

# ICC-ES Evaluation Report

**ESR-4287**

Issued April 2024


This report also contains:

- CBC Supplement

Subject to renewal April 2025

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<p><b>DIVISION: 07 00 00— THERMAL AND MOISTURE PROTECTION</b></p> <p><b>Section: 07 21 00— Thermal Insulation</b></p> <p><b>Section: 07 25 00— Water-Resistive Barriers/Weather Barriers</b></p>	<p><b>REPORT HOLDER: ICP CONSTRUCTION INC.</b></p>	<p><b>EVALUATION SUBJECT: ICP ADHESIVES &amp; SEALANTS HANDIFOAM (HVLP HFO 2.0 AND HVLP MD 2.0) SPRAY- APPLIED INSULATIONS</b></p>	
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## 1.0 EVALUATION SCOPE

### 1.1 Compliance with the following codes:

- 2021, 2018, 2015, 2012 and 2009 [International Building Code® \(IBC\)](#)
- 2021, 2018, 2015, 2012 and 2009 [International Residential Code® \(IRC\)](#)
- 2021, 2018, 2015, 2012 and 2009 [International Energy Conservation Code® \(IECC\)](#)
- 2013 Abu Dhabi International Building Code (ADIBC)<sup>†</sup>
- Other Codes (see Section 8.0)

<sup>†</sup>The ADIBC is based on the 2009 IBC. 2009 IBC code sections referenced in this report are the same sections in the ADIBC.

### Properties evaluated:

- Physical properties
- Surface burning characteristics
- Thermal resistance
- Water vapor transmission
- Attic and crawl space installation
- Air permeability
- Water-resistive barrier
- Fire-resistance-rated construction
- Exterior walls in Types I through IV construction

### 1.2 Evaluation to the following green code(s) and/or standards:

- 2019 [California Green Building Standards Code \(CALGreen\)](#), Title 24, Part 11
- 2020, 2015, 2012 and 2008 [ICC 700 National Green Building Standard™](#) (ICC 700-2020, ICC 700-2015, ICC 700-2012 and ICC 700-2008)

### Attributes verified:

See Section 2.0

## 2.0 USES

HandiFoam (HVLP HFO 2.0 and HVLP MD 2.0) spray-applied polyurethane foam insulations are used as nonstructural thermal insulating material in all types of construction under the IBC and dwellings under the IRC. See Section 4.7 for use in exterior walls of Type I, II, III and IV construction. The insulation is for use in wall cavities, floor/ceiling assemblies, exterior side of vertical foundations or the underside of on-grade slabs. It may be used in attic and crawl spaces as described in Section 4.4. Under the IRC and 2021, 2018 and 2015 IBC, the insulation may be used as air-impermeable insulation when installed in accordance with Section 3.5. When installed in accordance with Section 4.5, the insulation may be used as an alternative to the water-resistive barriers required in 2021 and 2018 IBC Section 1403.2 (2015, 2012 and 2009 IBC Section 1404.2) and IRC Section R703.2. The insulation may be used in fire-resistance-rated wall assemblies when construction is in accordance with Section 4.6.

The attributes of the insulation used as a water-resistive barrier have been verified as conforming to the provisions of (i) CALGreen Section 5.407.1; (ii) ICC 700-2020 Sections 602.1.8, 11.602.1.8, 1202.6 and 13.104.1.4; (iii) ICC 700-2015 Section 602.1.8, 11.602.1.8 and 12.6.602.1.8; (iv) ICC 700-2012 Section 602.1.8, 11.602.1.8 and 12.5.602.1.8; and (v) ICC 700-2008 Section 602.9 for water-resistive barriers. The attributes of the insulation have been verified as conforming to the provisions of ICC 700-2008 Section 703.2.1.1.1(c) as an air impermeable insulation. Note that decisions on compliance for those areas rest with the user of this report. The user is advised of the project-specific provisions that may be contingent upon meeting specific conditions, and the verification of those conditions is outside the scope of this report. These codes or standards often provide supplemental information as guidance.

## 3.0 DESCRIPTION

### 3.1 General:

HandiFoam (HVLP HFO 2.0 and HVLP MD 2.0) are two-component, closed-cell, rigid foam plastic insulations. The insulations are produced in the field by combining an isocyanate component A with a resin component B, resulting in products having a nominal density of 2.0 pcf (32 kg/m<sup>3</sup>). HandiFoam insulations use an A component designated as HandiFoam HVLP. Each insulation uses a different proprietary blend for the B component. The insulation components B have a shelf life of six (6) months, and components A have a shelf life of twelve (12) months when stored in factory-sealed containers at temperatures between 50°F (10°C) and 80°F (27°C) before installation.

