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DrJ Research Report

DRR 1509-10

Prescriptive Requirements for
Installation of Vinyl Siding over Foam
Plastic Insulating Sheathing

Foam Sheathing Committee (FSC) Members

Code Compliance Process:

Prescriptive requirements for installation of vinyl siding over foam plastic insulating sheathing (FPIS) when used as insulating material in exterior wall assemblies

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Issue Date:
August 9, 2012
Revision Date:
October 16, 2020

For current information on this topic refer to
Quick Guide: Code-Compliant Vinyl Siding Applications over FPIS ci

REPORT HOLDER INFORMATION:

Foam Sheathing Committee (FSC) Members

fsc.americanchemistry.com/Members

continuousinsulation.org

DIVISION: 07 00 00 - THERMAL AND MOISTURE PROTECTION

SECTION: 07 21 00 - Thermal Insulation

SECTION: 07 46 00 - Siding

SECTION: 07 46 33 - Plastic Siding

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1 Code Compliance Process Evaluated[1]

1.1 Prescriptive requirements for installation of vinyl siding over foam plastic insulating sheathing (FPIS) when used as insulating material in exterior wall assemblies

2 Applicable Codes and Standards[2,3]

2.1 *Codes*

2.1.1 *IBC—12, 15, 18: International Building Code®*

2.1.2 *IRC—12, 15, 18: International Residential Code®*

2.2 *Standards and Referenced Documents*

2.2.1 *ASCE/SEI 7: Minimum Design Loads and Associated Criteria for Buildings and Other Structures*

2.2.2 *ASTM C1289: Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board*

2.2.3 *ASTM C578: Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation*

2.2.4 *ASTM D3679: Standard Specification for Rigid Poly(Vinyl Chloride) (PVC) Siding*

2.2.5 *SBCA ANSI/FS 100: Standard Requirements for Wind Pressure Resistance of Foam Plastic Insulating Sheathing Used in Exterior Wall Covering Assemblies*

3 Evaluation Scope

3.1 This research report addresses code compliance of the products listed in Section 4.1 with respect to their use with vinyl siding in exterior wall assemblies.

3.2 This research report is limited to exterior applications where the FPIS product is used as an exterior wall sheathing that is required to resist transverse wind loading only.

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[1] Building codes require data from valid research reports be obtained from *approved sources*. Work of licensed *registered design professionals* (RDPs) meets the code requirements for approval by the *building official*.

Building official approval of a licensed RDP is performed by verifying the RDP and/or their business entity complies with all professional engineering laws of the relevant *jurisdiction*. Therefore, the work of licensed RDPs is accepted by *building officials*, except when plan (i.e. peer) review finds an error with respect to a specific section of the code. Where this DRR is not approved, the *building official* responds in writing stating the reasons for disapproval.

For more information on any of these topics or our mission, product evaluation policies, product approval process, and engineering law, visit drjengineering.org or call us at 608-310-6748.

[2] Unless otherwise noted, all references in this DRR are from the 2018 version of the codes and the standards referenced therein (e.g., *ASCE 7, NDS, ASTM*). This material, design, or method of construction also complies with the 2000-2015 versions of the referenced codes and the standards referenced therein.

[3] All terms defined in the applicable building codes are italicized.

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3.3 For guidance on specific matters of code compliance, refer to the locally applicable building code, manufacturer's installation instructions for specified materials, and the research reports listed in Section 7 that address specific code compliance topics for appropriate application of FPIS materials.

3.4 Any code compliance issues not specifically addressed in this section are outside the scope of this DRR.

3.5 Any engineering evaluation conducted for this DRR was performed on the dates provided in this DRR and within DrJ's professional scope of work.

4 Product Description and Materials

4.1 This research report applies to the following manufacturers and products:

4.1.1 Atlas Roofing Corporation – Energy Shield®, Energy Shield® Pro, Energy Shield® Pro2, Energy Shield® CGF, Stucco Shield®, ThermalStar® LCi™, and ThermalStar® LCi-SS™

4.1.2 BASF Corporation – Neopor®

4.1.3 DuPont de Nemours, Inc. – Tuff-R™, Super Tuff-R™, Tuff-R™ C, Super Tuff-R™ C, Thermax™, Isocast™ R, and Styrofoam™

4.1.4 Hunter Panels – Xci Foil (Class A), Xci CG (Class A), Xci 286, Xci Ply (Class A), Xci Foil, Xci CG, Xci Ply, and Xci NB

4.1.5 Rmax – R-Matte® Plus-3, Durasheath®, Thermasheath®, Thermasheath®-XP, Thermasheath®-SI, ECOMAXci® FR, ECOMAXci® FR White, TSX-8500, TSX-8510, ECOMAXci® FR Ply, and ECOMAXci® Air Barrier

4.2 FPIS products listed in Section 4.1 and used in accordance with this research report shall comply with the following material standards:

4.2.1 Expanded polystyrene (EPS) manufactured in compliance with *ASTM C578*

4.2.2 Extruded polystyrene (XPS) manufactured in compliance with *ASTM C578*

4.2.3 Polyisocyanurate (Polyiso) manufactured in compliance with *ASTM C1289*

4.3 FPIS products are produced under proprietary manufacturing processes and are formed into rigid insulation panels.

4.4 EPS and XPS FPIS complying with *ASTM C578* are used with the following:

4.4.1 No facings

4.4.2 Facings on one side

4.4.3 Facings on both sides

4.5 Polyiso FPIS complying with *ASTM C1289* must have facings on both sides.

4.6 FPIS products are typically available in the following sizes:

4.6.1 Thicknesses range from ½" to 6".

4.6.2 The standard product width is 48".

4.6.3 Standard lengths include 96", 108", and 120".

4.6.4 Consult manufacturer for availability of product with non-standard width or length.

4.7 Consult FPIS manufacturer and manufacturers of other wall components for material property data regarding vapor permeability, WRB qualification, air barrier qualification, fire performance properties, and other matters required to ensure an overall code-compliant wall assembly. See Section 7 for additional information.

