drywall-wood
framed systems
Introduction
The basic gypsum drywall assemblies described herein offer economical, quickly erected walls and ceilings on wood framing. Excellent sound attenuation at low cost is provided when gypsum panels are resiliently attached. The assemblies are likewise suitable for wall furring and exterior soffit applications. Also designed for wood-frame construction are USG Area Separation Fire Walls/Party Walls fire-rated gypsum drywall assemblies for multi-family housing (see separate System Folder SA925) and SHEETROCK Brand Vinyl-Covered Gypsum Panels (see separate Product Folder SA928). Variations of the systems are outlined below.

Single layer
A basic drywall construction suitable where SHEETROCK Brand Gypsum Panels are applied direct to wood framing—either vertically with long edges parallel to framing, or horizontally with long edges at right angles to framing members. Perpendicular application, recommended except in certain fire-rated partition assemblies, provides greater strength, reduces joint treatment needed, and compensates for uneven framing alignment. Fastening of panels is by four alternative methods: Standard single nailing: 6 1/2 to 7 1/2 o.c. spacing for ceilings, 7 1/2 to 8 for walls. Double nailing: For minimizing defects due to loosely nailed panels. First nails spaced 12 o.c, followed by second nails in close proximity (2") of first. Screw application: Best known insurance against fastener pops caused by loosely attached panels. 1-1/4" Type W screw is used. Adhesive application: Continuous bead of drywall stud adhesive applied to framing plus supplementary nailing; improves bond strength by 50% to 100%, greatly reduces face nailing needed. When vinyl foam tape is used on sidewalls with stud adhesive, supplementary fasteners are unnecessary.

Three proven methods of upgrading single layer job quality
SHEETROCK Brand Gypsum Panels SW Edge—Panels have an exclusive tapered rounded edge to help minimize ridging or beading and other imperfections and help compensate for extremes of temperature and humidity during construction. Back-Blocking Joint Reinforcement—A method designed to minimize an inherent joint deformation ("ridging") that may occur with adverse job and weather conditions. Floating Interior Angle System—Application of panels to effectively reduce nail pops and angle cracking which may result from stresses at intersections of walls and ceilings.

Double Layer
Systems have a face layer of SHEETROCK Brand Gypsum Panels job-laminated to a base layer of gypsum panels and/or nailed or screw-attached through base layer directly to wood framing in walls and ceilings. Because laminated systems minimize the use of mechanical fasteners in the face layer, finer appearance results—along with greater strength, fire and sound resistance. Adhesive laminating of face layer to base layer is by either of two methods: (a) strip laminating—SHEETROCK Brand Setting- Type (DURABOND) or Lightweight Setting-Type (EASY SAN) Joint Compound or SHEETROCK Brand Taping or All Purpose Joint Compound Ready-Mixed applied in vertical strips 2" o.c. and supplementary 1-1/2" Type G screws, or (b) sheet laminating—adhesive applied over the entire panel surface with supplementary Type G screws or temporary supports until adhesive dries. These assemblies are completed with a United States Gypsum Company joint treatment system and decorating. In walls, however, when predecorated SHEETROCK Brand Vinyl-Faced Gypsum Panels are adhesively applied, joint treatment is not required (see folder SA928).
### Drywall/Wood

#### Framed Systems

<table>
<thead>
<tr>
<th>Partition Applications</th>
<th>Fire rating</th>
<th>Detail &amp; Physical Data</th>
<th>Description &amp; Test No.</th>
<th>Acoustical Performance</th>
<th>System Reference</th>
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<td><strong>Fire Stud—I/2” SHEETROCK Brand gypsum panels, FIRECODE C core—2 x 4 16” o.c.—panels nailed 7” o.c.—1-5/8” cem ctd nails—joints fin—UL Des U317</strong></td>
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<td><strong>Fire Stud—resil partition—5/8” SHEETROCK Brand gypsum panels, FIRECODE C core—2 x 4 16” or 24” o.c.—3” THERMAFIBER SAFB—RC-1 chain or equivalent one side spaced 24” o.c.—panels applied horizontally and att to channels-end joints back-blocked with RC-1 chain or equivalent with 1” Type S screws—opp side direct att with 1-1/4” Type W screws—joints fin—perimeter caulked—UL Des U311</strong></td>
<td>50 BBN-760903</td>
<td>B</td>
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<tr>
<td></td>
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<td></td>
<td><strong>Wd Stud—resil partition—5/8” SHEETROCK Brand gypsum panels, FIRECODE C core—2 x 4 16” o.c.—RC-1 chain one side spaced horiz 24” o.c.—panels att with 1” Type S screws—joints fin—perimeter caulked—T-1396-GSU</strong></td>
<td>41 Based on RC-1 channel one side only—USG-960802</td>
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<td><strong>Wd Stud—resil partition—5/8” SHEETROCK Brand gypsum panels, FIRECODE C core—2 x 3 non-load-bearing studs 16” o.c.—2 x 3 plates 1” apart—panels nailed 7” o.c.—3” THERMAFIBER SAFB one side—joints fin—perim caulked—UL Des U305 and U314—joints fin</strong></td>
<td>34 Based on 18” educations spacing and screws 6” o.c.—USG-30-FT-G&amp;H</td>
<td>D</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td><strong>Wd Stud—2 layer—base layer 1/4” SHEETROCK Brand gypsum panels appl vert with 4d ctd nails—1/2” panel face layer strip lamin—1/2” SHEETROCK Brand gypsum panels, FIRECODE C core—2 x 4 16” o.c.—joints stag &amp; fin—perimeter caulked—est fire rating based on UL Des U305 and U340</strong></td>
<td>54 Based on SHEETROCK Brand gypsum panels, FIRECODE C core, and on screws or nails 7” o.c.—TL-77-149</td>
<td>E</td>
</tr>
<tr>
<td></td>
<td>1 hr. est.</td>
<td></td>
<td><strong>Wd Stud—2 layer—base layer 1/4” SHEETROCK Brand gypsum panels appl vert with 4d ctd nails—1/2” panel face layer strip lamin—1/2” SHEETROCK Brand gypsum panels, FIRECODE C core—2 x 4 16” o.c.—joints stag &amp; fin—perimeter caulked—est fire rating based on UL Des U305 and U340</strong></td>
<td>45 TL-69-52</td>
<td>F</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>Wd Stud—2 layers 5/8” SHEETROCK Brand gypsum panels, FIRECODE C core, ea side—2 x 4 16” o.c.—2” THERMAFIBER SAFB—RC-1 chain or equivalent one side spaced 24” o.c.—resil side screw att—opp side nail att—both base layers appl vert and face layers appl horiz—base layers perm caulked—joints fin—UL Des U334</strong></td>
<td>59 Based on same construction without SAFB—TL-67-239</td>
<td>G</td>
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<tr>
<td></td>
<td>2 hr.</td>
<td></td>
<td><strong>Wd Stud—2 layers 5/8” SHEETROCK Brand gypsum panels, FIRECODE C core, or SHEETROCK Brand gypsum panels, water-resistant, FIRECODE core, ea side—2 x 4 16” o.c.—base layer att with 1-7/8” nails 6” o.c.—face layer att with 2-3/8” nails 8” o.c.—joints fin—ULC Des U301</strong></td>
<td>N/A</td>
<td>I</td>
</tr>
</tbody>
</table>

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- *Where thermal insulation is shown in assembly drawings, the specific product is required in the assembly to achieve the stated fire rating.
- Fiberglass insulation cannot be substituted for THERMAFIBER Insulation.
- **Where RC-1 is referenced, use RC-1 Resilient Channel or equivalent.
### Drywall/Wood Framed Systems

#### Fire-rated Construction

<table>
<thead>
<tr>
<th>Partition Applications</th>
<th>Fire Rating</th>
<th>Description &amp; Test No.</th>
<th>Acoustical Performance</th>
</tr>
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<tbody>
<tr>
<td><strong>Applications</strong></td>
<td><strong>Rating</strong></td>
<td><strong>Detail &amp; Physical Data</strong></td>
<td><strong>Description &amp; Test No.</strong></td>
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<td><strong>Partition Applications</strong></td>
<td><strong>Detail &amp; Physical Data</strong></td>
<td><strong>Description &amp; Test No.</strong></td>
<td><strong>System Reference</strong></td>
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<tr>
<td><strong>Applications</strong></td>
<td><strong>Rating</strong></td>
<td><strong>Detail &amp; Physical Data</strong></td>
<td><strong>Description &amp; Test No.</strong></td>
</tr>
<tr>
<td><strong>Wall Furring</strong></td>
<td><strong>Applications</strong></td>
<td><strong>Detail &amp; Physical Data</strong></td>
<td><strong>Description &amp; Test No.</strong></td>
</tr>
<tr>
<td><strong>Applications</strong></td>
<td><strong>Rating</strong></td>
<td><strong>Detail &amp; Physical Data</strong></td>
<td><strong>Description &amp; Test No.</strong></td>
</tr>
<tr>
<td><strong>Exterior Wall</strong></td>
<td><strong>Applications</strong></td>
<td><strong>Detail &amp; Physical Data</strong></td>
<td><strong>Description &amp; Test No.</strong></td>
</tr>
</tbody>
</table>

### Resilient Attachment

SHEETROCK Brand Gypsum Panels are screw-attached to RC-1 Resilient Channels or equivalent, which are screw-attached 24" o.c. to the framing. The galvanized steel channels “float” the panels away from the framing, providing a spring action that isolates the gypsum panel surface. These systems combine highly effective sound isolation with lightweight low-cost construction.