### 3.2 Surface-burning Characteristics:

The insulations have a flame-spread index of 25 or less and a smoke-developed index of 450 or less when tested in accordance with ASTM E84 (UL 723) at a maximum thickness of 4 inches (102 mm).

### 3.3 Thermal Resistance, R-values:

The insulations have thermal resistance (*R*-values) at a mean temperature of 75°F (24°C) as shown in [Table 1](#).

### 3.4 Vapor Retarder:

The insulations have a vapor permeance of less than 1 perm [ $5.72 \times 10^{-8} \text{ g}/(\text{Pa}\cdot\text{s}\cdot\text{m}^2)$ ], in accordance with ASTM E96 (Desiccant Method), when applied at the following minimum thicknesses, and qualify as Class II vapor retarders:

HandiFoam HVLP HFO 2.0 = 1.25 inches (32 mm)

HandiFoam HVLP MD 2.0 = 1.50 inches (38 mm)

### 3.5 Air Permeability:

HandiFoam (HVLP HFO 2.0 and HVLP MD 2.0) spray-applied polyurethane foam insulations, at a minimum thickness of 1 inch (25.4 mm), are considered air-impermeable insulation in accordance with 2021, 2018, 2015 and 2012 IRC Section R806.5 (2009 IRC Section R806.4) and 2021 and 2018 IBC Section 1202.3 (2015 IBC Section 1203.3), based on testing in accordance with ASTM E283.

### 3.6 ALDOCOAT 800 Coating:

ALDOCOAT 800 coating, manufactured by Aldo Products Company, is a single-component, water-based latex coating supplied in 5-gallon pails (19 L) and 55-gallon (208 L) drums. The materials have a shelf-life of six (6) months when stored in a factory-sealed container at temperatures of 40°F (4.5°C) and 90°F (32°C).

### 3.7 NoBurn® Plus Coating:

NoBurn® Plus coating, manufactured by No-Burn, Inc., is a translucent aqueous liquid supplied in 1- and 5-gallon (4 and 19 L) pails and 55-gallon (208 L) drums. The coating has a shelf life of three (3) years when stored in a factory-sealed container at temperatures between 40°F (4.5°C) and 90°F (32°C).

### 3.8 NoBurn® Plus XD Coating:

NoBurn® Plus XD coating, manufactured by No-Burn, Inc., is a latex-based coating supplied in 5-gallon (19 L) pails and 55-gallon (208 L) drums. The coating has a shelf life of three (3) years when stored in a factory-sealed container at temperatures between 40°F (4.5°C) and 90°F (32°C).

### 3.9 Flame Seal® TB Coating:

Flame Seal TB coating, manufactured by Flame Seal Products Inc., is a two-component, water-based polymeric intumescent coating, consisting of the Flame Seal TB resin and Flame Seal T50 crosslinking catalyst. The two components are mixed prior to application. The coating is supplied in 5-gallon (19 L) pails (4 gallons (15.1 L) of TB and 1 gallon (3.8 L) of T50) and 50-gallon (189.2 L) drums (40 gallons (151.4 L) of TB and 10 gallon (37.8 L) of T50) and has a shelf-life of twelve months when stored in factory-sealed containers at temperatures between 40°F (4°C) and 90°F (32°C).

### 3.10 DC 315 Intumescent Coating:

DC 315 Intumescent Coating, described in [ESR-3702](#) and manufactured by International Fireproof Technology Inc., is a single-component, water-based, liquid-applied intumescent coating. The coating is supplied in 5-gallon (19L) pails and 55-gallon (208 L) drums and has a shelf-life of one (1) year when stored in factory-sealed containers at temperatures between 50°F (10°C) and 80°F (27°C).

### 3.11 ICP FIRESHELL® F10E Coating:

FIRESHELL® F10E coating, described in [ESR-3997](#), manufactured by ICP Construction, is a proprietary single-component, water-based, liquid-applied intumescent coating. The coating is supplied in 5-gallon (19 L) pails and 55-gallon (208 L) drums and has a shelf-life of one (1) year when stored in factory-sealed containers at temperatures between 45°F (7.2°C) and 95°F (35°C).

