tapping type; cadmium-plated for exterior locations.

F. Screws for Attachment to Steel Members From 0.033 to 0.112 Inch in Thickness: ASTM C954; steel drill screws for application of gypsum board to loadbearing steel studs.

G. Fasteners: Provide fasteners of type, material, size, corrosion resistance, holding power and other properties required to fasten steel framing and furring members securely to substrates involved; complying with the recommendations of gypsum drywall manufacturers for applications indicated.

H. Screws: ASTM C 1002; self-piercing tapping type; cadmium-plated for exterior locations.

I. Screws: ASTM C 954; steel drill screws for application of gypsum board to loadbearing steel studs.

J. Anchorage to Substrate: Tie wire, nails, screws, and other metal supports, of type and size to suit
application; to rigidly secure materials in place.

K. Adhesive for Attachment to Wood: ASTM C557.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that project conditions are appropriate for work of this section to commence.
   1. Environmental Requirements, General: Establish and maintain environmental conditions for
      application and finishing gypsum board to comply with ASTM C 840, with gypsum board
      manufacturer's recommendations, and with adhesive manufacturer's recommendations, for
      before, during, and after installation.
   2. Minimum Room Temperatures: For non-adhesive attachment of gypsum board to framing,
      maintain not less than 40º.
   3. Ventilate building spaces to remove water not required for drying joint treatment materials.
      Avoid drafts during dry, hot weather to prevent materials from drying too rapidly.

3.02 SEQUENCING AND SCHEDULING

A. Sequence installation of gypsum board and sheathing with installation of exterior cladding and
   roofing to comply with requirements indicated below:
   1. Do not leave gypsum sheathing board exposed to weather after its application for more than
      one month or, if protected as indicated below, for more than 6 months, unless otherwise
      warranted by manufacturer:
      a. Cover exterior surface of sheathing with a temporary air infiltration barrier equivalent to
         6-mil polyethylene film. Apply covering immediately after sheathing is installed.
      b. Remove covering just prior to installation of asphalt felt, face brick, and similarly applied
         exterior materials.

3.03 SHAFT WALL INSTALLATION

A. Shaft Wall Framing: Install in accordance with manufacturer's installation instructions.
   1. Fasten runners to structure with short leg to finished side, using appropriate power-driven
      fasteners at not more than 24 inches on center.
   2. Install studs at spacing required to meet performance requirements.

B. Shaft Wall Liner: Cut panels to accurate dimension and install sequentially between special
   friction studs.
   1. On walls over sixteen feet high, screw-attach studs to runners top and bottom.
   2. Seal perimeter of shaft wall and penetrations with acoustical sealant.

3.04 FRAMING INSTALLATION

A. Metal Framing: Install in accordance with ASTM C754 and manufacturer's instructions.

B. Do not bridge building expansion and control joints with steel framing or furring members;
   independently frame both sides of joints with framing or furring members or as indicated.

C. Suspended Ceilings and Soffits: Space framing and furring members at 16 inches on center
   minimum.
   1. Level ceiling system to a tolerance of 1/1200.
   2. Laterally brace entire suspension system.
   3. Suspend ceiling hangers from building structural members and as follows:
      a. Install hangers plumb and free from contact with insulation or other objects within
         ceiling plenum that are not part of supporting structural or ceiling suspension system.
Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, counter splaying, or other equally effective means.

b. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with the location of hangers required to support standard suspension system members, install supplemental suspension members and hangers in form of trapeze or equivalent devices. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards.

c. Secure wire hangers by looping and wire-tying, either directly to structures or to inserts, eye screws, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause them to deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.

d. Secure flat, angle, channel, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices and fasteners that are secure and appropriate for structure as well as for type of hanger involved, and in a manner that will not cause them to deteriorate or fail due to age, corrosion, or elevated temperatures.

e. Secure hangers to structural support by connecting directly to structure where possible; otherwise, connect to anchorage devices or fasteners as indicated or required.

f. Do not support ceilings directly from permanent metal forms. Furnish cast-in-place hanger inserts that extend through forms.

g. Do not attach hangers to steel deck tabs.

h. Do not attach hangers to steel roof deck. Attach hangers to structural members.

i. Do not connect or suspend steel framing from ducts, pipes or conduit.

j. Keep hangers and braces 2-inches clear of ducts, pipes and conduits.

k. Sway-brace suspended steel framing with hangers used for support.

l. Install suspended steel framing components in sizes and at spacing indicated but not less than that required by referenced steel framing installation standard

1) Wire Hangers: 0.1620-inch diameter (8 gauge), 4-feet on center. Install supplementary hangers as necessary at ceiling fixtures to provide a hanger at each corner of each fixture, diffuser, grille, and other ceiling-mounted equipment.

m. Grid Suspension System: Attach perimeter wall track or angle where grid suspension system meets vertical surfaces. Mechanically join main beam and cross furring members to each other and butt-cut to fit into wall track.

4. Install bracing as required at exterior locations to resist wind uplift.

D. Studs: Space studs as permitted by standard.

1. Extend partition framing to structure in all locations unless otherwise indicated.

2. Installation Tolerances: Install each steel framing and furring member so that fastening surface does not vary more than 1/8-inch from plane of faces of adjacent framing.

3. Partitions Terminating at Ceiling: Attach ceiling runner securely to ceiling track in accordance with manufacturer's instructions.

4. Extend non-bearing wall partition framing to 6 inches above adjacent ceiling heights, except where partitions are indicated to terminate at suspended ceilings.

a. Provide studs up to tie to structure at 4'-0" o.c. minimum, from partitions terminating below ceilings

5. Install steel studs and furring in sizes and at spacings, indicated but not less than that required by referenced steel framing installation standard.

6. Install steel studs so that flanges point in the same direction and gypsum boards can be installed in the direction opposite to that of the flange.
7. Install horizontal steel bridging/bracing in all walls, and the additional strap bracing at curved
walls as steel framing progresses. Install in compliance with stud manufacturer's
recommendations, at spacing indicated
   a. Galvanized steel strap bracing shall be provided continuous at top and bottom runner
      tracks and at bridging locations at all curved stud walls.
8. Isolate steel framing from building structure to prevent transfer of loading imposed by
   structural movement, at locations indicated below to comply with details shown on Drawings:
   a. Where edges of suspended ceilings abut building structure horizontally at ceiling
      perimeters or penetration of structural elements.
   b. Where partition and wall framing abuts overhead structure:
      1) Unless framing is specifically indicated to terminate below ceilings, all framing and
         gypsum board shall extend up to bottom of structure above.
9. Partitions Terminating at Structure: Attach extended leg top runner to structure, maintain
   clearance between top of studs and structure, and brace both flanges of studs with continuous
   bridging.
10. Install runners (tracks) at floors, ceilings and structural walls and columns, where gypsum
    drywall stud system abuts other construction.
E. Openings: Reinforce openings as required for weight of doors or operable panels, using not less
    than double studs at jambs.
   1. Frame door openings to comply with details indicated, with GA-219 and with applicable
      published recommendations of gypsum board manufacturer. Attach vertical studs at jambs
      with screws either directly to frames or to jamb anchor clips on door frames; install runner
      track section (for cripple studs) at head and secure to jamb studs.
      a. Extend vertical jamb studs (double studs-typical) through suspended ceilings and attach
         to underside of floor or roof structure above, unless otherwise indicated.
   2. Frame openings other than door openings to comply with details indicated, or if none
      indicated, in same manner as required for door openings; and install framing below sills of
      openings to match framing required above door heads.
   3. Spot grout hollow metal door frames for solid core wood doors, hollow metal doors and doors
      over 32-inches wide. Apply spot grout at each jamb anchor clip just before inserting board
      into frame.
F. Standard Wall Furring: Install at concrete and masonry walls scheduled to receive gypsum board,
   not more than 4 inches from floor and ceiling lines and abutting walls. Secure in place on alternate
   channel flanges at maximum 24 inches on center.
   1. Orientation: Horizontal.
   2. Spacing: At 16 inches on center minimum.
G. Furring for Fire Ratings: Install as required for fire resistance ratings indicated and to GA-600
   requirements.
H. Blocking: Install blocking for support of plumbing fixtures, toilet partitions, wall cabinets, wood
   frame openings, toilet accessories, hardware, and heavy trim, shelving, furnishings and equipment
   services. Bolt or screw steel channels to studs. Comply with Section 06 10 00 for wood blocking.

3.05 BOARD INSTALLATION
   A. Comply with ASTM C 840, GA-216, and manufacturer's instructions. Install to minimize butt end
      joints, especially in highly visible locations.
   B. General application and finishing of gypsum Board:
      1. Cut boards as recommended by manufacturer.
2. Locate exposed end-butt joints as far from center of walls and ceilings as possible, and stagger not less than 24-inches in alternate courses of board.

3. Install ceiling boards across framing in the manner which minimizes the number of end-butt joints, and which avoids end joints in the central area of each ceiling. Stagger end joints at least 24- inches.

4. Install wall/partitions boards in manner which minimizes the number of end-butt joints or avoids them entirely where possible. At high walls, install boards horizontally with end joints staggered over studs.

5. Install exposed gypsum board with face side out. Do not install imperfect, damaged or damp boards. Butt boards together for a light contact at edges and ends with not more than 1/16-inch open space between boards. Do not force into place.

6. Locate either edge or end joints over supports, except in horizontal applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Position boards so that like edges abut, tapered edges against tapered edges and mill-cut or field-cut ends against mill-cut or field-cut ends. Do not place tapered edges against cut edges or ends. Stagger vertical joints over different studs on opposite sides of partitions.

7. Attach gypsum board to steel studs so that leading edge or end of each board is attached to open (unsupported) edge of stud flange first.

8. Attach gypsum board to supplementary framing and blocking provided for additional support at openings and cutouts.
   a. Cover both faces of steel stud partition framing with gypsum board in concealed spaces (above ceilings, etc.), except inside double or chase walls which are required to be braced internally.
      1) Except where concealed application is required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. area, and may be limited to not less than 75% of full coverage.
      2) Fit gypsum board around ducts, pipes, and conduits.
      3) Where partitions intersect open concrete coffers, concrete joists, and other structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by coffers, joists, and other structural members; allow 1/4-to-1/2-inch-wide joints to install sealant.
   b. Fire-stop around penetrations as required by Codes and authorities having jurisdiction. Refer to Section 07 84 00 for additional information and requirements

9. Where interior partitions are indicated to extend to the structure above, the drywall shall also extend to the structure with the same number of layers as required below the ceiling.

10. Isolate perimeter of non-load-bearing drywall partitions at structural abutments. Provide 1/4-inch to 1/2-inch space and trim edge with "U" bead edge trim. Seal joints with acoustical sealant.

11. Gypsum panels applied to walls shall be applied with the bottom edge spaced a minimum of 1/4-inch above the floor.

12. At all interior walls, seal construction at perimeters of partition, partition intersections, control and expansion joints, openings and penetrations with a continuous bead of acoustical sealant including a bead at both faces of partitions. Comply with ASTM C 919 and manufacturer's recommendations for location of edge trim, and close off sound-flanking paths around or through construction, including sealing of partitions above acoustical ceilings.
   a. Offset boxes and similar openings minimum of one stud space, and insulate behind openings.
   b. Openings cut into wall for boxes shall leave maximum gap of 1/4" around box.
   c. Seal around box completely with acoustical sealant, or gasket recommended by manufacturer for acoustic isolation.
13. Space fasteners in gypsum boards in accordance with referenced gypsum board application and finishing standard and manufacturer's recommendations

C. Single-Layer Non-Rated: Install gypsum board in most economical direction, with ends and edges occurring over firm bearing.
1. Install gypsum wallboard as follows:
   a. On ceilings apply gypsum board prior to wall/partition board application to the greatest extent possible.
   b. On partitions/walls apply gypsum board vertically (parallel to framing), unless otherwise indicated or required for fire or smoke resistive rated assemblies. Provide maximum length panels, to minimize end joints.
   c. On partitions/walls 8'-1" or less in height apply gypsum board horizontally (perpendicular to framing); use maximum length sheets possible to minimize end joints.
2. Single-Layer Fastening Methods: Apply gypsum boards to supports as follows:
   a. Fasten with screws

D. Double-Layer Non-Rated: Use gypsum board for first layer, placed parallel to framing or furring members, with ends and edges occurring over firm bearing. Place second layer perpendicular to framing or furring members. Offset joints of second layer from joints of first layer.
1. Install gypsum backing board for base layer and gypsum wallboard for face layer.
2. On ceilings apply base layer(s) prior to base layer application on walls/partitions; apply face layers in same sequence. Offset joints between layers at least 10-inches. Apply base layers at right angles to supports unless otherwise indicated.
3. On partitions/walls apply base layer(s) and face layers vertically (parallel to framing) with joints of base layers over supports and face layer joints offset at least one stud or furring member space from base layer joints.
4. Multi-Layer Fastening Methods:
   a. Apply base layer(s) of gypsum board and face layer to base layer(s) as follows:
   b. Fasten both base layer(s) and face layer separately to supports with screws

E. Fire-Rated Construction: Install gypsum board in strict compliance with requirements of assembly listing.

F. Exterior Sheathing: Comply with ASTM C 1280. Install sheathing vertically, with edges butted tight and ends occurring over firm bearing.
1. Fasteners spaced approximately 8-inches o.c. and set back 3/8-inch minimum from edges and ends of boards.
2. Cut boards at penetrations, edges and other obstructions of the work; fit tight against abutting work, except provide 3/8-inch setback where non-loadbearing work abuts structural elements at head and jambs.
3. Coordinate installation of sheathing with installation of flashing and joint sealers so that these combined materials are installed in the sequence and manner which prevents exterior moisture from passing through complete exterior wall assembly to the interior.
4. Apply fasteners so that screw heads bear tightly against face of gypsum sheathing boards but do not cut into face paper.
5. Do not bridge building expansion joints with gypsum sheathing; cut and space edges to match spacing of structural support elements

G. Glass Mat Faced Gypsum Board: Install in strict accordance with manufacturer's instructions.

H. Installation on Metal Framing: Use screws for attachment of all gypsum board.

I. Installation on Wood Framing: For rated assemblies, comply with requirements of listing
authority. For non-rated assemblies, install as follows:

J. Curved Surfaces: Apply gypsum board to curved substrates in accordance with GA-226.

K. Moisture Protection: Treat cut edges and holes in moisture resistant gypsum board with sealant.

3.06 INSTALLATION OF TRIM AND ACCESSORIES

A. General: Where feasible, use the same fasteners to anchor trim accessory flanges as required to fasten gypsum board to the supports. Otherwise, fasten flanges to comply with manufacturer's recommendations.

