Insulated Metal Panel Compliance with Chapter 26 of the IBC

This Expert Analysis will explain how CENTRIA Insulated Metal Panels (IMPs) achieve compliance with the 2018 International Building Code (IBC). IMPs contain foam plastic material and fall under Chapter 26 of the IBC. Chapter 26 provides standards addressing the use of foam plastic insulation on the inside or outside of a building.

To begin, Chapter 14 of the IBC addresses requirements for exterior walls of buildings. Section 1403.13 states, “foam plastic insulation used in exterior wall covering assemblies shall comply with Chapter 26”.

This section guides you to Chapter 26. Section 2603.4 states, “except as provided for in Section 2603.9, foam plastic shall be separated from the interior of a building by an approved thermal barrier”.

Section 2603.9 states, “foam plastic shall not be required to comply with the requirements of Section 2603.4 where specifically approved based on large-scale tests such as, but not limited to, NFPA 286, FM 4880, UL 1040 or UL 1715”.

Section 2603.5 states, “exterior walls of buildings of Type I, II, III or IV construction of any height shall comply with Sections 2603.5.1 through 2603.5.7”. These sections cover fire-resistance-rated walls, thermal barrier, potential heat, flame spread and smoke-developed indices, vertical and lateral fire propagation, label required and ignition and are detailed below.

**Section 2603.5.1- Fire-resistance-rated walls:** Where the wall is required to have a fire-resistance rating, data based on tests conducted in accordance with ASTM E119 or UL 263 shall be provided to substantiate that the fire-resistance rating is maintained.

- CENTRIA has wall assemblies incorporating IMPs that are tested and certified in their entirety. These assemblies are listed in the UL Fire Resistance Directory.
- The fire resistance hourly ratings have been determined by the UL 263 Fire Test of Building Construction and Materials, designed to determine how quickly fire can raise the temperature to unacceptable levels.

**Section 2603.5.2- Thermal barrier:** Any foam plastic insulation shall be separated from the building interior by a thermal barrier meeting the provisions of Section 2603.4, unless special approval is obtained on the basis of Section 2603.9.

- As noted above, CENTRIA IMPs are not required to comply with the requirements of Section 2603.4 since they are specifically approved based on large-scale tests (NFPA 286 and FM 4880).
**Section 2603.5.3- Potential heat:** The potential heat of foam plastic insulation in any portion of the wall or panel shall not exceed the potential heat expressed in Btu per square feet of the foam plastic insulation contained in the wall assembly tested in accordance with Section 2603.5.5. The potential heat of the foam plastic insulation shall be determined by tests conducted in accordance with NFPA 259 and the results shall be expressed in Btu per square feet.

- The potential heat of the foam plastic insulation contained in the CENTRIA IMP assemblies is tested in accordance with NFPA 259 and meets the requirements of NFPA 285. NFPA 259 testing is always completed on the same panels that are tested per NFPA 285; thus linking the results from the two tests.

**Section 2603.5.4- Flame spread and smoke-developed indices:** Foam plastic insulation, exterior coatings and facings shall be tested separately in the thickness intended for use, but not to exceed 4 inches and shall each have a flame spread index (FSI) of 25 or less and a smoke-developed index (SDI) of 450 or less as determined in accordance with ASTM E84 or UL 723.

- CENTRIA IMPs have been tested in accordance with ASTM E84 and results are within the acceptance criteria of the test standard. CENTRIA tests the bare foam core to obtain the results of FSI < 25 and SDI < 450 as opposed to testing just the painted steel skins. CENTRIA IMPs are Class A fire rated.

**Section 2603.5.5- Vertical and lateral fire propagation:** The exterior wall assembly shall be tested in accordance with and comply with the acceptance criteria of NFPA 285.

- CENTRIA has tested various assemblies with IMPs that meet the requirements of the NFPA 285 test standard.

**Section 2603.5.6- Label required:** The edge or face of each piece, package or container of foam plastic insulation shall bear the label of an approved agency. The label shall contain the manufacturers or distributor’s identification, model number, serial number or definitive information describing the product or materials’ performance characteristics and approved agency’s identification.

- CENTRIA IMP packages are labeled by product.

**Section 2603.5.7- Ignition:** Exterior walls shall not exhibit sustained flaming when tested in accordance with NFPA 268. Where a material is intended to be installed in more than one thickness, tests of the minimum and maximum thickness intended for use shall be performed.

- Most CENTRIA IMPs meet the exception of Section 2603.5.7 for minimum steel face thickness. Those that do not (MetalWrap), have been tested in accordance with NFPA 268 and results are within the acceptance criteria of the test standard.
<table>
<thead>
<tr>
<th>IBC Section No.</th>
<th>Section Description</th>
<th>CENTRIA Compliance</th>
</tr>
</thead>
<tbody>
<tr>
<td>2603.5.1</td>
<td>Fire-resistance-rated walls</td>
<td>Wall assemblies incorporating IMPs listed per UL 263</td>
</tr>
<tr>
<td>2603.5.2</td>
<td>Thermal barrier</td>
<td>Not required based on NFPA 286 and FM 4880 large scale tests</td>
</tr>
<tr>
<td>2603.5.3</td>
<td>Potential heat</td>
<td>IMP assemblies tested in accordance with NFPA 259</td>
</tr>
<tr>
<td>2603.5.4</td>
<td>Flame spread and smoke-developed indices</td>
<td>IMPs tested in accordance with ASTM E84</td>
</tr>
<tr>
<td>2603.5.5</td>
<td>Vertical and lateral fire propagation</td>
<td>IMP assemblies tested in accordance with NFPA 285</td>
</tr>
<tr>
<td>2603.5.6</td>
<td>Label required</td>
<td>IMPs are labeled</td>
</tr>
<tr>
<td>2603.5.7</td>
<td>Ignition</td>
<td>IMPs tested in accordance with NFPA 268 as required</td>
</tr>
</tbody>
</table>

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Appendix

Chapter 14, 2018 IBC-Exterior Walls

Chapter 26, 2018 IBC-Plastics
CHAPTER 14
EXTERIOR WALLS

SECTION 1401
GENERAL

1401.1 Scope. The provisions of this chapter shall establish the minimum requirements for exterior walls; exterior wall coverings; exterior wall openings; exterior windows and doors; and architectural trim.

SECTION 1402
PERFORMANCE REQUIREMENTS

1402.1 General. The provisions of this section shall apply to exterior walls, wall coverings and components thereof.

1402.2 Weather protection. Exterior walls shall provide the building with a weather-resistant exterior wall envelope. The exterior wall envelope shall include flashing, as described in Section 1404.4. 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 described in Section 1403.2, and a means for draining water that enters the assembly to the exterior. Protection against condensation in the exterior wall assembly shall be provided in accordance with Section 1404.3.

Exceptions:

1. A weather-resistant exterior wall envelope shall not be required over concrete or masonry walls designed in accordance with Chapters 19 and 21, respectively.

2. Compliance with the requirements for a means of drainage, and the requirements of Sections 1403.2 and 1404.4, shall not be required for an exterior wall envelope that has been demonstrated through testing to resist wind-driven rain, including joints, penetrations and intersections with dissimilar materials, in accordance with ASTM E331 under the following conditions:

   2.1. Exterior wall envelope test assemblies shall include not fewer than one opening, one control joint, one wall/eave interface and one wall sill. Tested openings and penetrations shall be representative of the intended end-use configuration.

   2.2. Exterior wall envelope test assemblies shall be not less than 4 feet by 8 feet (1219 mm by 2438 mm) in size.

   2.3. Exterior wall envelope assemblies shall be tested at a minimum differential pressure of 6.24 pounds per square foot (psf) (0.297 kN/m²).

   2.4. Exterior wall envelope assemblies shall be subjected to a minimum test exposure duration of 2 hours.

   The exterior wall envelope design shall be considered to resist wind-driven rain where the results of testing indicate that water did not penetrate control joints in the exterior wall envelope, joints at the perimeter of openings or intersections of terminations with dissimilar materials.

3. Exterior insulation and finish systems (EIFS) complying with Section 1407.4.1.

[BS] 1402.3 Structural. Exterior walls, and the associated openings, shall be designed and constructed to resist safely the superimposed loads required by Chapter 16.

1402.4 Fire resistance. Exterior walls shall be fire-resistance rated as required by other sections of this code with opening protection as required by Chapter 7.

1402.5 Vertical and lateral flame propagation. Exterior walls on buildings of Type I, II, III or IV construction that are greater than 40 feet (12 192 mm) in height above grade plane and contain a combustible water-resistive barrier shall be tested in accordance with and comply with the acceptance criteria of NFPA 285. For the purposes of this section, fenestration products, flashing of fenestration products and water-resistive-barrier flashing and accessories at other locations, including through wall flashings, shall not be considered part of the water-resistive barrier.

Exceptions:

1. Walls in which the water-resistive barrier is the only combustible component and the exterior wall has a wall covering of brick, concrete, stone, terra cotta, stucco or steel with minimum thicknesses in accordance with Table 1404.2.
2. Walls in which the water-resistive barrier is the only combustible component and the water-resistive barrier has a peak heat release rate of less than 150 kW/m², a total heat release of less than 20 MJ/m² and an effective heat of combustion of less than 18 MJ/kg as determined in accordance with ASTM E1354 and has a flame spread index of 25 or less and a smoke-developed index of 450 or less as determined in accordance with ASTM E84 or UL 723. The ASTM E1354 test shall be conducted on specimens at the thickness intended for use, in the horizontal orientation and at an incident radiant heat flux of 50 kW/m².

[BS] 1402.6 Flood resistance. For buildings in flood hazard areas as established in Section 1612.3, exterior walls extending below the elevation required by Section 1612 shall be constructed with flood-damage-resistant materials.

[BS] 1402.7 Flood resistance for coastal high-hazard areas and coastal A zones. For buildings in coastal high-hazard areas and coastal A zones as established in Section 1612.3, electrical, mechanical and plumbing system components shall not be mounted on or penetrate through exterior walls that are designed to break away under flood loads.

SECTION 1403
MATERIALS

1403.1 General. Materials used for the construction of exterior walls shall comply with the provisions of this section. Materials not prescribed herein shall be permitted, provided that any such alternative has been approved.

1403.2 Water-resistive barrier. Not fewer than one layer of No.15 asphalt felt, complying with ASTM D226 for Type 1 felt or other approved materials, shall be attached to the studs or sheathing, with flashing as described in Section 1404.4, in such a manner as to provide a continuous water-resistive barrier behind the exterior wall veneer.

[BS] 1403.3 Wood. Exterior walls of wood construction shall be designed and constructed in accordance with Chapter 23.

[BS] 1403.3.1 Basic hardboard. Basic hardboard shall conform to the requirements of ANSI A135.4.

[BS] 1403.3.2 Hardboard siding. Hardboard siding shall conform to the requirements of ANSI A135.6 and, where used structurally, shall be so identified by the label of an approved agency.

[BS] 1403.4 Masonry. Exterior walls of masonry construction shall be designed and constructed in accordance with this section and Chapter 21. Masonry units, mortar and metal accessories used in anchored and adhered veneer shall meet the physical requirements of Chapter 21. The backing of anchored and adhered veneer shall be of concrete, masonry, steel framing or wood framing. Continuous insulation meeting the applicable requirements of this code shall be permitted between the backing and the masonry veneer.

[BS] 1403.5 Metal. Exterior walls constructed of cold-formed steel, structural steel or aluminum shall be designed in accordance with Chapters 22 and 20, respectively.

[BS] 1403.5.1 Aluminum siding. Aluminum siding shall conform to the requirements of AAMA 1402.

[BS] 1403.5.2 Cold-rolled copper. Copper shall conform to the requirements of ASTM B370.

[BS] 1403.5.3 Lead-coated copper. Lead-coated copper shall conform to the requirements of ASTM B101.

[BS] 1403.6 Concrete. Exterior walls of concrete construction shall be designed and constructed in accordance with Chapter 19.

[BS] 1403.7 Glass-unit masonry. Exterior walls of glass-unit masonry shall be designed and constructed in accordance with Chapter 21.

1403.8 Plastics. Plastic panel, apron or spandrel walls as defined in this code shall not be limited in thickness, provided that such plastics and their assemblies conform to the requirements of Chapter 26 and are constructed of approved weather-resistant materials of adequate strength to resist the wind loads for cladding specified in Chapter 16.

1403.9 Vinyl siding. Vinyl siding shall be certified and labeled as conforming to the requirements of ASTM D3679 by an approved quality control agency.

1403.10 Fiber-cement siding. Fiber-cement siding shall conform to the requirements of ASTM C1186, Type A (or ISO 8836, Category A), and shall be so identified on labeling listing an approved quality control agency.

1403.11 Exterior insulation and finish systems. Exterior insulation and finish systems (EIFS) and exterior insulation and finish systems (EIFS) with drainage shall comply with Section 1407.

1403.12 Polypropylene siding. Polypropylene siding shall be certified and labeled as conforming to the requirements of ASTM D7254 and those of Section 1403.12.1 or 1403.12.2 by an approved quality control agency. Polypropylene siding shall be installed in accordance with the requirements of Section 1404.18 and in accordance with the manufacturer's instructions. Polypropylene siding shall be secured to the building so as to provide weather protection for the exterior walls of the building.

1403.12.1 Flame spread index. The certification of the flame spread index shall be accompanied by a test report stating that all portions of the test specimen ahead of the flame front remained in position during the test in accordance with ASTM E84 or UL 723.

1403.12.2 Fire separation distance. The fire separation distance between a building with polypropylene siding and the adjacent building shall be not less than 10 feet (3048 mm).

1403.13 Foam plastic insulation. Foam plastic insulation used in exterior wall covering assemblies shall comply with Chapter 26.

SECTION 1404
INSTALLATION OF WALL COVERINGS

1404.1 General. Exterior wall coverings shall be designed and constructed in accordance with the applicable provisions of this section.

