CHAPTER 7
WALL COVERING

SECTION R701
GENERAL

R701.1 Application. The provisions of this chapter shall control the design and construction of the interior and exterior wall covering for all buildings.

R701.2 Installation. Products sensitive to adverse weather shall not be installed until adequate weather protection for the installation is provided. Exterior sheathing shall be dry before applying exterior cover.

SECTION R702
INTERIOR COVERING

R702.1 General. Interior coverings or wall finishes shall be installed in accordance with this chapter and Tables R702.1(1), Table R702.1(2), Table R702.1(3) and Table R702.3.5. Interior masonry veneer shall comply with the requirements of Section R703.7.1 for support and Section R703.7.4 for anchorage, except an air space is not required. Interior finishes and materials shall conform to the flame spread and smoke-density requirements of Section R315.

TABLE R702.1(1)
THICKNESS OF PLASTER

<table>
<thead>
<tr>
<th>PLASTER BASE</th>
<th>FINISHED THICKNESS OF PLASTER FROM FACE OF LATH, MASONRY, CONCRETE (inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Gypsum plaster</td>
</tr>
<tr>
<td>Expanded metal lath</td>
<td>5/16, minimum</td>
</tr>
<tr>
<td>Wire lath</td>
<td>5/16, minimum</td>
</tr>
<tr>
<td>Gypsum lath</td>
<td>1/2, minimum</td>
</tr>
<tr>
<td>Masonry walls</td>
<td>1/2, minimum</td>
</tr>
<tr>
<td>Monolithic concrete walls</td>
<td>5/8, maximum</td>
</tr>
<tr>
<td>Monolithic concrete ceilings</td>
<td>5/8, maximum</td>
</tr>
<tr>
<td>Gypsum veneer base</td>
<td>1/16, minimum</td>
</tr>
<tr>
<td>Gypsum sheathing</td>
<td>—</td>
</tr>
</tbody>
</table>

For SI: 1 inch = 25.4 mm.

a. When measured from back plane of expanded metal lath, exclusive of ribs, or self-furring lath, plaster thickness shall be 3/16 inch minimum.

b. When measured from face of support or backing.

c. Because masonry and concrete surfaces may vary in plane, thickness of plaster need not be uniform.

d. When applied over a liquid bonding agent, finish coat may be applied directly to concrete surface.

e. Approved acoustical plaster may be applied directly to concrete or over base coat plaster, beyond the maximum plaster thickness shown.

f. Attachment shall be in accordance with Table R702.3.5.

g. Where gypsum board is used as a base for portland cement plaster, weather-resistant sheathing paper complying with Section R703.2 shall be provided.

TABLE R702.1(2)
GYPSUM PLASTER PROPORTIONS

<table>
<thead>
<tr>
<th>NUMBER</th>
<th>COAT</th>
<th>PLASTER BASE OR LATH</th>
<th>MAXIMUM VOLUME AGGREGATE PER 100 POUNDS NEAT PLASTER (cubic feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Damp loose sand</td>
</tr>
<tr>
<td>Two-coat work</td>
<td>Base coat</td>
<td>Gypsum lath</td>
<td>2.5</td>
</tr>
<tr>
<td></td>
<td>Base coat</td>
<td>Masonry</td>
<td>3</td>
</tr>
<tr>
<td>Three-coat work</td>
<td>First coat</td>
<td>Lath</td>
<td>2d</td>
</tr>
<tr>
<td></td>
<td>Second coat</td>
<td>Lath</td>
<td>3d</td>
</tr>
<tr>
<td></td>
<td>First and second coats</td>
<td>Masonry</td>
<td>3</td>
</tr>
</tbody>
</table>

For SI: 1 inch = 25.4 mm, 1 cubic foot = 0.0283 m³, 1 pound = 0.454 kg.

a. Wood-fibered gypsum plaster may be mixed in the proportions of 100 pounds of gypsum to not more than 1 cubic foot of sand where applied on masonry or concrete.

b. When determining the amount of aggregate in set plaster, a tolerance of 10 percent shall be allowed.

c. Combinations of sand and lightweight aggregate may be used, provided the volume and weight relationship of the combined aggregate to gypsum plaster is maintained.

d. If used for both first and second coats, the volume of aggregate may be 2.5 cubic feet.

e. Where plaster is 1 inch or more in total thickness, the proportions for the second coat may be increased to 3 cubic feet.
WALL COVERING

### TABLE R702.1(3)

<table>
<thead>
<tr>
<th>MINIMUM PERIOD</th>
<th>MINIMUM INTERVAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>MOIST COATS</td>
<td>BETWEEN</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MAXIMUM VOLUME AGGREGATE PER VOLUME CEMENTITIOUS MATERIAL</th>
<th>Portland cement plater³ maximum volume aggregate per volume cement</th>
<th>Portland cement-lime plaster²</th>
<th>*</th>
<th>Approximate minimum thickness³ curing (inches)</th>
<th>First and second coats</th>
<th>Note⁴</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>4</td>
<td>3/₄₁₄</td>
<td>4</td>
<td>3/₄₁₂</td>
<td>48 Hours⁵</td>
<td>48 Hours⁵</td>
</tr>
<tr>
<td>Second</td>
<td>5</td>
<td>3/₁₄₁₄</td>
<td>5</td>
<td>First and second coats</td>
<td>48 Hours⁵</td>
<td>7 Days⁶</td>
</tr>
<tr>
<td>Finished</td>
<td>3</td>
<td>—</td>
<td>3</td>
<td>1/₄₁₄</td>
<td>—</td>
<td>Note⁴</td>
</tr>
</tbody>
</table>

For SI: 1 inch = 25.4 mm, 1 pound = 0.454 kg.

a. When determining the amount of aggregate in set plaster, a tolerance of 10 percent may be allowed.

b. From 10 to 20 pounds of dry hydrated lime (or an equivalent amount of lime putty) may be added as a plasticizing agent to each sack of Type I and Type II standard portland cement in base coat plaster.

c. No additions of plasticizing agents shall be made.

d. See Table R702.1(1).

e. Measured from face of support or backing to crest of scored plaster.

f. Twenty-four-hour minimum period for moist curing of interior portland cement plaster.

g. Twenty-four-hour minimum interval between coats of interior portland cement plaster.

h. Finish coat plaster may be applied to interior portland cement base coats after a 48-hour period.

i. For finish coat, plaster up to an equal part of dry hydrated lime by weight (or an equivalent volume of lime putty) may be added to Type I, Type II and Type III standard portland cement.