B. Control Joints: Place control joints consistent with lines of building spaces, as indicated on drawings or as follows:
   1. Not more than 30 feet apart on walls and ceilings over 50 feet long.
   2. At exterior soffits, not more than 30 feet apart in both directions.
   3. Install control joints at spacings and locations required by referenced gypsum board application and finish standard, and approved by the Architect for visual effect.

C. Corner Beads: Install at external corners, using longest practical lengths.

D. Edge Trim: Install at locations where gypsum board abuts dissimilar materials and as indicated.

3.07 JOINT TREATMENT

A. General: Apply treatment at gypsum board joints (both directions); flanges of corner bead, edge trim, and control joints; penetrations; fastener heads, surface defects and elsewhere as required to prepare work for decoration.

B. Glass Mat Faced Gypsum Board and Exterior Glass Mat Faced Sheathing: Use fiberglass joint tape, bedded and finished with chemical hardening type joint compound.
   1. Joint tape and joint compound shall be compatible with waterproofing subsequently applied.


D. Fiber Reinforced Gypsum and Cement Board: Use alkali-resistant glass fiber tape, recommended by manufacturer, embedded in latex-fortified mortar or latex-based Type 1 mastic over the joint. Use same material as specified for tile setting.

E. Finish gypsum board in accordance with levels defined in ASTM C840, as follows:
   1. Level 4: Walls and ceilings to receive paint finish or wall coverings, unless otherwise indicated.
   2. Level 5: Walls and ceilings to receive semi-gloss or gloss paint finish and other areas specifically indicated.
   3. Level 2: In utility areas, behind cabinetry, and on backing board to receive tile finish.
   4. Level 1: Fire rated wall areas above finished ceilings, whether or not accessible in the completed construction.
   5. Level 0: Temporary partitions and surfaces indicated to be finished in later stage of project.

F. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.
   1. Feather coats of joint compound so that camber is maximum 1/32 inch.
   2. Taping, filling, and sanding is not required at surfaces behind adhesive applied ceramic tile
and fixed cabinetry.

3. Taping, filling and sanding is not required at base layer of double layer applications.

G. Prefill open joints and rounded or beveled edges, if any, using setting-type joint compound.

H. Apply joint tape at joints between gypsum boards, except where trim accessories are indicated.

I. Finish interior gypsum wallboard by applying the following joint compounds in 3 coats (not including prefill of openings in base), and sand between coats and after last coat:
   1. Embedding and First Coat: Ready-mix drying-type all-purpose or taping compound.
   2. Fill (Second) Coat: Ready-mix drying-type all-purpose or topping compound.
   3. Finish (Third) Coat: Ready-mix drying-type all-purpose or topping compound.

J. Water-Resistant Gypsum Board and Exterior Gypsum Board: Finish joints between water-resistant backing board with tape and setting-type joint compound to comply with gypsum board manufacturer's written recommendations and installation standards referenced in related sections.

K. Partial Finishing: Omit third coat and sanding on concealed drywall construction which is indicated for drywall finishing, except where finishing is required to achieve fire-resistance rating, sound rating or to act as air or smoke barrier

L. Where Level 5 finish is indicated, spray apply high build drywall surfacer over entire surface after joints have been properly treated; achieve a flat and tool mark-free finish.

3.08 CLEANING AND PROTECTION OF WORK

A. Promptly remove any joint compound and adhesives and similar residue from adjacent surfaces, as it may occur.

B. Provide final protection and maintain conditions, in a manner suitable to Installer, which ensures gypsum drywall construction remain without damage or deterioration at time of Substantial Completion.

3.09 TOLERANCES

A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet in any direction.

3.10 FINISH LEVEL SCHEDULE

A. Level 1: Above finished ceilings concealed from view.

B. Level 2: Utility areas and areas behind cabinetry.

C. Level 3: Walls scheduled to receive textured wall finish.

D. Level 4: Walls and ceilings scheduled to receive flat or eggshell paint finish.

E. Level 5: Walls and ceilings scheduled to receive semi-gloss or gloss paint finish.

END OF SECTION
SECTION 09 30 00

TILING

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Tile for floor applications.
B. Tile for wall applications.
C. Ceramic trim.
D. Non-ceramic trim.

1.02 RELATED REQUIREMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
B. Section 07 90 05 - Joint Sealers.
C. Section 09 21 16 - Gypsum Board Assemblies: Description and installation of tile backer board.

1.03 REFERENCE STANDARDS


1.04 ADMINISTRATIVE REQUIREMENTS
A. Preinstallation Meeting: Convene a preinstallation meeting one week before starting work of this section; require attendance by all affected installers.

1.05 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide manufacturers' data sheets on tile, mortar, grout, and accessories. Include instructions for using grouts and adhesives.

C. Shop Drawings: Indicate tile layout, patterns, color arrangement, perimeter conditions, junctions with dissimilar materials, control and expansion joints, thresholds, ceramic accessories, and setting details.

D. Samples: Mount tile and apply grout on two plywood panels, minimum 18 x 18 inches in size illustrating pattern, color variations, and grout joint size variations.

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

F. Maintenance Data: Include recommended cleaning methods, cleaning materials, stain removal methods, and polishes and waxes.

G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 60 00 - Product Requirements, for additional provisions.
   2. Extra Tile: 2 percent of each size, color, and surface finish combination, but not less than 10 square feet of each type.

H. LEED Submittal: Documentation of recycled content and location of manufacture.

1.06 QUALITY ASSURANCE


B. Manufacturer Qualifications: Company specializing in manufacturing the types of products specified in this section, with minimum 5 years of documented experience.

C. Installer Qualifications: Company specializing in performing tile installation, with minimum of 5 years of documented experience.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Protect adhesives from freezing or overheating in accordance with manufacturer's instructions.

1.08 FIELD CONDITIONS

A. Do not install solvent-based products in an unventilated environment.

PART 2 - PRODUCTS

2.01 TILE

A. Manufacturers: All products of each type by the same manufacturer.
   1. See Drawings for manufacturers.
   2. Substitutions: See Section 01 60 00 - Product Requirements.

B. Porcelain Floor Tile
   1. See Drawings for products.
   2. Colors, Sizes, and Patterns: See Finish Plan and Finish Legend.
C. Porcelain Wall Tile
   1. See Drawings for products.

2.02 TRIM AND ACCESSORIES

A. Porcelain Trim: Matching bullnose ceramic shapes in sizes coordinated with field tile.
   1. Applications: Use in the following locations:
      a. Open Edges: Bullnose.
      b. Inside Corners: Jointed.
      c. Floor to Wall Joints: Cove base, unless indicated otherwise.
   2. Manufacturer: Same as for tile.

B. Non-Ceramic Trim: Satin natural anodized extruded aluminum, style and dimensions to suit
   application, for setting using tile mortar or adhesive.
   1. Applications: Use in the following locations:
      a. Open edges of wall tile.
      b. Open edges of floor tile.
      c. Wall corners, outside and inside.
      d. Transition between floor finishes of different heights.
         1) Schluter Reno-U, or similar.
      e. Thresholds at door openings.
      f. Expansion and control joints, floor and wall.
      g. Floor to wall joints.
      h. Borders and other trim as indicated on drawings.
   2. Manufacturer:
      c. Substitutions: See Section 01 60 00 - Product Requirements.

2.03 SETTING MATERIALS

2.04 ADHESIVE MATERIALS

A. Manufacturers:
   3. Substitutions: See Section 01 60 00 - Product Requirements.


2.05 GROUTS

A. Manufacturers:
   2. Hydroment.
   5. Substitutions: See Section 01 60 00 - Product Requirements.

B. Grout: 100% solids epoxy grout as specified in ANSI A118.3 - 2005.
   1. Colors: To be selected by Architect from manufacturer's full range.
   2. Location: At all locations, unless noted otherwise.
2.06 THICK-BED MATERIALS

A. Mortar Bed Materials: Portland cement, sand, latex additive, and water.

B. Cleavage Membrane: No. 15 asphalt saturated felt.

C. Waterproofing Membrane: Equivalent to "ECB Anti-Fracture Membrane", as manufactured by NAC Products, Inc.; Cuyahoga Falls, Ohio (Phone: 1-800-633-4622).
   1. Provide complete system, including substrate primer/sealer, 40-mil, two component, self-adhering membrane, and appropriate top-coat primer for the material(s) to be placed over the ECB system.
   2. Locations for Use: Below all tile flooring, turned up 1-inch at all edges and concealed by base material, and turned down at least 2-inches into floor drains.
   3. Completed membrane system is intended for waterproofing, and to bridge substrate joints within the limitations stated in manufacturer's current written product data.

2.07 THIN-SET ACCESSORY MATERIALS

A. Cleavage Membrane: No. 15 asphalt saturated felt.

B. Waterproofing Membrane: Equivalent to "ECB Anti-Fracture Membrane", as manufactured by NAC Products, Inc.; Cuyahoga Falls, Ohio (Phone: 1-800-633-4622).
   1. Provide complete system, including substrate primer/sealer, 40-mil, two component, self-adhering membrane, and appropriate top-coat primer for the material(s) to be placed over the ECB system.
   2. Locations for Use: Below all tile flooring, turned up 1-inch at all edges and concealed by base material, and turned down at least 2-inches into floor drains.
   3. Completed membrane system is intended for waterproofing, and to bridge substrate joints within the limitations stated in manufacturer's current written product data.

C. Membrane at Walls: No. 15 asphalt saturated felt.

D. Mesh Tape: 2-inch wide self-adhesive fiberglass mesh tape.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that sub-floor surfaces are smooth and flat within the tolerances specified for that type of work and are ready to receive tile.

B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive tile.

C. Verify that sub-floor surfaces are dust-free and free of substances that could impair bonding of setting materials to sub-floor surfaces.

D. Verify that concrete sub-floor surfaces are ready for tile installation by testing for moisture emission rate and alkalinity; obtain instructions if test results are not within limits recommended by tile manufacturer and setting materials manufacturer.

E. Verify that required floor-mounted utilities are in correct location.

3.02 PREPARATION

A. Protect surrounding work from damage.

B. Vacuum clean surfaces and damp clean.
C. Seal substrate surface cracks with filler. Level existing substrate surfaces to acceptable flatness tolerances.

D. Prepare substrate surfaces for adhesive installation in accordance with adhesive manufacturer's instructions.

3.03 INSTALLATION - GENERAL

A. Install tile and thresholds and grout in accordance with applicable requirements of ANSI A108.1 through A108.13, manufacturer's instructions, and The Tile Council of North America Handbook recommendations.

B. Lay tile to pattern indicated. Do not interrupt tile pattern through openings.

C. Cut and fit tile to penetrations through tile, leaving sealant joint space. Form corners and bases neatly. Align floor joints.

D. Place tile joints uniform in width, subject to variance in tolerance allowed in tile size. Make grout joints without voids, cracks, excess mortar or excess grout, or too little grout.

E. Form internal angles square and external angles bullnosed.

F. Install non-ceramic trim in accordance with manufacturer's instructions.

G. Sound tile after setting. Replace hollow sounding units.

H. Keep expansion joints free of adhesive or grout. Apply sealant to joints.

I. Prior to grouting, allow installation to completely cure; minimum of 48 hours.

J. Grout tile joints. Use epoxy grout unless otherwise indicated.

K. Apply sealant to junction of tile and dissimilar materials and junction of dissimilar planes.

3.04 INSTALLATION - FLOORS - THIN-SET METHODS

A. Over interior concrete substrates, install in accordance with TCA Handbook Method F131, epoxy bond coat and grout, unless otherwise indicated.
   1. Use waterproofing membrane under all tile.
   2. Where waterproofing membrane is indicated, install in accordance with TCA Handbook Method F122, with epoxy bond coat and grout.

3.05 INSTALLATION - FLOORS - MORTAR BED METHODS

A. Over exterior concrete substrates, install in accordance with TCA F101, bonded, with grout as indicated in finish schedule on Drawings.

   1. Where waterproofing membrane is indicated, with standard grout or no mention of grout type, install in accordance with The Tile Council of North America Handbook Method F121.
   2. Where epoxy bond coat and grout are indicated, install in accordance with The Tile Council of North America Handbook Method F132, bonded.
   3. Where epoxy or furan grout is indicated, but not epoxy or furan bond coat, install in accordance with The Tile Council of North America Handbook Method F114, with cleavage membrane.

C. Over wood substrates, install in accordance with The Tile Council of North America Handbook method F141, with standard grout, unless otherwise indicated.
D. Cleavage Membrane: Lap edges and ends.
E. Mortar Bed Thickness: 1-1/4 inch, unless otherwise indicated.

3.06 INSTALLATION - SHOWERS AND BATHTUB WALLS
A. At tiled shower receptors install in accordance with The Tile Council of North America Handbook Method B415, mortar bed floor, and W244, thin-set over cementitious backer unit walls.
B. At bathtub walls install in accordance with The Tile Council of North America Handbook Method B412, over cementitious backer units with waterproofing membrane.
C. Grout with standard grout as specified above.
D. Seal joints between tile work and other work with sealant Type specified in Section 07 90 05.

3.07 INSTALLATION - WALL TILE
B. Over coated glass mat backer board on studs, install in accordance with The Tile Council of North America Handbook Method W245.

3.08 INSTALLATION - SHOWER PANS
A. Over backer board walls and mortar bed floor, install shower receptor in accordance with The Tile Council of North America Handbook Method TR420. Test shower pans.

3.09 CLEANING
A. Clean tile and grout surfaces.

3.10 PROTECTION
A. Do not permit traffic over finished floor surface for 4 days after installation.

3.11 SCHEDULE
A. See Finish Schedule on Drawings.

END OF SECTION
SECTION 09 51 00

ACOUSTICAL CEILINGS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Suspended metal grid ceiling system.
B. Acoustical units.

1.02 RELATED REQUIREMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
B. Section 07 21 00 - Thermal Insulation: Acoustical insulation.
C. Section 07 90 05 - Joint Sealers: Acoustical sealant.

1.03 REFERENCE STANDARDS


1.04 ADMINISTRATIVE REQUIREMENTS

A. Sequence work to ensure acoustical ceilings are not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.
B. Do not install acoustical units until after interior wet work is dry.

