

## 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; architectural *trim*; balconies and similar projections; and bay and oriel windows.

### SECTION 1402 DEFINITIONS

**1402.1 Definitions.** The following terms are defined in Chapter 2:

**ADHERED MASONRY VENEER.** Veneer secured with approved mechanical fasteners to an approved backing. Type and spacing of fasteners shall be noted on construction documents.

**ANCHORED MASONRY VENEER.**

**BACKING.**

**EXTERIOR INSULATION AND FINISH SYSTEMS (EIFS).**

**EXTERIOR INSULATION AND FINISH SYSTEMS (EIFS) WITH DRAINAGE.**

**EXTERIOR WALL.**

**EXTERIOR WALL COVERING.**

**EXTERIOR WALL ENVELOPE.**

**FIBER-CEMENT SIDING.**

**HIGH-PRESSURE DECORATIVE EXTERIOR-GRADE COMPACT LAMINATE (HPL).**

**HIGH-PRESSURE DECORATIVE EXTERIOR-GRADE COMPACT LAMINATE (HPL) SYSTEM.**

**METAL COMPOSITE MATERIAL (MCM).**

**METAL COMPOSITE MATERIAL (MCM) SYSTEM.**

**POLYPROPYLENE SIDING.**

**PORCELAIN TILE.**

**VENEER.**

**VINYL SIDING.**

**WATER-RESISTIVE BARRIER.**

### SECTION 1403 PERFORMANCE REQUIREMENTS

**1403.1 General.** The provisions of this section shall apply to exterior walls, wall coverings and components thereof.

**1403.2 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 1405.4. 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 1404.2, 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 1405.3.

#### 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 1404.2 and 1405.4, 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 E 331 under the following conditions:

2.1. *Exterior wall envelope* test assemblies shall include at least one opening, one control joint, one wall/eave interface and one wall sill. All tested openings and penetrations shall be representative of the intended end-use configuration.

2.2. *Exterior wall envelope* test assemblies shall be at least 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/m<sup>2</sup>).

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 1408.4.1.

**1403.3 Structural.** *Exterior walls*, and the associated openings, shall be designed and constructed to resist safely the superimposed loads required by Chapter 16.

**1403.4 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.

**1403.5 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 purpose of this section, fenestration products and flashing of fenestrations 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 1405.2.
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/m<sup>2</sup>, a total heat release of less than 20 MJ/m<sup>2</sup> and an effective heat of combustion of less than 18 MJ/kg, as determined in accordance with ASTM E 1354, 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 E 84 or UL 723. The ASTM E 1354 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/m<sup>2</sup>.

**1403.6 Flood resistance.** For buildings in flood hazard areas as established by the Flood Plain Administrator, exterior walls extending below the elevation required by Section 1612 shall be constructed with flood-damage-resistant materials. Wood shall be pressure-preservative treated in accordance with AWP A U1 for the species, product and end use using a preservative listed in Section 4 of AWP A U1 or decay-resistant heartwood of redwood, black locust or cedar.

**1403.7 Flood resistance for high-velocity wave action areas.** For buildings in flood hazard areas subject to high-velocity wave action as established by the Flood Plain Administrator, 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 1404 MATERIALS

**1404.1 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*.

**1404.2 Water-resistive barrier.** A minimum of one layer of No.15 asphalt felt, complying with ASTM D 226 for Type 1 felt or other *approved* materials, shall be attached to the studs or sheathing, with flashing as described in Section 1405.4, in such a manner as to provide a continuous *water-resistive barrier* behind the *exterior wall* veneer.

**1404.3 Wood.** Exterior walls of wood construction shall be designed and constructed in accordance with Chapter 23.

**1404.3.1 Basic hardboard.** Basic hardboard shall conform to the requirements of AHA A135.4.

**1404.3.2 Hardboard siding.** Hardboard siding shall conform to the requirements of AHA A135.6 and, where used structurally, shall be so identified by the *label* of an *approved* agency.

**1404.4 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.

**1404.5 Metal.** Exterior walls of formed steel construction, structural steel or lightweight metal alloys shall be designed in accordance with Chapters 22 and 20, respectively.

**1404.5.1 Aluminum siding.** Aluminum siding shall conform to the requirements of AAMA 1402.

**1404.5.2 Cold-rolled copper.** Copper shall conform to the requirements of ASTM B 370.

**1404.5.3 Lead-coated copper.** Lead-coated copper shall conform to the requirements of ASTM B 101.

**1404.6 Concrete.** Exterior walls of concrete construction shall be designed and constructed in accordance with Chapter 19.