**R702.2 Interior plaster.** Gypsum plaster or portland cement plastering materials shall conform to ASTM C 5, C 28, C 35, C 37, C 59, C 61, C 587, C 588, C 631, C 847, C 897, C 933, C 1032 and C 1047, and shall be installed in accordance with ASTM C 843, C 844 and C 1063. Plaster shall not be less than three coats when applied over metal lath and not less than two coats when applied over other bases permitted by this section, except that veneer plaster may be applied in one coat not to exceed 3/₁₄ inch (4.76 mm) thickness, provided the total thickness is as set forth in Table R702.1(1).

**R702.2.1 Support.** Support spacing for gypsum or metal lath on walls or ceilings shall not exceed 16 inches (406 mm) for 1/₄ inch thick (9.5 mm) or 24 inches (610 mm) for 1/₄-inch-thick (12.7 mm) plain gypsum lath. Gypsum lath shall be installed at right angles to support framing with end joints in adjacent courses staggered by at least one framing space.

**R702.3 Gypsum board.**

**R702.3.1 Materials.** All gypsum board materials and accessories shall conform to ASTM C 36, C 79, C 475, C 514, C 630, C 931, C 960, C 1002, C 1047, C 1177, C 1178, C 1278, C 1395 or C 1396 and shall be installed in accordance with the provisions of this section. Adhesives for the installation of gypsum board shall conform to ASTM C 557.

**R702.3.2 Wood framing.** Wood framing supporting gypsum board shall not be less than 2 inches (51 mm) nominal thickness in the least dimension except that wood furring strips not less than 1-inch-by-2 inch (25.4 mm by 51 mm) nominal dimension may be used over solid backing or framing spaced not more than 24 inches (610 mm) on center.

**R702.3.3 Steel framing.** Steel framing supporting gypsum board shall not be less than 1.25 inches (32 mm) wide in the least dimension. Light-gage nonload-bearing steel framing shall comply with ASTM C 645. Load-bearing steel framing and steel framing from 0.033 inch to 0.112 inch (0.838 mm to 2.84 mm) thick shall comply with ASTM C 955.

**R702.3.4 Insulating concrete form walls.** Foam plastics for insulating concrete form walls constructed in accordance with Sections R404.4 and R611 on the interior of habitable spaces shall be covered in accordance with Section R314.1.2. Adhesives are permitted to be used in conjunction with mechanical fasteners. Adhesives used for interior and exterior finishes shall be compatible with the insulating form materials.

**R702.3.5 Application.** Maximum spacing of supports and the size and spacing of fasteners used to attach gypsum board shall comply with Table R702.3.5. Gypsum sheathing shall be attached to exterior walls in accordance with Table R602.3(1). Gypsum board shall be applied at right angles or parallel to framing members. All edges and ends of gypsum board shall occur on the framing members, except those edges and ends that are perpendicular to the framing members. Interior gypsum board shall not be installed where it is directly exposed to the weather or to water.

**R702.3.6 Fastening.** Screws for attaching gypsum board to wood framing shall be Type W or Type S in accordance with ASTM C 1002 and shall penetrate the wood not less than 3/₄ inch (15.9 mm). Screws for attaching gypsum board to light-gage steel framing shall be Type S in accordance with ASTM C 1002 and shall penetrate the steel not less than 3/₄ inch (9.5 mm). Screws for attaching gypsum board to steel framing 0.033 inch to 0.112 inch (0.838 mm to 2.84 mm) thick shall comply with ASTM C 954.
### TABLE R702.3.5
MINIMUM THICKNESS AND APPLICATION OF GYPSUM BOARD

<table>
<thead>
<tr>
<th>THICKNESS OF GYPSUM BOARD (inches)</th>
<th>APPLICATION</th>
<th>ORIENTATION OF GYPSUM BOARD TO FRAMING</th>
<th>MAXIMUM SPACING OF FRAMING MEMBERS (inches o.c.)</th>
<th>MAXIMUM SPACING OF FASTENERS (inches)</th>
<th>SIZE OF NAILS FOR APPLICATION TO WOOD FRAMING</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Application without adhesive</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$3/8$</td>
<td>Ceiling</td>
<td>Perpendicular</td>
<td>16</td>
<td>7</td>
<td>13 gage, $11/64''$ long, $19/64''$ head; 0.098'' diameter, $11/64''$ long, annular-ringed; or 4d cooler nail, 0.080'' diameter, $11/64''$ long, $1/32''$ head.</td>
</tr>
<tr>
<td></td>
<td>Wall</td>
<td>Either direction</td>
<td>16</td>
<td>8</td>
<td>13 gage, $11/64''$ long, $19/64''$ head; 0.098'' diameter, $11/64''$ long, annular-ringed; 5d cooler nail, 0.086'' diameter, $11/64''$ long, $19/64''$ head; or gypsum board nail, 0.086'' diameter, $11/64''$ long, $1/32''$ head.</td>
</tr>
<tr>
<td>$1/2$</td>
<td>Ceiling</td>
<td>Perpendicular</td>
<td>24</td>
<td>7</td>
<td>13 gage, $11/64''$ long, $19/64''$ head; 0.098'' diameter, $11/64''$ long, annular-ringed; 6d cooler nail, 0.092'' diameter, $11/64''$ long, $1/32''$ head; or gypsum board nail, 0.0915'' diameter, $11/64''$ long, $19/64''$ head.</td>
</tr>
<tr>
<td></td>
<td>Wall</td>
<td>Either direction</td>
<td>24</td>
<td>8</td>
<td>13 gage, $11/64''$ long, $19/64''$ head; 0.098'' diameter, $11/64''$ long, annular-ringed; 6d cooler nail, 0.092'' diameter, $11/64''$ long, $1/32''$ head; or gypsum board nail, 0.0915'' diameter, $11/64''$ long, $19/64''$ head.</td>
</tr>
<tr>
<td>$5/8$</td>
<td>Ceiling</td>
<td>Perpendicular</td>
<td>24</td>
<td>7</td>
<td>Same as above for $3/8''$ gypsum board.</td>
</tr>
<tr>
<td></td>
<td>Wall</td>
<td>Either direction</td>
<td>24</td>
<td>8</td>
<td>Same as above for $1/2''$ and $5/8''$ gypsum board, respectively.</td>
</tr>
</tbody>
</table>

