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DIVISION: 09—FINISHES**Section: 09260—Gypsum Board Assemblies****REPORT HOLDER:**

GYPSUM ASSOCIATION
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EVALUATION SUBJECT:

**GYPSUM WALL AND CEILING ASSEMBLIES AND
GYPSUM BOARD INTERIOR AND EXTERIOR
APPLICATIONS**

1.0 EVALUATION SCOPE**Compliance with the following codes:**

- 2003 *International Building Code*® (IBC)
- 2003 *International Residential Code*® (IRC)
- 1997 *Uniform Building Code*™ (UBC)

Properties evaluated:

- Interior finish
- Fire-resistance
- Sound control
- Structural
- Thermal barrier
- Exterior finish

2.0 USES

This evaluation report recognizes gypsum products for specific interior and exterior applications, and also recognizes various load-bearing and nonload-bearing fire-resistance-rated wall, floor-ceiling and roof-ceiling gypsum board assemblies. Some assemblies also provide sound transmission control. Structural evaluation is limited to transverse loading.

3.0 DESCRIPTION

The gypsum products and fire-resistance-rated wall, floor-ceiling and roof-ceiling assemblies shall conform to Section 4.0 of this report using materials as described below.

3.1 Water-resistant Gypsum Backing Board:

The backing board shall conform to ASTM C 1396 or ASTM C 630.

3.2 Gypsum Wallboard:

The wallboard shall conform to ASTM C 1396 or ASTM C 36.

3.3 Exterior Gypsum Soffit Board:

The soffit board shall conform to ASTM C 1396 or ASTM C 931.

3.4 Gypsum Sheathing Board:

The sheathing board shall conform to ASTM C 1396 or ASTM C 79.

3.5 Gypsum Backing Board, Core Board and Gypsum Shaftliner Board:

The backing, core board and shaftliner shall conform to ASTM C 1396 or ASTM C 442.

3.6 Gypsum Base for Veneer Plasters:

The gypsum base shall conform to ASTM C 1396 or ASTM C 588.

3.7 Gypsum Ceiling Board:

The ceiling board shall conform to ASTM C 1396 or ASTM C 1395.

3.8 Screws:

Type S, Type W and Type G screws specified for the assemblies described in this report shall comply with ASTM C 1002 or ASTM C 954.

4.0 INSTALLATION**4.1 General:**

Installation of the gypsum board wall and ceiling assemblies and interior and exterior applications as described below shall comply with this report and the Gypsum Association's published installation instructions. The Gypsum Association's published installation instructions shall be available at the jobsite at all times during installation.

4.2 Fire-resistance-rated Wall, Floor-ceiling and Roof-ceiling Gypsum Board Assemblies:**4.2.1 General Fire-resistance-rated Design Information:**

- a. The axial design stress of the wood studs used in fire-resistive construction shall be reduced to $0.78F_c$, calculated in accordance with Section 3.6 of the American Forest & Paper Association's National Design Specification for Wood Construction (NDS), with the maximum design stress not greater than 78 percent of the calculated allowable stress with studs having a slenderness ratio, l/d , of 33.
- b. When gypsum board is used in fire-resistive floor/ceiling, roof/ceiling, or wall assemblies, the board thickness, type of gypsum board, and construction of the assembly shall comply with Chapter 7 of the IBC or the UBC; Section R317 of the IRC; the 17th edition of the Gypsum Association Fire Resistance Design Manual; or current ICC-ES evaluation reports.

- c. Except where otherwise noted in this report, any of the gypsum boards listed in Section 3.0, of the same size, thickness, and core type specified, may be used. The gypsum base for veneer plasters shall be covered with minimum $\frac{1}{16}$ -inch-thick (1.6 mm) gypsum veneer plaster.
- d. Control joints such as those shown in Figure 2 are permitted to be used in one-hour or two-hour fire-resistance-rated construction described in this report or described in Table 7-B of the UBC or Table 720.1(2) of the IBC. The joints are permitted to be used on bearing or nonbearing walls of wood or steel construction.

4.2.2 Fire-resistance-rated Assemblies: Generic fire-resistance-rated systems (those not designated as proprietary in the listing), as listed in the Gypsum Association Fire Resistance Design Manual, 17th edition (except GA File Nos. FC 4340 and FC 4370), are recognized for use.

4.2.2.1 Two-hour Gypsum Board Solid Partition for Shaft Enclosure: The assembly is similar to Item 12-1.1 of Table 7-B of the UBC, or Item 9-1.1 of Table 720.1(2) of the IBC, except that the gypsum shaftliner is first installed onto 2-by-2-inch (51 by 51 mm) steel floor and ceiling runners using Type S screws spaced 12 inches (305 mm) on center. The runners shall be anchored at 24 inches (610 mm) on center, using approved fasteners. Two layers of $\frac{1}{2}$ -inch-thick (12.7 mm), Type X gypsum board installed with long edges parallel to wrapped coreboard edges are laminated to one side of the coreboard. All vertical joints shall be offset at least 3 inches (76 mm).

