

## 2021 Virginia Construction Code

### CHAPTER 25 GYPSUM BOARD, GYPSUM PANEL PRODUCTS AND PLASTER

#### SECTION 2501 GENERAL

##### **2501.1 Scope.**

Provisions of this chapter shall govern the materials, design, construction and quality of *gypsum board, gypsum panel products, lath, gypsum plaster, cement plaster* and reinforced gypsum concrete.

##### **2501.2 Other materials.**

Other *approved* wall or ceiling coverings shall be permitted to be installed in accordance with the recommendations of the manufacturer and the conditions of approval.

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### CHAPTER 25 GYPSUM BOARD, GYPSUM PANEL PRODUCTS AND PLASTER

#### SECTION 2502 PERFORMANCE

##### 2502.1 General.

Lathing, plastering and *gypsum board* and *gypsum panel product* construction shall be done in the manner and with the materials specified in this chapter and, where required for fire protection, shall comply with the provisions of [Chapter 7](#).

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#### SECTION 2503 INSPECTION

##### **2503.1 Inspection.**

Lath, *gypsum board* and *gypsum panel products* shall be inspected in accordance with [Section 110.3](#).

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#### SECTION 2504 VERTICAL AND HORIZONTAL ASSEMBLIES

##### 2504.1 Scope.

The following requirements shall be met where construction involves *gypsum board*, *gypsum panel products* or lath and plaster in vertical and *horizontal assemblies*.

##### 2504.1.1 Wood framing.

Wood supports for lath, *gypsum board* or *gypsum panel products*, as well as wood stripping or furring, shall be not less than 2 inches (51 mm) nominal thickness in the least dimension.

**Exception:** The minimum nominal dimension of wood furring strips installed over solid backing shall be not less than 1 inch by 2 inches (25 mm by 51 mm).

##### 2504.1.2 Studless partitions.

The minimum thickness of vertically erected studless solid plaster partitions of  $\frac{3}{8}$ -inch (9.5 mm) and  $\frac{3}{4}$ -inch (19.1 mm) rib metal lath,  $\frac{1}{2}$ -inch-thick (12.7 mm) gypsum lath, *gypsum board* or *gypsum panel product* shall be 2 inches (51 mm).

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#### SECTION 2505 SHEAR WALL CONSTRUCTION

##### **2505.1 Resistance to shear (wood framing).**

Wood-frame *shear walls* sheathed with *gypsum board*, *gypsum panel products* or lath and plaster shall be designed and constructed in accordance with [Section 2306.3](#) and are permitted to resist wind and seismic *loads*. Walls resisting seismic *loads* shall be subject to the limitations in Section 12.2.1 of [ASCE 7](#).

##### **2505.2 Resistance to shear (steel framing).**

Cold-formed steel-frame shear walls sheathed with *gypsum board* or *gypsum panel products* and constructed in accordance with the materials and provisions of [Section 2211.1.1](#) are permitted to resist wind and seismic *loads*. Walls resisting seismic *loads* shall be subject to the limitations in Section 12.2.1 of [ASCE 7](#).

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#### SECTION 2506 GYPSUM BOARD AND GYPSUM PANEL PRODUCT MATERIALS

##### 2506.1 General.

*Gypsum board, gypsum panel products* and accessories shall be identified by the manufacturer's designation to indicate compliance with the appropriate standards referenced in this section and stored to protect such materials from the weather.

##### 2506.2 Standards.

*Gypsum board* and *gypsum panel products* shall conform to the appropriate standards listed in [Table 2506.2](#) and [Chapter 35](#) and, where required for fire protection, shall conform to the provisions of [Chapter 7](#).

