

# *DIVISION 9*

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## FINISHES

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ARCHITECTURE  
INTERIOR DESIGN  
PLANNING



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## SECTION 09250

### GYPSUM BOARD ASSEMBLIES

#### PART 1 - GENERAL

##### 1.1 SUMMARY

###### A. Section Includes:

1. Non-load-bearing steel framing and furring for gypsum board assemblies.
2. Gypsum board assemblies attached to steel framing and furring.
3. Water-resistant gypsum board.
4. Sound attenuation insulation in partition stud spaces.
5. Joint treatment materials.
6. Acoustical sealant.
7. Fasteners.
8. Partition identification (stenciling fire-rated walls).

###### B. Related Sections:

1. Section 05400 - Cold Formed Metal Framing: Steel studs and "C" shaped steel joists for structural framing constructed of 18 gauge or heavier material.
2. Section 07210 - Building Insulation: Thermal batt insulation.
3. Section 07840 - Firestopping.
4. Section 09255 - Exterior Sheathing: Sheathing installed on exterior walls.
5. Section 09265 - Gypsum Board Shaft Wall: Gypsum board shaft wall systems.
6. Section 09310 - Ceramic Tile: Cementitious backer units for application of tile.
7. Section 09910 - Painting: Painting of gypsum Board walls.

##### 1.2 SUBMITTALS

- A. **Product Data:** Submit manufacturer's product specifications and installation recommendations for each product proposed.
- B. **Shop Drawings:** Show Control joint locations.
- C. **Samples:** For the following products:
1. Trim Accessories: Full-size Sample in 12-inch- (300-mm-) long length for each trim accessory indicated.

##### 1.3 QUALITY ASSURANCE

- A. **Reference Standards:** Comply with applicable requirements of ASTM C 754 (Installation of Steel Framing Members to Receive Screw-Attached Gypsum Wallboard, Backing Board, or Water-Resistant Backing Board) and ASTM C 840 (Application and Finishing of Gypsum Board), both as supplemented by this Section.
- B. **Sound Transmission Characteristics:** For gypsum board assemblies indicated to have STC ratings, provide materials and construction identical to those of assemblies whose STC ratings were determined per ASTM E 90 and classified per ASTM E 413 by a qualified independent testing agency.

- C. **Fire-Resistance Ratings:** Where indicated, provide materials and construction identical to assemblies tested for fire resistance per ASTM E 119 by an independent testing and inspecting agency acceptable to authorities having jurisdiction.
  - 1. Provide indicated fire-resistance rated assemblies identified in UL "Fire Resistance Directory" or other testing and inspecting agency acceptable to authorities having jurisdiction.
- D. **Single-Source Responsibility for Finishing Materials:** Obtain finishing materials from either the same manufacturer that supplies gypsum board and other panel products or from a manufacturer acceptable to gypsum board manufacturer.

#### 1.4 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 panels flat to prevent sagging.
- C. **Handle gypsum board** to prevent damage to edges, ends, and surfaces. Do not bend or otherwise damage metal corner beads and trim.

#### 1.5 PROJECT CONDITIONS

- A. **Environmental Conditions, General:** Establish and maintain environmental conditions for applying and finishing gypsum board to comply with ASTM C 840 and with gypsum board manufacturer's recommendations.
- B. **Do not install** interior products until installation areas are enclosed and conditioned.
- C. **Do not install panels** that are wet, those that are moisture damaged, and those that are mold damaged.
  - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
  - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.
- D. **Room Temperatures:** For attachment of gypsum board to framing, maintain not less than 40 deg F (4 deg C). For finishing of gypsum board, maintain not less than 50 deg F (10 deg C) for 48 hours prior to application and continuously after until dry. Do not exceed 95 deg F (35 deg C) when using temporary heat sources. Avoid conditions that result in gypsum veneer plaster drying too rapidly.
- E. **Protection:** Protect gypsum board products from direct exposure to rain, snow, sunlight, or other excessive weather conditions.
- F. **Ventilation:** Ventilate building spaces, as required, for drying joint treatment materials. Avoid drafts during hot dry weather to prevent finishing materials from drying too rapidly.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. **Available Manufacturers:** Subject to compliance with requirements, manufacturers offering acceptable products include, but are not limited to, the following:

1. Steel Framing and Furring:
  - a. ALABAMA METAL INDUSTRIES CORP.
  - b. METALPRO INC
  - c. CLARK STEEL FRAMING
  - d. DALE/INCOR INDUSTRIES, INC.
  - e. MARINO INDUSTRIES CORP.
  - f. GOLD BOND BUILDING PRODUCTS DIV., NATIONAL GYPSUM CO.
  - g. UNIMAST INC.
2. Grid Suspension Assemblies:
  - a. CHICAGO METALLIC CORP.
  - b. ARMSTONG.
  - c. NATIONAL ROLLING MILLS CO.
  - d. USG INTERIORS, INC.
3. Gypsum Board and Related Products:
  - a. UNITED STATES GYPSUM CO.
  - b. DOMTAR GYPSUM.
  - c. GEORGIA-PACIFIC CORP.
  - d. NATIONAL GYPSUM CO.

## 2.2 STEEL FRAMING COMPONENTS FOR SUSPENDED AND FURRED CEILINGS

- A. **General:** Provide components of sizes indicated but not less than that required to comply with ASTM C 754 for conditions indicated.
- B. **Cast-In-Place and Post-installed Anchors in Concrete:** Anchors of type indicated below, fabricated from corrosion-resistant materials, with holes or loops for attaching hanger wires, and with capability to sustain, without failure, a load equal to 5 times that imposed by ceiling construction, as determined from testing per ASTM E 488 conducted by a qualified independent testing agency.
  1. Cast-in-place type designed for attachment to concrete forms.
  2. Chemical anchor.
  3. Expansion anchor.
- C. **Powder-Actuated Fasteners in Concrete:** Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hangers of type indicated, and with capability to sustain, without failure, a load equal to 10 times that imposed by ceiling construction, as determined by testing per ASTM E 1190 conducted by a qualified testing agency.
- D. **Wire Ties:** ASTM A 641, Class 1 zinc coating, soft temper, minimum 0.062 inch (1.6 mm) thick.
- E. **Wire Hangers:** ASTM A 641, Class 1 zinc coating, soft temper, minimum 0.162 inch (4.1 mm) thick.
- F. **Channels:** Cold-rolled steel, 0.0598-inch (1.5-mm) minimum thickness of base (uncoated) metal and 7/16-inch (11.1-mm) wide flanges, with ASTM A 653, G 60 (ASTM A 653M, Z 180) hot-dip galvanized coating:
  1. Carrying Channels: 1-1/2 inches (38.1 mm) deep, 475 lb/1000 feet (70 kg/100 m), unless otherwise indicated.
  2. Furring Channels: 3/4 inch (19.1 mm) deep, 300 lb/1000 feet (45 kg/100 m), unless otherwise indicated.

- G. Steel Studs for Furring:** ASTM C 645, with flange edges bent back 90 deg and doubled over to form 3/16 inch minimum lip (return). Use for primary suspension members where indicated.
1. Minimum Base Metal Thickness:
    - a. 0.0329 inch for studs less than 4 inches in depth.
    - b. 0.0283 inch for studs 4 inches or greater in depth.
  2. Depth as indicated.
  3. Protective Coating: ASTM A 653, G 40 (ASTM A 653M, Z 90) hot-dip galvanized coating.
- H. Steel Rigid Furring Channels:** ASTM C 645, hat-shaped, and minimum thickness of base (uncoated) metal 0.0179 inch (nominal 25 ga.) unless otherwise indicated. Use for secondary suspension members where indicated.
1. Depth - 7/8 inch.
  2. Protective Coating: ASTM A 653, G 40 (ASTM A 653M, Z 90) hot-dip galvanized coating.
- I. Steel Resilient Furring Channels (If Required):** Manufacturer's standard product designed to reduce sound transmission, fabricated from steel sheet complying with ASTM A 653 (ASTM A 653M) or ASTM A 568 (ASTM A 568M) to form 1/2-inch- (12.7-mm-) deep channel of the following configuration:
1. Single or Double-Leg Configuration: Asymmetric-shaped channel with face connected to a single flange by a single-slotted leg (web) or hat-shaped channel, with 1-1/2-inch- (38.1-mm-) wide face connected to flanges by double-slotted or expanded-metal legs (webs).
- J. Drywall Grid Suspension System for Interior Ceilings:** Manufacturer's standard direct-hung grid suspension system complying with ASTM C 645 and composed of main beams and cross furring members that interlock to form a modular supporting network. Provide one of the following or Architect-approved substitute system:
1. Chicago Metallic Corp. 630 (630 "Fire Front" where required to be fire-resistant rated).
  2. Armstrong Drywall suspension grid
  3. National Rolling Mills, Inc. DFS Series (DFR Series where required to be fire-resistant rated).
  4. USG Interiors, Inc. Donn Rigid X Drywall Suspension System.

### 2.3 STEEL FRAMING FOR WALLS AND PARTITIONS

- A. General:** Provide steel framing members complying with the following requirements:
1. Component Sizes and Spacings: As indicated but not less than that required to comply with ASTM C 754 for maximum deflection of L/360 at 5 lbs. per sq. ft. lateral loading.
  2. Protective Coating: ASTM A 653/A 653M, G60 (Z180), hot-dip galvanized.
- B. Studs and Runners:** ASTM C 645, with flange edges of studs bent back 90 degrees and doubled over to form 3/16-inch-wide minimum lip (return) and complying with the following requirements for minimum thickness of base (uncoated) metal and for depth:
1. Nominal 20 gauge minimum unless otherwise indicated on Drawings.
  2. Nominal 20 gauge minimum at walls receiving ceramic tile finish.
  3. Nominal 16 gauge minimum at door jambs (two studs at each jamb)
  4. Depth: As indicated on drawings.
- C. Vertical Deflection:** Unless otherwise indicated on Drawings, all interior non-load-bearing light gauge steel framing which extends to the structure above shall be designed to accommodate a minimum of 1/2" vertical deflection using minimum 2" extended leg ceiling runners and deflection slide clips.