An excellent value in wood frame party walls consists of single-layer 5/8" SHEETROCK Brand Gypsum Panels, FIRECODE C Core, resiliently attached to one side of studs and directly attached to the other side, plus 3" THERMAFIBER SAFB pressed tightly into the stud cavity. This lightweight partition is widely used for its high sound value, STC 50, at costs which are little more than for conventional partition systems. (Use of a filler strip at the base may reduce STC rating.) It also offers 1-hour rated fire resistance; often chosen for use between units in garden apartments.
Where exceptional sound control, greater fire resistance and strength are required, double-layer drywall construction is used with THERMAFIBER SAFB and RC-1 Resilient Channels or equivalent applied to one side of wood studs (see table below).

| Sound Transmission Loss—db | Band Center Frequency—Hz | Test No. | Method | 125 | 160 | 200 | 250 | 315 | 400 | 500 | 630 | 800 | 1000 | 1250 | 1600 | 2000 | 2500 | 3150 | 4000 | STC |
|---------------------------|--------------------------|---------|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| H                         | TL-67-239                | Lab     | 35    | 41  | 47  | 53  | 56  | 57  | 59  | 60  | 61  | 63  | 64  | 65  | 66  | 64  | 60  | 59  | 61  | 59  |
| E                         | TL-77-149                | Lab     | 31    | 38  | 39  | 45  | 50  | 52  | 55  | 57  | 57  | 57  | 59  | 58  | 57  | 55  | 55  | 57  | 54  |
| F                         | USG-221-ST-G&H           | Lab     | 30    | 37  | 42  | 47  | 48  | 48  | 51  | 55  | 57  | 58  | 59  | 59  | 57  | 57  | 59  | 59  | 53  |
| B                         | BBN-760903               | Lab     | 26    | 30  | 36  | 42  | 45  | 47  | 50  | 55  | 56  | 57  | 57  | 57  | 55  | 57  | 55  | 54  | 58  | 50  |
| H                         | TL-67-212                | Lab     | 26    | 30  | 33  | 39  | 42  | 47  | 49  | 52  | 55  | 57  | 60  | 61  | 61  | 68  | 53  | 56  | 49  |
| K                         | TL-69-211                | Lab     | 30    | 33  | 35  | 40  | 40  | 42  | 44  | 46  | 49  | 51  | 52  | 52  | 48  | 48  | 53  | 57  | 47  |
| F                         | TL-69-52                 | Lab     | 21    | 28  | 34  | 35  | 39  | 41  | 41  | 46  | 49  | 51  | 54  | 56  | 55  | 53  | 52  | 55  | 49  |
| D                         | USG-860807               | Lab     | 25    | 20  | 34  | 37  | 33  | 32  | 37  | 36  | 40  | 42  | 44  | 45  | 38  | 34  | 36  | 41  | 37  |

**Area Separation Fire Wall/Party Wall**

Fast-erecting non-load-bearing drywall partitions for low-cost fire barriers in wood-frame multi-family housing (see separate Systems Folder SA925).

**Wall Furring**

SHEETROCK Brand Gypsum Panels, Foil-Back, provide an economical, efficient vapor retarder and a readily decorated interior surface for exterior walls. Panels are attached to wood furring strips 16\(\frac{1}{2}\)\(\text{in.}\) o.c. or screw-attached to Z-Furring Channels 24\(\frac{1}{2}\)\(\text{in.}\) o.c. The channels mechanically attach THERMAFIBER FS-15 Blankets or rigid foam insulation to the interior of exterior walls. The system provides a self-furring solid backup for SHEETROCK Brand Gypsum Panels, Foil-Back, screw-attached to the channels.

**Renovation**

1/2\(\text{in.}\) SHEETROCK Brand Gypsum Panels, FIRECODE C Core, screw-attached to Z-Furring Channels with THERMAFIBER SAFB between channels, improve the sound control of wood stud plaster walls. With 3\(\text{in.}\) channels and 2\(\text{in.}\) blankets, the assembly provides 50 STC sound rating.

**Availability**

Gypsum panels for these assemblies are available in five thicknesses and nine types. SHEETROCK Brand Gypsum Panels, FIRECODE Core, and SHEETROCK Brand Gypsum Panels, FIRECODE C Core, obtain higher fire-resistance ratings than regular panels. SHEETROCK Brand Gypsum Panels, Water-Resistant, are recommended as a tile base for tub and shower areas. SHEETROCK Brand Exterior Gypsum Ceiling Board offers superior weather-and-sag-resistance plus excellent paintability in exterior soffits.

Gypsum panels are easily screw-applied to channel-type corrosion-resistant steel studs. See SA923 Drywall/Steel Framed Systems in this series for details.

**Limitations**

1. Type S Screws must be used for attachment of single-layer panels to RC-1 Resilient Channels or equivalent.
2. Resilient channels must be attached to wood framing with 1-1/4\(\text{in.}\) Type W or Type S Screws. Nails must not be used.
3. Resilient ceilings should not be installed beneath highly flexible floor joists. Install only to framing meeting “Wood Framing Requirements” shown in Gypsum Panels Product Folder SA927.
4. Direct attachment to wood framing with fasterer penetration into wood exceeding 1\(\text{in.}\) is not recommended except where required to meet fire rating.
5. Maximum resilient channel spacing: ceilings—24\(\text{in.}\) for joists 16\(\text{in.}\) o.c.; 16\(\text{in.}\) for joists 24\(\text{in.}\) o.c. Sidewalls—24\(\text{in.}\) o.c.
6. SHEETROCK Brand Gypsum Panels should not be exposed to excessive or continuous moisture and extreme temperature. Specially formulated SHEETROCK Brand Gypsum Panels, Water-Resistant, are recommended as a base for wall tile in bathrooms and other high moisture areas, but they are not recommended for areas subject to constant moisture such as gang showers and commercial food processing. DUROCK Brand Cement Board is recommended as a ceramic tile base under these conditions.
7. These assemblies are not recommended for exterior soffits and ceilings which project upwards and away from the building proper.
8. Maximum support (studs, joists, channels, furring) spacing for gypsum panels:
### Single-Layer Application

<table>
<thead>
<tr>
<th>Panel thickness (in.)</th>
<th>Location</th>
<th>Application method</th>
<th>Max. support spacing o.c. in.</th>
<th>Max. support spacing o.c. mm</th>
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</thead>
<tbody>
<tr>
<td>3/8&quot; (9.5 mm)</td>
<td>ceilings (1)</td>
<td>perpendicular</td>
<td>16</td>
<td>406</td>
</tr>
<tr>
<td></td>
<td>sidewalls</td>
<td>perpendicular</td>
<td>16</td>
<td>406</td>
</tr>
<tr>
<td>1/2&quot; (12.7 mm)</td>
<td>ceilings (1)</td>
<td>parallel or perpendicular</td>
<td>16</td>
<td>406</td>
</tr>
<tr>
<td></td>
<td></td>
<td>perpendicular</td>
<td>24</td>
<td>610</td>
</tr>
<tr>
<td></td>
<td>sidewalls</td>
<td>parallel or perpendicular</td>
<td>24</td>
<td>610</td>
</tr>
<tr>
<td>5/8&quot; (15.9 mm)</td>
<td>ceilings (1)</td>
<td>parallel or perpendicular</td>
<td>16</td>
<td>406</td>
</tr>
<tr>
<td></td>
<td></td>
<td>perpendicular</td>
<td>24</td>
<td>610</td>
</tr>
<tr>
<td></td>
<td>sidewalls</td>
<td>parallel or perpendicular</td>
<td>24</td>
<td>610</td>
</tr>
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### Double-Layer Application

<table>
<thead>
<tr>
<th>Panel thickness (in.)</th>
<th>Location</th>
<th>Application method</th>
<th>Max. support spacing o.c. in.</th>
<th>Max. support spacing o.c. mm</th>
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<td>16</td>
<td>406</td>
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<tr>
<td></td>
<td>sidewalls</td>
<td>perpendicular or parallel</td>
<td>24</td>
<td>610</td>
</tr>
<tr>
<td>1/2&quot; &amp; 5/8&quot; (12.7 &amp; 15.9 mm)</td>
<td>ceilings (8)</td>
<td>perpendicular</td>
<td>24</td>
<td>610</td>
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<tr>
<td></td>
<td>sidewalls</td>
<td>perpendicular or parallel</td>
<td>24</td>
<td>610</td>
</tr>
</tbody>
</table>

(1) A 5/8" thickness is recommended for the finest single-layer construction, providing increased resistance to fire and transmission of sound; 1/2" for single-layer application in new residential construction and remodeling, and 3/8" for repair and remodeling over existing surfaces. (2) Long edge position relative to framing. (3) Not recommended below unheated spaces. (4) Not recommended if water-based texturing material is to be applied. (5) Max. spacing 16” if water-based texturing material is to be applied. (6) If 1/2" SHEETROCK Brand Interior Gypsum Ceiling Board—Sag-Resistant is used, max. spacing is 24” o.c. for parallel application with weight of unsupported insulation not exceeding 2.4 psf., when water-based texturing materials are used. (7) Adhesive must be used to laminate 3/8" board for double-layer ceilings. (8) Max. spacing 16” o.c. if fire rating required.