The assembly may also be constructed with four layers of $\frac{1}{2}$ -inch-thick (12.7 mm), Type X gypsum board, laminated together, with the joints of each layer offset at least 3 inches (76 mm) from the adjoining layers. The laminating compound shall comply with ASTM C 475 or be an approved powder setting-type compound. The first layer is attached to the 2-by-2-inch (51 by 51 mm) steel floor and ceiling angle runners using one $\frac{7}{8}$ -inch-long (22 mm), Type S screw at each corner. The second layer is then fully laminated to the first layer and screw-attached to the runners using $1\frac{5}{16}$ -inch-long (49.2 mm), Type S screws spaced 12 inches (305 mm) on center. The third layer is laminated in the same manner as the second layer, and is further attached using $1\frac{1}{2}$ -inch-long (38 mm), Type G screws spaced 24 inches (610 mm) on center along the edges and along the center, and held back $2\frac{1}{2}$ inches (63.5 mm) from the top and bottom edges. The fourth layer is fully laminated, with all of the vertical joints being offset.

4.2.2.2 One-hour Gypsum Board Partition with Wood Framing: The framing consists of nominal 2-by-4 wood studs spaced 16 inches (406 mm) on center, with blocking of the same size at midheight. Each side of the wall is covered with a single layer of $\frac{5}{8}$ -inch-thick (15.9 mm), Type X gypsum board applied either perpendicular to or parallel to the framing. The gypsum board is attached to the framing using No. 6 by $1\frac{1}{4}$ -inch-long (31.7 mm), buglehead, Type W screws spaced 8 inches (203 mm) on center along end joints and 12 inches (305 mm) on center in the field. Screws are placed no closer than $\frac{1}{2}$ inch (12.7 mm) to end or edge joints. Vertical joints are staggered 16 inches (406 mm) on center, and horizontal joints are staggered 12 inches (305 mm) on center on each side. The joints are taped with joint tape and covered with two coats of joint compound. Screw heads are covered with joint compound.

4.2.2.3 One-hour Gypsum Board Staggered-stud Bearing Partition: The framing consists of two rows of nominal 2-by-3 wood studs spaced at 16 inches (406 mm) on center or nominal 2-by-4 wood studs spaced at 24 inches (610 mm) on center, with blocking of the same size at midheight. Studs in opposite rows are staggered 8 inches (203 mm) or 12 inches

(305 mm) on center, and the rows are spaced a minimum of 1 inch (25.4 mm) apart. The plates for each row may be of the same size and material, or common plates may be used for the two rows. The exterior face of each row is then covered with $\frac{5}{8}$ -inch-thick (15.9 mm), Type X gypsum board applied horizontally or vertically using 6d cement-coated cooler nails at 7 inches (178 mm) on center, with end joints on nailing members. Fire-blocks, when required, may be of mineral wool batts, 2 inches (51 mm) thick in the intervening spaces between the two rows of studs, or $\frac{1}{2}$ -inch-thick (12.7 mm) gypsum board. Where nominally 2-by-3 studs are used, they shall be stress-graded lumber as set forth in Tables 4A through 4D of the NDS.

4.2.2.4 One-hour Gypsum Board Floor-ceiling or Roof-ceiling Assembly with Wood Framing: The ceiling construction is identical to assembly FC5406 in the Gypsum Association Fire Resistance Design Manual. Alternate framing consists of lower chords of trussed rafters, or pitched or flat trusses spaced a maximum of 24 inches (610 mm) on center. Alternate fasteners, having the same spacing as the screws, are $1\frac{7}{8}$ -inch-long (47.6 mm), 6d, cooler, box or wallboard nails for the base ply, and $2\frac{3}{8}$ -inch-long (60 mm), 8d, cooler, box or wallboard nails for the face ply. Type G screws, $1\frac{1}{2}$ inches (38 mm) long, are still required at the end joints of the gypsum board face layer.

4.2.2.5 One-hour Gypsum Board Roof-ceiling Assembly with Steel Framing: The assembly consists of steel roof framing with roof purlins spaced and designed to support a noncombustible ceiling grid to which is attached double $\frac{5}{8}$ -inch-thick (15.9 mm), Type X gypsum board. Cold-rolled steel main runner channels at 4 feet (1219 mm) on center, with size and hanger support complying with Table 25-A of the UBC or Section 2506.2.1 of the IBC, are hung from the steel framing. Number 25 gage, $\frac{7}{8}$ -inch-deep (22 mm), rigid cross-furring channels are spaced 24 inches (610 mm) on center. Furring channels are wire-tied to the runner channels using loops of No. 16 gage wire. The base layer of $\frac{5}{8}$ -inch-thick (15.9 mm), Type X gypsum board is applied at right angles to the furring channels using 1-inch-long (25.4 mm), Type S screws spaced at 24 inches (610 mm) on center. The face layer of $\frac{5}{8}$ -inch-thick (15.9 mm), Type X gypsum board is applied at right angles to the furring channels, using $1\frac{5}{8}$ -inch-long (41.3 mm), Type S screws spaced at 12 inches (305 mm) on center at joints, driven through the base layer and into the intermediate furring channels. Face layer joints are offset 24 inches (610 mm) from the base layer joints. One-and-one-half-inch-long (38 mm), Type G screws, placed 2 inches (51 mm) from either side of the face layer end joints, are also installed at 12 inches (305 mm) on center. The addition of insulation to the assembly is permitted, provided a minimum plenum space of 10 inches (254 mm) is maintained between the underside of the insulation and the gypsum panel.