1.05 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
B. Shop Drawings: Indicate grid layout and related dimensioning, junctions with other ceiling finishes, and mechanical and electrical items installed in the ceiling.
C. Product Data: Provide data on suspension system components and acoustical units.
D. Samples: Submit two samples 6x6 inch in size illustrating material, edge detail and finish of acoustical units.
E. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.
F. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 60 00 - Product Requirements, for additional provisions.
   2. Extra Acoustical Units: Quantity equal to 5 percent of total installed (but not less than 100 SF) for each type of acoustical unit.
G. LEED Submittal: Documentation of recycled content and location of manufacture.
1. Product Data for Credit MR 4.1: For products having recycled content, documentation indicating percentages by weight of postconsumer and preconsumer recycled content.
2. Product Data for Credits MR 5.1 and 5.2: For regional products, documentation indicating percentages by cost of material extracted, processed and manufactured within 500 miles of project site.
3. Product Data for Credit EQ 4.1: For sealants, including printed statement of VOC content.

1.06 QUALITY ASSURANCE
A. Suspension System Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
B. Acoustical Unit Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

1.07 FIELD CONDITIONS
A. Maintain uniform temperature of minimum 60 degrees F, and maximum humidity of 40 percent prior to, during, and after acoustical unit installation.

1.08 PROJECT CONDITIONS
A. Sequence work to ensure acoustical ceilings are not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.
B. Install acoustical units after interior wet work is dry.

PART 2 - PRODUCTS
2.01 ACOUSTICAL UNITS
A. Manufacturers:
   4. Substitutions: See Section 01 60 00 - Product Requirements.
B. Acoustical Panels:
   1. As indicated on Ceiling Finish Key.

2.02 SUSPENSION SYSTEM(S)
A. Manufacturers:
   1. Same as for acoustical units, and as indicated.
   2. Substitutions: See Section 01 60 00 - Product Requirements.
B. Suspension Systems - General: ASTM C635; die cut and interlocking components, with stabilizer bars, clips, splices, perimeter moldings, and hold down clips as required.
C. Exposed Steel Suspension System: Formed galvanized steel, commercial quality cold rolled; intermediate-duty.
   1. Finish: White painted, unless indicated otherwise.

2.03 ACCESSORIES
A. Support Channels and Hangers: Galvanized steel; size and type to suit application, seismic
requirements, and ceiling system flatness requirement specified.

B. Perimeter Moldings: Same material and finish as grid.
   1. At Exposed Grid: Provide L-shaped molding for mounting at same elevation as face of grid.

C. Acoustical Sealant For Perimeter Moldings: Specified in Section 07 90 05.

D. Touch-up Paint: Type and color to match acoustical and grid units.

PART 3 - EXECUTION

3.01 EXAMINATION

   A. Verify existing conditions before starting work.
   B. Verify that layout of hangers will not interfere with other work.

3.02 INSTALLATION - SUSPENSION SYSTEM

   A. Install suspension system in accordance with ASTM C636/C636M, ASTM E580/E580M, and manufacturer's instructions and as supplemented in this section.
   B. Rigidly secure system, including integral mechanical and electrical components, for maximum deflection of 1:360.
   C. Locate system on room axis according to reflected plan.
   D. Install after major above-ceiling work is complete. Coordinate the location of hangers with other work.
   E. Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.
   F. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers and related carrying channels to span the extra distance.
   G. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.
   H. Support fixture loads using supplementary hangers located within 6 inches of each corner, or support components independently.
   I. Do not eccentrically load system or induce rotation of runners.
   J. Perimeter Molding: Install at intersection of ceiling and vertical surfaces and at junctions with other interruptions.
      1. Install in bed of acoustical sealant.
      2. Use longest practical lengths.
      3. Overlap corners.
   K. Form expansion joints as detailed. Form to accommodate plus or minus 1 inch movement. Maintain visual closure.

3.03 INSTALLATION - ACOUSTICAL UNITS

   A. Install acoustical units in accordance with manufacturer's instructions.
   B. Fit acoustical units in place, free from damaged edges or other defects detrimental to appearance and function.
   C. Lay directional patterned units with pattern parallel to longest room axis.
D. Fit border trim neatly against abutting surfaces.
E. Install units after above-ceiling work is complete.
F. Install acoustical units level, in uniform plane, and free from twist, warp, and dents.
G. Cutting Acoustical Units:
   1. Cut to fit irregular grid and perimeter edge trim.
   2. Make field cut edges of same profile as factory edges.
   3. Double cut and field paint exposed reveal edges.
H. Where round obstructions occur, provide preformed closures to match perimeter molding.
I. Install hold-down clips on panels within 20 ft of an exterior door.

3.04 TOLERANCES
   A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet.
   B. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

END OF SECTION
SECTION 09 61 15

FLOOR SEALERS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Floors denoted on Finish Schedule as SC (Sealed Concrete).

B. Related Sections
   1. Drawings and general provisions of Contract, including General Conditions and Division 1
      Specification Sections, apply to the work of this Section.
   2. Section 03 30 00 - Cast-In-Place Concrete.

1.02 SUBMITTALS

A. Contractor shall submit specified manufacturer's complete technical data sheets for all products to
   be used, including installation instructions.

B. LEED Submittals:
   1. For products specified in this Section, submit documentation of recycled content and location
      of manufacture.

1.03 QUALITY ASSURANCE

A. Manufacturer Qualifications: Manufacturer of specified sealer shall have a minimum 10 years
   experience in the production of the specified products.

B. Contractor Qualifications: Contractor must have a minimum 3 years experience in sealing
   applications and successfully completed not less than 6 projects comparable in scale and
   complexity.

C. Regulatory Requirements
   1. Products shall comply with the United States Clean Air Act for maximum Volatile Organic
      Compound (VOC) content as specified in PART 2 of this section.

1.04 DELIVERY, STORAGE AND HANDLING

A. Deliver the specified products in original, unopened containers with legible manufacturer's
   identification and information.

B. Store specified products in conditions recommended by the manufacturer.

1.05 JOB SITE CONDITIONS

A. Environmental Conditions: Maintain an ambient temperature of between 50° F and 90° F during
   application and at least 48 hours after application.

B. Protection: Precautions shall be taken to avoid damage or contamination of any surfaces near the
   work zone. Protect completed stain work from moisture or contamination.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

D. Substitutions: See Section 01600 - Product Requirements.

2.02 PRODUCTS
   [basis of design]

PART 3 - EXECUTION

3.01 EXAMINATION
A. Verification of Conditions: Contractor shall examine areas and conditions under which work will be performed and identify conditions detrimental to proper and timely completion of work. Do not proceed until unsatisfactory conditions have been corrected.

3.02 PREPARATION
A. New Concrete
   1. Newly placed concrete should be sufficiently cured to allow the concrete to become reactive, a minimum 28 days.
   2. Immediately prior to sealing, the concrete must be thoroughly cleaned. The surface should be swept, and then pressure washed or scrubbed using a rotary floor machine. Use of suitable, high quality commercial detergents will facilitate cleaning. The surface must be rinsed after cleaning until the rinse water is completely clean. Allow floor to dry completely prior to application of floor sealer. All floor latents to be removed prior to sealing.

3.03 APPLICATION OF CLEAR SEALER
A. Allow the concrete substrate to completely dry.
B. The surface shall be sealed with a clear sealer produced of the type specified under Products above.
C. Apply at the rates and method recommended by manufacturer in written instructions which the installer shall have at the job site.
D. Maintain a wet edge at all times.
E. Allow sealer to completely dry before applying additional coats.
F. Apply second coat of sealer at 90° to the direction of the first coat using the same application method and rates.

3.04 PROTECTION
A. Diaper all hydraulic powered equipment to avoid staining of the concrete.
B. Do not allow any trade to park any vehicles on the inside slab. If necessary to complete their scope of work, drop cloths will be placed under vehicles at all times.
C. Protect slab during masonry work with 1/2-inch plyboard around work area.
D. Place no steel on interior slab to avoid rust stains and gouges. If construction dictates necessity of this, interior slab will be protected with 1/2-inch plyboard.
E. Do not allow acids and acidic detergents to come into contact with slab.
F. Inform all trades that the slab must be protected at all times.
G. Protect finished work until fully cured in accordance with manufacturer's recommendations.

H. Protect completed floor from damage until Substantial Completion.
   1. Do not allow vehicle and pedestrian traffic on unprotected floor.
   2. Do not allow construction materials, equipment, and tools on unprotected floor.

I. Immediately remove mortar splatter, spilled liquids, oil, grease, paint, coatings, and other surface contaminants which could adversely affect completed floor.

J. Repair damaged areas of completed floor to satisfaction of Architect.

3.05 MAINTENANCE

A. Sealed floors should be maintained by sweeping. Spills should be cleaned when they occur and dirt shall be rinsed off with water. Heavily soiled areas may be wet-cleaned by mopping or by scrubbing with a rotary floor machine equipped with a scrubbing brush and a suitable, high quality commercial detergent. Interior floors that require polishing should be maintained using a compatible, premium-grade, emulsion-type, commercial floor polish, following manufacturer's instructions and safety requirements.

END OF SECTION
SECTION 09 65 00

RESILIENT FLOORING

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Resilient tile flooring.
B. Resilient base.
C. Installation accessories.

1.02 RELATED REQUIREMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
B. Section 03 30 00 - Cast-in-Place Concrete: Restrictions on curing compounds for concrete slabs and floors.

1.03 REFERENCE STANDARDS

A. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring; 2011.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide data on specified products, describing physical and performance characteristics; including sizes, patterns and colors available; and installation instructions.
C. Shop Drawings: Indicate seaming plan.
D. Selection Samples: Submit manufacturer's complete set of color samples for Architect's initial selection.
E. Verification Samples: Submit two samples, 9x9 inch in size illustrating color and pattern for each resilient flooring product specified.
F. Concrete Testing Standard: Submit a copy of ASTM F710.
G. Certification: Prior to installation of flooring, submit written certification by flooring manufacturer and adhesive manufacturer that condition of sub-floor is acceptable.
H. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.
I. LEED Report: Report recycled content and VOC emission of flooring; VOC content of adhesives.
   1. Report location of manufacture.
J. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 60 00 - Product Requirements, for additional provisions.
   2. Extra Flooring Material: Provide minimum of 5% of each type and color.
3. Extra Wall Base: Provide minimum of 5% of each type and color.

**1.05 DELIVERY, STORAGE, AND HANDLING**

A. Protect roll materials from damage by storing on end.

**1.06 FIELD CONDITIONS**

A. Maintain temperature in storage area between 55 degrees F and 90 degrees F.

B. Store materials for not less than 48 hours prior to installation in area of installation at a temperature of 70 degrees F to achieve temperature stability. Thereafter, maintain conditions above 55 degrees F.

**PART 2 PRODUCTS**

**2.01 TILE FLOORING**

A. Vinyl Composition Tile (VCT): Homogeneous, with color extending throughout thickness, and:

1. Minimum Requirements: Comply with ASTM F1066, of Class corresponding to type specified.

2. Size: See Finish Legend.

3. Thickness: 0.125 inch.


5. Manufacturers:
   d. Substitutions: See Section 01 60 00 - Product Requirements.

B. Feature Strips: Of same material as tile.

**2.02 RESILIENT BASE**

A. Resilient Base: ASTM F1861, Type TS rubber, vulcanized thermoset; top set Style B, Cove, and as follows:

1. Height: See Finish Legend.

2. Thickness: 0.125 inch thick.

3. Finish: As selected by Architect.

4. Length: Roll.


6. Accessories: Premolded external corners and end stops.

7. Manufacturers:
   d. Substitutions: See Section 01 60 00 - Product Requirements.

**2.03 ACCESSORIES**

A. Subfloor Filler: White premix latex; type recommended by adhesive material manufacturer.

B. Primers, Adhesives, and Seaming Materials: Waterproof; types recommended by flooring manufacturer.

C. Moldings, Transition and Edge Strips: Same material as flooring, except where indicated otherwise.
D. Sealer and Wax: Types recommended by flooring manufacturer.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that surfaces are flat to tolerances acceptable to flooring manufacturer, free of cracks that might telegraph through flooring, clean, dry, and free of curing compounds, surface hardeners, and other chemicals that might interfere with bonding of flooring to substrate.

B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive resilient base.

C. Cementitious Sub-floor Surfaces: Verify that substrates are dry enough and ready for resilient flooring installation by testing for moisture and pH.
   1. Obtain instructions if test results are not within limits recommended by resilient flooring manufacturer and adhesive materials manufacturer.

D. Verify that concrete sub-floor surfaces are dry enough and ready for resilient flooring installation by testing for moisture emission rate and alkalinity in accordance with ASTM F710; obtain instructions if test results are not within limits recommended by resilient flooring manufacturer and adhesive materials manufacturer.

E. Verify that required floor-mounted utilities are in correct location.

3.02 PREPARATION

A. Remove sub-floor ridges and bumps. Fill minor low spots, cracks, joints, holes, and other defects with sub-floor filler to achieve smooth, flat, hard surface.

B. Prohibit traffic until filler is cured.

C. Clean substrate.

D. Apply primer as required to prevent "bleed-through" or interference with adhesion by substances that cannot be removed.

3.03 INSTALLATION

A. Starting installation constitutes acceptance of sub-floor conditions.

B. Install in accordance with manufacturer's instructions.

C. Spread only enough adhesive to permit installation of materials before initial set.

D. Fit joints tightly.

E. Set flooring in place, press with heavy roller to attain full adhesion.

F. Where type of floor finish, pattern, or color are different on opposite sides of door, terminate flooring under centerline of door.

G. Install edge strips at unprotected or exposed edges, where flooring terminates, and where indicated.
   1. Metal Strips: Attach to substrate before installation of flooring using stainless steel screws.
   2. Resilient Strips: Attach to substrate using adhesive.

H. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.

I. Install flooring in recessed floor access covers, maintaining floor pattern.
J. At movable partitions, install flooring under partitions without interrupting floor pattern.
K. Install feature strips where indicated.

3.04 TILE FLOORING
A. Mix tile from container to ensure shade variations are consistent when tile is placed, unless manufacturer's instructions say otherwise.
B. Lay flooring with joints and seams parallel to building lines to produce symmetrical tile pattern.

3.05 RESILIENT BASE
A. Fit joints tightly and make vertical. Maintain minimum dimension of 18 inches between joints.
B. Miter internal corners. At external corners, use premolded units. At exposed ends, use premolded units.
C. Install base on solid backing. Bond tightly to wall and floor surfaces.
D. Scribe and fit to door frames and other interruptions.