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**Corner Framing Details**

- **Inside/Outside Corners**
  - 2x4 wood stud
  - Wood joint
  - SHEETROCK joint reinforcement
  - SHEETROCK Brand gypsum panel
  - Wood base

**Floor Attachment**

- 3/4" SHEETROCK Brand gypsum panels, FIRECODE core
- 2 x 3 wood studs

**Sound-isolating Partition**

- Test TL-69-52: 45 STC

**Sound-isolating Chase Wall Partition**

- Test TL-77-149: 54 STC

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**Double nailing application**

- (1) 12"
- (2) 2"
Drywall/Wood Framed Systems

Tub and Shower Details—Single-layer Panels

- SHEETROCK Brand gypsum panels, water resistant
- adhesive
- tile
- 1/4" space
- caulk
- tub rim
- leveling guide

Double-layer panels

- 1/2" or 5/8" SHEETROCK Brand gypsum panels, water resistant
- 1/4" space
- tile
- continuous caulk
- tub rim
- leveling guide

Wall control joint

- SHEETROCK Brand joint compound
- zinc control joint no. 093

Fire resistive control joints

- 1/2" SHEETROCK Brand gypsum panel, FIRECODE core
- 1/2" gap
- wood stud
- 1/2" SHEETROCK Brand gypsum panel, FIRECODE core
- 1/2" gap
- zinc control joint no. 093 (both sides)

- 1/2" SHEETROCK Brand gypsum panel, FIRECODE core
- 1/2" gap
- wood stud
- 1/2" SHEETROCK Brand gypsum panel, FIRECODE core
- 1/2" gap
- zinc control joint no. 093 (both sides)

1 Hr. fire resistance—estimated based on WH-651-0318.1

2 Hr. fire resistance—estimated based on WH-651-0318.1
Cabinet Attachment

1 1/2" SHEETROCK Brand gypsum panels

2 x 2 wood stud frame

1/2" SHEETROCK Brand acoustical sealant

1" type S screw

2 1/4" type S screw (locate screws between studs)

SHEETROCK Brand acoustical joint tape

1" type W screw

Center hangers over RC-1 resilient channel or equivalent

RC-1 resilient channel or equivalent (may be inverted to ease attachment of base)

Hollow wall anchor

Toggle bolt

Floor attachment

2x4 wood stud

RC-1 resilient channel or equivalent (may be inverted to ease attachment of base)

THERMAFIBER SAFB

SHEETROCK Brand acoustical sealant

Wall attachment

1/2" SHEETROCK Brand gypsum panel

SHEETROCK Brand acoustical joint tape

SHEETROCK Brand panels, FIRECODE C core

Shower Receptor

SHEETROCK Brand panels, FIRECODE C core

Shower block

Fixtures Attachments — Light

Hollow wall anchor

Toggle bolt

Fastener load data

<table>
<thead>
<tr>
<th>Fastener type</th>
<th>Size</th>
<th>Base assembly</th>
<th>Allow. withdrawal resistance</th>
<th>Allow. shear resistance</th>
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<tbody>
<tr>
<td>Hollow wall anchor</td>
<td>1/8</td>
<td>1/2&quot; gypsum panel</td>
<td>20</td>
<td>178</td>
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<tr>
<td>Anchor or toggle bolt</td>
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<td>1/2&quot; gypsum panel</td>
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<td>133</td>
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<tr>
<td></td>
<td>1/4</td>
<td>1/2&quot; gypsum panel</td>
<td>40</td>
<td>178</td>
</tr>
</tbody>
</table>

(1) Newtons

Ceiling attachment

SHEETROCK Brand acoustic sealant

SHEETROCK Brand joint tape

Sealant — see good design practices

RC-1 resilient channel or equivalent (may be inverted to ease attachment of base)
### Ceilings

**Single layer**
In single-layer ceiling assemblies, SHEETROCK Brand Gypsum Panels are applied across the supports and fastened with nails or screws. Nails are spaced 6 1/2 to 7 1/2 o.c. (6 1/2 for fire-rated construction); 1-1/4” Type W screws are spaced 12 1/2 o.c. Where no fire rating is required, adhesive nail-on fastening improves bond strength and reduces face nailing.

**Resilient attachment**
Resilient channel systems offer fire-resistant wood joist floor/ceiling assemblies having highly efficient sound isolation at low cost—qualities particularly needed in apartments, motels and other multi-family buildings. RC-1 Resilient Channels (or equivalent) are screw-attached across wood joists; gypsum panels are attached to channels with Type S screws. A 1-hour fire rating is available with 1/2” SHEETROCK Brand Gypsum Panels, FIRECODE C Core.

**High performance**
USG High Performance Floor/Ceiling Systems achieve a 2-hour fire resistance rating (UL Design L541) and deliver STC/MTC ratings as high as 60/54, IIC ratings as high as 62. Floors consist of 1” SHEETROCK Brand Gypsum Liner Panels over 1/2” plywood and are finished in one of two ways: (1) ceramic tile over 1/2” DUROCK Brand Exterior Cement Board, or (2) vinyl tile or carpet/pad over 1/2” oriented strand board. Ceilings consist of two layers 5/8” SHEETROCK Brand Gypsum Panels, FIRECODE C Core, applied over RC-1 Resilient Channels or equivalent. Installed within the cavity are 3” THERMAFIBER SAFB. See data sheet WB1868 for complete information.

**Direct suspension**
When additional ceiling space is needed to accommodate large ducts or pipes, gypsum panels are screw-attached below a direct suspension system. This direct-hung steel ceiling grid consists of main beam runners 48” o.c. and cross furring channels spaced 24” o.c. A cross beam supports the edge of lighting fixtures. With 1/2” or 5/8” SHEETROCK Brand Gypsum Panels, FIRECODE C Core, screw-attached to this grid, a one-hour fire-rated wood joist floor/ceiling is provided. The assembly includes provision for lighting fixtures, air ducts and dampers.

**Textured ceilings**
When water-based texturing materials will be applied, 1/2” SHEETROCK Brand Interior Gypsum Ceiling Board—Sag-Resistant is ideal because it supports both the sprayed texture and insulation like 5/8” thick panels but at less cost.

**Renovation**
To improve the sound control of wood framed floor-ceilings, 1/2” SHEETROCK Brand Gypsum Panels, FIRECODE C Core, are screw-attached to 2” Z-Furring Channels fastened to bottom of joists. With 2” THERMAFIBER SAFB between channels, the system provides 45 STC and 40 IIC ratings (see detail, page 14).

**Exterior Soffits**
Eaves, canopies, carports and other exterior soffits with indirect exposure to the weather are quickly and economically completed with SHEETROCK Brand Exterior Gypsum Ceiling Board fastened directly to joists (see United States Gypsum Company bulletin WB1152 for detailed specification). Maximum frame spacing and other limitations for these systems are shown on page 6.