**TABLE 2506.2**  
**GYPSUM BOARD AND GYPSUM PANEL PRODUCTS MATERIALS AND ACCESSORIES**

MATERIAL	STANDARD
Accessories for gypsum board	<a href="#">ASTM C1047</a>
Adhesives for fastening gypsum board	<a href="#">ASTM C557</a>
Cold-formed steel studs and track, structural	<a href="#">AISI S240</a>
Cold-formed steel studs and track, nonstructural	<a href="#">AISI S220</a>
Elastomeric joint sealants	<a href="#">ASTM C920</a>
Expandable foam adhesives for fastening gypsum wallboard	<a href="#">ASTM D6464</a>
Factory-laminated gypsum panel products	<a href="#">ASTM C1766</a>
Fiber-reinforced gypsum panels	<a href="#">ASTM C1278</a>
Glass mat gypsum backing panel	<a href="#">ASTM C1178</a>
Glass mat gypsum panel 5	<a href="#">ASTM C1658</a>
Glass mat gypsum substrate	<a href="#">ASTM C1177</a>
Joint reinforcing tape and compound	<a href="#">ASTM C474; C475</a>
Nails for gypsum boards	<a href="#">ASTM C514, F547, F1667</a>
Steel screws	<a href="#">ASTM C954; C1002</a>
Standard specification for gypsum board	<a href="#">ASTM C1396</a>
Testing gypsum and gypsum products	<a href="#">ASTM C22; C472; C473</a>

##### 2506.2.1 Other materials.

Metal suspension systems for acoustical and lay-in panel ceilings shall comply with [ASTM C635](#) listed in [Chapter 35](#) and Section 13.5.6 of [ASCE 7](#) for installation in high seismic areas.

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### CHAPTER 25 GYPSUM BOARD, GYPSUM PANEL PRODUCTS AND PLASTER

#### SECTION 2507 LATHING AND PLASTERING

##### 2507.1 General.

Lathing and plastering materials and accessories shall be marked by the manufacturer's designation to indicate compliance with the appropriate standards referenced in this section and stored in such a manner to protect them from the weather.

##### 2507.2 Standards.

Lathing and plastering materials shall conform to the standards listed in [Table 2507.2](#) and [Chapter 35](#) and, where required for fire protection, shall conform to the provisions of [Chapter 7](#).

**TABLE 2507.2**  
**LATH, PLASTERING MATERIALS AND ACCESSORIES**

MATERIAL	STANDARD
Accessories for gypsum veneer base	<a href="#">ASTM C1047</a>
Blended cement	<a href="#">ASTM C595</a>
Cold-formed steel studs and track, structural	<a href="#">AISI S240</a>
Cold-formed steel studs and track, nonstructural	<a href="#">AISI S220</a>
Exterior plaster bonding compounds	<a href="#">ASTM C932</a>
Hydraulic cement	<a href="#">ASTM C1157</a> ; <a href="#">C1600</a>
Gypsum casting and molding plaster	<a href="#">ASTM C59</a>
Gypsum Keene's cement	<a href="#">ASTM C61</a>
Gypsum plaster	<a href="#">ASTM C28</a>
Gypsum veneer plaster	<a href="#">ASTM C587</a>
Interior bonding compounds, gypsum	<a href="#">ASTM C631</a>
Lime plasters	<a href="#">ASTM C5</a> ; <a href="#">C206</a>
Masonry cement	<a href="#">ASTM C91</a>
Metal lath	<a href="#">ASTM C847</a>
Plaster aggregates	
Sand	<a href="#">ASTM C35</a> ; <a href="#">C897</a>
Perlite	<a href="#">ASTM C35</a>
Vermiculite	<a href="#">ASTM C35</a>
Plastic cement	<a href="#">ASTM C1328</a>
Portland cement	<a href="#">ASTM C150</a>
Steel screws	<a href="#">ASTM C1002</a> ; <a href="#">C954</a>
Welded wire lath	<a href="#">ASTM C933</a>
Woven wire plaster base	<a href="#">ASTM C1032</a>

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#### SECTION 2508 GYPSUM CONSTRUCTION

##### 2508.1 General.

*Gypsum board, gypsum panel products and gypsum plaster* construction shall be of the materials listed in [Tables 2506.2](#) and [2507.2](#). These materials shall be assembled and installed in compliance with the appropriate standards listed in [Tables 2508.1](#) and [2511.1.1](#) and [Chapter 35](#).