**1404.7 Glass-unit masonry.** Exterior walls of glass-unit masonry shall be designed and constructed in accordance with Chapter 21.

**1404.8 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.

**1404.9 Vinyl siding.** Vinyl siding shall be certified and labeled as conforming to the requirements of ASTM D 3679 by an *approved* quality control agency.

**1404.10 Fiber-cement siding.** Fiber-cement siding shall conform to the requirements of ASTM C 1186, Type A, and shall be so identified on labeling listing an *approved* quality control agency.

**1404.11 Exterior insulation and finish systems.** Exterior insulation and finish systems (EIFS) and exterior insulation and finish systems (EIFS) with drainage shall comply with Section 1408.

**1404.12 Polypropylene siding.** Polypropylene siding shall be certified and labeled as conforming to the requirements of ASTM D 7254 and those of Section 1404.12.1 or 1404.12.2 by an *approved* quality control agency. Polypropylene siding shall be installed in accordance with the requirements of Section 1405.18 and in accordance with the manufacturer's

installation instructions. Polypropylene siding shall be secured to the building so as to provide weather protection for the exterior walls of the building.

**1404.12.1 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 E 84 or UL 723.

**1404.12.2 Fire separation distance.** The fire separation distance between a building with polypropylene siding and the adjacent building shall be no less than 10 feet (3048 mm).

**SECTION 1405  
INSTALLATION OF WALL COVERINGS**

**1405.1 General.** Exterior wall coverings shall be designed and constructed in accordance with the applicable provisions of this section.

**1405.2 Weather protection.** Exterior walls shall provide weather protection for the building. The materials of the minimum nominal thickness specified in Table 1405.2 shall be acceptable as approved weather coverings.

**1405.3 Vapor retarders.** 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.

**Exceptions:**

1. Basement walls.
2. Below-grade portion of any wall.
3. Masonry walls with exposed interior surfaces.
4. Where exterior continuous rigid insulation is at least 50 percent of required R-value for that wall assembly, a Class I or Class II vapor retarder may be installed on the interior surface of rigid insulation.
5. Construction where moisture or its freezing will not damage the materials.

**1405.3.1 Class III vapor retarders.** Class III vapor retarders shall be permitted where any one of the conditions in Table 1405.3.1 is met.

**1405.3.2 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.
- 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.

**TABLE 1405.2  
MINIMUM THICKNESS OF WEATHER COVERINGS**

COVERING TYPE	MINIMUM THICKNESS (inches)
Adhered masonry veneer	0.25
Aluminum siding	0.019
Anchored masonry veneer	2.625
Asbestos-cement boards	0.125
Asbestos shingles	0.156
Cold-rolled copper <sup>d</sup>	0.0216 nominal
Copper shingles <sup>d</sup>	0.0162 nominal
Exterior plywood (with sheathing)	0.313
Exterior plywood (without sheathing)	See Section 2304.6
Fiber cement lap siding	0.25 <sup>c</sup>
Fiber cement panel siding	0.25 <sup>c</sup>
Fiberboard siding	0.5
Glass-fiber reinforced concrete panels	0.375
Hardboard siding <sup>c</sup>	0.25
High-yield copper <sup>d</sup>	0.0162 nominal
Lead-coated copper <sup>d</sup>	0.0216 nominal
Lead-coated high-yield copper	0.0162 nominal
Marble slabs	1
Particleboard (with sheathing)	See Section 2304.6
Particleboard (without sheathing)	See Section 2304.6
Porcelain tile	.025
Precast stone facing <sup>c</sup>	0.625
Steel (approved corrosion resistant)	0.0149
Stone (cast artificial, anchored)	1.5
Stone (natural)	2
Structural glass	0.344
Stucco or exterior cement plaster	
Three-coat work over:	
Metal plaster base	0.875 <sup>b</sup>
Unit masonry	0.625 <sup>b</sup>
Cast-in-place or precast concrete	0.625 <sup>b</sup>
Two-coat work over:	
Unit masonry	0.5 <sup>b</sup>
Cast-in-place or precast concrete	0.375 <sup>b</sup>
Terra cotta (anchored)	1
Terra cotta (adhered)	0.25
Vinyl siding	0.035
Wood shingles	0.375
Wood siding (without sheathing) <sup>a</sup>	0.5

For SI: 1 inch = 25.4 mm.

- 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.
- e. Includes scratch coat, setting bed, and precast stone.