<table>
<thead>
<tr>
<th>Single-layer ceiling (sys. ref. A)</th>
<th>Double-layer ceiling (sys. ref. N)</th>
<th>1/2” sag-resistant interior ceiling board with spray texture</th>
<th>Resilient channel with blankets (sys. ref. G)</th>
</tr>
</thead>
</table>
| Ceramic Tile over DUROCK Brand Exterior Cement Board Floor/Ceiling Assembly  
STC: 60 MTC: 54 IIC: 52 | Carpet/Pad over Oriented Strand Board Floor/Ceiling Assembly  
STC: 59 MTC: 54 IIC: 62 | Vinyl Tile over Oriented Strand Board Floor/Ceiling Assembly  
STC: 58 MTC: 53 IIC: 51 | |
<table>
<thead>
<tr>
<th>Floor/Ceiling Assemblies</th>
<th>Fire Rating</th>
<th>Detail &amp; Physical Data</th>
<th>Description &amp; Test No.</th>
<th>Acoustical Performance</th>
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</thead>
<tbody>
<tr>
<td><strong>Framed Systems</strong></td>
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<tr>
<td>Drywall/Wood</td>
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<td><strong>Fire-rated Construction</strong></td>
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<td><strong>Acoustical Performance</strong></td>
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<tr>
<td><strong>Floor/Ceiling Details</strong></td>
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<tr>
<td><strong>System Reference</strong></td>
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</tbody>
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- **1 hr.**
- **1 hr. est.**
- **1 hr. est.**
- **1 hr. est.**
# United States Gypsum Company SA924

## Drywall/Wood Framed Systems

### Fire-rated Construction

<table>
<thead>
<tr>
<th>Floor/Ceiling Assemblies</th>
<th>Fire Rating</th>
<th>Description &amp; Test No.</th>
<th>Acoustical Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>5/8’ SHEETROCK Brand Gypsum Panels, FIRECODE core, ceiling—single 4 x 10 or double 2 x 10 wd joist 48&quot; o.c.—met fur chan spaced 24&quot; o.c.—panels att with 1” Type S screws—joints fin—UL Des L508</td>
<td>N/A</td>
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<td></td>
<td>1 hr.</td>
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<tr>
<td></td>
<td></td>
<td>5/8’ SHEETROCK Brand Gypsum Panels, FIRECODE core, 1” nom wd sub &amp; fin flr—2 x 10 wd joist 16” o.c.—panels att with 6d nails 8” o.c.—joints fin—UL Des L501</td>
<td>38 32 Based on 1-1/4” nom wd flr—CK-6412-7</td>
</tr>
<tr>
<td></td>
<td>1 hr. est</td>
<td>5/8’ SHEETROCK Brand Gypsum Panels, FIRECODE core, ceiling—1” nom wd sub &amp; fin flr—2 x 10 wd joist 16” o.c.—3” THERMAFIBER SAFB betw joists—panels att with 6d nails 6” o.c.—joints fin—est. fire rating based on UL Des L501</td>
<td>41 32 Based on 1-1/4” nom wd flr—CK-6412-6</td>
</tr>
<tr>
<td></td>
<td>1 hr.</td>
<td>1/2” or 5/8” SHEETROCK Brand Gypsum Panels, FIRECODE C core, ceiling—1” nom wd sub &amp; fin flr—2 x 10 wd joist 16” o.c.—susp grid with main run 48” o.c. and cross tees 24” o.c.—panels screw-att below grid—joints fin—UL Des L525</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>1 hr.</td>
<td>5/8’ SHEETROCK Brand Gypsum Panel, FIRECODE C core—wood trusses of min. 2 x 4 lumber secured with steel truss plates—trusses 24” o.c.—3/4” nominal plywood subfloor—RC-1 channel or equivalent spaced 12” or 16” o.c., panels attached with 1” Type S screws, joints finished—optional insulation directly over gypsum ceiling membrane—optional ceiling damper—UL Des L521</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>1 hr.</td>
<td>5/8’ SHEETROCK Brand Gypsum Panels, FIRECODE C core, ceiling—wd trusses of 2 x 4 fir secured with steel truss plates—trusses 24” o.c.—3/4” nominal plywood flr—met fur chan 24” o.c. wire-tied to trusses—panels att with 1” Type S screws 1/2” o.c.—joints fin—UL Des L528</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>1 hr.</td>
<td>5/8’ SHEETROCK Brand Gypsum Panels, FIRECODE C core, ceiling—wd trusses of 2 x 4 fir secured with steel truss plates—trusses 24” o.c.—3/4” nominal plywood flr—susp grid with main run 48” o.c. and cross tees 24” o.c.—panels att with 1” Type S-12 screws 12” o.c.—joints fin—UL Des L529</td>
<td>N/A</td>
</tr>
</tbody>
</table>
### Fire-rated Construction

<table>
<thead>
<tr>
<th>Fire Rating</th>
<th>Detail &amp; Physical Data</th>
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<th>STC IIC</th>
<th>Description &amp; Test No.</th>
<th>System Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1 hr.</strong></td>
<td></td>
<td><strong>Floor/ceiling or roof/ceiling—two layers</strong> 5/8&quot; SHEETROCK Brand Gypsum Panels, FIRECODE Core, attached to wood framing—GA FC5046 or RC2601</td>
<td></td>
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<td>O</td>
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<td></td>
<td><strong>1 1/2 hr.</strong> and</td>
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<tr>
<td><strong>2 hr.</strong></td>
<td></td>
<td><strong>Resil ceiling—1 1/2 hr.</strong> sys with 2 layers 1/2&quot; SHEETROCK Brand Gypsum Liner Panels, 1/2&quot; plywood—2 x 10 wd joint 16&quot; o.c.—3&quot; THERMAFIBER SAFB—ceiling of 2 layers 5/8&quot; SHEETROCK Brand Gypsum Panels, FIRECODE C core, over RC-1 chan 16&quot; o.c.—UL Des L541</td>
<td>N/A</td>
<td>Assembly not P</td>
<td></td>
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<tr>
<td><strong>2 hr.</strong></td>
<td></td>
<td><strong>Floor/ceiling—floor of 8&quot; x 8&quot; ceramic tile, 1/2&quot; DUROCK Brand exterior cement board, 1&quot; SHEETROCK Brand Gypsum Liner Panels, 1/2&quot; plywood—2 x 10 wd joint 16&quot; o.c.—3&quot; THERMAFIBER SAFB—ceiling of 2 layers 5/8&quot; SHEETROCK Brand Gypsum Panels, FIRECODE C core, over RC-1 chan 16&quot; o.c.—UL Des L541</strong></td>
<td>60 52</td>
<td>RAL-TL89-141—RAL-IN89-7</td>
<td>Q</td>
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<tr>
<td><strong>2 hr.</strong></td>
<td></td>
<td><strong>Floor/ceiling—floor of carpet/pad, 1-1/2&quot; flooring, 1/2&quot; plywood—2 x 10 wd joint 16&quot; o.c.—3&quot; THERMAFIBER SAFB—ceiling of 2 layers 5/8&quot; SHEETROCK Brand Gypsum Panels, FIRECODE C core, over RC-1 chan 16&quot; o.c.—UL Des L541</strong></td>
<td>59 69</td>
<td>RAL-TL90-40—RAL-IN90-5</td>
<td>R</td>
</tr>
</tbody>
</table>

### Acoustical Performance

<table>
<thead>
<tr>
<th>Fire Rating</th>
<th>Detail &amp; Physical Data</th>
<th>Description &amp; Test No.</th>
<th>STC IIC</th>
<th>Description &amp; Test No.</th>
<th>System Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1 hr.</strong></td>
<td></td>
<td><strong>5/8&quot; SHEETROCK Brand Gypsum Panel, FIRECODE C core, pitched wood trusses of min. 2 x 4 lumber, any UL Class A, B or C roofing system—RC-1 channels or equivalent spaced 12&quot; or 16&quot; o.c.—gypsum panels attached with 1&quot; Type S screws, joints finished—optional insulation directly over gypsum ceiling membrane—UL Des PS22</strong></td>
<td>N/A</td>
<td>S</td>
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</tr>
</tbody>
</table>

*Where thermal insulation is shown in assembly drawings, the specific product is required in the assembly to achieve the stated fire rating.
Fiberglass insulation cannot be substituted for THERMAFIBER Insulation.
**Where RC-1 is referenced, use RC-1 Resilient Channels or equivalent.
Drywall/Wood Framed Systems

Single-layer Panels with RC-1 Channel or equivalent

2x4 wood stud
SHEETROCK Brand gypsum panel
RC-1 resilient channel or equivalent

SHEETROCK Brand acoustical sealant

Ceiling and Floor Assemblies

½" plywood subfloor
25/32" oak finish floor
½" SHEETROCK Brand gypsum panels, FIRECODE C core
RC-1 resilient channel or equivalent - screw applied

Test CK-6512-7 (47 STC, 67 IIC)
Test CK-6512-6—same but without carpet & pad

Double-layer Panels with RC-1 Channel or equivalent

RC-1 resilient channel or equivalent
SHEETROCK Brand joint tape
THERMAFIBER SAFB

SHEETROCK Brand acoustical sealant
RC-1 resilient channel or equivalent

Test CK-6512-8 (52 STC, 71 IIC)
Test CK-6512-9—same but without carpet & pad
**Drywall/Wood Framed Systems**

**UL Design LS41**

- 8" x 8" ceramic tile
- 1/2" DUROCK Brand exterior cement board
- Ceramic tile over DUROCK Brand exterior cement board and SHEETROCK Brand gypsum liner panels

- 1/2" plywood
- 2x10 wood joists 16" o.c.
- 2 layers of 1/2" SHEETROCK Brand gypsum panels, FIRECODE C core
- 3" THERMAFIBER sound attenuation blankets 1" above bottom of joists
- 1 1/2" pumped, self-leveling gypsum cement floor underlayment (type F)

- Vinyl tile or carpet/pad over type F flooring

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**Exterior Wall & Soffit**

- Soft finish wall
- Interior finish wall
- Asphalt felt
- Gypsum sheathing

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**Ceiling Renovation**

Test USG-800107: 45 STC
USG-800106: 40 IIC
This section is an overview of design, application, installation and safety concerns that should be addressed when USG’s products and systems are used at professional constructions sites or at home in do-it-yourself projects. This section is not intended to be a comprehensive review but instead outline some major issues. No attempt is made at completeness. We recommend that architects and contractors seek the assistance of safety professionals, especially at the professional construction site, because there are many factors to be considered that are not included here. In addition, for more detailed information and references, please refer to Chapter 13 of the USG Gypsum Construction Handbook, Centennial Edition.