**TABLE 2508.1  
INSTALLATION OF GYPSUM CONSTRUCTION**

MATERIAL	STANDARD
Gypsum board and gypsum panel products	GA-216; ASTM C840
Gypsum sheathing and gypsum panel products	ASTM C1280
Gypsum veneer base	ASTM C844
Interior lathing and furring	ASTM C841
Steel framing for gypsum board and gypsum panel products	ASTM C754; C1007

##### 2508.2 Limitations.

*Gypsum wallboard or gypsum plaster* shall not be used in any exterior surface where such gypsum construction will be exposed directly to the weather. *Gypsum wallboard* shall not be used where there will be direct exposure to water or continuous high humidity conditions. *Gypsum sheathing* shall be installed on exterior surfaces in accordance with [ASTM C1280](#).

##### 2508.2.1 Weather protection.

*Gypsum wallboard, gypsum lath or gypsum plaster* shall not be installed until weather protection for the installation is provided.

##### 2508.3 Single-ply application.

Edges and ends of *gypsum board* and *gypsum panel products* shall occur on the framing members, except those edges and ends that are perpendicular to the framing members. Edges and ends of *gypsum board* and *gypsum panel products* shall be in moderate contact except in concealed spaces where fire-resistance-rated construction, shear resistance or *diaphragm* action is not required.

##### 2508.3.1 Floating angles.

Fasteners at the top and bottom plates of vertical assemblies, or the edges and ends of *horizontal assemblies* perpendicular to supports, and at the wall line are permitted to be omitted except on shear resisting elements or fire-resistance-rated assemblies. Fasteners shall be applied in such a manner as not to fracture the face paper with the fastener head.

##### 2508.4 Adhesives.

*Gypsum board* and *gypsum panel products* secured to framing with adhesives in ceiling assemblies shall be attached using an approved fastening schedule. Expandable foam adhesives for fastening *gypsum wallboard* shall conform to [ASTM D6464](#). Other adhesives for the installation of *gypsum wallboard* shall conform to [ASTM C557](#).

##### 2508.5 Joint treatment.

*Gypsum board* and *gypsum panel product* fire-resistance-rated assemblies shall have joints and fasteners treated.

**Exception:** Joint and fastener treatment need not be provided where any of the following conditions occur:

1. Where the gypsum board or the gypsum panel product is to receive a decorative finish such as wood paneling, battens, acoustical finishes or any similar application that would be equivalent to joint treatment.
2. On single-layer systems where joints occur over wood framing members.
3. Square edge or tongue-and-groove edge gypsum board (V-edge), gypsum panel products, gypsum backing board or gypsum sheathing.
4. On multilayer systems where the joints of adjacent layers are offset.
5. Assemblies tested without joint treatment.

##### 2508.6 Horizontal gypsum board or gypsum panel product diaphragm ceilings.

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Gypsum board or gypsum panel products shall be permitted to be used on wood joists to create a horizontal *diaphragm* ceiling in accordance with Table 2508.6.

**TABLE 2508.6**  
**SHEAR CAPACITY FOR HORIZONTAL WOOD-FRAME GYPSUM BOARD DIAPHRAGM CEILING ASSEMBLIES**

MATERIAL	THICKNESS OF MATERIAL (MINIMUM) (inches)	SPACING OF FRAMING MEMBERS (inches)	SHEAR VALUE <sup>a, b</sup> (PLF OF CEILING)	MINIMUM FASTENER SIZE
Gypsum board or gypsum panel product	1/2	16 o.c.	90	5d cooler or wallboard nail; 1 <sup>5</sup> / <sub>8</sub> -inch long; 0.086-inch shank; 1 <sup>5</sup> / <sub>64</sub> -inch head <sup>c</sup>
Gypsum board or gypsum panel product	1/2	24 o.c.	70	5d cooler or wallboard nail; 1 <sup>5</sup> / <sub>8</sub> -inch long; 0.086-inch shank; 1 <sup>5</sup> / <sub>64</sub> -inch head <sup>c</sup>

For SI: 1 inch = 25.4 mm, 1 pound per foot = 14.59 N/m.