1. Deflection Clip: Flex-C 3 Legged Dog
  2. Approved equal.
- D. Deflection and Firestop Track (for fire-rated partitions):** Top runner shall be designed to allow partition heads to expand and contract with movement of structure above while maintaining continuity of the fire-rated assembly. Comply with requirements of ASTM C 645 except configuration, of thickness indicated for studs and width to accommodate depth of studs indicated with flanges offset at midpoint to accommodate gypsum board thickness.
1. Provide for minimum vertical deflection specified above.
  2. Refer to drawings for details. If not detailed, provide manufacturer's standard offset configuration.
- E. Steel Rigid Furring Channels:** ASTM C 645, hat-shaped, 7/8-inch depth and 0.0179-inch (nominal 25 ga.) minimum thickness of base (uncoated) metal.
- F. Steel Channel Bridging:** Cold-rolled steel, 0.0598-inch (1.5-mm) minimum thickness of base (uncoated) metal and 7/16-inch- (11.1-mm-) wide flanges, 1-1/2 inches (38.1 mm) deep, 475 lb/1000 feet (45 kg/100 m), unless otherwise indicated.
- G. Steel Flat Strap and Backing Plate (If Required):** Steel sheet for blocking and bracing complying with ASTM A 653 (ASTM A 653M) or ASTM A 568 (ASTM A 568M), length and width as indicated, and with a minimum base metal (uncoated) thickness as follows:
1. Thickness: 0.027 inch (0.7 mm) unless otherwise indicated or otherwise required by manufacturer of items being installed.
- H. Z-Clips:** At underside of steel beams to receive fireproofing provide and securely fasten z-clips to anchor deflection tracks. Spacing and gauge shall match that of stud below.
- I. Fasteners for Metal Framing:** 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 board manufacturers for applications indicated.

#### 2.4 GYPSUM BOARD PRODUCTS

- A. General:** Provide gypsum board of types indicated in maximum lengths available to minimize end-to-end butt joints. Provide 5/8 inch thickness unless otherwise indicated.
1. Widths: 48 inches (1219 mm).
- B. Gypsum Board:** Complying with ASTM C 36/C 36M or ASTM C 1396/C 1396M, as applicable to type of gypsum board indicated and whichever is more stringent, 5/8 inch thick or as otherwise indicated on drawings.
1. Type: Type "X" at all locations.
  2. Edges: Tapered and featured (rounded or beveled) for prefilling.
- C. Water-Resistant Gypsum Backing Board:** ASTM C 630/C 630M or ASTM C 1396/C 1396M, 5/8 inch thick, and as follows:
1. Type X at all locations.

#### 2.5 TRIM ACCESSORIES

- A. Accessories for Interior Installation:** Provide corner beads, edge trim, and control joints complying with ASTM C 1047 and requirements indicated below:

Material:

1. Formed sheet steel zinc coated by hot-dip process, or rolled zinc.
  2. Shapes as indicated by reference to designations in ASTM C 1047:
    - a. Cornerbead on outside corners, unless otherwise indicated.
    - b. LC-bead with both face and back flanges; face flange formed to receive joint compound. Use LC-beads for edge trim unless otherwise indicated.
    - c. One-piece control joint formed with V-shaped slot, with removable strip covering slot opening.
- B. Accessory for Curved Edges:** Cornerbead formed of metal, plastic, or metal combined with plastic, with either notched or flexible flanges that are bendable to curvature radius.
- C. Reveal Moldings:** Reveal moldings are indicated on the Drawings. Where model numbers are not indicated, Architect shall select molding. Provide manufacturer's standard extruded aluminum accessories of sizes indicated, with paintable protective coating. Finish shall be selected by Architect.
1. All trim shall consist of a fin, tapered, grooved and pre-punched for screw attachments and to accept bonding agents. The surface shall be coated with a protective film compatible with plaster, latex, polyurethane epoxy, enamel, etc. Trims are extruded aluminum, alloy 6063, temper T-5 tensile strength 31 KSI.
  2. Available Manufacturers: Subject to compliance with requirements, provide one of the following:
    - a. Fry Reglet Corp.
    - b. Gordon, Inc.
    - c. Pittcon Industries Inc.

## 2.6 JOINT TREATMENT MATERIALS

- A. General:** Provide materials complying with ASTM C 475/C 475M and the recommendations of both the manufacturers of sheet products and of joint treatment materials for each application indicated.
1. For filling joints and treating fasteners of water-resistant gypsum backing board for application of ceramic tile, use materials recommended by the board manufacturer for this purpose.
- B. Joint Tape for Gypsum Board:** Paper reinforcing tape, unless otherwise indicated.
- C. Joint Tape for Cementitious Backer Units:** Polymer-coated, open glass-fiber mesh.
- D. Setting-Type Joint Compounds for High Impact Gypsum Board:** Factory-packaged, job-mixed, chemical-hardening powder products formulated for prefilling gypsum board joints.
- E. Setting-Type Joint Compounds for Gypsum Board:** Factory-packaged, job-mixed, chemical-hardening powder products formulated for prefilling gypsum board joints.
- F. Drying-Type Joint Compounds for Gypsum Board:** Factory-packaged vinyl-based products formulated for both taping and topping compounds.
- G. Joint Compound for Cementitious Backer Unit:** Material recommended by cementitious backer unit manufacturer.

## 2.7 ACOUSTICAL SEALANT

- A. **Acoustical Sealant (for Exposed or Concealed Joints):** Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834 and having flame-spread and smoke-developed ratings of less than 25 per ASTM E 84.
1. PL Acoustical Sealant; ChemRex, Inc.; Contech Brands.
  2. AC-20 FTR Acoustical and Insulation Sealant; Pecora Corp.
  3. SHEETROCK Acoustical Sealant; United States Gypsum Co.
- B. **Acoustical Sealant (for Concealed Joints):** Manufacturer's standard nondrying, nonhardening, nonskinning, nonstaining, gunnable, synthetic rubber sealant recommended for sealing interior concealed joints to reduce transmission of airborne sound. Acceptable products include the following:
1. BA-98, Pecora Corp.
  2. Tremco Acoustical Sealant, Tremco, Inc.
  3. Ohio Sealants, Inc.; Pro-Series SC-170 Rubber Base Sound Sealant.

## 2.8 SOUND ATTENUATION MATERIAL

- A. **Sound Attenuation Blankets:** Unfaced mineral-fiber blanket insulation produced by combining mineral fibers with thermosetting resins to comply with ASTM C 665 for Type I (blankets without membrane facing). Provide insulation with maximum flame spread of 25 and smoke development of 50 when tested in accordance with ASTM E 84.
1. Thickness: Minimum 3 1/2" thick or as required to achieve required sound rating.

## 2.9 MISCELLANEOUS MATERIALS

- A. **General:** Provide auxiliary materials for gypsum board construction that comply with referenced standards and recommendations of gypsum board manufacturer.
- B. **Screw Fasteners:**
1. Steel drill screws complying with ASTM C 1002 for the following applications:
    - a. Fastening gypsum board to steel members less than 0.03-inch thick.
    - b. Fastening gypsum board to wood members.
    - c. Fastening gypsum board to gypsum board.
  2. Steel drill screws complying with ASTM C 954 for fastening gypsum board to steel members from 0.033 to 0.112 inch thick.
  3. Corrosion-resistant-coated steel drill screws of size and type recommended by board manufacturer for fastening cementitious backer units.
  4. Gypsum board nails: ASTM C 514.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. **Project Conditions:** Verify that installation conditions specified in PART 1 - GENERAL have been achieved and can be maintained.
- B. **Protection:** Provide and maintain temporary protection of gypsum board from direct exposure to rain, snow, sunlight, or other excessive weather conditions.

- C. **Damaged Gypsum Board:** Gypsum board products that have become exposed to rain or water ponding at the floor line shall be replaced at the discretion of the Architect to an appropriate level, but not less than 4' - 0" above the finished floor line.
- D. **Related Work:** Examine substrates to which gypsum board assemblies attach or abut, installed hollow metal frames, cast-in-anchors, and structural framing for installation tolerances and other conditions affecting installation and performance of gypsum board assemblies.
- E. **Acceptance:** Do not proceed with installation until unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. **Ceiling Anchorages:** Coordinate ceiling suspension systems with overhead structural assemblies to ensure that provisions to receive ceiling hangers will develop their full strength and are at spacing required to support ceilings.
  - 1. Furnish concrete inserts and similar devices to other trades well in advance of time needed for installation.
- B. **Fireproofing:** Before sprayed-on fireproofing is applied, attach offset anchor plates or ceiling runners (tracks) to surfaces indicated to receive sprayed-on fireproofing. Where offset anchor plates are required, provide continuous units fastened to building structure not more than 24 inches o.c.
  - 1. After sprayed-on fireproofing has been applied, remove only as much fireproofing as necessary to complete installation of gypsum board assemblies without reducing thickness of fireproofing below that required to obtain fire-resistive rating indicated.
  - 2. Protect remaining fireproofing from damage.

