780 CMR 14.00

EXTERIOR WALLS

780 CMR 1401.0 GENERAL

1401.1 Scope. The provisions of 780 CMR 14.00 shall establish the minimum requirements for exterior walls, exterior wall coverings, exterior wall openings, exterior windows and doors, architectural trim, balconies and bay windows.

780 CMR 1402.0 DEFINITIONS

1402.1 General. The following words and terms shall, for the purposes of 780 CMR 14.00 and as used elsewhere in 780 CMR, have the meanings shown in 780 CMR 1402.0.

ADHERED MASONRY VENEER. Veneer secured and supported through the adhesion of an approved bonding material applied to an approved backing.

ANCHORED MASONRY VENEER. Veneer secured with approved mechanical fasteners to an approved backing.

BACKING. The wall or surface to which the veneer is secured.

EXTERIOR WALL. A wall, bearing or nonbearing, that is used as an enclosing wall for a building, other than a fire wall, and that has a slope of 60 degrees (1.05 rad) or greater with the horizontal plane.

EXTERIOR WALL COVERING. A material or assembly of materials applied on the exterior side of exterior walls for the purpose of providing a weather-resisting barrier, insulation or for aesthetics, including but not limited to, veneers, siding, exterior insulation and finish systems, architectural trim and embellishments such as cornices, soffits, facias, gutters and leaders.

EXTERIOR WALL ENVELOPE. A system or assembly of exterior wall components, including exterior wall finish materials, that provides protection of the building structural members, including framing and sheathing materials, and conditioned interior space, from the detrimental effects of the exterior environment.

FIBER CEMENT SIDING. A manufactured, fiber-reinforcing product made with an inorganic hydraulic or calcium silicate binder formed by chemical reaction and reinforced with organic or inorganic nonasbestos fibers, or both. Additives that enhance manufacturing or product performance are permitted. Fiber cement siding products have either smooth or textured faces and are intended for exterior wall and related applications.

METAL COMPOSITE MATERIAL (MCM). A factory-manufactured panel consisting of metal skins bonded to both faces of a plastic core.

METAL COMPOSITE MATERIAL (MCM) SYSTEM. An exterior wall finish system fabricated using MCM in a specific assembly including joints, seams, attachments, substrate, framing and other details as appropriate to a particular design.

VENEER. A facing attached to a wall for the purpose of providing ornamentation, protection or insulation, but not counted as adding strength to the wall.

780 CMR 1403.0 PERFORMANCE REQUIREMENTS

1403.1 General. The provisions of 780 CMR 1403.0 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 780 CMR 1405.3. 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 780 CMR 1404.2 and a means for draining water that enters the assembly to the exterior of the veneer, unless it is determined that penetration of water behind the veneer shall not be detrimental to the building performance. ***Protection against condensation in the exterior wall assembly shall be provided in accordance with 780 CMR 13.00.***

Exceptions:

1. A weather-resistant exterior wall envelope shall not be required over concrete or masonry walls designed in accordance with 780 CMR 19.00 and 21.00, respectively.
2. Compliance with the requirements for a means of drainage, and the requirements of 780 CMR 1405.2 and 1405.3, 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 four feet by eight 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^2).
2.4. Exterior wall envelope assemblies shall be subjected to a minimum test exposure duration of two 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.

1403.3 **Vapor Retarder**. An approved vapor retarder shall be provided ***(Conformance with the applicable requirements of 780 CMR 13.00 is also required).***

Exceptions:
1. Where other approved means to avoid condensation and leakage of moisture are provided.
2. Plain and reinforced concrete or masonry exterior walls designed and constructed in accordance with Chapter 19 or 21, respectively.

1403.4 Structural. Exterior walls, and the associated openings, shall be designed and constructed to resist safely the superimposed loads required by 780 CMR 16.00.

1403.5 Fire Resistance. Exterior walls shall be fire-resistance rated as required by other sections of 780 CMR with opening protection as required by 780 CMR 7.00.

1403.6 Flood Resistance. For buildings in flood hazard areas as established in 780 CMR 1612.0, exterior walls extending below the design flood elevation shall be resistant to water damage. Wood shall be pressure-preservative treated in accordance with AWPA C1, C2, C3, C4, C9, C15, C18, C22, C23, C24, C28, P1, P2 and P3, 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 in 780 CMR 1612.0 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.