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FIGURE 1. EXAMPLES OF POLYISO, XPS, AND EPS FPIS

5 APPLICATIONS

5.1 *Minimum Installation Requirements for FPIS Applied to Light-Frame Wall Framing Members*

5.1.1 Light-frame wood framing members supporting FPIS products shall have a nominal thickness of not less than 2" (1½" actual).

5.1.2 Light-frame steel framing members shall have a flange width of not less than 1½" (including bend radius at web and lip).

5.1.3 Framing members shall be spaced a maximum of 24" o.c.

5.1.4 FPIS products shall be attached to the wall framing in accordance with the manufacturer's installation instructions.

5.1.5 All sheathing edges shall be supported by wall framing or blocking. Blocking at horizontal sheathing joints located between the top and bottom plates of a wall shall not be required when it is determined to be unnecessary through approved analysis.

5.2 *Vinyl Siding over FPIS Installation Requirements in the IRC*

5.2.1 General vinyl siding fastener requirements are listed in *IRC* Table R703.3(1) and *IRC* Table R703.3(2) which include fasteners for vinyl siding over FPIS into studs.

5.2.1.1 Wood studs: 0.12" nail (shank) with a 0.313" diameter head and references (*IRC* Section R703.11.2).

5.2.1.2 Cold-formed steel (CFS) studs: No. 8 screws with a head diameter equal to or greater than 0.313" (*IRC* Table R703.3(2), Footnote b)

5.2.2 Where FPIS is applied directly over an approved backing material capable of independently resisting the design wind pressure, vinyl siding shall be installed in accordance with the manufacturer's installation instructions (*IRC* Section R703.11.2).

5.2.2.1 Where vinyl siding and FPIS are applied over structural panels and siding is fastened into studs (*IRC* Section R703.11.1)

5.2.2.2 Where vinyl siding and FPIS are applied over structural panels and siding is fastened into sheathing (*IRC* Section R703.3.2 and Table R703.3.2)

5.2.3 Where the vinyl siding manufacturer provides an approved design wind pressure rating for installation over FPIS, vinyl siding shall be installed in accordance with the manufacturer's installation instructions per *IRC* Section R703.11.2.[4]

5.2.4 Where FPIS does not qualify as an approved backing material capable of independently resisting the design wind pressure (*IRC* Section R703.11.2), one of the following must be met:

5.2.4.1 2018 *IRC* Compliance

[4] 2015 *IRC* Section R703.11.2.3

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5.2.4.1.1 The siding shall have a design wind pressure resistance in accordance with *IRC* Table R703.11.2.

5.2.4.2 2015 *IRC* Compliance

5.2.4.2.1 Where ultimate design wind speed does not exceed 115 miles per hour and Exposure Category is B and gypsum wallboard or equivalent is installed on the side of the wall opposite the FPIS, the following requirements must be met per 2015 *IRC* Section R703.11.2.1:

5.2.4.2.1.1 Siding fastener penetration into wood framing shall be 1¼" using minimum 0.120" nail shanks with a minimum 0.313" diameter head, 16" o.c.

5.2.4.2.1.2 Minimum FPIS shall be as follows:

5.2.4.2.1.2.1 ½ inch thick extruded polystyrene per *ASTM C578*

5.2.4.2.1.2.2 ½ inch thick polyisocyanurate per *ASTM C1289*

5.2.4.2.1.2.3 1 inch thick expanded polystyrene per *ASTM C578*

5.2.4.2.2 Where basic wind speed exceeds 1153 miles per hour or Exposure Category is C or D or all conditions described at Section 5.2.4.2 are not met (2015 *IRC* Section R703.11.2.2):

5.2.4.2.2.1 The adjusted design pressure rating for the assembly shall meet or exceed the loads listed in *IRC* Table R301.2(2) (Figure 2) adjusted for height and exposure using *IRC* Table R301.2(3) (Figure 3).