### 3.12 ICP FIRESHELL® (IB4) Coating:

FIRESHELL® (IB4) coating, manufactured by ICP Construction, is a proprietary single-component, water-based, liquid-applied intumescent coating. The coating is supplied in 5-gallon (19 L) pails and 55-gallon (208 L) drums and has a shelf-life of one (1) year when stored in factory-sealed containers at temperatures between 45°F (7.2°C) and 75°F (24°C).

### 3.13 FS-IB™ Ignition Barrier Coating:

FS-IB™ Ignition Barrier Coating, manufactured by Flameseal Products, Inc., is a proprietary single-component, water-based latex coating. The coating is supplied in 5-gallon (19 L) pails and 55-gallon (208 L) drums and has a shelf-life of six (6) months when stored in factory-sealed containers at temperatures between 60°F (16°C) and 80°F (27°C).

## 4.0 INSTALLATION

### 4.1 General:

The insulations must be installed in accordance with the manufacturer's published installation instructions, the applicable code and this report. The manufacturer's published installation instructions must be available on the jobsite at all times during installation.

### 4.2 Application:

HandiFoam (HVLP HFO 2.0 and HVLP MD 2.0) spray-applied polyurethane foam insulations are spray-applied at the jobsite by professional insulation contractors combining an isocyanate component "A" with a resin component "B" using a volumetric positive displacement pump as recommended in the manufacturer's published installation instructions. The insulation is applied in passes having a minimum thickness of 1/2 inch (12.7 mm) and a maximum thickness per pass as specified in the manufacturer's published installation instructions, up to the total thickness specified in Sections 3.2, 4.3, 4.4, 4.6 and 4.7 of this report. The insulation passes must be allowed to fully expand and be cured for a minimum of 15 minutes per inch prior to application of an additional pass.

The insulation must not be used in areas that have a maximum service temperature greater than 180°F (82°C). The foam plastic insulation must not be used in electrical outlet or junction boxes. The substrate must be free of moisture, frost or ice, loose scales, rust, oil, and grease or other surface contaminants. The insulation must be protected from the weather during and after application.

#### 4.3 Thermal Barrier:

**4.3.1 Application with a Prescriptive Thermal Barrier:** The spray-applied insulations must be separated from the interior of the building by an approved thermal barrier of 1/2-inch-thick (12.7 mm) gypsum wallboard or an equivalent thermal barrier complying with IBC Section 2603.4 or IRC Section R316.4, as applicable, except where installation is in accordance with Section 4.3.2, or in an attic or crawl space as described in Section 4.4, or when the installation is in sill plates and headers at a total thickness of 3 1/4 inches (83 mm) or less as permitted by IRC Section R316.5.11. There is no thickness limit when installation is behind a code-prescribed thermal barrier, except as noted in Section 4.4.3.

**4.3.2 Application without a Prescriptive Thermal Barrier:** The HandiFoam (HVLP HFO 2.0 and HVLP MD 2.0) insulations may be installed without the thermal barrier prescribed in IBC Section 2603.4 and IRC Section R316.4 in assemblies conforming to one of those described in [Table 2](#). The insulation may be left exposed where indicated in [Table 2](#).

#### 4.4 Ignition Barrier – Attics and Crawl Spaces:

**4.4.1 Application with a Prescriptive Ignition Barrier:** When the spray-applied insulations are installed within attics or crawl spaces where entry is made only for service of utilities, an ignition barrier must be installed in accordance with IBC Section 2603.4.1.6 or IRC Sections R316.5.3 and R316.5.4, as applicable, except where the installation is in accordance with Section 4.4.2. The ignition barrier must be consistent with the requirements for the type of construction required by the applicable code, and must be installed in a manner so that the foam plastic insulation is not exposed.

**4.4.2 Application without a Prescriptive Ignition Barrier:** The HandiFoam (HVLP HFO 2.0 and HVLP MD 2.0) insulations may be installed in attics and crawl spaces as described in this section without the ignition barriers described in IBC Section 2603.4.1.6 and IRC Sections R316.5.3 and R316.5.4, subject to the following conditions:

- a. Entry to the attic or crawl space is to service utilities, and no storage is permitted.
- b. There are no interconnected attic or crawl space areas.
- c. Air in the attic or crawl space is not circulated to other parts of the building.
- d. Attic ventilation is provided when required by 2021 and 2018 IBC Section 1202.2 (2015, 2012 and 2009 IBC Section 1203.2) or IRC Section R806, except when air-impermeable insulation is permitted in unvented attics in accordance with 2021, 2018, 2015 or 2012 IRC Section R806.5 (2009 IRC Section R806.4) or 2021 and 2018 IBC Section 1202.3 (2015 IBC Section 1203.3).
- e. Under-floor (crawl space) ventilation is provided when required by 2021 and 2018 IBC Section 1202.4 [2015 IBC Section 1203.4, 2012 and 2009 IBC Section 1203.3] or IRC Section R408.1, as applicable.
- f. Combustion air is provided in accordance with IMC Sections 701.