**Application with adhesive**

<table>
<thead>
<tr>
<th><strong>THICKNESS OF GYPSUM BOARD (inches)</strong></th>
<th>APPLICATION</th>
<th>ORIENTATION OF GYPSUM BOARD TO FRAMING</th>
<th>MAXIMUM SPACING OF FRAMING MEMBERS (inches o.c.)</th>
<th>MAXIMUM SPACING OF FASTENERS (inches)</th>
<th>SIZE OF NAILS FOR APPLICATION TO WOOD FRAMING</th>
</tr>
</thead>
<tbody>
<tr>
<td>$3/8$</td>
<td>Ceiling</td>
<td>Perpendicular</td>
<td>16</td>
<td>16</td>
<td>Same as above for $3/8''$ gypsum board.</td>
</tr>
<tr>
<td></td>
<td>Wall</td>
<td>Either direction</td>
<td>16</td>
<td>16</td>
<td>Same as above for $1/2''$ and $5/8''$ gypsum board, respectively.</td>
</tr>
<tr>
<td>$1/2$ or $5/8$</td>
<td>Ceiling</td>
<td>Perpendicular</td>
<td>24</td>
<td>12</td>
<td>Base ply nailed as above for $1/2''$ gypsum board; face ply installed with adhesive.</td>
</tr>
<tr>
<td></td>
<td>Wall</td>
<td>Either direction</td>
<td>24</td>
<td>16</td>
<td>Base ply nailed as above for $1/2''$ gypsum board; face ply installed with adhesive.</td>
</tr>
<tr>
<td>Two $3/4$ layers</td>
<td>Ceiling</td>
<td>Perpendicular</td>
<td>16</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Wall</td>
<td>Either direction</td>
<td>24</td>
<td>24</td>
<td></td>
</tr>
</tbody>
</table>

For SI: 1 inch = 25.4 mm.

a. For application without adhesive, a pair of nails spaced not less than 2 inches apart or more than $21/2$ inches apart may be used with the pair of nails spaced 12 inches on center.

b. Screws shall be Type S or W per ASTM C 1002 and shall be sufficiently long to penetrate wood framing not less than $7/8$ inch and metal framing not less than $7/8$ inch.

c. Where metal framing is used with a clinching design to receive nails by two edges of metal, the nails shall be not less than $7/16$ inch longer than the gypsum board thickness and shall have ringed shanks. Where the metal framing has a nailing groove formed to receive the nails, the nails shall have barbed shanks or be 5d, $13/16$ gage, $1/16$ inches long, $1/16$-inch head for $7/16$-inch gypsum board; and 6d, 13 gage, $1/4$ inches long, $15/64$-inch head for $7/16$-inch gypsum board.

d. Three-eighths-inch-thick single-ply gypsum board shall not be used on a ceiling where a water-based textured finish is to be applied, or where it will be required to support insulation above a ceiling. On ceiling applications to receive a water-based texture material, either hand or spray applied, the gypsum board shall be applied perpendicular to framing. When applying a water-based texture material, the minimum gypsum board thickness shall be increased from $3/8$ inch to $1/2$ inch for 16-inch on center framing, and from $1/2$ inch to $3/4$ inch for 24-inch on center framing or $1/2$-inch sag-resistant gypsum ceiling board shall be used.

e. Type X gypsum board for garage ceilings beneath habitable rooms shall be installed perpendicular to the ceiling framing and shall be fastened at maximum 6 inches o.c. by minimum $1/4$ inches 6d coated nails or equivalent drywall screws.

### R702.4 Ceramic tile.

**R702.4.1 General.** Ceramic tile surfaces shall be installed in accordance with ANSI A108.1, A108.4, A108.5, A108.6, A108.11, A118.1, A118.3, A136.1 and A137.1.

**R702.4.2 Gypsum backer.** Gypsum board utilized as the base or backer for adhesive application of ceramic tile or other nonabsorbent finish material shall conform with ASTM C630 or C1178. Water-resistant gypsum backer shall be permitted to be used on ceilings where framing spacing does not exceed 12 inches (305 mm) on center for $1/2$-inch-thick (12.7 mm) or 16 inches (406 mm) for $3/4$-inch-thick (15.9 mm) gypsum board. Water-resistant gypsum board shall not be installed over a vapor retarder in a shower or tub compartment. All cut or exposed edges, including those at wall intersections, shall be sealed as recommended by the manufacturer.