780 CMR 1404.0 MATERIALS

1404.1 General. Materials used for the construction of exterior walls shall comply with the provisions of 780 CMR 1404.0. Materials not prescribed in 780 CMR 1404.0 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, shall be attached to the sheathing, with flashing as described in 780 CMR 1405.3, 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 780 CMR 23.00.

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 780 CMR 1404.4 and 780 CMR 21.00. Masonry units, mortar and metal accessories used in anchored and adhered veneer shall meet the physical requirements of 780 CMR 21.00. 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 780 CMR 22.00 and 20.00, respectively.

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

1404.5.2 Seismic Requirements. Anchored masonry veneer located in Seismic Design Categories C and D shall conform to the requirements of Section 6.2.2.10 of ACI 530/ASCE 5/TMS 402. Anchored masonry veneer located in Seismic Design Category B shall conform to the requirements for Category C of Section 6.2.2.10 of ACI 530/ASCE 5/TMS 402.

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 780 CMR shall not be limited in thickness, provided that such plastics and their assemblies conform to the requirements of780 CMR 26.00 and are constructed of approved weather-resistant materials of adequate strength to resist the wind loads for cladding specified in 780 CMR 16.00.

1404.9 Vinyl Siding. Vinyl siding shall conform to the requirements of ASTM D 3679.

1404.10 Fiber Cement Siding. Fiber cement siding shall conform to the requirements of ASTM C 1186 and shall be so identified on labeling listing an approved quality control agency.

780 CMR 1405.0 INSTALLATION OF WALL COVERINGS

1405.1 General. Exterior wall coverings shall be designed and constructed in accordance with the applicable provisions of 780 CMR 1405.0.

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.

TABLE 1405.2 MINIMUM THICKNESS OF WEATHER COVERINGS

COVERING TYPE	MINIMUM THICKNESS (inches)
Adhered masonry veneer	0.25
Anchored masonry veneer	2.625
Aluminum siding	0.019
Asbestos-cement boards	0.125
Asbestos shingles	0.156
Cold-rolled copper[d]	0.02 16 nominal
Copper shingles[d]	0.0 162 nominal
Exterior plywood (with sheathing)	0.3 13
Exterior plywood (without sheathing)	See Section 2304.6
Fiberboard siding	0.5
Fiber cement lap siding	0.25[c]
Fiber cement panel siding	0.25[c]
Glass-fiber reinforced concrete panels	0.375
Hardboard siding[c]	0.25
High-yield copper[d]	0.0 162 nominal
Lead-coated copper[d]	0.02 16 nominal
Lead-coated high-yield copper	0.0 162 nominal
Marble slabs	1
Particle board (with sheathing)	See Section 2304.6
Particle board (without sheathing)	See Section 2304.6
Precast stone facing	0.625
Steel (approved corrosion resistant)	0.0 149
Stone (cast artificial)	1.5
Stone (natural)	2
Structural glass	0.344
Stucco or exterior portland cement plaster	
Three-coat work over:	
Metal plaster base	0.875[b]
Unit masonry	0.625[b]
Cast-in-place or precast concrete	0.625[b]
Two-coat work over:	
Unit masonry	0.5[b]
Cast-in-place or precast concrete	0.375[b]
Terra cotta (anchored)	1
Terra cotta (adhered)	0.25
Vinyl siding	0.035
Wood shingles	0.375
Wood siding (without sheathing)[a]	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 780 CMR 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.

1405.3 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.

1405.3.1 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.

1405.3.2 Masonry. Flashing and weepholes 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 780 CMR 1405.5.

1405.4 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 does not exceed three stories in height, measured from grade, except where fire-retardant-treated wood is used, the height shall not exceed four stories.
2. The veneer is attached to or furred from a noncombustible backing that is fire-resistance rated as required by other provisions of 780 CMR.
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.

1405.5 Anchored Masonry Veneer. Anchored masonry veneer shall comply with the provisions of 780 CMR 1405.5, 1405.6, 1405.7 and 1405.8 and Sections 6.1 and 6.2 of ACI 530/ASCE 5/TMS 402.