### 1 System Performance
United States Gypsum Company will provide test certification for published fire, sound and structural data covering systems designed and constructed according to its published specifications. Tests are conducted on Company products assembled to meet performance requirements of established test procedures specified by various agencies. System performance following substitution of materials or compromise in assembly design cannot be certified; failure may result under critical conditions.

### 2 Control Joints
Location of control joints is the responsibility of the design professional/architect. Gypsum panel surfaces should be isolated with control joints or other stress relief where:
- (a) partition or furring abuts a structural element (except floor) or dissimilar wall or ceiling;
- (b) ceiling abuts a structural element, dissimilar wall or partition or other vertical penetration;
- (c) construction changes within the plane of the partition or ceiling;
- (d) partition or furring run exceeds 30’;
- (e) ceiling dimensions exceed 50’ in either direction with perimeter relief, 30’ without relief;
- (f) exterior soffits exceed 30’ in either direction;
- (g) wings of “L,” “U” and “T”-shaped ceiling areas are joined;
- (h) expansion or control joints occur in the base exterior wall. Ceiling height door frames may be used as control joints. Less than ceiling height frames should have control joints extending to the ceiling from both corners. Treat window openings in same manner as doors.

Gypsum panel surfaces should not be firmly anchored across the flat grain of wide dimensional lumber such as floor joists and headers. Float panels over these members using resilient channels or provide a control joint to counteract wood shrinkage.

### 3 Penetrations
Penetrations of the gypsum panel diaphragm, such as borrowed lights, access panels, light troffers, require additional reinforcement at corners to distribute concentrated stress if a control joint is not used.

### 4 Sound Tests
Sound Tests are conducted under ideal laboratory conditions per ASTM procedures. Comparable field performance depends on building design and careful attention to detailing and workmanship. Where these partitions are used for sound control, seal the partition perimeter with 1/4” minimum round bead of SHEETROCK Brand Acoustical Sealant. Seal around all cutouts for lights, cabinets, pipes, ducts and electrical boxes. Back-to-back penetrations of the diaphragm, flanking paths, door and borrowed-light openings should be avoided. Exterior wall surfaces should be resiliently mounted to minimize flanking paths between floor and ceiling construction.

### 5 Air, Water and Vapor Control
Flashing and sealants as shown in the construction documents and as selected by the architect and/or structural engineer should be provided to resist air and water infiltration. The flashing and sealants selected shall be installed in a workmanlike manner in appropriate locations to maintain continuity of air/water barriers, particularly at windows, doors and other penetrations of exterior wall. All gypsum sheathing must be covered with No. 15 asphalt felt or equivalent sheet to ensure watertight construction. Asphalt felt should be applied horizontally with 2” overlap and attached to sheathing. Tyvek sheets should be stapled to sheathing according to manufacturer’s directions.

Vapor retarder is normally installed on the warm side of wall in cold climates to prevent interior moisture from entering the stud cavity. The use and location of a vapor retarder should be determined by a qualified mechanical engineer to prevent moisture condensation within the wall. Vinyl wall coverings are not recommended for the interior of walls containing vapor retarders.

### 6 Ceramic Tile
SHEETROCK Brand Gypsum Panels, Water-Resistant, or DUROCK Brand Cement Boards are recommended as a base for adhesive application of ceramic and plastic tile and plastic-faced wall panels. A vapor retarder is not recommended.

Taping and finishing of SHEETROCK Brand Gypsum Panels, Water-Resistant, is required under tile. It is recommended that all joints and fastener heads be treated with SHEETROCK Brand Setting-Type (DURABOND 45 or 90) or Lightweight Setting-Type (EASY SAND 45 OR 90) Joint Compound. The compound should also be used to embed tape beyond areas to be tiled. These areas should be finished with conventional joint systems.
### Wood Framing Requirements

Wood framing meeting the minimum requirements of local building codes is necessary for proper performance.

### Ceiling

To prevent objectionable sag in new gypsum panel ceilings, the weight of overlaid unsupported insulation should not exceed 1.3 psf for 1/2" thick panels with frame spacing 24” o.c.; 2.4 psf for 1/2" panels on 16” o.c. framing (or 1/2" SHEETROCK Brand Interior Gypsum Ceiling Board—Sag-Resistant on 24” o.c. framing) and 5/8” panels 24” o.c.; 3/8” thick panels must not be overlaid with unsupported insulation. A vapor retarder should be installed in exterior ceilings, and the plenum or attic space should be properly vented.

During periods of cold or damp weather when a polyethylene vapor retarder is installed on ceilings behind the gypsum board, it is important to install the ceiling insulation before or immediately after installing the ceiling board. Failure to follow this procedure may result in moisture condensation on the back side of the gypsum board, causing the board to sag.

Water-based textures, interior finishing materials and high ambient humidity conditions can produce sag in gypsum ceiling panels if adequate vapor and moisture control is not provided. The following precautions must be observed to minimize sagging of ceiling panels:

1. Where vapor retarder is required in cold weather conditions, the temperature of the gypsum ceiling panels and vapor retarder must remain above the interior air dew point temperature during and after the installation of panels and finishing materials.
2. The interior space must be adequately ventilated and air circulation must be provided to remove water vapor from the structure.

Most sag problems are caused by the condensation of water vapor within the gypsum panel. The placement of vapor retarders, insulation levels and ventilation requirements will vary by location and climate and should be reviewed by a qualified engineer if in question.

### Back-Blocking

Ridging or deformation at the panel joints may occur in gypsum board construction under adverse job or weather conditions. Back blocking end joints will minimize joint ridging and is recommended. Where back-blocking is used, float the end joints between supports and back-block with a 8" wide strip of gypsum board the full length of the joint adhesively applied over abutting ends. For fire-rated resilient construction, back butt-end joints with RC-1 Resilient Channels or equivalent. Refer to Gypsum Construction Handbook for complete details.

### Fixture Attachment

Lightweight fixtures and trim should be installed using expandable anchors for screw attachment. Medium and heavyweight fixtures are not recommended on resilient surfaces, but, if required, they should be supported from the primary framing.

### Double-Layer Laminated 3/8" Panels

In this assembly, use scaffold nails driven through gypsum blocks into the framing at third points vertically for temporary shoring. The 1-1/2" Type G screw is not recommended.

### Acoustical Tile

Treatment of joints and screwheads with joint compound may be omitted where gypsum panels serve as a base for adhesively applied acoustical tile.

### SHEETROCK Brand Exterior Gypsum Ceiling Board

Exposed surfaces should receive two coats of good quality exterior paint. First coat: oil-based primer; second coat: either alkyd or latex exterior paint.

### Shadowing

During periods of low outside temperature, airborne dirt may collect, producing photographing or shadowing over fasteners and furring of exterior walls. This natural phenomenon occurs through no fault of the products.

### WARNING: COMBUSTIBLE

Rigid foam (cellular plastic) insulation will ignite if exposed to fire of sufficient heat and intensity. Use only as directed by the specific instructions accompanying the product.

### Additional Information

See technical folders in this series: Construction Selector SA100 for fire and sound-rated systems; Gypsum Panels & Accessories SA927 for information on system components; Textures and Finishing Products SA933 for finishing product specifications; DURROCK Brand Cement Board Folder SA932 for data on ceramic tile base.
### Part 2: 2.1 A Gypsum Board:

**General Scope**

Specify to meet project requirements.

### Part 1: 1.1 Framed Systems

**Drywall/Wood Products Materials**

In cold weather during gypsum panel joint finishing, temperatures within the building shall be maintained above 55 °F (13 °C). Adequate ventilation shall be provided to carry off excess moisture.