	ZONE	EFFECTIVE WIND AREA (feet²)	ULTIMATE DESIGN WIND SPEED, V_{ult} (mph)																	
			110		115		120		130		140		150		160		170		180	
Wall	4	10	13.1	-14.0	14.3	-15.0	15.5	-16.0	18.2	-19.0	21.2	-22.0	24.3	-26.0	27.7	-30.0	31.2	-33.0	35.0	-37.9
	4	20	12.5	-13.0	13.6	-14.0	14.8	-16.0	17.4	-19.0	20.2	-22.0	23.2	-25.0	26.4	-28.0	29.7	-32.0	33.4	-36.4
	4	50	11.7	-12.0	12.8	-14.0	13.9	-15.0	16.3	-17.0	19.0	-20.0	21.7	-23.0	24.7	-27.0	27.9	-30.0	31.3	-34.3
	4	100	11.1	-12.0	12.1	-13.0	13.2	-14.0	15.5	-17.0	18.0	-19.0	20.6	-22.0	23.5	-25.0	26.5	-29.0	29.8	32.7
	4	500	10.0	-10.0	10.6	-11.0	11.6	-12.0	13.6	-15.0	15.8	-17.0	18.1	-20.0	20.6	-22.0	23.2	-25.0	26.1	-29.0
	5	10	13.1	-17.0	14.3	-19.0	15.5	-20.0	18.2	-24.0	21.2	-28.0	24.3	-32.0	27.7	-37.0	31.2	-41.0	35.0	-46.8
	5	20	12.5	-16.0	13.6	-17.0	14.8	-19.0	17.4	-22.0	20.2	-26.0	23.2	-30.0	26.4	-34.0	29.7	-39.0	33.4	-43.7
	5	50	11.7	-14.0	12.8	-16.0	13.9	-17.0	16.3	-20.0	19.0	-23.0	21.7	-27.0	24.7	-31.0	27.9	-35.0	31.3	-39.5
	5	100	11.1	-13.0	12.1	-14.0	13.2	-16.0	15.5	-19.0	18.0	-22.0	20.6	-25.0	23.5	-28.0	26.5	-32.0	29.8	-36.4
	5	500	10.0	-10.0	10.6	-11.0	11.6	-12.0	13.6	-15.0	15.8	-17.0	18.1	-20.0	20.6	-22.0	23.2	-25.0	26.1	-29.0

For SI: 1 foot = 304.8 mm, 1 square foot = 0.0929 m², 1 mile per hour = 0.447 m/s, 1 pound per square foot = 0.0479 kPa.

a. The effective wind area shall be equal to the span length multiplied by an effective width. This width shall be permitted to be not less than one-third the span length. For cladding fasteners, the effective wind area shall not be greater than the area that is tributary to an individual fastener.

b. For effective areas between those given, the load shall be interpolated or the load associated with the lower effective area shall be used.

c. Table values shall be adjusted for height and exposure by multiplying by the adjustment coefficient in Table R301.2(3).

d. See Figure R301.2(7) for location of zones.

e. Plus and minus signs signify pressures acting toward and away from the building surfaces.

FIGURE 2. *IRC* TABLE R301.2(2) COMPONENT AND CLADDING LOADS, MEAN ROOF HEIGHT OF 30 FT AND EXPOSURE B

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MEAN ROOF HEIGHT	EXPOSURE		
	B	C	D
15	1.00	1.21	1.47
20	1.00	1.29	1.55
25	1.00	1.35	1.61
30	1.00	1.40	1.66
35	1.05	1.45	1.70
40	1.09	1.49	1.74
45	1.12	1.53	1.78
50	1.16	1.56	1.81
55	1.19	1.59	1.84
60	1.22	1.62	1.87

FIGURE 3. *IRC* TABLE R301.2(3) HEIGHT AND EXPOSURE ADJUSTMENT COEFFICIENTS FOR TABLE R301.2(2)

5.2.4.2.3 The design wind pressure rating of the vinyl siding for installation over solid sheathing provided by the manufacturer shall be adjusted as follows:

5.2.4.2.3.1 For wall assemblies with FPIS on the exterior side and gypsum wallboard or equivalent on the interior side, the vinyl siding's design wind pressure rating shall be multiplied by 0.39.

5.2.4.2.3.2 For wall assemblies with FPIS on the exterior side and no gypsum wallboard or equivalent on the interior side, the vinyl siding's design wind pressure rating shall be multiplied by 0.27.

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5.2.5 *Wood Framing:*

5.2.5.1 *IRC* Section R703.15 includes requirements for prescriptive cladding attachment (direct and over furring) over FPIS by cladding weight, which would include vinyl siding in the 3 psf cladding weight category.

5.2.5.2 Cladding direct attachment over FPIS to wood framing members are provided in *IRC* Section R703.15.1, specifically Table R703.15.1 (Figure 4).

CLADDING FASTENER THROUGH FOAM SHEATHING	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 = 0.0479 kPa, 1 pound per square inch = 6.895 kPa.
DR = Design Required.
o.c. = On Center.
a. Wood framing shall be Spruce-pine-fir or any wood species with a specific gravity of 0.42 or greater in accordance with AWC NDS.
b. Nail fasteners shall comply with ASTM F1667, except nail length shall be permitted to exceed ASTM F1667 standard lengths.
c. Foam sheathing shall have a minimum compressive strength of 15 psi in accordance with ASTM C578 or ASTM C1289.

FIGURE 4. *IRC* TABLE R703.15.1 DIRECT ATTACHMENT TO WOOD FRAMING

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5.2.5.3 Cladding furring attachment over FPIS to wood framing members are provided in *IRC* Section R703.15.2 and Table R703.15.2 (Figure 5).

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 1× wood furring[c]	Minimum 2× wood stud	0.131″ diameter nail	$1^1/_4$	8	4.00	2.45	1.45	0.95	4.00	1.60	0.85	DR
				12	4.00	1.60	0.85	DR	4.00	0.95	DR	DR
				16	4.00	1.10	DR	DR	3.05	0.60	DR	DR
		0.162″ diameter nail	$1^1/_4$	8	4.00	4.00	2.45	1.60	4.00	2.75	1.45	0.85
				12	4.00	2.75	1.45	0.85	4.00	1.65	0.75	DR
				16	4.00	1.90	0.95	DR	4.00	1.05	DR	DR
		No.10 wood screw	1	12	4.00	2.30	1.20	0.70	4.00	1.40	0.60	DR
				16	4.00	1.65	0.75	DR	4.00	0.90	DR	DR
				24	4.00	0.90	DR	DR	2.85	DR	DR	DR
		$^1/_4$″ lag screw	$1^1/_2$	12	4.00	2.65	1.50	0.90	4.00	1.65	0.80	DR
				16	4.00	1.95	0.95	0.50	4.00	1.10	DR	DR
				24	4.00	1.10	DR	DR	3.25	0.50	DR	DR

For SI: 1 inch = 25.4 mm, 1 pound per square foot = 0.0479 kPa, 1 pound per square inch = 6.895 kPa.