1404.2 Weather protection. Exterior walls shall provide weather protection for the building. The materials of the minimum nominal thickness specified in Table 1404.2 shall be acceptable as approved weather coverings.
**TABLE 1404.2**
MINIMUM THICKNESS OF WEATHER COVERINGS

<table>
<thead>
<tr>
<th>COVERING TYPE</th>
<th>MINIMUM THICKNESS (inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adhered masonry veneer</td>
<td></td>
</tr>
<tr>
<td>Architectural cast stone</td>
<td>0.75</td>
</tr>
<tr>
<td>Other</td>
<td>0.25</td>
</tr>
<tr>
<td>Aluminum siding</td>
<td>0.019</td>
</tr>
<tr>
<td>Anchored masonry veneer</td>
<td></td>
</tr>
<tr>
<td>Stone (natural)</td>
<td>2.0</td>
</tr>
<tr>
<td>Architectural cast stone</td>
<td>1.25</td>
</tr>
<tr>
<td>Other</td>
<td>2.625</td>
</tr>
<tr>
<td>Asbestos-cement boards</td>
<td>0.125</td>
</tr>
<tr>
<td>Asbestos shingles</td>
<td>0.156</td>
</tr>
<tr>
<td>Cold-rolled copper</td>
<td>0.0216 nominal</td>
</tr>
<tr>
<td>Copper shingles</td>
<td>0.0162 nominal</td>
</tr>
<tr>
<td>Exterior plywood (with sheathing)</td>
<td>0.313</td>
</tr>
<tr>
<td>Exterior plywood (without sheathing)</td>
<td>See Section 2304.6</td>
</tr>
<tr>
<td>Fiber cement lap siding</td>
<td>0.25</td>
</tr>
<tr>
<td>Fiber cement panel siding</td>
<td>0.25</td>
</tr>
<tr>
<td>Fiberboard siding</td>
<td>0.5</td>
</tr>
<tr>
<td>Glass-fiber reinforced concrete panels</td>
<td>0.375</td>
</tr>
<tr>
<td>Hardboard siding</td>
<td>0.25</td>
</tr>
<tr>
<td>High-yield copper</td>
<td>0.0162 nominal</td>
</tr>
<tr>
<td>Lead-coated copper</td>
<td>0.0216 nominal</td>
</tr>
<tr>
<td>Lead-coated high-yield copper</td>
<td>0.0162 nominal</td>
</tr>
<tr>
<td>Marble slabs</td>
<td>1</td>
</tr>
<tr>
<td>Particleboard (with sheathing)</td>
<td>See Section 2304.6</td>
</tr>
<tr>
<td>Particleboard (without sheathing)</td>
<td>See Section 2304.6</td>
</tr>
<tr>
<td>Porcelain tile</td>
<td>0.25</td>
</tr>
<tr>
<td>Steel (approved corrosion resistant)</td>
<td>0.0149</td>
</tr>
<tr>
<td>Structural glass</td>
<td>0.344</td>
</tr>
<tr>
<td>Stucco or exterior cement plaster</td>
<td></td>
</tr>
<tr>
<td>Three-coat work over:</td>
<td></td>
</tr>
<tr>
<td>Metal plaster base</td>
<td>0.875</td>
</tr>
<tr>
<td>Unit masonry</td>
<td>0.625</td>
</tr>
<tr>
<td>Cast-in-place or precast concrete</td>
<td>0.625</td>
</tr>
<tr>
<td>Two-coat work over:</td>
<td></td>
</tr>
<tr>
<td>Unit masonry</td>
<td>0.5</td>
</tr>
<tr>
<td>Cast-in-place or precast concrete</td>
<td>0.375</td>
</tr>
<tr>
<td>Terra cotta (anchored)</td>
<td>1</td>
</tr>
<tr>
<td>Terra cotta (adhered)</td>
<td>0.25</td>
</tr>
<tr>
<td>Vinyl siding</td>
<td>0.035</td>
</tr>
<tr>
<td>Wood shingles</td>
<td>0.375</td>
</tr>
<tr>
<td>Wood siding (without sheathing)&lt;</td>
<td>0.5</td>
</tr>
</tbody>
</table>

For SI: 1 inch = 25.4 mm, 1 ounce = 28.35 g, 1 square foot = 0.093 m².

a. Wood siding of thicknesses less than 0.5 inch shall be placed over sheathing that conforms to Section 2304.6.

b. Exclusive of texture.

c. As measured at the bottom of decorative grooves.

d. 16 ounces per square foot for cold-rolled copper and lead-coated copper, 12 ounces per square foot for copper shingles, high-yield copper and lead-coated high-yield copper.

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**1404.3 Vapor retarders.** Vapor retarders as described in Section 1404.3.3 shall be provided in accordance with Sections 1404.3.1 and 1404.3.2, or an approved design using accepted engineering practice for hygrothermal analysis.

**1404.3.1 Class I and II vapor retarders.** Class I and II vapor retarders shall not be provided on the interior side of frame walls in Zones 1 and 2. Class I vapor retarders shall not be provided on the interior side of frame walls in Zones 3 and 4 other than Marine 4. Class I or II vapor retarders shall be provided on the interior side of frame walls in Zones 5, 6, 7, 8 and Marine 4. The appropriate zone shall be selected in accordance with Chapter 3 [CE] of the **International Energy Conservation Code-Commercial Provisions**.

**Exceptions:**

1. Basement walls.

2. Below-grade portion of any wall.

3. Construction where moisture or its freezing will not damage the materials.

4. Conditions where Class III vapor retarders are required in Section 1404.3.2.

**1404.3.2 Class III vapor retarders.** Class III vapor retarders shall be permitted where any one of the conditions in Table 1404.3.2 is met. Only Class III vapor retarders shall be used on the interior side of frame walls where foam plastic insulating sheathing with a perm rating of less than 1 is applied in accordance with Table 1404.3.2 on the exterior side of the frame wall.

**TABLE 1404.3.2**
CLASS III VAPOR RETARDERS

<table>
<thead>
<tr>
<th>ZONE</th>
<th>CLASS III VAPOR RETARDERS PERMITTED FOR:*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marine 4</td>
<td>Vented cladding over wood structural panels</td>
</tr>
<tr>
<td></td>
<td>Vented cladding over fiberboard</td>
</tr>
<tr>
<td></td>
<td>Vented cladding over gypsum</td>
</tr>
<tr>
<td></td>
<td>Continuous insulation with R-value ≥ R2.5</td>
</tr>
<tr>
<td></td>
<td>over 2 x 4 wall</td>
</tr>
<tr>
<td>5</td>
<td>Vented cladding over wood structural panels</td>
</tr>
<tr>
<td></td>
<td>Vented cladding over fiberboard</td>
</tr>
<tr>
<td></td>
<td>Vented cladding over gypsum</td>
</tr>
<tr>
<td></td>
<td>Continuous insulation with R-value ≥ R5</td>
</tr>
<tr>
<td></td>
<td>over 2 x 4 wall</td>
</tr>
<tr>
<td></td>
<td>Continuous insulation with R-value ≥ R7.5</td>
</tr>
<tr>
<td>6</td>
<td>Vented cladding over fiberboard</td>
</tr>
<tr>
<td></td>
<td>Vented cladding over gypsum</td>
</tr>
<tr>
<td></td>
<td>Continuous insulation with R-value ≥ R11.25</td>
</tr>
<tr>
<td>7 and 8</td>
<td>Continuous insulation with R-value ≥ R10</td>
</tr>
<tr>
<td></td>
<td>over 2 x 4 wall</td>
</tr>
<tr>
<td></td>
<td>Continuous insulation with R-value ≥ R15</td>
</tr>
<tr>
<td></td>
<td>over 2 x 6 wall</td>
</tr>
</tbody>
</table>

For SI: 1 pound per cubic foot = 16 kg/m³.

a. Spray foam with a maximum permanence of 1.5 perms at the installed thickness applied to the interior cavity side of wood structural panels, fiberboard, insulating sheathing or gypsum is deemed to meet the continuous insulation requirement where the spray foam R-value meets or exceeds the specified insulating sheathing R-value.
1404.3.3 Material vapor retarder class. The vapor retarder class shall be based on the manufacturer's certified testing or a tested assembly.

The following shall be deemed to meet the class specified:

Class I: Sheet polyethylene, nonperforated aluminum foil with a perm rating of less than or equal to 0.1.

Class II: Kraft-faced fiberglass batts or paint with a perm rating greater than 0.1 and less than or equal to 1.0.

Class III: Latex or enamel paint with a perm rating of greater than 1.0 and less than or equal to 10.0.

1404.3.4 Minimum clear airspaces and vented openings for vented cladding. For the purposes of this section, vented cladding shall include the following minimum clear airspaces:

1. Vinyl, polypropylene or horizontal aluminum siding applied over a weather-resistive barrier as specified in this chapter.

2. Brick veneer with a clear airspace as specified in this code.

3. Other approved vented claddings.

1404.4 Flashing. Flashing shall be installed in such a manner so as to prevent moisture from entering the wall or to redirect that moisture to the exterior. Flashing shall be installed at the perimeters of exterior door and window assemblies, penetrations and terminations of exterior wall assemblies, exterior wall intersections with roofs, chimneys, porches, decks, balconies and similar projections and at built-in gutters and similar locations where moisture could enter the wall. Flashing with projecting flanges shall be installed on both sides and the ends of copings, under sills and continuously above projecting trim. Where self-adhered membranes are used as flashings of fenestration in wall assemblies, those self-adhered flashings shall comply with AAMA 711. Where fluid applied membranes are used as flashing for exterior wall openings, those fluid applied membrane flashings shall comply with AAMA 714.

1404.4.1 Exterior wall pockets. In exterior walls of buildings or structures, wall pockets or crevices in which moisture can accumulate shall be avoided or protected with caps or drips, or other approved means shall be provided to prevent water damage.

1404.4.2 Masonry. Flashing and weep holes in anchored veneer designed in accordance with Section 1404.6 shall be located not more than 10 inches (254 mm) above finished ground level above the foundation wall or slab. At other points of support including structural floors, shelf angles and lintels, flashing and weep holes shall be located in the first course of masonry above the support.

1404.5 Wood veneers. Wood veneers on exterior walls of buildings of Type I, II, III and IV construction shall be not less than 1 inch (25 mm) nominal thickness, 0.438-inch (11.1 mm) exterior hardboard siding or 0.375-inch (9.5 mm) exterior-type wood structural panels or particleboard and shall conform to the following:

1. The veneer shall not exceed 40 feet (12 190 mm) in height above grade. Where fire-retardant-treated wood is used, the height shall not exceed 60 feet (18 290 mm) in height above grade.

2. The veneer is attached to or furred from a noncombustible backing that is fire-resistance rated as required by other provisions of this code.

3. Where open or spaced wood veneers (without concealed spaces) are used, they shall not project more than 24 inches (610 mm) from the building wall.

[BS] 1404.6 Anchored masonry veneer. Anchored masonry veneer shall comply with the provisions of Sections 1404.6 through 1404.9 and Sections 12.1 and 12.2 of TMS 402.

[BS] 1404.6.1 Tolerances. Anchored masonry veneers in accordance with Chapter 14 are not required to meet the tolerances in Article 3.3 F1 of TMS 602.

[BS] 1404.6.2 Seismic requirements. Anchored masonry veneer located in Seismic Design Category C, D, E or F shall conform to the requirements of Section 12.2.2.11 of TMS 402.

[BS] 1404.7 Stone veneer. Anchored stone veneer units not exceeding 10 inches (254 mm) in thickness shall be anchored directly to masonry, concrete or to stud construction by one of the following methods:

1. With concrete or masonry backing, anchor ties shall be not less than 0.1055-inch (2.68 mm) corrosion-resistant wire, or approved equal, formed beyond the base of the backing. The legs of the loops shall be not less than 6 inches (152 mm) in length bent at right angles and laid in the mortar joint, and spaced so that the eyes or loops are 12 inches (305 mm) maximum on center in both directions. There shall be provided not less than a 0.1055-inch (2.68 mm) corrosion-resistant wire tie, or approved equal, threaded through the exposed loops for every 2 square feet (0.2 m²) of stone veneer. This tie shall be a loop having legs not less than 15 inches (381 mm) in length bent so that the tie will lie in the stone veneer mortar joint. The last 2 inches (51 mm) of each wire leg shall have a right-angle bend. One-inch (25 mm) minimum thickness of cement grout shall be placed between the backing and the stone veneer.

2. With wood stud backing, a 2-inch by 2-inch (51 by 51 mm) 0.0625-inch (1.59 mm) zinc-coated or nonmetallic coated wire mesh with two layers of water-resistive barrier in accordance with Section 1403.2 shall be applied directly to wood studs spaced not more than 16 inches (406 mm) on center. On studs, the mesh shall be attached with 2-inch-long (51 mm) corrosion-resistant steel wire furring nails at 4 inches (102 mm) on center providing a minimum 1.125-inch (29 mm) penetration into each stud and with 8d annular threaded nails at 8 inches (203 mm) on center, into top and bottom plates or with equivalent wire ties. There shall be not less than a 0.1055-inch (2.68 mm) zinc-coated or nonmetallic coated wire, or approved equal, attached to the stud.
with not smaller than an 8d (0.120 in. diameter) annular threaded nail for every 2 square feet (0.2 m²) of stone veneer. This tie shall be a loop having legs not less than 15 inches (381 mm) in length, so bent that the tie will lie in the stone veneer mortar joint. The last 2 inches (51 mm) of each wire leg shall have a right-angle bend. One-inch (25 mm) minimum thickness of cement grout shall be placed between the backing and the stone veneer.

3. With cold-formed steel stud backing, a 2-inch by 2-inch (51 by 51 mm) 0.0625-inch (1.59 mm) zinc-coated or nonmetallic coated wire mesh with two layers of water-resistant barrier in accordance with Section 1403.2 shall be applied directly to steel studs spaced at not more than 16 inches (406 mm) on center. The mesh shall be attached with corrosion-resistant #8 self-drilling, tapping screws at 4 inches (102 mm) on center, and at 8 inches (203 mm) on center into top and bottom tracks or with equivalent wire ties. Screws shall extend through the steel connection not fewer than three exposed threads. There shall be not less than a 0.1055-inch (2.68 mm) corrosion-resistant wire, or approved equal, attached to the stud with not smaller than a #8 self-drilling, tapping screw extending through the steel framing not fewer than three exposed threads for every 2 square feet (0.2 m²) of stone veneer. This tie shall be a loop having legs not less than 15 inches (381 mm) in length, so bent that the tie will lie in the stone veneer mortar joint. The last 2 inches (51 mm) of each wire leg shall have a right-angle bend. One-inch (25 mm) minimum thickness of cement grout shall be placed between the backing and the stone veneer. The cold-formed steel framing members shall have a minimum bare steel thickness of 0.0428 inches (1.087 mm).

[BS] 1404.8 Slab-type veneer. Anchored slab-type veneer units not exceeding 2 inches (51 mm) in thickness shall be anchored directly to masonry, concrete or light-frame construction. For veneer units of marble, travertine, granite or other stone units of slab form, ties of corrosion-resistant dowels in drilled holes shall be located in the middle third of the edge of the units, spaced not more than 24 inches (610 mm) apart around the periphery of each unit with not less than four ties per veneer unit. Units shall not exceed 20 square feet (1.9 m²) in area. If the dowels are not tight fitting, the holes shall be drilled not more than 0.063 inch (1.6 mm) larger in diameter than the dowel, with the hole countersunk to a diameter and depth equal to twice the diameter of the dowel in order to provide a tight-fitting key of cement mortar at the dowel locations where the mortar in the joint has set. Veneer ties shall be corrosion-resistant metal capable of resisting, in tension or compression, a force equal to two times the weight of the attached veneer. If made of sheet metal, veneer ties shall be not smaller in area than 0.0336 by 1 inch (0.853 by 25 mm) or, if made of wire, not smaller in diameter than 0.1483-inch (3.76 mm) wire.