### 3.3 INSTALLING STEEL FRAMING, GENERAL

- A. **Installation Standard:** Install steel framing to comply with ASTM C 754 and with ASTM C 840 requirements that apply to framing installation.
- B. **Supplemental Framing:** Install supplementary framing, blocking, and bracing at terminations in gypsum board assemblies and to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction. Comply with details indicated and with recommendations of gypsum board manufacturer or, if none available, with "Gypsum Construction Handbook" published by USG Co.
- C. **Structural Isolation:** Isolate steel framing from building to prevent transfer of loading imposed by structural movement. Provide isolation at the following locations:
  - 1. Where building structure abuts ceiling perimeter or penetrates ceiling.
  - 2. Where partition framing and wall furring abut structure except at floor.
    - a. Provide deflection tracks, slip-joint or cushioned-type joints as necessary to attain lateral support and avoid axial loading.
  - 3. Where fire-rated partitions extend to underside of structure. Provide deflection and firestop track top runner at fire-rated assemblies.
- D. **Expansion Joints:** 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 as indicated.
- E. **Frame around existing ductwork** where ductwork penetrates wall. Frame and brace to underside of structure with kickers where top of wall meets underside of ductwork. Ductwork shall not be used as supporting member for drywall assembly.

### 3.4 INSTALLING STEEL FRAMING FOR SUSPENDED AND FURRED CEILINGS

- A. **General:** At the option of the Installer, any of the following framing methods may be used, unless a specific method is called for by the Drawings.
1. Main runners (carrying channels or metal studs) suspended from overhead structure and cross furring (rigid furring channels).
  2. Steel studs, suspended or attached to adjoining wall/partition structure. Unless otherwise indicated or required, use 3-5/8" studs, maximum 16" o.c., for spans up to 8'-0".
  3. Proprietary grid suspension system.
- B. **Coordination:** Coordinate layout and installation of ceiling suspension system with other work above, supported by and penetrating ceilings.
- C. **Hangers:** Suspend ceiling hangers from building structural members and as follows:
1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or ceiling suspension system. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplicing, or other equally effective means.
  2. 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 trapezes or equivalent devices. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards.
  3. 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.
  4. Do not support ceilings directly from permanent metal forms. Furnish cast-in-place hanger inserts that extend through forms.
  5. Do not attach hangers to steel deck tabs.
  6. Do not attach hangers to steel roof deck. Attach hangers to structural members.
  7. Do not connect or suspend steel framing from ducts, pipes or conduit.
- D. **Installation Tolerances:** Install steel framing components for suspended ceilings so that cross furring members or grid suspension members are level to within 1/8 inch in 12 ft. as measured both lengthwise on each member and transversely between parallel members.
- E. **Suspended Framing:** Provide hangers not closer than 6 inches to ends of primary members.
1. Locate both primary and secondary members not more than 6 inches from walls and partitions which interrupt ceilings.
  2. Provide 1" clearance between ends of framing members and abutting walls and partitions.
  3. Sway-brace suspended steel framing with hangers used for support.
- F. **Non-Proprietary Suspension System:** Install components in sizes and at spacings indicated but not less than that required by referenced steel framing installation standard.
1. Wire Hangers: 0.1620-inch diameter (8 gage), 4 feet on center maximum.
  2. Primary Members (main runners): Carrying channels or steel studs, 4 feet on center, maximum.
  3. Secondary members (cross furring): Hat-shaped channels, 24 inches on center, maximum.
  4. Wire-tie or clip furring members to main runners and to other structural supports as indicated.

- G. Drywall 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. Comply with system manufacturer's instructions.

### 3.5 INSTALLING STEEL FRAMING FOR WALLS AND PARTITIONS

- A. General:** Install runners (tracks) at floors, ceilings, and structural walls and columns where gypsum board stud assemblies abut other construction.
1. Space studs and furring members 16" o.c. unless otherwise indicated.
  2. Where studs are installed directly against exterior walls, install asphalt felt strips between studs and wall.
  3. Install steel studs and furring in sizes and at spacings indicated but not less than that required to comply with maximum deflection and minimum loading requirements specified in this Section.
- B. Installation Tolerances:** Install each steel framing and furring member so that fastening surfaces do not vary more than  $\frac{1}{8}$  inch from the plane formed by the faces of adjacent framing.
- C. Full Height Partitions:** Extend partition framing full height to structural supports or substrates above suspended ceilings, except where partitions are indicated to terminate at suspended ceilings. Cut studs  $\frac{1}{2}$  inch short of full height to avoid deflection transfer to studs. Install studs and top deflection track and/or firestop tracks in accordance with manufacturer's instructions. Provide extended leg ceiling runners.
1. Continue framing over frames for doors and openings and frame around ducts penetrating partitions above ceiling to provide support for gypsum board.
  2. Extend partitions to the underside of floor/roof slabs and decks or other continuous solid structural surfaces. Install framing around structural and other members extending below floor/roof slabs and decks, as needed, to support gypsum board closures needed to make partitions continuous from floor to underside of solid structure.
- D. Steel Framing for Curved Partitions:** Cut top and bottom runners through leg and web at 2-inch intervals for arc length. In cutting lengths of runners allow for uncut straight lengths of not less than 12 inches at ends of arcs.
1. Bend runners to uniform curve of radius indicated and locate straight lengths so they are tangent to arcs.
  2. Support outside (cut) leg of runners by clinching a 1-inch high by 0.0209-inch (25 gage) thick sheet steel strip to inside of cut legs using metal lock fasteners.
  3. Attach runners to structural elements at floor and ceiling with fasteners located 2 inches from ends and spaced 24 inches o.c.
  4. Attach runners to suspended ceilings with toggle bolts or hollow wall anchors located 2 inches from ends and spaced 16 inches o.c. in between where attached to suspended ceilings.
  5. Begin and end each arc with a stud and space intermediate studs equally along arcs at stud spacing recommended by gypsum board manufacturer for radiuses indicated. Attach studs to runners with  $\frac{3}{8}$ -inch long pan head framing screws. On straight lengths at ends of arcs, place studs 6 inches o.c. with last stud left free standing.
- E. Steel Framing at Door Openings:** Frame door openings with two minimum 16 gauge studs at each jamb to comply with details indicated and with applicable published recommendations of gypsum board manufacturer. Attach vertical studs at jambs with screws to runner tracks and to jamb anchor clips on door frames. Install runner track section (for cripple studs) at head and secure to jamb studs.
1. At each door, brace jamb studs (hinge and strike jambs) from door head to underside of structure.

- F. **Frame openings other than door openings** in same manner as required for door openings. Install framing below sills of openings to match framing required above door heads.
- G. **Wall Furring:** Space furring members 16 inches on centers unless otherwise indicated. Attach with 2-inch cut nails driven into masonry joints or with power-driven fasteners. Space fasteners 24 inches apart, staggered from flange to flange.
  - 1. Install furring members around openings, ducts, structural members, and other penetrations as needed to support gypsum board.
  - 2. Position furring members to provide support for all gypsum board edges (for vertical board application) or ends (for horizontal board application).
- H. **Clips, Supports, and Brackets:** Install clips, supports, brackets, runners, etc. that attach to structural steel or deck receiving fireproofing prior to the application of fireproofing. Repair fireproofing damaged by installation of balance of framing.
- I. **Backings for wall mounted accessories and furniture:** Provide sheet metal, studs, blocking as necessary and recommended by manufacturer of items being installed for solid anchorage to wall.

### 3.6 APPLYING AND FINISHING GYPSUM BOARD

- A. **General Standards:** Install and finish gypsum panels to comply with ASTM C 840 and gypsum board manufacturer's recommendations.
  - 1. Install gypsum panels with face side out. Do not install imperfect, damaged, or damp panels. Butt panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place.
  - 2. Locate either edge or end joints over supports. Position boards so that tapered edges abut tapered edges and mill-cut or field-cut ends abut mill-cut or field-cut ends. Do not place tapered edges against cut edges or ends.
  - 3. Locate exposed end-butt joints as far from centers of walls and ceilings as possible, and stagger not less than 24 inches in alternate courses of board.
  - 4. Fit gypsum board neatly around ducts, pipes, conduits, and other penetrating items, and around openings for electrical devices, fixtures, accessories and similar recessed items.
  - 5. Attach gypsum board to supplementary framing and blocking provided for additional support at openings and cutouts.
  - 6. Form reveals, control joints and expansion joints at locations indicated, with space between edges of boards, prepared to receive trim accessories.
    - a. Install control joints between dissimilar wall materials, as shown on drawings, and minimally every 30 feet horizontally or vertically.
  - 7. Where gypsum board intersects beams, joists, columns and other structural components, cut gypsum board to fit profile of component and allow 1/4 to 1/2 inch wide joint for sealant.
- B. **Ceilings:** Install ceiling boards across supports 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.
- C. **Walls and Partitions:** Install wall/partition boards with 1/4-inch gap at floor and in manner, which avoids end-butt joints entirely where possible.
  - 1. At walls more than 12 feet high, install boards horizontally with end joints staggered over studs.
  - 2. Stagger gypsum board joints over different studs on opposite faces of partitions.
  - 3. Cover both faces of partition framing with gypsum board in concealed spaces (above ceilings, etc.), except in chase walls.

4. 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.
5. Isolate perimeter of non-load-bearing partitions at structural abutments. Provide 1/4 inch to 1/2 inch space, and where exposed in the completed construction, trim edge with edge trim. Seal joints with acoustical sealant, except at fire-rated partitions joints shall be firestopped as specified in "Section 07840 - Firestopping"

### 3.7 PARTITION IDENTIFICATION

- A. **Stenciling:** Stencil the wall rating on each side of wall above the ceiling. Letters shall be minimum 2" high and labeled at 20 foot centers.
1. Label as "FIRE", "SMOKE", and "No. of hours".
  2. Non-rated walls, which extend to deck shall be labeled "NO WALL RATING REQUIRED".