- a. Values are not cumulative with other horizontal diaphragm values and are for short-term wind or seismic loading. Values shall be reduced 25 percent for normal loading.
- b. Values shall be reduced 50 percent in Seismic Design Categories D, E and F.
- c. 1<sup>1</sup>/<sub>4</sub>-inch, No. 6 Type S or W screws are permitted to be substituted for the listed nails.

**2508.6.1 Diaphragm proportions.**

The maximum allowable *diaphragm* proportions shall be 1<sup>1</sup>/<sub>2</sub>:1 between shear resisting elements. Rotation or cantilever conditions shall not be permitted.

**2508.6.2 Installation.**

Gypsum board or gypsum panel products used in a horizontal *diaphragm* ceiling shall be installed perpendicular to ceiling framing members. End joints of adjacent courses of gypsum board shall not occur on the same joist.

**2508.6.3 Blocking of perimeter edges.**

Perimeter edges shall be blocked using a wood member not less than 2-inch by 6-inch (51 mm by 152 mm) nominal dimension. Blocking material shall be installed flat over the top plate of the wall to provide a nailing surface not less than 2 inches (51 mm) in width for the attachment of the gypsum board or gypsum panel product.

**2508.6.4 Fasteners.**

Fasteners used for the attachment of gypsum board or gypsum panel products to a horizontal *diaphragm* ceiling shall be as defined in Table 2508.6. Fasteners shall be spaced not more than 7 inches (178 mm) on center at all supports, including perimeter blocking, and not more than 3/8 inch (9.5 mm) from the edges and ends of the gypsum board or gypsum panel product.

**2508.6.5 Lateral force restrictions.**

Gypsum board or gypsum panel products shall not be used in *diaphragm* ceilings to resist lateral forces imposed by masonry or concrete construction.

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#### SECTION 2509 SHOWERS AND WATER CLOSETS

##### 2509.1 Wet areas.

Showers and public toilet walls shall conform to [Section 1210.2](#).

##### 2509.2 Base for tile.

Materials used as a base for wall tile in tub and shower areas and wall and ceiling panels in shower areas shall be of materials listed in [Table 2509.2](#) and installed in accordance with the manufacturer's recommendations. Water-resistant gypsum backing board shall be used as a base for tile in water closet compartment walls when installed in accordance with [GA-216](#) or [ASTM C840](#) and the manufacturer's recommendations. Regular *gypsum wallboard* is permitted under tile or wall panels in other wall and ceiling areas when installed in accordance with [GA-216](#) or [ASTM C840](#).

**TABLE 2509.2  
BACKERBOARD MATERIALS**

MATERIAL	STANDARD
Glass mat gypsum backing panel	<a href="#">ASTM C1178</a>
Nonasbestos fiber-cement backer board	<a href="#">ASTM C1288</a> or <a href="#">ISO 8336</a> , Category C
Nonasbestos fiber-mat reinforced cementitious backer unit	<a href="#">ASTM C1325</a>

##### 2509.3 Limitations.

Water-resistant gypsum backing board shall not be used in the following locations:

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

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### SECTION 2510 LATHING AND FURRING FOR CEMENT PLASTER (STUCCO)

#### 2510.1 General.

Exterior and interior *cement plaster* and lathing shall be done with the appropriate materials listed in [Table 2507.2](#) and [Chapter 35](#).

#### 2510.2 Weather protection.

Materials shall be stored in such a manner as to protect them from the weather.

#### 2510.3 Installation.

Installation of these materials shall be in compliance with [ASTM C926](#) and [ASTM C1063](#).

#### 2510.4 Corrosion resistance.

Metal lath and lath attachments shall be of corrosion-resistant material.

#### 2510.5 Backing.

Backing or a lath shall provide sufficient rigidity to permit plaster applications.

##### 2510.5.1 Support of lath.

Where lath on vertical surfaces extends between rafters or other similar projecting members, solid backing shall be installed to provide support for lath and attachments.

##### 2510.5.2 Use of gypsum backing board.

Gypsum backing for cement plaster shall be in accordance with [Section 2510.5.2.1](#) or [2510.5.2.2](#).