4.2.2.6 Two-hour Gypsum Board Bearing Wall with Minimum STC (Sound Transmission Class) 50 Sound Rating: The construction consists of nominally 2-by-4 wood studs spaced 16 inches (406 mm) on center, faced on each side with two layers of $\frac{5}{8}$ -inch-thick (15.9 mm), Type X gypsum board. On one side, the gypsum board is fastened directly to the studs as specified for interior partitions in Item 17-1.5 of Table 7-B of the UBC or Item 14-1.5 of Table 720.1(2) of the IBC; on the other side, resilient furring channels spaced 24 inches (610 mm) on center (see Figure 1) are applied horizontally over the wood studs and are attached using 6d common or $1\frac{1}{4}$ -inch (31.7 mm) wallboard nails or 1-inch-long (25.4 mm), Type W or Type S screws. The $\frac{5}{8}$ -inch-thick (15.9 mm), Type X gypsum board is applied horizontally and is attached along longitudinal edges to the furring channels using 1-inch-long (25.4 mm), Type S screws

spaced 12 inches (305 mm) on center. Six-inch-wide (152 mm) strips of gypsum board are installed behind unsupported vertical butt joints and are attached at the ends and along the length of the strips using Type G, 1 $\frac{1}{2}$ -inch-long (38 mm) screws spaced 12 inches (305 mm) on center. A face layer of $\frac{5}{8}$ -inch-thick (15.9 mm), Type X gypsum board is applied with joints staggered from the base layer joints and secured to the resilient furring channels using 1 $\frac{5}{8}$ -inch-long (41.3 mm), Type S screws spaced 12 inches (305 mm) on center. With this partition, a minimum STC rating of 50 is attained. When desired, glass fiber or mineral wool insulation may be installed in the stud cavities.

4.2.3 Alternate Fire-resistance-rated Construction:

4.2.3.1 Alternate Suspended Ceiling Construction:

Gypsum board ceilings directly attached to steel framing as set forth in Table 7-C of the UBC or Table 720.1(3) of the IBC may be suspended by means of 1 $\frac{1}{2}$ -inch (38 mm), cold-rolled steel, main runner channels, spaced 48 inches (1219 mm) on center, that are suspended with No. 8, SWG galvanized wire hangers spaced 48 inches (1219 mm) on center. Furring channels are placed perpendicular to the cold-rolled steel main runner channels and are secured thereto using No. 18, SWG galvanized wire ties (double strand); the gypsum board is then installed in the manner required for direct attachment.

4.2.3.2 Alternate Gypsum Board Fasteners: Screws, either Type W or Type S, depending on the framing member, may be used in lieu of nails in fire-resistance-rated assemblies described in this report or described in Tables 7-B and 7-C of the UBC or Table 720.1(2) and 720.1(3) of the IBC, provided the screw penetration into the framing member is equivalent to the nail penetration, the screw spacing is the same as the nail spacing, and the cross-sectional area of the screws is equal to that of the specified nails.

4.2.3.3 Joint Treatment: For the fire-resistive assemblies in this report, taping and finishing of joints and fasteners is permitted to be omitted in the following cases:

- Where there is square-edge gypsum board or tongue-and-groove-edge (V-edge) gypsum backing board or gypsum sheathing.
- In single-layer applications on wood-framed assemblies where joints fall over framing members.
- On inner layers and outer layers of multiple-layer wood-framed or steel-framed assemblies, where the joints of adjacent layers are offset from each other.

4.3 Sound Control Systems:

Generic sound control systems, as listed in the Gypsum Association Fire Resistance Design Manual, 17th edition, are recognized for use. Partition systems shall be sealed at perimeter and around cut-outs using beads of nonhardening caulking compound, except that tape and joint compound are permitted to be used in lieu of caulking above the top plate in wood-framed systems. Where carpet and pad are specified for the IIC sound rating shown in the manual, the carpet shall be a 44-ounce (1492 g/m²) wool carpet with a 40-ounce (1356 g/m²) hair pad.

Except where otherwise noted in this report, any of the gypsum boards listed in Section 3.0, of the same size, thickness, and core type specified, may be used.