[BS] 1404.9 Terra cotta. Anchored terra cotta or ceramic units not less than 3/4 inches (41 mm) thick shall be anchored directly to masonry, concrete or stud construction. Tied terra cotta or ceramic veneer units shall be not less than 1 1/4 inches (41 mm) thick with projecting dovetail webs on the back surface spaced approximately 8 inches (203 mm) on center. The facing shall be tied to the backing wall with corrosion-resistant metal anchors of not less than No. 8 gage wire installed at the top of each piece in horizontal bed joints not less than 12 inches (305 mm) nor more than 18 inches (457 mm) on center; these anchors shall be secured to 1/8-inch (6.4 mm) corrosion-resistant pencil rods that pass through the vertical aligned loop anchors in the backing wall. The veneer ties shall have sufficient strength to support the full weight of the veneer in tension. The facing shall be set with not less than a 2-inch (51 mm) space from the backing wall and the space shall be filled solidly with Portland cement grout and pea gravel. Immediately prior to setting, the backing wall and the facing shall be drenched with clean water and shall be distinctly damp when the grout is poured.

[BS] 1404.10 Adhered masonry veneer. Adhered masonry veneer shall comply with the applicable requirements in this section and Sections 12.1 and 12.2 of TMS 402.

[BS] 1404.10.1 Exterior adhered masonry veneer. Exterior adhered masonry veneer shall be installed in accordance with Section 1404.10 and the manufacturer’s instructions.

[BS] 1404.10.1.1 Water-resistive barriers. Water-resistive barriers shall be installed as required in Section 2510.6.

[BS] 1404.10.1.2 Flashing. Flashing shall comply with the applicable requirements of Section 1404.4 and the following.

[BS] 1404.10.1.2.1 Flashing at foundation. A corrosion-resistant screed or flashing of a minimum 0.019-inch (0.48 mm) or 26 gage galvanized or plastic with a minimum vertical attachment flange of 3/4 inches (89 mm) shall be installed to extend not less than 1 inch (25 mm) below the foundation plate line on exterior stud walls in accordance with Section 1404.4. The water-resistive barrier shall lap over the exterior of the attachment flange of the screed or flashing.

[BS] 1404.10.1.3 Clearances. On exterior stud walls, adhered masonry veneer shall be installed not less than 4 inches (102 mm) above the earth, or not less than 2 inches (51 mm) above paved areas, or not less than 1/2 inch (12.7 mm) above exterior walking surfaces that are supported by the same foundation that supports the exterior wall.

[BS] 1404.10.1.4 Adhered masonry veneer installed with lath and mortar. Exterior adhered masonry veneer installed with lath and mortar shall comply with the following.

[BS] 1404.10.1.4.1 Lathing. Lathing shall comply with the requirements of Section 2510.

[BS] 1404.10.1.4.2 Scratch coat. A nominal 1/8-inch-thick (12.7 mm) layer of mortar complying with the material requirements of Sections 2103 and 2512.2 shall be applied, encapsulating the lathing.
The surface of this mortar shall be scored horizontally, resulting in a scratch coat.

[BS] 1404.10.1.4.3 Adhering veneer. The masonry veneer units shall be adhered to the mortar scratch coat with a nominal \( \frac{1}{8} \)-inch-thick (12.7 mm) setting bed of mortar complying with Sections 2103 and 2512.2 applied to create a full setting bed for the back of the masonry veneer units. The masonry veneer units shall be worked into the setting bed resulting in a nominal \( \frac{3}{4} \)-inch (9.5 mm) setting bed after the masonry veneer units are applied.

[BS] 1404.10.1.5 Adhered masonry veneer applied directly to masonry and concrete. *Adhered masonry veneer* applied directly to masonry or concrete shall comply with the applicable requirements of Section 1404.10 and with the requirements of Section 1404.10.1.4 or 2510.7.

[BS] 1404.10.1.6 Cold weather construction. Cold weather construction of *adhered masonry veneer* shall comply with the requirements of Sections 2104 and 2512.4.

[BS] 1404.10.1.7 Hot weather construction. Hot weather construction of *adhered masonry veneer* shall comply with the requirements of Section 2104.

[BS] 1404.10.2 Exterior adhered masonry veneers—porcelain tile. Adhered units shall not exceed \( \frac{3}{8} \) inch (15.8 mm) thickness and 24 inches (610 mm) in any face dimension nor more than 3 square feet (0.28 m\(^2\)) in total face area and shall not weigh more than 9 pounds psf (0.43 kN/m\(^2\)). *Porcelain tile* shall be adhered to an approved backing system.

[BS] 1404.10.3 Interior adhered masonry veneers. Interior *adhered masonry veneers* shall have a maximum weight of 20 psf (0.958 kg/m\(^2\)) and shall be installed in accordance with Section 1404.10. Where the interior *adhered masonry veneer* is supported by wood construction, the supporting members shall be designed to limit deflection to \( \frac{1}{400} \) of the span of the supporting members.

[BS] 1404.11 Metal veneers. Veneers of metal shall be fabricated from approved corrosion-resistant materials or shall be protected front and back with porcelain enamel, or otherwise be treated to render the metal resistant to corrosion. Such veneers shall be not less than 0.0149-inch (0.378 mm) nominal thickness sheet steel mounted on wood or metal furring strips or approved sheathing on light-frame construction.

[BS] 1404.11.1 Attachment. Exterior metal veneer shall be securely attached to the supporting masonry or framing members with corrosion-resistant fastenings, metal ties or by other approved devices or methods. The spacing of the fastenings or ties shall not exceed 24 inches (610 mm) either vertically or horizontally, but where units exceed 4 square feet (0.4 m\(^2\)) in area there shall be not less than four attachments per unit. The metal attachments shall have a cross-sectional area not less than provided by W 1.7 wire. Such attachments and their supports shall be designed and constructed to resist the wind loads as specified in Section 1609 for components and cladding.

1404.11.2 Weather protection. Metal supports for exterior metal veneer shall be protected by painting, galvanizing or by other equivalent coating or treatment. Wood studs, furring strips or other wood supports for exterior metal veneer shall be approved pressure-treated wood or protected as required in Section 1402.2. Joints and edges exposed to the weather shall be caulked with approved durable waterproofing material or by other approved means to prevent penetration of moisture.

1404.11.3 Backup. Masonry backup shall not be required for metal veneer unless required by the fire-resistance requirements of this code.

1404.11.4 Grounding. Grounding of metal veneers on buildings shall comply with the requirements of Chapter 27 of this code.

[BS] 1404.12 Glass veneer. The area of a single section of thin exterior structural glass veneer shall not exceed 10 square feet (0.93 m\(^2\)) where that section is not more than 15 feet (4572 mm) above the level of the sidewalk or grade level directly below, and shall not exceed 6 square feet (0.56 m\(^2\)) where it is more than 15 feet (4572 mm) above that level.

[BS] 1404.12.1 Length and height. The length or height of any section of thin exterior structural glass veneer shall not exceed 48 inches (1219 mm).

[BS] 1404.12.2 Thickness. The thickness of thin exterior structural glass veneer shall be not less than 0.344 inch (8.7 mm).

[BS] 1404.12.3 Application. Thin exterior structural glass veneer shall be set only after backing is thoroughly dry and after application of an approved bond coat uniformly over the entire surface of the backing so as to effectively seal the surface. Glass shall be set in place with an approved mastic cement in sufficient quantity so that not less than 50 percent of the area of each glass unit is directly bonded to the backing by mastic not less than \( \frac{3}{4} \) inch (6.4 mm) thick and not more than \( \frac{3}{4} \) inch (15.9 mm) thick. The bond coat and mastic shall be evaluated for compatibility and shall bond firmly together.

[BS] 1404.12.4 Installation at sidewalk level. Where glass extends to a sidewalk surface, each section shall rest in an approved metal molding, and be set not less than \( \frac{3}{4} \) inch (6.4 mm) above the highest point of the sidewalk. The space between the molding and the sidewalk shall be thoroughly caulked and made water tight.

[BS] 1404.12.4.1 Installation above sidewalk level. Where thin exterior structural glass veneer is installed above the level of the top of a bulkhead facing, or at a level more than 36 inches (914 mm) above the sidewalk level, the mastic cement binding shall be supplemented with approved nonferrous metal shelf angles located in the horizontal joints in every course. Such shelf angles shall be not less than 0.0478-inch (1.2 mm) thick and not less than 2 inches (51 mm) long and shall be spaced at approved intervals, with not less than two angles for each glass unit. Shelf angles shall be secured to the wall or backing with expansion bolts, toggle bolts or by other approved methods.
[BS] 1404.12.5 Joints. Unless otherwise specifically approved by the building official, abutting edges of thin exterior structural glass veneer shall be ground square. Mitered joints shall not be used except where specifically approved for wide angles. Joints shall be uniformly buttered with an approved jointing compound and horizontal joints shall be held to not less than 0.063 inch (1.6 mm) by an approved nonrigid substance or device. Where thin exterior structural glass veneer abuts nonresilient material at sides or top, expansion joints not less than \( \frac{1}{8} \) inch (6.4 mm) wide shall be provided.

[BS] 1404.12.6 Mechanical fastenings. Thin exterior structural glass veneer installed above the level of the heads of show windows and veneer installed more than 12 feet (3658 mm) above sidewalk level shall, in addition to the mastic cement and shelf angles, be held in place by the use of fastenings at each vertical or horizontal edge, or at the four corners of each glass unit. Fastenings shall be secured to the wall or backing with expansion bolts, toggle bolts or by other methods. Fastenings shall be so designed as to hold the glass veneer in a vertical plane independent of the mastic cement. Shelf angles providing both support and fastenings shall be permitted.

[BS] 1404.12.7 Flashing. Exposed edges of thin exterior structural glass veneer shall be flashed with overlapping corrosion-resistant metal flashing and caulked with a waterproof compound in a manner to effectively prevent the entrance of moisture between the glass veneer and the backing.

1404.13 Exterior windows and doors. Windows and doors installed in exterior walls shall conform to the testing and performance requirements of Section 1709.5.

1404.13.1 Installation. Windows and doors shall be installed in accordance with approved manufacturer’s instructions. Fastener size and spacing shall be provided in such instructions and shall be calculated based on maximum loads and spacing used in the tests.

[BS] 1404.14 Vinyl siding. Vinyl siding conforming to the requirements of this section and complying with ASTM D3679 shall be permitted on exterior walls of buildings located in areas where \( V_{aw} \) as determined in accordance with Section 1609.3.1 does not exceed 100 miles per hour (45 m/s) and the building height is less than or equal to 40 feet (12 192 mm) in Exposure C. Where construction is located in areas where \( V_{aw} \) as determined in accordance with Section 1609.3.1 exceeds 100 miles per hour (45 m/s), or building heights are in excess of 40 feet (12 192 mm), tests or calculations indicating compliance with Chapter 16 shall be submitted. Vinyl siding shall be secured to the building so as to provide weather protection for the exterior walls of the building.

[BS] 1404.14.1 Application. The siding shall be applied over sheathing or materials listed in Section 2304.6. Siding shall be applied to conform to the water-resistive barrier requirements in Section 1402. Siding and accessories shall be installed in accordance with approved manufacturer’s instructions. Unless otherwise specified in the approved manufacturer’s instructions, nails used to fasten the siding and accessories shall have a minimum 0.313-inch (7.9 mm) head diameter and \( \frac{1}{8} \)-inch (3.18 mm) shank diameter. The nails shall be corrosion resistant and shall be long enough to penetrate the studs or nailing strip not less than \( \frac{1}{8} \) inch (19 mm). For cold-formed steel light-frame construction, corrosion-resistant fasteners shall be used. Screw fasteners shall penetrate the cold-formed steel framing not fewer than three exposed threads. Other fasteners shall be installed in accordance with the approved construction documents and manufacturer’s instructions. Where the siding is installed horizontally, the fastener spacing shall not exceed 12 inches (305 mm) horizontally and 12 inches (305 mm) vertically. Where the siding is installed vertically, the fastener spacing shall not exceed 12 inches (305 mm) horizontally and 12 inches (305 mm) vertically.

[BS] 1404.15 Cement plaster. Cement plaster applied to exterior walls shall conform to the requirements specified in Chapter 25.

[BS] 1404.16 Fiber-cement siding. Fiber-cement siding complying with Section 1403.10 shall be permitted on exterior walls of Type I, II, III, IV and V construction for wind pressure resistance or wind speed exposures as indicated by the manufacturer’s listing and label and approved installation instructions. Where specified, the siding shall be installed over sheathing or materials listed in Section 2304.6 and shall be installed to conform to the water-resistive barrier requirements in Section 1402. Siding and accessories shall be installed in accordance with approved manufacturer’s instructions. Unless otherwise specified in the approved manufacturer’s instructions, nails used to fasten the siding to wood studs shall be corrosion-resistant round head smooth Shank and shall be long enough to penetrate the studs not less than 1 inch (25 mm). For cold-formed steel light-frame construction, corrosion-resistant fasteners shall be used. Screw fasteners shall penetrate the cold-formed steel framing not fewer than three exposed full threads. Other fasteners shall be installed in accordance with the approved construction documents and manufacturer’s instructions.

[BS] 1404.16.1 Panel siding. Fiber-cement panel siding shall comply with the requirements of ASTM C1186, Type A, minimum Grade II (or ISO 8336, Category A, minimum Class 2). Panels shall be installed with the long dimension of either parallel or perpendicular to framing. Vertical and horizontal joints shall occur over framing members and shall be protected with caulking, with battens or flashing, or be vertical or horizontal shiplap or otherwise designed to comply with Section 1402.2. Panel siding shall be installed with fasteners in accordance with the approved manufacturer’s instructions.

[BS] 1404.16.2 Lap siding. Fiber-cement lap siding having a maximum width of 12 inches (305 mm) shall comply with the requirements of ASTM C1186, Type A, minimum Grade II (or ISO 8336, Category A, minimum Class 2). Lap siding shall be lapped not less than \( 1\frac{1}{4} \) inches (32 mm) and lap siding not having tongue-and-groove end joints shall have the ends protected with caulking, covered with an H-section joint cover, located over a strip of flashing or shall be otherwise designed to comply with Section 1402.2. Lap siding courses shall be installed with the fastener heads exposed or concealed in accordance with the approved manufacturer’s instructions.
EXTERIOR WALLS

[BS] 1404.17 Fastening. Weather boarding and wall coverings shall be securely fastened with aluminum, copper, zinc, zinc-coated or other approved corrosion-resistant fasteners in accordance with the nailing schedule in Table 2304.10.1 or the approved manufacturer’s instructions. Shingles and other weather coverings shall be attached with appropriate standard-shingle nails to furring strips securely nailed to studs, or with approved mechanically bonding nails, except where sheathing is of wood not less than 1-inch (25 mm) nominal thickness or of wood structural panels as specified in Table 2308.6.3.(3).