**TABLE 1405.3.1  
CLASS III VAPOR RETARDERS**

ZONE	CLASS III VAPOR RETARDERS PERMITTED FOR: <sup>a</sup>
Marine 4 <sup>b</sup>	Vented cladding over wood structural panels Vented cladding over fiberboard Vented cladding over gypsum Insulated sheathing with <i>R</i> -value ≥ R2.5 over 2 × 4 wall Insulated sheathing with <i>R</i> -value ≥ R3.75 over 2 × 6 wall
5 <sup>c</sup>	Vented cladding over wood structural panels Vented cladding over fiberboard Vented cladding over gypsum Insulated sheathing with <i>R</i> -value ≥ R5 over 2 × 4 wall Insulated sheathing with <i>R</i> -value ≥ R7.5 over 2 × 6 wall

For SI: 1 pound per cubic foot = 16 kg/m<sup>3</sup>.

- a. Spray foam with a minimum density of 2 lbs/ft<sup>3</sup> applied to the interior cavity side of wood structural panels, fiberboard, insulating sheathing or gypsum is deemed to meet the insulating sheathing requirement where the spray foam *R*-value meets or exceeds the specified insulating sheathing *R*-value.
- b. Zone Marine 4 includes the following counties: Benton, Clackamas, Clatsop, Columbia, Coos, Curry, Douglas, Jackson, Josephine, Lane, Lincoln, Linn, Marion, Multnomah, Polk, Tillamook, Washington and Yamhill.
- c. Zone 5 are the counties not included in Zone Marine 4.

**1405.3.3 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 lap 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.

**1405.4 Flashing.** Flashing shall be installed in such a manner so as to prevent moisture from entering the wall or to redirect it 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*.

**1405.4.1 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.

**1405.4.2 Masonry.** Flashing and weep holes in anchored veneer shall be located in the first course of masonry above finished ground level above the foundation wall or slab, and other points of support, including structural floors, shelf angles and lintels where anchored veneers are designed in accordance with Section 1405.6.

**1405.5 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.

**1405.6 Anchored masonry veneer.** Anchored masonry veneer shall comply with the provisions of Sections 1405.6, 1405.7, 1405.8 and 1405.9 and Sections 6.1 and 6.2 of TMS 402/ACI 530/ASCE 5.

**1405.6.1 Tolerances.** Anchored masonry veneers in accordance with Chapter 14 are not required to meet the tolerances in Article 3.3 F1 of TMS 602/ACI 530.1/ASCE 6.

**1405.6.2 Seismic requirements.** Anchored masonry veneer located in Seismic Design Category C, D, E or F shall conform to the requirements of Section 6.2.2.10, except Section 6.2.2.10.3.3, of ACI 530/ASCE 5/TMS 402. Mechanically attached anchors to the joint reinforcement, as required in ACI 530/ASCE 5/TMS 402, Section 6.2.2.10.3.3 with clips and hooks, shall be required in Seismic Design Category D, Section 6.2.2.10.2, for Occupancy Categories III and IV.

**1405.7 Stone veneer.** 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 (o.c.) 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 m<sup>2</sup>) of stone veneer. This tie shall be a loop having legs not less than 15 inches (381 mm) in length bent so that it 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 non-metallic coated wire mesh with two layers of water-resistive barrier in accordance with Section 1404.2 shall be applied directly to wood studs spaced a maximum of 16

inches (406 mm) o.c. On studs, the mesh shall be attached with 2-inch long (51 mm) corrosion-resistant steel wire furring nails at 4 inches (102 mm) o.c. providing a minimum 1.125-inch (29 mm) penetration into each stud and with 8d annular threaded nails at 8 inches (203 mm) o.c. 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 a minimum of an 8d (0.120 in. diameter) annular threaded nail for every 2 square feet (0.2 m<sup>2</sup>) of stone veneer. This tie shall be a loop having legs not less than 15 inches (381 mm) in length, so bent that it 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-resistive barrier in accordance with Section 1404.2 shall be applied directly to steel studs spaced a maximum of 16 inches (406 mm) o.c. The mesh shall be attached with corrosion-resistant #8 self-drilling, tapping screws at 4 inches (102 mm) o.c., and at 8 inches (203 mm) o.c. into top and bottom tracks or with equivalent wire ties. All screws shall extend through the steel connection a minimum of 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 a minimum of a #8 self-drilling, tapping screw extending through the steel framing a minimum of three exposed threads for every 2 square feet (0.2 m<sup>2</sup>) of stone veneer. This tie shall be a loop having legs not less than 15 inches (381 mm) in length, so bent that it 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).

