SECTION 09 21 00 - GYPSUM BOARD ASSEMBLIES

PART 1 - GENERAL

1.1 SUMMARY

A. Provide the work of this Section in accordance with requirements of the Contract Documents.

B. This Section includes, but is not limited to the following:

1. Non load-bearing steel framing members for interior gypsum board assemblies.
2. Suspension systems for interior gypsum ceilings, soffits, and grid systems.
3. Interior gypsum board.
4. Mold and mildew resistant interior gypsum board panels attached to steel framing.
5. Impact and abuse resistant drywall
6. Tile backing panels attached to steel framing.
7. Shaft-wall enclosures.
8. Chase enclosures.
9. Stair enclosures.
10. Horizontal enclosures.
11. Sound attenuation fire blankets (SAFB).
12. Acoustical blanket insulation.

C. Related Work:

1. Division 05, Section 05 40 00 "Cold-Formed Metal Framing" for exterior and interior load-bearing and exterior non-load-bearing wall studs; floor joists; roof rafters and ceiling joists; and roof trusses.
2. Division 05, Section 05 50 00 "Miscellaneous Metal Fabrications" for steel plate blocking located in walls and load bearing steel framing.
3. Division 06, Section 06 10 53 "Miscellaneous Rough Carpentry" for fire retardant treated wood blocking.
4. Division 06, Section 06 16 00 "Sheathing" for gypsum sheathing for exterior walls.
5. Division 07, Section 07 21 00 "Thermal Insulation", for insulation other than specified in this section.
6. Division 07, Section 07 84 13 "Penetration Firestopping" for penetrations of fire rated walls.
7. Division 07, Section 07 84 46 "Fire-Resistive Joint Firestopping" for head-of-wall assemblies that incorporate gypsum board shaft-wall assemblies.
8. Division 07, Section 07 92 00 "Joint Sealants" for acoustical sealants at bottom & top of walls and penetrations.
9. Division 08, Section 08 80 00“Glazing” for glazing trim specified in this section recessed in gypsum ceiling.
10. Division 09, Section 09 90 00"Painting" for application of primers and finish coats.

1.2 DEFINITIONS

A. Gypsum Board Construction Terminology: Refer to ASTM C11 and GA-505 for definitions of terms for gypsum board assemblies not defined in this Section or in other referenced standards.

1.3 ACTION SUBMITTALS

A. Product Data: Submit manufacturer's technical data for each type of product specified including related accessories. Furnish a material list with technical data documenting the location and primary function, quality, and performance of each material component or system to be used in the Work, or other such primary characteristics as required by the Drawings or Specifications.

B. Sustainable Design Submittals:

1. Building Product Disclosure and Optimization - Sourcing of Raw Materials:

a. Extended Producer Responsibility (EPR): Submit documentation indicating that manufacturers have a take back or recycling program for the product purchased.
b. Bio-based Materials: For bio-based products and materials other than wood, submit documentation of product data and testing results in compliance with LEED requirements.
c. Recycled Content: For products having recycled content, indicate percentages by weight of post-consumer and pre-consumer recycled content.

1) Include statement indicating costs for each product having recycled content.

d. Regional Materials: For products that are required to comply with requirements for regional materials, indicating location of material manufacturer and point of extraction, harvest, or recovery for each raw material.

1) Include statement indicating distance to Project, cost for each regional material and the fraction by weight that is considered regional.

2. Indoor Environmental Quality, Low Emitting Materials: Building Products must be tested and compliant with the California Department of Public-Health (CDPH) Standard Method v1.2 2017, using the applicable exposure scenario.

a. For paints, and coatings, wet applied, include printed statement of VOC content, showing compliance with the applicable VOC limits of the California Air Resources Board (CARB) 2007, Suggested Control Measure for Architectural Coatings or the South Coast Air Quality Management District (SCAQMD) Rule 1113-2011.
b. Adhesives and Sealants: For wet applied on-site products, submit printed statement showing compliance with the applicable chemical content requirements of SCAQMD Rule 1168, effective July 1, 2005 and rule amendment date of January 7, 2005.
c. For Gypsum Board/Wall Covering products, submit documentation of VOC emissions testing compliance in the form of GreenGuard Gold certification, SCS Indoor Advantage Gold certification or CDPH Standard Method v1.2 compliance verification.

C. Shop Drawings: Submit detailed shop drawings, including plans, elevations, sections, details of components, and attachments to other units of Work, indicating the following:

1. Details of unusual conditions in connection with gypsum drywall construction.
2. Proposed locations of control joints, and expansion joints that are required but not shown.
3. Locations of access doors occurring in gypsum drywall construction.
4. Details of attachment to primary ceiling supports.
5. Details of rated assemblies with copies of their respective approvals. Coordinate with Division 07, Section 07 84 46 "Fire Resistive Joint Firestopping" to provide combined submittals for partition head details and penetration details at rated partitions.

D. Gypsum Board Location Schedule: Submit for Architect's information. Provide a gypsum board location schedule utilizing the same room designations shown on Drawings listing special gypsum board types, thicknesses of partitions, composition of assemblies, and any special requirements if any, for each room scheduled for special gypsum drywall installation.

E. Calculations: Where proposer varies from prescriptive requirements of the specification and partition assembly drawings, provide engineering calculations for partition assemblies based on performance criteria, signed and sealed by a State Licensed Professional Engineer indicating compliance with performance criteria.

1. Prepare and submit reviewed shop drawings, specifications, load and deflection tables and any other supporting data required by authorities having jurisdiction for their review and approval, and pay fees incurred, prior to beginning installation.

1.4 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Reflected ceiling plans drawn to scale and coordinating penetrations and ceiling-mounted items. Show the following:

1. Ceiling-mounted items including light fixtures; air outlets and inlets; speakers; sprinklers; access panels; and special moldings at walls, column penetrations, and other junctures of gypsum board ceilings with adjoining construction.
2. Minimum Drawing Scale: 1/4 inch = 1 foot (1:48).

B. Certificates: Certification signed by manufacturer of gypsum board assembly components certifying that their products comply with specified requirements, comply with UL designations shown and are approved for use by local authorities having jurisdiction.

C. Evaluation Reports: For shaft wall assemblies, post installed anchors from ICC-ES or other qualified testing agency acceptable to authorities having jurisdiction.

D. Acoustical-Test-Response Reports: From a qualified independent testing agency substantiating required STC rating for each gypsum board and shaft wall assembly that carry an acoustic rating.

E. Sustainable Design Submittals:

1. Building Product Disclosure and Optimization - Environmental Product Declarations

a. Submit product specific type III EPDs or Industry wide (generic) EPDs, USGBC approved program declaration or products with a publicly available, critically reviewed life-cycle assessment conforming to ISO 14044 that have at least a cradle to gate scope.

2. Building Product Disclosure and Optimization - Material Ingredients

a. Material Ingredient Reporting: Submit documentation confirming chemical inventory of products to at least 0.1 % (1000pm) with at least one of the following:

1) Submit published manufacturer inventory of ingredients identified by name and Chemical Abstract Service Registration Number (CASRN)
2) Submit documentation that product has been certified as Cradle-to-Cradle v3 at the Bronze Level or better
3) Submit Declare product label indicating that all ingredients have been disclosed down to 1000 ppm or designated as Red List Free or Declared
4) Living Product Challenge
5) Product Lens Certification

6) USGBC approved program.

b. Material Ingredient Optimization: Submit documentation confirming chemical inventory of products to at least 0.01 % (100pm) and/or that has a compliant material ingredient optimization report with at least one of the following:

1) Submit GreenScreen V1.2 Benchmark: Third party report prepared by a licensed GreenScreen List Translator, or a full GreenScreen Assessment.
2) Submit third-party verified documentation that product has been certified as Cradle-to-Cradle v3 at the Bronze Level or better
3) Submit third-party verified Cradle to Cradle v3 Material Health certificate at the Bronze Level or better
4) Submit third-party verified Declare product label indicating that all ingredients have been disclosed down to 100 ppm
5) Submit third-party verified documentation that product is Living Product Challenge certified with a Red List Free or LBC Red List Free Declare label.
6) Submit documentation that product has a manufacturer prepared action plan with material inventory to at least 1000 ppm.