### 3.8 SOUND-RATED CONSTRUCTION

- A. **Sound Attenuation Blankets:** Install sound attenuation blankets where indicated, in coordination with framing erection. Install blankets after framing is complete and piping, conduit, ducts and other penetrating items are complete and tested. At partitions install blankets from open side before second gypsum board face is installed. Cut and fit insulation around penetrating items to fill the area with a continuous insulating barrier. Remove and replace with new material insulation, which becomes displaced, torn, wet and otherwise damaged before it is enclosed.
- B. **Acoustical Sealants:** Where sound-rated construction is indicated, seal construction at perimeters, control and expansion joints, openings and penetrations with continuous sealant including a bead at both faces of partitions. Comply with ASTM C 919 and manufacturer's recommendations for location of edge trim and closing off sound-flanking paths around or through gypsum board assemblies, including sealing partitions above acoustical ceilings.
1. Except where fire-rated gypsum board construction is required, provide acoustical sealant as specified in this Section.
  2. Where fire-rated gypsum board construction is required, firestopping sealant shall be provided as specified in "Section 07840 - Firestopping".

### 3.9 GYPSUM BOARD APPLICATION METHODS

- A. **General:** Space fasteners in gypsum panels according to referenced gypsum board application and finishing standard and manufacturer's recommendations.
- B. **Single-Layer Application:** Install gypsum board as follows:
1. On ceilings, apply gypsum board prior to wall/partition board application to the greatest extent possible and at right angles to supports, unless otherwise indicated. Provide lengths that will avoid or minimize end joints.
  2. On partitions/walls, apply gypsum board vertically (parallel to supports), unless otherwise indicated, and provide panel lengths that will avoid or minimize end joints. Stagger joints on opposite sides of partitions.
  3. On furring members, apply gypsum board vertically (parallel to supports) with no end joints. Locate edge joints over furring members.
- C. **Wall Tile Substrates:** For substrates indicated to receive thin-set ceramic tile and similar rigid applied wall finishes, install cementitious backer units in accordance with "Section 09310 - Ceramic Tile".

- D. Double-Layer Application:** Install gypsum backing board for base layers and special-purpose gypsum wallboard for face layers.
1. On partitions/walls, apply base layers and face layers vertically (parallel to supports) with joints of base layers located over stud or furring member and face layer joints offset at least one stud or furring member from base layer joints. Stagger joints on opposite sides of partitions.
- E. Single-Layer Fastening Methods:** Apply gypsum panels to steel framing with screws.
- F. Double-Layer Fastening Methods:** Apply base layer of gypsum panels and face layer to base layer as follows:
1. Fasten base layers with screws and gypsum board face layer with adhesive and supplementary fasteners.
  2. Fasten special-purpose board face layers with adhesive only. Assure flush surface alignment of the two types of boards at juncture by building-up adhesive thickness under the thinner board. Install special-purpose boards with snug, flush, butt joints.
- G. Curved Partitions and Ceilings:** Install gypsum panels as follows:
1. Select gypsum panel lengths and cut them as required to produce one unbroken panel covering each curved surface plus 12-inch-long straight sections at ends of curves and tangent to them.
  2. Wet gypsum panels on surfaces that will become compressed when panels are installed over a curve and where the radius of the curve prevents using dry panels. Comply with gypsum board manufacturer's recommendations relative to curve radiuses, wetting methods, stacking panels after wetting, and other preparations that precede installing wetted gypsum panels.
  3. Apply gypsum panels horizontally with wrapped edges perpendicular to studs. On convex sides of partitions, begin installation at one end of curved surface and fasten gypsum panels to studs as they are wrapped around the curve. On concave side, start fastening panels to stud at center of curve and work outwards to panel ends. Fasten panels to framing with screws spaced 12 inches o.c.
  4. For double-layer construction, apply gypsum board base layer horizontally and fasten to studs with screws spaced 16 inches o.c. Center gypsum board face layers over joints in base layer and fasten to studs with screws spaced 12 inches o.c.
  5. Allow wetted gypsum panels to dry before applying joint treatment.

### 3.10 WALL PRIORITY

- A. Wall Intersections:** Intersections of walls shall be installed in accordance with a priority of the highest to lowest. The highest priority wall shall continue uninterrupted (IE. gypsum board layers required on each side of wall shall continue through wall intersection) while the lower priority wall shall abut the other wall.

**B. Schedule:**

WALL	PRIORITY
Two-hour shaftwall:	1 (highest)
Two-hour wall:	2
One-hour shaftwall:	3
One-hour wall:	4
Non-rated wall to deck:	5
Non-rated wall to above ceiling:	6 (lowest)

### 3.11 INSTALLING TRIM ACCESSORIES

- A. **General:** For trim accessories with back flanges, fasten to framing with the same fasteners used to fasten gypsum board. Otherwise, fasten trim accessories according to accessory manufacturer's directions for type, length, and spacing of fasteners. Provide trim as follows.
1. Install corner beads at all external corners.
  2. Install edge trim where edge of gypsum panels would otherwise be exposed and where gypsum panels are tightly abutted to other construction. Provide edge trim type with face flange formed to receive joint compound except where other types are indicated.
  3. Install aluminum reveal trim and other accessories where indicated. Comply with manufacturer's instructions.
- B. **Control Joints:** Install control joints at locations indicated, and where not indicated in locations approved by Architect for visual effect according to the following requirements:
1. In ceilings: Not more than 50 feet apart in any direction, and wherever support framing or furring changes direction.
  2. In walls/partitions: Not more than 30 feet apart, and wherever a control joint occurs in an exterior wall which services as a base for gypsum board finish. Wall or partition height door frames may be considered control joints.

### 3.12 FINISHING GYPSUM BOARD ASSEMBLIES

- A. **General:** Treat gypsum board joints (both directions); flanges of corner bead, edge trim, and control joints; penetrations; fastener heads and surface defects; and elsewhere as required to prepare gypsum board surfaces for decoration and levels of gypsum board finish indicated.
1. Prefill open joints, rounded or beveled edges, and damaged areas using setting-type joint compound.
  2. Apply joint tape over gypsum board joints and to face flanges of aluminum reveal trim and coves as recommended by trim accessory manufacturer to prevent cracks from developing in joint compound at flange edges.
- B. **Levels of Gypsum Board Finish:** Provide the following levels of gypsum board finish per GA-214.
1. Level 1: Use for ceiling plenum areas, concealed areas, and where indicated, unless a higher level of finish is required for fire-resistive-rated assemblies and sound-rated assemblies.
  2. Level 2: Not used.
  3. Level 3: Not used.
  4. Level 4 (Typical Default Finish): Use for surfaces receiving flat or eggshell paints over light textured finish or backed wallcoverings.
  5. Level 5: Use on all curved walls/ceilings and on gypsum board surfaces indicated to receive gloss and semi-gloss enamels, and non-textured flat paints.
- C. **Level 1 Finish:** Where level 1 gypsum board finish is indicated, apply joint compound specified for embedding coat.
- D. **Level 4 Finish:** For level 4 gypsum board finish, embed tape in finishing compound plus two separate coats applied over joints, angles, fastener heads, and trim accessories using the following joint compounds (not including prefill), and sand between coats and after last coat:
1. Embedding and First Coat: Ready-mixed, drying-type, all-purpose or taping compound.
  2. Fill (Second) Coat: Ready-mixed, drying-type, all-purpose or topping compound.
  3. Finish (Third) Coat: Ready-mixed, drying-type, all-purpose or topping compound.

- E. **Level 5 Finish:** Where level 5 gypsum board finish is required, provide finish specified for level 4 plus a thin, uniform skim coat of joint compound over entire surface. Use joint compound specified for the finish (third coat). Produce surfaces free of tool marks and ridges ready for decoration of type indicated.
- F. **Base for Ceramic Tile:** Finish cementitious backer units to comply with unit manufacturer's directions.
- G. **Control Joint Finishing:** At all control joints and at all joints between high impact wall panels use manufacturer's recommended setting compound manufacturers recommended tape.
- H. **Existing Surfaces:** Repair existing surfaces to provide uniform finished surfaces, which are not evident as patches. Include surfaces, which are defective, damaged or defaced as a result of selective removal, previous occupancy, or deficient workmanship. Skim coat overall if necessary to repair defects and provide uniform smooth surface, using adhesive compound recommended by the compound manufacturer. At repairs of limited extent, feather out compound over existing smooth surfaces to avoid obvious patched appearance.

### 3.13 PARTITION IDENTIFICATION

- A. **Stenciling:** Stencil the wall rating on each side of wall above the ceiling. Letters shall be minimum 2" high and labeled at 20 foot centers.
  - 1. Label as "FIRE", "SMOKE", and "No. of hours".
  - 2. Non-rated walls, which extend to deck shall be labeled "NO WALL RATING REQUIRED".

### 3.14 CLEANING AND PROTECTION

- A. **Cleaning:** Promptly remove any residual joint compound from adjacent surfaces.
- B. **Protection:** Provide final protection and maintain conditions that ensure gypsum board assemblies remain without damage or deterioration at time of Substantial Completion.

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## SECTION 09265

### GYPSUM BOARD SHAFT WALL

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. **Section Includes:** Shaft wall systems at locations as indicated on Drawings.
- B. **Related Sections:**
  - 1. Section 09250 - Gypsum Board Assemblies: Application and finishing gypsum board over liner panels of gypsum board shaft wall assemblies, acoustical sealant, environmental requirements, and sound attenuation insulation.