**1405.8 Slab-type veneer.** Slab-type veneer units not exceeding 2 inches (51 mm) in thickness shall be anchored directly to masonry, concrete or stud 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 a maximum of 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 m<sup>2</sup>) 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 when 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.

**1405.9 Terra cotta.** Anchored terra cotta or ceramic units not less than 1<sup>5</sup>/<sub>8</sub> 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<sup>3</sup>/<sub>8</sub> inches (41 mm) thick with projecting dovetail webs on the back surface spaced approximately 8 inches (203 mm) o.c. 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) o.c.; these anchors shall be secured to 1/4-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.

**1405.10 Adhered masonry veneer.** Adhered masonry veneer shall comply with the applicable requirements in Section 1405.10 and Sections 6.1 and 6.3 of TMS 402/ACI 530/ASCE 5.

**1405.10.1 Exterior adhered masonry veneer.** Exterior adhered masonry veneer shall be installed in accordance with Section 1405.10 and in accordance with the manufacturer's instructions.

**1405.10.1.1 Water-resistive barriers.** Water-resistive barriers shall be installed as required in Section 2510.6.

**1405.10.1.2 Flashing at foundation.** A corrosion-resistant screed or flashing of a minimum 0.019-inch (0.48 mm) or 26 gauge galvanized or plastic with a minimum vertical attachment flange of 3<sup>1</sup>/<sub>2</sub> inches (89 mm) shall be installed to extend a minimum of 1 inch (25 mm) below the foundation plate line on exterior stud walls in accordance with Section 1405.4. The water-resistive barrier shall lap over the exterior of the attachment flange of the screed or flashing.

**1405.10.1.3 Clearances.** On exterior stud walls, adhered masonry veneer shall be installed a minimum of 4 inches (102 mm) above the earth, or a minimum of 2 inches (51 mm) above paved areas, or a minimum of 1/2 inch (12 mm) above exterior walking surfaces which are supported by the same foundation that supports the exterior wall.

**1405.10.2 Exterior adhered masonry veneers—porcelain tile.** Adhered units shall not exceed 5/8 inch (15.8 mm) thickness and a maximum of 24 inches (610 mm) in any face dimension nor more than 3 square feet (0.28 m<sup>2</sup>) in total face area and shall not weigh more than 9 pounds psf (0.43 kN/m<sup>2</sup>). Porcelain tile shall be adhered to an approved backing system.

**1405.10.3 Interior adhered masonry veneers.** Interior adhered masonry veneers shall have a maximum weight of

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20 psf (0.958 kg/m<sup>2</sup>) and shall be installed in accordance with Section 1405.10. Where the interior adhered masonry veneer is supported by wood construction, the supporting members shall be designed to limit deflection to  $\frac{1}{600}$  of the span of the supporting members.

**Exception:** Where interior adhered masonry veneer can be demonstrated to support its own weight and the lateral load for the interior adhered masonry veneer is provided through the use of an engineered system, the 20 psf (0.958 kg/m<sup>2</sup>) limitation does not apply.

**1405.11 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 not be less than 0.0149-inch (0.378 mm) nominal thickness sheet steel mounted on wood or metal furring strips or approved sheathing on the wood construction.

**1405.11.1 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<sup>2</sup>) 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 capable of resisting a horizontal force in accordance with the wind loads specified in Section 1609, but in no case less than 20 psf (0.958 kg/m<sup>2</sup>).

**1405.11.2 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 1403.2. 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.

**1405.11.3 Backup.** Masonry backup shall not be required for metal veneer except as is necessary to meet the fire-resistance requirements of this code.

**1405.11.4 Grounding.** Grounding of metal veneers on buildings shall comply with the *Electrical Code*.

**1405.12 Glass veneer.** The area of a single section of thin exterior structural glass veneer shall not exceed 10 square feet (0.93 m<sup>2</sup>) where it 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<sup>2</sup>) where it is more than 15 feet (4572 mm) above that level.

**1405.12.1 Length and height.** The length or height of any section of thin exterior structural glass veneer shall not exceed 48 inches (1219 mm).

**1405.12.2 Thickness.** The thickness of thin exterior structural glass veneer shall be not less than 0.344 inch (8.7 mm).