F. Fabrication Engineering and Design Data Submittal: Submit for gypsum board assemblies to verify compliance with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.5 QUALITY ASSURANCE

A. Single-Source Responsibility for Steel Framing: Obtain steel framing members for gypsum board assemblies from a single manufacturer, unless otherwise indicated.

B. Single-Source Responsibility for Panel Products: Obtain each type of gypsum board and other panel products from a single manufacturer.

C. 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.

D. Installer Qualifications: The gypsum board work shall be performed by a firm having five (5) year experience in the application of gypsum board and shaft wall assemblies on projects similar in size and scope to this Project.

E. Mockups: Before beginning gypsum board installation, install mockups of at least 100 sq. ft. (9 sq. m) in surface area to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Install mockups for each level of gypsum board finish indicated for use in exposed locations.
2. Provide mockup of finishing procedures on paperless wallboard products, including one primer coat of paint.
3. Mockup one penetration (duct, light fixture) through gypsum board. Show finishing of edges.
4. Tile backer panels at one wall where Large Format Tile will be installed.
5. Apply or install final decoration indicated, including painting and wallcoverings, on exposed surfaces for review of mockups.
6. Simulate finished lighting conditions for review of mockups.
7. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 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 boards to prevent damage to edges, ends, and surfaces. Do not bend or otherwise damage metal trim and framing components.

D. Store and handle gypsum panels in a manner to prevent mold growth on panels.

E. Comply with requirements of Gypsum Association Publications GA 801 (Handling and Storage of Gypsum Panel Products); GA 238 (Guidelines for Prevention of Mold Growth on Gypsum Board) and GA-220 (Gypsum Board Winter Related Installation)

1.7 PROJECT CONDITIONS

A. Environmental Conditions, General: Establish and maintain environmental conditions for applying and finishing gypsum board to comply with ASTM C840 requirements or gypsum board manufacturer's recommendations, whichever are more stringent.

B. Do not install interior products until installation areas are enclosed and conditioned.

C. Do not install panels that are wet, moisture damaged, or mold damaged.

1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, and 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 nonadhesive attachment of gypsum board to framing, maintain not less than 40 deg F. For adhesive attachment and finishing of gypsum board, maintain not less than 50 deg F for 48 hours before application and continuously after until dry. Do not exceed 95 deg F when using temporary heat sources.

E. 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.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fabrication and System Engineering Requirements:

1. Drawings of metal support system assemblies are diagrammatic and show design intent of finished profiles, shapes and forms; relationships between elements; location, identification, dimension and size of components, assemblies and accessories; and details and diagrams of connections.

2. Based on stud spacing indicated on drawings, engineer, fabricate, assemble and install metal support systems to meet or exceed the criteria indicated and specified, to conform to the profiles indicated and to other requirements of the Contract Documents, to comply with requirements of the latest "SSMA Product Technical Guide" and ASTM C754 as well as applicable governing codes and regulations, and to provide structurally sound assemblies.

    a. For shaft wall assemblies provide assemblies based on manufacturers systems and AER-09038 Report published by Progressive Engineering Inc., latest edition, or equal from other named manufacturers.
    b. Walls shown in section may exceed floor to floor specified in the SSMA Product Technical Guide", and walls may support large, heavy monitors, sign bands, wall panels. Studs for these applications shall be gaged via fabrication engineering and design by the Contractor's licensed Professional Engineer to support imposed loads and comply with deflection limits specified in structural performance below.
    c. Where drywall is required to support imposed loads of wall and ceiling mounted items, coordinate with trades providing that work, to obtain imposed loads for engineering of gypsum wall board assemblies. These requirements include but are not limited to

        1) Miscellaneous metal supports specified in Division 05, Section 05 50 00 “Miscellaneous Metal Fabrications",
        2) Handrails and railing supports specified in Division 05, Section 05 73 00 “Decorative Metal Railings “,
        3) Decorative metal specified in Division 05, Section 05 75 00 "Decorative Formed Metals".
        4) Decorative wood specified in Division 06 Section 06 40 00 "Architectural Woodwork".
        5) Other Sections that rely on gypsum board assemblies for primary support.

B. Structural Performance: Provide steel framing capable of supporting specified gypsum board panels and withstanding loads within limits and under conditions indicated.

1. Unless otherwise indicated, engineer, fabricate and install gypsum board assemblies to ensure that the completed assembly withstands a minimum positive and negative pressure of 5 lbf/sq. ft. (239 Pa) normal to the plane of the wall.
2. Deflection Limits: framing systems to withstand loads without deflections greater than the following:

    a. Stairs, Elevator Hoistways, and Vertical Shafts: L/120 at 10 psf.
    b. Public Spaces and Lobbies: L/120 at 15 psf.
    c. Partitions Receiving Monitors, Televisions, Heavy Audio/Visual Equipment: L/360 at 15 psf.
    d. Typical Partitions: L/240 at 5 psf.
    e. Typical Partitions with Tile Backing Panels: L/360 at 5 psf.
    f. Typical Elevator Shaft Wall Systems: L/240 at 10 psf.
    g. Typical Ceiling Framing: L/360 at 10psf.
    h. Other Partitions: L/240 at 5 psf.

        1) Maximum Deflection:
            a) L/240 at 5 lbf per sq. ft.
            b) L/120 at 5 lbf per sq. ft.
            c) L/120 at 7.5 lbf per sq. ft.
            d) L/120 at 10 lbf per sq. ft.

3. At partitions indicated to support large format tiles (defined in the TCNA as stone, porcelain, glass, and other tiling with at least one dimension greater than 15 inches(381mm) provide minimum 33 mils (20 gage structural) steel studs max. 16

inches(406mm) on center, with studs vertically braced 4 ft.(1219 mm). o.c. for full height of partition except if limiting height requires heavier mil thickness as follows;

a. Engineer, fabricate and install partition with mil thickness of structural quality and depth required to comply with floor to floor limiting heights and a maximum deflection of L/360 or 1/2 inch at mid span, whichever is more severe.
b. At walls where stone is indicated to be installed with grout and adhesive, provide horizontal reinforcing to limit deflection to L/720 or maximum of 1/4 inch(6mm) at midspan, whichever is more severe.

1) In addition, coordinate with miscellaneous metal fabrication for provision of steel lintels every 10 ft.(3048mm) on walls to carry back weight of stone panels to structural substrate.

4. Finished installation shall be smooth and flat not to exceed 1/8 inch in 10 ft.(3mm in 3048mm), noncumulative along entire run of partition. If not in compliance with this requirement, tile installer must correct before proceeding with installation
5. Where non-structural metal studs specified in this section cannot comply with performance requirements specified or are not on the SSMA charts for floor to floor limiting heights, use non-load bearing cold formed metal framing specified in Division 05, Section 05 40 00 "Cold Formed Metal Framing" to support partitions, suspended ceilings and imposed loads of finishes and equipment.

C. Fire-Rated Assemblies: For fire-resistance-rated assemblies that incorporate non-load-bearing steel framing, construct assemblies of materials and construction identical to those tested in assembly indicated, according to ASTM E119 by an independent testing agency, to achieve fire resistance ratings indicated on Drawings.

D. Fire-Resistance-Rated Assemblies: Indicated by design designations from UL's "Fire Resistance Directory", GA or other approved tested assemblies. Where no test number is referenced, utilize and submit a tested approved assembly that achieves the fire rating required by the Drawings, including the Life Safety Plan.

1. Assemblies listed do not necessarily indicate all assemblies that may be used in this project. Contractor may propose alternate UL listed assemblies that meet the same requirements to the Architect for consideration. Contractor may not substitute assemblies without written authorization by the Architect.
2. Drawings, keys or written descriptions located in the Contract Documents to describe fire rated assemblies for beams, floors, roofs, columns, walls, partitions and through-penetration firestop systems do not necessarily call out each and every specific requirement of the designated UL listed assembly identified. It is the Contractor’s responsibility to become thoroughly familiar with the corresponding requirements published in the most recent issue of the Underwriters Laboratories Inc. Fire Resistance Directory and construct the fire rated assemblies in strict accordance with those requirements.
3. Prescribed UL Design Numbers which may be called for on this Project and may be required as determined during the construction process if existing conditions dictate. The list of assemblies below is not intended to represent all rated conditions designated in whole of the Contract Documents or those that may be considered viable alternates (where approved by Architect). UL listed fire rated assemblies include, but are not limited to the following:

a. Wall Systems: Refer to Drawings.
b. Division 07, Section 07 84 13 "Penetrations Firestopping" for firestopping.
c. Division 07, Section 07 84 46 "Fire-Resistive Joint Firestopping" for fire resistive joints.