[BS] 1404.18 Polypropylene siding. Polypropylene siding conforming to the requirements of this section and complying with Section 1403.12 shall be limited to exterior walls located in areas where the wind speed specified in Chapter 16 does not exceed 100 miles per hour (45 m/s) and the building height is less than or equal to 40 feet (12.19 m) in Exposure C. Where construction is located in areas where the basic wind speed exceeds 100 miles per hour (45 m/s), or building heights are in excess of 40 feet (12.19 m), tests or calculations indicating compliance with Chapter 16 shall be submitted. Polypropylene siding shall be installed in accordance with the manufacturer’s instructions. Polypropylene siding shall be secured to the building so as to provide weather protection for the exterior walls of the building.

SECTION 1405
COMBUSTIBLE MATERIALS ON THE EXTerior SIDE OF EXTERIOR WALLS

1405.1 Combustible exterior wall coverings. Combustible exterior wall coverings shall comply with this section.

Exception: Plastics complying with Chapter 26.

1405.1.1 Types I, II, III and IV construction. On buildings of Types I, II, III and IV construction, exterior wall coverings shall be permitted to be constructed of combustible materials, complying with the following limitations:

1. Combustible exterior wall coverings shall not exceed 10 percent of an exterior wall surface area where the fire separation distance is 5 feet (1524 mm) or less.

2. Combustible exterior wall coverings shall be limited to 40 feet (12.19 m) in height above grade plane.

3. Combustible exterior wall coverings constructed of fire-retardant-treated wood complying with Section 2303.2 for exterior installation shall not be limited in wall surface area where the fire separation distance is 5 feet (1524 mm) or less and shall be permitted up to 60 feet (1828 mm) in height above grade plane regardless of the fire separation distance.

4. Wood veneers shall comply with Section 1404.5.

1405.1.1.1 Ignition resistance. Where permitted by Section 1405.1, combustible exterior wall coverings shall be tested in accordance with NFPA 268.

Exceptions:

1. Wood or wood-based products.

2. Other combustible materials covered with an exterior weather covering, other than vinyl sidings, included in and complying with the thickness requirements of Table 1404.2.

3. Aluminum having a minimum thickness of 0.019 inch (0.48 mm).

1405.1.1.1.1 Fire separation 5 feet or less. Where installed on exterior walls having a fire separation distance of 5 feet (1524 mm) or less, combustible exterior wall coverings shall not exhibit sustained flaming as defined in NFPA 268.

1405.1.1.1.2 Fire separation greater than 5 feet. For fire separation distances greater than 5 feet (1524 mm), any exterior wall covering shall be permitted that has been exposed to a reduced level of incident radiant heat flux in accordance with the NFPA 268 test method without exhibiting sustained flaming. The minimum fire separation distance required for the exterior wall covering shall be determined from Table 1405.1.1.1.2 based on the maximum tolerable level of incident radiant heat flux that does not cause sustained flaming of the exterior wall covering.

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For SI: 1 foot = 304.8 mm, 1 Btu/H··°F = 0.0057 kW/m²·K.

1405.1.2 Location. Combustible exterior wall coverings located along the top of exterior walls shall be completely backed up by the exterior wall and shall not extend over or above the top of the exterior wall.

1405.1.3 Fireblocking. Where the combustible exterior wall covering is furred out from the exterior wall and forms a solid surface, the distance between the back of the exterior wall covering and the exterior wall shall not exceed 1 1/4 inches (41 mm). The concealed space thereby created shall be fireblocked in accordance with Section 718.

Exception: The distance between the back of the exterior wall covering and the exterior wall shall be permitted to exceed 1 1/4 inches (41 mm) where the concealed space is not required to be fireblocked by Section 718.
SECTION 1406
METAL COMPOSITE MATERIALS (MCM)

1406.1 General. The provisions of this section shall govern the materials, construction and quality of metal composite materials (MCM) for use as exterior wall coverings in addition to other applicable requirements of Chapters 14 and 16.

1406.2 Exterior wall finish. MCM used as exterior wall finish or as elements of balconies and similar projections and bay and oriel windows to provide cladding or weather resistance shall comply with Sections 1406.4 through 1406.14.

1406.3 Architectural trim and embellishments. MCM used as architectural trim or embellishments shall comply with Sections 1406.7 through 1406.14.

1406.4 Structural design. MCM systems shall be designed and constructed to resist wind loads as required by Chapter 16 for components and cladding.

1406.5 Approval. Results of approved tests or an engineering analysis shall be submitted to the building official to verify compliance with the requirements of Chapter 16 for wind loads.

1406.6 Weather resistance. MCM systems shall comply with Section 1402 and shall be designed and constructed to resist wind and rain in accordance with this section and the manufacturer’s installation instructions.

1406.7 Durability. MCM systems shall be constructed of approved materials that maintain the performance characteristics required in Section 1406 for the duration of use.

1406.8 Fire-resistance rating. Where MCM systems are used on exterior walls required to have a fire-resistance rating in accordance with Section 705, evidence shall be submitted to the building official that the required fire-resistance rating is maintained.

Exception: MCM systems not containing foam plastic insulation, which are installed on the exterior surface of a fire-resistance-rated exterior wall in a manner such that the attachments do not penetrate through the entire exterior wall assembly, shall not be required to comply with this section.

1406.9 Surface-burning characteristics. Unless otherwise specified, MCM shall have a flame spread index of 75 or less and a smoke-developed index of 450 or less when tested in the maximum thickness intended for use in accordance with ASTM E84 or UL 723.

1406.10 Type I, II, III and IV construction. Where installed on buildings of Type I, II, III and IV construction, MCM systems shall comply with Sections 1406.10.1 through 1406.10.4, or Section 1406.11.

1406.10.1 Surface-burning characteristics. MCM shall have a flame spread index of not more than 25 and a smoke-developed index of not more than 450 when tested as an assembly in the maximum thickness intended for use in accordance with ASTM E84 or UL 723.

1406.10.2 Thermal barriers. MCM shall be separated from the interior of a building by an approved thermal barrier consisting of 1/2-inch (12.7 mm) gypsum wallboard or a material that is tested in accordance with and meets the acceptance criteria of both the Temperature Transmission Fire Test and the Integrity Fire Test of NFPA 275.

1406.10.3 Thermal barrier not required. The thermal barrier specified for MCM in Section 1406.10.2 is not required where:

1. The MCM system is specifically approved based on tests conducted in accordance with NFPA 286 and with the acceptance criteria of Section 803.1.1.1, UL 1040 or UL 1715. Such testing shall be performed with the MCM in the maximum thickness intended for use. The MCM system shall include seams, joints and other typical details used in the installation and shall be tested in the manner intended for use.

2. The MCM is used as elements of balconies and similar projections, architectural trim or embellishments.

1406.10.4 Full-scale tests. The MCM system shall be tested in accordance with, and comply with, the acceptance criteria of NFPA 285. Such testing shall be performed on the MCM system with the MCM in the maximum thickness intended for use.

1406.11 Alternate conditions. MCM and MCM systems shall not be required to comply with Sections 1406.10.1 through 1406.10.4 provided that such systems comply with Section 1406.11.1, 1406.11.2, 1406.11.3 or 1406.11.4.

1406.11.1 Installations up to 40 feet in height. MCM shall not be installed more than 40 feet (1219 mm) in height above grade where installed in accordance with Sections 1406.11.1.1 and 1406.11.1.2.

1406.11.1.1 Fire separation distance of 5 feet or less. Where the fire separation distance is 5 feet (1524 mm) or less, the area of MCM shall not exceed 10 percent of the exterior wall surface.

1406.11.1.2 Fire separation distance greater than 5 feet. Where the fire separation distance is greater than 5 feet (1524 mm), the area of exterior wall surface coverage using MCM shall not be limited.

1406.11.2 Installations up to 50 feet in height. MCM shall not be installed more than 50 feet (15240 mm) in height above grade where installed in accordance with Sections 1406.11.2.1 and 1406.11.2.2.

1406.11.2.1 Self-ignition temperature. MCM shall have a self-ignition temperature of 650°F (343°C) or greater when tested in accordance with ASTM D1929.

1406.11.2.2 Limitations. Sections of MCM shall not exceed 300 square feet (27.9 m²) in area and shall be separated by not less than 4 feet (1219 mm) vertically.

1406.11.3 Installations up to 75 feet in height (Option 1). MCM shall not be installed more than 75 feet (22860 mm) in height above grade plane where installed in accordance with Sections 1406.11.3.1 through 1406.11.3.5.

Exception: Buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 shall be exempt from the height limitation.
1406.11.3.1 Prohibited occupancies. MCM shall not be permitted on buildings classified as Group A-1, A-2, H, I-2 or I-3 occupancies.

1406.11.3.2 Non-fire-resistance-rated exterior walls. MCM shall not be permitted on exterior walls required to have a fire-resistance rating by other provisions of this code.

1406.11.3.3 Specifications. MCM shall be required to comply with all of the following:

1. MCM shall have a self-ignition temperature of 650°F (343°C) or greater when tested in accordance with ASTM D1929.
2. MCM shall conform to one of the following combustibility classifications when tested in accordance with ASTM D635:

   **Class CC1:** Materials that have a burning extent of 1 inch (25 mm) or less when tested at a nominal thickness of 0.060 inch (1.5 mm) or in the thickness intended for use.

   **Class CC2:** Materials that have a burning rate of 2\(1/4\) inches per minute (1.06 mm/s) or less when tested at a nominal thickness of 0.060 inch (1.5 mm) or in the thickness intended for use.

1406.11.3.4 Area limitation and separation. The maximum area of a single MCM panel and the minimum vertical and horizontal separation requirements for MCM panels shall be as provided for in Table 1406.11.3.4. The maximum percentage of exterior wall area of any story covered with MCM panels shall not exceed that indicated in Table 1406.11.3.4 or the percentage of unprotected openings permitted by Section 705.8, whichever is smaller.

**Exception:** In buildings provided with flame barriers complying with Section 705.8.5 and extending 30 inches (760 mm) beyond the exterior wall in the plane of the floor, a vertical separation shall not be required at the floor other than that provided by the vertical thickness of the flame barrier.

1406.11.3.5 Automatic sprinkler system increases. Where the building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1, the maximum percentage area of exterior wall of any story covered with MCM panels and the maximum square footage of a single area of MCM panels in Table 1406.11.3.4 shall be increased 100 percent. The area of MCM panels shall not exceed 50 percent of the exterior wall area of any story or the area permitted by Section 705.8 for unprotected openings, whichever is smaller.

1406.11.4 Installations up to 75 feet in height (Option 2). MCM shall not be installed more than 75 feet (22,860 mm) in height above grade plane where installed in accordance with Sections 1406.11.4.1 through 1406.11.4.4.

**Exception:** Buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 shall be exempt from the height limitation.

1406.11.4.1 Minimum fire separation distance. MCM shall not be installed on any wall with a fire separation distance less than 30 feet (9144 mm).

**Exception:** Where the building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1, the fire separation distance shall be permitted to be reduced to not less than 20 feet (6096 mm).

1406.11.4.2 Specifications. MCM shall be required to comply with all of the following:

1. MCM shall have a self-ignition temperature of 650°F (343°C) or greater when tested in accordance with ASTM D1929.
2. MCM shall conform to one of the following combustibility classifications when tested in accordance with ASTM D635:

   **Class CC1:** Materials that have a burning extent of 1 inch (25 mm) or less when tested at a nominal thickness of 0.060 inch (1.5 mm), or in the thickness intended for use.

   **Class CC2:** Materials that have a burning rate of 2\(1/4\) inches per minute (1.06 mm/s) or less when tested at a nominal thickness of 0.060 inch (1.5 mm), or in the thickness intended for use.

1406.11.3.4 AREA LIMITATION AND SEPARATION REQUIREMENTS FOR MCM PANELS

<table>
<thead>
<tr>
<th>FIRE SEPARATION DISTANCE (feet)</th>
<th>COMBUSTIBILITY CLASS OF MCM</th>
<th>MAXIMUM PERCENTAGE AREA OF EXTERIOR WALL COVERED WITH MCM PANELS</th>
<th>MAXIMUM SINGLE AREA OF MCM PANELS (square feet)</th>
<th>MINIMUM SEPARATION OF MCM PANELS (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Vertical</td>
</tr>
<tr>
<td>Less than 6</td>
<td>—</td>
<td>Not Permitted</td>
<td>Not Permitted</td>
<td>—</td>
</tr>
<tr>
<td>6 or more but less than 11</td>
<td>CC1</td>
<td>10</td>
<td>50</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>CC2</td>
<td>Not Permitted</td>
<td>Not Permitted</td>
<td>—</td>
</tr>
<tr>
<td>11 or more but less than or</td>
<td>CC1</td>
<td>25</td>
<td>90</td>
<td>6</td>
</tr>
<tr>
<td>equal to 30</td>
<td>CC2</td>
<td>15</td>
<td>70</td>
<td>8</td>
</tr>
<tr>
<td>More than 30</td>
<td>CC1</td>
<td>50</td>
<td>Not Limited</td>
<td>3(^a)</td>
</tr>
<tr>
<td></td>
<td>CC2</td>
<td>50</td>
<td>100</td>
<td>6(^a)</td>
</tr>
</tbody>
</table>

For SI: 1 foot = 304.8 mm, 1 square foot = 0.0929 m\(^2\).

\(^a\) For reductions in the minimum vertical separation, see Section 1406.11.3.4.
1406.11.4.3 Area and size limitations. The aggregate area of MCM panels shall not exceed 25 percent of the area of any exterior wall face of the story on which those panels are installed. The area of a single MCM panel installed above the first story above grade plane shall not exceed 16 square feet (1.5 m²) and the vertical dimension of a single MCM panel shall not exceed 4 feet (1219 mm).

Exception: Where the building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1, the maximum aggregate area of MCM panels shall be increased to 50 percent of the exterior wall face of the story on which those panels are installed and there shall not be a limit on the maximum dimension or area of a single MCM panel.

1406.11.4.4 Vertical separations. Flame barriers complying with Section 705.8 and extending 30 inches (762 mm) beyond the exterior wall or a vertical separation of not less than 4 feet (1219 mm) in height shall be provided to separate MCM panels located on the exterior walls at one-story intervals.

Exception: Buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.