**1405.12.3 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 at least 50 percent of the area of each glass unit is directly bonded to the backing by mastic not less than  $\frac{1}{4}$  inch (6.4 mm) thick and not more than  $\frac{5}{8}$  inch (15.9 mm) thick. The bond coat and mastic shall be evaluated for compatibility and shall bond firmly together.

**1405.12.4 Installation at sidewalk level.** Where glass extends to a sidewalk surface, each section shall rest in an *approved* metal molding, and be set at least  $\frac{1}{4}$  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.

**1405.12.4.1 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.

**1405.12.5 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  $\frac{1}{4}$  inch (6.4 mm) wide shall be provided.

**1405.12.6 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.

**1405.12.7 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.

**1405.13 Exterior windows and doors.** Windows and doors installed in exterior walls shall conform to the testing and performance requirements of Section 1710.5.

**1405.13.1 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.

\*

**1405.14 Vinyl siding.** Vinyl siding conforming to the requirements of this section and complying with ASTM D 3679 shall be permitted on exterior walls of buildings located in areas where  $V_{asd}$  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  $V_{asd}$  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.

**1405.14.1 Application.** The siding shall be applied over sheathing or materials listed in Section 2304.6. Siding shall be applied to conform with the *water-resistive barrier* requirements in Section 1403. 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 at least  $\frac{3}{4}$  inch (19 mm). Where the siding is installed horizontally, the fastener spacing shall not exceed 16 inches (406 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.

**1405.15 Cement plaster.** Cement plaster applied to exterior walls shall conform to the requirements specified in Chapter 25.

**1405.16 Fiber-cement siding.** Fiber-cement siding complying with Section 1404.10 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 1403. 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 at least 1 inch (25 mm). For metal framing, all-weather screws shall be used and shall penetrate the metal framing at least three full threads.

**1405.16.1 Panel siding.** Fiber-cement panels shall comply with the requirements of ASTM C 1186, Type A, minimum Grade II. Panels shall be installed with the long dimension either parallel or perpendicular to framing. Vertical and horizontal joints shall occur over framing members and shall be sealed with caulking, covered with battens or shall be designed to comply with Section 1403.2. Panel siding shall be installed with fasteners in accordance with the *approved* manufacturer's instructions.

**1405.16.2 Lap siding.** Fiber-cement lap siding having a maximum width of 12 inches (305 mm) shall comply with the requirements of ASTM C 1186, Type A, minimum Grade II. Lap siding shall be lapped a minimum of  $1\frac{1}{4}$  inches (32 mm) and lap siding not having tongue-and-groove end joints shall have the ends sealed with caulking, covered with an H-section joint cover, located over a strip of flashing or shall be designed to comply with Section 1403.2. Lap siding courses shall be installed with the fastener heads exposed or concealed in accordance with the *approved* manufacturer's instructions.

**1405.17 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 2304.9.1 or the *approved* manufacturer's installation 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 2308.9.3(3).

**1405.18 Polypropylene siding.** Polypropylene siding conforming to the requirements of this section and complying with Section 1404.12 shall be limited to exterior walls of Type VB construction 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 (12 192 mm) 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 (12 192 mm), tests or calculations indicating compliance with Chapter 16 shall be submitted. Polypropylene siding shall be installed in accordance with the manufacturer's installation instructions. Polypropylene siding shall be secured to the building so as to provide weather protection for the exterior walls of the building.

## SECTION 1406 COMBUSTIBLE MATERIALS ON THE EXTERIOR SIDE OF EXTERIOR WALLS

**1406.1 General.** Section 1406 shall apply to *exterior wall coverings*; balconies and similar projections; and bay and oriel windows constructed of combustible materials.

**1406.2 Combustible exterior wall coverings.** Combustible *exterior wall coverings* shall comply with this section.

**Exception:** Plastics complying with Chapter 26.

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**1406.2.1 Type I, II, III and IV construction.** On buildings of Type 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 (12 192 mm) 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 (18 288 mm) in height above grade plane regardless of the fire separation distance.
4. Wood veneers shall comply with Section 1405.5.

**1406.2.1.1 Ignition resistance.** Where permitted by Section 1406.2.1, 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 covering other than vinyl sidings listed in Table 1405.2.
3. Aluminum having a minimum thickness of 0.019 inch (0.48 mm).

**1406.2.1.1.1 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.

**1406.2.1.1.2 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 1406.2.1.1.2 based on the maximum tolerable level of incident radiant heat flux that does not cause sustained flaming of the exterior wall covering.