##### 1.2 DEFINITIONS

- A. **Gypsum Board Construction Terminology:** Refer to ASTM C 11 and GA 505 for definitions of terms for gypsum board construction not otherwise defined in this Section or other referenced standards.

##### 1.3 ASSEMBLY PERFORMANCE REQUIREMENTS

- A. **Performance Requirements, General:** Provide gypsum board shaft wall assemblies that comply with the following requirements:
  - 1. They are composed of proprietary gypsum board panels and metal components designed for erection from outside the shafts.
  - 2. They comply with performance requirements specified as determined from testing manufacturers' standard assemblies representing those indicated for this Project.
- B. **Fire-Resistivity:** Fabricate and install gypsum board shaft wall assemblies to have fire-resistance ratings indicated.
- C. **Structural Performance Characteristics:** Engineer, fabricate, and install gypsum board shaft wall assemblies to withstand the following lateral design loads (air pressures) without failing and while maintaining an airtight and smoke-tight seal. Apply design loads transiently and cyclically under in-service conditions for maximum heights of partitions indicated. Evidence of failure includes deflections exceeding those indicated below, bending stresses causing studs to break or to distort, and end-reaction shear causing runners to bend or to shear and studs to become crippled.
  - 1. Lateral Design Load: 10 psf.
  - 2. Deflection Limit:  $L/240$  of partition height, except where otherwise indicated.
  - 3. Loads caused by properly installed and functioning elevators.

##### 1.4 SUBMITTALS

- A. **Product Data** from manufacturers for each type of gypsum board shaft wall assembly specified.

- B. **Engineering data** from gypsum board shaft wall assembly manufacturer certifying and substantiating compliance of gypsum board shaft wall assemblies with structural performance requirements.
- C. **Assembly test reports** from a qualified independent testing agency certifying and substantiating compliance of gypsum board shaft wall assemblies with structural performance requirements based on tests performed on manufacturers' standard assemblies representing those indicated.
- D. **Fire-test-response reports** from testing and inspecting agency substantiating compliance of gypsum board shaft wall assemblies with fire-resistivity performance requirements.
  - 1. Include data substantiating that elevator entrances and other items indicated as penetrating gypsum board shaft wall assemblies do not negate fire resistance rating.
- E. **Research reports** or evaluation reports of the model code organization acceptable to authorities having jurisdiction that evidence each assembly's compliance with requirements and with the building code in effect for Project.

## 1.5 QUALITY ASSURANCE

- A. **Fire-Test-Response Characteristics:** Provide gypsum board shaft wall assemblies that comply with the following requirements:
  - 1. Fire-resistivity tests are performed by a qualified testing and inspecting agency. A qualified testing and inspecting agency includes UL, Warnock Hersey, or another agency performing testing and follow-up services that is acceptable to authorities having jurisdiction.
  - 2. Gypsum board wall assemblies indicated are identical in materials and construction to those tested for fire resistivity per ASTM E 119.
  - 3. Fire-resistance-rated assemblies are indicated by GA File Numbers in GA 600 "Fire Resistance Design Manual," design designations listed in the UL "Fire Resistance Directory," or by Warnock Hersey or another qualified testing and inspecting agency.
- B. **Single-Source Responsibility:** Obtain components for gypsum board shaft wall assemblies from a single manufacturer for each type of assembly indicated.
- C. **Pre-installation Conference:** Conduct conference at Project Site to meet with Installer, qualified representative of gypsum board shaft wall manufacturer, and installers of other construction that penetrates, attaches to, or affects shaft wall construction.
  - 1. Review foreseeable methods and procedures related to shaft wall construction including, but not necessarily limited to, the following:
    - a. Fasteners proposed for anchoring steel framing to building structure.
    - b. Structural framing protected by sprayed-on fireproofing.
    - c. Elevator equipment including hoist-way doors, elevator call buttons, and elevator floor indicators.
    - d. Wiring devices in shaft wall assemblies.
    - e. Doors and other items penetrating shaft wall assemblies.
    - f. Items supported by shaft wall-assembly framing.
    - g. Mechanical work enclosed within shaft wall assemblies.

## 1.6 DELIVERY, STORAGE, AND HANDLING

- A. **Deliver materials** in original packages, containers, and 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. **Handle gypsum boards** to prevent damage to edges, ends, and surfaces. Do not bend or otherwise damage metal trim and framing components.

## 1.7 PROJECT CONDITIONS

- A. **Environmental Conditions:** Comply with requirements of "Section 09250 - Gypsum Board Assemblies" for environmental conditions, room temperatures, and ventilation.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
  - 1. Domtar Gypsum.
  - 2. Georgia-Pacific Corp.
  - 3. Gold Bond Building Products Div., National Gypsum Co.
  - 4. United States Gypsum Co.

### 2.2 BASIC ASSEMBLY MATERIALS

- A. **General:** Provide standard materials and components listed in manufacturer's published product literature for gypsum board shaft wall assemblies of type and application indicated. Provide gypsum and other panels in maximum lengths available to eliminate or minimize end-to-end butt joints and in thicknesses required to produce assemblies complying with structural and other performance requirements.
- B. **Steel Framing:** ASTM C 645, of profile, size, and base metal thickness required to produce assemblies complying with Part 1 "Assembly Performance Requirements" Article; with sectional properties computed to conform with AISI "Specification for the Design of Cold-Formed Steel Structural Members"; and as follows:
  - 1. Protective Coating: G 60 hot-dip galvanized coating per ASTM A 525.
- C. **Gypsum Liner Panels:** Proprietary liner panels as required for the specific fire-resistant-rated gypsum board shaft wall assemblies indicated, with moisture-resistant paper facings.
- D. **Gypsum Wallboard:** ASTM C 36, type as required by fire-resistant assembly indicated, and as follows:
  - 1. Edges: Tapered.

- E. **Gypsum Backing Board for Multi-layer Applications:** ASTM C 442 or, where backing board is not available from manufacturer, gypsum wallboard, ASTM C 36, type as required by fire-resistant assembly indicated, edge configuration as standard with manufacturer.
- F. **Water-Resistant Gypsum Backing Board:** ASTM C 630, type as required by fire-resistant assembly indicated.
- G. **Accessories:** Refer to "Section 09250 - Gypsum Board Assemblies" for corner beads, edge trim, and control joints.
- H. **Gypsum Wallboard Joint Treatment Materials:** Provide materials complying with ASTM C 475 and recommendations of gypsum board shaft wall assembly manufacturer for the applications indicated, and as specified in "Section 09250 - Gypsum Board Assemblies".

### 2.3 MISCELLANEOUS MATERIALS

- A. **General:** Provide auxiliary materials for gypsum board shaft wall construction that comply with requirements indicated and recommendations of gypsum board shaft wall assembly manufacturer.
- B. **Laminating Adhesive:** Special adhesive or joint compound recommended for laminating gypsum boards of type indicated.
- C. **Steel Drill Screws:**
  - 1. Comply with ASTM C 1002 for fastening gypsum board to steel members less than 0.03-inch thick.
  - 2. Comply with ASTM C 954 for fastening gypsum board to steel members from 0.033 to 0.112 inch thick.
- D. **Runner Fasteners:** Power-driven fasteners of type indicated below and of size and material required to withstand loading conditions imposed on shaft wall assemblies without exceeding allowable design stress of runners, fasteners, or structural substrates where anchors are embedded.
  - 1. **Powder-Actuated Fasteners:** Provide powder-actuated fasteners with the capability to sustain, without failure, a load equal to 10 times that imposed by shaft wall assemblies, as determined from testing per ASTM E 1190 by a qualified testing agency.
- E. **Acoustical Sealant:** Refer to "Section 09250 - Gypsum Board Assemblies".
- F. **Sound-Attenuation Blankets:** Refer to "Section 09250 - Gypsum Board Assemblies".

### 2.4 BASIC ASSEMBLY DESCRIPTION

- A. **General:** Characteristics of selected components are described below for purposes of indicating proprietary gypsum board shaft wall assemblies that are manufacturer's standard. Provide complete shaft wall assemblies that comply with requirements indicated in this Article and Part 1 "Assembly Performance Requirements" Article.
- B. **Cavity Shaft Wall Assemblies:** Provide assemblies constructed of proprietary gypsum liner panels inserted between steel tracks at each end of studs; with specially shaped steel studs engaged in tracks and fitted between gypsum liner panels; and with gypsum board on finished side or sides applied to studs in the number of layers, thicknesses and arrangement indicated.

1. Gypsum Liner Panel Thickness: Not less than 1 inch.
2. Stud Shape: C-H, double E, C-T, or I as standard with manufacturer.
3. Stud Thickness: 20 gauge.
4. Stud Depth: Minimum 2 ½ inches or as otherwise indicated.
5. Room-Side Finish: As indicated.
6. Shaft Side Finish: 1 layer of gypsum board of thickness indicated; provide only where finish is indicated on shaft side as well as room side, otherwise leave exposed.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. **Substrates:** Examine substrates to which gypsum board shaft wall assemblies attach or abut with Installer present. Substrates include hollow metal frames, elevator hoist-way door frames, cast-in anchors, and structural framing for compliance with requirements for installation tolerances and other conditions affecting performance of gypsum board shaft wall assemblies. Do not proceed with installation until unsatisfactory conditions have been corrected.