E. Wall Marking and Identification: In accordance with local building code requirements, permanently label fire rated walls, fire partitions, smoke barriers and smoke partitions and any other wall required to have protected openings or penetrations shall be effectively and permanently identified with signs or stenciling using lettering not less than 3 inches(76mm) high and with minimum 3/8 inch(10 mm) strokes with the words "FIRE AND/OR SMOKE BARRIER - PROTECT ALL OPENINGS".

1. Locate in accessible concealed floor, floor-ceiling, or attic space at 15 feet from end of wall and at intervals not exceeding 30 feet measured horizontally along the wall or partition.

F. 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.

1. STC-Rated Assemblies: Indicated by design designations from GA-600, "Fire Resistance Design Manual."

G. Low-Emitting Materials: For ceiling and wall assemblies, provide materials and construction identical to those tested in assembly and complying with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Indoor Sources Using Environmental Chambers."

H. Design Modifications: Make design modifications only as may be necessary to meet performance requirements and coordinate the Work. Variations in details and materials which do not adversely affect appearance, durability or strength shall be submitted to the Architect for review. Submit calculations as required.

I. Low-Emitting Materials:

1. Architectural paints and coatings wet-applied inside the weather-proofing system must meet the VOC general emissions testing criteria of CDPH Standard Method v1.2.
2. All paints and coatings wet-applied inside the weather-proofing system must have VOC content in compliance with the applicable VOC limits (g/L) found in tables in Division 01, Section 01 81 13 "Sustainable Design Requirements - LEED v4 BD+C."
3. Adhesives and Sealants wet-applied inside the weather-proofing system must meet the VOC general emissions testing criteria of CDPH Standard Method v1.2.
4. All adhesives and sealants wet-applied inside the weather-proofing system must have VOC content in compliance with the applicable VOC limits (g/L) found in tables in Division 01, Section 01 81 13.14 "Sustainable Design Requirements - LEED v4 BD+C."
5. All gypsum panel/wall covering products must meet the VOC general emissions testing criteria of CDPH Standard Method v1.2.

2.2 STEEL FRAMING SYSTEMS FOR WALLS AND PARTITIONS

A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of pre-consumer recycled content not less than 25 percent.

B. Framing Members, General: Comply with ASTM C754 for conditions indicated and with maximum deflection conditions specified under Article "Performance Requirements."

1. Steel Sheet Components: Comply with ASTM C645 requirements for metal , for steel framing, runners, studs, tracks, head joints, backing plate, channels, brackets and other steel supports, unless otherwise indicated.
2. Protective Coating: ASTM A653/A653M, G60 (Z180), hot-dip galvanized unless otherwise indicated. G40 equivalent coatings will not be accepted.

C. Studs and Runners: ASTM C645.

1. Steel Studs and Runners:

a. Products:

1) Subject to compliance with requirements, provide one of the following:
a) CEMCO; California Expanded Metal Products Co.
b) ClarkDietrich Building Systems.
c) Marino\WARE.
d) MBA Building Supplies.
e) MRI Steel Framing, LLC.
f) Phillips Manufacturing Co.
g) Steel Network, Inc. (The).
h) Telling Industries.
i) Mill Steel Framing.

b. Strength: 33 ksi minimum or thicker if required by performance requirements for deflection.
c. Minimum Base-Metal Thickness: 33 mils (0.912 mm) (20 gage, structural).
d. Depth: As shown on Drawings.

D. Attachments to Concrete Floor: As follows:

1. Power-Actuated Fasteners: Suitable for application indicated, fabricated from corrosion-resistant materials, and capable of sustaining, without failure, a load equal to 10 times that imposed by construction as determined by testing according to ASTM E1190 by a qualified independent testing agency.

E. Slip-Type Head Joints: Where indicated, provide one of the following coordinated with expected vertical movement:

1. Single Long-Leg Runner System: ASTM C645 top runner with minimum 2-inch-(51-mm-) deep flanges in thickness not less than indicated for studs, installed with studs friction fit into top runner and with continuous bridging located within 12 inches(305 mm) of the top of studs to provide lateral bracing.
2. Double-Long Leg Runner System: ASTM C645 top runners, with minimum 3-inch-(76-mm-) deep flanges in thickness not less than indicated for studs with studs friction fit into top runner and continuous bridging located within 12 inches(300mm) of the top of Studs to provide lateral bracing.
3. Deflection Track: Steel sheet top runner manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above; in thickness not less than indicated for studs and in width to accommodate depth of studs.

a. Products:

1) Subject to compliance with requirements, provide one of the following:
a) ClarkDietrich Building Systems Framing; SLP-TRK Slotted Deflection Track.
b) MBA Building Supplies; Slotted Deflecto Track.
c) Steel Network Inc. (The); VertiTrack VTD Series.
d) Superior Metal Trim; Superior Flex Track System (SFT)
e) Marino\WARE Metal Framing; SLTY - Slotted Deflection Track
f) Mill Steel Framing; Slotted Slip Track

F. Firestop Tracks: Top runner manufactured to allow partition heads to expand and contract with movement of the structure while maintaining continuity of fire-resistance-rated assembly indicated; in thickness not less than indicated for studs and in width to accommodate depth of studs.

G. Flat Strap and Backing Steel: Steel sheet, profiled or shaped studs, for blocking and bracing in length and width as required to support imposed loads.

1. Minimum Base Metal Thickness: 54 mils(137-mm) (16 gage), sized as required to fasten to studs for supporting wall mounted fixtures, equipment or required for attachment of other work.
2. At partitions indicated to support gravity and pullout loads of imposed fixtures, equipment, services, heavy trim, furnishings and similar work, engineer and provide additional framing, blocking and bracing support within partitions, or increase mil thickness or reduce spacing as required to support imposed loads and deflection criteria. Where floor to floor limiting heights are exceeded, provide additional bracing at midpoint of wall.
    a. Install supplementary 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, wall-mounted door stops, and similar items that cannot be supported directly by shaft wall assembly framing.
3. Coordinate with Division 06, Section 06 10 53 "Miscellaneous Rough Carpentry" for fire retardant treated solid wood or plywood blocking.

H. Cold-Rolled Channel Bridging: Steel, 0.0538-inch(1.367-mm) (16 gage) minimum base-metal thickness, with minimum 1/2-inch- 13-mm-) wide flanges.

1. Depth: 1-1/2 inches(38 mm) minimum, otherwise indicated on Drawings.
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-Metal Thickness: 30 mils(0.912 mm) (20 gage).
2. Depth: 7/8 inch(22.2 mm) unless otherwise indicated on Drawings.

J. Resilient Furring Channels: 1/2-inch-(13-mm-) deep, steel sheet members designed to reduce sound transmission.

1. Configuration: Asymmetrical or hat shaped, with face attached to single flange by a slotted leg (web) or attached to two flanges by slotted or expanded metal legs.

K. Cold-Rolled Furring Channels: Roll formed galvanized steel channel type, 7/8-inch-deep, for wall furring and ceiling attachment, fabricated from 54 mils(1.37-mm) uncoated-steel thickness, with minimum 1/2-inch-wide flanges.

1. Depth: As indicated on Drawings.

L. Furring Brackets: Adjustable, serrated arm type of corrosion resistant steel sheet, complying with ASTM C645, with minimum uncoated steel thickness of 30 mils engineered for screw attachment to steel studs and steel rigid furring channels.

M. Z-Shaped Furring: With slotted or nonslotted web, face flange of 1-1/4 inches (32 mm), wall attachment flange of 3/4 inch (19 mm), minimum uncoated-metal thickness of 0.0179 inch (0.455 mm), and depth required to fit insulation thickness indicated and spray fireproofing required.

2.3 STEEL FRAMING COMPONENTS FOR SUSPENDED AND FURRED CEILINGS

A. Ceiling Support Members, General: Provide heavy-duty metal suspension systems of types, structural classifications, and finishes indicated complying with ASTM C645 and Building Code for conditions indicated.