### Part 2: 2.1 Products

<table>
<thead>
<tr>
<th>Material</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Gypsum Board</td>
<td>48&quot; wide—(1/4&quot;) (3/8&quot;) (1/2&quot;) thick (Regular) (Foil-Back) SHEETROCK Brand Gypsum Panels; (1/2&quot;) (5/8&quot;) thick (Foil-Back) SHEETROCK Brand Gypsum Panels, FIRECODE C; (1/2&quot;) (5/8&quot;) thick SHEETROCK Brand Gypsum Panels, Water-Resistant; (1/2&quot;) thick SHEETROCK Brand Gypsum Panels, Water-Resistant, FIRECODE C; (5/8&quot;) thick SHEETROCK Brand Gypsum Panels, Water-Resistant, FIRECODE C; (1/2&quot;) (5/8&quot;) thick SHEETROCK Brand (FIRECODE) Exterior Gypsum Ceiling Board; 1/2&quot; thick SHEETROCK Brand Interior Gypsum Ceiling Board—Sag-Resistant—lengths as required.</td>
</tr>
<tr>
<td>B Cement Board</td>
<td>(1/2&quot;) (5/8&quot;) DUROCK Brand Cement Board.</td>
</tr>
<tr>
<td>C Sheathing</td>
<td>48&quot; wide, 1/2&quot; x (24&quot;) (48&quot;&quot;) wide SHEETROCK Brand Gypsum Sheathing; 5/8&quot; x (24&quot; wide) (48&quot;&quot;) wide SHEETROCK Brand Gypsum Sheathing, FIRECODE C; 1/2&quot; x (24&quot;&quot;) wide (48&quot;&quot;) wide Gyp-Lap Gypsum Sheathing; 5/8&quot; x (24&quot;&quot;) wide (48&quot;&quot;) wide Gyp-Lap (Type X) Gypsum Sheathing.</td>
</tr>
<tr>
<td>D Finishing Products</td>
<td>Joint Treatment: SHEETROCK Brand Joint Tape; SHEETROCK Brand Fiberglass Drywall Tape (must use a setting-type joint compound for first coat over tape); SHEETROCK Brand Setting-Type (DURABOND) or Lightweight Setting-Type (EASY SAND) Joint Compound (20, 45, 90, 210, 300); SHEETROCK Brand Joint Compound (Taping, Topping, All Purpose). SHEETROCK Brand Ready-Mixed Joint Compound Ready-Mixed (PLUS 3), SHEETROCK Brand Ready-Mixed All Purpose Joint Compound (Midweight).</td>
</tr>
<tr>
<td>E Adhesive</td>
<td>1 (for Back-Blocking and Fire-Rated Double-Layer Systems)—SHEETROCK Brand Setting-Type (DURABOND) or Lightweight Setting-Type (EASY SAND) Joint Compound or SHEETROCK Brand Joint Compound Ready-Mixed (All Purpose) (Taping).</td>
</tr>
<tr>
<td>F Fasteners</td>
<td>1 Screws: (1-1/4&quot; Type W) (1-1/2&quot; Type GI) (3/8&quot;, 1&quot;, 1-1/8&quot;, 1-1/4&quot;, 1-5/8&quot;, 1-7/8&quot; Type S) (1&quot; Type S-12), (2) for Non-Rated Systems—1-1/4&quot;, 1-3/8&quot; (Annular Ring Drywall) (Cement Coated Cooler) Nails—obtain locally.</td>
</tr>
<tr>
<td>H Zinc Control Joint No.</td>
<td>093.</td>
</tr>
<tr>
<td>I RC-1 Resilient Channel or equivalent.</td>
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<tr>
<td>J THERMAFIBER Sound Attenuation Fire Blankets; (1-1/2&quot;) (2&quot;) (3&quot;) x 16&quot; or 24&quot; x 48&quot;, THERMAFIBER Fire-Safety FS-15 Blankets (1&quot;) (2&quot;) (3&quot;) (5-1/4&quot;) (6&quot;) x 15&quot; or 23&quot; x 48&quot;.</td>
<td></td>
</tr>
<tr>
<td>K Sealant</td>
<td>SHEETROCK Brand Acoustical Sealant.</td>
</tr>
</tbody>
</table>
Drywall/Wood
Framed Systems

Part 3: 3.1 3.1.1 Gypsum Panel Erection: Direct Attachment—Apply gypsum panels to ceilings first, then to walls. Place panels (perpendicular to framing) (parallel to framing). When using perpendicular application, position all ends over framing members. Use maximum practical lengths to minimize end joints. Fit ends and edges closely, but not forced together. Stagger end joints in successive courses. Place end joints on opposite sides of partitions on different studs. When necessary, cut ends, edges and cutouts within field of panel in a workmanlike manner. Cut panels with a razor knife and straight edge. Avoid cutting with power tools. If cut with a power tool, tool must be equipped with a dust collector.

Drive fasteners in field of panel first, working toward ends and edges. Hold panel in firm contact with framing while driving fasteners. Space perimeter fasteners at least 3/8" from ends and edges. Drive nails home with heads slightly below surface of panels to provide a uniform dimple 1/32" deep. Do not use a nail set; avoid breaking face paper.

Attach gypsum panels to framing supports by:
A Standard single nailing method: Attach panels with specified nails spaced 7" o.c. max. for ceilings, 8" o.c. max. for walls.
B Adhesive application: Attach gypsum panels with drywall stud adhesive applied in a continuous 3/8" bead at center of attachment to face of framing members. Where two panels meet on a framing member, apply two beads permitting adhesive contact to both panels. Do not apply adhesive to members such as bridging, diagonal bracing, etc., into which no supplemental fasteners will be driven. Immediately following panel erection, apply fasteners per manufacturer's directions. Hand impact panel along framing to ensure contact at all points.
C Double-nailing method: Attach gypsum panels with nails spaced 12" o.c. with second nails in close proximity (2" away).
D Power-driven screws: Attach gypsum panels with 1-1/4" Type W screws—spaced 16" o.c. max. for walls, 12" o.c. for ceilings.
E Vinyl Foam Tape: Attach gypsum panels, using stud adhesive and 8" tape strips applied according to manufacturer's directions.

3.1.2 SHEETROCK Brand Gypsum Panels, Water-Resistant, Erection
A Framing: If necessary, fur out studs so inside face of shower receptor is flush with gypsum panel face. Install appropriate blocking or headers to support tub and other plumbing fixtures, and to receive soap dishes, grab bars, towel racks and other hardware. When studs are more than 16" o.c., or when ceramic tile over 5/16" thick will be used, install suitable blocking between studs. Place blocking approximately 1" above top of tub or receptor and at midpoint between base and ceiling.
B Gypsum Panels: After tub, shower pan or receptor is installed, place temporary 1/4" spacer strips around lip of fixture. Pre-cut panels to required sizes and make necessary cut-outs. Before installing panels, brush thinned tile adhesive over all cut or exposed panel edges at utility holes, joints and intersections.
Install panels perpendicular with paperbound edge abutting top of spacer strip. Fasten panels with nails 8" o.c. max., or screws 12" o.c. max. Where ceramic tile more than 5/16" thick will be used, space nails 4" o.c. max. and screws 8" o.c. max. Adhesive application (see 3.1.1 B above) may be used for attaching panels when ceramic tile no more than 5/16" thick will be used.

In areas to be tiled, treat all fastener heads with SHEETROCK Brand Setting-Type (DURABOND) or Lightweight Setting-Type (EASY SAND) Joint Compound. Fill tapered edges in gypsum panel with this SHEETROCK Brand Setting-Type Compound, embed SHEETROCK Brand Joint Tape firmly and wipe off excess compound. Follow immediately with a second coat over the taping coat, being careful not to crown the joint. Fold and embed tape properly in all interior angles to provide a true angle.

In areas not to be tiled, embed tape and treat fasteners with SHEETROCK Brand Setting-Type (DURABOND) or Lightweight Setting-Type (EASY SAND) Joint Compound applied in the conventional manner. Finish with at least two coats of joint compound applied according to directions.
Prior to tile erection, seal cut panel edges of all openings around pipes, fittings and fixtures with thinned tile adhesive. Remove spacer strips, but do not caulk gap at bottom of panels. Note: Using an adhesive approved by the tile manufacturer, install tile down to top edge of shower floor or tub and overlapping lip or return of tub or receptor. Fill all tile joints with an unbroken application of grout. Apply caulking compound between the tile and shower floor or tub.

3.1.3 Floating Interior Angle System—Apply gypsum panels to ceilings first. Follow standard framing practices for corner fastening. Fit panels snugly at all angles. Apply gypsum panels to walls to maintain firm support for ceiling panels. At horizontal angles, apply the first fastener 8" from the intersection. At vertical interior angles attach the overlapping panel only, at the angle. Use conventional fastening in remainder of area.
3.2 Double-Layer Systems

3.2.1 Base Layer Erection—Direct Attachment

A Ceilings: Apply gypsum panel base layer on ceilings first (perpendicular to framing) (parallel to framing). Position end joints to offset face layer joints by at least 16". Joints may occur on or between framing members. Apply foil-back panels with foil side against framing.

B Sidewalls: Apply gypsum panel base layer with long edges centered on framing members (parallel). When pre-decorated face layers will be used, apply base layer horizontally. Apply foil-back panels with foil side against framing. Attach panels to framing supports by (screw) (nail) attachment as follows:

C Screw Attachment: Attach panels with power-driven 1-1/4" Type W screws spaced 16" o.c. max. for walls, 12" o.c. max. for ceilings. Stagger screws on adjoining edges and ends.

D Nail Attachment: Attach panels with specified nails spaced 8" o.c. max. for walls, 7" o.c. max. for ceilings. Drive nails so heads are flush with surface and opposite each other on adjacent ends and edges.