1405.5.1 Tolerances. Anchored masonry veneers in accordance with 780 CMR 14.00 are not required to meet the tolerances in Article 3.3 G1 of ACI 530.1/ASCE 6/TMS 602.

1405.5.2 Seismic Requirements. Anchored masonry veneer located in Seismic Design

Categories C and D shall conform to the requirements of Section 6.2.2.10 of ACI 530/ASCE 5/TMS 402. Anchored masonry veneer located in Seismic Design Category B shall conform to the requirements for Category C of Section 6.2.2.10 of ACI 530/ASCE 5/TMS 402.

1405.6 Stone Veneer. Stone veneer units not exceeding ten 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 six 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 two square feet (0.2 m^2) 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 two 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 stud backing, a two-inch by two-inch (51 by 51 mm) 0.0625-inch (1.59 mm) corrosion-resistant wire mesh with two layers of waterproofed paper backing in accordance with 780 CMR 1403.3 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 two-inch-long (51 mm) corrosion-resistant steel wire furring nails at four inches (102 mm) o.c. providing a minimum 1.125-inch (29 mm) penetration into each stud and with 8d common nails at eight 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) corrosion-resistant wire, or approved equal, looped through the mesh for every two square feet (0.2 m^2) 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 two 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.

1405.7 Slab-type Veneer. Slab-type veneer units not exceeding two 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 located in the middle third of the edge of the units spaced a maximum of 24 inches (610 m) 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^2) 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.

1405.8 Terra Cotta. Anchored terra cotta or ceramic units not less than 1.625 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 1.625 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 0.25-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 two-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.

1405.9 Adhered Masonry Veneer. Adhered masonry veneer shall comply with the applicable requirements in 780 CMR 1405.9.1 and Sections 6.1 and 6.3 of ACI 530/ASCE 5/TMS 402.

1405.9.1 Adhesion. Adhesion developed between adhered veneer units and backing shall have a shear strength of at least 50 pounds per square inch (psi) (0.34 MPa) based on gross unit surface area or shall be adhered in compliance with Article 3.3C of ACI 530.1/ASCE 6/TMS 602.

1405.9.1.1 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 780 CMR 1405.9. Where the interior

veneer is supported by wood construction, the supporting members shall be designed to limit deflection to 1/600 of the span of the supporting members.

1405.10 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.

1405.10.1 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 four 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 capable of resisting a horizontal force in accordance with the wind loads specified in 780 CMR 1609, but in no case less than 20 psf (0.958 kg/m^2).

1405.10.2 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 780 CMR 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.

1405.10.3 Backup. Masonry backup shall not be required for metal veneer except as is necessary to meet the fire-resistance requirements of 780 CMR.

1405.10.4 Grounding. Grounding of metal veneers on buildings shall comply with the requirements of 527 CMR 12.00: the Massachusetts Electrical Code.

1405.11 Glass Veneer. The area of a single section of thin exterior structural glass veneer shall not exceed ten square feet (0.93 m^2) 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 six square feet (0.56 m^2) where it is more than 15 feet (4572 mm) above that level.

1405.11.1 Length and Height. The length or height of any section of thin exterior structural glass veneer shall not exceed 48 inches (1219 mm).

1405.11.2 Thickness. The thickness of thin exterior structural glass veneer shall be not less than 0.344 inch (8.7 mm).

1405.11.3 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% of the area of each glass unit is directly bonded to the backing by mastic not less than 0.25 inch (6.4 mm) thick and not more than 0.625 inch (15.9 mm) thick. The bond coat and mastic shall be evaluated for compatibility and shall bond firmly together.

1405.11.4 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 0.25 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.

1405.11.4.1 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 (12 mm) thick and not less than two 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.

1405.11.5 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 0.25 inch (6.4 mm) wide shall be provided.

1405.11.6 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.

1405.11.7 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.

1405.12 **Exterior Windows and Doors**. Windows and doors installed in exterior walls shall conform to the testing and performance requirements of 780 CMR 1627.5 ***and otherwise conform to any applicable requirements set forth in 780 CMR 13.00***.

1405.12.1 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.