**R702.4.3 Limitations.** Water-resistant gypsum backer shall not be used in the following locations:

1. Over a vapor retarder in a shower or bathtub compartment.
2. Where there will be direct exposure to water, or in areas subject to continuous high humidity.

### R702.5 Other finishes.

Wood veneer paneling and hardboard paneling shall be placed on wood or cold-formed steel framing spaced not more than 16 inches (406 mm) on center. Wood veneer and hard board paneling less than $1/4$ inch (6.4 mm) nominal thickness shall not have less than a $1/4$-inch (9.5 mm) gypsum board backer. Wood veneer paneling not less than $1/4$ inch (6.4 mm) nominal thickness shall conform to...
Asphalt-R703.2 Weather-resistant sheathing paper. Asphalt-saturated felt free from holes and breaks, weighing not less than 14 pounds per 100 square feet (0.683 kg/m²) and complying with ASTM D 226 or other approved weather-resistant material shall be applied over studs or sheathing of all exterior walls as required by Table R703.4. Such felt or material shall be applied horizontally, with the upper layer lapped over the lower layer not less than 2 inches (51 mm). Where joints occur, felt shall be lapped not less than 6 inches (152 mm).

**Exception:** Such felt or material is permitted to be omitted in the following situations:

1. In detached accessory buildings.

**SECTION R703 EXTERIOR COVERING**

**R703.1 General.** Exterior walls shall provide the building with a weather-resistant exterior wall envelope. The exterior wall envelope shall include flashing as described in Section R703.8. The exterior wall envelope shall be designed and constructed in such a manner as to prevent the accumulation of water within the wall assembly by providing a water-resistive barrier behind the exterior veneer as required by Section R703.2.

**R703.2 Weather-resistant sheathing paper.** Asphalt-saturated felt free from holes and breaks, weighing not less than 14 pounds per 100 square feet (0.683 kg/m²) and complying with ASTM D 226 or other approved weather-resistant material shall be applied over studs or sheathing of all exterior walls as required by Table R703.4. Such felt or material shall be applied horizontally, with the upper layer lapped over the lower layer not less than 2 inches (51 mm). Where joints occur, felt shall be lapped not less than 6 inches (152 mm).

2. Under panel siding with shiplap joints or battens.

3. Under exterior wall finish materials as permitted in Table R703.4.

4. Under paperbacked stucco lath.

**R703.3 Wood, hardboard and wood structural panel siding.**

**R703.3.1 Panel siding.** Joints in wood, hardboard or wood structural panel siding shall be made as follows unless otherwise approved. Vertical joints in panel siding shall occur over framing members, unless wood or wood structural panel sheathing is used, and shall be shiplapped or covered with a batten. Horizontal joints in panel siding shall be lapped a minimum of 1 inch (25.4 mm) or shall be shiplapped or shall be flashed with Z-flashing and occur over solid blocking, wood or wood structural panel sheathing.

**R703.3.2 Horizontal siding.** Horizontal lap siding shall be lapped a minimum of 1 inch (25.4 mm), or 0.5 inch (12.7 mm) if rabbeted, and shall have the ends caulked, covered with a batten, or sealed and installed over a strip of flashing.

**R703.4 Attachments.** Unless specified otherwise, all wall coverings shall be securely fastened in accordance with Table R703.4 or with other approved aluminum, stainless steel, zinc-coated or other approved corrosion-resistant fasteners.

**R703.5 Wood shakes and shingles.** Wood shakes and shingles shall conform to CSSB Grading Rules for Wood Shakes and Shingles.

**R703.5.1 Application.** Wood shakes or shingles shall be applied either single-course or double-course over nominal 1/2-inch (12.7 mm) wood-based sheathing or to furring strips over 1/2-inch (12.7 mm) nominal nonwood sheathing. A weather-resistant permeable membrane shall be provided over all sheathing, with horizontal overlaps in the membrane of not less than 2 inches (51 mm) and vertical overlaps of not less than 6 inches (152 mm). Where furring strips are used, they shall be 1 inch by 3 inches or 1 inch by 4 inches (25.4 mm by 76 mm or 25.4 mm by 102 mm) and shall be fastened horizontally to the studs with 7d or 8d box nails and shall be spaced a distance on center equal to the desired exposure, and shall be attached to the wall by nailing through other wall material into the studs.

**R703.5.2 Weather exposure.** The maximum weather exposure specified in Table R703.5.2. The spacing between adjacent shingles to allow for expansion shall not exceed 1/4 inch (6.4 mm), and between adjacent shakes, it shall not exceed 3/16 inch (12.7 mm). The offset spacing between joints in adjacent courses shall be a minimum of 1/2 inches (38 mm).

**R703.5.3 Attachment.** Each shake or shingle shall be held in place by two hot-dipped zinc-coated, stainless steel, or aluminum nails or staples. The fasteners shall be long enough to penetrate the sheathing or furring strips by a minimum of 1/2 inch (12.7 mm) and shall not be overdriven.

**R703.5.3.1 Staple attachment.** Staples shall not be less than 16 gage and shall have a crown width of not less than 3/16 inch (11.1 mm), and the crown of the staples shall be parallel with the butt of the shake or shingle. In single-course application, the fasteners shall be con-
TABLE R703.4
WEATHER–RESISTANT SIDING ATTACHMENT AND MINIMUM THICKNESS