4.4 Allowable Partition Heights:

4.4.1 Gypsum Board or Veneer Base: To comply with Section 1611.5 of the UBC and Section 1607.13 and Table 1604.3 of the IBC, the allowable height limits of non-bearing partitions are as follows:

- Partitions utilizing No. 25 gage [minimum 0.0179 inch (0.454 mm) uncoated base-metal thickness] steel channel

studs conforming to ASTM C 645 shall have maximum heights as set forth in a current ICC-ES evaluation report. Mechanical fastening of intermediate studs to the track is not required unless this is specified in the evaluation report.

- 2 $\frac{5}{8}$ -inch-thick (67 mm), semi-solid partitions, constructed of $\frac{1}{2}$ -inch-thick (12.7 mm) gypsum board face sheets laminated to each side of 1 $\frac{5}{8}$ -by-6-inch (41.3 mm by 152 mm) laminated gypsum board studs spaced 2 feet (610 mm) on center, shall not exceed 12 feet (3658 mm) in height.
- Demountable walls consisting of 2 $\frac{1}{2}$ -inch-deep (63.5 mm), No. 25 gage, channel-shaped studs complying with ASTM C 645 and spaced 24 inches (610 mm) on center, shall not exceed 11 $\frac{1}{2}$ feet (3505 mm) in height. Full-length sheets of $\frac{1}{2}$ -inch-thick (12.7 mm) gypsum board shall be installed vertically with edge joints centered on stud flanges. Edge joints shall be covered with a metal batten strip attached to the studs using 1-inch-long (25.4 mm), Type S screws spaced 12 inches (305 mm) on center. The gypsum board shall be attached to intermediate studs using an approved adhesive.

4.4.2 Lath and Plaster: To comply with Section 1611.5 of the UBC, or Section 1607.13 and Table 1604.3 of the IBC, the allowable height limits of No. 25 gage steel-stud nonbearing partitions are as follows: The steel studs shall comply with Item a of Section 4.4.1 of this report. The allowable heights and sectional properties of steel stud systems shall be as set forth in a current ICC-ES evaluation report.

4.5 Walls and Ceilings in Shower and Bath Areas:

4.5.1 Attachment: Full-size sheets of minimum $\frac{1}{2}$ -inch-thick (12.7 mm), water-resistant gypsum backing board shall be applied with the long dimension perpendicular to supports and attached with nails, or drywall screws complying with ASTM C 1002, spaced not more than 8 inches (203 mm) on center, except that where ceramic tile is more than $\frac{3}{8}$ inch (9.5 mm) thick, the nails or drywall screws shall be spaced a maximum of 4 inches (102 mm) on center.

Gypsum board shall not be used in areas subject to continuous high humidity, such as saunas, steam rooms, gang shower rooms or indoor pools.

Fire-resistance-rated construction requires Type X, water-resistant gypsum backing board, with the board thickness and method of attachment as prescribed by the applicable code or by a current ICC-ES evaluation report.

For fire-resistance- or sound-transmission-rated construction, the gypsum board shall extend from floor to ceiling. All layers of gypsum board shall be mechanically attached using fasteners.

4.5.2 Framing: The maximum spacing of wood or steel studs 2 $\frac{1}{2}$ inches (64 mm) deep or less is 16 inches (406 mm) on center. Studs 3 $\frac{1}{2}$ inches (89 mm) deep, or more, are permitted to be spaced a maximum of 24 inches (610 mm) on center, provided there is blocking or backing 1 inch (25.4 mm) above the top of the tub or receptor and at all gypsum board horizontal joints in the area that receives tile. Approved blocking, headers or framing shall support the tub, plumbing fixtures, soap dishes, grab bars, towel racks, and similar items. Approved framing shall reinforce interior angles to provide rigid corners.

4.5.3 Vapor Retarders: The water-resistant gypsum backing board, which is the base layer for tile or wall panels in tub and shower enclosures, shall not be foil-backed. A vapor retarder shall not be installed behind the gypsum backing board at shower and bath areas.

4.5.4 Building Paper: Building paper required in Section 2306.13 of the UBC may be omitted; however, when used, it shall not be a vapor-retarder type.

4.5.5 Receptors: The position of the projecting lips of the tub or shower receptor or pan, with respect to the studs, shall be flush with the outside face of the water-resistant gypsum backing board. See Figure 1 for details. Shower pans, receptors, or tubs shall be installed before installation of the gypsum board. Minimum clearance is $\frac{1}{4}$ inch (6.4 mm) between the paperbound edge of the water-resistant gypsum backing board and the tub or shower receptor or pan.

4.5.6 Joint Treatment: Gypsum board joints, including those at all angle intersections, which are under areas to receive tile or wall panels, shall be treated with joint compound and tape, but shall not be finish-coated. All cut edges and openings around pipes and fixtures shall be treated with an approved, water-resistant, flexible compound or caulk. Areas to be tiled that are covered with a joint compound shall be skim-coated with bedding adhesive. The bedding adhesive for ceramic tile shall conform to ANSI A136.1 for Organic Adhesives for Installation of Ceramic Tile, Type I.