In attics, the insulation may be spray-applied to the underside of roof sheathing or roof rafters, and/or vertical surfaces provided the assembly conforms to one of the assemblies described in [Table 3](#). In crawl spaces, the insulations may be spray-applied to the underside of floors and/or vertical surfaces provided the assembly conforms to one of the assemblies described in [Table 3](#). When an intumescent coating is used, surfaces to be coated must be dry, clean, and free of dirt, loose debris and any other substances that could interfere with adhesion of the coating. The intumescent coating must be applied to all surfaces in accordance with the respective coating manufacturer's installation instructions. The coating must be applied when ambient and substrate temperatures are above of 50°F (10°C). The insulations may be installed in unvented attics as described in this section in accordance with 2021, 2018, 2015 and 2012 IRC Section R806.5 (2009 IRC Section R806.4).

**4.4.3 Use on Attic Floors:** The HandiFoam (HVLP HFO 2.0 and HVLP MD 2.0) insulations may be installed in accordance with this section and [Table 3](#) between and over the joists in attic floor. The insulation must be separated from the interior of the building by an approved thermal barrier. The ignition barrier required in IBC Section 2603.4.1.6 and IRC Section R316.5.3 may be omitted.

#### 4.5 Water-resistive Barrier:

The HandiFoam (HVLP MD 2.0) insulations may be used as an alternative to the water-resistive barrier prescribed in 2021 and 2018 IBC Section 1403.2 (2015, 2012 and 2009 IBC Section 1404.2) and IRC Section R703.2, when installed on exterior walls as described in this section.

The insulations must be spray-applied to the exterior side of the sheathing, masonry or other suitable exterior wall substrates to form a continuous layer of 1 inch (25.4 mm) minimum thickness. All construction joints and penetrations must be sealed with HandiFoam (HVLP MD 2.0) insulation.

#### 4.6 Two-hour Fire-resistance-rated Wall Assemblies (Load-bearing):

HandiFoam (HVLP HFO 2.0) may be installed on interior load-bearing two-hour fire-resistance-rated walls, provided the system is installed in accordance with the following:

**4.6.1 Wood Framing:** Two rows on separate plates, 3 inches (76 mm) apart, of minimum 2-by-4 wood studs (No. 2 Douglas fir) spaced a maximum of 16 inches (406 mm) on center.

**4.6.2 Wall Finish:** Base layer of  $\frac{5}{8}$ -inch-thick (15.9 mm), Type X gypsum wallboard is applied horizontally and fastened to each outer side of a double row of studs with 6d by  $1\frac{7}{8}$ -inch-long (48 mm) coated nails, spaced 2 feet (610 mm) on center. Face layer of  $\frac{5}{8}$ -inch-thick (15.9 mm), Type X gypsum board is applied horizontally and fastened to each outer side of studs over the base layer with 8d by  $2\frac{3}{8}$ -inch-long (60 mm) coated nails, spaced 8 inches (203 mm) on centers. Gypsum wallboard joints must be staggered 24 inches (610 mm) between layers and on opposite sides of the wall.

**4.6.3 Insulation:** HandiFoam (HVLP HFO 2.0) is applied in the stud cavities of both rows at a thickness of 3 inches (76 mm).

#### 4.7 Exterior Walls in Types I, II, III and IV Construction:

HandiFoam (HVLP HFO 2.0 and HVLP MD 2.0) may be installed in or on exterior walls of buildings of Type I, II, III and IV construction complying with IBC Section 2603.5 and as described in this section. The maximum thickness of the foam plastic is as set forth in [Table 4](#) or [6](#) when installed on the exterior of the sheathing or  $3\frac{5}{8}$  inches (92 mm) when installed in stud cavities. The potential heat of these HandiFoam spray-applied insulations is 1961 Btu/ft<sup>2</sup> (22.3 MJ/m<sup>2</sup>) per inch of thickness. The wall assembly must be as described in [Table 4](#), [5](#) or [6](#).

