SECTION 09 29 00

GYPSUM BOARD ASSEMBLIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Non-load-bearing steel framing systems for interior partitions.
2. Suspension systems for interior ceilings and soffits.
3. Grid suspension systems for gypsum board ceilings.
4. Interior gypsum board.
5. Tile backing panels.
6. Acoustical accessories at interior partitions.
7. Trim accessories.
8. Window wall accessories.
9. Vapor retarders at interior partitions.
10. Security mesh at interior partitions.
11. Bullet resistant composite at interior partitions.
12. Joint treatments.
13. Wall framing for double door assemblies.

B. Interior wall framing items where Delegated Design is required are not listed in this Section. For more information for wall framing for interior walls and openings where Delegated Design is required, refer to Section 05 40 00 for Additional Information. Coordinate all Work and submittals for compliance with the Contract Documents. Interior wall framing requiring Delegated Design includes but is not limited to the following:
1. Interior wall framing for larger openings.
2. Interior wall framing for items noted as “CFMF”.
3. Interior wall framing which exceed height limitations indicated in the drywall partition framing chare on the Drawings.

1.2 ACTION SUBMITTALS

A. Product Data: For the following:
1. Non-load-bearing steel framing systems for interior partitions.
2. Suspension systems for interior ceilings and soffits.
3. Grid suspension systems for gypsum board ceilings.
4. Gypsum board products.
5. Acoustical accessories.

6. Trim accessories.
7. Window wall accessories
8. Vapor retarders.
9. Security mesh.
10. Bullet resistant composite.
11. Joint treatment materials.
12. Textured finishes.

B. Shop Drawings:
1. Include layout, spacings, sizes, thicknesses, and types of gypsum board assemblies; fabrication; and fastening and anchorage details, including mechanical fasteners.
2. Indicate reinforcing channels, supplemental framing, seismic restraints, shear diaphragms, strapping, bracing, bridging, splices, accessories, connection details, and attachment to adjoining work.
3. Indicate locations, fabrication, and installation of control and expansion joints.
4. Indicate fire and smoke rated walls.

C. Samples: For the following products:
1. Trim Accessories: Full-size Sample in 12-inch- (300-mm-) long length for each trim accessory indicated.
2. Textured Finishes: 12-inch- (300-mm-) square for each textured finish indicated and on same backing indicated for Work.

1.3 INFORMATIONAL SUBMITTALS

A. Product Certificates: For each type of code-compliance certification for studs and tracks.

B. Evaluation Reports: For, high-strength steel studs and firestop tracks from ICC-ES or other qualified testing agency acceptable to authorities having jurisdiction.

1.4 QUALITY ASSURANCE

A. Code-Compliance Certification of Studs and Tracks: Provide documentation that framing members are certified according to the product-certification program of the Certified Steel Stud Association, the Steel Framing Industry Association, or the Steel Stud Manufacturers Association.

B. Single Source Responsibility:
1. Framing Members: Obtain steel framing members from single manufacturer.
2. Panel Products: Obtain each type of gypsum board and other panel products from single manufacturer.
3. Finishing Materials: To the extent possible, obtain finishing materials from same manufacturer supplying gypsum board products. When not possible, obtain materials from manufacturer acceptable to gypsum board manufacturer.

C. Preliminary Conference: Before starting any Work of this Section conduct a preliminary conference at the project site to support contractor coordination and address particular issues inherent in the Data Center design maximum deflection anticipated and other items to be encountered.

1. Meet with Owner, Architect, Framing and Gypsum board assemblies Installer, framing system manufacturer's representative, Mechanical, Electrical and Plumbing Contractors and other installers whose work interfaces with or affects Gypsum board framing, total deflection to be encountered and all suspended components and equipment.
2. Review status of submittals and confirm Architect approval. No Work of this Section may be performed prior to submittal approval.
   a. If submittals are not approved, discuss measures of remedy and compliance.
3. Review methods and procedures related to framing and Gypsum board assembly installation, including manufacturer's written instructions, defection and unsupported length bracing requirements for framing.
4. Review requirements for deflection in the Data Hall total anticipated deflection in Data Hall and ancillary spaces.
5. Review installation details for framing and Gypsum board assembly installation which meet all fire rating requirements. Review specific wall head detailing to permit deflection anticipated while maintaining partition ratings. Specifically address increased deflection requirements and confirm constructability of details to be utilized.
6. Review structural loading limitations of gypsum board assemblies framing and accessories.
7. Review coordination of Work and Schedule with mechanical, electrical and plumbing items which will affect total structure deflection.

D. Mockups: Build mockups of at least 100 sq. ft. (9 sq. m) in surface area to demonstrate aesthetic effects and to set quality standards for materials and execution.

1. Build mockups for the following:
   a. Each level of gypsum board finish indicated for use in exposed locations.
   b. Each texture finish indicated.
   c. Framing for double door openings.
2. Apply or install final decoration indicated, including painting and wallcoverings, on exposed surfaces for review of mockups.
3. Simulate finished lighting conditions for review of mockups.
4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.5 COORDINATION

A. For wall framing of interior walls for larger openings and items noted as “CFMF” in the Drawings shall be Provided in compliance with this Section and as indicated in Section 05 40 00 Cold Formed Steel Framing. Coordinate all Work for compliance with the Contract Documents complete set.

B. Coordinate the Work of all other sections, Owner Furnished Contractor Installed items and equipment intended to be incorporated into the Work concurrently or after the Work has been completed. Coordinate with Owner to identify all such equipment.

C. Coordinate installation of framing and anchorages for double door assemblies. Coordinate framing with door setting drawings, templates, and directions for installing anchorages. Deliver sleeves, inserts, anchor bolts, and items with integral anchors to project site in time for installation.

D. Coordinate opening framing for double doors, member thicknesses, double king and jack studs, headers, continuous nested wood blocking and framing member deflection to ensure framing will support all double door assemblies and their continued use.

1.6 DELIVERY, STORAGE AND HANDLING

A. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

1.7 FIELD CONDITIONS

A. Environmental Limitations: Comply with ASTM C840 requirements or gypsum board manufacturer's written instructions, whichever are more stringent.

1. Do not install interior gypsum panels and products until installation areas are enclosed and conditioned.

B. Room Temperatures: Maintain minimum 40 degrees F (4 degrees C). For adhesive attachment and finishing of gypsum board, maintain minimum 50 degrees F (10 degrees C) for 48 hours before application and continuously after until dry. Do not exceed 95 degrees F (35 degrees C) when using temporary heat sources.

C. Ventilation: Ventilate building spaces as required to dry joint treatment materials. Avoid drafts during hot, dry weather to prevent finishing materials from drying too rapidly.

