

2021 Virginia Construction Code

CHAPTER 26 PLASTIC

SECTION 2603 FOAM PLASTIC INSULATION

2603.1 General.

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

2603.1.1 Spray-applied foam plastic.

Single- and multiple-component spray-applied foam plastic insulation shall comply with the provisions of Section 2603 and ICC 1100-2018.

2603.2 Labeling and identification.

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

2603.3 Surface-burning characteristics.

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

Exceptions:

1. Smoke-developed index for interior trim as provided for in [Section 2604.2](#).
2. In cold storage buildings, ice plants, food plants, food processing rooms and similar areas, foam plastic insulation where tested in a thickness of 4 inches (102 mm) shall be permitted in a thickness up to 10 inches (254 mm) where the building is equipped throughout with an automatic sprinkler system in accordance with [Section 903.3.1.1](#). The approved automatic sprinkler system shall be provided in both the room and that part of the building in which the room is located.
3. Foam plastic insulation that is a part of a Class A, B or C roof-covering assembly provided that the assembly with the foam plastic insulation satisfactorily passes [NFPA 276](#) or [UL 1256](#). The smoke-developed index shall not be limited for roof applications.
4. Foam plastic insulation greater than 4 inches (102 mm) in thickness shall have a maximum flame spread index of 75 and a smoke-developed index of 450 where tested at a minimum thickness of 4 inches (102 mm), provided that the end use is approved in accordance with [Section 2603.9](#) using the maximum thickness and density intended for use.
5. Flame spread and smoke-developed indices for foam plastic interior signs in covered and open mall buildings provided that the signs comply with [Section 402.6.4](#).

2603.4 Thermal barrier.

Except as provided for in [Sections 2603.4.1](#) and [2603.9](#), foam plastic shall be separated from the interior of a building by an approved thermal barrier of $\frac{1}{2}$ -inch (12.7 mm) *gypsum wallboard*, heavy timber in accordance with [Section 602.4](#) or a material that is tested in accordance with and meets the acceptance criteria of both the Temperature Transmission Fire Test and the Integrity Fire Test of [NFPA 275](#). Combustible concealed spaces shall comply with [Section 718](#).

2603.4.1 Thermal barrier not required.

The thermal barrier specified in [Section 2603.4](#) is not required under the conditions set forth in [Sections 2603.4.1.1](#) through [2603.4.1.14](#).

2603.4.1.1 Masonry or concrete construction.

A thermal barrier is not required for foam plastic installed in a masonry or concrete wall, floor or roof system where the foam plastic insulation is covered on each face by not less than 1-inch (25 mm) thickness of masonry or concrete.

2603.4.1.2 Cooler and freezer walls.

Foam plastic installed in a maximum thickness of 10 inches (254 mm) in cooler and freezer walls shall:

1. Have a flame spread index of 25 or less a smoke-developed index of not more than 450, where tested in a minimum 4-inch (102 mm) thickness.
2. Have flash ignition and self-ignition temperatures of not less than 600°F and 800°F (316°C and 427°C), respectively.

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3. Have a covering of not less than 0.032-inch (0.8 mm) aluminum or corrosion-resistant steel having a base metal thickness not less than 0.0160 inch (0.4 mm) at any point.
4. Be protected by an automatic sprinkler system in accordance with [Section 903.3.1.1](#). Where the cooler or freezer is within a building, both the cooler or freezer and that part of the building in which it is located shall be sprinklered.

2603.4.1.3 Walk-in coolers.

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

2603.4.1.4 Exterior walls, one-story buildings.

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

2603.4.1.5 Roofing.

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

1. The roof assembly is separated from the interior of the building by wood structural panel sheathing not less than 0.47 inch (11.9 mm) in thickness bonded with exterior glue, with edges supported by blocking, tongue-and-groove joints, other approved type of edge support or an equivalent material.
2. The assembly with the foam plastic insulation satisfactorily passes [NFPA 276](#) or [UL 1256](#).