**1406.2.2 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.

**TABLE 1406.2.1.1.2  
MINIMUM FIRE SEPARATION FOR  
COMBUSTIBLE EXTERIOR WALL COVERINGS**

FIRE SEPARATION DISTANCE (feet)	TOLERABLE LEVEL INCIDENT RADIANT HEAT ENERGY(kW/m <sup>2</sup> )	FIRE SEPARATION DISTANCE (feet)	TOLERABLE LEVEL INCIDENT RADIANT HEAT ENERGY(kW/m <sup>2</sup> )
5	12.5	16	5.9
6	11.8	17	5.5
7	11.0	18	5.2
8	10.3	19	4.9
9	9.6	20	4.6
10	8.9	21	4.4
11	8.3	22	4.1
12	7.7	23	3.9
13	7.2	24	3.7
14	6.7	25	3.5
15	6.3		

For SI: 1 foot = 304.8 mm, 1 Btu/H<sup>2</sup> × °F = 0.0057 kW/m<sup>2</sup> × K.

**1406.2.3 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<sup>5</sup>/<sub>8</sub> 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<sup>5</sup>/<sub>8</sub> inches (41 mm) where the concealed space is not required to be fireblocked by Section 718.

**1406.3 Balconies and similar projections.** Balconies and similar projections of combustible construction other than fire-retardant-treated wood shall be fire-resistance rated where required by Table 601 for floor construction or shall be of Type IV construction in accordance with Section 602.4. The aggregate length of the projections shall not exceed 50 percent of the building's perimeter on each floor.

### Exceptions:

1. On buildings of Type I and II construction, three stories or less above *grade plane*, *fire-retardant-treated wood* shall be permitted for balconies, porches, decks and exterior stairways not used as required exits.
2. Untreated wood is permitted for pickets and rails or similar guardrail devices that are limited to 42 inches (1067 mm) in height.
3. Balconies and similar projections on buildings of Type III, IV and V construction shall be permitted to be of Type V construction, and shall not be required to have a *fire-resistance rating* where sprinkler protection is extended to these areas.
4. Where sprinkler protection is extended to the balcony areas, the aggregate length of the balcony on each floor shall not be limited.



**1406.4 Bay and oriel windows.** Bay and oriel windows shall conform to the type of construction required for the building to which they are attached.

**Exception:** *Fire-retardant-treated wood* shall be permitted on buildings three stories or less above grade plane of Type I, II, III or IV construction.

## SECTION 1407 METAL COMPOSITE MATERIALS (MCM)

**1407.1 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.

**1407.1.1 Plastic core.** The plastic core of the MCM shall not contain foam plastic insulation as defined in Section 2602.1.

**1407.2 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 1407.4 through 1407.14.

**1407.3 Architectural trim and embellishments.** MCM used as architectural *trim* or embellishments shall comply with Sections 1407.7 through 1407.14.

**1407.4 Structural design.** MCM systems shall be designed and constructed to resist wind loads as required by Chapter 16 for components and cladding.

**1407.5 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.

**1407.6 Weather resistance.** MCM systems shall comply with Section 1403 and shall be designed and constructed to resist wind and rain in accordance with this section and the manufacturer's installation instructions.

**1407.7 Durability.** MCM systems shall be constructed of *approved* materials that maintain the performance characteristics required in Section 1407 for the duration of use.

**1407.8 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 outer 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.

**1407.9 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 E 84 or UL 723.

**1407.10 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 1407.10.1 through 1407.10.4, or Section 1407.11.

**1407.10.1 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 E 84 or UL 723.

**1407.10.2 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.

**1407.10.3 Thermal barrier not required.** The thermal barrier specified for MCM in Section 1407.10.2 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 803.1.2.1, 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.

**1407.10.4 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.

**1407.11 Alternate conditions.** MCM and MCM systems shall not be required to comply with Sections 1407.10.1 through 1407.10.4 provided such systems comply with Sections 1407.11.1, 1407.11.2, 1407.11.3, or 1407.11.4.

**1407.11.1 Installations up to 40 feet in height.** MCM shall not be installed more than 40 feet (12 190 mm) in height above grade where installed in accordance with Sections 1407.11.1.1 and 1407.11.1.2.

**1407.11.1.1 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.

**1407.11.1.2 Fire separation distance greater than 5 feet.** Where the *fire separation distance* is greater than 5 feet (1524 mm), there shall be no limit on the area of *exterior wall* surface coverage using MCM.