## 5.0 CONDITIONS OF USE:

The ICP Construction Inc. spray-applied insulations described in this report comply with, or are suitable alternatives to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:

- 5.1 The spray-applied insulations and the intumescent coatings must be installed in accordance with the manufacturer's published installation instructions, this evaluation report and the applicable code. The instructions within this report govern if there are any conflicts between the manufacturer's published installation instructions and this report.
- 5.2 The spray-applied insulations must be separated from the interior of the building by an approved thermal barrier, as described in Section 4.3, except where installation is in accordance with Section 4.3.2 or where installation is in an attic or crawl space as described in Section 4.4.
- 5.3 The spray-applied insulations must not exceed the thicknesses noted in Section 3.2, 4.3, 4.4, 4.6 or 4.7, as applicable.
- 5.4 The spray-applied insulations must be protected from the weather during application.
- 5.5 The spray-applied insulations must be applied by professional spray polyurethane foam installers approved by ICP Construction Inc. or by the Spray Polyurethane Foam Alliance (SPFA) for the installation of spray polyurethane foam insulation.
- 5.6 Installation in fire-resistance-rated construction must be as described in Section 4.6.
- 5.7 Use of the insulation in areas where the probability of termite infestation is "very high" must be in accordance with 2021, 2018 and 2015 IBC Section 2603.8 [2012 IBC Section 2603.9 (2009 IBC Section 2603.8)] or IRC Section R318.4, as applicable.

- 5.8 Jobsite certification and labeling of the insulation must comply with 2021, 2018 and 2015 IRC Section N1101.10 (2012 IRC Section N1101.14) and 2021, 2018 and 2015 or 2012 IECC Sections C303.1, R303.1 and R401.3 (2009 IECC Sections 303.1 and 401.3).
- 5.9 When used in or on exterior walls of buildings of Type I, II, III and IV construction, the wall assembly must conform to those described in Section 4.7.
- 5.10 When used in unvented attics in accordance with Section 4.4.2 of this report, installation with a vapor diffusion port in accordance with 2021 IBC Section 1202.3, Item 5.2 or 2021 and 2018 IRC Section R806.5, Item 5.2 is outside the scope of this report.
- 5.11 The polyurethane foam plastic insulation components are produced in Houston, Texas; Orange, California and Toronto, Canada under a quality-control program with inspections by ICC-ES.

## 6.0 EVIDENCE SUBMITTED

- 6.1 Data in accordance with the [ICC-ES Acceptance Criteria for Spray-applied Foam Plastic Insulation \(AC377\)](#), dated April 2020, revised April 2020 (editorially revised July 2020), including reports of tests in accordance with Appendix X of AC377.
- 6.2 Data in accordance with ASTM E119 (UL 263).
- 6.3 Reports of water vapor transmission tests in accordance with ASTM E96.
- 6.4 Reports of air leakage testing in accordance with ASTM E283.
- 6.5 Reports of fire propagation characteristics tests in accordance with NFPA 285.
- 6.6 Reports of potential heat of foam plastics tests in accordance with NFPA 259.
- 6.7 Reports of room corner tests in accordance with NFPA 286, UL 1715 and ASTM E84.

## 7.0 IDENTIFICATION

- 7.1 The ICC-ES mark of conformity, electronic labeling, or the evaluation report number (ICC-ES ESR-4287) along with the name, registered trademark, or registered logo of the report holder [and/or listee] must be included in the product label. [Electronic labeling is the ICC-ES web address ([www.icc-es.org](http://www.icc-es.org)); specific URL related to the report; or the ICC-ES machine-readable code placed on the aforementioned items.]
- 7.2 In addition, Each container of components A and B of the polyurethane foam plastic insulation bears a label with the ICP Construction Inc., name and address, the product name, the product type (A or B component), density, the flame-spread and smoke-developed indices, the evaluation report number (ESR-4287), the shelf life and the date of manufacture.

The ICP Construction FIRESHIELD<sup>®</sup> F10E coating is identified with the manufacturer's name, the product trade name, use instructions and evaluation report number ([ESR-3997](#)).

The International Fireproof Technology Inc. DC 315 coating is identified with the manufacturer's name, the product trade name, date of manufacture, shelf life or expiration date, manufacturer's instructions for application and evaluation report number ([ESR-3702](#)).