1. Provide primary suspension members of suitable design and adequate strength to support the finish materials, light fixtures, diffusers and other items occurring in or on the ceiling
2. Create suspended ceilings to comply with performance requirements paragraphs.

B. Steel Framing Members: Provide components complying with ASTM C754 for conditions indicated.

1. Protective Coating: ASTM A653, G40 hot-dip galvanized coating.

C. 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.

D. Hanger Attachments to Concrete:

1. Expansion Anchors: Fabricated from corrosion-resistant materials with holes or loops for attaching hangers and capable of sustaining, without failure, a load equal to 5 times that imposed by construction as determined by testing according to ASTM E488/E488M by an independent testing agency.

a. Type: Post-installed, chemical anchor or Post-installed, expansion anchor.

E. Strap Iron Inserts: Galvanized, mild steel flats, 1 by 3/16 inch with 7/16-inch diameter holes punched on center line and lower ends, designed to develop the full strength of the hangers.

F. Hangers: Mild steel, zinc coated or protected with rust-inhibitive paint. Provide one of the following:

1. Flat Hangers: Steel sheet, 1 by 3/16-inch(25 by 5 mm) by length indicated unless otherwise indicated on Drawings.
2. Angle-Type Hangers: Angles with legs not less than 7/8 inch(22.2 mm) wide, formed from 68 mils-(1.6-mm-) thick galvanized steel sheet complying with ASTM A653, G 60(ASTM A653M, Z 180) coating designation, with bolted connections and 5/16-inch (8-mm) diameter bolts.
3. Rod Hangers: ASTM A510, mild carbon steel rods, 1/4 inch(6mm) in diameter.

G. Carrying Channels: Cold-rolled steel, 54 mils(1.37-mm) minimum thickness of base (uncoated) metal and 7/16-inch- (11.1-mm-) wide flanges, and as follows:

1. Carrying Channels: 1-1/2 inches(38.1 mm) deep, 475 lb./1000 feet(70 kg/100 m), unless otherwise indicated.
2. Finish: ASTM A653, G 60(ASTM A653M, Z 180) hot-dip galvanized coating.

H. Furring Channels (Furring Members):

1. Cold Rolled Channels: 54 mils (1.37mm) thick uncoated steel thickness with minimum 1/2 inch wide flanges, 3/4 inch deep, 300 lb./1000 feet, unless otherwise indicated.

a. Finish: ASTM A653, G 60 hot-dip galvanized coating.

2. Steel Studs for Furring Channels: ASTM C645, with flange edges of studs bent back 90 degrees and doubled over to form 3/16-inch(5-mm) wide minimum lip (return), and complying with the following requirements for minimum thickness of base (uncoated) metal and for depth:

a. Thickness: 33 mils(0.84 mm), unless otherwise indicated.
b. Depth: min. 2-1/2 inches(41 mm) unless otherwise indicated on Drawings.

3. Hat-Shaped, Rigid Furring Channels: ASTM C645, 7/8 inch deep.

a. Minimum Base-Metal Thickness: 33 mils or as otherwise indicated on Drawings.

4. Resilient Furring Channels: 1/2-inch-deep members designed to reduce sound transmission.

a. Configuration: Asymmetrical.

I. 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 World Industries, Inc.; Drywall Grid Systems.
b. Chicago Metallic Corporation; Drywall Grid System.
c. USG Corporation; Drywall Suspension System.

J. Isolation Strip at Exterior Walls:

1. Asphalt Saturated Organic Felt: ASTM D 226/D 226M, Type I (No. 15 asphalt felt), nonperforated.
2. 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.

K. Auxiliary Materials: Provide auxiliary materials complying with referenced installation standards.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. ClarkDietrich Building Systems.
b. MRI Steel Framing, LLC.

2. Fasteners for Steel Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.
3. Backer Plates: Galvanized steel, 0.050-inch (1.27 mm), minimum 6 inch (150 mm) width

2.4 GYPSUM BOARD PRODUCTS

A. Recycled Content of Gypsum Panel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 50 percent.

B. Regional Materials: Gypsum panel products shall be manufactured within 100 miles(`600km) of Project site from materials that have been extracted, harvested, or recovered, as well as manufactured, within 100 miles(160 km) of Project site.

C. Regional Materials: Gypsum panel products shall be manufactured within 100 miles(160 km) of Project site.

2.5 INTERIOR GYPSUM BOARD

A. Panel Material Requirements: Provide materials and components complying with requirements of fire-resistance-rated assemblies indicated.

1. Provide auxiliary materials complying with gypsum board manufacturer's written recommendations.

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

C. Gypsum Board Non Fire Rated and Fire Rated:

1. Type X: ASTM C1396/C1396M or ASTM C1658/C1568M:

a. Thickness: 5/8 inch(15.9 mm).
b. Long Edges: Tapered.
c. Product:

1) Subject to compliance with requirements, provide one of the following:
a) CertainTeed Corporation, Gypsum Board, Type X.
b) Georgia-Pacific Gypsum LLC, ToughRock Fireguard X Gypsum Board
c) National Gypsum Company; Gold Bond Fire-Shield Gypsum Board.
d) USG Corporation, Sheetrock Gypsum Panels, Firecode Type X.
e) Continental Building Products, Firecheck Type X

2. Type C: ASTM C1396. Manufactured to have increased fire resistive capability:

a. Thickness: 5/8 inch(15.9 mm).
b. Long Edges: Tapered.
c. Product:

1) Subject to compliance with requirements, provide one of the following:
a) CertainTeed Corporation, "Type C Gypsum Board."
b) Georgia-Pacific Gypsum LLC, "ToughRock Fireguard C Gypsum Board."
c) National Gypsum Company; "Gold Bond Fire-Shield Type C Gypsum Board."
d) USG Corporation, "CGC Sheetrock Brand, Firecode C Panels."
e) Continental Building Products, "5/8 inch Firecheck Type C."

D. Mold and Mildew Resistant Gypsum Board:

1. ASTM C1396/C1396M or ASTM C1658/C1568M with moisture- and mold-resistant core and surfaces.
2. Core: 5/8 inch(15.9 mm), Type X.
3. Long Edges: Tapered.
4. Mold Resistance: ASTM G21 with a score of 0, and ASTM D3273, score of 10 as rated according to ASTM D3274.
5. Product:

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

1) Continental Building Products, "Mold Defense Type X."
2) Georgia-Pacific Gypsum LLC, ToughRock Mold Guard Type X Board.
3) National Gypsum Company; "Gold Bond XP Fire-Shield Wallboard."

b. USG Corporation, "Sheetrock Brand, Mold Tough Firecode."

E. Gypsum Shaftliner Board, Moisture- and Mold-Resistant Type X:

1. ASTM C1396/C1396M or ASTM C1658/C1568M; manufacturer's proprietary fire-resistive liner panels with moisture- and mold-resistant core and surfaces.
2. Thickness: 1 inch(25 mm).
3. Long Edges: Double bevel.
4. Mold Resistance: ASTM D3273, score of 10 as rated according to ASTM D3273.
5. Product: Subject to compliance with requirements, provide one of the following:

a. CertainTeed "M2Tech Shaftliner Type X."
b. Continental Building Products, "Mold Defense Shaftliner Type X."
c. National Gypsum Company "Gold Bond Fire-Shield Shaftliner XP."
d. USG Corporation "Type X Sheetrock Glass-Mat Panel Mold Tough."

F. Gypsum Ceiling Board:

1. ASTM C1396/C1396M. Manufactured to have more sag resistance than regular type gypsum board.
2. Core: 5/8 inch(15.9 mm).
3. Long Edges: Tapered.
4. Products:

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

1) CertainTeed Corporation, "Type X Gypsum Board."
2) Continental Building Products, "Firecheck Type C."
3) Georgia-Pacific Gypsum LLC, “ToughRock Fireguard C Gypsum Board."
4) National Gypsum Company, "Gold Bond Brand High Strength Celling Board ."
5) USG Corporation, "Sheetrock Firecode Type X."

G. Abuse-Resistant Gypsum Board: High density, fire resistant, type X core, with heavy paper face that is highly resistant to scuffing, tested in accordance with ASTM C1629/C1629M.