<table>
<thead>
<tr>
<th>SIDING MATERIAL</th>
<th>NOMINAL THICKNESS(^a) (inches)</th>
<th>JOINT TREATMENT</th>
<th>SHEATHING PAPER REQUIRED</th>
<th>TYPE OF SUPPORTS FOR THE SIDING MATERIAL AND FASTENERS(^{b,c,d})</th>
<th>Number or spacing of fasteners</th>
</tr>
</thead>
<tbody>
<tr>
<td>Horizontal aluminum(^i)</td>
<td>0.019</td>
<td>Lap</td>
<td>No</td>
<td>0.120 nail 1(\frac{1}{8})&quot; long</td>
<td>6d box nail, 0.024 Not allowed Same as stud spacing</td>
</tr>
<tr>
<td>With insulation</td>
<td>0.024</td>
<td>Lap</td>
<td>No</td>
<td>0.120 nail 1(\frac{1}{8})&quot; long</td>
<td>6d box nail, 0.024 Not allowed Same as stud spacing</td>
</tr>
<tr>
<td>Brick veneer</td>
<td>2</td>
<td>Section R703</td>
<td>Yes (Note m)</td>
<td>See Section R703 and Figure R703.7</td>
<td>6(^b) panel edges 12(^d) inter, sup.(^g)</td>
</tr>
<tr>
<td>Hardboard(^i)</td>
<td>1/16</td>
<td>Note g See R703.2</td>
<td>Note o</td>
<td>Note o</td>
<td>Note o</td>
</tr>
<tr>
<td>Lap-siding-horizontal</td>
<td>1/16</td>
<td>Note r</td>
<td>Yes</td>
<td>Note q</td>
<td>Note q</td>
</tr>
<tr>
<td>Steel(^l)</td>
<td>29 ga.</td>
<td>Lap</td>
<td>No</td>
<td>0.113 nail 1(\frac{1}{8})&quot; Staple–1(\frac{1}{8})&quot;</td>
<td>6d box nail, 0.024 Not allowed Same as stud spacing</td>
</tr>
<tr>
<td>Stone veneer</td>
<td>2</td>
<td>Section R703</td>
<td>Yes (Note m)</td>
<td>See Section R703 and Figure R703.7</td>
<td>6(^d) panel edge 12(^d) inter, sup.(^g)</td>
</tr>
<tr>
<td>Particleboard panels</td>
<td>3/8 – 1/2</td>
<td>Note g</td>
<td>Note g</td>
<td>6d box nail</td>
<td>6d box nail</td>
</tr>
<tr>
<td>Plywood panel(^f) (exterior grade)</td>
<td>3/8</td>
<td>Note g</td>
<td>Note g</td>
<td>0.099 nail–2(^c)</td>
<td>0.113 nail–2(\frac{1}{4})&quot;</td>
</tr>
<tr>
<td>Vinyl siding(^f)</td>
<td>0.035</td>
<td>Lap</td>
<td>No</td>
<td>0.120 nail 1(\frac{1}{8})&quot; Staple–1(\frac{1}{8})&quot;</td>
<td>6d box nail, 0.024 Not allowed Same as stud spacing</td>
</tr>
<tr>
<td>Wood(^d) Rustic, drop</td>
<td>3/16 Min</td>
<td>Lap</td>
<td>No</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shiplap</td>
<td>3/16</td>
<td>Lap</td>
<td>No</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Butt tip</td>
<td>1/16</td>
<td>Lap</td>
<td>No</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fiber cement panel siding(^f)</td>
<td>3/16</td>
<td>Note t</td>
<td>Yes</td>
<td>Note y</td>
<td>0.113 nail–2(\frac{1}{4})&quot;</td>
</tr>
<tr>
<td>Fiber cement lap siding(^f)</td>
<td>3/16</td>
<td>Note w</td>
<td>Yes</td>
<td>Note y</td>
<td>0.113 nail–2(\frac{1}{4})&quot;</td>
</tr>
</tbody>
</table>

For SI: 1 inch = 25.4 mm.

a. Based on stud spacing of 16 inches on center. Where studs are spaced 24 inches, siding shall be applied to sheathing approved for that spacing.
b. Nails is a general description and shall be T–head, modified round head, or round head with smooth or deformed shanks.
c. Staples shall have a minimum crown width of 7/16–inch outside diameter and be manufactured of minimum No. 16 gage wire.
d. Nails or staples shall be aluminum, galvanized, or rust–preventive coated and shall be driven into the studs for fiberboard or gypsum backing.
e. Aluminum nails shall be used to attach aluminum siding.
f. Aluminum (0.019 inch) shall be unbacked only when the maximum panel width is 10 inches and the maximum flat area is 8 inches. The tolerance for aluminum siding shall be ±0.002 inch of the nominal dimension.
g. If boards or panels are applied over sheathing or a weather–resistant membrane, joints need not be treated. Otherwise, vertical joints shall occur at studs and be covered with battens or be lapped.
h. All attachments shall be coated with a corrosion–resistive coating.
i. Shall be of approved type.

(continued)
cealed by the course above and shall be driven approximately 1 inch (25.4 mm) above the butt line of the succeeding course and 3/4 inch (19.1 mm) from the edge. In double-course applications, the exposed shake or shingle shall be face-nailed with two casing nails, driven approximately 2 inches (51 mm) above the butt line and 3/4 inch (19.1 mm) from each edge. In all applications, staples shall be concealed by the course above. With shingles wider than 8 inches (203 mm) two additional nails shall be required and shall be nailed approximately 1 inch (25.4 mm) apart near the center of the shingle.

R703.5.4 Bottom courses. The bottom courses shall be doubled.

R703.6 Exterior plaster.

R703.6.1 Lath. All lath and lath attachments shall be of corrosion-resistant materials. Expanded metal or woven wire lath shall be attached with 1 1/2-inch-long (38 mm), 11 gage nails having a 1/16-inch (11.1 mm) head, or 1/8-inch-long (22.2 mm), 16 gage staples, spaced at no more than 6 inches (152 mm), or as otherwise approved.