1406.12 Type V construction. MCM shall be permitted to be installed on buildings of Type V construction.

1406.13 Foam plastic insulation. MCM systems containing foam plastic insulation shall also comply with the requirements of Section 2603.

1406.14 Labeling. MCM shall be labeled in accordance with Section 1703.5.

SECTION 1407
EXTERIOR INSULATION AND FINISH SYSTEMS (EIFS)

1407.1 General. The provisions of this section shall govern the materials, construction and quality of exterior insulation and finish systems (EIFS) for use as exterior wall coverings in addition to other applicable requirements of Chapters 7, 14, 16, 17 and 26.

1407.2 Performance characteristics. EIFS shall be constructed such that it meets the performance characteristics required in ASTM E2568.

([BS]) 1407.3 Structural design. The underlying structural framing and substrate shall be designed and constructed to resist loads as required by Chapter 16.

1407.4 Weather resistance. EIFS shall comply with Section 1402 and shall be designed and constructed to resist wind and rain in accordance with this section and the manufacturer’s application instructions.

1407.4.1 EIFS with drainage. EIFS with drainage shall have an average minimum drainage efficiency of 90 percent when tested in accordance the requirements of ASTM E2273 and is required on framed walls of Type V construction, Group R1, R2, R3 and R4 occupancies.

1407.4.1.1 Water-resistant barrier. For EIFS with drainage, the water-resistant barrier shall comply with Section 1403.2 or ASTM E2570.

1407.5 Installation. Installation of the EIFS and EIFS with drainage shall be in accordance with the EIFS manufacturer’s instructions.

1407.6 Special inspections. EIFS installations shall comply with the provisions of Sections 1704.2 and 1705.16.

SECTION 1408
HIGH-PRESSURE DECORATIVE EXTERIOR-GRADE COMPACT LAMINATES (HPL)

1408.1 General. The provisions of this section shall govern the materials, construction and quality of High-Pressure Decorative Exterior-Grade Compact Laminates (HPL) for use as exterior wall coverings in addition to other applicable requirements of Chapters 14 and 16.

1408.2 Exterior wall finish. HPL used as exterior wall covering or as elements of balconies and similar projections and bay and oriel windows to provide cladding or weather resistance shall comply with Sections 1408.4 through 1408.14.

1408.3 Architectural trim and embellishments. HPL used as architectural trim or embellishments shall comply with Sections 1408.7 through 1408.14.

([BS]) 1408.4 Structural design. HPL systems shall be designed and constructed to resist wind loads as required by Chapter 16 for components and cladding.

1408.5 Approval. Results of approved tests or an engineering analysis shall be submitted to the building official to verify compliance with the requirements of Chapter 16 for wind loads.

1408.6 Weather resistance. HPL systems shall comply with Section 1402 and shall be designed and constructed to resist wind and rain in accordance with this section and the manufacturer’s instructions.

1408.7 Durability. HPL systems shall be constructed of approved materials that maintain the performance characteristics required in Section 1408 for the duration of use.

1408.8 Fire-resistance rating. Where HPL systems are used on exterior walls required to have a fire-resistance rating in accordance with Section 705, evidence shall be submitted to the building official that the required fire-resistance rating is maintained.

Exception: HPL systems not containing foam plastic insulation, which are installed on the exterior surface of a fire-resistance-rated exterior wall in a manner such that the attachments do not penetrate through the entire exterior wall assembly, shall not be required to comply with this section.

1408.9 Surface-burning characteristics. Unless otherwise specified, HPL shall have a flame spread index of 75 or less and a smoke-developed index of 450 or less when tested in the minimum and maximum thicknesses intended for use in accordance with ASTM E84 or UL 723.

1408.10 Type I, II, III and IV construction. Where installed on buildings of Type I, II, III and IV construction,
1408.12 Type V construction. HPL shall be permitted to be installed on buildings of Type V construction.

1408.13 Foam plastic insulation. HPL systems containing foam plastic insulation shall comply with the requirements of Section 2603.

1408.14 Labeling. HPL shall be labeled in accordance with Section 1703.5.

SECTION 1409
PLASTIC COMPOSITE DECKING

1409.1 Plastic composite decking. Exterior deck boards, stair treads, handrails and guards constructed of plastic composites, including plastic lumber, shall comply with Section 2612.
CHAPTER 26
PLASTIC

User note:

About this chapter: The use of plastics in building construction and components is addressed in Chapter 26. This chapter provides standards addressing foam plastic insulation, foam plastics used as interior finish and trim, and other plastic veneers used on the inside or outside of a building. This chapter addresses the use of light-transmitting plastics in various configurations such as walls, roof panels, skylights, signs and glazing. Requirements for the use of fiber-reinforced polymers, fiberglass-reinforced polymers and reflective plastic core insulation are also contained in this chapter. Additionally, requirements specific to the use of wood-plastic composites and plastic lumber are contained in this chapter.

SECTION 2601
GENERAL

2601.1 Scope. These provisions shall govern the materials, design, application, construction and installation of foam plastic, foam plastic insulation, plastic veneer, interior plastic finish and trim, light-transmitting plastics and plastic composites, including plastic lumber.

SECTION 2602
FINISH AND TRIM

2602.1 Exterior finish and trim. See Chapter 14 for requirements for exterior wall finish and trim.

2602.2 Interior finish and trim. See Section 2604 for requirements for interior finish and trim.

SECTION 2603
FOAM PLASTIC INSULATION

2603.1 General. The provisions of this section shall govern the requirements and uses of foam plastic insulation in buildings and structures.

2603.2 Labeling and identification. Packages and containers of foam plastic insulation and foam plastic insulation components delivered to the job site shall bear the label of an approved agency showing the manufacturer’s name, product listing, product identification and information sufficient to determine that the end use will comply with the code requirements.

2603.3 Surface-burning characteristics. Unless otherwise indicated in this section, foam plastic insulation and foam plastic cores of manufactured assemblies shall have a flame spread index of not more than 75 and a smoke-developed index of not more than 450 where tested in the maximum thickness intended for use in accordance with ASTM E84 or UL 723. Loose fill-type foam plastic insulation shall be tested as board stock for the flame spread and smoke-developed indices.

Exceptions:

1. Smoke-developed index for interior trim as provided for in Section 2604.2.

2. In cold storage buildings, ice plants, food plants, food processing rooms and similar areas, foam plastic insulation where tested in a thickness of 4 inches (102 mm) shall be permitted in a thickness up to 10 inches (254 mm) where the building is equipped throughout with an automatic fire sprinkler system in accordance with Section 903.3.1.1. The approved automatic sprinkler system shall be provided in both the room and that part of the building in which the room is located.

3. Foam plastic insulation that is a part of a Class A, B or C roof-covering assembly provided that the assembly with the foam plastic insulation satisfactorily passes NFPA 276 or UL 1256. The smoke-developed index shall not be limited for roof applications.

4. Foam plastic insulation greater than 4 inches (102 mm) in thickness shall have a maximum flame spread index of 75 and a smoke-developed index of 450 where tested at a minimum thickness of 4 inches (102 mm), provided that the end use is approved in accordance with Section 2603.9 using the maximum thickness and density intended for use.

5. Flame spread and smoke-developed indices for foam plastic interior signs in covered and open mall buildings provided that the signs comply with Section 402.6.4.

2603.4 Thermal barrier. Except as provided for in Sections 2603.4.1 and 2603.9, foam plastic shall be separated from the interior of a building by an approved thermal barrier of 1/4-inch (12.7 mm) gypsum wallboard, heavy timber in accordance with Section 602.4 or a material that is tested in accordance with and meets the acceptance criteria of both the Temperature Transmission Fire Test and the Integrity Fire Test of NFPA 275. Combustible concealed spaces shall comply with Section 718.

2603.4.1 Thermal barrier not required. The thermal barrier specified in Section 2603.4 is not required under the conditions set forth in Sections 2603.4.1.1 through 2603.4.1.14.

2603.4.1.1 Masonry or concrete construction. A thermal barrier is not required for foam plastic installed in a masonry or concrete wall, floor or roof system where the foam plastic insulation is covered on each face by not less than 1-inch (25 mm) thickness of masonry or concrete.
2603.4.1.2 Cooler and freezer walls. Foam plastic installed in a maximum thickness of 10 inches (254 mm) in cooler and freezer walls shall:

1. Have a flame spread index of 25 or less and a smoke-developed index of not more than 450, where tested in a minimum 4-inch (102 mm) thickness.

2. Have flash ignition and self-ignition temperatures of not less than 600°F and 800°F (316°C and 427°C), respectively.

3. Have a covering of not less than 0.032-inch (0.8 mm) aluminum or corrosion-resistant steel having a base metal thickness not less than 0.0160 inch (0.4 mm) at any point.

4. Be protected by an automatic sprinkler system in accordance with Section 903.3.1.1. Where the cooler or freezer is within a building, both the cooler or freezer and that part of the building in which it is located shall be sprinklered.

2603.4.1.3 Walk-in coolers. In nonsprinklered buildings, foam plastic having a thickness that does not exceed 4 inches (102 mm) and a maximum flame spread index of 75 is permitted in walk-in coolers or freezer units where the aggregate floor area does not exceed 400 square feet (37 m²) and the foam plastic is covered by a metal facing not less than 0.032-inch-thick (0.81 mm) aluminum or corrosion-resistant steel having a minimum base metal thickness of 0.016 inch (0.41 mm). A thickness of up to 10 inches (254 mm) is permitted where protected by a thermal barrier.

2603.4.1.4 Exterior walls-one-story buildings. For one-story buildings, foam plastic having a flame spread index of 25 or less, and a smoke-developed index of not more than 450, shall be permitted without thermal barriers in or on exterior walls in a thickness not more than 4 inches (102 mm) where the foam plastic is covered by a thickness of not less than 0.032-inch-thick (0.81 mm) aluminum or corrosion-resistant steel having a base metal thickness of 0.0160 inch (0.41 mm) and the building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.

2603.4.1.5 Roofing. A thermal barrier is not required for foam plastic insulation that is a part of a Class A, B or C roof-covering assembly that is installed in accordance with the code and the manufacturer’s instructions and is either constructed as described in Item 1 or tested as described in Item 2.

1. The roof assembly is separated from the interior of the building by wood structural panel sheathing not less than 0.47 inch (11.9 mm) in thickness bonded with exterior glue, with edges supported by blocking, tongue-and-groove joints, other approved type of edge support or an equivalent material.

2. The assembly with the foam plastic insulation satisfactorily passes NFPA 276 or UL 1256.

2603.4.1.6 Attics and crawl spaces. Within an attic or crawl space where entry is made only for service of utilities, foam plastic insulation shall be protected against ignition by 1/2-inch-thick (38 mm) mineral fiber insulation; 1/4-inch-thick (6.4 mm) wood structural panel, particleboard or hardboard; 1/8-inch (9.5 mm) gypsum wallboard, corrosion-resistant steel having a base metal thickness of 0.016 inch (0.4 mm); 1/16-inch-thick (38 mm) self-supported spray-applied cellulose insulation in attic spaces only or other approved material installed in such a manner that the foam plastic insulation is not exposed. The protective covering shall be consistent with the requirements for the type of construction.

2603.4.1.7 Doors not required to have a fire protection rating. Where pivoted or side-hinged doors are permitted without a fire protection rating, foam plastic insulation, having a flame spread index of 75 or less and a smoke-developed index of not more than 450, shall be permitted as a core material where the door facing is of metal having a minimum thickness of 0.032-inch (0.8 mm) aluminum or steel having a base metal thickness of not less than 0.016 inch (0.4 mm) at any point.

2603.4.1.8 Exterior doors in buildings of Group R-2 or R-3. In occupancies classified as Group R-2 or R-3, foam-filled exterior entrance doors to individual dwelling units that do not require a fire-resistance rating shall be faced with aluminum, steel, fiberglass, wood or other approved materials.

2603.4.1.9 Garage doors. Where garage doors are permitted without a fire-resistance rating and foam plastic is used as a core material, the door facing shall be metal having a minimum thickness of 0.032-inch (0.8 mm) aluminum or 0.010-inch (0.25 mm) steel or the facing shall be minimum 0.125-inch-thick (3.2 mm) wood. Garage doors having facings other than those described in this section shall be tested in accordance with, and meet the acceptance criteria of, DASMA 107.

Exception: Garage doors using foam plastic insulation complying with Section 2603.3 in detached and attached garages associated with one- and two-family dwellings need not be provided with a thermal barrier.

2603.4.1.10 Siding backer board. Foam plastic insulation of not more than 2,000 British thermal units per square feet (Btu/sq. ft.) (22.7 MJ/m²) as determined by NFPA 259 shall be permitted as a siding backer board with a maximum thickness of 1/8 inch (12.7 mm), provided that it is separated from the interior of the building by not less than 2 inches (51 mm) of mineral fiber insulation or equivalent or where applied as insulation with re-siding over existing wall construction.

2603.4.1.11 Interior trim. Foam plastic used as interior trim in accordance with Section 2604 shall be permitted without a thermal barrier.

2603.4.1.12 Interior signs. Foam plastic used for interior signs in covered mall buildings in accordance with
Section 402.6.4 shall be permitted without a thermal barrier. Foam plastic signs that are not affixed to interior building surfaces shall comply with Chapter 8 of the International Fire Code.

2603.4.1.13 Type V construction. Foam plastic spray applied to a sill plate, joist header and rim joist in Type V construction is subject to all of the following:

1. The maximum thickness of the foam plastic shall be \(3/4\) inch (8.26 mm).
2. The density of the foam plastic shall be in the range of 1.5 to 2.0 pcf (24 to 32 kg/m³).
3. The foam plastic shall have a flame spread index of 25 or less and an accompanying smoke-developed index of 450 or less when tested in accordance with ASTM E84 or UL 723.

2603.4.1.14 Floors. The thermal barrier specified in Section 2603.4 is not required to be installed on the walking surface of a structural floor system that contains foam plastic insulation where the foam plastic is covered by a minimum nominal \(1/2\)-inch-thick (12.7 mm) wood structural panel or approved equivalent. The thermal barrier specified in Section 2603.4 is required on the underside of the structural floor system that contains foam plastic insulation where the underside of the structural floor system is exposed to the interior of the building.

Exception: Foam plastic used as part of an interior floor finish.

2603.5 Exterior walls of buildings of any height. Exterior walls of buildings of Type I, II, III or IV construction of any height shall comply with Sections 2603.5.1 through 2603.5.7. Exterior walls of cold storage buildings required to be constructed of noncombustible materials, where the building is more than one story in height, shall comply with the provisions of Sections 2603.5.1 through 2603.5.7. Exterior walls of buildings of Type V construction shall comply with Sections 2603.2, 2603.3 and 2603.4. Fireblocking shall be in accordance with Section 718.2.