1. Core: 5/8 inch(15.9 mm), Type X.
2. Long Edges: Tapered.
3. Mold Resistance: ASTM D3273, score of 10 as rated according to ASTM D3274.
4. Product:

a. Subject to compliance with requirements, provide the following or comparable product by one of the named manufacturers:

1) CertainTeed Corporation, Extreme Abuse Resistant Type X Gypsum Board.
2) Georgia-Pacific Gypsum LLC, ToughRock Fireguard X Mold Guard Max Abuse-Resistant Gypsum Board.
3) National Gypsum Company, Hi-Abuse XP Wallboard.
4) USG Corporation, Sheetrock Brand, Mold Tough AR Firecode X Panels.

H. Impact-Resistant Gypsum Board: High density, fire resistant, type X core, reinforced with a fiberglass mesh to provide impact/penetration resistance in accordance with ASTM C1629/C1629M, Level 2.

1. Core: 5/8 inch(15.9 mm), Type X.
2. Long Edges: Tapered.
3. Product:

a. Subject to compliance with requirements, provide the following or comparable product by one of the named manufacturers:

1) CertainTeed Corporation, Extreme Impact Resistant Type X.
2) Georgia-Pacific Gypsum LLC, ToughRock Fireguard X Mold Guard Max Impact Resistant Gypsum Panel.
3) National Gypsum Company, Hi Impact XP Wallboard.
4) USG Corporation, Sheetrock Brand Glass-Matt Panels, Mold Tough Very High Impact Fire Code Type X.

2.6 TILE BACKING PANELS

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

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

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

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

1) National Gypsum Company, PermaBase Cement Board.
2) James Hardie, Hardi Backer 500 board.

2.7 TRIM ACCESSORIES

A. Accessories for Interior Installation: Cornerbead, edge trim, and control joints complying with ASTM C1047 and requirements indicated below:

1. Material: Galvanized steel sheet or rolled zinc or paper faced galvanized steel sheet.
2. Shapes indicated below by reference to Fig. 1 designations in ASTM C1047:

a. Cornerbead on outside corners, unless otherwise indicated.
b. Bullnose bead.
c. LC-bead with both face and back flanges; face flange formed to receive joint compound. Use LC-beads for edge trim, unless otherwise indicated.
d. L-bead with face flange only; face flange formed to receive joint compound. Use L-bead where indicated.
e. U-bead with face and back flanges; face flange formed to be left without application of joint compound. Use U-bead where indicated.
f. Control Joint Trim: ASTM C1047, provide #93 Zinc Control Joint (ZNCJ) by Clark Dietrich.
g. Fire Rated Control Joint: "FAS-093X Fire Rated Control Joint" (CEMCO or Marino\Ware) composite control joint with intumescent tape factory applied to the back side of the joint, tested according to UL 2079 and used to relieve stresses of expansion and contraction of drywall interior partitions or ceilings running in a horizontal or vertical direction. Steel is fabricated from (G40 coating) hot dip galvanized steel complying with ASTM A653 and ASTM A1003.

2.8 JOINT TREATMENT MATERIALS

A. General: Provide joint treatment materials complying with ASTM C475/C475M and the recommendations of both the manufacturers of panel products and of joint treatment materials for each application indicated. Comply with all Gypsum Association and manufacturer’s recommendations regarding temperature and humidity before applying joint compound and finish materials to gypsum board and paperless gypsum board.

B. Joint Tape for Gypsum Board: Pressure-sensitive or staple-attached, open-weave, glass-fiber reinforcing tape with setting-type joint compound.

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

C. Drying Type Joint Compounds for Interior Gypsum Board:

1. Factory packaged drying type all-purpose latex compounds for non-wet interior, complying the following requirements:

    a. Ready-Mixed Formulation: Factory-mixed product.
    b. Taping compound formulated for prefilling open joints and damaged surface areas, embedding tape and for first coat on joints, over fasteners and face flanges of trim accessories.

        1) Use setting type for installing paper faced metal trim accessories

    c. Topping compound formulated for fill (second) and finish (third) coats.
    d. All-purpose compound formulated for both taping and topping compounds.

D. Setting-Type Joint Compounds for Interior Gypsum Board:

1. Factory-packaged vinyl-based products complying with the following requirements for formulation and intended use.

    a. Ready-Mixed Formulation: Factory-mixed product.
    b. Taping compound formulated for embedding tape and for first coat over fasteners and face flanges of trim accessories.
    c. Topping compound formulated for fill (second) and finish (third) coats.
    d. All-purpose compound formulated for both taping and topping compounds.

E. Tile Backing Panel Finishing Materials:

1. Tape, joint and skim coat compounds as recommended by manufacturer or as follows:

    a. Tiled Surfaces:

        1) Joint Tape: G-P Dens-Shield glass mesh tape or equivalent.
        2) Reinforcing Mesh: 2-inch(50 mm) coated mesh tape equivalent to Sto "Reinforcing Fiber Mesh."
        3) Tile setting materials as specified in Division 09, Section 09 30 00 "Tiling."

2.9 ACOUSTIC AND FIRE RATED MATERIALS

A. Sound Attenuation Fire Blankets (SAFB): ASTM C665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool with thermal conductivity of "k" = 0.25 Btu in./hr. ft.^{2} o F. at 75 deg. F. Minimum 3 pcf density. ASTM E84, flame spread 15, smoke developed 10, or less.

1. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.
2. Provide manufacturer’s standard sizes in thickness indicated.
3. Products:

    a. "Thermafiber SAFB (Sound Attenuation Fire Blanket)" (Owens Corning) Formaldehyde Free.
    b. "AFB EVO" (Roxul Inc.).

4. Recycled Content of Blankets: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 65 percent.
5. Formaldehyde Free: Comply with CARB requirements for ultra-low emitting formaldehyde (ULEF) resins or no added formaldehyde resins.

B. Acoustical Blanket Insulation: Manufactured from inorganic glass fibers 2 pcf density, blanket that is fabricated in widths to suit framing spacing with continuous lengths cut to suit cavity lengths, with the following performance criteria:

1. Maximum Air Velocity (UL181 Erosion Test): 3,000 fpm
2. Fungi Resistance (ASTM C1388): Meets Requirement
3. Surface Burning Characteristics (ASTM E84, UL723): Flame Spread of 25, Smoke Developed rating of 50.
4. NRC (ASTM C423): Minimum 0.95
5. Greenguard Gold Certified
6. Recycled Content of Blankets: Containing a minimum of 53% recycled glass content, 31 percent pre-consumer and 22% and post-consumer.
7. Products:

    a. "SelectSound Black Acoustic Blanket" (Owens Corning)

C. Partition End Closures **MTL-11**:

1. Pre-assembled extruded aluminum partition closure with and acoustic seals and with spring loaded mechanism to adjust for a tight fit between vertical junctions of curtain wall and adjacent gypsum board partition.
2. Fill partition closure with acoustic insulation.
3. Provide metals free from surface blemishes where exposed to view in finished unit. Surfaces that exhibit pitting, seam marks, roller marks, stains, and discolorations, or other imperfections on finished units are not acceptable.
4. Exposed Aluminum Finish: Manufacturer’s standard baked acrylic finish or acrylic-polyester powder coat paint in colour to match curtain wall colour and finish. [Field painted by Section 09 91 00 “Painting”].
5. Product: Mullion Mate [Series 30] [Series 40] with [Extruded Mullion Mate End Caps [Brake Formed Mullion Mate End Caps] by Gordon Interior Specialties Division, Gordon Inc.

D. Acoustic Box Pads (For Acoustic Control): Polybutene pads, 1/8-inch(3 mm) thick, Lowery's Electrical Box Pads as manufactured by Harry A. Lowery & Associates, Inc., Sun Valley, CA 91352, or other approved by Architect.

E. Fire Rated Box Pads: Putty Pads; moldable non-curing one component, intumescent, fire-rated material for through-penetration fire stop systems and sound attenuation systems; self-adhering; 1/8-inch(3 mm) thick minimum.

2.10 AUXILIARY MATERIALS

A. General: Provide auxiliary materials for gypsum board assemblies that comply with referenced standards and recommendations of gypsum board and framing manufacturers.

B. Isolation Strip at Exterior Walls: 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. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.

1. Laminating adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

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

E. Track Fasteners: Power-driven fasteners of size and material required to withstand loading conditions imposed on assemblies without exceeding allowable design stress of track, fasteners, or structural substrates in which anchors are embedded.