4.6 Exterior Surfaces:

4.6.1 Exterior Ceiling Surfaces:

4.6.1.1 Location: Exterior gypsum soffit board may be used as a ceiling finish at exterior locations such as carports, open porches, walkways, soffits and similar installations that are horizontal or inclined downward away from the building. Gypsum wallboard is permitted for use as a ceiling finish at exterior horizontal applications not exposed to the weather as defined by Section 2502 of the IBC, Section R702.3.5 of the IRC and Section 224 of the UBC.

4.6.1.2 Framing: Maximum spacing of framing members shall be 16 inches (406 mm) on center when supporting $\frac{1}{2}$ -inch-thick (12.7 mm) board, and shall be 24 inches (610 mm) on center when supporting $\frac{5}{8}$ -inch-thick (15.9 mm) board. Gypsum board applications perpendicular to framing members shall comply with ASTM C 840 (IBC), Table R702.3.5 of the IRC, or Table 25-G of the UBC.

4.6.1.3 Joints: In ceiling areas having long runs, the maximum spacing of expansion joints shall be 30 feet (9.144 m). A $\frac{1}{4}$ -inch (6.4 mm) clearance joint is required between gypsum board and adjacent walls, fascia, beams or columns. Fascia boards shall extend downward past the ceiling board surface a minimum of $\frac{1}{4}$ inch (6.4 mm). Exterior gypsum soffit board or gypsum wallboard joints and fastener heads shall be provided with joint treatment. An alternate joint treatment is batten strips.

4.6.1.4 Surface Treatment: The exterior gypsum soffit board and the gypsum wallboard as allowed by the applicable code shall have one of the following surface treatments applied at the jobsite:

- One coat of latex exterior paint applied over an oil-base primer.
- Two coats of an oil- or alkyd-based exterior paint.

4.6.2 Exterior Wall Surfaces: Exterior walls shall be prepared in accordance with IBC Section 1404.2, IRC Section R703.2 and Table R703.4, and UBC Case 4 of Section 1402.1 and Section 1402.2, as applicable.

When portland cement plaster conforming to Chapter 25 of the UBC is the exterior wall covering, paper-backed lath, installed in accordance with Chapter 25 of the UBC, shall be applied over the water-repellent gypsum sheathing. Portland cement plaster requires weep screeds in accordance with UBC Chapter 25.

4.7 Roof Assembly Application:

4.7.1 For IBC or IRC Compliance: When construction is in accordance with the IBC or IRC, the gypsum board shall be covered with an approved underlayment in accordance with IBC Sections 1507.8.3 and 1507.9.3, and IRC Sections R905.7.3 and R905.8.3.

4.7.2 For UBC Compliance: When construction is in accordance with the UBC, gypsum board products specified in this section are permitted to be used as underlayment for wood shake or shingle roofing. The $\frac{5}{8}$ -inch-thick (15.9 mm), Type X, water-resistant gypsum backing board or water-repellent gypsum backing board or sheathing shall be placed under minimum $\frac{15}{32}$ -inch-thick (11.9 mm) wood structural panels or 1-inch-thick (25 mm) spaced sheathing. Except for filler strips, board width shall be 48 inches (1210 mm). Application of the wood structural panel shall comply with Sections 2315.3.1 and 2312.2 of the UBC, provided the nail size is increased to achieve minimum embedment lengths. The deck, whether solid or spaced boards, shall be overlaid with a layer of approved nonbituminous saturated felt lapped 2 inches (51 mm) on horizontal and vertical joints. Wood shake and shingle grading and application shall comply with Chapter 15 of the UBC.

4.8 Thermal Barrier:

Regular gypsum board, a minimum of $\frac{1}{2}$ inch (12.7 mm) thick, is permitted to be used as a thermal barrier in accordance with Sections 2603.4 or 2603.5.2 of the IBC; Section R314.1.2 of the IRC; or Section 2602.4 of the UBC. The gypsum board shall be attached in such a manner that it will remain in place for 15 minutes of fire exposure. For walls constructed of wood framing, attachment of the gypsum board in accordance with Table 25-G of the UBC, or ASTM C 840 (IBC), or IRC Section R702.3.5, is permitted. For other construction, attachment of the gypsum wallboard shall comply with a specific ICC-ES evaluation report, or the method of attachment shall be qualified by testing in accordance with UBC Standard 26-3 (IBC); or FM 4880, UL 1040, NFPA 286 or UL 1715 (IBC and IRC).