2603.4.1.6 Attics and crawl spaces.

Within an *attic* or crawl space where entry is made only for service of utilities, foam plastic insulation shall be protected against ignition by 1¹/₂-inch-thick (38 mm) mineral fiber insulation; 1¹/₄-inch-thick (6.4 mm) *wood structural panel*, *particleboard* or *hardboard*; 3¹/₈-inch (9.5 mm) *gypsum wallboard*, corrosion-resistant steel having a base metal thickness of 0.016 inch (0.4 mm); 1¹/₂-inch-thick (38 mm) self-supported spray-applied cellulose insulation in *attic* spaces only or other approved material installed in such a manner that the foam plastic insulation is not exposed. The protective covering shall be consistent with the requirements for the type of construction.

2603.4.1.7 Doors not required to have a fire protection rating.

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

2603.4.1.8 Exterior doors in buildings of Group R-2 or R-3.

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

2603.4.1.9 Garage doors.

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

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

2603.4.1.10 Siding backer board.

Foam plastic insulation of not more than 2,000 British thermal units per square feet (Btu/sq. ft.) (22.7 MJ/m²) as determined by [NFPA 259](#) shall be permitted as a siding backer board with a maximum thickness of 1¹/₂ inch (12.7 mm), provided that it is separated from the interior of the building by not less than 2 inches (51 mm) of mineral fiber insulation or equivalent or where applied as insulation with re-siding over existing wall construction.

2603.4.1.11 Interior trim.

Foam plastic used as interior *trim* in accordance with [Section 2604](#) shall be permitted without a thermal barrier.

2603.4.1.12 Interior signs.

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

2603.4.1.13 Type V construction.

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

1. The maximum thickness of the foam plastic shall be $\frac{3}{4}$ inches (82.6 mm).
2. The density of the foam plastic shall be in the range of 1.5 to 2.0 pcf (24 to 32 kg/m³).
3. The foam plastic shall have a flame spread index of 25 or less and an accompanying smoke-developed index of 450 or less when tested in accordance with [ASTM E84](#) or [UL 723](#).

2603.4.1.14 Floors.

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

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

2603.5 Exterior walls of buildings of any height.

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

2603.5.1 Fire-resistance-rated walls.

Where the wall is required to have a *fire-resistance rating*, data based on tests conducted in accordance with [ASTM E119](#) or [UL 263](#) shall be provided to substantiate that the *fire-resistance rating* is maintained.

2603.5.2 Thermal barrier.

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

Exception: One-story buildings complying with [Section 2603.4.1.4](#).

2603.5.3 Potential heat.

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

Exception: One-story buildings complying with [Section 2603.4.1.4](#).

2603.5.4 Flame spread and smoke-developed indices.

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

Exception: Prefabricated or factory-manufactured panels having minimum 0.020-inch (0.51 mm) aluminum facings and a total thickness of $\frac{1}{4}$ inch (6.4 mm) or less are permitted to be tested as an assembly where the foam plastic core is not exposed in the course of construction.

2603.5.5 Vertical and lateral fire propagation.

Exterior wall assemblies shall be tested in accordance with, and comply with, acceptance criteria of [NFPA 285](#). Where noncombustible materials or combustible materials permitted by [Section 603](#), [803](#), [806](#) or [1405](#) differ from assembly to assembly or within an assembly, multiple tests shall not be required.

Exceptions:

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

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inch (25 mm).

3. *Buildings* equipped throughout with an automatic sprinkler system in accordance with [Section 903.3.1.1](#).