D. Do not install paper-faced gypsum panels until installation areas are enclosed and conditioned.

E. Do not install panels that are wet, moisture damaged, and 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.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Performance Requirements: Comply with manufacturer's load tables and the following design pressures and deflections:

1. Typical Partitions: L/240 at 5 psf.
2. Partitions Receiving Adhered Masonry, Stone Cladding, Plaster Veneer, Cementitious Wall Panels or Heavy Tile: L/360 at 15 psf.
3. Partitions Receiving Monitors, Televisions, or Audio/Visual Equipment: L/360 at 15 psf.
4. Partitions receiving specialty finishes such as wood panels or other applied finish systems: L/240 at 10 psf.
5. Partitions at stairs, elevator hoistways and vertical shafts: L/240 at 10 psf.
6. Partitions to support double door assemblies: Configure to support actual door assembly system weight, anchorages and use with deflections no less than L/120 at 15 psf. Minimum stud thicknesses shall comply with minimums listed in this Section.
    a. Provide double king studs as indicated in Installation within this Section.
    b. Provide double jack studs as indicated in Installation within this Section.

B. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials identical to those tested in UL design assemblies indicated on Drawings according to ASTM E119 by an independent testing agency.

C. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E90 and classified according to ASTM E413 by an independent testing agency.

2.2 FRAMING SYSTEMS

A. Interior wall framing in this Section does not include items where Delegated Design is required. For more information for wall framing for interior walls refer to Section 05 40 00 Cold Formed Steel Framing. Items where Delegated Design is required includes but are not limited to the following:

1. Interior wall framing for larger openings.
2. Interior wall framing for items noted as “CFMF”.
3. Interior wall framing which exceed height limitations indicated in the drywall partition framing chare on the Drawings.

B. Framing Members, General: Comply with ASTM C754 for conditions indicated.

1. Steel Sheet Components: Comply with ASTM C645 requirements for steel unless otherwise indicated.
2. Protective Coating: Coating with corrosion resistance of ASTM A653/A653M, G40 (Z120), hot-dip galvanized unless otherwise indicated.

C. Studs and Tracks: ASTM C645. Use either conventional steel studs and tracks or, high-strength steel studs and tracks.

1. Steel Studs and Tracks:

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

1) CEMCO; California Expanded Metal Products Co.
2) ClarkDietrich.
3) Custom Stud.
4) MarinoWARE.
5) MBA Building Supplies.
6) Phillips Manufacturing Co.
7) SCAFCO Steel Stud Company.
8) Steel Construction Systems.
9) Telling Industries.
10) The Steel Network, Inc.

b. Minimum Base Metal Thickness: 0.0329 inch (0.836 mm) or greater for studs and track of partitions; increase thickness as required to meet the Performance Requirements criteria of the partition types and uses indicated in this Section, unless otherwise exceeded on the Drawings.

1) The minimum base metal thickness shall only be reduced for high STC partitions as indicated on the Drawings, for values that cannot be attained with the minimum base metal thickness of 0.0329 inch indicated above. Written endorsement by the Architect is required for any reductions in material.

c. Minimum base metal thickness of studs and track for partitions to support double door assemblies: Configure framing to support actual door assembly system weight, anchorages and use with deflections no less than indicated in Performance Requirements with a minimum member thickness of 0.0478inch (18 Gauge).

1) Provide continuous wood blocking nested into inner jack stud for double door frame anchorages.
2) Head and sill tracks having the same minimum base metal thickness shall extend a minimum of 3 feet on either side of all rough openings.

d. Depths: As indicated on Drawings.

e. Spacing: As indicated on Drawings; maximum typical spacing of 16 inches on center unless otherwise confirmed with the Architect.

2. Embossed (Dimpled) Equivalent Thickness Steel Studs and Tracks: Not Permitted; meet minimum thicknesses indicated herein.

D. Slip-Type Head Joints: Provide one or more of the following as required to accommodate anticipated floor or roof structure deflection:

1. Clip System: Clips designed for use in head-of-wall deflection conditions that provide a positive attachment of studs to tracks while allowing 4 inches (102 mm) minimum vertical movement.

a. Products: Subject to compliance with requirements, provide one of the following:

1) CEMCO; California Expanded Metal Products Co.; Deflex Clips.

2) ClarkDietrich; Fast Top Clip.
3) Fire Trak Corp; PosiKlip.
4) The Steel Network, Inc.; VertiClip SLD Series.

2. Single Long-Leg Track System: ASTM C645 top track with 4 inches (102 mm) deep flanges in thickness not less than indicated for studs, installed with studs friction fit into top track and with continuous bridging located within 12 inches (305 mm) of the top of studs to provide lateral bracing.
3. Double-Track System: ASTM C645 top outer tracks, inside track with 2-inch- (51-mm-) deep flanges in thickness not less than indicated for studs and fastened to studs, and outer track sized to friction-fit over inner track.
4. Deflection Track: Steel sheet top track manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above and allowing 1-1/2 inches (38 mm) minimum vertical movement; in thickness not less than indicated for studs and in width to accommodate depth of studs.
   a. Products: Subject to compliance with requirements, provide one of the following:
      1) CEMCO; California Expanded Metal Products Co.; CST Slotted Deflection Track.
      2) ClarkDietrich; MaxTrak Slotted Deflection Track.
      3) MarinoWARE; Slotted Track.
      4) Perfect Wall, Inc.; The System Slotted Deflection Track.
      5) SCAFCO Steel Stud Company; SDLT-Slotted Leg Track System.
      6) Steel Construction Systems; SDLT-Slotted Leg Track System.
      7) Telling Industries; Interior Slotted Track.

E. Firestop Tracks: Provide one or more of the following as required to accommodate anticipated floor or roof structure deflection:
   1. Top track manufactured to allow partition heads to expand and contract with movement of structure while maintaining continuity of fire-resistance-rated assembly indicated and allowing up to 2 inches (51 mm) vertical movement; in thickness not less than indicated for studs and in width to accommodate depth of studs.
      a. Products: Subject to compliance with requirements, provide one of the following:
         1) Blazeframe Industries / ClarkDietrich Building Systems.
         2) CEMCO; California Expanded Metal Products Co.; FAS Track.
         3) MarinoWARE; FAS Track 1000.
         4) Perfect Wall, Inc.; The System Slotted Deflection Track.
         5) SCAFCO Steel Stud Company; SCAFCO Slotted Leg Track System.
         6) Steel Construction Systems; Steel-Con Slotted Leg Track System.
   2. Top track manufactured to allow partition heads to expand and contract with movement of structure while maintaining continuity of fire-resistance-rated assembly indicated and allowing up to 4 inches (102 mm) vertical movement; in thickness not less than indicated for studs and in width to accommodate depth of studs.
      a. Products: Subject to compliance with requirements, provide one of the following:

1) ClarkDietrich; BlazeFrame RipTRAK.
2) Fire Trak Corp; Fire Trak System attached to studs with Fire Trak PosiKlip.

3. Top track manufactured to allow partition heads to expand and contract with movement of structure while maintaining continuity of fire-resistance-rated assembly indicated and allowing up to 6 inches (153 mm) vertical movement; in thickness not less than indicated for studs and in width to accommodate depth of studs.
   a. Product: Subject to compliance with requirements, provide one of the following:
      1) Fire Trak Corp; Fire Trak Shadowline attached to studs with Fire Trak PosiKlip.

F. Steel Box or Back to Back Headers: C shapes used to form header beams, of web depths indicated, unpunched, with stiffened flanges:
   1. Flange Width: 1-5/8 inches (41 mm).
   2. Minimum Base Metal Thickness: to match surrounding construction.
   3. Depth: 3.5 inches minimum unless otherwise indicated on the Drawings.

G. Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length and width indicated.
   1. Minimum Base-Steel Thickness: 0.0359 inch (0.912 mm).

H. Cold-Rolled Channel Bridging: Steel, 0.0538-inch (1.367-mm) minimum base-steel thickness, with minimum 1/2-inch- (13-mm-) wide flanges.
   1. Depth: 1-1/2 inches (38 mm).
   2. Clip Angle: Not less than 1-1/2 by 1-1/2 inches (38 by 38 mm), 0.068-inch- (1.72-mm-) thick, galvanized steel.

I. Hat-Shaped, Rigid Furring Channels: ASTM C645.
   1. Minimum Base-Steel Thickness: 0.0296 inch (0.752 mm).
   2. Depth: 7/8 inch (22.2 mm).

J. Resilient Furring Channels: 1/2-inch- (13-mm-) deep, steel sheet members designed to reduce sound transmission.
   1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to the following:
      a. ClarkDietrich; RC Deluxe.
      b. SCAFCO Steel Stud Company; Kwik RC.
      c. Steel Construction Systems; RC 1/Serenity.
   2. Configuration: Asymmetrical.

K. Cold-Rolled Furring Channels: 0.053-inch (1.34-mm) uncoated-steel thickness, with minimum 1/2-inch- (13-mm-) wide flanges.
   1. Depth: 3/4 inch (19 mm).

2. Furring Brackets: Adjustable, corrugated-edge-type steel sheet with minimum uncoated-steel thickness of 0.0329 inch (0.8 mm).
3. Tie Wire: ASTM A641/A641M, Class 1 zinc coating, soft temper, 0.062-inch- (1.59-mm-) diameter wire, or double strand of 0.048-inch- (1.21-mm-) diameter wire.

L. Z-Shaped Furring: With slotted or nonslotted web, face flange of 1-1/4 inches (32 mm), wall attachment flange of 7/8 inch (22 mm), minimum uncoated-steel thickness of 0.0179 inch (0.455 mm), and depth required to fit insulation thickness indicated.

M. Wood Blocking: Provide fire retardant treated solid wood blocking as specified in Section 06 10 00 Rough Carpentry to support all wall mounted items double door assemblies and equipment anchored in or on to partition assemblies. Coordinate the Work of all other sections, Owner Furnished Contractor Installed items and equipment intended to be incorporated into the Work concurrently or after the Work has been completed. Coordinate with Owner to identify all such equipment.

2.3 SUSPENSION SYSTEMS

A. Tie Wire: ASTM A641/A641M, Class 1 zinc coating, soft temper, 0.062-inch- (1.59-mm) diameter wire, or double strand of 0.048-inch- (1.21-mm-) diameter wire.

B. Hanger Attachments to Concrete:
1. Post-Installed Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC01 AC193 AC58 or AC308 as appropriate for the substrate.
a. Material: Carbon-steel components zinc-plated to comply with ASTM B633 or ASTM F1941 (ASTM F1941M), Class Fe/Zn 5, unless otherwise indicated.
2. Power-Actuated Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.

C. Wire Hangers: ASTM A641/A641M, Class 1 zinc coating, soft temper, 0.16 inch (4.12 mm) in diameter.

D. Flat Hangers: Steel sheet, 1 by 3/16 inch (25 by 5 mm) by length indicated.

E. Angle-Type Hangers: Angles with legs not less than 7/8-inch (22-mm) wide with a base steel thickness of 0.0538 inch (1.367 mm) and minimum 5/16-inch- (8-mm-) diameter bolted connections.

F. Carrying Channels (Main Runners): Cold-rolled, commercial-steel sheet with a base-steel thickness of 0.0538 inch (1.367 mm) and minimum 1/2 inch- (13-mm-) wide flanges.
1. Depth: 2 inches (51 mm).

G. Furring Channels (Furring Members):
1. Cold-Rolled Channels: 0.0538-inch (1.367-mm) uncoated-steel thickness, with minimum 1/2-inch- (13-mm-) wide flanges, 3/4 inch (19 mm) deep.
2. Steel Studs and Tracks: ASTM C645.
a. Minimum Base-Steel Thickness: 0.0296 inch (0.752 mm).

b. Depth: As indicated on Drawings.

3. Embossed, Equivalent-Strength Steel Studs and Tracks: Not Permitted.
4. Hat-Shaped, Rigid Furring Channels: ASTM C645, 7/8 inch (22 mm) deep.
   a. Minimum Base-Steel Thickness: 0.0296 inch (0.752 mm).
5. Resilient Furring Channels: 1/2-inch (13-mm-) deep members designed to reduce sound transmission.
   a. Configuration: Asymmetrical.

H. Grid Suspension System for Gypsum Board Ceilings: ASTM C645, direct-hung system composed of main beams and cross-furring members that interlock.

1. Products: Subject to compliance with requirements, provide one of the following:
   a. Armstrong Ceiling & Wall Solutions; Drywall Grid Systems.
   b. Rockfon (Rockwool International); 640/660 Drywall Ceiling Suspension.
   c. USG Corporation; Drywall Suspension System.

2.4 GYPSUM BOARD, GENERAL

A. Size: Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

2.5 INTERIOR GYPSUM BOARD

A. Gypsum Board: ASTM C1396/C1396M.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. American Gypsum.
   b. CertainTeed Gypsum.
   c. Georgia-Pacific Gypsum LLC.
   d. National Gypsum Company.
   e. PABCO Gypsum.
   f. USG Corporation.
2. Core: 5/8 inch (15.9 mm), Type X.
3. Long Edges: Tapered.

B. Flexible Gypsum Board: ASTM C1396/C1396M. Manufactured to bend to fit radii and to be more flexible than standard regular-type gypsum board of same thickness.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. CertainTeed Gypsum.
   b. Georgia-Pacific Gypsum LLC.
   c. National Gypsum Company.
   d. PABCO Gypsum.
   e. USG Corporation.
2. Thickness: 1/4 inch (6.4 mm).

3. Long Edges: Tapered.

C. Mold-Resistant Gypsum Board: ASTM C1396/C1396M. With moisture- and mold-resistant core and paper surfaces.
   1. Products: Subject to compliance with requirements, provide one of the following:
      a. American Gypsum; M-Bloc® Type X with Mold & Moisture Resistance.
      b. CertainTeed Gypsum; CertainTeed M2Tech Mold and Moisture Resistant Type X Gypsum Board.
      c. National Gypsum Company; Gold Bond® XP® Fire-Shield® Gypsum Board.
      d. PABCO Gypsum; MOLD CURB® Plus.
      e. USG Corporation; USG Sheetrock® Brand Mold Tough® Firecode® X Panels.
   2. Core: 5/8 inch (15.9 mm), Type X.
   3. Long Edges: Tapered.
   4. Mold Resistance: ASTM D3273, score of 10 as rated according to ASTM D3274.