#### 3.2 PREPARATION

- A. **Fireproofing:** Before sprayed-on fireproofing is applied, attach offset anchor plates or ceiling runners (tracks) to surfaces indicated to receive sprayed-on fireproofing. Where offset anchor plates are required, install continuous units formed from hot-dip galvanized sheet steel of thickness indicated. Fasten plates to building structure with fasteners spaced not more than 24 inches o.c. Secure ceiling runners to offset plates with screws spaced 24 inches o.c.
  1. After sprayed-on fireproofing has been applied, remove only as much fireproofing as needed to complete installation of shaft wall assemblies. Protect from damage any fireproofing that remains.

#### 3.3 INSTALLATION OF GYPSUM BOARD SHAFT WALL ASSEMBLIES

- A. **General:** Install gypsum board shaft wall assemblies to comply with performance and other requirements indicated as well as with manufacturer's installation instructions and the following:
  1. ASTM C 754 for installing steel framing.
  2. "Section 09250-Gypsum Board Assemblies" for applying and finishing gypsum wallboard.
- B. **Expansion Joints:** Do not bridge building expansion joints with shaft wall assemblies; frame both sides of joints with furring and other support as indicated.
- C. **Supplemental Framing:** Install supplemental framing in gypsum board shaft wall assemblies around openings and as required for blocking, bracing, and support of gravity and pullout loads of fixtures, equipment, services, heavy trim, furnishings, and similar items that cannot be supported directly by shaft wall assembly framing.
  1. Support elevator hoist-way door frames independently of shaft wall framing assemblies, or reinforce assemblies according to assembly manufacturer's instructions.
  2. Where handrails are indicated for direct attachment to gypsum board shaft wall assemblies, provide not less than a 0.0341 inch thick by 4 inch wide galvanized steel reinforcement strip, accurately positioned and secured behind not less than 1 gypsum board face layer of 5/8 inch thickness.

- D. **Coordination:** Coordinate gypsum board shaft wall construction with sprayed-on fireproofing applied to structural elements so both remain complete and undamaged. Patch or replace sprayed-on fireproofing removed or damaged during the installation of shaft wall assemblies to comply with requirements specified in "Section 07812 - Cementitious Fireproofing.
- E. **Stairs (where applicable):** Integrate stair hanger rods with gypsum board shaft wall assemblies where indicated (and where possible) by locating cavity of assemblies where required to enclose rods.
- F. **Penetrations:** At penetrations in shaft wall, maintain fire-resistance rating of entire shaft wall assembly by installing supplementary steel framing around perimeter of penetration and fire protection behind boxes containing wiring devices, elevator call buttons, elevator floor indicators, and similar items.
- G. **Isolate shaft wall assemblies** from building structure at locations indicated to prevent transfer of loading imposed by structural movement. Comply with details indicated on Drawings.
- H. **Seal gypsum board shaft walls** at perimeter of each section that abuts other work and at joints and penetrations within each section. Install acoustical sealant to withstand dislocation by air pressure differential between shaft and external spaces; comply with manufacturer's instructions and ASTM C 919.
- I. **Elevator Shafts:** In elevator shafts where gypsum board shaft wall assemblies cannot be positioned within 2 inches of the shaft face of structural beams, floor edges, and similar projections into shaft, install 1/2-inch or 5/8-inch thick gypsum board cants covering tops of projections as follows:
  - 1. Slope cant panels not less than 75 degrees with the horizontal. Set base-edge of panels in gypsum board adhesive and secure top edges to shaft walls at 24 inches o.c. with screws fastened to shaft wall framing.
  - 2. Where needed to support gypsum board cants, install steel studs spaced 24" o.c.; extend studs from top of projection to shaft wall framing behind cant.

### 3.4 WALL PRIORITY

- A. **Wall Intersections:** Intersections of walls shall be installed in accordance with a priority of the highest to lowest. The highest priority wall shall continue uninterrupted (ie. gypsum board layers required on each side of wall shall continue through wall intersection) while the lower priority wall shall abut the other wall.

- B. **Schedule:**

WALL	PRIORITY
Two-hour shaft wall:	1 highest
Two-hour wall:	2
One-hour shaft wall:	3
One-hour wall:	4
Non-rated wall to deck:	5
Non-rated wall to above ceiling:	6 lowest

### 3.5 PROTECTION

- A. **Provide final protection** and maintain conditions in a manner acceptable to Installer that ensures gypsum board shaft wall assemblies are without damage or deterioration at the time of Substantial Completion.

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## SECTION 09310

### CERAMIC TILE

#### PART 1 - GENERAL

##### 1.1 SUMMARY

###### A. Section Includes:

1. Ceramic tile for floors; latex-portland cement mortar, and epoxy grout; thin-set and mortar bed applications.
2. Mortar, grout, and accessories.
3. Cementitious backer units for application of tile.
4. "Interior Finish Legend" on the Drawings.

###### B. Related Sections:

1. Section 03301 - Cast-in-Place Concrete Repair: Monolithic slab finishes for tile substrates.
2. Section 07920 - Joint Sealants: Sealing of tile expansion joints and where tile abuts plumbing fixtures, countertops, and items penetrating tile walls, wainscots, etc.
3. Division 15 Sections: Plumbing fixtures and floor drains.

##### 1.2 REFERENCES

###### A. Industry Standards: The Industry Standards listed below refer to the latest date of issue or editions, unless otherwise indicated.

1. ANSI A108 Series (A108.1A, .1B, .1C, .4, .5, .6, .8, .9, .10, .11, .12, and .13-1999): Specifications for Installation of Ceramic Tile
2. ANSI A118.3 Specifications for Chemical Resistant Water Cleanable Tile-Setting and Grouting Epoxy and Water Cleanable Tile-Setting Epoxy Adhesive.
3. ANSI A118.4: Specifications for Latex-Portland Cement Mortar.
4. ANSI A118.6: Specifications for Standard Cement Grouts for Tile Installation.
5. ANSI A118.7: Specifications for Polymer Modified Cement Grouts for Tile Installation
6. ANSI A137.1 Specifications for Ceramic Tile.
7. ASTM C144 Aggregate for Masonry Mortar.
8. ASTM C150 Portland Cement.
9. TCA (Tile Council of America) Handbook for Ceramic Tile Installation.

##### 1.3 PERFORMANCE REQUIREMENTS

###### A. Static Coefficient of Friction: For tile installed on walkway surfaces, provide products with the following values as determined by testing identical products per ASTM C 1028:

1. Level Surfaces: 0.6.
2. Step Treads: 0.6.
3. Ramp Surfaces: 0.8.

#### 1.4 SUBMITTALS

- A. **Product Data:** Submit manufacturer's specifications and installation recommendations for each type of product proposed.
- B. **Shop Drawings:** Indicate tile patterns and locations and widths of expansion, contraction, control, and isolation joints in tile substrates and finished tile surfaces.
  - 1. Locate precisely each joint and crack in tile substrates by measuring, record measurements on shop drawings, and coordinate them with tile joint locations, in consultation with Architect.
- C. **Samples for Initial Selection:** Actual tile samples of tile showing full range of colors, textures, and patterns available for each type and composition of tile indicated. Include samples of grout and accessories involving color selection.
- D. **Samples for Verification:** Sets showing full range of color and texture variations, in sets showing full range of variations expected.
  - 1. Each type and composition of tile and for each color and texture required, at least 12 inches square, mounted on plywood or hardboard backing and grouted.
  - 2. Full-size units of each type of trim and accessory for each color required.
  - 3. Stone thresholds in 6 inch lengths.

#### 1.5 QUALITY ASSURANCE

- A. **Single-Source Responsibility for Tile:** For ceramic tiles to be used for bathrooms throughout the project select a single source, which matches color, grade, finish, type, composition and variety of tile such as Dal Tile is called out on the Finish Legend on the Drawings. For tiles to be used for bathrooms throughout the project, a single source will be required. Select a source which matches color, grade, finish, type, composition, and variety of tile such as American Olean and Crossville as called out on the Finish Legend on the Drawings. All substitutions must be submitted to Architect for approval.
- B. **Single-Source Responsibility for Setting and Grouting Materials:** Obtain ingredients of a uniform quality from one manufacturer for each cementitious and admixture component and from one source or producer for each aggregate. Grouting materials shall include coloring agents to match grout to tiles for all fountains included in the project.
- C. **Installer Qualifications:** Engage an experienced Installer who has successfully completed tile installations similar in material, design, and extent to that indicated for Project.
- D. **Regulatory Requirements:** All specifications for ceramic tile installations must conform to local building codes, ordinances, trade practices and climatic conditions.

#### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. **Delivery and Storage:** Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirement of ANSI A137.1 for labeling sealed tile packages.
- B. **Protection:** Prevent damage or contamination to materials by water, freezing, foreign matter, and other causes.

## 1.7 PROJECT CONDITIONS

- A. **Environmental Conditions:** Maintain environmental conditions and protect work during and after installation to comply with referenced standards and manufacturer's printed recommendations.
- B. **Ventilation:** Vent temporary heaters to exterior to prevent damage to tile work from carbon dioxide buildup.
- C. **Temperature:** Maintain temperatures at 50 deg F or more in tiled areas during installation and for 7 days after completion, unless higher temperatures are required by referenced installation standard or manufacturer's instructions.

## 1.8 EXTRA MATERIALS

- A. Deliver extra materials to Owner. Furnish extra materials that match products installed as described below, packaged with protective covering for storage and identified with labels clearly describing contents.
  - 1. **Tile and Trim Units:** Furnish quantity of full-size units equal to 3 percent of amount installed, for each type, composition, color, pattern, and size.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. **Approved Products/Manufacturers:** Ceramic and porcelain tile products and manufacturers are listed in the "Finish Legend" on the Drawings.
- B. **Approved Manufacturers for Tile Accessories:** Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include the following:
  - 1. Acrylic Emulsion for Latex Portland Cement Mortars and Grouts:
    - a. BOSTIK CONSTRUCTION PRODUCTS DIV.
    - b. C-CURE CHEMICAL CO.
    - c. LATICRETE INTERNATIONAL, INC.
    - d. MAPEI, INC.