**1407.11.2 Installations up to 50 feet in height.** MCM shall not be installed more than 50 feet (15 240 mm) in height above grade where installed in accordance with Sections 1407.11.2.1 and 1407.11.2.2.

**1407.11.2.1 Self-ignition temperature.** MCM shall have a self-ignition temperature of 650°F (343°C) or greater when tested in accordance with ASTM D 1929.

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**1407.11.2.2 Limitations.** Sections of MCM shall not exceed 300 square feet (27.9 m<sup>2</sup>) in area and shall be separated by a minimum of 4 feet (1219 mm) vertically.

**1407.11.3 Installations up to 75 feet in height (Option 1).** MCM shall not be installed more than 75 feet (22 860 mm) in height above grade plane where installed in accordance with Sections 1407.11.3.1 through 1407.11.3.5.

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

**1407.11.3.1 Prohibited occupancies.** MCM shall not be permitted on buildings classified as Group A-1, A-2, H, I-2 or I-3 occupancies.

**1407.11.3.2 Nonfire-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.

**1407.11.3.3 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 D 1929.
2. MCM shall conform to one of the following combustibility classifications when tested in accordance with ASTM D 635:

**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 1/2 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.

**1407.11.3.4 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

1407.11.3.4. The maximum percentage of exterior wall area of any story covered with MCM panels shall not exceed that indicated in Table 1407.11.3.4 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.

**1407.11.3.5 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 1407.11.3.4 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 704.8 for unprotected openings, whichever is smaller.

**1407.11.4 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 1407.11.4.1 through 1407.11.4.4.

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

**1407.11.4.1 Minimum fire separation distance.** MCM shall not be installed on any wall with a fire separation distance less than 30 feet (9 144 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).

**TABLE 1407.11.3.4  
AREA LIMITATION AND SEPARATION REQUIREMENTS FOR MCM PANELS**

FIRE SEPARATION DISTANCE (feet)	COMBUSTIBILITY CLASS OF MCM	MAXIMUM PERCENTAGE AREA OF EXTERIOR WALL COVERED WITH MCM PANELS	MAXIMUM SINGLE AREA OF MCM PANELS (square feet)	MINIMUM SEPARATION OF MCM PANELS (feet)	
				Vertical	Horizontal
Less than 6	—	Not Permitted	Not Permitted	—	—
6 or more but less than 11	CC1	10	50	8	4
	CC2	Not Permitted	Not Permitted	—	—
11 or more but less than or equal to 30	CC1	25	90	6	4
	CC2	15	70	8	4
More than 30	CC1	50	Not Permitted	3 <sup>a</sup>	0
	CC2	50	100	6 <sup>a</sup>	3

For SI: 1 foot = 304.8 mm, 1 square foot = 0.0929 m<sup>2</sup>.

a. For reductions in the minimum vertical separation, see Section 1407.11.3.4.

**1407.11.4.2 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 D 1929.
2. MCM shall conform to one of the following combustibility classifications when tested in accordance with ASTM D 635:

**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<sup>1</sup>/<sub>2</sub> 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.

**1407.11.4.3 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 it is installed. The area of a single MCM panel installed above the first story above grade plane shall not exceed 16 square feet (1.5 m<sup>2</sup>) 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 it is installed and there shall not be a limit on the maximum dimension or area of a single MCM panel.

**1407.11.4.4 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.

**1407.12 Type V construction.** MCM shall be permitted to be installed on buildings of Type V construction.

**1407.13 Foam plastic insulation.** MCM systems containing foam plastic insulation shall also comply with the requirements of Section 2603.

**1407.14 Labeling.** MCM shall be labeled in accordance with Section 1703.5.

## SECTION 1408 EXTERIOR INSULATION AND FINISH SYSTEMS (EIFS)

**1408.1 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.

**1408.2 Performance characteristics.** EIFS shall be constructed such that it meets the performance characteristics required in ASTM E 2568.

**1408.3 Structural design.** The underlying structural framing and substrate shall be designed and constructed to resist loads as required by Chapter 16.

**1408.4 Weather resistance.** EIFS shall comply with Section 1403 and shall be designed and constructed to resist wind and rain in accordance with this section and the manufacturer's application instructions.

**1408.4.1 EIFS with drainage required.** All EIFS systems must incorporate a drainage system.

**Exception:** EIFS systems without drainage (barrier systems) may be used in the following applications:

1. Repairs and replacement to existing barrier systems.
2. Architectural features not protecting an interior space.
3. Installation on concrete and concrete masonry unit (CMU) block surfaces.