3.06 CLEANING
A. Remove excess adhesive from floor, base, and wall surfaces without damage.
B. Clean, seal, and wax in accordance with manufacturer's instructions.
   1. Apply protective floor polish to resilient flooring surfaces free from soil, excess adhesive or surface blemishes. Use commercially available, metal, cross-linked acrylic product acceptable to resilient flooring manufacturer.
      a. Coordinate selection of floor polish with Owner and/or their maintenance service.
      b. Buff floor tile and provide two (2) coats of a protective floor polish at or near the point of substantial completion.

3.07 PROTECTION
A. Prohibit traffic on resilient flooring for 48 hours after installation.

3.08 SCHEDULE
A. See Drawings.

END OF SECTION
SECTION 09 65 66

RESILIENT ATHLETIC FLOORING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Interlocking, loose-laid rubber tile.
B. Painted game lines (if indicated).
C. Accessories.

1.02 RELATED REQUIREMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
B. Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions.
C. Section 03 30 00 - Cast-in-Place Concrete: Restrictions on curing compounds for concrete slabs and floors.
D. Section 09 65 00 - Resilient Flooring.

1.03 REFERENCE STANDARDS

B. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring; 2011.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
B. Product Data: Manufacturer's printed data sheets for products specified.
C. Shop Drawings: Fabrication and installation details, and layout, colors, and widths of game lines and equipment locations.
D. LEED Submittal: Documentation of recycled content and location of manufacture.
E. Selection Samples: Manufacturer's color charts for flooring materials specified and game line paints, indicating full range of colors and textures available.
F. Verification Samples: Actual flooring material specified, not less than 12 in square, mounted on solid backing.
   1. Include samples of game lines, illustrating colors selected.

1.05 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer certified in writing by the flooring manufacturer to be qualified for installation of specified flooring system.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to project site in unopened containers clearly labeled with manufacturer's name and identification of contents.
B. Store materials in dry and clean location until needed for installation. During installation, handle in a manner that will prevent marring and soiling of finished surfaces.

1.07 FIELD CONDITIONS
A. Maintain temperature in spaces to receive adhesively installed resilient flooring within range of 70-95 degrees F for not less than 48 hours before the beginning of installation and for not less than 48 hours after installation has been completed. Subsequently, do not allow temperature in installed spaces to drop below 50 degrees F or to go above 100 degrees F.

PART 2 PRODUCTS
2.01 PREFORMED ATHLETIC FLOORING
A. Manufacturers: All products by the same manufacturer.
   2. Substitutions: See Section 01 60 00 - Product Requirements.
B. Rubber Tile Flooring: Inertia MultiFunctional Sport Floor Rubber material formed into square tiles with invisible interlocking tabs, free-laid without adhesive.
   1. VOC Content: As specified in Section 01 61 16.
   2. Thickness: Minimum 1/4 in.
   4. Tensile Strength: Minimum 150 psi, per ASTM D412.
   5. Surface Texture: Smooth.
   6. Color: As selected from manufacturer's standards.

2.02 ACCESSORIES
A. Leveling Compound: Latex-modified cement formulation as recommended by flooring manufacturer for substrate conditions.
B. Adhesive: Water-resistant type recommended by flooring manufacturer for project conditions. Use two-part urethane adhesive, unless manufacturer recommends otherwise.

PART 3 EXECUTION
3.01 EXAMINATION
A. Examine substrates for conditions detrimental to installation of athletic flooring. Proceed with installation only after unsatisfactory conditions have been corrected.
B. Verify that surfaces are flat to tolerances acceptable to flooring manufacturer, free of cracks that might telegraph through flooring, clean, dry, and free of curing compounds, surface hardeners, and other chemicals that might interfere with bonding of athletic flooring to substrate.
C. Cementitious Sub-floor Surfaces: Verify that substrates are dry enough and ready for resilient flooring installation by testing for moisture and pH.
   1. Test in accordance with ASTM F710.
   2. Obtain instructions if test results are not within limits recommended by resilient flooring manufacturer and adhesive materials manufacturer.

3.02 PREPARATION
A. Prepare floor substrates as recommended by flooring and adhesive manufacturers.
B. Concrete: Use leveling compound as necessary to achieve substrate flatness of plus or minus 1/8 inch within 10 ft radius.
C. Remove coatings that are incompatible with flooring adhesives, using methods recommended by flooring manufacturer.
D. Broom clean areas to receive athletic flooring immediately before beginning installation.

3.03 INSTALLATION
A. Starting installation constitutes acceptance of sub-floor conditions.
B. Comply with manufacturer's recommendations and approved shop drawings.
C. Rubber Tile Flooring:
   1. Lay out center lines in spaces to receive tile flooring, based on location of principal walls. Start tile installation from center, and adjust as necessary to avoid tiles less than one-half width at perimeter.
   2. Lay tiles square with room axis, matching for color and pattern by selecting from cartons and mixing as recommended by manufacturer.

3.04 CLEANING
A. Clean flooring using methods recommended by manufacturer.

3.05 PROTECTION
A. Protect finished athletic flooring from construction traffic to insure that it is without damage upon completion of the work.

END OF SECTION
SECTION 09 67 00

FLUID-APPLIED RESINOUS (EPOXY) FLOORING

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

A. Furnish and install the high solids laminate epoxy flooring system as specified and indicated with 8" integral rolled cove base. Prior to installation, provide decontamination and cleaning as specified. The term “high solids laminate film epoxy flooring system” as used in this section will include the primer, intermediate coat, topcoat, and any related materials for the project.

B. Complete the high solids laminate epoxy flooring system installation in strict accordance with these specifications, the coating system manufacturer's most current requirements for surface preparation, application and inspection, and the instructions for safety. In the event of a conflict between these specifications and the manufacturer's instructions, the more stringent requirements will apply.

C. The Contractor shall be responsible for providing ventilation, initial cleaning, inspection, supervision, dust control and equipment protection as specified herein and related sections for the work associated with this Section. The Contractor is responsible for all other work associated with this Section including protection of existing equipment and structures in the work area, surface preparation, high solids laminate epoxy flooring application, curing, coating repair, rework, inspection and supervision.

1.02 RELATED SECTIONS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.03 REFERENCES:

A. Society for Protective Coatings (SSPC) Specifications and Standards:
   2. SSPC-SP-13: “Surface Preparation of Concrete”.

B. NACE (National Association of Corrosion Engineers)

C. ASTM (American Society for Testing and Materials)
   5. ASTM D4414-95, “Standard Practice for Measurement of Wet Film Thickness by Notched Gages”.
   6. ICRI Guide No. 03732, “Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings and Polymer Overlays,” International Concrete Repair Institute, Sterling, VA.
7. ASTM D4259, “Standard Practice for Abrading Concrete”.

1.04 DEFINITIONS

A. Terms used in this Section are defined as follows:

1. High Solids Laminate Epoxy Flooring Work - The aspects involved with proper application of the specified high solids laminate epoxy flooring system, including but not limited to cleaning, surface preparation, mixing, application, curing, and quality control.

2. Approved Materials - The coating system, blast media, and other specified materials for this coating work.

3. Dry Film Thickness - The primer or coating films' actual thickness following curing and drying. Dry film thickness is measured in mils or thousandths of an inch (0.001”) and is abbreviated DFT.

4. Coating System Manufacturer - Refers to the approved coating Manufacturer, abbreviated as CSM in this Section.

5. Manufacturer's Technical Representative(s) - Refers to the technical representative(s) of the approved CSM.


1.05 QUALITY ASSURANCE

A. The Contractor shall meet the following requirements:

1. The Contractor is ultimately responsible for the workmanship and quality of the high solids laminate epoxy flooring system installation. Inspections by the Owner, the Engineer, or others do not limit the Contractor's responsibility.

2. Do not use or retain contaminated, outdated, or diluted materials for flooring. Do not use materials from previously opened containers.

3. Use only products of the approved CSM. Provide the same products for repairs as for the original coating.

4. If any requirements of this specification are contradicted by a referenced standard or vice-versa, the matter shall be resolved in writing by the A/E or its representative.

5. Make available at all times all locations and phases of the work for access and inspection by the Engineer, the Owner, or other personnel designated by the Owner. The Contractor shall provide ventilation, egress, and whatever other means are required for the Owner, Engineer, or designated personnel to access and exit the work areas safely.

6. Conduct work so that the high solids laminate epoxy flooring system is installed as specified herein. Inspect work continually to ensure that the coating system is installed as specified herein. The A/E shall inspect the work to determine conformance with the contract documents.

7. The Contractor's Supervisor shall be on site at all times and will be thoroughly familiar with the work in progress. This Supervisor shall have authority to receive and execute all direction provided by the A/E or the Owner.

8. The methods of construction shall be in accordance with all requirements of this specification and the best trade practices. Any changes in the high solids laminate epoxy flooring system installation requirements shall be allowed only with the written approval of the A/E.

9. Installation shall be performed by an applicator having satisfactory experience in the application of these or similar materials or with on-site consultation by a qualified field service representative of the CSM.

B. Mock-up

1. Prior to commencing the installation, the Contractor shall install with the Owner's approval, a mutually agreed upon mock-up test sample to show final color and appearance of the high
solids laminate epoxy flooring system. Owner, Contractor, Architect, and Manufacturer's representative shall review and mutually agree upon color, grade, and final texture of coating system before starting installation. The acceptance of a sample will constitute the job standard by which installation will proceed. The approved sample will be kept at the job site and referred to at completion of the project for final approval of the floor.

1.06 SUBMITTALS

A. Submit the following prior to commencing with any phase of the work covered by this Section:

1. Products submitted shall be accompanied by material data sheets, performance criteria must be submitted for each product. Substitution requests will not be considered unless submitted 10 days prior to the bid date.

2. Manufacturer's current printed recommendations and product data sheets for all high solids laminate epoxy flooring system products including performance criteria, surface preparation and applications, volatile organic compound (V.O.C.) data, and safety requirements.

3. Material Safety Data Sheets (MSDS) for any materials brought on-site including all floor coating system materials, solvents, and abrasive blast media.

4. Contractor's written verification that the personnel who will perform this work have the required experience as specified in 1.05 1.9. This document must list the names of all of the Contractor's supervisors and trades people who will perform work on the project covered by this Section.

5. List of cleaning and thinner solutions allowed by the CSM.

6. Storage requirements including temperature, humidity, and ventilation for Coating System Materials.

B. Owner, contractor, and manufacturer's representative shall review and mutually agree upon color, grade, and final texture of coating system before starting installation. The acceptance of a sample will constitute the job standard by which installation will proceed.

C. LEED Submittals: Provide documentation of recycled content, and location of manufacture.

1. Provide test results proving compliance with VOC requirements in Section 01 61 16.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Material shall be delivered to project site in manufacturer's original unopened containers.

B. Materials shall be stored indoors, protected from damage, moisture, direct sunlight and temperatures below 40 degrees F or above 90 degrees F.

C. Store all materials only in area or areas designated by the Owner solely for this purpose. Confine mixing, thinning, clean-up and associated operations, and storage of coating materials related debris before authorized disposal, to these areas. All materials are to be stored on pallets or similar storage/handling skids off the ground.

D. Mix all coating materials in a designated enclosed mixing area. This enclosed area must protect the mixing operation and materials from direct sunlight, inclement weather, freezing, or other means of damage or contamination. Protect all other concrete and metallic surfaces and finishes from any spillage of material(s) within the mixing area.

E. Do not use drain piping for disposal of coating materials.

F. The Contractor shall take all precautions and implement all measures necessary to avert potential hazards associated with the high solids laminate epoxy flooring system materials as described on the pertinent Material Safety Data Sheets or container labels.
G. Deliver all materials to the job site in new, unopened containers. Each container shall bear the CSM's name and label.
   1. Labels on all material containers must show the following information:
      a. Name or title of product.
      b. Manufacturer's batch number.
      c. Manufacturer's name.
      d. Generic type of material.
      e. Application and mixing instructions.
      f. Hazardous material identification label.
      g. Shelf life date.
   2. All containers shall be clearly marked indicating any personnel safety hazards associated with the use of or exposure to the materials.
   3. All materials shall be handled and stored to prevent damage or loss of label.
   4. Do not use or retain contaminated, outdated, prematurely opened, diluted materials, or materials which have exceeded their shelf life.

1.08 ENVIRONMENTAL CONDITIONS

A. Surfaces and surrounding air temperatures must exceed 55 degrees F, but must be less than 90 degrees F, with materials at not less than 70 degrees F during application.

B. Do not apply coating materials when dust is being generated.

C. If existing facility lighting is not adequate for flooring system application, the Contractor shall provide all temporary lighting during the work equivalent to one 200 watt explosion proof incandescent lamp per 100 square feet of work area.

PART 2 - PRODUCTS

2.01 SYSTEM- Epoxy/Urethane Decorative Flake Broadcast System

A. Surface Preparation: ICRI-CSP 3. Substrate shall be clean, dry, and free of foreign contaminants.

B. 8" Cove Base: Install 8" rolled radius cove base utilizing Tnemec Series 237 Power-Tread (add 30-50 mesh silica sand to desired consistency). Cove base shall received prime coat of Tnemec 205 Terra-Tread FC applied at a rate to achieve 3.0 - 5.0 mils DFT. Primer shall be applied to cove base at the same time as horizontal surfaces. Cove base shall receive one coat of Tnemec Series 280 Tneme-Glaze (same color as Series 205) at a rate to achieve 6.0 - 8.0 mils DFT. While still wet, broadcast decorative flake into wet Series 280 until rejection. Allow to cure and lightly sand.

C. Primer Coat: Series 205 Terra-Tread FC
   1. Dry Film Thickness: 3.0 - 5.0 mils

D. Broadcast Coat: Series 224-Deco-Fleck
   1. Dry Film Thickness: 8.0 - 10.0 mils

E. Grout Coat: Series 284 Deco-Clear
   1. Dry Film Thickness: 8.0 - 12.0 mils

F. Finish Coat: Series 295 CRU
   1. Dry Film Thickness: 2.0 - 3.0 mils

G. Performance Criteria:
   1. ASTM D 4060, Abrasion, (CS-17 Wheel, 1,000 grams load, 1,000 cycles): Requirement: List Mg loss after 1,000 cycles.
3. ASTM D 2047, Coefficient of Friction: Requirement: No less than .52 static coefficient of friction.
4. ASTM D 4585, Humidity: Requirement: List results at 2,000 hours.
5. ASTM D 1308, Stain Resistance: Requirement: List results at 24 hours to the following reagents:
   Blackberry Jam  Catsup  Crisco  Coffee
   Lime Juice  Toothpaste  Vinegar  Salad Dressing
   Blood  Urine  Onion  Tide Solution
   Tea  Margarine  5% Sodium Hydroxide
6. ASTM D 1653, Moisture Vapor Transmission: Requirements: List grams/metre² in 24 hours

2.02 MANUFACTURER
A. Tnemec Company, Incorporated.

PART 3 - EXECUTION

3.01 GENERAL
A. Protection
   1. Mask, cover, or otherwise protect all surfaces, equipment, and finishes not to receive the high solids laminate epoxy flooring system specified in this Section.
B. Strictly follow the approved CSM's written instructions and the requirements of this specification regarding all aspects of high solids laminate epoxy flooring work including: mixing, application, recoat times and curing.
C. Mock-up
   1. Prior to commencing the installation, the Contractor shall install with the Owner's and Architect's approval, a 10 feet by 10 feet mock-up test sample to determine final color, texture and appearance of epoxy flooring system. See article in Quality Assurance above.