##### 2510.5.2.1 Gypsum board as a backing board.

Gypsum lath or *gypsum wallboard* shall not be used as a backing for *cement plaster*.

**Exception:** Gypsum lath or *gypsum wallboard* is permitted, with a *water-resistive barrier*, as a backing for self-furred metal lath or self-furred wire fabric lath and *cement plaster* where either of the following conditions occur:

1. On horizontal supports of ceilings or roof soffits.
2. On interior walls.

##### 2510.5.2.2 Gypsum sheathing backing.

*Gypsum sheathing* is permitted as a backing for metal or wire fabric lath and *cement plaster* on walls. A *water-resistive barrier* shall be provided in accordance with [Section 2510.6](#).

##### 2510.5.3 Backing not required.

*Wire backing* is not required under expanded metal lath or paperbacked wire fabric lath.

#### 2510.6 Water-resistive barriers.

*Water-resistive barriers* shall be installed as required in [Section 1403.2](#) and, where applied over wood-based sheathing, shall [comply with Section 2510.6.1](#) or [2510.6.2](#).

##### 2510.6.1 Dry climates.

One of the following shall apply for dry (B) climate zones:

1. The water-resistive barrier shall be two layers of 10-minute Grade D paper or have a water resistance equal to or greater than two layers of water-resistive barrier complying with [ASTM E2556](#), Type I. The individual layers shall be installed independently such that each layer provides a separate continuous plane and any flashing, installed in accordance with [Section 1404.4](#) and intended to drain to the water-resistive barrier, is directed between the layers.
2. The water-resistive barrier shall be 60-minute Grade D paper or have a water resistance equal to or greater than one layer of water-resistive barrier complying with [ASTM E2556](#), Type II. The water-resistive barrier shall be separated from the stucco by a layer of foam plastic insulating sheathing or other nonwater absorbing layer, or a drainage space.

##### 2510.6.2 Moist or marine climates.

In moist (A) or marine (C) climate zones, *water-resistive barrier* shall comply with one of the following:

1. In addition to complying with Item 1 or 2 of [Section 2510.6.1](#), a space or drainage material not less than  $\frac{3}{16}$  inch (4.8 mm) in depth shall be applied to the exterior side of the *water-resistive barrier*.

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2. In addition to complying with Item 2 of Section 2510.6.1, drainage on the exterior side of the *water-resistive barrier* shall have a minimum drainage efficiency of 90 percent as measured in accordance with ASTM E2273 or Annex A2 of ASTM E2925.

**2510.7 Preparation of masonry and concrete.**

Surfaces shall be clean, free from efflorescence, sufficiently damp and rough for proper bond. If the surface is insufficiently rough, *approved* bonding agents or a Portland cement dash bond coat mixed in proportions of not more than two parts volume of sand to one part volume of Portland cement or plastic cement shall be applied. The dash bond coat shall be left undisturbed and shall be moist cured not less than 24 hours.

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#### SECTION 2511 INTERIOR PLASTER

##### 2511.1 General.

Plastering gypsum plaster or *cement plaster* shall be not less than three coats where applied over metal lath or wire fabric lath and not less than two coats where applied over other bases permitted by this chapter.

**Exception:** *Gypsum veneer plaster* and *cement plaster* specifically designed and *approved* for one-coat applications.

##### 2511.1.1 Installation.

Installation of lathing and plaster materials shall conform to [Table 2511.1.1](#) and [Section 2507](#).

**TABLE 2511.1.1  
INSTALLATION OF PLASTER CONSTRUCTION**

MATERIAL	STANDARD
Cement plaster	<a href="#">ASTM C926</a>
Gypsum plaster	<a href="#">ASTM C842</a>
Gypsum veneer plaster	<a href="#">ASTM C843</a>
Interior lathing and furring (gypsum plaster)	<a href="#">ASTM C841</a>
Lathing and furring (cement plaster)	<a href="#">ASTM C1063</a>
Steel framing	<a href="#">ASTM C754; C1007</a>

##### 2511.2 Limitations.

Plaster shall not be applied directly to fiber insulation board. *Cement plaster* shall not be applied directly to gypsum lath or *gypsum plaster* except as specified in [Sections 2510.5.1](#) and [2510.5.2](#).