DR = Design Required.

o.c. = On Center.

a. Wood framing and furring shall be Spruce-pine-fir or any wood species with a specific gravity of 0.42 or greater in accordance with 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× 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 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.

FIGURE 5. *IRC* TABLE R703.15.2 FURRING ATTACHMENT TO WOOD FRAMING

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5.2.6 *CFS Framing:*

5.2.6.1 *IRC* Section R703.16 includes requirements for prescriptive cladding attachment (direct and over furring) over FPIS by cladding weight, which would include vinyl siding in the 3 psf cladding weight category.

5.2.6.2 Cladding direct attachment over FPIS to CFS framing members are provided in *IRC* Section R703.16.1, specifically Table R703.16.1 (Figure 6).

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
Steel framing (minimum penetration of steel thickness + 3 threads)	No. 8 screw into 33-mil steel or thicker	6	3.00	2.95	2.20	1.45	3.00	2.35	1.25	DR
		8	3.00	2.55	1.60	0.60	3.00	1.80	DR	DR
		12	3.00	1.80	DR	DR	3.00	0.65	DR	DR
	No. 10 screw into 33-mil steel	6	4.00	3.50	2.70	1.95	4.00	2.90	1.70	0.55
		8	4.00	3.10	2.05	1.00	4.00	2.25	0.70	DR
		12	4.00	2.25	0.70	DR	3.70	1.05	DR	DR
	No. 10 screw into 43-mil steel or thicker	6	4.00	4.00	4.00	3.60	4.00	4.00	3.45	2.70
		8	4.00	4.00	3.70	3.00	4.00	3.85	2.80	1.80
		12	4.00	3.85	2.80	1.80	4.00	3.05	1.50	DR

For SI: 1 inch = 25.4 mm, 1 mil = 0.0254 mm, 1 pound per square foot = 0.0479 kPa, 1 pound per square inch = 6.895 kPa.
DR = Design Required.
o.c. = On Center.
a. Steel framing shall be minimum 33 ksi steel for 33 mil and 43 mil steel, and 50 ksi steel for 54 mil steel or thicker.
b. Screws shall comply with the requirements of ASTM C1513.
c. Foam sheathing shall have a minimum compressive strength of 15 psi in accordance with ASTM C578 or ASTM C1289.

FIGURE 6. *IRC* TABLE R703.16.1 DIRECT ATTACHMENT TO CFS

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5.2.6.3 Cladding furring attachment over FPIS to CFS framing members are provided in *IRC* Section R703.16.2 and Table R703.16.2 (Figure 7).

FURRING MATERIAL	FRAMING MEMBER	FASTENER TYPE AND MINIMUM SIZE[b]	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]			
					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 1× wood furring[c]	33-mil steel stud	No. 8 screw	Steel thickness + 3 threads	12	3.00	1.80	DR	DR	3.00	0.65	DR	DR
				16	3.00	1.00	DR	DR	2.85	DR	DR	DR
				24	2.85	DR	DR	DR	2.20	DR	DR	DR
		No. 10 screw	Steel thickness + 3 threads	12	4.00	2.25	0.70	DR	3.70	1.05	DR	DR
				16	3.85	1.45	DR	DR	3.40	DR	DR	DR
				24	3.40	DR	DR	DR	2.70	DR	DR	DR
	43-mil or thicker steel stud	No. 8 Screw	Steel thickness + 3 threads	12	3.00	1.80	DR	DR	3.00	0.65	DR	DR
				16	3.00	1.00	DR	DR	2.85	DR	DR	DR
				24	2.85	DR	DR	DR	2.20	DR	DR	DR
		No. 10 screw	Steel thickness + 3 threads	12	4.00	3.85	2.80	1.80	4.00	3.05	1.50	DR
				16	4.00	3.30	1.95	0.60	4.00	2.25	DR	DR
				24	4.00	2.25	DR	DR	4.00	0.65	DR	DR

For SI: 1 inch = 25.4 mm, 1 mil = 0.0254 mm, 1 pound per square foot = 0.0479 kPa, 1 pound per square inch = 6.895 kPa.
DR = Design Required.
o.c. = On Center.

a. Wood furring shall be Spruce-pine-fir or any softwood species with a specific gravity of 0.42 or greater. Steel furring shall be minimum 33-ksi steel. 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 ASTM C1513.

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 more than 24 inches (610 mm) 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.

FIGURE 7. *IRC* TABLE R703.16.2 FURRING ATTACHMENT TO CFS

5.2.7 *Masonry or Concrete Wall Construction:*

5.2.7.1 Cladding direct attachment over FPIS by cladding weight for concrete/masonry walls shall be by design in accordance with *IRC* Section R703.17 or per cladding manufacturer's approved installation instructions.

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5.3 *Vinyl Siding over FPIS Installation Requirements in the IBC*

5.3.1 *IBC* Section 1404.14[5] addresses vinyl siding with no foam sheathing.