1405.13 Vinyl Siding. Vinyl siding conforming to the requirements of 780 CMR 1405.13 and complying with ASTM D 3679 shall be permitted on exterior walls of buildings of Type V construction located in areas where the basic wind speed specified in 780 CMR 16.00 does not exceed 100 miles per hour (161 km/h) 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 (161 km/h), or building heights are in excess of 40 feet (12 192 mm), tests or calculations indicating compliance with 780 CMR 16.00 shall be submitted. Vinyl siding shall be secured to the building so as to provide weather protection for the exterior walls of the building.

1405.13.1 Application. The siding shall be applied over sheathing or materials listed in 780 CMR 2304.6. Siding shall be applied to conform with the weather-resistant barrier requirements in 780 CMR 1403.0. 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 0.125-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 0.75 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.

1405.14 Cement Plaster. Cement plaster applied to exterior walls shall conform to the requirements specified in 780 CMR 25.00.

1405.15 Fiber Cement Siding. Fiber cement siding complying with 780 CMR 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 in the manufacturer's compliance report and approved installation instructions. Where specified, the siding shall be installed over sheathing or materials listed in 780 CMR 2304.6 and shall be installed to conform to the weather-resistant barrier requirements in 780 CMR 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 one 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 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 one-inch (25 mm) nominal thickness or of wood structural panels as specified in Table 2304.5(3).

1405.17 Fiber Cement Siding.

1405.17.1 Panel Siding. Panels shall be installed with the long dimension parallel to framing. Vertical joints shall occur over framing members and shall be sealed with caulking or covered with battens. Horizontal joints shall be flashed with Z-flashing and blocked with solid wood framing.

1405.17.2 Horizontal Lap Siding. Lap siding shall be lapped a minimum of 1¼ inches (32 mm) and shall have the ends sealed with caulking, covered with an H-section joint cover or located over a strip of flashing. Lap siding courses shall be permitted to be installed with the fastener heads exposed or concealed, according to approved manufacturers' instructions.

780 CMR 1406.0 COMBUSTIBLE MATERIALS ON THE EXTERIOR SIDE OF EXTERIOR WALLS

1406.1 General. 780 CMR 1406.0 shall apply to exterior wall coverings, balconies and similar appendages, and bay and oriel windows constructed of combustible materials.

1406.2 Combustible Exterior Wall Coverings. Combustible exterior wall coverings shall comply with 780 CMR 1406.2.

Exception. Plastics complying with 780 CMR 26.00.

1406.2.1 Ignition Resistance. 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).
4. Exterior wall coverings on exterior walls of Type V construction.

1406.2.1.1 Fire Separation Five Feet or less. Where installed on exterior walls having a fire separation distance of five feet (1524 mm) or less, combustible exterior wall coverings shall not exhibit sustained flaming as defined in NFPA 268.

1406.2.1.2 Fire Separation Greater than Five Feet. For fire separation distances greater than five feet (1524 mm), an assembly 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 assembly shall be determined from Table 1406.2.1.2 based on the maximum tolerable level of incident radiant heat flux that does not cause sustained flaming of the assembly.

1406.2.2 Architectural Trim. In buildings of Type I, II, III and IV construction that do not exceed three stories or 40 feet (12 192 mm) in height above grade plane, exterior wall coverings shall be permitted to be constructed of wood where permitted by 780 CMR 1405.4 or other equivalent combustible material. Combustible exterior wall coverings, other than fire-retardant-treated wood complying with 780 CMR 2303.2 for exterior installation, shall not exceed 10% of an exterior wall surface area where the fire separation distance is five feet (1524 mm) or less. Architectural trim that exceeds 40 feet (12 192 mm) in height above grade plane shall be constructed of approved noncombustible materials and shall be secured to the wall with metal or other approved noncombustible brackets.

TABLE 1406.2.1.2 MINIMUM FIRE SEPARATION FOR COMBUSTIBLE VENEERS FIRE SEPARATION DISTANCE (feet)

FIRE SEPARATION DISTANCE (feet)	TOLERABLE LEVEL INCIDENT RADIANT HEAT ENERGY(kW/m^2)	FIRE SEPARATION DISTANCE (feet)	TOLERABLE LEVEL INCIDENT RADIANT HEAT ENERGY(kW/m^2)
5	12.5	16	5.9
6	11.8	17	5.5
7	11	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^2 x°F = .0057 kW/m^2 x K.