**1408.5 Installation.** EIFS with drainage shall be in accordance with the EIFS manufacturer's instructions.

**1408.6 Special inspections.** EIFS installations shall comply with the provisions of Sections 1704.2 and 1705.15.

## SECTION 1409 HIGH-PRESSURE DECORATIVE EXTERIOR-GRADE COMPACT LAMINATES (HPL)

**1409.1 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.

**1409.2 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 1409.4 and 1409.14.

**1409.3 Architectural trim and embellishments.** HPL used as architectural trim or embellishments shall comply with Sections 1409.7 through 1409.14.

**1409.4 Structural design.** HPL systems shall be designed and constructed to resist wind loads as required by Chapter 16 for components and cladding.

**1409.5 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.

**1409.6 Weather resistance.** HPL systems shall comply with Section 1403 and shall be designed and constructed to resist wind and rain in accordance with this section and the manufacturer's installation instructions.

**1409.7 Durability.** HPL systems shall be constructed of approved materials that maintain the performance characteristics required in Section 1409 for the duration of use.

**1409.8 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 outer 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.

**1409.9 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 E 84 or UL 723.

**1409.10 Type I, II, III and IV construction.** Where installed on buildings of Type I, II, III and IV construction, HPL systems shall comply with Sections 1409.10.1 through 1409.10.4, or Section 1409.11.

**1409.10.1 Surface-burning characteristics.** HPL shall have a flame spread index of not more than 25 and a smoke-developed index of not more than 450 when tested in the minimum and maximum thicknesses intended for use in accordance with ASTM E 84 or UL 723.

**1409.10.2 Thermal barriers.** HPL shall be separated from the interior of a building by an approved thermal barrier consisting of  $\frac{1}{2}$ -inch (12.7 mm) gypsum wallboard or equivalent thermal barrier material that will limit the average temperature rise of the unexposed surface to not more than 250°F (121°C) after 15 minutes of fire exposure in accordance with the standard time-temperature curve of ASTM E 119 or UL 263. The thermal barrier shall be installed in such a manner that it will remain in place for not less than 15 minutes based on a test conducted in accordance with UL 1715.

**1409.10.3 Thermal barrier not required.** The thermal barrier specified for HPL in Section 1409.10.2 is not required where:

1. The HPL system is specifically approved based on tests conducted in accordance with UL 1040 or UL 1715. Such testing shall be performed with the HPL in the minimum and maximum thicknesses intended for use. The HPL 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 HPL is used as elements of balconies and similar projections, architectural trim or embellishments.

**1409.10.4 Full-scale tests.** The HPL system shall be tested in accordance with, and comply with, the acceptance criteria of NFPA 285. Such testing shall be performed on the HPL system with the HPL in the minimum and maximum thicknesses intended for use.

**1409.11 Alternate conditions.** HPL and HPL systems shall not be required to comply with Sections 1409.10.1 through 1409.10.4 provided such systems comply with Section 1409.11.1 or 1409.11.2.

**1409.11.1 Installations up to 40 feet in height.** HPL shall not be installed more than 40 feet (12 190 mm) in height above grade plane where installed in accordance with Sections 1409.11.1.1 and 1409.11.1.2.

**1409.11.1.1 Fire separation distance of 5 feet or less.** Where the fire separation distance is 5 feet (1524 mm) or less, the area of HPL shall not exceed 10 percent of the exterior wall surface.

**1409.11.1.2 Fire separation distance greater than 5 feet.** Where the fire separation distance is greater than 5 feet (1524 mm), there shall be no limit on the area of exterior wall surface coverage using HPL.

**1409.11.2 Installations up to 50 feet in height.** HPL shall not be installed more than 50 feet (15 240 mm) in height above grade plane where installed in accordance with Sections 1409.11.2.1 and 1409.11.2.2.

**1409.11.2.1 Self-ignition temperature.** HPL shall have a self-ignition temperature of 650°F (343°C) or greater when tested in accordance with ASTM D 1929.

**1409.11.2.2 Limitations.** Sections of HPL shall not exceed 300 square feet (27.9 m<sup>2</sup>) in area and shall be separated by a minimum 4 feet (1219 mm) vertically.

**1409.12 Type V construction.** HPL shall be permitted to be installed on buildings of Type V construction.

**1409.13 Foam plastic insulation.** HPL systems containing foam plastic insulation shall also comply with the requirements of Section 2603.

**1409.14 Labeling.** HPL shall be labeled in accordance with Section 1703.5.