1. Expansion Anchors: Fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 5 times design load, as determined by testing per ASTM E488 conducted by a qualified testing agency.

F. Steel Drill Screws: 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.

G. Spot Grout: ASTM C475/C475M, setting-type joint compound recommended for spot grouting hollow metal door frames.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates to which gypsum board assemblies attach or abut, including installed hollow metal frames, cast-in-anchors, and structural framing, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of assemblies specified in this Section.

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

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

3.2 PREPARATION

A. Temporary Heat: When the outside temperature is below 55 deg F, provide heat and maintain in all areas where the work is to be performed. Provide heat continuously and uniformly at 55 deg F from one week prior to start of installation until dry wall application and joint treatment is completed. Do not start installation until curtainwall, storefront and doors installed, or openings temporarily closed. Provide ventilation to remove excess moisture during joint treatment.

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

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

C. Sprayed Fire-Resistive Materials: Coordinate sprayed fire resistive materials with gypsum board assemblies, so both elements of Work remain complete and undamaged. Patch or replace sprayed fire-resistive materials removed or damaged during installation of gypsum board assemblies to comply with requirements specified in Division 07, Section 07 81 00 "Applied Fire Protection".

1. Before sprayed fire-resistive materials are applied, attach offset anchor plates or metal z-furring channels 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 to support gypsum board assemblies, without reducing the thickness of fire-resistive materials below that required for fire-resistance ratings indicated. Protect adjacent fire-resistive materials from damage.

3.3 INSTALLING STEEL FRAMING, GENERAL

A. Steel Framing Installation Standard: Install steel framing system components to comply with ASTM C754 and with ASTM C840 requirements that apply to framing installation.

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

C. At duct openings, fire dampers, smoke dampers and fire smoke dampers, door frames, window framing and other openings greater than 3 ft. x 3 ft. through drywall partitions, provide double stud framing vertically and horizontally sized to frame openings and provide support for imposed items. In addition, at dampers, comply with UL assembly requirements for damper framing.

D. Install supplementary framing, blocking, and bracing at terminations in gypsum board assemblies to support fixtures, equipment, services, casework, heavy trim, grab bars and railings, toilet accessories, furnishings, or similar construction.

1. Comply with details indicated and with recommendations of gypsum board manufacturer or, if none available, with United States Gypsum Co.'s "Gypsum Construction Handbook."
2. Coordinate with Division 06, Section 06 10 53 "Miscellaneous Rough Carpentry" for fire retardant treated wood blocking to support green walls, monitors and other wall mounted items.
3. Identify the location of framing, blocking assemblies on the face of drywall to enable trades who install wall and ceiling mounted devices.

E. Isolate steel framing from building structure at locations indicated to prevent transfer of loading imposed by structural movement. Comply with details shown on Drawings.

F. Install bracing at terminations in assemblies.

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

3.4 INSTALLING STEEL FRAMING FOR SUSPENDED AND FURRED CEILINGS

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

1. Wire Hangers: 48 inches (1219 mm) o.c.
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 ceiling 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 the location of hangers required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.

    a. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards.

3. Wire Hangers: Secure wire hangers by looping and wire-tying, either directly to structures or to inserts, eyescrews, 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.
4. Flat Hangers: Secure flat, angle, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices and fasteners that are secure and appropriate for structure and for type of hanger, and in a manner that will not cause them to deteriorate or otherwise fail.
5. Do not attach hangers to steel roof deck without Structural approval in writing on shop drawings.
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. Install miscellaneous framing and connections, including supplementary framing, web stiffeners, clip angles, continuous angles, anchors, and fasteners, to provide a complete and stable wall-framing system.

E. 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.

F. Installation Tolerances: Install steel framing components for suspended ceilings so that cross-furring or grid suspension members are level to within 1/8 inch in 12 feet(3 mm in 3.6 m) as measured both lengthwise on each member and transversely between parallel members.

3.5 INSTALLING STEEL FRAMING FOR WALLS AND PARTITIONS

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

1. Single-Layer Application: 16 inches(406 mm) o.c. unless otherwise indicated.
2. Multilayer Application: 16 inches(406 mm) o.c. unless otherwise indicated.
3. Tile Backing Panels: 16 inches(406 mm) o.c. unless otherwise indicated or required by tile backing panel manufacturer.

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

1. Seal joints between surfaces with sealant.

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

1. Fasteners: Secure runners to substrates with fasteners spaced a maximum of 24 inches (600 mm) on center unless closer spacing is recommended by the framing manufacturer for the floor and ceiling construction involved. Provide fasteners at all corners and ends of runner tracks.
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.

D. Install steel studs so flanges point in the same direction and leading edge or end of each gypsum board panel can be attached to open (unsupported) edges of stud flanges first.

E. In fire rated construction, extend partition framing full height to structural supports or substrates above suspended ceilings. Continue framing over frames for doors and openings and frame around ducts penetrating partitions above ceiling to provide support for gypsum board.

1. Cut studs short of full height by dimension required to allow for deflection indicated. Coordinate with the partition sheet for deflections indicated. Coordinate with partition schedule and head of partition details for movement requirements and details.
2. For fire-resistance-rated and STC-rated assemblies that extend to the underside of floor/roof slabs and decks or other continuous solid-structure surfaces to obtain ratings, install framing around structural and other members extending below floor/roof slabs and decks, as needed to support gypsum board closures and to make partitions continuous from floor to underside of solid structure.
3. Fasteners: Secure top and bottom runners (tracks) to structural substrates with fasteners starting 2 inches from ends and to match stud spacing. Secure gypsum boards to studs with fasteners spaced a maximum of 8 inches (600 mm) on center at the perimeter and 12 inches on center in the field of board, unless closer spacing is recommended by the framing manufacturer for the floor and ceiling construction involved. Provide fasteners at all corners and ends of runner tracks.

F. Frame door openings to comply with GA-600 and with gypsum board manufacturer's applicable written recommendations, and as follows:

1. Single Doors to 32 inches(813 mm) Wide: Two 33 mils thick studs or one 43 mils thick stud at each jamb and one additional stud no more than 6 inches(150 mm) from stud. At fire rated openings, use one 0.045 inch(1.14 mm) thick stud only.
2. Single Doors Greater Than 32 inches to 48 inches(813 to 1219 mm) Wide: One 43 mils thick stud at each jamb and one additional stud no more than 6-inches(152 mm) from jamb studs.
3. Single Doors Greater Than 48 inches(1219 mm) Wide and Pairs of Doors: Two 43 mils thick studs at each jamb and one additional stud no more than 6 inches(150 mm) from jamb studs.
4. Provide runner track and typical studs above door openings with studs spaced not more than 24 inches(610 mm) o.c.
5. At all welded frames with fixed anchor clips secure stud reinforcing to jamb anchor clips with not less than two self-tapping screws per clip.
6. Extend jamb studs through suspended ceilings and attach to underside of floor or roof structure above.

G. 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.

1. 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.
2. Sound-Rated Partitions: Install framing to comply with sound-rated assembly indicated.

H. Direct Furring:

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

I. Z-Furring Members:

1. 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.
2. 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.

J. Installation Tolerance: Install each framing member to a tolerance of 1/8 inch in 10 ft. non-cumulative for plumbness and level, and so fastening surfaces vary not more than 1/8 inch(3 mm) from the plane formed by faces of adjacent framing.

3.6 APPLYING AND FINISHING GYPSUM BOARD, GENERAL

A. Gypsum Board Application and Finishing Standards: Install and finish gypsum panels to comply with ASTM C840, GA 214 and GA-216, and if applicable, GA-220.

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

C. 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(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. Avoid joints other than control joints at corners of framed openings where possible.

E. Attach gypsum panels to steel studs so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.

F. Attach gypsum panels to framing provided at openings and cutouts.

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

H. Cover both faces of steel stud partition framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases that are braced internally.

1. Except where 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 open concrete coffers, concrete joists, and other structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by coffers, joists, and other structural members; allow 1/4 to 3/8 inch(6.4 to 9.5 mm) wide joints to install sealant.

I. Where chase walls are indicated, provide bracing between parallel rows of studs. Unless otherwise indicated, provide gypsum board braces no less than 1/2 inch-(12.7 mm) thick by 12 inches(300 mm) wide and cut to width of chase. Locate at quarter points in wall height between each pair of parallel studs. Fasten with not less than 3 screws at each stud.