TABLE R703.5.2
MAXIMUM WEATHER EXPOSURE FOR WOOD SHAKES AND SHINGLES ON EXTERIOR WALLS

<table>
<thead>
<tr>
<th>LENGTH</th>
<th>EXPOSURE FOR SINGLE COURSE</th>
<th>EXPOSURE FOR DOUBLE COURSE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shingles</td>
<td>16</td>
<td>7 1/2</td>
</tr>
<tr>
<td>Shakes</td>
<td>18</td>
<td>8 1/2</td>
</tr>
<tr>
<td>24</td>
<td>11 1/2</td>
<td>16</td>
</tr>
<tr>
<td>18</td>
<td>8 1/2</td>
<td>14</td>
</tr>
<tr>
<td>24</td>
<td>11 1/2</td>
<td>18</td>
</tr>
</tbody>
</table>

For SI: 1 inch = 25.4 mm.

a. Dimensions given are for No. 1 grade.

b. A maximum 10-inch exposure is permitted for No. 2 grade.

c. A maximum 11-inch exposure is permitted for No. 2 grade.

R703.6.2 Plaster. Plastering with portland cement plaster shall be not less than three coats when applied over metal lath or wire lath and shall be not less than two coats when applied over masonry, concrete or gypsum backing. If the plaster surface is completely covered by veneer or other facing material or is completely concealed, plaster application need be only two coats, provided the total thickness is as set forth in Table R702.1(1).

On wood-frame construction with an on-grade floor slab system, exterior plaster shall be applied in such a manner as to cover, but not extend below, lath, paper and screed.

The proportion of aggregate to cementitious materials shall be as set forth in Table R702.1(3).

R703.6.2.1 Weep screeds. A minimum 0.019-inch (0.48 mm) (No. 26 galvanized sheet gage), corrosion-resistant weep screed or plastic weep screed, with a minimum vertical attachment flange of 3/16 inches (89 mm) shall be provided at or below the foundation plate line on exterior stud walls in accordance with ASTM C 926. The weep screed shall be placed a minimum of 4 inches (102 mm)
above the earth or 2 inches (51 mm) above paved areas and shall be of a type that will allow trapped water to drain to the exterior of the building. The weather-resistant barrier shall lap the attachment flange. The exterior lath shall cover and terminate on the attachment flange of the weep screed.

R703.7 Stone and masonry veneer, general. All stone and masonry veneer shall be installed in accordance with this chapter, Table R703.4 and Figure R703.7. Such veneers installed over a backing of wood or cold-formed steel shall be limited to the first story above grade and shall not exceed 5 inches (127 mm) in thickness.

Exceptions:

1. In Seismic Design Categories A and B, exterior masonry veneer with a backing of wood or cold-formed steel framing shall not exceed 30 feet (9144 mm) in height above the noncombustible foundation, with an additional 8 feet (2348 mm) permitted for ends.

2. In Seismic Design Category C, exterior masonry veneer with a backing of wood or cold-formed steel framing shall not exceed 30 feet (9144 mm) in height above the noncombustible foundation, with an additional 8 feet (2348 mm) permitted for gabled ends. In other than the topmost story, the length of bracing shall be 1.5 times the length otherwise required in Chapter 6.

3. For detached one- or two-family dwellings with a maximum nominal thickness of 4 inches (102 mm) of exterior masonry veneer with a backing of wood frame located in Seismic Design Category D, the masonry veneer shall not exceed 20 feet (6096 mm) in height above a noncombustible foundation, with an additional 8 feet (2348 mm) permitted for gabled ends, or 30 feet (9144 mm) in height with an additional 8 feet (2348 mm) permitted for gabled ends where the lower 10 feet (3048 mm) has a backing of concrete or masonry wall, provided the following criteria are met:

3.1. Braced wall panels shall be constructed with a minimum of \( \frac{7}{16} \) inch (11.1 mm) thick sheathing fastened with 8d common nails at 4 inches (102 mm) on center on panel edges and at 12 inches (305 mm) on center on intermediate supports.

3.2. The bracing of the top story shall be located at each end and at least every 25 feet (7620 mm) on center but not less than 45% of the braced wall line. The bracing of the first story shall be as provided in Table R602.10.1.

3.3. Hold down connectors shall be provided at the ends of braced walls for the second floor to first floor wall assembly with an allowable design of 2100 lbs. (952.5 kg) Hold down connectors shall be provided at the ends of each wall segment of the braced walls for the first floor to foundation assembly with an allowable design of 3700 lbs. (1678 kg). In all cases, the hold down connector force shall be transferred to the foundation.

3.4. Cripple walls shall not be permitted.

4. For detached one- and two-family dwellings with a maximum actual thickness of 3 inches (76 mm) of exterior masonry veneer with a backing of wood frame located in Seismic Design Category D, the masonry veneer shall not exceed 20 feet (6096 mm) in height above a noncombustible foundation, with an additional 8 feet (2348 mm) permitted for gabled ends, or 30 feet (9144 mm) in height with an additional 8 feet (2348 mm) permitted for gabled ends where the lower 10 feet (3048 mm) has a backing of concrete or masonry wall, provided the following criteria are met:

4.1. Braced wall panels shall be constructed with a minimum of \( \frac{7}{16} \) inch (11.1 mm) thick sheathing fastened with 8d common nails at 4 inches (102 mm) on center on panel edges and at 12 inches (305 mm) on center on intermediate supports.

4.2. The bracing of the top story shall be located at each end and at least every 25 feet (7620 mm) on center but not less than 55% of the braced wall line. The bracing of the first story shall be as provided in Table R602.10.1.