D. Abuse-Resistant Gypsum Board: ASTM C1396/C1396M gypsum board, tested according to ASTM C1629/C1629M.
   1. Products: Subject to compliance with requirements, provide one of the following:
      a. American Gypsum; 5/8" M-Bloc® AR Type X with Mold & Moisture Resistance.
      b. CertainTeed Gypsum; CertainTeed Extreme Abuse Resistant Type X Gypsum Board with M2Tech Mold and Moisture Technology.
      c. National Gypsum Company; Gold Bond® Hi-Abuse® XP® Gypsum Board.
      d. PABCO Gypsum; PABCO ABUSE CURB®.
      e. USG Corporation; USG Sheetrock® Brand Mold Tough® Abuse-Resistant Firecode®.
   2. Core: 5/8 inch (15.9 mm), Type X.
   3. Surface Abrasion: ASTM C1629/C1629M, meets or exceeds Level 2 requirements.
   4. Indentation: ASTM C1629/C1629M, meets or exceeds Level 1 requirements.
   5. Soft-Body Impact: ASTM C1629/C1629M, meets or exceeds Level 2 requirements.
   6. Long Edges: Tapered.
   7. Mold Resistance: ASTM D3273, score of 10 as rated according to ASTM D3274.

E. Impact-Resistant Gypsum Board: ASTM C1396/C1396M gypsum board, tested according to ASTM C1629/C1629M.
   1. Products: Subject to compliance with requirements, provide one of the following:
      a. American Gypsum; 5/8" M-Bloc® IR Type X with Mold & Moisture Resistance. 3233
      b. CertainTeed Gypsum; CertainTeed Extreme Impact Resistant Type X Gypsum Board with M2Tech Mold and Moisture Technology. 3133
      c. National Gypsum Company; Gold Bond® Hi-Impact® XP® Gypsum Board. 3133

d. PABCO Gypsum; PABCO® Impact Resistant. 2133
e. USG Corporation; USG Sheetrock® Brand Mold Tough® VHI (Very High Impact) Firecode® Core. 2233

2. Core: 5/8 inch (15.9 mm), Type X.
3. Surface Abrasion: ASTM C1629/C1629M, meets or exceeds Level 2 requirements.
4. Indentation: ASTM C1629/C1629M, meets or exceeds Level 1 requirements.
5. Soft-Body Impact: ASTM C1629/C1629M, meets or exceeds Level 3 requirements.
6. Hard-Body Impact: ASTM C1629/C1629M, meets or exceeds Level 3 requirements according to test in Annex A1.
7. Long Edges: Tapered.
8. Mold Resistance: ASTM D3273, score of 10 as rated according to ASTM D3274.

F. Acoustically Enhanced Gypsum Board: ASTM C1396/C1396M. Multilayer products constructed of two layers of gypsum boards sandwiching a viscoelastic sound-absorbing polymer core.

1. Products: Subject to compliance with requirements, provide one of the following:
   a. CertainTeed Gypsum; CertainTeed SilentFX QuickCut Type X Acoustical Gypsum Board.
   b. National Gypsum Company; Gold Bond® SoundBreak XP™ Retrofit™ Board.
   c. PABCO Gypsum; QuietRock® ES.
2. Core: 5/8 inch (15.9 mm), Type X .
3. Long Edges: Tapered.

2.6 TILE BACKING PANELS

A. Glass-Mat, Water-Resistant Backing Board: ASTM C1178/C1178M, with manufacturer's standard edges.

1. Products: Subject to compliance with requirements, provide one of the following:
   a. CertainTeed Corporation; GlasRoc Tile Backer.
   b. Georgia-Pacific Gypsum LLC; DensShield Tile Backer.
   c. National Gypsum Company; Gold Bond® eXP® Tile Backer.
   d. USG Corporation; USG Durock™ Glass-Mat Tile Backerboard.
2. Core: 5/8 inch (15.9 mm), Type X.
3. Mold Resistance: ASTM D3273, score of 10 as rated according to ASTM D3274.
4. Glass-Mat boards are not permitted for tile backing panels in tub and shower areas for walls or ceilings and other such wet areas as determined by the Architect. Cementitious backer units shall be utilized in these areas.

B. Cementitious Backer Units: ANSI A118.9 and ASTM C1288 or ASTM C1325, with manufacturer's standard edges.

1. Products: Subject to compliance with requirements, provide one of the following:

a. FinPan, Inc; Util-A-Crete Concrete Backer Board.
b. National Gypsum Company; PermaBase® Cement Board.
c. USG Corporation; DUROCK Cement Board.

2. Thickness: 5/8 inch (15.9 mm).
3. Mold Resistance: ASTM D3273, score of 10 as rated according to ASTM D3274.

2.7 ACOUSTICAL ACCESSORIES

A. Sound-Attenuation Blankets: ASTM C665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.

1. Products: Subject to compliance with requirements, provide one of the following:
   a. CertainTeed Corporation
   b. Johns Manville; a Berkshire Hathaway company; Formaldehyde-free™ Unfaced thermal and acoustical batts.
   c. Knauf Insulation; EcoBatt® Insulation.
   d. Owens Corning; EcoTouch® Insulation.
2. Flame-Spread Index: Not more than 25 when tested in accordance with ASTM E84.
3. Smoke-Developed Index: Not more than 50 when tested in accordance with ASTM E84.
4. Blanket Supports: Provide to suit application as required to secure blankets where friction is insufficient.
   a. Steel wire, galvanized; type and size to suit application. Provide wires at 16 inches on center maximum.
   b. Retainer Strips: For securing insulation between supports, 0.025 inch nominal thickness, formed, metallic coated steel or PVC retainer clips.

B. Acoustical Sealant for Exposed and Concealed Joints: Manufacturer's standard nonsag, paintable, nonstaining latex acoustical sealant complying with ASTM C834.

1. Products: Subject to compliance with requirements, provide one of the following:
   a. GE Construction Sealants; Momentive Performance Materials Inc.; RCS20 Acoustical.
   b. Hilti, Inc.; CP 506 Smoke and Acoustical Sealant.
   c. QuietRock; QuietSeal Pro.
   d. Specified Technologies, Inc.; SpecSeal Smoke 'N' Sound Sealant.
   e. Tremco Incorporated; Tremco Acoustical Sealant.
   f. USG Corporation; SHEETROCK Acoustical Sealant.
2. Colors of Exposed Acoustical Joint Sealants: White.

2.8 TRIM ACCESSORIES

A. Interior Trim: ASTM C1047, galvanized or aluminum-coated steel sheet, rolled zinc, or paper-faced galvanized-steel sheet.

1. Edge Shapes:

a. Cornerbead.
b. Bullnose bead.
c. LC-Bead: J-shaped; exposed long flange receives joint compound.
d. L-Bead: L-shaped; exposed long flange receives joint compound.
e. U-Bead: J-shaped; exposed short flange does not receive joint compound.
f. Curved-Edge Cornerbead: With notched or flexible flanges.

2. Expansion (Control) Joints:
   a. Products: Subject to compliance with requirements, provide the following:
      1) ClarkDietrich; #93 Zinc Control Joint (ZNCJ).
3. Fire-Rated Expansion (Control) Joints: Composite control joint with intumescent tape factory applied to back of control joint on one side.
   a. Products: Subject to compliance with requirements, provide the following:
      1) ClarkDietrich; FAS-093X Fire Rated Control Joint.