J. Do not bridge architectural or building expansion joints with gypsum wall assemblies; frame both sides of expansion joints with furring and other support.

K. Firestop Tracks: Where indicated, install to maintain continuity of fire-resistance-rated assembly indicated.

L. Control Joints: Install control joints according to ASTM C840 and in specific locations as shown on drawings or at spacings indicated in the specification and at locations approved by Architect, while maintaining fire-resistance rating of gypsum board assemblies.

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

1. Attach gypsum panels to framing provided at openings and cutouts.
2. Install the first run of gypsum board consistently at a minimum of 1/4 inch to maximum 3/4 inch above finish floor.

N. STC-Rated Assemblies: Seal construction at perimeters, behind control and expansion joints, and at openings and penetrations that are 1/2 inch or less with a continuous bead of acoustical sealant. At fire rated acoustic assemblies, provide fire stopping sealants at larger openings coordinated with Division 07 Section 07 84 46 "Fire Resistive Joint Firestopping". Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C919 and manufacturer's written recommendations for locating edge trim and closing off sound-flanking paths around or through gypsum board assemblies, including sealing partitions above acoustical ceilings.

1. At partitions, provide continuous beads of acoustical sealant at juncture of both faces of runners or plates with floor and ceiling construction, and wherever wallboard abuts dissimilar materials (i.e., doors and windows). Apply prior to installation of wallboard.
2. At ceilings, provide continuous beads of acoustical sealant wherever wallboard abuts dissimilar materials.
3. Provide continuous bead of acoustical sealant behind faces of control joints. Apply prior to installation of surface applied control joint accessories and locate at proper depth in joint to allow for insertion of expansion portion of control joint accessory.
4. At openings and cutouts, fill open spaces between wallboard and fixtures, cabinets, ducts and other flush or penetrating items, with continuous bead of acoustical sealant.
5. Provide acoustical sealant at sides and backs of electrical boxes to completely seal openings and joints.
6. Use moldable electric box pad materials at ducts, pipes, and other items penetrating partitions above suspended ceilings to seal penetrations.

7. Comply with ASTM C919 and with manufacturer's written recommendations for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings.
8. Sound Flanking Paths: Where sound rated partition walls intersect non rated wallboard partition walls, extend sound rated construction to completely close sound flanking paths through non rated construction. Provide acoustical sealant at joints between face layers at vertical interior angles of intersecting partitions.

O. Install sound-attenuation blankets, where indicated, prior to installing gypsum panels unless blankets are readily installed after panels have been installed on one side. Form continuous layer for full height of partition and tightly abutting web of studs. Fit carefully behind electrical outlets and other penetrations. Attach to back face of wallboard in accordance with manufacturer's instructions.

P. Cut openings in gypsum board for electrical outlets, piping and other penetrations. Maintain close tolerances so that edges will be covered by plates and escutcheons. Cut both face and back paper. Do not install electrical outlets back to back on opposing sides of partitions

Q. Partition End Fillers: Provide partition end fillers at ends of partitions to provide acoustic closure between offices.

1. At walls that are perpendicular to exterior glass walls, provide proprietary system specified using manufacturer's standard shop finished one piece channels and silicone closures for each location.
    a. Provide fiberglass insulation within cores of channels to allow for sound mitigation. Secure channels to gypsum drywall partition end studs.
    b. Provide silicone closures of depth necessary to allow for 3/- inch(19mm) mullion deflection and 1-inch(25mm) glass deflection in either direction.
2. At walls that are perpendicular with exterior mullions or solid walls: Install compressible filler continuously between window wall mullion and gypsum board partition end filler panels, maintaining a min. of 3/4 in. spacing to allow for curtain wall deflection. Utilize self-adhesive to position end fillers on window mullion. Adhesively apply compressible filler continuously from floor to ceiling including underside of soffit. Do not penetrate window mullion with any type of fastenings. Prior to installing partition studs or vertical support members, apply adhesive to side facing partition to allow for two-sided adhesion and a continuous seal.

R. Space fasteners in gypsum panels according to referenced gypsum board application and finishing standard and manufacturer's recommendations.

1. Space screws a maximum of 12 inches (300 mm) o.c. for vertical applications.
2. Install fasteners not less than 3/8-inch(9 mm) from ends or edges of wallboard sheets, spacing fasteners opposite each other on adjacent ends or edges.
3. Space fasteners in panels that are tile substrates a maximum of 8 inches(200 mm) o.c.

S. Single-Layer Application: Install gypsum wallboard panels as follows:

1. On ceilings, apply gypsum panels before wall/partition board application to the greatest extent possible and at right angles to framing, unless otherwise indicated.
2. On partitions/walls, apply gypsum panels horizontally (perpendicular to framing), unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.
    a. Stagger abutting end joints not less than one framing member in alternate courses of board.

b. At stairwells and other high walls, install panels horizontally, unless otherwise indicated or required by fire-resistance-rated assembly.

3. On Z-furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.
4. Fastening Methods: Apply gypsum panels to supports with steel drill screws.

T. Multilayer Application:

1. On ceilings, apply gypsum board panels before applying panels 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 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. 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. Fastening Methods: Fasten base layers and face layers separately to supports with screws.

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

V. At hollow metal door frames, cut gypsum boards to fit around hardware reinforcement or mortar boxes. Spot grout frames with a quick setting grout or compound at each jamb anchor clip just prior to inserting of boards into frame at tenant entry doors and base building doors. Insert boards into frame so that its edge is fully bedded against inside surface of the frame. Butter the edge of boards with joint compound if necessary to achieve full bedding.

3.7 INSTALLATION OF INSULATION IN CEILINGS FOR SOUND ATTENUATION

A. Where acoustical blankets are indicated for sound attenuation above ceilings, install blanket insulation over entire ceiling area in thicknesses indicated. Extend insulation 24 inches (610 mm) on both sides of partition heads.

3.8 APPLYING TILE BACKING PANELS

A. Cementitious Backer Units: ANSI A108.11, at showers, tubs, janitor closets, large format tile location, and locations where partitions are erected first, and concrete topping is poured adjacent to the wall and other wet areas indicated locations indicated to receive tile. Tile backing panel should not be exposed above the surface of the topping slab and should be installed only to the height required for the concrete pour.

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

C. Support ends of boards over framing. Fasten boards to studs with 1-1/4-inch(32 mm) long screws spaced 16 inches(406 mm) o.c. and at perimeter 8 inches(203mm) o.c. not less than 3/8 inch(10mm) nor more than 5/8 inch(16mm) for board edges.

D. Install Moisture and Mold Resistant gypsum wallboard of the same thickness above tile backer board on walls with ceramic tile wainscot and full height on other walls in toilet rooms and wet areas.

E. Seal joints with sealant and tape as recommended by manufacturer. Seal joints, cuts, and penetrations with silicone sealant.

3.9 LARGE FORMAT TILE BACKING PANEL INSTALLATION

A. General: TCNA defines large format tile as any tile with one dimension larger than 15 inches (381mm).

B. Install cementitious or water-resistant gypsum backing boards substrates in accordance with requirements of the Tile Council of North America TCNA and tile manufacturer's recommendations and written instructions

C. Maximum substrate variation not to exceed 1/8 inch in 10 ft.(3mm in 3048mm) and 1/16 inch in 2 ft. noncumulative along entire run of partition, when measured from surface high points with a straight-edge. No lippage will be allowed between adjacent panels. If not in compliance with this requirement, drywall installer shall coordinate with tile installer to correct substrate, so it is acceptable for large format tile installation.

D. Install horizontal reinforcing framing 48 inches(1219mm) o.c. for full height of partitions to stiffen wall and limit wall deflection to L/480 of the overall height of wall, not to exceed 1/2 inch(12mm), except for hand set dimension stone panel walls which shall be stiffened to L/720 not to exceed 1/4 inch(6mm).

3.10 SHAFT-WALL INSTALLATION

General: Install gypsum board shaft-wall assemblies to comply with requirements of fire-resistance-rated assemblies indicated, manufacturer's written installation instructions, and the following:

1. ASTM C754 for installing steel framing except comply with framing spacing indicated.

B. Install supplementary 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. At elevator hoistway entrance door frames, provide jamb struts on each side of door frame.
2. Where handrails directly attach to gypsum board shaftwall assemblies, provide galvanized steel reinforcing strip accurately positioned and secured behind at least one layer of face panel.