5.3.2 *Masonry or Concrete Wall Construction:*

5.3.2.1 Cladding direct attachment over FPIS by cladding weight for concrete/masonry walls shall be by design in accordance with *IBC* Section 2603.11 or per cladding manufacturer's approved installation instructions.

5.3.3 *CFS Framing:*

5.3.3.1 *IBC* Section 2603.12 includes requirements for prescriptive cladding attachment (direct and over furring) over FPIS by cladding weight, which would include vinyl siding in the 3 psf cladding weight category.

5.3.3.2 Cladding direct attachment over FPIS to CFS framing members and minimum fastening requirements are provided in IBC Section 2603.12.1 and Table 2603.12.1 (Figure 8).

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	3.00	2.95	2.20	1.45	3.00	2.35	1.25	DR
		8	3.00	2.55	1.60	0.60	3.00	1.80	DR	DR
		12	3.00	1.80	DR	DR	3.00	0.65	DR	DR
	#10 screw into 33 mil steel	6	4.00	3.50	2.70	1.95	4.00	2.90	1.70	0.55
		8	4.00	3.10	2.05	1.00	4.00	2.25	0.70	DR
		12	4.00	2.25	0.70	DR	3.70	1.05	DR	DR
	#10 screw into 43 mil steel or thicker	6	4.00	4.00	4.00	3.60	4.00	4.00	3.45	2.70
		8	4.00	4.00	3.70	3.00	4.00	3.85	2.80	1.80
		12	4.00	3.85	2.80	1.80	4.00	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.
a. Cold-formed steel framing shall be minimum 33 ksi steel for 33 mil and 43 mil steel and 50 ksi steel for 54 mil steel or thicker.
b. Screws shall comply with the requirements of AISI S240.
c. Foam sheathing shall have a minimum compressive strength of 15 pounds per square inch in accordance with ASTM C578 or ASTM C1289.

FIGURE 8. *IBC* TABLE 2603.12.1 DIRECT ATTACHMENT TO CFS

[5] 2015 *IBC* Section 1405.14

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5.3.3.1 Cladding furring attachment over FPIS to CFS framing members and minimum fastening requirements for attachment to furring are provided in *IBC* Section 2603.12.2 and Table 2603.12.2 (Figure 9).

FURRING MATERIAL	FRAMING MEMBER	FASTENER TYPE AND MINIMUM SIZE[b]	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]			
					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	3.00	1.80	DR	DR	3.00	0.65	DR	DR
				16	3.00	1.00	DR	DR	2.85	DR	DR	DR
				24	2.85	DR	DR	DR	2.20	DR	DR	DR
		#10 screw	Steel thickness plus 3 threads	12	4.00	2.25	0.70	DR	3.70	1.05	DR	DR
				16	3.85	1.45	DR	DR	3.40	DR	DR	DR
				24	3.40	DR	DR	DR	2.70	DR	DR	DR
	43 mil or thicker cold-formed steel stud	#8 Screw	Steel thickness plus 3 threads	12	3.00	1.80	DR	DR	3.00	0.65	DR	DR
				16	3.00	1.00	DR	DR	2.85	DR	DR	DR
				24	2.85	DR	DR	DR	2.20	DR	DR	DR
		#10 screw	Steel thickness plus 3 threads	12	4.00	3.85	2.80	1.80	4.00	3.05	1.50	DR
				16	4.00	3.30	1.95	0.60	4.00	2.25	DR	DR
				24	4.00	2.25	DR	DR	4.00	0.65	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 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.

FIGURE 9. *IBC* TABLE 2603.12.2 FURRING ATTACHMENT TO CFS

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5.3.4 *Wood Framing:*

5.3.4.1 *IBC* Section 2603.13 includes requirements for prescriptive cladding attachment (direct and over furring) over FPIS by cladding weight, which would include vinyl siding in the 3 psf cladding weight category.

5.3.4.2 Cladding direct attachment over FPIS to wood framing and minimum fastening requirements for direct attachment are provided in *IBC* Section 2603.13.1 and Table 2603.13.1 (Figure 10).

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.

a. Wood framing shall be spruce-pine-fir or any wood species with a specific gravity of 0.42 or greater in accordance with ANSI/AWC NDS.

b. Nail fasteners shall comply with ASTM F1667, except nail length shall be permitted to exceed ASTM F1667 standard lengths.

c. Foam sheathing shall have a minimum compressive strength of 15 psi in accordance with ASTM C578 or ASTM C1289.

FIGURE 10. *IBC* TABLE 2603.13.1 DIRECT ATTACHMENT TO WOOD FRAMING

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5.3.4.3 Cladding furring attachment over FPIS to wood framing and minimum fastening requirements for attachment to furring are provided in *IBC* Section 2603.13.2 and Table 2603.13.2 (Figure 11).

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	4.00	2.45	1.45	0.95	4.00	1.60	0.85	DR
				12	4.00	1.60	0.85	DR	4.00	0.95	DR	DR
				16	4.00	1.10	DR	DR	3.05	0.60	DR	DR
		0.162" diameter nail	$1^1/_4$	8	4.00	4.00	2.45	1.60	4.00	2.75	1.45	0.85
				12	4.00	2.75	1.45	0.85	4.00	1.65	0.75	DR
				16	4.00	1.90	0.95	DR	4.00	1.05	DR	DR
		No. 10 wood screw	1	12	4.00	2.30	1.20	0.70	4.00	1.40	0.60	DR
				16	4.00	1.65	0.75	DR	4.00	0.90	DR	DR
				24	4.00	0.90	DR	DR	2.85	DR	DR	DR
		$^1/_4$" lag screw	$1^1/_2$	12	4.00	2.65	1.50	0.90	4.00	1.65	0.80	DR
				16	4.00	1.95	0.95	0.50	4.00	1.10	DR	DR
				24	4.00	1.10	DR	DR	3.25	0.50	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 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.