4.9 Ceiling Diaphragms:

In jurisdictions enforcing the IBC, ceiling diaphragm construction shall be in accordance with IBC Section 2508.5

In jurisdictions enforcing the UBC and the IRC, the following construction is applicable: Allowable shear values for gypsum board ceiling diaphragms that resist wind or earthquake forces are set forth in Table 1 of this report. The ceiling diaphragm is not permitted to laterally support masonry or concrete walls or permanent lateral loads. Framing members shall be minimum nominally 2-by-6-inch (50 by 152 mm) members. Values are not cumulative with other horizontal diaphragms. Perimeter nominally 2-by-6 or 2-by-8 (50 by 152 mm or 50 by 203 mm) blocking shall be installed flat over the top plate, providing a minimum 2-inch-wide (51 mm) nailing surface for the gypsum board. Nail edge and end distances are a minimum of $\frac{3}{8}$ inch (9.5 mm). The diaphragm height-to-length ratio is a maximum of 2:1, spanning between shear-resisting elements. Rotation or cantilevered conditions are not permitted. Continuous gypsum board end joints parallel to framing members are not permitted.

4.10 Shear Walls:

Table 2 shows maximum allowable shear values for gypsum board shearwalls. Gypsum board shall be applied either horizontally or vertically on nominally 2-by-4 (50 by 102 mm) wood studs. Additionally, Section 2505 of the IBC or Table 22-VIII-B of the UBC is applicable.

5.0 CONDITIONS OF USE

The gypsum board wall and ceiling assemblies and interior and exterior applications described in this report comply with, or are suitable alternatives to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:

- 5.1 Installation shall comply with this report, the Gypsum Association's published installation instructions and the applicable code. In the event of a conflict between the Gypsum Association's published installation instructions and this report, this report shall govern.
- 5.2 Partition construction and heights are as set forth in this report. Indicated stud spacings are maximums. Stud sizes (depths) and gages are minimums.
- 5.3 Allowable shear for vertical diaphragms (shearwalls) shall be reduced by 50 percent for dynamic loading due to earthquake in Seismic Zones 3 and 4 in jurisdictions adopting the UBC, and Seismic Design Category D in areas adopting the IBC or IRC. In jurisdictions adopting the IBC or IRC, gypsum board shall not be used to resist seismic forces in structures in Seismic Design Category E or F.
- 5.4 Documentation shall be submitted to the code official verifying that the gypsum board products to be installed comply with the applicable standard noted in Section 3.0 of this report.
- 5.5 The fire-resistance-rated assemblies identified as GA File Nos. FC 4340 and FC 4370 in the Gypsum Association Fire Resistance Design Manual are not within the scope of in this evaluation report.

- 5.6 Calculations and details shall be submitted to the code official for approval of structural-use applications.

6.0 EVIDENCE SUBMITTED

- 6.1 Reports of testing in accordance with ASTM E 119.
- 6.2 Reports of testing in accordance with ASTM E 84 (UBC Standard 7-1).
- 6.3 Reports of transverse load testing in accordance with UL 1296.
- 6.4 Reports of sound transmission testing in accordance with ASTM E 90 and ASTM E 413.
- 6.5 Reports of testing in accordance with ASTM C 473.
- 6.6 Reports of racking shear wall testing in accordance with ASTM E 72.

7.0 IDENTIFICATION

Gypsum boards shall be identified by the manufacturer's name, the thickness, the brand name and the ASTM specification. Gypsum board products that have been evaluated by ICC-ES for compliance with the standards indicated in Section 3.0 of this report shall also be identified by the ICC-ES report number associated with the specific product.

Bundles of steel studs shall be identified as set forth in a current ICC-ES evaluation report on the product. Screws shall be identified on the packaging by the name, brand or trademark of the producer or supplier and the ASTM designation.

TABLE 1—ALLOWABLE SHEAR FOR GYPSUM BOARD APPLIED TO CEILING FRAMING IN HORIZONTAL DIAPHRAGMS¹ (lb/ft)

BOARD THICKNESS (in.)	MINIMUM FASTENER SIZE ^{2,4}	FRAME SPACING (in.) ³	
		16 o.c.	24 o.c.
1/2	5d cooler or wallboard	90	70

For SI: 1 inch = 25.4 mm, 1 plf = 14.6 N/m.

¹The values are not cumulative with other horizontal diaphragm values. Values shall be reduced by 50 percent in IBC Seismic categories D, E and F, and in UBC Seismic Zones 3 and 4.

²Nail spacing is a maximum of 7 inches on center at all supports.

³Solid blocking is required at all gypsum board joints.

⁴1/4-inch, No. 6, Type S or W screws are permitted to be substituted for the listed nails.