### 2.2 PRODUCTS, GENERAL

- A. **ANSI Standard for Ceramic Tile:** Comply with ANSI A137.1 "American National Standard Specifications for Ceramic Tile" for types, compositions, and grades of tile indicated.
- B. **ANSI Standard for Tile Installation Materials:** Comply with ANSI standard referenced with products and materials indicated for setting and grouting.
- C. **Colors, Textures, and Patterns:** Provide selections as indicated in the "Finish Legend" on the Drawings.
  - 1. Provide tile trim and accessories that match color and finish of adjoining flat tile unless otherwise indicated.

- D. **Factory Blending:** For tile exhibiting color variations within the ranges selected during sample submittals, blend tile in factory and package accordingly so that tile units taken from one package show the same range in colors as those taken from other packages and match approved samples.
- E. **Mounting:** Where factory-mounted tile is required, provide back or edge-mounted tile assemblies as standard with manufacturer unless another mounting method is indicated.

### 2.3 TILE PRODUCTS

- A. **Tile Products:** Refer to the "Interior finish Legend" on the Drawings.
- B. **Trim Units:** Provide tile trim units to match characteristics of adjoining flat tile and to comply with following requirements:
  - 1. **Size:** As indicated, coordinated with sizes and coursing of adjoining flat tile where applicable.
  - 2. **Shapes:** As follows, selected from manufacturer's standard shapes:
    - a. **Shapes:** As follows, selected from manufacturer's standard shapes:
    - b. **Wainscot Cap:** Surface Bullnose.
    - c. **External Corners:** Bullnose shape with a radius of at least ½ inch unless otherwise indicated.
    - d. **Internal Corners:** Coved (round-in) styled; use coved base and cap angle pieces designed to member with stretcher shapes.
    - e. **Base for Thin-Set Mortar Installations:** Coved, module size

### 2.4 MORTAR

- A. **Portland Cement Mortar Bed Method:** Mortar consisting of ASTM C150 Portland Cement with latex additive, ASTM C144 sand and potable water complying with quality established by ANSI A108.1.
- B. **Thin-Set Method:** ANSI A118.4, Latex Portland Cement Mortar.

### 2.5 EPOXY GROUT

- A. **Water-Cleanable, Tile-Setting and -Grouting Epoxy:** ANSI A118.3, grout color as selected by Architect from manufacturer's full range of colors.
  - 1. **Manufacturer:** Mapei Corp.
    - a. **Product:** Kerapoxy
  - 2. **Manufacturer:** Laticrete International Inc.
    - a. **Product:** SpectraLOCK

### 2.6 GROUT AND TILE SEALERS

- A. **Silicone Sealers:** Colorless, penetrating, highly polymerized resin for use on grout joints and unglazed tile.
  - 1. **Approved Products/Manufacturers:**
    - a. "Magic Seal"; BOSTIK HYDROMET.

- b. "Silicone Grout Sealer"; L & M MANUFACTURING CO.
- c. Approved equal.

## 2.7 CEMENTITIOUS BACKER UNITS

- A. **Approved Products/Manufacturers:** Subject to compliance with requirements provide one of the following:
  - 1. "DUROCK Interior Cement Board"; UNITED STATES GYPSUM CO.
  - 2. "DomCrete Cementitious Tile-Backer Board"; DOMTAR GYPSUM.
  - 3. "Util-A-Crete Concrete Backer Board"; FINPAN, INC.
  - 4. "Glas-crete Cementitious Backer Board"; GLASCRETE, INC.
  - 5. "Wonder-Board"; GLASCRETE, INC.
  - 6. Approved equal.
- B. **Description:** Provide cementitious backer units complying with ANSI A118.9, in maximum lengths available to minimize end-to-end butt joints, and as follows:
  - 1. Manufacturer's standard thickness but not less than 7/16 inch, unless otherwise indicated.
  - 2. Manufacturer's standard width, but not less than 32 inches.
- C. **Screw Fasteners:**
  - 1. Corrosion-resistant-coated steel drill screws of size and type recommended by board manufacturer for fastening cementitious backer units.
- D. **Joint Treatment Material:** Provide materials complying with ASTM C 475 and the recommendations of both the manufacturers of sheet products and of joint treatment materials for each application indicated.
  - 1. For filling joints and treating fasteners of cementitious backer units for application of ceramic tile, use materials recommended by the board manufacturer.
- E. **Joint Tape for Cementitious Backer Units:** Polymer-coated, open glass-fiber mesh.
- F. **Joint Compound for Cementitious Backer Unit:** Material recommended by cementitious backer unit manufacturer.

## 2.8 MIXING MORTARS AND GROUT

- A. **Mixing:** Mix mortars and grouts to comply with requirements of referenced standards and manufacturers including those for accurate proportioning of materials, water, or additive content; type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other procedures needed to produce mortars and grouts of uniform quality with optimum performance characteristics for application indicated.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. **Examination:** Examine substrates, areas, , and conditions after installation of cementitious backer board where tile will be installed, with Installer present, for compliance with

requirements for installation tolerances and other conditions affecting performance of installed tile.

1. Verify that substrates for setting tile are firm; dry; clean; free from oil, waxy films, and curing compounds; and within flatness tolerances required by referenced ANSI A108 Series of tile installation standards for installations indicated.
2. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed before installing tile.
3. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust latter in consultation with Architect.

**B. Acceptance:** Do not proceed with installation until unsatisfactory conditions have been corrected.

### 3.2 CEMENTITIOUS BACKER BOARD

**A. Tile Backer Board:** At wall tile applications, install backer board over metal studs in accordance with manufacturer's instructions. Tape joints and corners; cover with skim coat of dry-set mortar to a featheredge.

1. Base for Ceramic Tile: Finish cementitious backer units to comply with unit manufacturer's directions.

### 3.3 PREPARATION

**A. Remove surface-applied finishes and adhesives.**

**B. Remove coatings,** including curing compounds, and other substances that contain soap, wax, oil, or silicone and are incompatible with tile-setting materials by using a terrazzo or concrete grinder, a drum sander, or a polishing machine equipped with a heavy-duty wire brush.

**C. Blending:** For tile exhibiting color variations within the ranges selected during sample submittals, verify that tile has been blended in factory and packaged accordingly so that tile units taken from one package show the same range in colors as those taken from other packages and match approved samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

### 3.4 INSTALLATION, GENERAL

**A. ANSI Tile Installation Standard:** Comply with parts of ANSI 108 series of tile installation standards included under "American National Standard Specifications for the Installation of Ceramic Tile" that apply to type of setting and grouting materials and methods indicated.

**B. TCA Installation Guidelines:** TCA "Handbook for Ceramic Tile Installation"; comply with TCA installation methods indicated.

**C. Workmanship:** Extend tile work into recesses and under or behind equipment and fixtures to form a complete covering without interruptions except as otherwise shown. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.

1. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so that plates, collars, or covers overlap tile.

2. Match tiles within each space by selecting tiles to achieve uniformity of color and pattern. Reject or relocate tiles that do not match color and pattern of adjacent tiles.
  3. Mix tiles to achieve a uniformly random distribution of color shadings and patterns.
  4. Wipe backs of tiles with a damp cloth to remove dirt and dust before units are installed.
  5. Set individual stone tiles into setting material, taking care to maintain accurate joint alignment and spacing. Beat-in tiles to obtain 80 percent contact between back of tile and setting material.
- D. Jointing Pattern:** Unless otherwise shown, lay tile in grid pattern. Align joints when adjoining tiles on floor, base, walls, and trim are same size. Lay out tile work and center tile fields in both directions in each space or on each wall area. Adjust to minimize tile cutting. Provide uniform joint widths unless otherwise shown.
1. For tile mounted in sheets, make joints between tile sheets same width as joints within tile sheets so that extent of each sheet is not apparent in finished work.
- E. Expansion Joints:** Locate expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated during installation of setting materials, mortar beds, and tile. Do not saw cut joints after installation of tiles.
1. Locate joints in tile surfaces directly above joints in concrete substrates.
  2. Prepare joints and apply sealants to comply with requirements of "Section 07920 - Joint Sealants".
- F. Grouting:** Grout tile to comply with the requirements of ANSI A108.10 for latex portland cement grout.
- G. Mildew-Resistant Sealant:** Use where tile abuts plumbing fixtures, countertops, and items penetrating tile walls, wainscots and bases, such as pipes and outlets. Refer to "Section 07920 - Joint Sealants".

### 3.5 CERAMIC TILE INSTALLATION METHODS

- A. General:** Install mortar bed, tile, and grout in accordance with manufacturer's instructions and TCA Handbook for Ceramic Tile Installation.
- B. Ground Floor:**
1. Floors - Thin-Set:.....TCA # F115.
- C. Other Floors:**
1. Floors - Thin Set: ..... TCA #F115.

### 3.6 CLEANING AND PROTECTION

- A. Cleaning:** Upon completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.
1. Remove epoxy grout residue from tile as soon as possible.
- B. Finished Tile Work:** Leave finished installation clean and free of cracked, chipped, broken, unbonded, and otherwise defective tile work.
1. Joints shall be uniform in width; straight, level, plumb and aligned in both directions; neatly grouted without irregularities, holes and gaps.