3.02 PREPARATION
A. Test Substrate for MVT (Moisture Vapor Drive) once for every 1,000ft sq in accordance with ASTM F-1869 Anhydrous Calcium Chloride Test.
B. Shot-blast or mechanically abrade to remove laitance, curing compounds, sealers and other contaminants and to provide surface profile. (Reference ASTM D4259, ICRI CSP2-3).
C. Vacuum clean concrete to remove all dirt, dust, and other loose materials.
D. After mechanically abrading, verify that all surfaces are clean, dry and free of any contaminants, which could adversely affect the adhesion of the flooring system.
E. If between final surface preparation work and high solids laminate epoxy flooring system application, contamination of the prepared and cleaned substrates occurs, recleaning shall be required until the requirements of this Section are met.

3.03 CLEANUP
A. Remove waste materials, rubbish, and debris and dispose of them at the owner's direction. Leave work areas in a clean and tidy condition.

3.04 PROTECTION
A. Protect the completed work from water, airborne particles or other surface contaminants until cured for a minimum of 24 hours after application.

B. Protect from traffic, physical abuse, immersion and chemical exposure until the complete system has thoroughly cured for 24 hours at 75 degrees F. For different temperatures, consult the manufacturer's representative about curing times.

3.05 FIELD QUALITY CONTROL INSPECTION AND TESTING

A. Inspection by the Engineer, Owner or others does not limit the Contractor's responsibilities for quality as specified herein or as required by the CSM's instructions.

B. The Contractor shall perform the Q.C. procedures listed below in conjunction with the requirements of this Section. The Engineer will inspect the work to determine conformance to the contract documents.

1. Degree of Cleanliness.
   a. Visually inspect the degree of cleanliness of substrates to meet the requirements of this Section. The pH of the concrete substrates will be measured using pH indicating papers. pH testing is to be performed once every 100 sq. ft. of surface area to be coated.
   b. Acceptable pH values shall be between 8.0 and 11.0 as measured by a full-range (1-12) color indicating pH paper with readable color calibrations and a scale at whole numbers (minimum). Use Hydrion Insta-Chek Jumbo 0-13 or 1-12 or equal. The paper shall be touched to the surface once using moderate finger pressure. The surface shall not be wiped or moved laterally to disturb the surface during pH testing. Following the one touch, lift the paper vertically to not “wipe” the surface. Compare the color indicated with the scale provided and record the pH.
   c. Note: If the surface of the concrete is dry, it is not possible to take a pH measurement. However, pH values are still important on dry surfaces. When a dry concrete substrate is encountered for a pH test, the surface where the pH test is to be performed shall be sprayed lightly with distilled, deionized water from a commercially available spray bottle that has been properly rinsed to remove any dissolved solids. The spray shall just wet the surface to a “shiny” appearance. Wait 60 seconds to allow chemical equilibria to be established and then test the pH of the water on the surface. Perform this test in accordance with ASTM D4262.

2. Concrete Surface Profile: CSP 3
   a. Using the replicate rubber specimens inspect the concrete surface profile in accordance with ICRI Guide No. 03732. This should be performed once for every 100 square feet of surface area to be coated.

3. Measure and record ambient air temperature once every two hours of each shift using a thermometer and measure and record substrate temperature once every two hours using a surface thermometer.

4. Measure and record relative humidity every two hours of each shift using a sling psychrometer in accordance with ASTM E337.

5. Inspect correct mixing of coating materials in accordance with the CSM's instructions.

6. Inspect and record that the “pot life” of coating materials used are not exceeded during installation.

7. Inspect to verify proper curing of the high solids laminate epoxy flooring system as recommended by the CSM.

END OF SECTION
SECTION 09 67 26
ACRYLIC FLAKE FLOOR COATINGS

PART 1 - GENERAL

1.01 SUMMARY
A. This Section includes a complete decorative methyl-methacrylate (MMA) resin interior floor coating system. The work includes the following:
2. Application of a decorative acrylic flake floor coating system with integral cove bases.

B. Related Sections: The following Sections contain requirements that relate to this Section:
1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 SYSTEM DESCRIPTION
A. General: The coating system shall be a solvent-free, 100 percent reactive MMA resin coating system with decorative flakes broadcast to a thickness of approximately 3/16 inch (4770 ìm). The MMA system manufacturer shall supply colored flakes.
1. Appearance: The finish floor coating system shall be uniform in color, texture, and appearance.
2. Edge Termination: Edges that terminate at walls, floor discontinuities, and other embedded items shall be sharp and uniform with no thick or ragged edges. Edges that terminate at adjacent floor surfaces shall be feathered to the minimum thickness allowable.

B. Slip Resistance: Provide finished surfaces with a verifiable slip resistance as recommended in the Americans with Disabilities Act (ADA), "Accessibility Guidelines for Buildings and Facilities (ADAAG), and as determined by the Owner and the Owner’s insurance and legal counsels for slip and fall insurability and legal liability.

1.03 SUBMITTALS
A. Product Data: Manufacturer's printed instructions for evaluating, preparing, and treating the substrate, technical data, and tested physical and performance properties of floor coating system.

B. Samples: For each coating system, color, and texture required, one 12 inches (300 mm) square sample on a rigid backing.
1. Provide stepped samples on backing large enough to illustrate build-up of floor coatings.
2. Include integral aggregate wearing course in samples.

C. LEED Submittal:
1. Product Data for Credit EQ 4.1: For sealants, including printed statement of VOC content.

D. Installer Certificates: Signed by manufacturer certifying that installers comply with specified requirements.

E. Test Results: Indicate and interpret results of required tests including, but not limited to, bond testing, moisture testing, alkalinity, and other manufacturer recommended tests on concrete substrates. Verify compliance with requirements.

F. Maintenance data for floor coatings to include in the "Operating and Maintenance Manual" specified in Division 01. Identify substrate and type of floor coatings applied. Include recommendations for periodic inspections, cleaning, care, maintenance, and repair of floor coatings.
1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Only manufacturers of 100 percent reactive, MMA based acrylic liquid as defined by their technical literature are acceptable. Technical literature shall provide the name of the material, generic type, descriptive information, Material Safety Data Sheets (MSDS) and certified test reports showing test results that demonstrate equivalent performance based on the specified products.

B. Applicator Qualifications: Engage an experienced applicator for this project that shall be prequalified and approved by the material manufacturer at the time of project initiation. Acceptability will include judgment on equipment, history, and financial strength. The manufacturer shall not permit the application of any of its materials by untrained, non-approved personnel.
   1. Each approved applicator shall have been trained by the Manufacturer in all phases of surface preparation and application of the specified flooring system.
   2. Each approved applicator shall have five years experience of installing the specified flooring system and shall submit a list of five projects/references as a prequalification requirement. Each of the five projects/references shall be of the same type, equal size, quantity, and magnitude to this project as a prequalification requirement. Architect reserves the option to personally inspect the projects/references to accept or reject any of the Contractors prior to bid time as a prequalification requirement.
   3. Subcontractor: The only subcontractor to the applicator shall be for concrete surface preparation.

C. Source Limitations: Obtain primary acrylic floor coating materials, including primers, resins, hardening agents, and topcoats, through one source from a single manufacturer. Provide secondary materials, including patching and fill material, joint sealant, and repair materials from manufacturer or from source recommended by manufacturer.

D. Product Options: Products and manufacturers named in Part 2 establish requirements for product quality in terms of appearance, construction, and performance. Other manufacturers' products comparable in quality to named products and complying with requirements may be considered. Refer to Division 01 Section "Product Requirements."
   1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval and only to the extent needed to comply with performance requirements. Where modifications are proposed, submit comprehensive explanatory data to Architect for review.

E. Field Sample: Apply 200 square foot (18.5 square meters) of acrylic floor coating to an area selected by the Architect to demonstrate surface preparation, joint and crack treatment, thickness, texture, color, and standard of workmanship.
   1. If Architect determines that field sample does not meet requirements, reapply coating until the field sample is accepted.
   2. Simulate finished lighting conditions for Architect's review of mockups.
   3. Keep the accepted field sample undisturbed during construction as a standard for judging completed work. The undamaged field sample may be incorporated into the Work.
   4. The Owner shall determine from field samples the size and amount of non-slip aggregate required to provide the slip resistance prescribed by the Owner's insurance and legal counsels.

F. Bond Testing: Surface preparation shall be evaluated by conducting bond tests at the site prior to application of the coating system. Bond testing shall be performed in the presence of the manufacturer. At least two bond tests shall be performed in each bay. Locations of bond tests shall be documented on the record drawings and cross-referenced to the actual bond test.
specimen. Maintain test specimens at project office until completion of work. Proceed only after acceptance of test results by manufacturer.

G. Preconstruction Conference: Prior to commencement of work representatives of the Owner, Contractor, Construction Manager, Applicator, Manufacturer, and Architect shall meet at the project site to review the testing, surface preparation, and application requirements of the Work of this Section.
1. Review requirements for floor coatings. Notify participants at least 3 working days before conference.
2. Provide results of moisture test of the concrete prior to preinstallation conference.

1.05 DELIVERY, STORAGE AND HANDLING

A. Deliver materials in original packages and containers, with seals unbroken, bearing manufacturer's labels indicating brand name and directions for storage and mixing with other components.

B. Store materials as recommended by manufacturer to prevent deterioration from moisture, heat, cold, direct sunlight, or other detrimental effects.

1.06 PROJECT CONDITIONS

A. Environmental Limitations:
   1. Material, air and surface temperatures shall be in the range of 25° to 85° F (-4° to 30° C) during application and cure, unless a special formulation is being used and Manufacturer has been consulted. For temperatures below 25° F (-4° C) consult manufacturer for cold weather temperature additives.
   2. Relative humidity in the specific location of the application shall be less then 85 percent and the surface temperature shall be at least 5°F (3° C) above the dew point

B. Lighting: Provide permanent lighting or, if permanent lighting is not in place, simulate permanent lighting conditions during acrylic coating application.

C. Close spaces to traffic during acrylic coating application and for not less than 24 hours after application, unless manufacturer recommends a longer period.

D. Conditions required for new concrete:
   1. The concrete shall be fully cured for a minimum of 28 days prior to application of the coating system pending moisture testing. Concrete curing compounds shall be evaluated by the manufacturer.
   2. Surface contaminants such as membranes, or other bond breakers should not be used. Curing compounds shall be approved by the manufacturer.

1.07 WARRANTY

A. General: Warranties specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and are in addition to and run concurrent with other warranties made by the Contractor under requirements of the Contract Documents.

B. Warranty: Submit written warranty signed by floor coating manufacturer and applicator agreeing to repair or replace acrylic floor coatings that do not meet requirements or that deteriorate within the warranty period indicated below. Warranty does not include deterioration or failure of floor coating due to unusual weather phenomena, failure of prepared and treated substrate, formation of new joints and cracks in excess of 1/16 inch (1.5 mm) wide, fire, vandalism, or damage caused by truck traffic or maintenance equipment.
1. Warranty Period: 5 years after date of Substantial Completion.

1.08 EXTRA STOCK

A. General: Include enough material for Owner's personnel to perform repairs on an area equal to 200 square feet (18.5 square meters).

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Basis-of-Design System: The design is based on "Degaclad CF Self Leveling Full Flake Coating System" by BASF Building Systems. Subject to compliance with requirements, provide either the named system or a comparable system by one of the other specified manufacturers. Comparable systems are subject to review and approval through the submittal process specified.

B. Manufacturers: Subject to compliance with requirements, provide systems by one of the manufacturers specified.
1. BASF Building Systems
2. Res-Tek
3. Sika Corp.

C. The system includes, but is not limited to, the following: Degaclad CF Self Leveling Full Flake Coating System
2. Base Coat: Degadur R61SL. Pigmented as indicated in Finish Legend.
3. Vinyl Flakes: Distribution shall be as defined in the Finish Legend.
4. First Topcoat: Degadur R71 Colorless Topcoat Resin.
5. Antimicrobial Additive: Manufacturer’s standard.
6. Non-slip Aggregate:
   a. Glass beads (25-45 sieve) as required to meet field sample testing.
7. Second Topcoat: Degadur R71 Colorless Topcoat Resin.

2.02 MATERIALS

A. System Description: Provide primer, bond coat and topcoat as follows:
1. Primer/Sealer: Solvent-free, 100 percent reactive, MMA-based liquid to which a curing agent is added at the job site.
2. Topping: Single component pigmented, solvent-free, 100 percent reactive, MMA-based liquid.
3. Topcoats: Single component transparent, solvent-free, 100 percent reactive, MMA-based liquid.

B. Mixing: Follow manufacturer's prescribed procedures and recommendations.

C. Color Chip Product: The color chips to be used as a decorative component shall be produced from an ester functionalized resin based polymer combined with inorganic filler materials subject to the following limitations:
1. The polymer shall be a vinyl acetate surfactant stabilized with pH of 3. Vinyl acrylic or acrylic compounds shall not be used.
2. The inorganic filler materials shall not include calcium, calcium associated with the mineral silicate, or calcium associated with the mineral carbonate.

PART 3 - EXECUTION
3.01 INSPECTION
   A. Examine all surfaces to receive coatings and report to the Architect any conditions that will adversely affect the appearance or performance of the coating systems and that cannot be put into acceptable condition by the specified surface preparation.
   B. Do not proceed with installation until unsatisfactory conditions have been corrected.
   C. Protect adjacent surfaces not to be coated. Owner's equipment shall be protected from dust, cleaning solutions, and flooring materials.