2603.5.1 Fire-resistance-rated walls. Where the wall is required to have a fire-resistance rating, data based on tests conducted in accordance with ASTM E119 or UL 263 shall be provided to substantiate that the fire-resistance rating is maintained.

2603.5.2 Thermal barrier. Any foam plastic insulation shall be separated from the building interior by a thermal barrier meeting the provisions of Section 2603.4, unless special approval is obtained on the basis of Section 2603.9.

Exception: One-story buildings complying with Section 2603.4.1.4.

2603.5.3 Potential heat. The potential heat of foam plastic insulation in any portion of the wall or panel shall not exceed the potential heat expressed in Btu per square feet (mJ/m²) of the foam plastic insulation contained in the wall assembly tested in accordance with Section 2603.5.5. The potential heat of the foam plastic insulation shall be determined by tests conducted in accordance with NFPA 259 and the results shall be expressed in Btu per square foot (mJ/m²).

Exception: One-story buildings complying with Section 2603.4.1.4.

2603.5.4 Flame spread and smoke-developed indices. Foam plastic insulation, exterior coatings and facings shall be tested separately in the thickness intended for use, but not to exceed 4 inches (102 mm), and shall each have a flame spread index of 25 or less and a smoke-developed index of 450 or less as determined in accordance with ASTM E84 or UL 723.

Exception: Prefabricated or factory-manufactured panels having minimum 0.020-inch (0.51 mm) aluminum facings and a total thickness of \(1/8\) inch (6.4 mm) or less are permitted to be tested as an assembly where the foam plastic core is not exposed in the course of construction.

2603.5.5 Vertical and lateral fire propagation. The exterior wall assembly shall be tested in accordance with and comply with the acceptance criteria of NFPA 285.

Exceptions:

1. One-story buildings complying with Section 2603.4.1.4.
2. Wall assemblies where the foam plastic insulation is covered on each face by not less than 1-inch (25 mm) thickness of masonry or concrete and meeting one of the following:
   2.1. There is no airspace between the insulation and the concrete or masonry.
   2.2. The insulation has a flame spread index of not more than 25 as determined in accordance with ASTM E84 or UL 723 and the maximum airspace between the insulation and the concrete or masonry is not more than 1 inch (25 mm).

2603.5.6 Label required. The edge or face of each piece, package or container of foam plastic insulation shall bear the label of an approved agency. The label shall contain the manufacturer's or distributor's identification, model number, serial number or definitive information describing the product or materials' performance characteristics and approved agency's identification.

2603.5.7 Ignition. Exterior walls shall not exhibit sustained flaming where tested in accordance with NFPA 268. Where a material is intended to be installed in more than one thickness, tests of the minimum and maximum thickness intended for use shall be performed.

Exception: Assemblies protected on the outside with one of the following:

1. A thermal barrier complying with Section 2603.4.
2. A minimum 1-inch (25 mm) thickness of concrete or masonry.
3. Glass-fiber-reinforced concrete panels of a minimum thickness of \(1/4\) inch (9.5 mm).
4. Metal-faced panels having minimum 0.019-inch-thick (0.48 mm) aluminum or 0.016-inch-thick (0.41 mm) corrosion-resistant steel outer facings.

5. A minimum \( \frac{3}{4} \) inch (22.2 mm) thickness of stucco complying with Section 2510.

6. A minimum \( \frac{1}{4} \) inch (6.4 mm) thickness of fiber-cement lap, panel or shingle siding complying with Section 1404.16 and Section 1404.16.1 or 1404.16.2.

2603.6 Roofing. Foam plastic insulation meeting the requirements of Sections 2603.2, 2603.3 and 2603.4 shall be permitted as part of a roof-covering assembly, provided that the assembly with the foam plastic insulation is a Class A, B or C roofing assembly where tested in accordance with ASTM E108 or UL 790.

2603.7 Foam plastic in plenums as interior finish or interior trim. Foam plastic in plenums used as interior wall or ceiling finish, or interior trim, shall exhibit a flame spread index of 25 or less and a smoke-developed index of 50 or less when tested in accordance with ASTM E84 or UL 723 at the maximum thickness and density intended for use, and shall be tested in accordance with NFPA 286 and meet the acceptance criteria of Section 803.1.1. As an alternative to testing to NFPA 286, the foam plastic shall be approved based on tests conducted in accordance with Section 2603.9.

Exceptions:

1. Foam plastic in plenums used as interior wall or ceiling finish, or interior trim, shall exhibit a flame spread index of 75 or less and a smoke-developed index of 450 or less when tested in accordance with ASTM E84 or UL 723 at the maximum thickness and density intended for use, where it is separated from the airflow in the plenum by a thermal barrier complying with Section 2603.4.

2. Foam plastic in plenums used as interior wall or ceiling finish, or interior trim, shall exhibit a flame spread index of 75 or less and a smoke-developed index of 450 or less when tested in accordance with ASTM E84 or UL 723 at the maximum thickness and density intended for use, where it is separated from the airflow in the plenum by corrosion-resistant steel having a base metal thickness of not less than 0.0160 inch (0.4 mm).

3. Foam plastic in plenums used as interior wall or ceiling finish, or interior trim, shall exhibit a flame spread index of 75 or less and a smoke-developed index of 450 or less when tested in accordance with ASTM E84 or UL 723 at the maximum thickness and density intended for use, where it is separated from the airflow in the plenum by not less than a 1-inch (25 mm) thickness of masonry or concrete.

2603.8 Protection against termites. In areas where the probability of termite infestation is very heavy in accordance with Figure 2603.8, extruded and expanded polystyrene, polyisocyanurate and other foam plastics shall not be installed on the exterior face or under interior or exterior foundation walls or slab foundations located below grade. The clearance between foam plastics installed above grade and exposed earth shall be not less than 6 inches (152 mm).

Exceptions:

1. Buildings where the structural members of walls, floors, ceilings and roofs are entirely of noncombustible materials or preservative-treated wood.

2. An approved method of protecting the foam plastic and structure from subterranean termite damage is provided.

3. On the interior side of basement walls.

![FIGURE 2603.8 TERMITE INFESTATION PROBABILITY MAP](image-url)
2603.9 Special approval. Foam plastic shall not be required to comply with the requirements of Section 2603.4 or those of Section 2603.6 where specifically approved based on large-scale tests such as, but not limited to, NFPA 286 (with the acceptance criteria of Section 803.1.1.1), FM 4880, UL 1040 or UL 1715. Such testing shall be related to the actual end-use configuration and be performed on the finished manufactured foam plastic assembly in the maximum thickness intended for use. Foam plastics that are used as interior finish on the basis of special tests shall conform to the flame spread and smoke-developed requirements of Chapter 8. Assemblies tested shall include seams, joints and other typical details used in the installation of the assembly and shall be tested in the manner intended for use.

2603.10 Wind resistance. Foam plastic insulation complying with ASTM C578 and ASTM C1289 and used as exterior wall sheathing on framed wall assemblies shall comply with ANSI/FS 100 for wind pressure resistance.

2603.11 Cladding attachment over foam sheathing to masonry or concrete wall construction. Cladding shall be specified and installed in accordance with Chapter 14 and the cladding manufacturer's installation instructions or an approved design. Foam sheathing shall be attached to masonry or concrete construction in accordance with the insulation manufacturer's installation instructions or an approved design. Furring and furring attachments through foam sheathing shall be designed to resist design loads determined in accordance with Chapter 16, including support of cladding weight as applicable. Fasteners used to attach cladding or furring through foam sheathing to masonry or concrete substrates shall be approved for application into masonry or concrete material and shall be installed in accordance with the fastener manufacturer's installation instructions.

Exceptions:

1. Where the cladding manufacturer has provided approved installation instructions for application over foam sheathing and connection to a masonry or concrete substrate, those requirements shall apply.
2. For exterior insulation and finish systems, refer to Section 1407.
3. For anchored masonry or stone veneer installed over foam sheathing, refer to Section 1404.

2603.12 Cladding attachment over foam sheathing to cold-formed steel framing. Cladding shall be specified and installed in accordance with Chapter 14 and the cladding manufacturer's approved installation instructions, including any limitations for use over foam plastic sheathing, or an approved design. Where used, furring and furring attachments shall be designed to resist design loads determined in accordance with Chapter 16. In addition, the cladding or furring attachments through foam sheathing to cold-formed steel framing shall meet or exceed the minimum fastening requirements of Sections 2603.12.1 and 2603.12.2, or an approved design for support of cladding weight.

Exceptions:

1. Where the cladding manufacturer has provided approved installation instructions for application over foam sheathing, those requirements shall apply.
2. For exterior insulation and finish systems, refer to Section 1407.
3. For anchored masonry or stone veneer installed over foam sheathing, refer to Section 1404.

2603.12.1 Direct attachment. Where cladding is installed directly over foam sheathing without the use of furring, cladding minimum fastening requirements to support the cladding weight shall be as specified in Table 2603.12.1.

2603.12.2 Furred cladding attachment. Where steel or wood furring is used to attach cladding over foam sheathing, furring minimum fastening requirements to support the cladding weight shall be as specified in Table 2603.12.2. Where placed horizontally, wood furring shall be preservative-treated wood in accordance with Section 2303.1.9 or naturally durable wood and fasteners shall be corrosion resistant in accordance Section 2304.10.5. Steel furring shall have a minimum G60 galvanized coating.

2603.13 Cladding attachment over foam sheathing to wood framing. Cladding shall be specified and installed in accordance with Chapter 14 and the cladding manufacturer's installation instructions. Where used, furring and furring attachments shall be designed to resist design loads determined in accordance with Chapter 16. In addition, the cladding or furring attachments through foam sheathing to framing shall meet or exceed the minimum fastening requirements of Section 2603.13.1 or 2603.13.2, or an approved design for support of cladding weight.

Exceptions:

1. Where the cladding manufacturer has provided approved installation instructions for application over foam sheathing, those requirements shall apply.
2. For exterior insulation and finish systems, refer to Section 1407.
3. For anchored masonry or stone veneer installed over foam sheathing, refer to Section 1404.

2603.13.1 Direct attachment. Where cladding is installed directly over foam sheathing without the use of furring, minimum fastening requirements to support the cladding weight shall be as specified in Table 2603.13.1.

2603.13.2 Furred cladding attachment. Where wood furring is used to attach cladding over foam sheathing, furring minimum fastening requirements to support the cladding weight shall be as specified in Table 2603.13.2. Where placed horizontally, wood furring shall be preservative-treated wood in accordance with Section 2303.1.9 or naturally durable wood and fasteners shall be corrosion resistant in accordance with Section 2304.10.5.
### TABLE 2603.12.1
CLADDING MINIMUM FASTENING REQUIREMENTS FOR DIRECT ATTACHMENT OVER FOAM PLASTIC SHEATHING TO SUPPORT CLADDING WEIGHT*

<table>
<thead>
<tr>
<th>CLADDING FASTENER THROUGH FOAM SHEATHING INTO:</th>
<th>CLADDING FASTENER TYPE AND MINIMUM SIZEb</th>
<th>CLADDING FASTENER VERTICAL SPACING (inches)</th>
<th>MAXIMUM THICKNESS OF FOAM SHEATHINGc (inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>16° o.c. fastener horizontal spacing</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3 psf 11 psf 18 psf 25 psf 3 psf 11 psf 18 psf 25 psf</td>
</tr>
<tr>
<td>Cold-formed steel framing (minimum penetration of steel thickness plus 3 threads)</td>
<td>#8 screw into 33 mil steel or thicker</td>
<td>6</td>
<td>3.00 2.95 2.20 1.45 3.00 2.35 1.25 DR</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8</td>
<td>3.00 2.55 1.60 0.60 3.00 1.80 DR DR</td>
</tr>
<tr>
<td></td>
<td></td>
<td>12</td>
<td>3.00 1.80 DR DR DR DR</td>
</tr>
<tr>
<td></td>
<td>#10 screw into 33 mil steel</td>
<td>6</td>
<td>4.00 3.50 2.70 1.95 4.00 2.90 1.70 0.55 DR DR</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8</td>
<td>4.00 3.10 2.05 1.00 4.00 2.25 0.70 DR DR</td>
</tr>
<tr>
<td></td>
<td></td>
<td>12</td>
<td>4.00 2.25 0.70 DR DR DR</td>
</tr>
<tr>
<td></td>
<td>#10 screw into 43 mil steel or thicker</td>
<td>6</td>
<td>4.00 4.00 3.60 3.00 4.00 3.45 2.70 DR DR</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8</td>
<td>4.00 4.00 3.70 3.00 4.00 3.85 2.80 1.80 DR DR</td>
</tr>
<tr>
<td></td>
<td></td>
<td>12</td>
<td>4.00 3.85 2.80 1.80 4.00 3.05 1.50 DR DR</td>
</tr>
</tbody>
</table>

For SI: 1 inch = 25.4 mm, 1 pound per square foot (psf) = 0.0479 kPa, 1 pound per square inch = 0.00069 MPa.

DR = design required, o.c. = on center.

a. Cold-formed steel framing shall be minimum 33 ksi steel for 33 mil and 43 mil steel and 50 ksi steel for 54 mil steel or thicker.
b. Screws shall comply with the requirements of AISI S240.
c. Foam sheathing shall have a minimum compressive strength of 15 pounds per square inch in accordance with ASTM C578 or ASTM C1289.

### TABLE 2603.12.2
FURRING MINIMUM FASTENING REQUIREMENTS FOR APPLICATION OVER FOAM PLASTIC SHEATHING TO SUPPORT CLADDING WEIGHT*

<table>
<thead>
<tr>
<th>FURRING MATERIAL</th>
<th>FRAMING MEMBER</th>
<th>FASTENER TYPE AND MINIMUM SIZEb</th>
<th>MINIMUM PENETRATION INTO WALL FRAMING (inches)</th>
<th>FASTENER SPACING IN FURRING (inches)</th>
<th>MAXIMUM THICKNESS OF FOAM SHEATHINGc (inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>16° o.c. furringc</td>
<td>24° o.c. furringc</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3 psf 11 psf 18 psf 25 psf 3 psf 11 psf 18 psf 25 psf</td>
<td></td>
</tr>
<tr>
<td>Minimum 33 mil steel furring or minimum 1x wood furringc</td>
<td>#8 screw</td>
<td>Steel thickness plus 3 threads</td>
<td>12</td>
<td>3.00 1.80 DR DR 3.00 0.65 DR DR</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>16</td>
<td>3.00 1.00 DR DR 2.85 DR DR DR DR</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>24</td>
<td>2.85 DR DR DR 2.20 DR DR DR DR</td>
<td></td>
</tr>
<tr>
<td></td>
<td>#10 screw</td>
<td>Steel thickness plus 3 threads</td>
<td>12</td>
<td>4.00 2.25 0.70 DR 3.70 1.05 DR DR DR</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>16</td>
<td>3.85 1.45 DR DR 3.40 DR DR DR DR</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>24</td>
<td>3.40 DR DR DR 2.70 DR DR DR DR</td>
<td></td>
</tr>
<tr>
<td></td>
<td>#8 Screw</td>
<td>Steel thickness plus 3 threads</td>
<td>12</td>
<td>3.00 1.80 DR DR 3.00 0.65 DR DR DR</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>16</td>
<td>3.00 1.00 DR DR 2.85 DR DR DR DR</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>24</td>
<td>2.85 DR DR DR 2.20 DR DR DR DR</td>
<td></td>
</tr>
<tr>
<td></td>
<td>#10 screw</td>
<td>Steel thickness plus 3 threads</td>
<td>12</td>
<td>4.00 3.85 2.80 1.80 4.00 3.05 1.50 DR DR</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>16</td>
<td>4.00 3.30 1.95 0.60 4.00 2.25 DR DR</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>24</td>
<td>4.00 2.25 DR DR 4.00 0.65 DR DR</td>
<td></td>
</tr>
</tbody>
</table>

For SI: 1 inch = 25.4 mm, 1 pound per square foot (psf) = 0.0479 kPa, 1 pound per square inch = 0.00069 MPa.