2603.5.6 Label required.

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

2603.5.7 Ignition.

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

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

1. A thermal barrier complying with [Section 2603.4](#).
2. A minimum 1-inch (25 mm) thickness of concrete or masonry.
3. Glass-fiber-reinforced concrete panels of a minimum thickness of $\frac{3}{8}$ inch (9.5 mm).
4. Metal-faced panels having minimum 0.019-inch-thick (0.48 mm) aluminum or 0.016-inch-thick (0.41 mm) corrosion-resistant steel outer facings.
5. A minimum $\frac{7}{8}$ -inch (22.2 mm) thickness of stucco complying with [Section 2510](#).
6. A minimum $\frac{1}{4}$ -inch (6.4 mm) thickness of *fiber-cement* lap, panel or shingle siding complying with [Section 1404.16](#) and [Section 1404.16.1](#) or [1404.16.2](#).

2603.6 Roofing.

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

2603.7 Foam plastic in plenums as interior finish or interior trim.

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

Exceptions:

1. Foam plastic in plenums used as interior wall or ceiling finish, or interior *trim*, shall exhibit a *flame spread index* of 75 or less and a *smoke-developed index* of 450 or less when tested in accordance with [ASTM E84](#) or [UL 723](#) at the maximum thickness and density intended for use, where it is separated from the airflow in the plenum by a thermal barrier complying with [Section 2603.4](#).
2. Foam plastic in plenums used as interior wall or ceiling finish, or interior *trim*, shall exhibit a *flame spread index* of 75 or less and a *smoke-developed index* of 450 or less when tested in accordance with [ASTM E84](#) or [UL 723](#) at the maximum thickness and density intended for use, where it is separated from the airflow in the plenum by corrosion-resistant steel having a base metal thickness of not less than 0.0160 inch (0.4 mm).
3. Foam plastic in plenums used as interior wall or ceiling finish, or interior *trim*, shall exhibit a *flame spread index* of 75 or less and a *smoke-developed index* of 450 or less when tested in accordance with [ASTM E84](#) or [UL 723](#) at the maximum thickness and density intended for use, where it is separated from the airflow in the plenum by not less than a 1-inch (25 mm) thickness of masonry or concrete.

2603.8 Protection against termites.

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

Exceptions:

1. Buildings where the structural members of walls, floors, ceilings and roofs are entirely of noncombustible materials or preservative-treated wood.
2. An approved method of protecting the foam plastic and structure from subterranean termite damage is provided.
3. On the interior side of basement walls.

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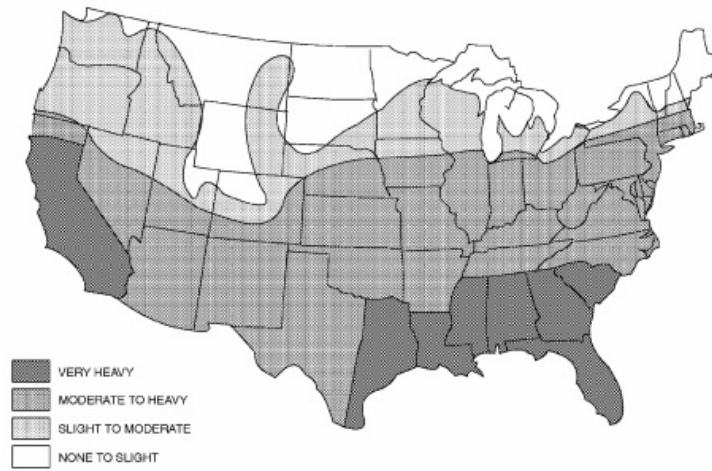


FIGURE 2603.8
TERMITE INFESTATION PROBABILITY MAP

2603.9 Special approval.

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

[BS] 2603.10 Wind resistance.

Foam plastic insulation complying with [ASTM C578](#) and [ASTM C1289](#) and used as *exterior wall* sheathing on framed wall assemblies shall comply with ANSI/FS 100 for wind pressure resistance.

[BS] 2603.11 Cladding attachment over foam sheathing to masonry or concrete wall construction.

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

Exceptions:

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

[BS] 2603.12 Cladding attachment over foam sheathing to cold-formed steel framing.