B. Base-of-Wall PVC Moisture Barrier Trim: Extruded PVC, 1/2 inch (12.7 mm) high.
   1. Products: Subject to compliance with requirements, provide the following:
      a. Waterguard; Waterguard.

C. Extruded Aluminum Trim Accessories: Aluminum: Alloy and temper with not less than the strength and durability properties of ASTM B221 (ASTM B221M), Alloy 6063-T5, of profiles and dimensions indicated.
   1. High Strength Corner Trim, 7/8 inch (22 mm) wide, continuous integral fin for surface contact with gypsum board, tapered to edge; punched with holes staggered to accept screw fastening. Prime with corrosion resistant primer.
      a. Basis-of-Design Product: Subject to compliance with requirements, provide Pittcon Industries; Softforms SO-HSE-90 or comparable product by one of the following:
      b. Fry Reglet Corporation.
      c. Schluter.
   2. Reveal Molding, 5/8 inch (15.9 mm) deep by 1/2 inch (12.7 mm) wide:
      a. Products: Subject to compliance with requirements, provide the following:
         1) Fry Reglet; DRM-625-50 and DRMF-625-50
         2) Other profiles as indicated on the Drawings.
      b. Finish: Clear anodized.

D. Fire-Rated Reveal Backer: 0.0359 inch (0.912 mm) thick, ASTM A653/A653M, hot-dip galvanized, ASTM C645 flat steel strap backer plate with an affixed cured intumescent strip to maintain fire ratings behind architectural reveal moldings in fire-rated partitions.
   1. Products: Subject to compliance with requirements, provide the following:
      a. ClarkDietrich; BlazeFrame® “FSB” (Flat Strap Backer).

E. Exterior Trim: ASTM C 1047. Hot dip galvanized steel sheet or rolled zinc.

2.9 AUXILIARY MATERIALS

A. Provide auxiliary materials that comply with referenced installation standards and manufacturer's written instructions.

B. Floor Track Seal: Provide the following where indicated:
   1. Foam Gasket: Adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement, 1/8 inch (3.2 mm) thick, in width to suit steel stud size.

C. Fasteners for Steel Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.

D. Steel Drill Screws For Gypsum Board: ASTM C1002 unless otherwise indicated.
   1. Use screws complying with ASTM C954 for fastening panels to steel members from 0.033 to 0.112 inch (0.84 to 2.84 mm) thick.
   2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.

E. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.
   1. Verify adhesives have a VOC content of 50 g/L or less.
   2. Verify adhesive complies with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

2.10 WINDOW WALL ACCESSORIES

A. Acoustical Mullion Trim Cap:
   1. Products: Subject to compliance with requirements, provide the following to meet the fire rating of surrounding construction:
      a. Non-Fire-Rated: MULL-it-OVER Products; 55 Classic Mullion Trim Cap.
      b. Fire-Rated: MULL-it-OVER Products; 60 Classic Mullion Trim Cap.
   2. General Description: Provide acoustical mullion trim caps of design, basic profile, materials, and operation indicated on Drawings. Provide units with capability to accommodate variations in adjacent surfaces.
      a. Furnish units in lengths of sufficient additional length to allow for field trimming to required length to match variations in construction tolerances of adjacent systems.
   3. Performance Requirements:
      a. Sound Transmission: STC 57 or better.
   4. Components:
      a. Aluminum Extrusions:
         1) Profile: As selected by Architect to allow complete closure of the vertical gap between partition and window wall.
      b. Sound Absorbing Foam:

1) Resistant to smoke, flame, and microbial growth.
2) Fire Rating: ASTM E 84 Class 1.
3) Fungi Resistance: Zero rating per ASTM G 21.

c. Compressible Foam: Between edge of extrusion and interior face of curtain wall glass.
1) Thickness: Standard 5/16 inch (8 mm), compressible to 1/4 inch (6 mm), or larger thickness to accommodate a larger mullion deflection.

d. Fasteners:
1) Self-Tapping or appropriate threaded fastener.
2) Compatible with all materials fasteners will contact with and not causing galvanic corrosion.

e. Snap Cover: Snap-on fastener cover.

5. Finishes:
a. Baked-Enamel or Powder-Coated : AAMA 2603 except with a minimum dry film thickness of 1.5 mils (0.04 mm). Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.
1) Color and Gloss: Match Architect's sample.

B. Adjustable Partition Closures
1. Products: Subject to compliance with requirements, provide the following:
a. Gordon Interior Specialties Division, Gordon, Inc.; Mullion Mate.

2. General Description: Provide extruded aluminum partition closures, pre-assembled and spring-loaded, to provide a tight fit for vertical junctures of partitions and window walls.
a. Furnish units in lengths of sufficient additional length to allow for field trimming to required length to match variations in construction tolerances of adjacent systems.

3. Performance Requirements:
a. Sound Transmission: STC 38 or better.

4. Components:
a. Aluminum Extrusions:
1) Profile: As selected and approved by Architect to allow solid attachment and fastening to the partition wall framing.

b. Acoustical Insulation: Unfaced glass or slag mineral fiber blanket inside spring-loaded partition closure.

c. Compressible Gaskets with Adhesive: Between edge of extrusion and interior face of window wall mullions or glass.
1) Thickness: Standard 5/16 inch (8 mm), compressible to 1/4 inch (6 mm), or larger thickness to accommodate a larger mullion deflection.

5. Finishes:
a. Powder-Coated: AAMA 2603 except with a minimum dry film thickness of 1.5 mils (0.04 mm). Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.
1) Color and Gloss: Match Architect's sample.

2.11 VAPOR RETARDERS

A. Vapor Retarder Sheet: Fire retardant, reinforced-polyethylene sheet with outer layers of polyethylene film laminated to an inner reinforcing layer consisting of either nonwoven grid of nylon cord or polyester scrim and weighing not less than 20 lb/1000 sq. ft. with maximum permeance rating of 0.1 perm.

1. Products: Subject to compliance with requirements, provide the following:
   a. Raven Industries, Inc; DURA-SKRIM 2FR.
   b. Reef Industries, Inc; Griffolyn T-55 FR.
2. Surface-Burning Characteristics: Maximum flame-spread and smoke-developed indexes of 25 and 75, respectively, per ASTM E 84.

B. Joint Sealer Tape: Polyethylene tape, 3" wide. Verify compatibility with sheet and adjacent materials.

2.12 [SECURITY MESH

A. Expanded metal galvanized steel, ASTM F 1267, Class 2 Galvanized, Grade A.

1. Products: Subject to compliance with requirements, provide the following:
   a. AMICO; ASM .75-9F HEAVY, Super Maximum Security.
2. Material: Steel.
3. Steel Finish: Galvanized.
4. Type: II, expanded and flattened.

B. Provide u-channel binding at edges of mesh around openings.

C. Fasteners: Flat trapezoidal washers furnished by manufacturer, and fine threaded, bugle head, self-tapping screws with a #8 shank long enough to penetrate metal studs by at least 3/8-inch (9.5-mm)**.**

1. Products: Subject to compliance with requirements, provide the following:
   a. AMICO; Secura Clips.

D. Where Expanded Metal Security Gratings and Frames are indicated within interstitial spaces, above partitions, below raised access flooring or in other locations, refer to Section 05 50 00.]