C. Integrate stair hanger rods with gypsum board and gypsum board shaft-wall assemblies by locating cavity of assemblies where required to enclose rods.

D. At penetrations in gypsum board shaft-wall, and gypsum wall board maintain fire-resistance rating of 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.

E. Isolate perimeter of gypsum panels from building structure to prevent cracking of panels, while maintaining continuity of fire-rated construction.

F. Firestop Tracks: Where indicated, install to maintain continuity of fire-resistance-rated assembly indicated.

G. Control Joints: Install control joints at locations indicated on Drawings according to ASTM C840 and in accordance with the maximum spacing indicated in the specifications, while maintaining fire-resistance rating of gypsum board shaft-wall assemblies.

H. Seal gypsum board shaft walls with acoustical sealant at perimeter of each assembly where it abuts other work and at joints and penetrations within each assembly. Install acoustical sealant to withstand dislocation by air-pressure differential between shaft and external spaces; maintain an airtight and smoke-tight seal; and comply with ASTM C919 requirements or with manufacturer's written instructions, whichever are more stringent.

I. In elevator shafts where gypsum board shaft-wall assemblies cannot be positioned within 2 inches(50 mm) of the shaft face of structural beams, floor edges, and similar projections into shaft, install 5/8-inch(16 mm)- thick, gypsum board cants covering tops of projections. No recesses allowed (at steel beams especially).

1. Slope cant panels at least 75 degrees from horizontal. Set base edge of panels in gypsum board adhesive and secure top edges to shaft walls at 24 inches(610 mm) o.c. with screws fastened to shaft-wall framing.
2. Where cants exceed 2 inches(51 mm), support gypsum board cants, with steel stud framing installed 24 inches(610 mm) o.c. and extend studs from the projection to shaft-wall framing.

3.11 INSTALLATION OF BOX PADS

A. Cut openings in wallboard for electrical outlets, piping and other penetrations. Maintain close tolerances so that edges will be covered by plates and escutcheons. Cut both face and back paper. Do not install electrical outlets back to back on opposing sides of partitions. Maintain at least one full stud cavity between outlets (two regular placements between).

B. Install acoustical box pads over all electrical and other type of device boxes in sound rated walls, including but necessarily limited to electrical junction boxes, electrical switch boxes, power outlet receptacle boxes, thermostat control boxes, telephone outlet boxes and television cable or antenna outlet boxes.

C. Install fire rated box pads over all electrical and other type of device boxes and other items penetrating fire-rated walls, including but necessarily limited to electrical junction boxes, electrical switch boxes, power outlet receptacle boxes, thermostat control boxes, telephone outlet boxes, exit sign boxes, building clock boxes, and television cable or antenna outlet boxes.

D. Install in accordance with the printed installation instructions of the manufacturer.

E. Brush or wipe dust and dirt from box surface.

F. Center pad on back of box and mold around conduit or cable entering box. Mold pad around all sides covering all openings.

3.12 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.

B. Install cornerbead at external corners.

C. Install edge trim where edge of gypsum panels would otherwise be exposed. Provide edge trim type with face flange formed to receive joint compound, except where other types are indicated.

1. Install LC-bead where gypsum panels are tightly abutted to other construction and back flange can be attached to framing or supporting substrate.
2. Install L-bead where edge trim can only be installed after gypsum panels are installed.
3. Install U-bead where indicated.

D. Install control joints according to ASTM C840 and GA 216 and in specific locations approved by Architect for visual effect; except, that in no case shall control joints in ceilings, soffits, or partitions be spaced at distances greater than 30-linear feet(9 m).

1. Control joints shall be installed where partitions, walls, or ceilings traverse a construction joint (expansion, seismic, or building control element) in the base building structure.
2. Control joints shall be installed where a wall or partition runs in an uninterrupted straight plan exceeding 30-linear feet(9.1 m).
3. Control joints in interior ceilings with perimeter relief shall be installed so that linear dimensions between control joints do not exceed 50 feet(15 m) and total area between control joints does not exceed 2,500-sq. ft.(230 sq. m).
4. Control joints in interior ceilings without perimeter relief shall be installed so that linear dimensions between control joints do not exceed 30 feet(9.1 m) and total area between control joints does not exceed 900-sq. ft.(84 sq. m).
5. A control joint or intermediate blocking shall be installed where ceiling framing members change direction.
6. A control joint shall be installed where a partition, wall, or ceiling abuts a dissimilar wall or ceiling, or penetration.
7. A control joint shall be installed where partition, wall, or ceiling backup construction or framing changes within plane of partition, wall, or ceiling.
8. Control joints shall be installed where wings of "L", "U", and "T" –shaped ceiling areas are joined together.
9. Less-than-ceiling height door and window frames shall have control joints extending from both frame corners to the ceiling or shall have additional framing reinforcement at the frame corners to distribute concentrated stresses.

E. Install edge trim where edge of gypsum panels would otherwise be exposed or semi-exposed. Provide edge trim type with face flange formed to receive joint compound.

3.13 FINISHING GYPSUM BOARD ASSEMBLIES

A. General: Treat gypsum board joints, interior angles, flanges of cornerbead, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration.

B. Prefill open joints, rounded or beveled edges, and damaged areas using setting-type joint compound.

C. Apply joint tape over gypsum board joints, except those with trim accessories having flanges not requiring tape.

D. Gypsum Board Finish Levels: Finish joints of fire resistance rated assemblies in accordance with requirements of their listing for testing of assemblies. Finish panels to levels indicated below, according to ASTM C840, GA-216, and GA 214, for locations indicated:

1. Level 1: Embed tape at joints in ceiling plenum areas, concealed areas, and where indicated, unless a higher level of finish is required for fire-resistance-rated assemblies and sound-rated assemblies. For use at panels at ceiling plenum areas, concealed areas, and where indicated.
2. Level 2: Embed tape and apply separate first coat of joint compound to tape, fasteners, and trim flanges where panels are substrate for ceramic or acoustical tile. Level 2 finish shall be applied to Moisture and Mold resistant gypsum board, where panels are substrate for tile, and other locations where indicated. Provide level 2 finishes in unexposed areas such as insides of closets, electrical equipment rooms and communications rooms. (note: coat closets in office areas shall be finished to match adjacent walls.)
3. Level 3: Embed tape and apply separate first and fill coats of joint compound to tape, fasteners, and trim flanges. Joint compound shall be smooth and free from tool marks and ridges. Level 3 finish shall be applied to panels in Mechanical Rooms, Electrical Rooms, and similar spaces.
4. Level 4: Embed tape and apply separate first, fill, and finish coats of joint compound to tape, fasteners, and trim flanges. Joint compound shall be smooth and free from tool marks and ridges. Level 4 finish shall be applied to panels in all locations except where another level of finish is specified, and at panel surfaces that will be exposed to view, unless otherwise indicated.
5. Level 5: Embed tape and apply separate first, fill, and finish coats of joint compound to tape, fasteners, and trim flanges, and apply min. 1/16 in.(1.6mm). skim coat of joint compound over entire surface where indicated for a Level "5" finish in accordance with "Recommended Specification Levels of Gypsum Board Finish" as developed by AWCI, CISCA, Gypsum Association and PDCA. Provide level 5 finish at all exposed drywall surfaces including soffits within:

    a. Partitions with continuous, unbroken length of 20 feet(6 m).
    b. Horizontal and vertical surfaces of soffits.
    c. Walls used for the display of art
    d. Walls with continuous height of 12 feet or taller.

E. Finish Tolerances

1. Framing: 1/8 inch in 10 ft. (non-cumulative) for plumbness and level, +/- 1/8 inch for fastening surfaces of adjacent framing members and for deviation from specified spacing.
2. Finish board surfaces within 1/4 inch(6.4 mm) in 10 feet(3 m) (non-cumulative) for plumb, level, warp and bow.
3. Finish board surfaces within plus or minus1/4 inch(6.4 mm) from plan location.
4. Finish board surfaces within 1/16 inch(1.5 mm) between planes of board faces.

3.14 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