FIGURE 11. *IBC* TABLE 2603.13.2 FURRING ATTACHMENT TO WOOD FRAMING

5.3.4.4 Note, the 2015 *IBC* does not include cladding direct or furring attachment over FPIS by cladding weight for wood framing; however, engineered design would be permitted.

6 INSTALLATION

6.1 *Steps to Determine Vinyl Siding over FPIS Design Parameters*

6.1.1 Step 1: Determine if structure is within the limits of the *IRC* for wind design:

6.1.1.1 If wind design is not required per *IRC* Section R301.2.1.1 and Figure R301.2(5)B[6], Go to Step 2

6.1.1.2 If wind design is required per Figure R301.2(5)B[6] or local jurisdiction, the structure is out of scope of the *IRC* prescriptive wind provisions. Design is required per *IRC* Section R301.2.1.1.

[6] 2015 *IRC* Section R301.2(4)B

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6.1.2 Step 2: Determine the basic wind speed from local jurisdiction or *IRC* Figure R301.2(5)A[7], Exposure Category (*IRC* Section R301.2.1.4), and *mean roof height* of the structure.

6.1.3 Step 3: Determine Component and Cladding Loads (*IRC* Table R301.2(2)).

6.1.3.1 Zone 5 with Effective Wind area = 10 square feet will always control (Figure 2).

6.1.3.2 Negative value will always control.

6.1.3.3 Adjust design value, if necessary (*IRC* Table R301.2(3)), for mean roof height and exposure (Figure 3).

6.1.4 Step 4: Determine vinyl siding product's design wind pressure rating for fastener and stud spacing from manufacturer's literature or other approved source.

6.1.5 Step 5: Determine FPIS product's design wind pressure rating per stud spacing from manufacturer's literature, or other approved source.

6.2 *Steps to Determine Vinyl Siding over FPIS Code Requirements*

6.2.1 If the FPIS product's approved design wind pressure rating exceeds the design wind pressure value determined above, the FPIS product can serve as the vinyl siding backing.

6.2.2 If the vinyl siding product's approved design wind pressure rating when installed over FPIS exceeds the design wind pressure value determined above, the vinyl siding product requires no special backing requirement.

6.2.3 If the vinyl siding approved design wind pressure rating when installed over FPIS and FPIS product's approved design wind pressure rating does not exceed the design wind pressure value determined above, the following steps are required:

6.2.3.1 If the design wind speed = 115 miles per hour or less and Exposure Category is B (*IRC* Section R703.11.2[8])

6.2.3.1.1 Gypsum wallboard or equivalent on wall interior is required.

6.2.3.1.2 Fastener specifications and penetration into framing must be met.

6.2.3.1.3 Minimum FPIS product thicknesses must be met.

6.2.3.2 If the design wind speed is greater than 115 miles per hour or Exposure Category is C or D or all the requirements for *IRC* Section R703.11.2[8] cannot be met:

6.2.3.2.1 The vinyl siding approved design wind pressure rating over solid sheathing must be adjusted as follows:

6.2.3.2.1.1 Where there is gypsum wallboard or equivalent on the interior, multiply vinyl siding approved design wind pressure rating over solid sheathing value by 0.39.

6.2.3.2.1.2 Where there is no gypsum wallboard or equivalent on the interior, multiply vinyl siding approved design wind pressure rating over solid sheathing value by 0.27.

6.3 The following two tables are used as references in the examples that follow. Consult the FPIS manufacturer's information for allowable design wind pressure resistance applicable their specific product.

6.4 Installation shall comply with the manufacturer's installation instructions and this DRR. In the event of a conflict between the manufacturer's installation instructions and this DRR, the more restrictive shall govern.

TABLE 1. FPIS ALLOWABLE WIND PRESSURE

FPIS Material[4]	FPIS Thickness (in)	Allowable Design Wind Pressure Resistance (psf)			
		Walls with Interior Finish[5]		Walls without Interior Finish	
		16" o.c. framing	24" o.c. framing	16" o.c. framing	24" o.c. framing
EPS	¾	21.8	NP	NP	NP

[7] 2015 *IRC* Figure R301.2(4)A

[8] 2015 *IRC* Section R703.11.2.1

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FPIS Material[4]	FPIS Thickness (in)	Allowable Design Wind Pressure Resistance (psf)			
		Walls with Interior Finish[5]		Walls without Interior Finish	
		16" o.c. framing	24" o.c. framing	16" o.c. framing	24" o.c. framing
(Type II, ASTM C578)	1	38.8	19.4	27.2	NP
	≥1½	89.0	39.5	62.3	27.7
Polyiso (Type 1, ASTM C1289)	½	33.3	NP	23.3	NP
	¾	56.4	25.1	39.5	17.6
	1	67.5	30.0	47.2	21.0
	≥1½	77.4	34.4	54.1	24.1
XPS (Type X, ASTM C578)	½ [4]	28.3 [4]	NP	19.8 [4]	NP
	¾	21.4	NP	NP	NP
	1	38.0	29.0	26.6	20.3
	≥1½	78.2	34.7	54.7	24.3