2.13 JOINT TREATMENT MATERIALS

A. General: Comply with ASTM C475/C475M.

B. Joint Tape:

1. Interior Gypsum Board: Paper.
2. Tile Backing Panels: As recommended by panel manufacturer.

C. Joint Compound for Interior Gypsum Board: For each coat, use formulation that is compatible with other compounds applied on previous or for successive coats.

1. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use drying-type, all-purpose compound.
    a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to the following:
        1) National Gypsum Company; Proform Taping Joint Compound, Ready-Mixed.
        2) USG Corporation; Sheetrock Brand Taping Joint Compound, Ready-Mixed.
2. Fill Coat: For second coat, use, sandable topping drying-type, all-purpose compound.
    a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to the following:
        1) National Gypsum Company; Proform All Purpose Joint Compound, Ready-Mixed.
        2) USG Corporation; Sheetrock Brand All Purpose Joint Compound, Ready-Mixed.
3. Finish Coat: For third coat, use drying-type, sandable all-purpose compound.
    a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to the following:
        1) National Gypsum Company; Proform All Purpose Joint Compound, Ready-Mixed.
        2) USG Corporation; Sheetrock Brand All Purpose Joint Compound, Ready-Mixed.
4. Skim Coat: For final coat of Level 5 finish, use drying-type, all-purpose compound.
    a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to the following:
        1) National Gypsum Company; Proform Lite Joint Compound, Ready-Mixed.
        2) USG Corporation; Sheetrock Brand Lightweight Joint Compound, Ready-Mixed.

D. Joint Compound for Tile Backing Panels:
1. Glass-Mat, Water-Resistant Backing Panel: As recommended by backing panel manufacturer.
2. Cementitious Backer Units: As recommended by backer unit manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and support framing, for compliance with requirements and other conditions affecting performance of the Work.

B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Suspended Assemblies: Coordinate installation of suspension systems with installation of overhead structure to ensure that inserts and other provisions for anchorages to building structure have been installed to receive hangers at spacing required to support the Work and that hangers will develop their full strength.

1. Furnish concrete inserts and other devices indicated to other trades for installation in advance of time needed for coordination and construction.

B. Coordination with Sprayed Fire-Resistive Materials:

1. Before sprayed fire-resistive materials are applied, attach offset anchor plates or ceiling tracks to surfaces indicated to receive sprayed fire-resistive materials. Where offset anchor plates are required, provide continuous plates fastened to building structure not more than 24 inches (610 mm) o.c.
2. After sprayed fire-resistive materials are applied, remove them only to extent necessary for installation of non-load-bearing steel framing. Do not reduce thickness of fire-resistive materials below that are required for fire-resistance ratings indicated. Protect adjacent fire-resistive materials from damage.

3.3 INSTALLATION, GENERAL

A. Installation Standard: ASTM C754, except comply with framing sizes and spacing indicated.

B. Install framing and accessories plumb, square, and true to line, with connections securely fastened.

C. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.

D. Install bracing at terminations in assemblies.

E. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

3.4 INSTALLING FRAMED ASSEMBLIES

A. For wall framing of interior walls for larger openings and items noted as “CFMF” in the Drawings shall be installed in compliance with this Section and as indicated in Section 05 40 00 Cold Formed Steel Framing. Coordinate all Work for compliance with the Contract Documents complete set.

B. Install framing system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.

C. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.

D. Install studs so flanges within framing system point in same direction.

E. Install tracks at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings except where partitions are indicated to terminate at suspended ceilings. Continue framing around and above ducts that penetrate partitions above ceiling.

1. Track Anchor Spacing: 32 inches (813 mm) maximum.
2. Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.
3. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install track section (for cripple studs) at head and secure to jamb studs.
    a. Provide continuous header section across the rough opening. For openings larger than 24 inches provide box headers.
    b. Install two studs at each jamb unless otherwise indicated.
    c. Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2-inch (13-mm) clearance from jamb stud to allow for installation of control joint in finished assembly.
    d. Extend both jamb studs through suspended ceilings and attach to underside of overhead structure.
4. Other Framed Openings: Frame openings other than door openings the same as required for door openings unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.
5. Fire-Resistance-Rated Partitions: Install framing to comply with fire-resistance-rated assembly indicated and support closures and to make partitions continuous from floor to underside of solid structure.
    a. Firestop Track: Where indicated, install to maintain continuity of fire-resistance-rated assembly indicated.
6. Sound-Rated Partitions: Install framing to comply with sound-rated assembly indicated.
7. Curved Partitions:
    a. Bend track to uniform curve and locate straight lengths so they are tangent to arcs.
    b. Begin and end each arc with a stud, and space intermediate studs equally along arcs. On straight lengths of no fewer than two studs at ends of arcs, place studs 6 inches (150 mm) o.c.

F. Double door assembly opening framing:

1. Utilize studs, tracks and other framing materials meeting the minimum base metal thickness indicated in the Materials article of this Section.
2. Extend head and sill track of heavier thickness a minimum of 3 feet beyond the rough opening on either side of the door.
    a. Track Anchor Spacing: 24 inches maximum and at each end.

3. Provide double king studs securely anchored to base track and structure above; members shall have a minimum thickness of 0.0478inch (18 Gauge) and meet all Performance Requirements of this section for the weight of double door units installed.
4. Provide double jack studs at both sides of opening; members shall have a minimum thickness of 0.0478inch (18 Gauge) and meet all Performance Requirements of this section for the weight of double door units installed. Provide continuous wood blocking nested into inner jack stud for double door frame anchorages.
5. Provide built up headers at all openings consisting of open face to open face stud members no less than 1-5/8 inch deep by 5-5/8 inch wide; members shall have a minimum thickness of 0.0478inch (18 Gauge) with no pre-punched openings. Secure members together with continuous track at the top of the header assembly, width to match partition assembly, thickness to match header.

G. Direct Furring:
1. Attach to concrete or masonry with stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches (610 mm) o.c.

H. Z-Shaped Furring Members:
1. Erect insulation, specified in Section 07 21 00 "Thermal Insulation," vertically and hold in place with Z-shaped furring members spaced 24 inches (610 mm) o.c.
2. Except at exterior corners, securely attach narrow flanges of furring members to wall with concrete stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches (610 mm) o.c.
3. At exterior corners, attach wide flange of furring members to wall with short flange extending beyond corner; on adjacent wall surface, screw-attach short flange of furring channel to web of attached channel. At interior corners, space second member no more than 12 inches (305 mm) from corner and cut insulation to fit.

I. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch (3 mm) from the plane formed by faces of adjacent framing.

3.5 INSTALLING CEILING SUSPENSION SYSTEMS

A. Install suspension system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.
1. Hangers: 48 inches (1219 mm) o.c. with seismic accessories and bracing where required.
2. Carrying Channels (Main Runners): 48 inches (1219 mm) o.c.
3. Furring Channels (Furring Members): 16 inches (406 mm) o.c.