DR = Design Required, o.c. = on center.

a. Wood furring shall be spruce-pine-fir or any softwood species with a specific gravity of 0.42 or greater. Steel furring shall be minimum 33 ksi steel. Cold-formed steel studs shall be minimum 33 ksi steel for 33 mil and 43 mil thickness and 50 ksi steel for 54 mil steel or thicker.
b. Screws shall comply with the requirements of AISI S240.
c. Where the required cladding fastener penetration into wood material exceeds 1/4 inch and is not more than 1/8 inches, a minimum 2-inch nominal wood furring or an approved design shall be used.
d. Foam sheathing shall have a minimum compressive strength of 15 pounds per square inch in accordance with ASTM C578 or ASTM C1289.
e. Furring shall be spaced not more than 24 inches on center, in a vertical or horizontal orientation. In a vertical orientation, furring shall be located over wall studs and attached with the required fastener spacing. In a horizontal orientation, the indicated 8-inch and 12-inch fastener spacing in furring shall be achieved by use of two fasteners into studs at 16 inches and 24 inches on center, respectively.
<table>
<thead>
<tr>
<th>CLADDING FASTENER THROUGH FOAM SHEATHING INTO:</th>
<th>CLADDING FASTENER TYPE AND MINIMUM SIZE(^a)</th>
<th>CLADDING FASTENER VERTICAL SPACING (INCHES)</th>
<th>MAXIMUM THICKNESS OF FOAM SHEATHING(^*) (INCHES)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wood Framing (minimum 1(\frac{1}{4})-inch penetration)</td>
<td>0.113(^\prime) diameter nail</td>
<td>6</td>
<td>2.00</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>2.00</td>
<td>1.00</td>
</tr>
<tr>
<td></td>
<td>12</td>
<td>2.00</td>
<td>0.55</td>
</tr>
<tr>
<td></td>
<td>0.120(^\prime) diameter nail</td>
<td>6</td>
<td>3.00</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>3.00</td>
<td>1.20</td>
</tr>
<tr>
<td></td>
<td>12</td>
<td>3.00</td>
<td>0.70</td>
</tr>
<tr>
<td></td>
<td>0.131(^\prime) diameter nail</td>
<td>6</td>
<td>4.00</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>4.00</td>
<td>1.55</td>
</tr>
<tr>
<td></td>
<td>12</td>
<td>4.00</td>
<td>0.90</td>
</tr>
<tr>
<td></td>
<td>0.162(^\prime) diameter nail</td>
<td>6</td>
<td>4.00</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>4.00</td>
<td>2.55</td>
</tr>
<tr>
<td></td>
<td>12</td>
<td>4.00</td>
<td>1.60</td>
</tr>
</tbody>
</table>

For SI: 1 inch = 25.4 mm, 1 pound per square foot (psf) = 0.0479 kPa.
DR = Design Required, o.c. = on center.
\(a\) Wood framing shall be spruce-pine-fir or any wood species with a specific gravity of 0.42 or greater in accordance with ANSI/AWC NDS.
\(b\) Nail fasteners shall comply with ASTM F1667, except nail length shall be permitted to exceed ASTM F1667 standard lengths.
\(c\) Foam sheathing shall have a minimum compressive strength of 15 psi in accordance with ASTM C578 or ASTM C1289.

SECTION 2604 INTERIOR FINISH AND TRIM

**2604.1 General.** Plastic materials installed as interior finish or trim shall comply with Chapter 8. Foam plastics shall only be installed as interior finish where approved in accordance with the special provisions of Section 2603.9. Foam plastics that are used as interior finish shall meet the flame spread and smoke-developed index requirements for interior finish in accordance with Chapter 8. Foam plastics installed as interior trim shall comply with Section 2604.2.

**2604.1.1 Plenums.** Foam plastics installed in plenums as interior wall or ceiling finish shall comply with Section 2603.7. Foam plastics installed in plenums as interior trim shall comply with Sections 2604.2 and 2603.7.

**[F] 2604.2 Interior trim.** Foam plastic used as interior trim shall comply with Sections 2604.2.1 through 2604.2.4.

**[F] 2604.2.1 Density.** The minimum density of the interior trim shall be 20pcf (320 kg/m\(^3\)).

**[F] 2604.2.2 Thickness.** The maximum thickness of the interior trim shall be 1/\(\frac{4}{\text{inch}}\) (12.7 mm) and the maximum width shall be 8 inches (204 mm).

**[F] 2604.2.3 Area limitation.** The interior trim shall not constitute more than 10 percent of the specific wall or ceiling areas to which it is attached.

**[F] 2604.2.4 Flame spread.** The flame spread index shall not exceed 75 where tested in accordance with ASTM E84 or UL 723. The smoke-developed index shall not be limited.

**Exception:** Where the interior trim material has been tested as an interior finish in accordance with NFPA 286 and complies with the acceptance criteria in Section 803.1.1.1, it shall not be required to be tested for flame spread index in accordance with ASTM E84 or UL 723.

SECTION 2605 PLASTIC VENEER

**2605.1 Interior use.** Where used within a building, plastic veneer shall comply with the interior finish requirements of Chapter 8.

**2605.2 Exterior use.** Exterior plastic veneer, other than plastic siding, shall be permitted to be installed on the exterior walls of buildings of any type of construction in accordance with all of the following requirements:

1. Plastic veneer shall comply with Section 2606.4.
2. Plastic veneer shall not be attached to any exterior wall to a height greater than 50 feet (15 240 mm) above grade.
3. Sections of plastic veneer shall not exceed 300 square feet (27.9 m\(^2\)) in area and shall be separated by not less than 4 feet (1219 mm) vertically.

**Exception:** The area and separation requirements and the smoke-density limitation are not applicable to plastic veneer applied to buildings constructed of Type VB construction, provided that the walls are not required to have a fire-resistance rating.

**2605.3 Plastic siding.** Plastic siding shall comply with the requirements of Sections 1403 and 1404.
### Table 2603.13.2
**Furring Minimum Fastening Requirements for Application Over Foam Plastic Sheathing to Support Cladding Weight**

<table>
<thead>
<tr>
<th>Furring Material</th>
<th>Framing Member</th>
<th>Fastener Type and Minimum Size</th>
<th>Minimum Penetration Into Wall Framing (Inches)</th>
<th>Fastener Spacing in Furring (Inches)</th>
<th>Maximum Thickness of Foam Sheathing* (Inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Minimum 1x Wood Furring'</td>
<td>0.131&quot; diameter nail</td>
<td>1/4</td>
<td>3 psf</td>
<td>25 psf</td>
</tr>
<tr>
<td></td>
<td>Minimum 2x Wood Stud</td>
<td>0.162&quot; diameter nail</td>
<td>1/4</td>
<td>11 psf</td>
<td>25 psf</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No. 10 wood screw</td>
<td>1</td>
<td>18 psf</td>
<td>25 psf</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1/2&quot; lag screw</td>
<td>1</td>
<td>25 psf</td>
<td>25 psf</td>
</tr>
</tbody>
</table>

For SI: 1 inch = 25.4 mm, 1 pound per square foot (psf) = 0.0479 kPa, 1 pound per square inch = 0.00689 MPa.

DR = Design Required, o.c. = on center.

a. Wood framing and furring shall be spruce-pine-fir or any wood species with a specific gravity of 0.42 or greater in accordance with ANSI/AWC NDS.
b. Nail fasteners shall comply with ASTM F1667, except nail length shall be permitted to exceed ASTM F1667 standard lengths.
c. Where the required cladding fastener penetration into wood material exceeds 1/4 inch and is not more than 1/2 inch, a minimum 2-inch nominal wood furring or an approved design shall be used.
d. Foam sheathing shall have a minimum compressive strength of 15 psi in accordance with ASTM C578 or ASTM C1289.
e. Furring shall be spaced no greater than 24 inches on center in a vertical or horizontal orientation. In a vertical orientation, furring shall be located over wall studs and attached with the required fastener spacing. In a horizontal orientation, the indicated 8-inch and 12-inch fastener spacing in furring shall be achieved by the use of two fasteners into studs at 16 inches and 24 inches on center, respectively.

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**SECTION 2606**

**LIGHT-TRANSMITTING PLASTICS**

**2606.1 General.** The provisions of this section and Sections 2607 through 2611 shall govern the quality and methods of application of light-transmitting plastics for use as light-transmitting materials in buildings and structures. Foam plastics shall comply with Section 2603. Light-transmitting plastic materials that meet the other code requirements for walls and roofs shall be permitted to be used in accordance with the other applicable chapters of the code.

**2606.2 Approval for use.** Sufficient technical data shall be submitted to substantiate the proposed use of any light-transmitting material, as approved by the building official and subject to the requirements of this section.

**2606.3 Identification.** Each unit or package of light-transmitting plastic shall be identified with a mark or decal satisfactory to the building official, which includes identification as to the material classification.

**2606.4 Specifications.** Light-transmitting plastics, including thermoplastic, thermostetting or reinforced thermostetting plastic material, shall have a self-ignition temperature of 650°F (343°C) or greater where tested in accordance with ASTM D1929; a smoke-developed index not greater than 450 where tested in the manner intended for use in accordance with ASTM E84 or UL 723, or a maximum average smoke density rating not greater than 75 where tested in the thickness intended for use in accordance with ASTM D2843 and shall conform to one of the following combustibility classifications:

**Class CC1:** Plastic materials that have a burning extent of 1 inch (25 mm) or less where tested at a nominal thickness of 0.060 inch (1.5 mm), or in the thickness intended for use, in accordance with ASTM D635.

**Class CC2:** Plastic materials that have a burning rate of 2½ inches per minute (1.06 mm/s) or less where tested at a nominal thickness of 0.060 inch (1.5 mm), or in the thickness intended for use, in accordance with ASTM D635.
2606.5 Structural requirements. Light-transmitting plastic materials in their assembly shall be of adequate strength and durability to withstand the loads indicated in Chapter 16. Technical data shall be submitted to establish stresses, maximum unsupported spans and such other information for the various thicknesses and forms used as deemed necessary by the building official.

2606.6 Fastening. Fastening shall be adequate to withstand the loads in Chapter 16. Proper allowance shall be made for expansion and contraction of light-transmitting plastic materials in accordance with accepted data on the coefficient of expansion of the material and other material in conjunction with which it is employed.

2606.7 Light-diffusing systems. Unless the building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1, light-diffusing systems shall not be installed in the following occupancies and locations:

1. Group A with an occupant load of 1,000 or more.
2. Theaters with a stage and proscenium opening and an occupant load of 700 or more.
5. Interior exit stairways and ramps and exit passageways.

2606.7.1 Support. Light-transmitting plastic diffusers shall be supported directly or indirectly from ceiling or roof construction by use of noncombustible hangers. Hangers shall be not less than No. 12 steel-wire gage (0.106 inch) galvanized wire or equivalent.

2606.7.2 Installation. Light-transmitting plastic diffusers shall comply with Chapter 8 unless the light-transmitting plastic diffusers will fall from the mountings before igniting, at an ambient temperature of less than 200°F (111°C) below the ignition temperature of the panels. The panels shall remain in place at an ambient room temperature of 175°F (79°C) for a period of not less than 15 minutes.

2606.7.3 Size limitations. Individual panels or units shall not exceed 10 feet (3048 mm) in length nor 30 square feet (2.79 m²) in area.

2606.7.4 Fire suppression system. In buildings that are equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1, plastic light-diffusing systems shall be protected both above and below unless the sprinkler system has been specifically approved for installation only above the light-diffusing system. Areas of light-diffusing systems that are protected in accordance with this section shall not be limited.

2606.7.5 Electrical luminaires. Light-transmitting plastic panels and light-diffuser panels that are installed in approved electrical luminaires shall comply with the requirements of Chapter 8 unless the light-transmitting plastic panels conform to the requirements of Section 2606.7.2. The area of approved light-transmitting plastic materials that is used in required exits or corridors shall not exceed 30 percent of the aggregate area of the ceiling in which such panels are installed, unless the building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.

2606.8 Partitions. Light-transmitting plastics used in or as partitions shall comply with the requirements of Chapters 6 and 8.

2606.9 Bathroom accessories. Light-transmitting plastics shall be permitted as glazing in shower stalls, shower doors, bathtub enclosures and similar accessory units. Safety glazing shall be provided in accordance with Chapter 24.

2606.10 Awnings, patio covers and similar structures. Awnings constructed of light-transmitting plastics shall be constructed in accordance with the provisions specified in Section 3105 and Chapter 32 for projections. Patio covers constructed of light-transmitting plastics shall comply with Section 2606. Light-transmitting plastics used in canopies at motor fuel-dispensing facilities shall comply with Section 2606, except as modified by Section 406.7.2.

2606.11 Greenhouses. Light-transmitting plastics shall be permitted in lieu of glass in greenhouses.

2606.12 Solar collectors. Light-transmitting plastic covers on solar collectors having noncombustible sides and bottoms shall be permitted on buildings not over three stories above grade plane or 9,000 square feet (836.1 m²) in total floor area, provided that the light-transmitting plastic cover does not exceed 33.33 percent of the roof area for CC1 materials or 25 percent of the roof area for CC2 materials.

Exception: Light-transmitting plastic covers having a thickness of 0.010 inch (0.3 mm) or less shall be permitted to be of any plastic material provided that the area of the solar collectors does not exceed 33.33 percent of the roof area.