4.3. Hold down connectors shall be provided at the ends of braced walls for the second floor to first floor wall assembly with an allowable design of

<table>
<thead>
<tr>
<th>SIZE OF STEEL ANGLE (inches)</th>
<th>NO STORY ABOVE</th>
<th>ONE STORY ABOVE</th>
<th>TWO STORIES ABOVE</th>
<th>NO. OF 1/2&quot; OR EQUIVALENT REINFORCING BARS</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 x 3 x 1/4</td>
<td>6'-0&quot;</td>
<td>4'-6&quot;</td>
<td>3'-0&quot;</td>
<td>1</td>
</tr>
<tr>
<td>4 x 3 x 1/4</td>
<td>8'-0&quot;</td>
<td>6'-0&quot;</td>
<td>4'-6&quot;</td>
<td>1</td>
</tr>
<tr>
<td>5 x 3 1/2 x 1/16</td>
<td>10'-0&quot;</td>
<td>8'-0&quot;</td>
<td>6'-0&quot;</td>
<td>2</td>
</tr>
<tr>
<td>6 x 3 1/2 x 1/16</td>
<td>14'-0&quot;</td>
<td>9'-6&quot;</td>
<td>7'-0&quot;</td>
<td>2</td>
</tr>
<tr>
<td>2-6 x 3 1/2 x 1/16</td>
<td>20'-0&quot;</td>
<td>12'-0&quot;</td>
<td>9'-6&quot;</td>
<td>4</td>
</tr>
</tbody>
</table>

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

a. Long leg of the angle shall be placed in a vertical position.

b. Depth of reinforced lintels shall not be less than 8 inches and all cells of hollow masonry lintels shall be grouted solid. Reinforcing bars shall extend not less than 8 inches into the support.

c. Steel members indicated are adequate typical examples; other steel members meeting structural design requirements may be used.
2300 lbs. (1043 kg). Hold down connectors shall be provided at the ends of each wall segment of the braced walls for the first floor to foundation assembly with an allowable design of 3900 lbs. (1769 kg). In all cases, the hold down connector force shall be transferred to the foundation.

4.4. Cripple walls shall not be permitted.

**R703.7.1 Interior veneer support.** Veneers used as interior wall finishes shall be permitted to be supported on wood or cold-formed steel floors that are designed to support the loads imposed.

**R703.7.2 Exterior veneer support.** Except in Seismic Design Categories D1 and D2, exterior masonry veneers having an installed weight of 40 pounds per square foot (195 kg/m²) or less shall be permitted to be supported on wood or cold-formed steel construction. When masonry veneer supported by wood or cold-formed steel construction adjoins masonry veneer supported by the foundation, there shall be a movement joint between the veneer supported by the wood or cold-formed steel construction and the veneer supported by the foundation. The wood or cold-formed steel construction supporting the masonry veneer shall be designed to limit the deflection to \( \frac{L}{600} \) of the span for the supporting members. The design of the wood or cold-formed steel construction shall consider the weight of the veneer and any other loads.

**R703.7.2.1 Support by steel angle.** A minimum 6 inches by 4 inches by \( \frac{3}{16} \) inch (152 mm by 102 mm by 8 mm) steel angle, with the long leg placed vertically, shall be anchored to double 2 inches by 4 inches (51 mm by 102 mm) wood studs at a maximum on center spacing of 16 inches (406 mm). Anchorage of the steel angle at every double stud spacing shall be a minimum of two \( \frac{3}{16} \) inch (1.1 mm) diameter by 4 inches (102 mm) lag screws. The steel angle shall have a minimum clearance to underlying construction of \( \frac{3}{16} \) inch (1.6 mm). A minimum of two-thirds the width of the masonry veneer thickness shall bear on the steel angle. Flashing and weep holes shall be located in the masonry veneer wythe in accordance with Figure R703.7.1. The maximum height of the masonry veneer above the steel angle support shall be 12 feet, 8 inches (3861 mm). The air space separating the masonry veneer from the wood backing shall be in accordance with Table R703.7.4 and R703.7.4.2. The method of support for the masonry veneer on wood construction shall be constructed in accordance with Figure R703.7.2.2.

The maximum slope of the roof construction without stops shall be 7:12. Roof construction with slopes greater than 7:12 but not more than 12:12 shall have stops of a minimum 3 inches \( \times \) 3 inches \( \times \frac{1}{4} \) inch (76 mm \( \times \) 76 mm \( \times \) 6 mm) steel plate welded to the angle at 24 inches (610 mm) on center along the angle or as approved by the building official.

**R703.7.3 Lintels.** Masonry veneer shall not support any vertical load other than the dead load of the veneer above. Veneer above openings shall be supported on lintels of non-combustible materials and the allowable span shall not exceed the values set forth in Table R703.7.3. The lintels shall have a length of bearing of not less than 4 inches (102 mm).

**R703.7.4 Anchorage.** Masonry veneer shall be anchored to the supporting wall with corrosion-resistant metal ties. Where veneer is anchored to wood backings through the use of corrugated sheet metal ties, the distance separating the veneer from the sheathing material shall be a maximum of 1 inch (25.4 mm). Where the veneer is anchored to wood backings through the use of metal strand wire ties, the distance separating the veneer from the sheathing material shall be a maximum of \( 4\frac{1}{4} \) inches (114 mm). Where the veneer is anchored to cold-formed steel backings, adjustable metal strand wire ties shall be used. Where veneer is anchored to cold-formed steel backings, the distance separating the veneer from the sheathing material shall be a maximum of 4.5 inches (114 mm).

**R703.7.4.1 Size and spacing.** Veneer ties, if strand wire, shall not be less in thickness than No. 9 U.S. gage wire and shall have a hood embedded in the mortar joint, or if sheet metal, shall be not less than No. 22 U.S. gage by \( 1\frac{1}{4} \) inch (22.3 mm) corrugated. Each tie shall be spaced not more than 24 inches (610 mm) on center horizontally and vertically and shall support not more than 2.67 square feet (0.248 m²) of wall area.

**Exception:** In Seismic Design Category D1 or D2, and townhouses in Seismic Design Category C and in wind areas of more than 30 pounds per square foot pressure (1.44 kN/m²), each tie shall support not more than 2 square feet (0.186 m²) of wall area.