B. Isolate suspension systems from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement.

C. Suspend hangers from building structure as follows:

1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or suspension system.
    a. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with locations of hangers required to support standard suspension system members, install supplemental suspension members and hangers in the form of trapezes or equivalent devices.
    a. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by ASTM C 754.
3. Wire Hangers: Secure by looping and wire tying, either directly to structures or to inserts, eye screws, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause hangers to deteriorate or otherwise fail.
4. Flat Hangers: Secure to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices and fasteners that are secure and appropriate for structure and hanger, and in a manner that will not cause hangers to deteriorate or otherwise fail.
5. Do not attach hangers to steel roof deck.
6. Do not attach hangers to permanent metal forms. Furnish cast-in-place hanger inserts that extend through forms.
7. Do not attach hangers to rolled-in hanger tabs of composite steel floor deck.
8. Do not connect or suspend steel framing from ducts, pipes, or conduit.

D. Fire-Resistance-Rated Assemblies: Wire tie furring channels to supports.

E. Seismic Bracing: Sway-brace suspension systems with hangers used for support.

F. Grid Suspension Systems: Attach perimeter wall track or angle where grid suspension systems meet vertical surfaces. Mechanically join main beam and cross-furring members to each other and butt-cut to fit into wall track.

G. Installation Tolerances:
1. Install suspension systems that are level to within 1/8 inch in 12 feet (3 mm in 3.6 m) measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.
2. Where sprinkler heads, diffusers, and speakers are arranged in alignment, variation from exact alignment shall not vary more than 1/2-inch (13-mm) either side of centerline through various element openings.

3.6 INSTALLATION OF ACOUSTICAL ACCESSORIES

A. Place acoustical insulation in partitions tight within spaces, around cut openings, behind and around electrical and mechanical items within or behind partitions, and tight to items passing through partitions.

B. Install electrical J-box putty pads at partitions in accordance with manufacturer's instructions.

C. Install acoustical sealant at partitions in accordance with manufacturer's instructions.

3.7 INSTALLATION OF VAPOR RETARDERS

A. Install vapor retarder within partition assemblies where indicated on the Drawings as follows:

1. Single layer gypsum board partition assemblies:
    a. Provide continuous double-stick tape on studs to provide a seal for penetrating screws.
    b. Install vapor retarder sheet to studs over double-stick tape, then secure vapor retarder sheet with screws or sheet metal tabs as necessary.
    c. Overlap joints in vapor retarder a minimum of 3 inches (76 mm).
    d. Seal all joints, tears, penetrations, and edges of vapor retarder with joint sealer tape to provide a continuous sealed barrier.
    e. Install single layer of gypsum board over vapor retarder.
2. Multiple layer gypsum board partition assemblies:
    a. Install first layer of gypsum board.
    b. Install vapor retarder sheet over first layer of gypsum board. Use staples and/or tape only enough to tack vapor retarder in place.
    c. Overlap joints in vapor retarder a minimum of 3 inches (76 mm).
    d. Seal all joints, tears, penetrations, and edges of vapor retarder with joint sealer tape to provide a continuous sealed barrier.
    e. Install second layer of gypsum board over vapor retarder.

3.8 INSTALLATION OF SECURITY MESH

A. Install security mesh where indicated on Drawings.

1. Where Expanded Metal Security Gratings and Frames are indicated within interstitial spaces, above partitions, below raised access flooring or in other locations, refer to Section 05 50 00.

B. Fasten security mesh to studs and top and bottom runners at maximum 12 inches (305 mm) on center and at each corner. Fasten at top track to allow deflection of structure.

C. Splice security mesh only at studs or overlap a minimum of 3 inches (152 mm) and fasten together at 12 inches (305 mm) on center.

D. Studs receiving security mesh must have a minimum base-steel thickness of 0.0538 inch (1.37 mm).

E. Spacing of studs receiving security mesh shall not exceed 16 inches (406 mm) on center.

3.9 INSTALLATION OF BULLET RESISTANT COMPOSITE

A. Install where indicated on Drawings.

B. Install in accordance with manufacturer's printed recommendations using adhesives, mastics, screws, or bolts appropriate to substrate and approved by manufacturer.

C. Joints: Reinforce panel joints with a back-up layer of bullet resistive composite material no less than 4 inches (102 mm) in width, extending a minimum of 2 inches (51 mm) to each side of joint.

3.10 INSTALLATION AND FINISHING OF PANELS, GENERAL

A. Comply with ASTM C840.

B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.

C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch (1.5 mm) of open space between panels. Do not force into place.

D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.

E. Form control and expansion joints with space between edges of adjoining gypsum panels.

F. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.

1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. (0.7 sq. m) in area.
2. Fit gypsum panels around ducts, pipes, and conduits.
3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch- (6.4- to 9.5-mm-) wide joints to install sealant.

G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments. Provide 1/4- to 1/2-inch- (6.4- to 12.7-mm-) wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.

H. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.

I. STC-Rated Assemblies:

1. Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations.
2. Comply with ASTM C919 and with manufacturer's written instructions for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings.

J. Install sound attenuation blankets before installing gypsum panels unless blankets are readily installed after panels have been installed on one side.

3.11 INSTALLATION OF INTERIOR GYPSUM BOARD

A. Install interior gypsum board in the following locations:

1. Type X: All framed surfaces unless otherwise indicated.
2. Mold-Resistant Type: At all framed interior surfaces of exterior walls and as indicated on the Drawings.
3. Flexible Type: Apply in double layer at curved assemblies.
4. Abuse-Resistant Type: As indicated on Drawings.
5. Impact-Resistant Type: As indicated on Drawings.
6. Acoustically Enhanced Type: As indicated on Drawings.

B. Single-Layer Application:

1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing unless otherwise indicated.
2. On partitions and walls 8'-1" or less in height apply gypsum boards horizontally (perpendicular to framing) with end joints staggered over studs; use maximum length sheets possible to minimize end joints.
    a. Stagger all abutting end joints not less than 32 inches in alternate courses of panels for all horizontal panels.
3. On partitions and walls of high wall areas over 15'-0" in height apply gypsum boards horizontally (perpendicular to framing) with end joints staggered over studs; use maximum length sheets possible to minimize end joints.
    a. Stagger all abutting end joints not less than 32 inches in alternate courses of panels for all horizontal panels.
4. For partitions and walls not requiring horizontal applications by the requirements of this Section, indicated on the Drawings or required by fire-resistance-rated assembly gypsum panels may be installed vertically (parallel to framing); provide sheet lengths to minimize end joints.
    a. Stagger all abutting end joints not less than 32 inches in alternate courses of panels.
5. On Z-shaped furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.
6. Fastening Methods: Apply gypsum panels to supports with steel drill screws.

C. Multilayer Application:

1. On ceilings, apply gypsum board indicated for base layers before applying base layers on walls/partitions; apply face layers in same sequence. Apply base layers at right angles to framing members and offset face-layer joints one framing member, 16 inches (400 mm) minimum, from parallel base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly.
2. On partitions/walls, apply gypsum board indicated for base layers and face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer joints unless otherwise indicated or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.
3. On Z-shaped furring members, apply base layer vertically (parallel to framing) and face layer either vertically (parallel to framing) or horizontally (perpendicular to framing) with vertical joints offset at least one furring member. Locate edge joints of base layer over furring members.
4. Fastening Methods: Fasten base layers with screws; fasten face layers with adhesive and supplementary fasteners.