Drive fasteners in field of panel first, working toward ends and edges. Hold panel in firm contact with framing while driving fasteners. Space fasteners 3/8" min. from ends and edges.

3.2.2 Face Layer Erection: Direct Attachment—Use gypsum panels in maximum practical lengths to minimize end joints. Fit ends and edges closely, but not forced together. Stagger joints at least 16" from parallel joints in base layer. When necessary, cut ends, edges and cutouts within field of panels in a workmanlike manner.

After panels are cut to size, mix and apply adhesive according to manufacturer’s directions and laminate face layer to base layer in the following manner:

Sheet Lamination—For fire-rated construction on walls, apply specified SHEETROCK Brand Setting-Type (DURABOND) or Lightweight Setting-type (EASY SAND) Joint Compound, or SHEETROCK Brand Joint Compound Ready-Mixed (Taping or All Purpose) to entire back surface of face panels and to extreme edges of panels. Apply adhesive in beads approximately 3/8" wide at base and 1/2" high and spaced 1-1/2" to 2" o.c. Laminated face layer to base layer using moderate pressure and temporary support or supplemental fastening as follows:

A Temporary nailing: Use double-headed nails with at least 3/4" penetration into framing. Space nails 16" to 24" o.c. When proper bond is developed, remove nails and dimple holes for joint treatment.

B Temporary supports: Brace or shore face layer every 16" to 24". When proper bond is developed, remove supports.

C Screws: Permanently attach face layer with 1-1/2" Type G screws. Space screws along edges 36" o.c. max., within 2" of joint and 12" of both ends. In field of panel, space screws along centerline, 48" max. and within 24" of ends.

Strip Lamination—For fire-rated construction on walls, apply specified SHEETROCK Brand Setting-Type (DURABOND) or Lightweight Setting-Type (EASY SAND) Joint Compound, or SHEETROCK Brand Taping or All Purpose Joint Compound Ready-Mixed to base layer panels in vertical strips of four 1/2" beads, 1-1/2" to 2" o.c. Space strips 24" o.c. Permanently attach face layer with 1-1/2" Type G screws placed to penetrate adhesive strips. Space screws along edges 36" o.c. max., within 2" of joint and 12" of both ends. In field of panel, space screws along centerline, 48" o.c. max. and within 24" of both ends.

For non-rated construction, laminate face to base layer as follows:

Laminating Adhesive—Apply adhesive in strips using notched spreader having 1/4" x 1/4" min. notches spaced 2" o.c. max. Apply strips to back of face panel in center and along both edges. Position panel, press firmly in place and fasten as required. For walls, use pre-bowed panels, erect panels vertically and fasten 16" o.c. at top and bottom of panel. For ceilings, space fasteners 16" o.c. along edges and ends, with one permanent fastener per framing member at mid-width of panel.

Liquid Contact Adhesive—Apply adhesive to both contact surfaces according to manufacturer’s directions; let adhesive air-dry; erect panels as soon as possible after drying. Position panel, press panel firmly in place and fasten as required. For perpendicular application to walls and for all ceiling applications, fasten face panel at each corner and along edges spaced 48" o.c. max. For parallel application to walls, use pre-bowed panels and fasten 16" o.c. at top and bottom of panel.

Vinyl Foam Tape—Attach gypsum panels, using laminating adhesive and vinyl foam tape applied in continuous strips across back face of panel according to manufacturer’s directions.

For mechanical attachment in non-rated construction, space nails 7" o.c. on ceilings, 8" o.c. walls; space screws 12" o.c. on ceilings, 16" o.c. on walls.

3.2.3 Face Layer Erection: SHEETROCK Brand Vinyl-Covered Gypsum Panels—Before application, pre-bow panels to a 2" permanent bow convex to face of studs. Apply pre-bowed panels vertically with joints staggered at least 10" from parallel joints in base layer. Position less-than-full-width panels with cut edge at corner. When necessary, cut ends, edges and cutouts within field of panels in a workmanlike manner.

For fire-rated construction, install panels using specified SHEETROCK Brand Setting-Type (DURABOND) or Lightweight Setting-Type (EASY SAND) Joint Compound, or SHEETROCK Brand Taping or All Purpose Joint Compound Ready-Mixed as laminating adhesive. Apply adhesive to base layer in vertical strips of four 1/2" beads, 1-1/2" to 2" o.c. Space strips 24" o.c. Fasten panels 16" o.c. at top and bottom of panel.
For non-rated construction, install face layers, using (laminating) (liquid contact) adhesive as follows:

A **Laminating Adhesive:** Apply adhesive in strips using notched spreader having 1/4" x 1/4" min. notches spaced 2" o.c. max. Apply strips to back of face panel in center and along both edges. Position panel, press firmly in place and fasten 16" o.c. at top and bottom.

B **Liquid Contact Adhesive:** Apply adhesive to both contact surfaces according to manufacturer’s directions; let adhesive air-dry; erect panels as soon as possible after drying. Position panel, press firmly in place and fasten 16" o.c. at top and bottom.

Finish joints, edges, corners with SHEETROCK Brand Vinyl-Faced Mouldings matching panel finishes and installed according to manufacturer’s directions.

### 3.3 Resilient Attachment Systems

#### 3.3.1 Resilient Channel Erection—Position resilient channels at right angles to wood framing, space (16") (24") o.c. and attach to each support with 1-1/4" Type W or 1-1/4" Type S screws driven through holes in channel mounting flange.

On walls, install channels with mounting flange down. (Channel may be inverted at floor to accommodate attachment of base.) Locate channels 2" from floor and within 6" of ceiling. Extend channels into all corners and attach to corner framing. Position channels max. 6" from wall-ceiling angle. Cantilever channel ends no more than 6". For double-layer system, attach channel through base layer to framing with 1-7/8" Type S screws. Splice channel by nesting directly over framing member, screw-attach through both flanges. Reinforce with 3/8" pan head screws located at both ends of splice. Use of a filler strip at the base may reduce STC rating.

Where cabinets are to be installed, attach RC-1 Resilient Channels (or equivalent) to studs at center of top and bottom cabinet hanger brackets. When distance between hangers exceeds 24" o.c., install additional channel at mid-point between hangers. **Note:** Screws attaching cabinets to resilient channels should be placed between studs. Screws that contact studs reduce the system’s resiliency and sound rating.

#### 3.3.2 Gypsum Panel Erection: Ceilings—

A **Base Layer:** For fire-rated assembly, apply gypsum base-layer panels with long edges across joists and end joints staggered. Fasten panels to framing with 8d cement-coated nails spaced 7" o.c. Attach resilient channel through base layer perpendicular to framing with 1-7/8" Type S screws spaced 24" o.c. for joists 18" o.c.; spaced 16" o.c. for joists 24" o.c.

B **Face Layer:** Apply face-layer panels of maximum practical length with long dimension perpendicular to resilient channels and end joints staggered. End joints may occur over resilient channels or midway between channels with joint floated and back-blocked. Fit ends and edges closely, but not forced together. Fasten panels to channels with 1" Type S screws spaced 12" o.c. in field of panels and along abutting ends. Cut panels neatly and provide support at cutouts and openings.

#### 3.3.3 USG High Performance Floor/Ceiling System

A **Floor:** Apply 3/8" bead of SHEETROCK Brand Acoustical Sealant to the center of the top flange of the joists. Place 1/2" thick min. APA span rated exterior grade plywood sheets with long dimension across wood joists spaced 16" o.c. Fasten plywood to wood joists with (6d)(8d) cc sinkers 6" o.c. along supported ends and 10" o.c. at intermediate joists.

Install SHEETROCK Brand Gypsum Liner Panels after the structure is fully enclosed and all interior partitions are installed. Loose lay the liner panels on the subfloor with the long dimension at a right angle to the wood joists. Stagger panel end joints and fit panels closely to wall intersections without forcing. Seal the perimeter of the floor with SHEETROCK Brand Acoustical Sealant to provide an airtight seal.

Finish floor with DUROCK Brand Exterior Cement Board for gypsum liner panels to achieve comparable fire- and sound-rated performance.

B **Cavity:** Install 3" thick THERMABEAM SAFB to fit snugly between all floor joists. Support each batten with four spring steel wire rods (0.087" dia. typical) uniformly spaced to hold the batts approximately 1" above the bottom of the joists. Butt ends tightly and fill all voids.