**TABLE 2—ALLOWABLE SHEAR FOR WIND OR SEISMIC FORCES (pounds per foot)
FOR VERTICAL DIAPHRAGMS OF GYPSUM BOARD WOOD-FRAMED WALLS^{1,2}**

BOARD THICKNESS (in.)	WALL CONSTRUCTION	MINIMUM FASTENER SIZE ³	MAXIMUM STUD SPACING (in.)	MAXIMUM FASTENER SPACING (in.)		ALLOWABLE SHEAR VALUE (plf)
				Edges	Field	
1/2	Unblocked	5d cooler or wallboard nails	24	7	7	75
				4	4	110
5/8	Unblocked	6d cooler or wallboard nails	24	4	4	145
1/2	Unblocked	No. 6 - 1 1/4-inch screws	16	8	12	60
1/2	Blocked ⁴	No. 6 - 1 1/4-inch screws	16	4	16	160
1/2	Blocked ⁴	No. 6 - 1 1/4-inch screws	16	4	12	155
1/2	Blocked ⁴	No. 6 - 1 1/4-inch screws	24	8	12	70
1/2	Blocked ⁴	No. 6 - 1 1/4-inch screws	16	6	12	90
5/8	Unblocked	No. 6 - 1 1/4-inch screws	16	8	12	70
5/8	Blocked ⁴	No. 6 - 1 1/4-inch screws	16	8	12	90

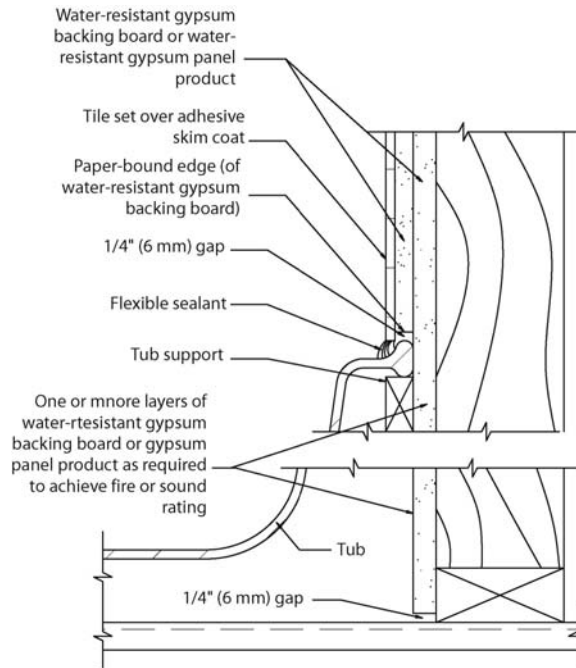
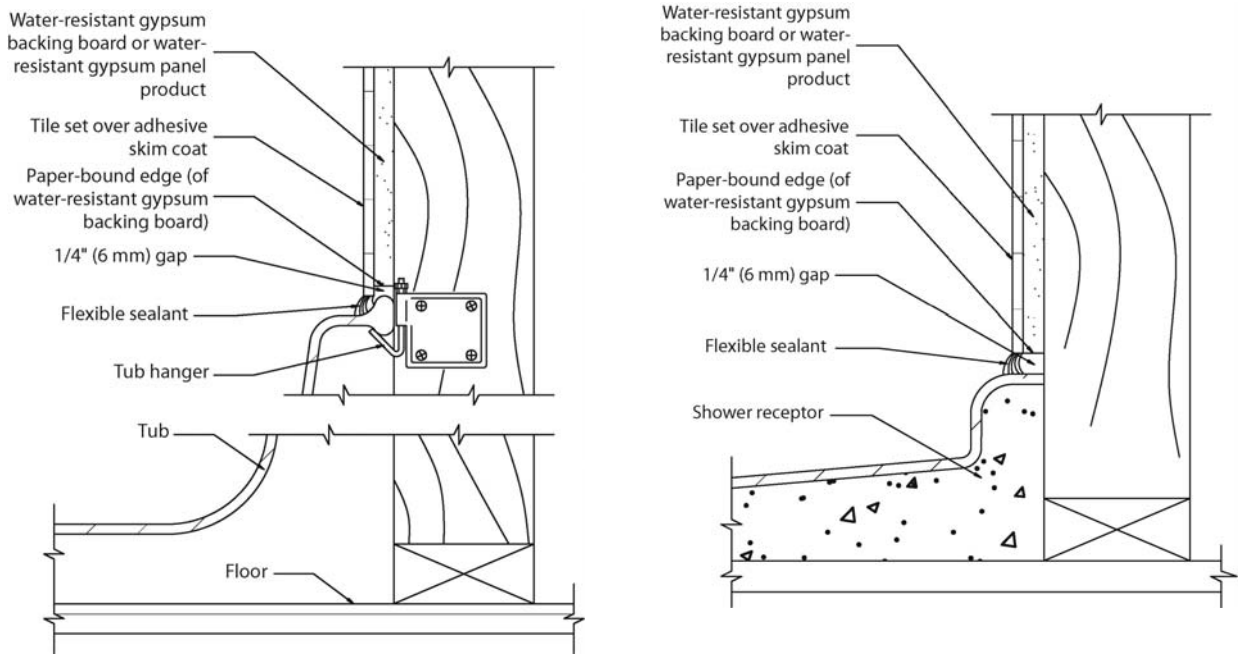
For **SI**: 1 inch = 25.4 mm, 1 plf = 14.6 N/m.