3.02 PREPARATION
   A. General: Prepare and clean substrates according to acrylic coating manufacturer's written instructions for substrate indicated. Provide clean, dry, and neutral Ph substrate for acrylic coating application.
   B. Concrete Substrates: Provide sound concrete surfaces free of laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants incompatible with acrylic coating.
      1. Roughen concrete substrates as follows:
         a. Comply with ASTM C 811 requirements, unless manufacturer's written instructions are more stringent.
      2. Repair damaged and deteriorated concrete according to acrylic coating manufacturer's written recommendations.
      3. Verify that concrete substrates are dry.
         a. Perform anhydrous calcium chloride test, ASTM F 1869. Proceed with application only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. (1.36 kg of water/92.9 sq. m) of slab in 24 hours.
         b. Perform plastic sheet test, ASTM D 4263. Proceed with application only after testing indicates absence of moisture in substrates.
         c. Perform additional moisture tests recommended by manufacturer. Proceed with application only after substrates pass testing.
      4. Verify that concrete substrates have neutral Ph and that acrylic coating will adhere to them. Perform tests recommended by manufacturer. Proceed with application only after substrates pass testing.
   C. Mask off adjoining surfaces not receiving floor coatings and close off deck drains and other deck penetrations to prevent spillage and migration of liquid coatings.
   D. Bond Testing:
      1. Evaluate completed surface preparation by conducting material bond tests in accordance with the manufacturer's written instruction.
   E. Use patching and fill material to fill holes and depressions in substrates according to manufacturer's written instructions.
   F. Treat control joints and other nonmoving substrate cracks to prevent cracks from reflecting through acrylic coating according to manufacturer's written recommendations.

3.03 APPLICATION
   A. General: Apply components of acrylic coating system according to manufacturer's written instructions to produce a uniform, monolithic wearing surface of thickness indicated.
      1. Coordinate application of components to provide optimum adhesion of acrylic coating system.
2. Cure acrylic coating components according to manufacturer's written instructions. Prevent contamination during application and curing processes.
3. At substrate expansion and isolation joints, provide joint in acrylic coating to comply with acrylic coating manufacturer's written recommendations.

B. Apply primer over prepared substrate at manufacturer's recommended spreading rate.

C. Apply self-leveling topping coat(s) in thickness indicated for flooring system.
   1. Broadcast colored flakes while the body coat resin is still wet to provide surfaces matching approved sample.

3.04 COVE BASES

A. Surface Preparation
   1. If walls are to be painted prior to installation of cove base, the bottom portion of the walls shall remain un-coated to the height of the cove base to insure a proper bond to the walls and partitions.
   2. If walls are constructed of a non-compatible material, a backer board of 5/8 inch cementitious backer board cut to the desired height of the cove base shall be installed. The top of the backer board shall be cut at a 45° angle to create a “beveled” edge.
   3. Backer boards shall be fastened using a high grade construction adhesive and counter sunk screws or concrete masonry anchors.

B. System Description
   1. Cove base shall be installed according to manufacturers recommendations and shall be as follows:
      a. Trowel-On Cove Base consisting of a trowel applied radius/base mix with a termination strip installed at the top of the base.

C. Cove base will receive a broadcast and top coat consistent with flooring system.
   1. Slip resistant aggregate is not required on cove bases.

3.05 FIELD QUALITY CONTROL/INSPECTION

A. Manufacturer's Installation Specialist shall be present during substrate preparation and evaluation and installation of the acrylic flake floor coating.

B. Request acceptance of surface preparation from the Architect before application of the prime/seal coat.

C. Work not acceptable to the Architect shall be corrected before consideration of final acceptance.

3.06 CLEANING

A. Remove any material spatters and other material that is not where it should be. Remove masking and covers taking care not to contaminate surrounding area.

B. Repair damage to adjacent surfaces and materials that is caused by coating application activities.

END OF SECTION
SECTION 09 68 13

TILE CARPETING

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Carpet tile, fully adhered.

1.02 RELATED REQUIREMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. Division 1 Section "LEED Requirements" for additional LEED requirements.

C. Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions.

D. Section 09 30 00 - Tile: Termination edging of adjacent floor finish.

E. Section 09 65 00 - Resilient Flooring: Rubber base, and transition strips.

1.03 REFERENCE STANDARDS

A. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring; 2011.

B. CRI (CIS) - Carpet Installation Standard; Carpet and Rug Institute; 2009.

C. CRI (GLA) - Green Label Testing Program - Approved Adhesive Products; Carpet and Rug Institute; Current Edition.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate layout of joints.

C. Product Data: Provide data on specified products, describing physical and performance characteristics; sizes, patterns, colors available, and method of installation.

D. Samples: Submit two carpet tiles illustrating color and pattern design for each carpet color selected.

E. Submit two, 12 inch long samples of edge strip.

F. LEED Submittals:
   1. In compliance with the USGBC LEED -NC v2.2 Rating System provide Product Data highlighting the following:
      a. CRI Green Label Plus Program certification number.
      b. Percentages of post-consumer and pre-consumer recycled content.
      c. Distance (miles) between the project site and the manufacturer, and the distance (miles) between the project site and the extraction site for each raw material contained within the product.
      d. VOC data for each adhesive and sealant.

G. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

H. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and
I. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 60 00 - Product Requirements, for additional provisions.
   2. Extra Carpet Tiles: Quantity equal to 5 percent of total installed of each color and pattern installed.

1.05 QUALITY ASSURANCE
   A. Manufacturer Qualifications: Company specializing in manufacturing specified carpet tile with minimum three years documented experience.
   B. Installer Qualifications: Company specializing in installing carpet with minimum three years experience.

1.06 FIELD CONDITIONS
   A. Store materials in area of installation for minimum period of 24 hours prior to installation.

PART 2 - PRODUCTS

2.01 MANUFACTURERS
   A. See Drawings for Manufacturer.
   B. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 MATERIALS
   A. Carpet Tile: As indicated, manufactured in one color dye lot.
      1. Tile Size: As indicated on Finish Legend.
      2. Color: As indicated on Finish Legend.
      3. Pattern: As indicated on Finish Legend.

2.03 ACCESSORIES
   A. Sub-Floor Filler: White premix latex; type recommended by flooring material manufacturer.
   B. Edge Strips: Embossed aluminum, or rubber, as selected; color as selected.
   C. Adhesives: Acceptable to carpet tile manufacturer, compatible with materials being adhered; maximum VOC of 50 g/L; CRI Green Label certified; in lieu of labeled product, independent test report showing compliance is acceptable.

PART 3 - EXECUTION

3.01 EXAMINATION
   A. Verify that sub-floor surfaces are smooth and flat within tolerances specified for that type of work and are ready to receive carpet tile.
   B. Verify that sub-floor surfaces are dust-free and free of substances that could impair bonding of adhesive materials to sub-floor surfaces.
   C. Cementitious Sub-floor Surfaces: Verify that substrates are dry enough and ready for flooring installation by testing for moisture and pH.
      1. Test in accordance with ASTM F710.
      2. Obtain instructions if test results are not within limits recommended by flooring material manufacturer and adhesive materials manufacturer.
D. Verify that required floor-mounted utilities are in correct location.

3.02 PREPARATION

A. Prepare floor substrates as recommended by flooring and adhesive manufacturers.
B. Remove sub-floor ridges and bumps. Fill minor or local low spots, cracks, joints, holes, and other defects with sub-floor filler.
C. Apply, trowel, and float filler to achieve smooth, flat, hard surface. Prohibit traffic until filler is cured.
D. Vacuum clean substrate.

3.03 INSTALLATION

A. Starting installation constitutes acceptance of sub-floor conditions.
B. Install carpet tile in accordance with manufacturer's instructions and CRI Carpet Installation Standard.
C. Blend carpet from different cartons to ensure minimal variation in color match.
D. Cut carpet tile clean. Fit carpet tight to intersection with vertical surfaces without gaps.
E. Locate change of color or pattern between rooms under door centerline.
F. Fully adhere carpet tile to substrate.
G. Trim carpet tile neatly at walls and around interruptions.
H. Complete installation of edge strips, concealing exposed edges.

3.04 CLEANING

A. Remove excess adhesive without damage, from floor, base, and wall surfaces.
B. Clean and vacuum carpet surfaces.

END OF SECTION
SECTION 09 78 16

PLASTIC INTERIOR WALL PANELING (FRP)

PART 1 - GENERAL

1.01 SUMMARY

A. Fiberglass Reinforced Panels used as Sanitary Wall Panels made of Fiberglass Reinforced Plastic for sanitary environments. Locations: Main Commissary Kitchen, Sinks in Concession Stands, Janitor Closets, and as indicated.

1.02 RELATED REQUIREMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. Section 07 90 05 - Joint Sealers.

1.03 REFERENCES

A. American Society for Testing and Materials: Standard Specifications (ASTM)

1.04 SUBMITTALS

A. Product Data: Submit manufacturer's product data including preparation instructions and recommendations, storage and handling requirements and recommendations, and installation methods.

B. Shop Drawings: Submit elevations of each wall showing location of paneling and trim members with respect to all discontinuities in the wall elevation.

C. Selection Samples: Submit manufacturer's standard color pattern selection samples representing manufacturer's full range of available colors and patterns.

D. Samples for Verification: Submit appropriate section of panel for each finish selected indicating the color, texture, and pattern required.

E. LEED Submittals: Indicate documentation of recycled content and location of manufacturer.

1.05 QUALITY ASSURANCE

A. Conform to building code requirements for interior finish for smoke and flame spread requirements as tested in accordance with:
   1. ASTM E 84 (Method of test for surface burning characteristics of building materials).
   2. Sanitary Standards: System components and finishes to comply with:
      a. United States Department of Agriculture (USDA) requirements for food preparation facilities, incidental contact.
      b. Food and Drug Administration (FDA) 1999 Food Code 6-101.11

1.06 DELIVERY, STORAGE AND HANDLING

A. Materials are to be factory packaged on strong pallets. All materials are to be stored lying flat, under cover and protected from the elements. Panels should be allowed to acclimate to room
temperature (70°) for 48 hours prior to installation.

1.07 PROJECT SITE CONDITIONS

A. Building should be fully enclosed prior to installation with sufficient heat (70°) and ventilation consistent with good working conditions for finish work.

B. During installation and for not less than 48 hours before, maintain an ambient temperature and relative humidity within limits required by type of adhesive used and recommendation of adhesive manufacturer.
   1. Provide ventilation to disperse fumes during application of adhesive as recommended by the adhesive manufacturer.

1.08 WARRANTY

A. Furnish one year guarantee against defects in material and workmanship.

PART 2 - PRODUCTS

2.01 MANUFACTURER

A. Crane Composites.

B. Kemlite "Glasbord FX Panels".


D. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 MATERIALS

A. Panels:
   1. Fiberglass reinforced thermosetting polyester resin panel sheets complying with ASTM D 5319.
      a. Coating: Multi-layer print, primer and finish coats.
      b. Dimensions:
         1) Thickness: Not less than 0.090 inch (2.29 mm).
         2) Width: 4'-0" nominal.
         3) Length: As indicated on Drawings.
      c. Tolerance:
         1) Length and width: +/- 1/8 inch.
         2) Square: Not to exceed 1/8 inch for 8 foot panels or 5/32 for 10 foot panels.
   2. Properties: Resistant to rot, corrosion, staining, denting, peeling, and splintering.
   4. Front Finish:
      a. Color: As selected from Manufacturer's standard colors.
      b. Surface Texture: Pebbled.

B. Base:
   1. Color: As selected.
   2. Profiles: As selected from manufacturer's standards, unless indicated otherwise.

C. Moldings:
   1. Aluminum Trim: Prefinished heavy weight extruded aluminum 6063-T5 alloy.
      b. Profile: As selected from manufacturer's standards, unless indicated otherwise.
      c. Color: Bright anodized, unless indicated otherwise.
2.03 ACCESSORIES

A. Fasteners: Non-staining nylon drive rivets.
   1. Match panel colors.
   2. Length to suit project conditions.

B. Adhesive:
   1. As recommended by Manufacturer.

C. Sealants:
   1. Mildew-resistant, neutral curing silicone; VOC limit - 250 g/l, unless recommended otherwise by manufacturer.

PART 3 – EXECUTION

3.01 EXAMINATION

A. Examine backup surfaces to determine that corners are plumb and straight, surfaces are smooth, uniform, clean and free from foreign matter, nails countersunk, joints and cracks filled flush and smooth with the adjoining surface.
   1. Verify that stud spacing does not exceed 24 inch on-center.

B. Repair defects prior to installation.
   1. Level wall surfaces to panel manufacturer's requirements. Remove protrusions and fill indentations.

3.02 PREPARATION

A. Panels should be opened and allowed to acclimate for 48 hours prior to installation. Room temperature should be approximately 70° F.

B. Panels must be applied over a smooth, solid, flat, clean subwall such as drywall or plywood.

3.03 INSTALLATION

A. Comply with manufacturer's recommended procedures and installation sequence.

B. Cut sheets to meet supports allowing 1/8 inch clearance for every 8 foot of panel.
   1. Cut and drill with carbide tipped saw blades or drill bits, or cut with shears.
   2. Pre-drill fastener holes 1/8 inch oversize with high speed drill bit.
      a. Space at 8 inches maximum on center at perimeter, approximately 1 inch from panel edge.
      b. Space at in field in rows 16 inches on center, with fasteners spaced at 12 inches maximum on center.

C. Apply panels to board substrate, above base, vertically oriented with seams plumb and pattern aligned with adjoining panels.
   1. Install panels with manufacturers' recommended gap for panel field and corner joints.
      a. Adhesive trowel and application method to conform to adhesive manufacturer's recommendations.
      b. Drive fasteners for snug fit. Do not over-tighten.

D. Apply panel moldings to all panel edges using silicone sealant providing for required clearances.
   1. All moldings must provide for a minimum 1/8 inch of panel expansion at joints and edges, to insure proper installation.
   2. Apply sealant to all moldings, channels and joints between the system and different materials to assure watertight installation.
3.04 CLEANING

A. Remove excess sealant from panels and moldings. Wipe down using a damp cloth and mild soap solution or cleaner.

B. Refer to manufacturer's specific cleaning recommendations Do not use abrasive cleaners.

END OF SECTION
PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Surface preparation.