1406.2.3 Location. Where combustible exterior wall covering is located along the top of exterior walls, such trim shall be completely backed up by the exterior wall and shall not extend over or above the top of exterior walls.

1406.2.4 Fireblocking. Where the combustible exterior wall covering is furred from the wall and forms a solid surface, the distance between the back of the covering and the wall shall not exceed 1.625 inches (41 mm) and the space thereby created shall be fireblocked in accordance with 780 CMR 717 so that there will be no open space exceeding 100 square feet (9.3 m^2). Where wood furring strips are used, they shall be of approved wood of natural decay resistance or preservative-treated wood.

Exceptions:

1. Fireblocking of cornices is not required in single-family dwellings.
2. Fireblocking shall not be required where installed on noncombustible framing and the face of the exterior wall finish exposed to the concealed space is covered by one of the following materials:
   - 2.1. Aluminum having a minimum thickness of 0.019 inch (0.5 mm);
   - 2.2. Corrosion-resistant steel having a base metal thickness not less than 0.016 inch (0.4 mm) at any point; or
   - 2.3. Other approved noncombustible materials.

1406.3 Balconies and Similar Projections. Balconies and similar projections of combustible construction, other than fire-retardant-treated wood, shall afford the fire-resistance rating required by Table 601 for floor construction or shall be of

Type IV construction as described in 780 CMR 602.4, and the aggregate length shall not exceed 50% of the building perimeter on each floor.

Exceptions:
1. On buildings of Type I and II construction, three stories or less in height, 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 appendages 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 windows 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 of Type I, II, III and IV construction.

780 CMR 1407.0 METAL COMPOSITE MATERIALS (MCM)

1407.1 General. The provisions of 780 CMR 1407.0 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 780 CMR 14.00 and 780 CMR 16.00.

1407.2 Exterior Wall Finish. MCM used as exterior wall finish or as elements of balconies and similar appendages and bay and oriel windows to provide cladding or weather resistance shall comply with 780 CMR 1407.4 through 1407.13.

1407.3 Architectural Trim and Embellishments. MCM used as architectural trim or embellishments shall comply with 780 CMR 1407.7 through 1407.13.

1407.4 Structural Design. MCM systems shall be designed and constructed to resist wind loads as required by 780 CMR 16.00 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 780 CMR 16.00 for wind loads.

1407.6 Weather Resistance. MCM systems shall comply with 780 CMR 1403.0 and shall be designed and constructed to resist wind and rain in accordance with 780 CMR 1407.0 and the manufacturer's installation instructions.

1407.7 Durability. MCM systems shall be constructed of approved materials that maintain the performance characteristics required in 780 CMR 1407.0 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 780 CMR 704.0, evidence shall be submitted to the building official that the required fire-resistance rating is maintained.

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 as an assembly in the maximum thickness intended for use in accordance with ASTM E84.

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 780 CMR 1407.10.1 through 1407.10.4, or 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.

1407.10.2 Thermal Barriers. MCM shall be separated from the interior of a building by an approved thermal barrier consisting of 0.5-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. 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.

1407.10.3 Thermal Barrier Not Required. The thermal barrier specified for MCM in 780 CMR 1407.10.2 is not required where:
1. The MCM system is specifically approved based on tests conducted in accordance with 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 appendages, architectural trim or embellishments.

1407.10.4 Full-scale Tests. The MCM exterior wall assembly 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 780 CMR 1407.10.1 through 1407.10.4 provided such systems comply with 780 CMR 1407.11.1 or 1407.11.2.

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 the grade plane where installed in accordance with 780 CMR 1407.11.1.1 and 1407.11.1.2.

1407.11.1.1 Fire Separation Distance of Five Feet or less. Where the fire separation distance is five feet (1524 mm) or less, the area of MCM shall not exceed 10% of the exterior wall surface.

1407.11.1.2 Fire Separation Distance Greater than Five Feet. Where the fire separation distance is greater than five 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 the grade plane where installed in accordance with 780 CMR 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.

1407.11.2.2 Limitations. Sections of MCM shall not exceed 300 square feet (27.9 m^2) in area and shall be separated by a minimum of four feet (1219 mm) vertically.

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

NON-TEXT PAGE