¹Shear walls are not permitted to resist loads imposed by masonry or concrete construction. See UBC Section 2513.2 or IBC Section 2306.4. Values are for short-term loading from wind or seismic forces. Values shall be reduced by 25 percent for normal loading. The values shall be reduced by 50 percent in UBC Seismic Zones 3 and 4. When used in conjunction with the IBC, the values shall be reduced by 50 percent in Seismic Design Category D. Values shall not be used in IBC Seismic Design Categories E and F.

²The shear values are permitted to be additive when identical materials applied as specified in the table are applied to both sides of the wall.

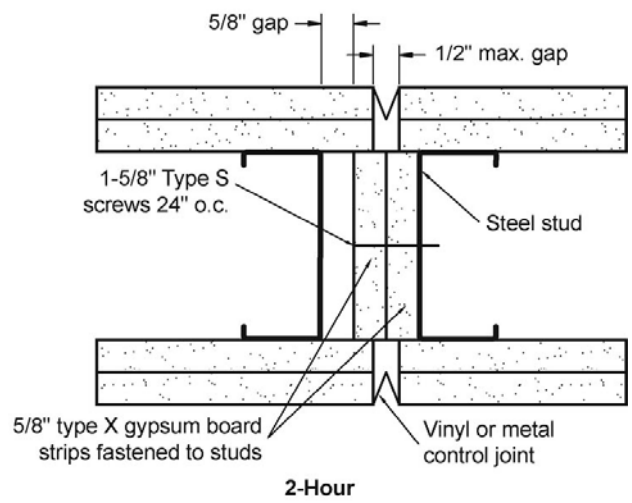
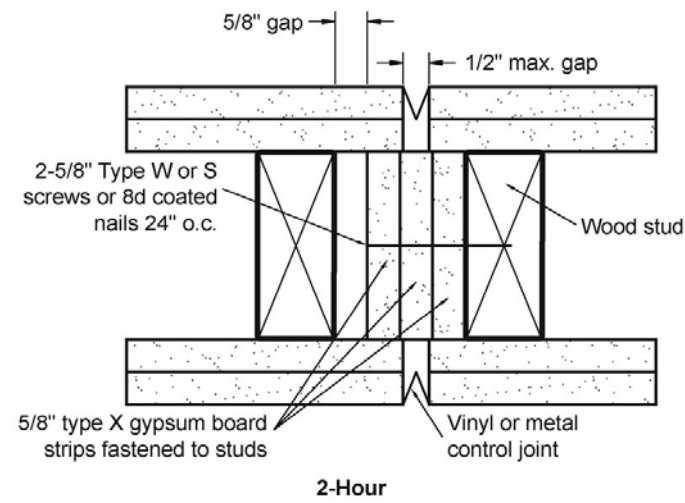
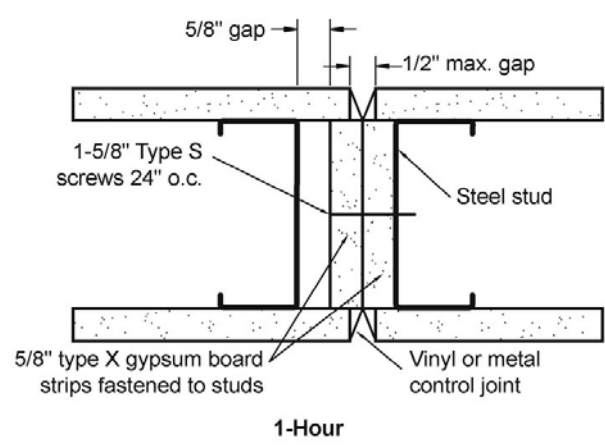
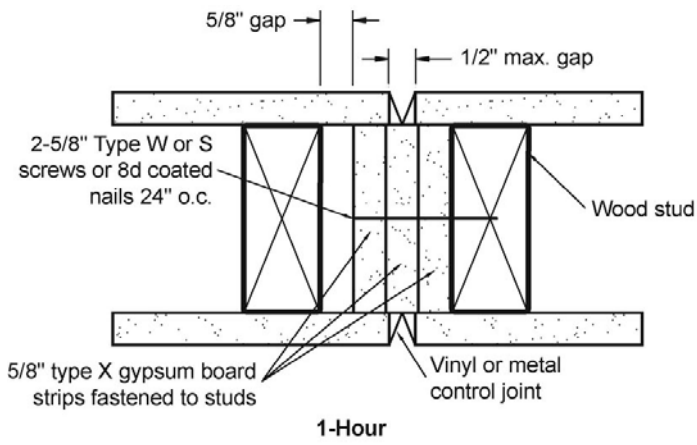
³Screws shall be Type W or Type S drywall screws.

⁴All board edges shall be blocked.



For SI: 1 inch = 25.4 mm.

FIGURE 1—SHOWER AND BATH INSTALLATION DETAILS



For SI: 1 inch = 25.4 mm.

FIGURE 2—CONTROL JOINT DETAILS