D. Laminating to Substrate: Where gypsum panels are indicated as directly adhered to a substrate (other than studs, joists, furring members, or base layer of gypsum board), comply with gypsum board manufacturer's written instructions and temporarily brace or fasten gypsum panels until fastening adhesive has set.

E. Curved Surfaces:

1. Install panels horizontally (perpendicular to supports) and unbroken, to extent possible, across curved surface plus 12-inch- (300-mm-) long straight sections at ends of curves and tangent to them.
2. For double-layer construction, fasten base layer to studs with screws 16 inches (400 mm) o.c. Center gypsum board face layer over joints in base layer, and fasten to studs with screws spaced 12 inches (300 mm) o.c.

3.12 INSTALLATION OF TILE BACKING PANELS

A. Glass-Mat, Water-Resistant Backing Panels: Comply with manufacturer's written installation instructions and install at non-wet locations indicated to receive tile less than or equal to 1.4 sq. ft. (0.13 sq. m) in area or 5 lb./sq. ft. (24.4 kg/sq. m) in weight. Install with 1/4-inch (6.4-mm) gap where panels abut other construction or penetrations.

B. Cementitious Backer Units: ANSI A108.11, at locations indicated to receive tile greater than 1.4 sq. ft. (0.13 sq. m) in area or 5 lb./sq. ft. (24.4 kg/sq. m) in weight locations indicated to receive adhered masonry or stone and at all tub, shower and wet area walls and ceilings.

C. Where tile backing panels abut other types of panels in same plane, shim framed surfaces to produce a uniform plane across panel surfaces.

3.13 INSTALLATION OF TRIM ACCESSORIES

A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.

B. Control Joints: Maintain fire ratings of assemblies at control joints. Install control joints according to ASTM C840 and as follows:
   1. Partitions: Install control joints:
      a. no greater than 30 feet (9 m) on center where a partition runs in an uninterrupted straight plane;
      b. at both corners of openings in wall planes, above and below opening, where width of opening is 6 feet (1.8 m) or greater, or where ratio of width to height of wall area above or below opening exceeds 4:1;
      c. at all spliced joints of vertical studs;
      d. at other locations indicated on Drawings.
   2. Ceilings: Install control joints:
      a. no greater than 30 feet (9 m) on center and with total area not to exceed 900 sq. ft. (81 sq. m);
      b. where sections of "A", "L", "O", "U", "T" and "X" shaped ceiling areas or furr-down areas intersect;
      c. at other locations indicated on Drawings.

C. Interior Trim: Install in the following locations:
   1. Cornerbead: Use at outside corners unless otherwise indicated.
   2. Bullnose Bead: Use where indicated on Drawings.
   3. LC-Bead: Use at exposed panel edges.
   4. L-Bead: Use where edge trim can only be installed after gypsum board is installed.
   5. U-Bead: Use at exposed panel edges not intended to receive joint compound.
   6. Curved-Edge Cornerbead: Use at curved openings.

D. Aluminum Trim: Maintain fire ratings of assemblies at aluminum trim. Install in locations indicated on Drawings.

3.14 INSTALLATION OF WINDOW WALL ACCESSORIES

A. Measure and cut window wall accessories to proper lengths.

B. Install window wall accessories in accordance with accessory manufacturer's printed installation instructions.

C. Cope around horizontal mullions, sills, or other obstructions leaving appropriate gap for differential movement between the window wall accessories, mullions, and obstructions.

D. Apply continuous bead of acoustical sealant between window wall accessories and dissimilar adjacent materials to provide finished appearance and maintain specified acoustical rating.

3.15 FINISHING GYPSUM BOARD

A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.

B. Prefill open joints, rounded or beveled edges, and damaged surface areas.

C. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.

D. Gypsum Board Finish Levels:
   1. Level 1:
      a. Joints: Tape set in joint compound.
      b. Interior Angles: Tape set in joint compound.
      c. Surface: Tool marks and ridges acceptable. Surface free of excess joint compound.
   2. Level 2:
      a. Joints: Tape embedded in joint compound and wiped with a joint knife, leaving a thin coat of compound over tape.
      b. Interior Angles: Tape embedded in joint compound and wiped with a joint knife, leaving a thin coat of compound over tape.
      c. Accessories: Shall be covered to one separate coat of joint compound.
      d. Fasteners: Shall be covered by one separate coat of joint compound.
      e. Surface: Surface shall be free of excess joint compound. Tool marks and ridges acceptable. Joint compound applied over the body of the tape at the time of tape embedment shall be considered a separate coat of joint compound and shall satisfy the conditions of this level.
   3. Level 3:
      a. Joints: Taped as in Level 2, then covered with one separate coat of joint compound.
      b. Interior Angles: Taped as in Level 2, then covered with one separate coat of joint compound.
      c. Accessories: Shall be covered by two separate coats of joint compound.
      d. Fasteners: Shall be covered by two separate coats of joint compound.
      e. Surface: Joint compound shall be smooth and free of tool marks and ridges.
   4. Level 4:
      a. Joints: Taped as in Level 2, then covered with two separate coats of joint compound.
      b. Interior Angles: Taped as in Level 2, then covered with one separate coat of joint compound.
      c. Accessories: Shall be covered by three separate coats of joint compound.
      d. Fasteners: Shall be covered by three separate coats of joint compound.
      e. Surface: Joint compound shall be smooth and free of tool marks and ridges.
   5. Level 5:

a. Joints: Taped as in Level 2, then covered with two separate coats of joint compound.
b. Interior Angles: Taped as in Level 2, then covered with one separate coat of joint compound.
c. Accessories: Shall be covered by three separate coats of joint compound.
d. Fasteners: Shall be covered by three separate coats of joint compound.
e. Surface: A thin skin coat of joint compound, or a material manufactured especially for this purpose, shall be applied to the entire surface. The surface shall be smooth and free of tool marks and ridges.

E. Gypsum Board Finish Level Schedule: Finish panels to levels indicated below and according to ASTM C840:
1. Level 0: Not used; all gypsum wall board shall receive a minimum Level 1 finish without exception.
2. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
3. Level 2: Areas Where panels that are substrate for ceramic or porcelain tile or acoustical tile; garage, warehouses, and storage areas.
4. Level 3: Areas receiving heavy or medium texture (spray or hand applied) finishes before final painting. Do not use Level 3 finish where finish is painted smooth or under wallcoverings.
5. Level 4: At panel surfaces that will be exposed to view unless otherwise indicated; provide beneath all wall coverings.
a. Provide primer and its application to surfaces as specified in Section 09 91 23 "Interior Painting"; Provide primer under all wall coverings.
6. Level 5: Provide at panel surfaces including but not limited to: Gloss and semigloss paints and coatings and surfaces subject to high lighting conditions, natural or applied. .
a. Primer and its application to surfaces are specified in Section 09 91 23 "Interior Painting." Coat prepared surface with specified drywall primer prior to the application of finish paint.

F. Glass-Mat Faced Panels: Finish according to manufacturer's written instructions.

G. Cementitious Backer Units: Finish according to manufacturer's written instructions.

3.16 PROTECTION

A. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.

B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.

C. Remove and replace panels that are wet, moisture damaged, and 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.

END OF SECTION