B. Field application of paints and other coatings.

C. Scope: Finish all interior and exterior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated, including the following:
   1. Both sides and edges of plywood backboards for electrical and telecom equipment before installing equipment.
   2. Elevator pit ladders.
   3. Exposed surfaces of steel lintels and ledge angles.
   4. Mechanical and Electrical:
      a. In all areas, paint all insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, mechanical equipment, and electrical equipment, unless otherwise indicated.
      b. In all areas, paint shop-primed items.
      c. Provide color banding for insulated and uninsulated piping in accordance with ANSI A13.1, "Scheme for the Identification of Piping Systems" and the Owner's specific requirements.
      d. Paint interior surfaces of air ducts that are visible through grilles and louvers with one coat of flat black paint to visible surfaces.
      e. Paint dampers exposed behind louvers, grilles, to match face panels.

D. Do Not Paint or Finish the Following Items:
   1. Items fully factory-finished unless specifically so indicated; materials and products having factory-applied primers are not considered factory finished.
   2. Items indicated to receive other finishes.
   3. Items indicated to remain unfinished.
   4. Fire rating labels, equipment serial number and capacity labels, and operating parts of equipment.
   5. Non-metallic roofing and flashing.
   6. Stainless steel, anodized aluminum, bronze, terne, and lead items.
   7. Marble, granite, slate, and other natural stones.
   8. Floors, unless specifically so indicated.
   9. Ceramic and other tiles.
   12. Exterior insulation and finish system (EIFS).
   14. Acoustical materials, unless specifically so indicated.
   15. Concealed pipes, ducts, and conduits.

1.02 RELATED REQUIREMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
B. Division 1 Section "LEED Requirements" for additional LEED requirements.
C. Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions.
D. Section 05 50 00 - Metal Fabrications: Shop-primed items.
E. Section 05 51 00 - Metal Stairs: Shop-primed items.
F. Section 09 96 00 - High-Performance Coatings.
G. Division 22, 23, and 26 Sections: Identification for Plumbing and HVAC Piping and Equipment, and Electrical Systems.

1.03 REFERENCE STANDARDS

1.04 DEFINITIONS
A. Conform to ASTM D 16 for interpretation of terms used in this section.

1.05 SUBMITTALS
A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide complete list of all products to be used, with the following information for each:
   1. Manufacturer's name, product name and/or catalog number, and general product category (e.g. "alkyd enamel").
   2. MPI product number (e.g. MPI #47).
   3. Cross-reference to specified paint system(s) product is to be used in; include description of each system.
   4. If proposal of substitutions is allowed under submittal procedures, explanation of all substitutions proposed.
C. Samples for initial color selection: Submit three paper "drop" samples, 8-1/2 by 11 inches in size, illustrating range of colors available for each finishing product specified.
   1. Where sheen is specified, submit samples in only that sheen.
D. Samples for verification purposes: Provide samples of each color and material to be applied, with texture to simulate actual conditions, on representative samples of the actual substrate. Define each separate coat, including fillers and primers. Use representative colors when preparing samples for review. Resubmit until required sheen, color, and texture are achieved.
E. Certification: By manufacturer that all paints and coatings comply with VOC limits specified.
F. LEED Submittals:
   1. VOC content of all paints and coatings actually used.
   2. Submit documentation of recycled content and location of manufacture.
G. Manufacturer's Instructions: Indicate special surface preparation procedures and substrate conditions requiring special attention.
H. Maintenance Data: Submit data on cleaning, touch-up, and repair of painted and coated surfaces.

I. Applicator certifications that are required to be in writing.

### 1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum three years documented experience.

B. Applicator Qualifications: Company specializing in performing the type of work specified with minimum five years experience.

C. Single-Source Responsibility: Provide primers and undercoat paint produced by the same manufacturer as the finish coats. Use only thinners approved by paint manufacturer, and use only within the recommended limits.

D. Coordination of Work: Review other sections in which primers are provided to ensure compatibility of the total systems for various substrates. On request, furnish information on characteristics of finish materials to ensure use of compatible primers.

1. Notify the Architect of any problems anticipated using the materials specified, prior to proceeding with work.

E. Material Quality: Provide the manufacturer's best quality grade paint material of the various coating types specified. Paint material containers not displaying manufacturer's product identification will not be acceptable.

1. Proprietary names used to designate colors or materials are not intended to imply that products named are required or to exclude approved equivalent products of other manufacturers.

F. Color Pigments: Pure, non-fading, applicable types to suit substrates and service indicated.

G. Lead content in pigments or other painting materials and components is not allowed.

H. Solvents and V.O.C. Compliance: All painting products selected and used for this project shall comply with or exceed LEED-NC Low-Emitting Materials requirements (for Credit 4.2), or requirements specified in Section 01616 - Volatile Organic Compound (VOC) Content Restrictions, whichever is most stringent.

I. VOC Compliance for Field-Applied Exterior Paints and Coatings: Provide materials that comply with the Air Quality Control regulations of the local Air Quality Management District having jurisdiction over the location of the project or EPA Region II. In the event that local regulations are silent on specific applications, comply with the National Volatile Organic Compound Emission Standards for Architectural Coatings (40 CFR Part 59).

J. VOC Content of Field-Applied Interior Paints and Coatings: Provide products that comply with the following limits for VOC content, exclusive of colorants added to a tint base, when calculated according to 40 CFR 59, Subpart D (EPA Method 24); these requirements do not apply to paints and coatings that are applied in a fabrication or finishing shop:

1. Flat Paints and Coatings: VOC content of not more than 50 g/L.
2. Nonflat Paints, Coatings, and Primers: VOC content of not more than 150 g/L.
3. Anti-Corrosive and Anti-Rust Paints Applied to Ferrous Metals: VOC not more than 250 g/L.
4. Floor Coatings: VOC not more than 100 g/L.
5. Shellacs, Clear: VOC not more than 730 g/L.
6. Shellacs, Pigmented: VOC not more than 550 g/L.

### 1.07 REGULATORY REQUIREMENTS
1.08 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.

B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, pigment and vehicle constituents by volume, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.

C. Paint Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

D. Keep storage area neat and orderly. Remove oily rags and waste daily. Take necessary measures to ensure that workers, others present or passing through or inspecting work areas (painting or any other work), and the work areas themselves are protected from fire and health hazards resulting from handling, mixing, and application of materials.

1.09 PROJECT CONDITIONS

A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.

B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.

C. Do not apply exterior coatings during rain or snow, or when relative humidity is outside the humidity ranges required by the paint product manufacturer.
   1. Painting may continue during inclement weather if surfaces and areas to be painted are enclosed and heated within temperature limits specified by the manufacturer, during application, drying and curing periods.

D. Minimum Application Temperatures for Latex Paints: 45 degrees F for interiors; 50 degrees F for exterior; unless required otherwise by manufacturer's instructions.

E. Minimum Application Temperature for solvent-thinned Finishes: 65 degrees F for interior or exterior, unless required otherwise by manufacturer's instructions.

F. Provide lighting level of 80 ft candles measured mid-height at substrate surface.

1.10 EXTRA MATERIALS

A. See Section 01 60 00 - Product Requirements, for additional provisions.

B. Supply 3 gallons of each color and type; store where directed.

C. Label each container with color, type, and room locations in addition to the manufacturer's label.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Provide all paint and coating products from the same manufacturer to the greatest extent possible.

B. Paints:
   1. Comex Group (Color Wheel, Frazee, General Paint, Kwal, or Parker):

C. Basis of Design Products: The design for each type of paint is based on the products named. Subject to compliance with requirements, provide either the named product of a comparable product by another qualified manufacturer.

D. Primers:
1. Latex Block Filler: Sherwin Williams, "PrepRite Block Filler".
3. Latex-based Interior Primer: Sherwin Williams, "Pro-Green 200 Interior Latex Primer".
4. Polyamine Epoxy Primer: Tnemec Series 201 "Epoxoprime".
5. Rust Inhibiting Primer for Non-Galvanized Ferrous Metal:
   a. Shop Applied: Tnemec Series V10 "Tnemec Primers".
   b. Field Applied: Tnemec Series 135 "Chembuild".
6. Galvanized Steel and Non-Ferrous Metal Primer: Tnemec Series 135 "Chembuild".
7. Intermediate for Shop Primed Structural Steel: Tnemec Series L69 "Hi-Build Epoxoline II".

E. Exterior Finish Paint Materials:
1. Semi-Gloss Acrylic Polymer: Tnemec Series 1029 "Enduratone".
2. Semi-Gloss Aliphatic Acrylic Polyurethane: Tnemec Series 1075 "Endura-Shield II".

F. Interior Finish Coat Materials:
1. Semi-Gloss Acrylic Polymer: Tnemec Series 1029 "Enduratone".
2. Polyamine Epoxy Finish: Two component, high-performance, modified polyamine epoxy coating: Tnemec, Series 280 "Tneme-Glaze".
3. Semi-Gloss Aliphatic Acrylic Polyurethane: Tnemec Series 1075 "Endura-Shield II".
4. Latex-based Interior Eggshell: Sherwin Williams "ProGreen 200 Interior Latex Finish".
5. Latex-based Interior Flat: Sherwin Williams "ProGreen 200 Interior Latex Finish".

G. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 MATERIALS - GENERAL

A. Provide materials in compliance with the USGBC LEED -NC v2.2 Rating System requirements:
   1. Paints and Coatings used on the interior of the building (defined as inside of the weatherproofing system and applied on-site) shall comply with the following criteria:
      a. Architectural paints, coatings and primers must not exceed the VOC content limits established in Green Seal Standards GS-11.
      b. Anti-corrosive and anti-rust paints must not exceed the VOC content limits established in Green Seal Standards GS-03.
      c. Clear wood finishes, floor coatings, stains and shellacs must not exceed the VOC content limits established in South Coast Air Quality Management District (SCAQMD) Rule 1113, Architectural Coatings.

2.03 PAINTS AND COATINGS - GENERAL

A. Paints and Coatings: Ready mixed, unless intended to be a field-catalyzed coating.
   1. Provide paints and coatings of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
2. Provide materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.

3. For opaque finishes, tint each coat including primer coat and intermediate coats, one-half shade lighter than succeeding coat, with final finish coat as base color.

4. Supply each coating material in quantity required to complete entire project's work from a single production run.

5. Do not reduce, thin, or dilute coatings or add materials to coatings unless such procedure is specifically described in manufacturer's product instructions.

6. Minimum Coating Thickness: Apply paint materials no thinner than manufacturer's recommended spreading rate. Provide total dry film thickness of the entire system as recommended by manufacturer.

B. Primers: Where the manufacturer offers options on primers for a particular substrate, use primer categorized as "best" by the manufacturer.

C. Volatile Organic Compound (VOC) Content:
1. Provide coatings that comply with the most stringent requirements specified in the following:
   b. Architectural coatings VOC limits of State in which the project is located.
2. Determination of VOC Content: Testing and calculation in accordance with 40 CFR 59, Subpart D (EPA Method 24), exclusive of colorants added to a tint base and water added at project site; or other method acceptable to authorities having jurisdiction.

D. Colors: As indicated on drawings
1. Allow for minimum of three colors for each system, unless otherwise indicated, without additional cost to Owner.
2. Extend colors to surface edges; colors may change at any edge as directed by Architect.
3. In all areas, finish pipes, ducts, conduit, and equipment the same color as the wall/ceiling they are mounted on/under.
4. In utility areas, finish equipment, piping, conduit, and exposed duct work in colors according to the color coding scheme indicated.

2.04 PAINT SYSTEMS - EXTERIOR

A. Wood, Opaque, Acrylic, 3 Coat:
   1. One coat of Exterior Wood Primer.
   2. Two coats of Semi-Gloss Acrylic Polyurethane.

B. Concrete/Masonry, Opaque, Acrylic, 3 Coat:
   1. One coat of block filler: Acrylic Cementitious Block Filler.
   2. First Coat: Semi-Gloss Acrylic Polymer (3 mils).

C. Ferrous Metals, Non-galvanized, Acrylic, 3 Coat:
   1. Primer: Rust Inhibiting Primer (Primer is not required on shop-primed items. Shop primer may require field touch-up.)
   2. First Coat: Semi-Gloss Acrylic Polymer (3 mils).

D. Aluminum and Galvanized Sheet Metal, Acrylic, 3 Coat:
   1. Primer: Galvanized Steel and Non-Ferrous Metal Primer.
   2. First Coat: Semi-Gloss Acrylic Polymer (3 mils).

E. Galvanized Miscellaneous Shapes and Plates, including Railings, Polyurethane, 2 Coat:
1. Primer: Galvanized Steel and Non-Ferrous Metal Primer (4 mils).

F. Shop Primed Structural Steel: Miscellaneous Shapes and Plates with Organic Zinc Rich Primer, Polyurethane, 2 Coat:

2.05 PAINT SYSTEMS - INTERIOR

A. Wood, Opaque, Acrylic, 3 Coat:
1. One coat wood primer.
2. Two coats of eggshell acrylic polyurethane.

B. Concrete/Masonry, Acrylic, 3 Coat: (Including CMU in Corridors (Not subject to Moisture and Food Preparation)).
2. First Coat: Semi-Gloss Acrylic Polymer (3 mils).

C. Concrete/Masonry, Acrylic, 3 Coat: (Unit Partitions in Administrative Areas (Not subject to Moisture and Food Preparation)) Eggshell Enamel Finish, 3 Coat.
1. Primer: Latex Block Filler.
2. First Coat: Latex-based Interior Eggshell.

D. Concrete/Masonry (Areas Subject to Moisture and Food Preparation), High Performance, Amine-Epoxy Coating, 3 Coat:

E. Gypsum Board Walls and Partitions (Not Subject to Moisture and Food Preparation), Eggshell Enamel Finish, 3 Coat:
1. Primer: Latex-based Interior Primer.
2. First Coat: Latex-based Interior Eggshell (1.7 mils).
3. Second Coat: Latex-based Interior Eggshell (1.7 mils).

F. Gypsum Board Ceilings and Soffits (Not Subject to Moisture and Food Preparation), Flat Enamel Finish, 3 Coat:
1. Primer: Latex-based Interior Primer.
2. First Coat: Latex-based Interior Flat (1.8 mils).
3. Second Coat: Latex-based Interior Flat (1.8 mils).

G. Gypsum Board and Tile Backing Panels on Walls and Ceilings, in Areas subject to Moisture and Food Preparation, High Performance, Amine-Epoxy Coating:
1. Tile Backing Panel Preparation: Finish with finishing system specified in Division 9 Section, "Gypsum Board Assemblies".
H. Non-Galvanized Ferrous Metal, Acrylic, 3 Coat:
   1. Primer: Rust Inhibiting Primer (Primer is not required on shop-primed items. Shop primer may require field touch-up.)
   2. First Coat: Semi-Gloss Acrylic Polymer (3 mils).