SI: 1 in = 25.4 mm, 1 psf = 0.0479 kN/m²

1. Linear interpolation shall not be permitted.
2. Tabulated resistance values apply to positive and negative wind pressure design loads as applicable.
3. NP = not permitted (allowable design wind pressure less than 17.4 psf)
4. Facers are permissible for EPS and XPS products manufactured in accordance with *ASTM C578*. For ½" XPS, the values in Figure 6 are based on use of polymeric film facers, although facers are not required for FPIS products that meet the requirements of Section 5 without the use of facers. The values for all other thicknesses of XPS and all EPS thicknesses shown in Figure 6 are based on the absence of any facer, although facers may be used for FPIS products provided the requirements of Section 5 are satisfied with the use of facers. Polyiso products are required to have facers in accordance with *ASTM C1289*.
5. Interior finish material shall be minimum ½"-thick gypsum wallboard complying with *ASTM C1396* and installed in accordance with the locally applicable building code.
6. Manufacturer specific wind pressure resistance as published in approved code evaluation reports, if any, shall supersede the values given here.

TABLE 2. SAMPLE VINYL SIDING APPROVED DESIGN WIND PRESSURES

Siding	Max. Stud Spacing (in)	Fastener	Approved Design Wind Pressure (psf) Over Solid Sheathing	Adjusted Design Wind Pressure (psf) Over solid sheathing	
				GWB (0.39)	No GWB (0.27)
Product A	16	Nail to stud	26	10.14	7.02
	16	Staple to stud	23	8.97	6.21
Product B	16	Nail to stud	54	21.06	14.58
	24	Nail to stud	32	12.48	8.64
	16	Staple to stud	38	14.82	10.26
Product C	16	Nail to stud	86	33.54	23.22
	24	Nail to stud	50	19.50	13.50
	16	Staple to stud	56	21.84	15.12

SI: 1 in = 25.4 mm, 1 psf = 0.0479 kN/m²

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6.5 *Example 1*

6.5.1 Design wind pressure for 115 mph, Exposure C, 15 ft Mean Roof Height

6.5.1.1 Zone 5 (Effective wind area 10 ft^2) = -19.0 (Figure 2) adjusted for height and exposure per *IRC* Table R301.2(3) by 1.21 = -23.0 (Figure 3)

6.5.1.2 Stud spacing is 16" o.c. (gyp on interior)

6.5.1.3 Sheathing is 1" FPIS

6.5.1.3.1 All FPIS products, 1 inch or thicker, in qualify as approved backing material with 16" o.c. stud spacing (gyp on interior) per IRC Section R703.11.2[9]

6.5.1.4 Vinyl sidings from Table 2 that would qualify:

6.5.1.4.1 Product C only. Siding must be nailed to stud. 33.54 > 23.0

6.6 *Example 2*

6.6.1 Design wind pressure for 115 mph, Exposure B, less than or equal to 30 ft Mean Roof Height

6.6.1.1 Zone 5 (Effective wind area 10 ft^2) = -19.0 (Figure 2)

6.6.1.2 Stud spacing is 24" o.c. (gyp on interior)

6.6.1.3 Sheathing is 1" EPS

6.6.1.3.1 *IRC* Section R703.11.2[10] allows the use of 1" thick EPS as long as siding fastener requirements are met.

6.6.1.3.2 Table 1 allowable design wind pressure for 1" thick EPS with 24" o.c. studs (gyp interior) = 19.4

6.6.1.4 Vinyl sidings from Table 2 that would qualify:

6.6.1.4.1 All without any adjustment with the 1” EPS as an approved vinyl siding backer (Table 1)

6.7 *Example 3*

6.7.1 Design wind pressure for 130 mph, Exposure D, 25 ft Mean Roof Height

6.7.1.1 Zone 5 (Effective wind area 10 ft^2) = -24.0 (Figure 2) adjusted for height and exposure per *IRC* Table R301.2(3) by 1.61 = -38.64 (Figure 3)

6.7.1.2 Stud spacing is 16" o.c. (gyp on interior)

6.7.1.3 Sheathing is 1" XPS

6.7.1.3.1 Table 1 allowable design wind pressure for 1" XPS with 16" o.c. studs (gyp interior) = 38.0

6.7.1.3.2 It does not qualify as an approved vinyl siding backer.

6.7.1.4 Vinyl sidings from Table 2 that would qualify:

6.7.1.4.1 No siding product listed adjusted by 0.39 qualifies. A higher rated vinyl siding would have to be selected or a different FPIS product or XPS thickness.

LEGACY

[9] 2015 *IRC* Section R703.11.2.2

[10] 2015 *IRC* Section R703.11.2.1

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6.8 *Example 4*

6.8.1 When looking for a vinyl siding with an approved design wind pressure rating for a given basic wind speed, Table 3 may be referenced for guidance.