2. Tile, trim, and stone thresholds shall be the colors, patterns and textures indicated for each location, and shall match the approved samples.
  3. Exposed surfaces of tile and trim units shall be uniform and even in plane, without offsets over 1/32-inch in adjacent units.
  4. Cut edges of tile and trim units shall be concealed by joint grout, sealant, or overlapping escutcheons of penetrating items.
- C. **Grout and Tile Sealer:** After grout has fully cured, apply sealer to grout joints and unglazed tile surfaces in accordance with manufacturer's instructions. As soon as grout sealer has penetrated grout joints, remove excess sealer and sealer that has gotten on tile faces by wiping with soft cloth.
- D. **Protection:** Provide final protection and maintain conditions in a manner acceptable to manufacturer and installer that ensures that tile is without damage or deterioration.
1. When recommended by tile manufacturer, apply a protective coat of neutral protective cleaner to completed tile walls and floors. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear.
  2. Prohibit foot and wheel traffic from tiled floors for at least 7 days after grouting is completed.
- E. **Before final inspection,** remove protective coverings and rinse neutral cleaner from tile surfaces.

### 3.7 CERAMIC TILE SCHEDULE

- A. **The following** designations and material descriptions correspond to those shown on the drawings:
1. **Floor Ceramic Tile CT-1:**
    - a. **Manufacturer:** Dal Tile
    - b. **Style:** Keystones
    - c. **Type:** 2" x 2" Mosaic
  2. **Floor Ceramic Tile CT-2:**
    - a. **Manufacturer:** Dal Tile
    - b. **Style:** Porcelto Grani
    - c. **Type:** 8" x 8"

See Drawings for additional information

END OF SECTION

## SECTION 09510

### ACOUSTICAL CEILINGS

#### PART 1 - GENERAL

##### 1.1 SUMMARY

**A. Section Includes:**

1. Acoustical ceiling and suspension systems.

**B. Related Sections:**

1. Section 07210 - Building Insulation.
2. Section 09250 - Gypsum Board Assemblies: Suspended gypsum board ceilings.
3. Division 15: Sprinkler heads, grilles, registers, and diffusers in acoustical ceilings.
4. Division 16: Fire alarm components, lighting fixtures, speakers in ceiling system and other systems components in acoustical ceilings.

##### 1.2 DEFINITIONS

**A. AC:** Articulation Class.

**B. CAC:** Ceiling Attenuation Class.

**C. LR:** Light Reflectance coefficient.

**D. NRC:** Noise Reduction Coefficient

##### 1.3 SUBMITTALS

**A. Product Data:** Submit manufacturer's specifications and installation instructions for each type of product proposed for use.

1. Include test reports to confirm fire performance and acoustical properties of proposed acoustical units.

**B. Coordination Drawings:** Submit reflected ceiling plans drawn accurately to scale coordinating penetrations and ceiling-mounted items. Show the following:

1. Adjoining gypsum board construction.
2. Ceiling suspension members, including wall moldings.
3. Method of attaching hangers to building structure.
4. Ceiling-mounted items including light fixtures, speakers, alarm and detection devices, and other electrical systems components; air outlets and inlets, sprinkler heads, and other mechanical systems components; and special moldings at walls, column penetrations, and other junctures with adjoining construction.

**C. Samples For Verification:** Submit the following:

1. 12-inch long samples of suspension system members, including moldings, of color and system type proposed for use.

2. 12-inch square samples of acoustical unit type, pattern and color proposed for use.

#### 1.4 QUALITY ASSURANCE

- A. **Installer Qualifications:** Engage an experienced Installer who has successfully completed acoustical ceilings similar to those indicated for Project.
- B. **Fire-Performance:** Provide acoustical panels with surface burning characteristics specified below, based on ASTM E 84 tests performed by UL or other independent agency acceptable to authorities having jurisdiction. Identify packaged products with approval markings of test agency.
  1. Flame Spread: 25 or less.
  2. Smoke Developed: 50 or less.
- C. **Source Limitations:**
  1. Acoustical Ceiling Panel: Obtain each type through one source from a single manufacturer.
  2. Suspension System: Obtain each type through one source from a single manufacturer.
- D. **Preinstallation Conference:** Conduct conference at Project site
- E. **Coordination:** Coordinate layout and installation of acoustical panels and suspension system with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. **Delivery and Storage:** Deliver ceiling components to project site in original packages and protect during storage against damage.
  1. Before installing acoustical ceiling units, permit them to reach stabilized temperature and humidity of space where they will be installed.
- B. **Handling:** Handle ceiling components to avoid chipping or damaging them.

#### 1.6 PROJECT CONDITIONS

- A. **Installation Conditions:** Do not install acoustical ceilings until space is enclosed and weatherproof, wet-work in space is completed and nominally dry, work above ceilings is complete, and temperature and humidity will be continuously maintained near levels intended for final occupancy.
- B. **Fireproofing:** All fireproofing which is removed shall be replaced. All penetrations of fireproofing shall be patched or sealed to restore the required fire resistance.

#### 1.7 EXTRA MATERIALS

- A. **General:** Furnish extra materials that match products installed, are packaged with protective covering for storage, and are identified with appropriate labels.
- B. **Acoustical Ceiling Units:** Furnish quantity of full-size units equal to 2.0 percent of each type of ceiling unit installed.

- C. **Suspension System Components:** Furnish quantity of main- and cross-tees and edge moldings equal to 2.0 percent of components installed.

## 1.8 WARRANTY

- A. **Sag Warranty:** Ceiling panel products shall have a ten (10) year warranty to withstand temperature conditions up to 90 degrees F and relative humidity of 90 percent without visible sag.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. **Approved Products/Manufacturers:** Refer to the CEILING SYSTEM LEGEND as shown on the Drawings.
- B. **Substitutions:** Products of other manufacturers may be substituted upon Architect's approval. Final determination of match shall be by Architect. Refer to Sections 01630 and 01631.

### 2.2 ACOUSTICAL PANELS, GENERAL

- A. **Standard for Acoustical Ceiling Units:** Provide manufacturer's standard panels of configuration indicated that comply with ASTM E 1264 classifications as designated by types, patterns, acoustical ratings, and light reflectances, unless otherwise indicated.
1. **Mounting Method for Measuring NRC:** Type E-400 (plenum mounting in which face of test specimen is 15-3/4 inches away from the test surface) per ASTM E 795.
- B. **Colors and Patterns:** Provide products to match appearance characteristics indicated.

### 2.3 METAL SUSPENSION SYSTEMS, GENERAL

- A. **Standard for Metal Suspension Systems:** Provide manufacturer's standard metal suspension systems that comply with ASTM C 635 requirements as specified.
- B. **Finishes and Colors, General:** Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes. Provide manufacturer's standard factory-applied finish for type of system indicated.
- C. **Attachment Devices:** Size for 5 times design load indicated in ASTM C 635, Table 1, Direct Hung unless otherwise indicated.
- D. **Wire for Hangers and Ties:** ASTM A 641, Class 1 zinc coating, soft temper.
1. **Gage:** Provide wire sized so that stress at 3 times hanger design load (ASTM C 635, Table 1, Direct-Hung) will be less than yield stress of wire, but not less than 0.106-inch diameter (12 gage).
  2. **Anchors in Concrete:** Anchors of type and material indicated below, with holes or loops for attaching hangers of type indicated and with capability to sustain, without failure, a load equal to five times that imposed by ceiling construction, as determined by testing per ASTM E 488 or ASTM E 1512 as applicable, conducted by a qualified testing and inspecting agency

- E. **Hold-Down Clips:** Where indicated, provide manufacturer's standard hold-down clips spaced 24 inches o.c. on all cross tees.
- F. **Edge Moldings and Trim:** Manufacturer's standard moldings for edges and penetrations, of types and profiles indicated.
  - 1. **Material:** Roll-formed, hemmed-edge, galvanized steel.
  - 2. **Finish:** Provide manufacturer's standard factory-applied finish to match system components.

## 2.4 RELATED MATERIALS

- A. **Concealed Acoustical Sealant:** Nondrying, nonhardening, nonskinning, nonstaining, nonbleeding, gunnable synthetic rubber sealant recommended for sealing interior concealed joints to reduce airborne sound transmission, Pecora "BA-98", Tremco "Acoustical Sealant", or similar.

## 2.5 SOUND ATTENUATION MATERIAL

- A. **Sound Attenuation Blankets:** Unfaced mineral-fiber blanket insulation produced by combining mineral fibers with thermosetting resins to comply with ASTM C 665 for Type I (blankets without membrane facing). Provide insulation with maximum flame spread of 25 and smoke development of 50 when tested in accordance with ASTM E 84.
  - 1. **Thickness:** Minimum 3 1/2" thick or as required to achieve required sound rating.

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. **Examination:** Examine ambient conditions, substrates and construction to which ceiling system attaches or abuts, for compliance with requirements specified in this and other sections that affect installation and anchorage of ceiling system. Do not proceed with ceiling installation until unsatisfactory conditions have been corrected.
- B. **Layout:** Generally, measure each ceiling area and establish layout of acoustical units to balance border widths at opposite edges of each ceiling. Avoid use of less-than-half-size units at borders, and comply with reflected ceiling plans.
  - 1. If drawing dictates specific layout or work point, comply with Drawings.
- C. **Coordination:** Furnish layouts for preset inserts, clips, and other devices for ceiling hangers, which are installed as work of other Sections. Supply devices for installation well in advance of time needed.

### 3.2 INSTALLATION

- A. **General:** Comply with ASTM C 636 installation standard, manufacturer's instructions, and CISCA "Ceiling Systems Handbook."
- B. **Arrangement:** Arrange acoustical units and orient ceiling suspension grid shown by reflected ceiling plans.