**R703.7.4.1.1 Veneer ties around wall openings.** Veneer ties around wall openings. Additional metal ties
shall be provided around all wall openings greater than 16 inches (406 mm) in either dimension. Metal ties around the perimeter of openings shall be spaced not more than 3 feet (9144 mm) on center and placed within 12 inches (305 mm) of the wall opening.

**R703.7.4.2 Air space.** The veneer shall be separated from the sheathing by an air space of a minimum of 1 inch (25.4 mm) but not more than 4.5 inches (114 mm). The weather-resistant membrane or asphalt-saturated felt required by Section R703.2 is not required over water-repellent sheathing materials.

**R703.7.4.3 Mortar or grout fill.** As an alternate to the air space required by Section R703.7.4.2, mortar or grout shall be permitted to fill the air space. When the 1-inch (25.4 mm) space is filled with mortar, a weather-resistant membrane or building paper is required over studs or sheathing. When filling the air space, it is permitted to replace the sheathing and weather-resistant membrane or asphalt-saturated felt paper with a wire mesh and approved paper or an approved paper-backed reinforcement attached directly to the studs.

**R703.7.5 Flashing.** Flashing shall be located beneath the first course of masonry above finished ground level above the foundation wall or slab and at other points of support, including structural floors, shelf angles and lintels when masonry veneers are designed in accordance with Section R703.7. See Section R703.8 for additional requirements.

**R703.7.6 Weepholes.** Weepholes shall be provided in the outside wythe of masonry walls at a maximum spacing of 33 inches (838 mm) on center. Weepholes shall not be less than 1/16 inch (4.8 mm) in diameter. Weepholes shall be located immediately above the flashing.

**R703.8 Flashing.** Approved corrosion-resistant flashing shall be provided in the exterior wall envelope in such a manner as to prevent entry of water into the wall cavity or penetration of water to the building structural framing components. The flashing shall extend to the surface of the exterior wall finish and shall be installed to prevent water from reentering the exterior wall envelope. Approved corrosion-resistant flashings shall be installed at all of the following locations:

1. At top of all exterior window and door openings in such a manner as to be leakproof, except that self-flashing windows having a continuous lap of not less than 1/8 inches (28 mm) over the sheathing material around the perimeter of the opening, including corners, do not require additional flashing; jamb flashing may also be omitted when specifically approved by the building official.
2. At the intersection of chimneys or other masonry construction with frame or stucco walls, with projecting lips on both sides under stucco copings.
3. Under and at the ends of masonry, wood or metal copings and sills.
4. Continuously above all projecting wood trim.
5. Where exterior porches, decks or stairs attach to a wall or floor assembly of wood-frame construction.
6. At wall and roof intersections.
7. At built-in gutters.

**R703.9 Exterior insulation finish systems, general.** All Exterior Insulation Finish Systems (EIFS) shall be installed in accordance with the manufacturer’s installation instructions and the requirements of this section. Decorative trim shall not be face nailed through the EIFS. The EIFS shall terminate not less than 6 inches (152 mm) above the finished ground level.

**R703.9.1 Weather-resistive barrier.** All EIFS shall have a weather-resistive barrier applied between the underlying water-sensitive building components and the exterior insulation, and a means of draining water to the exterior of the veneer. A weather-resistive barrier shall be compliant with ASTM D 226 Type I asphalt saturated felt or equivalent, shall be applied horizontally with the upper layer lapped over the lower layer not less than 2 inches (51 mm), and shall have all vertical joints lapped not less than 6 inches (152 mm).

**R703.9.2 Flashing, general.** Flashing of EIFS shall be provided in accordance with the requirements of Section R703.8.

**R703.10 Fiber cement siding.**

**R703.10.1 Panel siding.** Panels shall be installed with the long dimension parallel to framing. Vertical joints shall occur over framing members and shall be sealed with caulking or covered with battens. Horizontal joints shall be flashed with Z-flashing and blocked with solid wood framing.

**R703.10.2 Horizontal lap siding.** Lap siding shall be lapped a minimum of 1/4 inches (32 mm) and shall have the ends sealed with caulking, covered with an H-section joint cover, or located over a strip of flashing. Lap siding courses may be installed with the fastener heads exposed or concealed, according to approved manufacturers’ installation instructions.

**R703.11 Adhered masonry veneer.** Adhered masonry veneer shall comply with the applicable requirements in Section R703.11.1 and Sections 6.1 and 6.3 of ACI 530/ASCE 5/TMS 402. Special inspection is not required.

**R703.11.1 Area and use limitations.** The use of exterior adhered veneer shall be limited as follows:

1. Horizontal installation of adhered veneer or installation of adhered veneer on an overhead, sloping surface shall be permitted with the approval of the building official based on appropriate technical documentation.
2. Exterior adhered veneer shall not be located more than 30 feet (9144 mm) above any adjacent grade, roof, walkway or similar surface.
WALL COVERING

FIGURE R703.7
MASONRY VENEER WALL DETAILS
(continued)

For SI: 1 inch = 25.4 mm.
WALL COVERING

For SI: 1 inch = 25.4 mm.

a. See Sections R703.7.5, R703.7.6 and R703.8.
b. See Sections R703.2 and R703.7.4.
c. See Sections R703.7.4.2 and R703.7.4.3.
d. See Section R703.7.2.1.

FIGURE R703.7—continued
MASONRY VENEER WALL DETAILS
WALL COVERING

**FIGURE R703.7.2.1**
EXTERIOR MASONRY VENEER SUPPORT BY STEEL ANGLES

**FIGURE R703.7.2.2**
EXTERIOR MASONRY VENEER SUPPORT BY ROOF MEMBERS