C **Ceiling:** Apply RC-1 Resilient Channels (or equivalent) 16" o.c. perpendicular to joists and fastened with 1-7/8" Type S screws. Attach base layers of 5/8" SHEETROCK Brand Gypsum Panels, FIRECODE C Core, perpendicular to channels with 1" Type S screws 16" o.c. at channels, 8" o.c. at panel ends. Attach face layers with 1-5/8" Type S screws 8" o.c. at channels, with 1-1/2" Type G screws 8" o.c. at panel ends, staggering screws 4" from screws in base layer. Treat joints and fasteners with SHEETROCK Brand joint system. Seal perimeter with SHEETROCK Brand Acoustical Sealant.
### 3.3.4 Gypsum Panel Erection—Walls

Apply resilient channel per 3.3.1. Apply gypsum panels of maximum practical length with long dimension parallel to resilient channel and fastened with 1” Type S screws spaced 12” o.c. along channels. Center horizontal abutting edges over screw flange of channel. Where channel resiliency makes screw placement difficult, the next longer screw may be used, but do not drive screw directly over stud. For direct attachment, fasten panels to wood studs with 6d nails 8” o.c. For two-layer application of gypsum panels, apply base layer perpendicular to resilient channels and attach to channels with 1” Type S screws spaced 24” o.c. and to wood studs with 1-1/4” Type W screws 16” o.c. Apply face layer with long dimension perpendicular to long edges of base layer and fasten with 1-5/8” Type S screws 16” o.c.

### 3.4 Wall Furring Systems

#### 3.4.1 Single-Layer Application—Direct Attachment

Space suitable wood furring strips 16” o.c. and attach to masonry walls. Apply gypsum panels of maximum practical length with long dimension perpendicular to furring strips. Fasten panels with 1-1/4” Type W screws spaced 16” o.c. Apply foil-back panels with foil side against furring. Where there is a possibility of water penetration through exterior walls, install an asphalt felt strip between furring strips and wall.

#### 3.4.2 Mechanical Application—Z-Furring Channels

Erect insulation vertically on interior of masonry and concrete walls and hold in place with Z-Furring Channels. Apply resilient channel and fastened with 1” Type S screws spaced 16” o.c. on masonry walls. For two-layer application, apply base layer perpendicular to resilient channels and attach to channels with 1” Type S screws spaced 24” o.c. and to wood studs with 1-1/4” Type W screws 16” o.c. Apply face layer with long dimension perpendicular to long edges of base layer and fasten with 1-5/8” Type S screws 16” o.c.

### 3.5 Gypsum Sheathing Application

Apply 24” wide sheathing horizontally with tongue edge up. Install supplementary bracing as required by applicable code. Fasten sheathing with nails spaced 8” o.c. along each stud.

Apply 48” wide sheathing vertically with bottom edge bearing on foundation or subfloor. Install supplementary bracing (and adhesive) as required by applicable code. Fasten sheathing to studs and plates with nails 8” o.c.

### 3.6 Exterior Ceilings and Soffits

Apply SHEETROCK Brand Exterior Gypsum Ceiling Board (perpendicular to supports) (parallel to supports) with end joints over supports and with 1-1/16” to 1/8” space between butted ends of boards. Use maximum practical lengths to minimize end joints. Fasten boards to supports with screws spaced 12” o.c. or nails spaced 8” o.c. Where specified, cover joints with wood battens secured fastened to framing. Finish joints, trim and fasteners with SHEETROCK Brand Setting-Type (DURABOND) or Lightweight Setting-Type (EASY SAND) Joint Compound applied according to directions.

### 3.7 Joint System

#### 3.7.1 Prefill Application

- A Mix SHEETROCK Brand Setting-Type (DURABOND) or Lightweight Setting-Type (EASY SAND) Joint Compound according to directions on bag. Do not overmix, or use extremely cold water or cold joint compound.
- B Prefill all “V” grooves formed by abutting tapered eased edges of SHEETROCK Brand Gypsum Panels, SW Edge, with SHEETROCK Brand Setting-Type (DURABOND) or Lightweight Setting-Type (EASY SAND) Joint Compound using a flexible 5” or 6” joint finishing knife or Ames Pre-Fill Tool. Fill “V” joint flush and wipe off excess compound beyond the “V” groove, leaving a clear depression to receive tape. Allow prefill to harden prior to the next application (tape or embedding coat).

#### 3.7.2 SHEETROCK Brand Joint Tape

- A Mix joint compound in strict accordance with manufacturer’s recommendations.
- B Apply joint compound in a thin uniform layer to all joints and angles to be reinforced. Immediately apply SHEETROCK Brand Joint Tape centered over joint and seated into compound. Sufficient compound—approx. 1/64” to 1/32”—must remain under the tape to provide proper bond. Follow immediately with a thin skin coat to embed tape, but not to function as a second coat. Fold and embed tape properly in all interior angles to provide a true angle. The tape or embedding coat must be thoroughly dry prior to application of second coat. (Exception: DURABOND Setting-Type and EASY SAND Lightweight Setting-Type Joint Compounds need only have hardened prior to application of next coat.)
3.7.4 Finishing Fasteners

A. Apply a setting-type, all-purpose, or lightweight all-purpose compound to fastener depressions as the first coat. Follow with a minimum of two additional coats of topping or all-purpose compound, leaving all depressions level with the surface. (Exception: Setting-type and lightweight all-purpose joint compounds need only one additional coat.)

B. Reinforce all vertical and horizontal exterior corners with corner bead fastened with nails or 9/16 o.c. on both flanges along entire length of bead.

C. Where partition or ceiling terminates against masonry or other dissimilar material, apply metal trim over gypsum panel edge and fasten with nails or galvanized staples 9” o.c. on both flanges along entire length of head.

3.8 Application and Finishing

3.8.1 SHEETROCK Brand Paper Faced Drywall

A. Apply compound to both sides of corner, extending 2” on each side for outer corners, 1-1/2” for inside corners. Stir to desired length; align tightly to ceiling and press firmly with fingers along length of corner to set. Do not bend head. Run taping knife over corner at a 45° angle with even pressure. Remove excess compound using knife to eliminate air bubbles under paper. Allow to dry.

B. For outer corners, apply another coat of compound to both sides, feathering out 5”-6” on each side. Let dry; sand lightly as necessary. For inner corners, apply fill coat to one side, feathering out 1”. Let dry. Apply fill coat to other side using same procedure. Let dry. Sand lightly where necessary.

C. For outer corner, apply finishing coat, feathering 8” from nose of bead. Draw knife along one side of bead with one edge resting on nose of bead and other on surface of wallboard. Repeat for other side. Let dry. Sand and prime. For inner corners, apply finishing coat to one side, feathering 1” past previous coat. Let dry. Apply finishing coat to other side. Let dry. Sand and prime.

3.9 Other Bead and Trim

3.9.1 Installation

A. Reinforce all vertical and horizontal exterior corners with corner bead fastened with nails or 9/16” galvanized staples 9” o.c. on both flanges along entire length of head.

B. Where partition or ceiling terminates against masonry or other dissimilar material, apply metal trim over gypsum panel edge and fasten with nails or galvanized staples 9” o.c.

3.9.2 Finishing

A. Apply first coat to all bead and trim and properly feather out from ground to plane of surface. Compound must thoroughly dry prior to application of second coat (exception: SHEETROCK Brand Setting-Type [DURABOND] and Lightweight Setting-Type [EASY SAND] Joint Compounds need only have hardened prior to application of next coat.)

B. Apply second coat in same manner as first coat, extending compound slightly beyond face of panel. Compound must be thoroughly dry prior to application of finish coat (exception: Setting-type joint compounds need only have hardened prior to application of next coat.)

C. Apply finish coat to all bead and trim, extending compound slightly beyond the second coat and properly feathering from ground to plane or surface (exception: Only two coats of SHEETROCK Brand Setting-Type [DURABOND] or Lightweight Setting-Type [EASY SAND] Joint Compound or SHEETROCK Brand Lightweight All Purpose Joint Compound Ready Mixed [PLUS 3] are needed.) When dry, sand finish as necessary to provide a flat smooth surface ready for decoration. When sanding, take care not to roughen face paper.
3.10 Screws

Power-drive at least 3/8" from edges or ends of gypsum panels to provide uniform dimple 1/32" deep.

3.11 Control Joints

Break gypsum panels and resilient channels behind joint and back by double supports. Apply acoustical sealant to fill gap and attach control joint to face layer with nails or 9/16" deep galvanized staples spaced 6" o.c. on both flanges along entire length of joint.

Metric Conversion

The table below provides metric equivalents for the dimensions of United States Gypsum Company products. “Soft” conversions merely apply a conversion factor that translates feet and inches (according to which the products were manufactured) into metric units; “hard” metric measurements are given for products actually manufactured in metric sizes.

### Metric Equivalents

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(1) Conversion Type: “Soft” is metric relabeling with no physical change of dimension; “hard” is a physical change to the metric dimension shown.
(2) Conversion factors: Inches x 25.4 = mm; Feet x 304.8 = mm.

Notes:
- Availability: Items above are not stocked in metric lengths or widths. Minimum quantity orders may be required. Leadtime should be determined; upcharges may apply. Geographic availability may vary and should be verified for the project location.
- Lengths: Shown on SHEETROCK Brand Gypsum Panels and steel stud framing for illustration purposes only.
- Framing spacing: 16" o.c. converts to 400 mm o.c.; 24" converts to 600 mm o.c.