I. Aluminum and Galvanized Sheet Metal, Acrylic, 3 Coat:
   1. Primer: Galvanized Steel and Non-Ferrous Metal Primer.
   2. First Coat: Semi-Gloss Acrylic Polymer (3 mils).

J. Galvanized Miscellaneous Shapes and Plates, including Railings, Polyurethane Finish, 2 coat:
   1. Primer: Galvanized Steel and Non-Ferrous Metal Primer (4 mils).

K. Shop-Primed Structural Steel: Miscellaneous Shapes and Plates with Organic Zinc Rich Primer, Semi-Gloss Acrylic Finish, 3 Coat:
   1. Intermediate: Intermediate for Shop-Primed Structural Steel (6 mils).
   2. First Coat: Semi-Gloss Acrylic Polymer (3 mils).

2.06 ACCESSORY MATERIALS

A. Accessory Materials: Provide all primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials required to achieve the finishes specified whether specifically indicated or not; commercial quality.

B. Patching Material: Latex filler.

C. Fastener Head Cover Material: Latex filler.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that surfaces are ready to receive work as instructed by the product manufacturer.

B. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.

C. Test shop-applied primer for compatibility with subsequent cover materials.

D. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
   1. Gypsum Wallboard: 12 percent.
   2. Masonry, Concrete, and Concrete Unit Masonry: 12 percent.
   3. Interior Wood: 15 percent, measured in accordance with ASTM D4442.
   4. Exterior Wood: 15 percent, measured in accordance with ASTM D4442.

3.02 PREPARATION

A. Clean surfaces thoroughly and correct defects prior to coating application.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

C. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.
D. Surfaces: Correct defects and clean surfaces which affect work of this section. Remove or repair existing coatings that exhibit surface defects.

E. Seal surfaces that might cause bleed through or staining of topcoat.

F. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.

G. Concrete and Unit Masonry Surfaces to be Painted: Remove dirt, loose mortar, scale, salt or alkali powder, and other foreign matter. Remove oil and grease with a solution of tri-sodium phosphate; rinse well and allow to dry. Remove stains caused by weathering of corroding metals with a solution of sodium metasilicate after thoroughly wetting with water. Allow to dry.

H. Gypsum Board Surfaces to be Painted: Fill minor defects with filler compound. Spot prime defects after repair.

I. Galvanized Surfaces to be Painted: Remove surface contamination and oils and wash with solvent. Apply coat of etching primer.

J. Corroded Steel and Iron Surfaces to be Painted: Prepare using at least SSPC-PC 2 (hand tool cleaning) or SSPC-SP 3 (power tool cleaning) followed by SSPC-SP 1 (solvent cleaning).

K. Uncorroded Uncoated Steel and Iron Surfaces to be Painted: Remove grease, mill scale, weld splatter, dirt, and rust. Where heavy coatings of scale are evident, remove by hand wire brushing or sandblasting; clean by washing with solvent. Apply a treatment of phosphoric acid solution, ensuring weld joints, bolts, and nuts are similarly cleaned. Prime paint entire surface; spot prime after repairs.

L. Shop-Primed Steel Surfaces to be Finish Painted: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces.

M. Interior Wood Surfaces to Receive Opaque Finish: Wipe off dust and grit prior to priming. Seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after primer has dried; sand between coats. Back prime concealed surfaces before installation.

N. Interior Wood Surfaces to Receive Transparent Finish: Wipe off dust and grit prior to sealing, seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after sealer has dried; sand lightly between coats. Prime concealed surfaces with gloss varnish reduced 25 percent with thinner.

O. Exterior Wood Surfaces to Receive Opaque Finish: Remove dust, grit, and foreign matter. Seal knots, pitch streaks, and sappy sections. Fill nail holes with tinted exterior calking compound after prime coat has been applied. Back prime concealed surfaces before installation.

P. Metal Doors to be Painted: Prime metal door top and bottom edge surfaces.

3.03 APPLICATION

A. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.

B. Exterior Wood to Receive Opaque Finish: If final painting must be delayed more than 2 weeks after installation of woodwork, apply primer within 2 weeks and final coating within 4 weeks.

C. Apply products in accordance with manufacturer's instructions.

D. Where adjacent sealant is to be painted, do not apply finish coats until sealant is applied.
E. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.

F. Apply each coat to uniform appearance.

G. Dark Colors and Deep Clear Colors: Regardless of number of coats specified, apply as many coats as necessary for complete hide.

H. Sand wood and metal surfaces lightly between coats to achieve required finish.

I. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.

J. Wood to Receive Transparent Finishes: Tint fillers to match wood. Work fillers into the grain before set. Wipe excess from surface.

K. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.04 FINISHING MECHANICAL AND ELECTRICAL EQUIPMENT

A. Refer to Section 22 05 53 and Section 26 05 53 for schedule of color coding of equipment, duct work, piping, and conduit.

B. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.

C. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.05 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for general requirements for field inspection.

3.06 CLEANING

A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.07 PROTECTION

A. Protect finished coatings until completion of project.

B. Touch-up damaged coatings after Substantial Completion.

3.08 SCHEDULE - SURFACES TO BE FINISHED

A. Paint the surfaces described in PART 2, Paint Systems Articles.

END OF SECTION
SECTION 09 96 00

HIGH-PERFORMANCE COATINGS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. High performance coatings.
   1. Coatings for Exterior Use: 3-coat high performance urethane system.

B. Special preparation of surfaces.

1.02 RELATED REQUIREMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions.

C. Division 5 - Structural & Miscellaneous Steel.

D. Section 09 90 00 - Painting and Coating.

1.03 REFERENCE STANDARDS

A. SSPC-SP1 - Solvent Cleaning; Society for Protective Coatings; Edition approved at time of bidding.

B. SSPC-SP 6 - Commercial Blast Cleaning; Society for Protective Coatings; 2006.

C. SSPC-SP 7 - Brush-Off Blast Cleaning; Society for Protective Coatings; 2006.

D. SSPC-SP 11 - Power Tool Cleaning to Bare Metal; Society for Protective Coatings; 1987 (Ed. 2004).

1.04 DEFINITIONS

A. Coatings: Paint or heavy duty finishes for use on surfaces subject to interior and exterior exposure, submergence, high moisture, splash, or chemical environment, including primers, sealers, fillers, and intermediate and finish coats.

B. Normal: Surfaces subject to normal temperature and humidity.

C. First Coat: Field primer, factory primer, or shop primer. When only one coat is required, first coat is the finish coat.

D. Second, Third, Intermediate, or Finish coats: Successive finish coats applied over first coat.

E. DFT: Dry Film Thickness (Mils/coat).

F. Sfpg: Square feet per gallon (per coat).

1.05 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data indicating coating materials.
   1. Manufacturer's literature including application recommendations and generic makeup for each coating scheduled.
   2. List each material and cross-reference the specific coating, finish system, and application.
3. Submit one copy of manufacturer's Material Safety Data Sheets (MSDS) for each type of coating to Architect.
4. Post copy of MSDS on the Site at all times when coating is in progress.

C. Samples: Submit two samples 4 x 4 inch in size illustrating colors available for selection.

D. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

E. Applicator's approval by manufacturer.

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

G. Maintenance Data: Include cleaning procedures and repair and patching techniques.

H. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. Extra Coating Materials: 2 gallon of each type and color.
   2. Label each container with manufacturer's name, product number, color number, and room names and numbers where used.

I. LEED Submittals:
   1. VOC content of all opaque coatings actually used.
   2. Submit documentation of recycled content and location of manufacture.

1.06 QUALITY ASSURANCE

A. VOC Compliance; Provide materials that comply with the Air Quality Control regulation of the local Air Quality Management District having jurisdiction over the location of the project or EPA Region II. In the event that local regulations are silent on specific applications, comply with the National Volatile Organic Compound Emission Standards for Architectural Coatings (40 CFR Part 59).

B. Regulatory Requirements: All coatings shall conform to OSHA requirements for allowable exposure to lead and other hazardous substances.

C. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum six years documented experience.

D. Applicator Qualifications: Company specializing in performing the work of this section, approved in writing by coating manufacturer, and with minimum five years documented experience applying coating systems similar in material and extent to those indicated.

E. Single-Source Responsibility: Provide coating material produced by the same manufacturer for each system.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Materials shall be delivered to the site in original containers with labels intact and seals unbroken.

B. Protect and heat or cool material storage location to maintain temperature ranges recommended by coating manufacturers, but not less than 50 degrees F.

C. Oily rags and waste must be removed from buildings each night or kept in appropriate metal containers. Provide fire extinguishers of the type recommended by coating manufacturers in areas of storage and where finishing is occurring. Allow no smoking or open containers of solvent.

D. Empty containers shall have labels canceled and clearly marked as to use.

1.08 FIELD CONDITIONS
A. Environmental Requirements:
   1. Relative humidity conditions as specified by coating manufacturer shall be adhered to.
   2. Do not apply exterior coating when cold damp, foggy, or rainy weather appears probable, or when the temperature of the substrate is below 50 degrees F., unless approved in writing by the coating manufacturer.
   3. Maintain the manufacturer's environmental requirements until the coating is fully cured.
   4. Apply no coating in areas where dust is being generated.
   5. Restrict traffic from area where coating is being applied or is curing.

B. Protection:
   1. Drop cloths shall be provided in all areas where coating is performed to fully protect other surfaces.
   2. Remove hardware, accessories, plates, lighting fixtures, and similar items or provide protection by masking. Upon completion, replace items or remove protection and clean.

C. Upon substantial completion, remaining unused material will become property of the Owner. Seal material as required for storage, mark contents with color, type, location, and shelf life, and store on Site where required by Owner.

1.09 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

B. Correct defective Work within a five year period after Date of Substantial Completion.

C. Manufacturer's Warranty: Manufacturer shall provide a 15-year color and gloss warranty that shall conform to the warranty offered by Basis-of-Design manufacturer.

D. Warranty: Include coverage for bond to substrate.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. High-Performance Coatings:
   4. Substitutions: Section 01 60 00 - Product Requirements.
      a. Each request for substitution shall include the name of the specified material for which a substitute is being requested; name of the proposed substitute material; and a complete description of the proposed substitute including performance and test data, cure times, recoat windows, and generic composition. No request for substitution will be considered that would decrease film thickness or offer a change in the generic type of coating specified.
      b. Substitution requests shall be received by the Architect no later than 10 days prior to bid date.

2.02 SYSTEM DESCRIPTION

A. Shop Application:
B. Field Application After Completion of Erection:
   1. Intermediate Topcoat for Bolted and Welded Connections: Polyamide Epoxy.

2.03 PRODUCTS
A. Primer: Organic zinc rich primer utilizing either an epoxy or urethane binder with a minimum volume solids of 50 percent and a minimum zinc content of 80 percent by weight in the dry film and complying with the requirements for ASTM A490 Class B Slip Coefficient.

B. Intermediate Coat for Bolted Connections: High Build Polyamide Epoxy, with a minimum solids by volume of 60 percent. Intermediate coat shall provide a minimum 18 month recoat window for application in the field of the specified acrylic polyurethane topcoat. Apply at a rate to achieve a dry film thickness of 5 mils.

C. Finish Topcoat: High-Build Acrylic Polyurethane Enamel, semi-gloss finish, with a minimum volume solids of 65 percent. Apply at a rate to achieve a dry-film thickness of 3 to 5 mils.

2.04 COLORS, MIXING, AND THINNING
A. Color shall be formed by pigments free of lead, lead compounds, or other materials that might be affected by the presence of hydrogen sulfide or other gases likely to be present at the Site.

B. Where thinning is necessary, only the products of the manufacturer furnishing the coating will be allowed. All such thinning shall be done in strict accordance with the coating manufacturer's recommendations.

C. Mix in accordance with the manufacturer's recommendations.

PART 3 - EXECUTION

3.01 EXAMINATION
A. Verify existing conditions before starting work.

B. Verify that substrate surfaces are ready to receive work as instructed by the coating manufacturer. Obtain and follow manufacturer's instructions for examination and testing of substrates.

3.02 SHOP APPLICATION
A. Surface Preparation: Clean surfaces in accordance with the Society for Protective Coatings (SSPC) specifications for commercial blast cleaning, SSPC-SP6, using blasting media to provide a surface profile of 1.5 mils.

B. Apply primer to all surfaces of structural steel, including surfaces of bolted connections, but not to surfaces within 2 inches of field welds or stud installations.

C. Do not apply intermediate coat to surfaces of bolted connections or to surfaces within 2 inches of field welds or stud installations.

D. Application: Apply coatings in accordance with the Society for Protective Coatings (SSPC) Paint Application Specification, SSPC-PA1, "Shop, Field & Maintenance Painting."

3.03 FIELD APPLICATION
A. Cleaning: Before applying field finish coatings, clean shop coated substrates of substances that
could impair bond of coatings. Remove oil and grease before cleaning.

1. Schedule cleaning and coating application so dust and other contaminates from cleaning process will not fall on wet, newly coated surfaces.

B. Surface Preparation: Clean and prepare surfaces to be coated according to manufacturer's written instructions for each substrate condition and as specified.

C. Provide barrier coats over incompatible primers or remove primers and reprime substrate.

D. Touch up bare areas and shop-applied prime coats that have been damaged. Wire brush, solvent clean, and touch up with same primer and intermediate coats as the shop coats.

E. Application Procedures: Apply coatings by brush, roller, spray, or other applicators according to manufacturer's written instructions.

F. Protect work of other trades, whether being coated or not, against damage from coating operation. Correct damage by cleaning, repairing, replacing, and recoating, as approved by Architect, and leave in an undamaged condition.

3.04 FINAL TOUCH-UP

A. Prior to substantial completion, examine the coated surfaces and retouch or refinish surfaces to leave in condition acceptable to the Architect.

3.05 CLEANING

A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

B. Clean surfaces immediately of overspray, splatter, and excess material.

C. Remove masking, coatings, and other material from floors, glass, and other surfaces not scheduled to be coated.

D. After coating has cured, clean and replace finish hardware, fixtures, and fittings previously removed.

E. Leave work areas in clean condition.

3.06 PROTECTION

A. Protect the completed work from water, airborne particles or other surface contaminants for a minimum of 24 hours after application.

B. Protect from traffic, physical abuse, immersion and chemical exposure for 24 hours at 75 degrees F. For different temperatures, consult the manufacturer's representative for curing times.

END OF SECTION