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

Exceptions:

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

[BS] 2603.12.1 Direct attachment.

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

[BS]TABLE 2603.12.1

CLADDING MINIMUM FASTENING REQUIREMENTS FOR DIRECT ATTACHMENT OVER FOAM PLASTIC SHEATHING TO SUPPORT CLADDING WEIGHT^a

CLADDING FASTENER THROUGH FOAM SHEATHING INTO:	CLADDING FASTENER TYPE AND MINIMUM SIZE ^b	CLADDING FASTENER VERTICAL SPACING (inches)	MAXIMUM THICKNESS OF FOAM SHEATHING ^c (inches)							
			16" o.c. fastener horizontal spacing				24" o.c. fastener horizontal spacing			
			Cladding weight				Cladding weight			
			3 psf	11 psf	18 psf	25 psf	3 psf	11 psf	18 psf	25 psf
Cold-formed steel framing (minimum penetration of steel thickness plus 3 threads)	#8 screw into 33 mil steel or thicker	6	3.0 0	2.95	2.20	1.45	3.0 0	2.35	1.25	DR
		8	3.0 0	2.55	1.60	0.60	3.0 0	1.80	DR	DR
		12	3.0 0	1.80	DR	DR	3.0 0	0.65	DR	DR
	#10 screw into 33 mil steel	6	4.0 0	3.50	2.70	1.95	4.0 0	2.90	1.70	0.55
		8	4.0 0	3.10	2.05	1.00	4.0 0	2.25	0.70	DR
		12	4.0 0	2.25	0.70	DR	3.7 0	1.05	DR	DR
	#10 screw into 43 mil steel or thicker	6	4.0 0	4.00	4.00	3.60	4.0 0	4.00	3.45	2.70
		8	4.0 0	4.00	3.70	3.00	4.0 0	3.85	2.80	1.80
		12	4.0 0	3.85	2.80	1.80	4.0 0	3.05	1.50	DR

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

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

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

[BS] 2603.12.2 Furred cladding attachment.

Where steel or wood furring is used to attach cladding over foam sheathing, furring minimum fastening requirements to support the cladding weight shall be as specified in [Table 2603.12.2](#). Where placed horizontally, wood furring shall be *preservative-treated wood* in accordance with [Section 2303.1.9](#) or *naturally durable wood* and fasteners shall be corrosion resistant in accordance [Section 2304.10.6](#). Steel furring shall have a minimum G60 galvanized coating.

[BS]TABLE 2603.12.2

FURRING MINIMUM FASTENING REQUIREMENTS FOR APPLICATION OVER FOAM PLASTIC SHEATHING TO SUPPORT CLADDING WEIGHT^a

					MAXIMUM THICKNESS OF FOAM SHEATHING ^d (inches)

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FURRING MATERIAL	FRAMING MEMBER	FASTENER TYPE AND MINIMUM SIZE ^b	MINIMUM PENETRATION INTO WALL FRAMING (inches)	FASTENER SPACING IN FURRING (inches)	16" o.c. furring			24" o.c. furring ^e				
					Cladding weight			Cladding weight				
					3 psf	11 psf	18 psf	25 psf	3 psf	11 psf	18 psf	25 psf
Minimum 33 mil steel furring or minimum 1x wood furring ^c	33 mil cold-formed steel stud	#8 screw	Steel thickness plus 3 threads	12	30	18	DR	DR	30	18	DR	DR
				16	30	18	DR	DR	28	18	DR	DR
				24	28	18	DR	DR	20	18	DR	DR
		#10 screw	Steel thickness plus 3 threads	12	40	27	DR	DR	31	20	DR	DR
				16	38	24	DR	DR	30	20	DR	DR
				24	34	20	DR	DR	27	20	DR	DR
	43 mil or thicker cold-formed steel stud	#8 Screw	Steel thickness plus 3 threads	12	30	18	DR	DR	30	18	DR	DR
				16	30	18	DR	DR	28	18	DR	DR
				24	28	18	DR	DR	20	18	DR	DR
		#10 screw	Steel thickness plus 3 threads	12	40	28	DR	DR	31	20	DR	DR
				16	40	25	DR	DR	30	20	DR	DR
				24	40	20	DR	DR	30	20	DR	DR