TABLE 3. DESIGN WIND PRESSURE DIVIDED BY ADJUSTMENT FACTOR

Basic Wind speed (mph)	Highest Design Wind Pressure (psf)	Adjusted Design Wind Pressure (psf)	
		GWB (0.39)	No GWB (0.27)
110	-17.0	-43.59	-62.96
115	-19.0	-48.72	-70.37
120	-20.0	-51.28	-74.07
130	-24.0	-61.54	-88.89
SI: 1 psf = 0.0479 kN/m^2, 1 mph = 1.61 km/h			

6.9 For applications outside the scope of this DRR, an engineered design is required.

7 TEST ENGINEERING SUBSTANTIATING DATA

7.1 *AISI S100: North American Specification for the Design of Cold-formed Steel Structural Members*

7.2 *AISI S200: North American Standard for Cold-Formed Steel Framing – General Provisions*

7.3 *ANSI/AWC NDS: National Design Specification (NDS) for Wood Construction*

7.4 *ANSI/AWC SDPWS: Special Design Provisions for Wind and Seismic*

7.5 *AWC TR 12: General Dowel Equations for Calculating Lateral Connection Values*

7.6 New York State Energy Research and Development Authority (NYSERDA), Fastening Systems for Continuous Insulation, 2010.

7.7 U.S. Department of Energy, The National Renewable Energy Laboratory (NREL), Cladding Attachment Over Thick Exterior Insulation

7.8 ABTG Research Report 1503-02: Attachment of Exterior Wall Coverings Through Foam Plastic Insulating Sheathing (FPIS) to Wood or Steel Wall Framing

7.9 Some information contained herein is the result of testing and/or data analysis by other sources which conform to *IBC* Section 1703 and relevant professional engineering law. DrJ relies on accurate data from these sources to perform engineering analysis. DrJ has reviewed and found the data provided by other professional sources to be credible.

7.10 Where appropriate, DrJ's analysis is based on design values that have been codified into law through codes and standards (e.g., *IBC, IRC, NDS®,* and *SDPWS*). This includes review of code provisions and any related test data that aids in comparative analysis or provides support for equivalency to an intended end-use application. Where the accuracy of design values provided herein is reliant upon the published properties of commodity materials (e.g., lumber, steel, and concrete), DrJ relies upon the grade mark, stamp, and/or design values provided by raw material suppliers to be accurate and conforming to the mechanical properties defined in the relevant material standard.

8 FINDINGS

8.1 Vinyl siding may be installed over FPIS subject to the following conditions:

8.1.1 The siding product shall be installed in compliance with the following:

8.1.1.1 The siding manufacturer's instructions

8.1.1.2 The FPIS manufacturer's instructions

8.1.1.3 The applicable building code

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8.1.2 The vinyl siding manufacturer and FPIS manufacturer shall provide the building official and purchaser with evidence of code compliance for matters beyond the scope of this DRR.

8.2 *IBC* Section 104.11 (*IRC* Section R104.11 and *IFC* Section 104.9 are similar) states:

> **104.11 Alternative materials, design and methods of construction and equipment.** The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative has been *approved*. An alternative material, design or method of construction shall be *approved* where the *building official* finds that the proposed design is satisfactory and complies with the intent of the provisions of this code, and that the material, method or work offered is, for the purpose intended, not less than the equivalent of that prescribed in this code…Where the alternative material, design or method of construction is not *approved*, the *building official* shall respond in writing, stating the reasons the alternative was not *approved*.

8.3 This product has been evaluated in the context of the codes listed in Section 2 and is compliant with all known state and local building codes. Where there are known variations in state or local codes applicable to this evaluation, they are listed here.

8.3.1 No known variations

9 REFERENCES

9.1 The Foam Sheathing Committee (FSC) of the American Chemistry Council sponsors research and tools to support the reliable, efficient, and economic design and installation of foam sheathing. This report is developed by DrJ from a grant provided by FSC. Learn more about foam sheathing at continuousinsulation.org.

10 CONDITIONS OF USE

10.1 The insulated sheathing products listed in Section 4.1 of this report comply with the 2018 and 2015 versions of the *IBC* and *IRC*, or are a code-compliant alternative as specified in the codes listed in Section 2 subject to the following conditions:

10.1.1 Installation shall comply with the manufacturer's installation instructions and this DRR. In the event of a conflict between the manufacturer's installation instructions and this DRR, the more restrictive shall govern.

10.2 The FPIS manufacturer shall provide the building official and purchaser with evidence of code compliance for matters beyond the scope of this DRR.

10.3 Where required by the *building official*, also known as the authority having jurisdiction (AHJ) in which the project is to be constructed, this DRR and the installation instructions shall be submitted at the time of *permit* application.

10.4 Any generally accepted engineering calculations needed to show compliance with this DRR shall be submitted to the AHJ for review and approval.

10.5 Design loads shall be determined in accordance with the building code adopted by the *jurisdiction* in which the project is to be constructed and/or by the Building Designer (e.g., *owner* or *registered design professional*).

10.6 At a minimum, this product shall be installed per Section 6 of this DRR.

10.7 These products are manufactured under a third-party quality control program in accordance with *IBC* Section 104.4 and 110.4 and *IRC* Section R104.4 and R109.2.

10.8 The actual design, suitability, and use of this DRR, for any particular building, is the responsibility of the *owner* or the owner's authorized agent. Therefore, the DRR shall be reviewed for code compliance by the *building official* for acceptance.

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11 IDENTIFICATION

11.1 The product(s) listed in Section 4.1 are identified by a label on the board or packaging material bearing the manufacturer's name, product name, label of the third-party inspection agency, and other information to confirm code compliance.

11.2 Additional technical information can be found at the respective FSC member websites found at fsc.americanchemistry.com/Members.

12 REVIEW SCHEDULE

12.1 For the most recent version or current status of this DRR, visit drjengineering.org or contact DrJ Engineering.

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