SECTION 2607
LIGHT-TRANSMITTING PLASTIC WALL PANELS

2607.1 General. Light-transmitting plastics shall not be used as wall panels in exterior walls in occupancies in Groups A-1, A-2, H, I-2 and I-3. In other groups, light-transmitting plastics shall be permitted to be used as wall panels in exterior walls, provided that the walls are not required to have a fire-resistance rating and the installation conforms to the requirements of this section. Such panels shall be erected and anchored on a foundation, waterproofed or otherwise protected from moisture absorption and sealed with a coat of mastic or other approved waterproof coating. Light-transmitting plastic wall panels shall comply with Section 2606.

2607.2 Installation. Exterior wall panels installed as provided for herein shall not alter the type of construction classification of the building.

2607.3 Height limitation. Light-transmitting plastics shall not be installed more than 75 feet (22.860 m) above grade plane, except as allowed by Section 2607.5.

2607.4 Area limitation and separation. The maximum area of a single wall panel and minimum vertical and horizontal separation requirements for exterior light-transmitting plastic wall panels shall be as provided for in Table 2607.4. The maximum percentage of wall area of any story in light-transmitting plastic wall panels shall not exceed that indicated in Table 2607.4 or the percentage of unprotected openings permitted by Section 705.8, whichever is smaller.

Exceptions:
1. In structures provided with approved flame barriers extending 30 inches (760 mm) beyond the exterior
### TABLE 2607.4

<table>
<thead>
<tr>
<th>FIRE SEPARATION DISTANCE (feet)</th>
<th>CLASS OF PLASTIC</th>
<th>MAXIMUM PERCENTAGE AREA OF EXTERIOR WALL IN PLASTIC WALL PANELS</th>
<th>MAXIMUM SINGLE AREA OF PLASTIC WALL PANELS (square feet)</th>
<th>MINIMUM SEPARATION OF PLASTIC WALL PANELS (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 6</td>
<td>—</td>
<td>Not Permitted</td>
<td>Not Permitted</td>
<td>—</td>
</tr>
<tr>
<td>6 or more but less than 11</td>
<td>CC1</td>
<td>10</td>
<td>50</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>CC2</td>
<td>Not Permitted</td>
<td>Not Permitted</td>
<td>—</td>
</tr>
<tr>
<td>11 or more but less than or equal to 30</td>
<td>CC1</td>
<td>25</td>
<td>90</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>CC2</td>
<td>15</td>
<td>70</td>
<td>8</td>
</tr>
<tr>
<td>Over 30</td>
<td>CC1</td>
<td>50</td>
<td>Not Limited</td>
<td>3(^a)</td>
</tr>
<tr>
<td></td>
<td>CC2</td>
<td>50</td>
<td>100</td>
<td>6(^b)</td>
</tr>
</tbody>
</table>

For SI: 1 foot = 304.8 mm, 1 square foot = 0.0929 m\(^2\).

\(^a\) For combinations of plastic glazing and plastic wall panel areas permitted, see Section 2607.6.

\(^b\) For reductions in vertical separation allowed, see Section 2607.4.

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2608.2 Buildings of other types of construction. Openings in the exterior walls of buildings of types of construction other than Type VB, where not required to be protected by Section 705, shall be permitted to be glazed or equipped with light-transmitting plastic in accordance with Section 2606 and all of the following:

1. The aggregate area of light-transmitting plastic glazing shall not exceed 25 percent of the area of any wall face of the story in which it is installed. The area of a single pane of glazing installed above the first story above grade plane shall not exceed 16 square feet (1.5 m\(^2\)) and the vertical dimension of a single pane shall not exceed 4 feet (1219 mm).

   **Exception**: Where an automatic sprinkler system is provided throughout in accordance with Section 903.3.1.1, the area of allowable glazing shall be increased to not more than 50 percent of the wall face of the story in which it is installed with no limit on the maximum dimension or area of a single pane of glazing.

2. Approved flame barriers extending 30 inches (762 mm) beyond the exterior wall in the plane of the floor, or vertical panels not less than 4 feet (1219 mm) in height, shall be installed between glazed units located in adjacent stories.

   **Exception**: Buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.

3. Light-transmitting plastics shall not be installed more than 75 feet (22 860 mm) above grade level.

   **Exception**: Buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.
and I-3. In all other groups, light-transmitting plastic roof panels shall comply with any one of the following conditions:

1. The building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.

2. The roof construction is not required to have a fire-resistance rating by Table 601.

3. The roof panels meet the requirements for roof coverings in accordance with Chapter 15.

2609.2 Separation. Individual roof panels shall be separated from each other by a distance of not less than 4 feet (1219 mm) measured in a horizontal plane.

Exceptions:

1. The separation between roof panels is not required in a building equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.

2. The separation between roof panels is not required in low-hazard occupancy buildings complying with the conditions of Section 2609.4, Exception 2 or 3.

2609.3 Location. Where exterior wall openings are required to be protected by Section 705.8, a roof panel shall not be installed within 6 feet (1829 mm) of such exterior wall.

2609.4 Area limitations. Roof panels shall be limited in area and the aggregate area of panels shall be limited by a percentage of the floor area of the room or space sheltered in accordance with Table 2609.4.

Exceptions:

1. The area limitations of Table 2609.4 shall be permitted to be increased by 100 percent in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.

2. Low-hazard occupancy buildings, such as swimming pool shelters, shall be exempt from the area limitations of Table 2609.4, provided that the buildings do not exceed 5,000 square feet (465 m²) in area and have a minimum fire separation distance of 10 feet (3048 mm).

3. Greenhouses that are occupied for growing or maintaining plants, without public access, shall be exempt from the area limitations of Table 2609.4 provided that they have a minimum fire separation distance of 4 feet (1220 mm).

4. Roof coverings over terraces and patios in occupancies in Group R-3 shall be exempt from the area limitations of Table 2609.4 and shall be permitted with light-transmitting plastics.

### TABLE 2609.4

<table>
<thead>
<tr>
<th>CLASS OF PLASTIC</th>
<th>MAXIMUM AREA OF INDIVIDUAL ROOF PANELS (square feet)</th>
<th>MAXIMUM AGGREGATE AREA OF ROOF PANELS (percent of floor area)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CC1</td>
<td>300</td>
<td>30</td>
</tr>
<tr>
<td>CC2</td>
<td>100</td>
<td>25</td>
</tr>
</tbody>
</table>

For SI: 1 square foot = 0.0929 m².

SECTION 2610

**LIGHT-TRANSMITTING PLASTIC SKYLIGHT GLAZING**

2610.1 Light-transmitting plastic glazing of skylight assemblies. Skylight assemblies glazed with light-transmitting plastic shall conform to the provisions of this section and Section 2606. Unit skylights glazed with light-transmitting plastic shall comply with Section 2405.5.

**Exception:** Skylights in which the light-transmitting plastic conforms to the required roof-covering class in accordance with Section 1505.

2610.2 Mounting. The light-transmitting plastic shall be mounted above the plane of the roof on a curb constructed in accordance with the requirements for the type of construction classification, but not less than 4 inches (102 mm) above the plane of the roof. Edges of the light-transmitting plastic skylights or domes shall be protected by metal or other approved noncombustible material, or the light-transmitting plastic dome or skylight shall be shown to be able to resist ignition where exposed at the edge to a flame from a Class B brand as described in ASTM E108 or UL 790. The Class B brand test shall be conducted on a skylight that is elevated to a height as specified in the manufacturer’s installation instructions, but not less than 4 inches (102 mm).

Exceptions:

1. Curb shall not be required for skylights used on roofs having a minimum slope of three units vertical in 12 units horizontal (25-percent slope) in occupancies in Group R-3 and on buildings with a nonclassified roof covering.

2. The metal or noncombustible edge material is not required where nonclassified roof coverings are permitted.

2610.3 Slope. Flat or corrugated light-transmitting plastic skylights shall slope not less than four units vertical in 12 units horizontal (4:12). Dome-shaped skylights shall rise above the mounting flange a minimum distance equal to 10 percent of the maximum width of the dome but not less than 3 inches (76 mm).

**Exception:** Skylights that pass the Class B Burning Brand Test specified in ASTM E108 or UL 790.

2610.4 Maximum area of skylights. Each skylight shall have a maximum area within the curb of 100 square feet (9.3 m²).

**Exception:** The area limitation shall not apply where the building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or the building is equipped with smoke and heat vents in accordance with Section 910.

2610.5 Aggregate area of skylights. The aggregate area of skylights shall not exceed 33 1/3 percent of the floor area of the room or space sheltered by the roof in which such skylights are installed where Class CC1 materials are utilized, and 25 percent where Class CC2 materials are utilized.

**Exception:** The aggregate area limitations of light-transmitting plastic skylights shall be increased 100 percent beyond the limitations set forth in this section where the
building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or the building is equipped with smoke and heat vents in accordance with Section 910.

2610.6 Separation. Skylights shall be separated from each other by a distance of not less than 4 feet (1219 mm) measured in a horizontal plane.

Exceptions:
1. Buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.
2. In Group R-3, multiple skylights located above the same room or space with a combined area not exceeding the limits set forth in Section 2610.4.

2610.7 Location. Where exterior wall openings are required to be protected in accordance with Section 705, a skylight shall not be installed within 6 feet (1829 mm) of such exterior wall.

2610.8 Combinations of roof panels and skylights. Combinations of light-transmitting plastic roof panels and skylights shall be subject to the area and percentage limitations and separation requirements applicable to roof panel installations.

SECTION 2611
LIGHT-TRANSMITTING PLASTIC INTERIOR SIGNS

2611.1 General. Light-transmitting plastic interior signs shall be limited as specified in Sections 2606 and 2611.2 through 2611.4.

Exception: Light-transmitting plastic interior wall signs in covered and open mall buildings shall comply with Section 402.6.4.

2611.2 Maximum area. The aggregate area of all light-transmitting plastics shall not exceed 24 square feet (2.23 m²).

Exception: In buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1, the aggregate area of light-transmitting plastics shall not exceed 100 square feet (9.29 m²), provided that all plastics are Class CC1 in accordance with Section 2606.4.

2611.3 Separation. Signs exceeding the aggregate area of Section 2611.2 shall be separated from each other by not less than 4 feet (1219 mm) horizontally and 8 feet (2438 mm) vertically.

2611.4 Encasement. Backs of wall-mounted signs and non-illuminated portions of all signs regulated by this section shall be fully encased in metal.

SECTION 2612
PLASTIC COMPOSITES

2612.1 General. Plastic composites shall consist of either wood/plastic composites or plastic lumber. Plastic composites shall comply with the provisions of this code and with the additional requirements of Section 2612.

2612.2 Labeling. Plastic composite deck boards and stair treads, or their packaging, shall bear a label that indicates compliance with ASTM D7032 and includes the allowable load and maximum allowable span determined in accordance with ASTM D7032. Plastic composite handrails and guards, or their packaging, shall bear a label that indicates compliance with ASTM D7032 and includes the maximum allowable span determined in accordance with ASTM D7032.

2612.3 Flame spread index. Plastic composite deck boards, stair treads, handrails and guards shall exhibit a flame spread index not exceeding 200 when tested in accordance with ASTM E84 or UL 723 with the test specimen remaining in place during the test.

Exception: Materials determined to be noncombustible in accordance with Section 703.5.

2612.4 Termite and decay resistance. Where required by Section 2304.12, plastic composite deck boards, stair treads, handrails and guards containing wood, cellulosic or any other biodegradable materials shall be termite and decay resistant as determined in accordance with ASTM D7032.

2612.5 Construction requirements. Plastic composites meeting the requirements of Section 2612 shall be permitted to be used as exterior deck boards, stair treads, handrails and guards where combustible construction is permitted.

2612.5.1 Span rating. Plastic composites used as exterior deck boards shall have a span rating determined in accordance with ASTM D7032.

2612.6 Plastic composite deck boards, stair treads, handrails and guards. Plastic composite deck boards, stair treads, handrails and guards shall be installed in accordance with this code and the manufacturer’s instructions.

SECTION 2613
FIBER-REINFORCED POLYMER

2613.1 General. The provisions of this section shall govern the requirements and uses of fiber-reinforced polymer in and on buildings and structures.

2613.2 Labeling and identification. Packages and containers of fiber-reinforced polymer and their components delivered to the job site shall bear the label of an approved agency showing the manufacturer’s name, product listing, product identification and information sufficient to determine that the end use will comply with the code requirements.

2613.3 Interior finishes. Fiber-reinforced polymer used as interior finishes, decorative materials or trim shall comply with Chapter 8.

2613.3.1 Foam plastic cores. Fiber-reinforced polymer used as interior finish and that contains foam plastic cores shall comply with Chapter 8 and this chapter.

2613.4 Light-transmitting materials. Fiber-reinforced polymer used as light-transmitting materials shall comply with Sections 2606 through 2611 as required for the specific application.

2613.5 Exterior use. Fiber-reinforced polymer shall be permitted to be installed on the exterior walls of buildings of any
type of construction where such polymers meet the requirements of Section 2603.5. Fireblocking shall be installed in accordance with Section 718.

Exceptions:

1. Compliance with Section 2603.5 is not required wherever all of the following conditions are met:
   
   1.1. The fiber-reinforced polymer shall not exceed an aggregate total of 20 percent of the area of the specific wall to which it is attached, and single architectural elements shall not exceed 10 percent of the area of the specific wall to which it is attached, and no contiguous sets of architectural elements shall not exceed 10 percent of the area of the specific wall to which they are attached.
   
   1.2. The fiber-reinforced polymer shall have a flame spread index of 25 or less. The flame spread index requirement shall not be required for coatings or paints having a thickness of less than 0.036 inch (0.9 mm) that are applied directly to the surface of the fiber-reinforced polymer.
   
   1.3. Fireblocking complying with Section 718.2.6 shall be installed.
   
   1.4. The fiber-reinforced polymer shall be installed directly to a noncombustible substrate or be separated from the exterior wall by one of the following materials: corrosion-resistant steel having a minimum base metal thickness of 0.016 inch (0.41 mm) at any point, aluminum having a minimum thickness of 0.019 inch (0.5 mm) or other approved noncombustible material.

2. Compliance with Section 2603.5 is not required where the fiber-reinforced polymer is installed on buildings that are 40 feet (12 190 mm) or less above grade and the following conditions are met:

   2.1. The fiber-reinforced polymer shall meet the requirements of Section 1405.1.
   
   2.2. Where the fire separation distance is 5 feet (1524 mm) or less, the area of the fiber-reinforced polymer shall not exceed 10 percent of the wall area. Where the fire separation distance is greater than 5 feet (1524 mm), the area of the exterior wall coverage using fiber-reinforced polymer shall not be limited.
   
   2.3. The fiber-reinforced polymer shall have a flame spread index of 200 or less. The flame spread index requirements do not apply to coatings or paints having a thickness of less than 0.036 inch (0.9 mm) that are applied directly to the surface of the fiber-reinforced polymer.
   
   2.4. Fireblocking complying with Section 718.2.6 shall be installed.