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

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

a. Wood furring shall be spruce-pine-fir or any softwood species with a specific

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gravity of 0.42 or greater. Steel furring shall be minimum 33 ksi steel. Cold-formed steel studs shall be minimum 33 ksi steel for 33 mil and 43 mil thickness and 50 ksi steel for 54 mil steel or thicker.

- b. Screws shall comply with the requirements of [AISI S240](#).
- c. Where the required cladding fastener penetration into wood material exceeds 3/4 inch and is not more than 1 1/2 inches, a minimum 2-inch nominal wood furring or an approved design shall be used.
- d. Foam sheathing shall have a minimum compressive strength of 15 pounds per square inch in accordance with [ASTM C578](#) or [ASTM C1289](#).
- e. Furring shall be spaced not more than 24 inches on center, in a vertical or horizontal orientation. In a vertical orientation, furring shall be located over wall studs and attached with the required fastener spacing. In a horizontal orientation, the indicated 8-inch and 12-inch fastener spacing in furring shall be achieved by use of two fasteners into studs at 16 inches and 24 inches on center, respectively.

[BS] 2603.13 Cladding attachment over foam sheathing to wood framing.

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

Exceptions:

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

[BS] 2603.13.1 Direct attachment.

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

**[BS]TABLE 2603.13.1
CLADDING MINIMUM FASTENING REQUIREMENTS FOR DIRECT ATTACHMENT OVER FOAM PLASTIC
SHEATHING TO SUPPORT CLADDING WEIGHT^a**

CLADDING FASTENER THROUGH FOAM SHEATHING INTO:	CLADDING FASTENER TYPE AND MINIMUM SIZE ^b	CLADDING FASTENER VERTICAL SPACING (INCHES)	MAXIMUM THICKNESS OF FOAM SHEATHING ^c (INCHES)							
			16" o.c. fastener horizontal spacing				24" o.c. fastener horizontal spacing			
			Cladding weight:				Cladding weight:			
			3 psf	11 psf	18 psf	25 psf	3 psf	11 psf	18 psf	25 psf
Wood Framing (minimum 1 1/4-inch penetration)	0.113" diameter nail	6	2.00	1.45	0.75	DR	2.00	0.85	DR	DR
		8	2.00	1.00	DR	DR	2.00	0.55	DR	DR
		12	2.00	0.55	DR	DR	1.85	DR	DR	DR
	0.120" diameter nail	6	3.00	1.70	0.90	0.55	3.00	1.05	0.50	DR
		8	3.00	1.20	0.60	DR	3.00	0.70	DR	DR
		12	3.00	0.70	DR	DR	2.15	DR	DR	DR
	0.131" diameter nail	6	4.00	2.15	1.20	0.75	4.00	1.35	0.70	DR
		8	4.00	1.55	0.80	DR	4.00	0.90	DR	DR
		12	4.00	0.90	DR	DR	2.70	0.50	DR	DR
	0.162" diameter nail	6	4.00	3.55	2.05	1.40	4.00	2.25	1.25	0.80
		8	4.00	2.55	1.45	0.95	4.00	1.60	0.85	0.50
		12	4.00	1.60	0.85	0.50	4.00	0.95	DR	DR

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

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

- Wood framing shall be spruce-pine-fir or any wood species with a specific gravity of 0.42 or greater in accordance with [ANSI/AWC NDS](#).
- Nail fasteners shall comply with [ASTM F1667](#), except nail length shall be permitted to exceed [ASTM F1667](#) standard lengths.
- Foam sheathing shall have a minimum compressive strength of 15 psi in accordance with [ASTM C578](#) or [ASTM C1289](#).