##### 2511.3 Grounds.

Where installed, grounds shall ensure the minimum thickness of plaster as set forth in [ASTM C842](#) and [ASTM C926](#). Plaster thickness shall be measured from the face of lath and other bases.

##### 2511.4 Interior masonry or concrete.

Condition of surfaces shall be as specified in [Section 2510.7](#). *Approved* specially prepared *gypsum plaster* designed for application to concrete surfaces or *approved* acoustical plaster is permitted. The total thickness of base coat plaster applied to concrete ceilings shall be as set forth in [ASTM C842](#) or [ASTM C926](#). Should ceiling surfaces require more than the maximum thickness permitted in [ASTM C842](#) or [ASTM C926](#), metal lath or wire fabric lath shall be installed on such surfaces before plastering.

##### 2511.5 Wet areas.

Showers and public toilet walls shall conform to [Sections 1210.2](#) and [1210.3](#). Where wood frame walls and partitions are covered on the interior with *cement plaster* or tile of similar material and are subject to water splash, the framing shall be protected with an *approved* moisture barrier.

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#### SECTION 2513 EXPOSED AGGREGATE PLASTER

##### 2513.1 General.

Exposed natural or integrally colored aggregate is permitted to be partially embedded in a natural or colored bedding coat of *cement plaster* or *gypsum plaster*, subject to the provisions of this section.

##### 2513.2 Aggregate.

The aggregate shall be applied manually or mechanically and shall consist of marble chips, pebbles or similar durable, moderately hard (three or more on the Mohs hardness scale), nonreactive materials.

##### 2513.3 Bedding coat proportions.

The bedding coat for interior or exterior surfaces shall be composed of one part Portland cement and one part Type S lime; or one part blended cement and one part Type S lime; or masonry cement; or plastic cement and not more than three parts of graded white or natural sand by volume. The bedding coat for *interior surfaces* shall be composed of 100 pounds (45.4 kg) of neat *gypsum plaster* and not more than 200 pounds (90.8 kg) of graded white sand. A factory-prepared bedding coat for interior or exterior use is permitted. The bedding coat for exterior surfaces shall have a minimum compressive strength of 1,000 pounds per square inch (6895 kPa).

##### 2513.4 Application.

The bedding coat is permitted to be applied directly over the first (scratch) coat of plaster, provided that the ultimate overall thickness is not less than  $\frac{7}{8}$  inch (22 mm), including lath. Over concrete or masonry surfaces, the overall thickness shall be not less than  $\frac{1}{2}$  inch (12.7 mm).

##### 2513.5 Bases.

Exposed aggregate plaster is permitted to be applied over concrete, masonry, *cement plaster* base coats or *gypsum plaster* base coats installed in accordance with [Section 2511](#) or [2512](#).

##### 2513.6 Preparation of masonry and concrete.

Masonry and concrete surfaces shall be prepared in accordance with the provisions of [Section 2510.7](#).

##### 2513.7 Curing of base coats.

*Cement plaster* base coats shall be cured in accordance with [ASTM C926](#). Cement plaster bedding coats shall retain sufficient moisture for hydration (hardening) for 24 hours minimum or, where necessary, shall be kept damp for 24 hours by light water spraying.

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#### SECTION 2514 REINFORCED GYPSUM CONCRETE

##### 2514.1 General.

Reinforced gypsum concrete shall comply with the requirements of [ASTM C317](#) and [ASTM C956](#).

##### 2514.2 Minimum thickness.

The minimum thickness of reinforced gypsum concrete shall be 2 inches (51 mm) except the minimum required thickness shall be reduced to 1½ inches (38 mm), provided that the following conditions are satisfied:

1. The overall thickness, including the formboard, is not less than 2 inches (51 mm).
2. The clear span of the gypsum concrete between supports does not exceed 33 inches (838 mm).
3. Diaphragm action is not required.
4. The design *live load* does not exceed 40 pounds per square foot (psf) (1915 Pa).

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