[BS] 2603.13.2 Furred cladding attachment.

Where wood furring is used to attach cladding over foam sheathing, furring minimum fastening requirements to support the cladding weight shall be as specified in [Table 2603.13.2](#). Where placed horizontally, wood furring shall be *preservative-treated wood* in accordance with [Section 2303.1.9](#) or *naturally durable wood* and fasteners shall be corrosion resistant in accordance with [Section 2304.10.6](#).

[BS]TABLE 2603.13.2

FURRING MINIMUM FASTENING REQUIREMENTS FOR APPLICATION OVER FOAM PLASTIC SHEATHING TO SUPPORT CLADDING WEIGHT^{a, b}

FURRING MATERIAL	FRAMING MEMBER	FASTENER TYPE AND MINIMUM SIZE	MINIMUM PENETRATION INTO WALL FRAMING (INCHES)	FASTENER SPACING IN FURRING (INCHES)	MAXIMUM THICKNESS OF FOAM SHEATHING ^d (INCHES)							
					16" o.c. furring ^e				24" o.c. furring ^e			
					Siding weight:				Siding weight:			
					3 psf	11 psf	18 psf	25 psf	3 psf	11 psf	18 psf	25 psf
Minimum 1x Wood Furring ^c	Minimum 2x Wood Stud	0.131" diameter nail	1 ^{1/4}	8	4.0 0	2.4 5	1.4 5	0.9 5	4.0 0	1.6 0	0.8 5	DR
				12	4.0 0	1.6 0	0.8 5	DR	4.0 0	0.9 5	DR	DR
				16	4.0 0	1.1 0	DR	DR	3.0 5	0.6 0	DR	DR
		0.162" diameter nail	1 ^{1/4}	8	4.0 0	4.0 0	2.4 5	1.6 0	4.0 0	2.7 5	1.4 5	0.8 5
				12	4.0 0	2.7 5	1.4 5	0.8 5	4.0 0	1.6 5	0.7 5	DR
				16	4.0 0	1.9 0	0.9 5	DR	4.0 0	1.0 5	DR	DR
		No. 10 wood screw	1	12	4.0 0	2.3 0	1.2 0	0.7 0	4.0 0	1.4 0	0.6 0	DR
				16	4.0 0	1.6 5	0.7 5	DR	4.0 0	0.9 0	DR	DR
				24	4.0 0	0.9 0	DR	DR	2.8 5	DR	DR	DR
		1/4" lag screw	1 ^{1/2}	12	4.0 0	2.6 5	1.5 0	0.9 0	4.0 0	1.6 5	0.8 0	DR
				16	4.0 0	1.9 5	0.9 5	0.5 0	4.0 0	1.1 0	DR	DR
				24	4.0 0	1.1 0	DR	DR	3.2 5	0.5 0	DR	DR

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

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

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- a. Wood framing and furring shall be spruce-pine-fir or any wood species with a specific gravity of 0.42 or greater in accordance with ANSI/AWC NDS.
- b. Nail fasteners shall comply with ASTM F1667, except nail length shall be permitted to exceed ASTM F1667 standard lengths.
- c. Where the required cladding fastener penetration into wood material exceeds 3/4 inch and is not more than 1 1/2 inches, a minimum 2-inch nominal wood furring or an approved design shall be used.
- d. Foam sheathing shall have a minimum compressive strength of 15 psi in accordance with ASTM C578 or ASTM C1289.
- e. Furring shall be spaced not greater than 24 inches on center in a vertical or horizontal orientation. In a vertical orientation, furring shall be located over wall studs and attached with the required fastener spacing. In a horizontal orientation, the indicated 8-inch and 12-inch fastener spacing in furring shall be achieved by use of two fasteners into studs at 16 inches and 24 inches on center, respectively.