The other Intumescent coatings are identified with the manufacturer's name, the product trade name and use instructions.

- 7.3 The report holder's contact information is the following:

**ICP CONSTRUCTION INC.**  
**2775 BARBER ROAD**  
**NORTON, OHIO 44203**  
**(334) 753-4585**  
[www.icpadhesives.com](http://www.icpadhesives.com)

## 8.0 OTHER CODES

### 8.1 Evaluation Scope:

In addition to the codes referenced in Section 1.0, the products in this report were evaluated for compliance with the requirements of the following codes:

- 2006 and 2003 *International Building Code*<sup>®</sup>
- 2006 and 2003 *International Residential Code*<sup>®</sup>
- 2006 and 2003 *International Energy Conservation Code*<sup>®</sup>

**8.2 Uses:**

The products comply with the above-mentioned codes as described in Sections 2.0 through 7.0 of this report, with the following modifications:

- **Application with a Prescriptive Thermal Barrier:** See Section 4.3.1, except the approved thermal barrier must be installed in accordance with Section R314.4 of the 2006 IRC or Section R314.1.2 of the 2003 IRC, as applicable.
- **Application with a Prescriptive Ignition Barrier:** See Section 4.4.1, except an ignition barrier must be installed in accordance with Section R314.2.3 of the 2003 IRC, or Section R314.5.3 or R314.5.4 of the 2006 IRC.
- **Application without a Prescriptive ignition Barrier:** See Section 4.4.2, except that combustion air is provided in accordance with Sections 701 and 703 of the 2006 IMC.
- **Protection against Termites:** See Section 5.7, except use of the insulation in areas where the probability of termite infestation if “very heavy” must be in accordance with Section 320.4 of the 2003 IRC or Section R320.5 of the 2006 IRC.
- **Jobsite Certification and Labeling:** See Section 5.8, except jobsite certification and labeling must comply with Section 102.5.1 of the 2003 IECC, or Sections 102.1.1 and 102.1.11, as applicable, of the 2006 IECC.

**TABLE 1—THERMAL RESISTANCE (R-VALUES)<sup>1</sup>**

HANDIFOAM (HVLP MD 2.0)		HANDIFOAM (HVLP HFO 2.0)	
THICKNESS (INCHES)	R-VALUE (°F.ft <sup>2</sup> .h/Btu) <sup>1,2</sup>	THICKNESS (INCHES)	R-VALUE (°F.ft <sup>2</sup> .h/Btu) <sup>1,2</sup>
1	6.7	1	6.9
2	13	2	14
3	20	3	21
3.5	24	3.5	25
4	28	4	29
5	34	5	36
6	41	6	43
7	48	7	50
8	55	8	57
10	69	10	71
11	76	11	78
12	83	12	86

For SI: 1 inch = 25.4 mm; 1 °F.ft<sup>2</sup>.h/Btu = 0.176 110 °K.m<sup>2</sup>/W.

<sup>1</sup>R-values are calculated based on tested K values at 1-and either 3.5- or 4-inch thicknesses.

<sup>2</sup>R-values greater than 10 are rounded to the nearest whole number.

**TABLE 2—USE OF INSULATION WITHOUT A PRESCRIPTIVE THERMAL BARRIER<sup>1</sup>**

INSULATION TYPE	MAXIMUM THICKNESS (in.) (Wall Cavities)	MAXIMUM THICKNESS (in.) (Ceilings, Underside of Roof Sheathing/Rafters & Floors)	FIRE-PROTECTIVE COATING MINIMUM THICKNESS & TYPE (Applied to all Foam Surfaces) <sup>2</sup>	MINIMUM APPLICATION RATE OF FIRE-PROTECTIVE COATING	May be left exposed as an Interior Finish	TESTS SUBMITTED
HANDIFOAM HVLP MD 2.0	5½	11½	DC315 Prime Coat 4 mils wet & DC315 16 wet mils	0.25 gal / 100 ft <sup>2</sup> & 1.00 gal / 100 ft <sup>2</sup>	Yes	NFPA 286
	5½	7½	F10E 23 wet mils	1.23 gal / 100 ft <sup>2</sup>	Yes	NFPA 286
HANDIFOAM HVLP HFO 2.0	5½	7½	DC315 20 wet mils	1.25 gal / 100 ft <sup>2</sup>	Yes	NFPA 286
	5½	9½	F10E 21 wet mils	1.16 gal / 100 ft <sup>2</sup>	Yes	NFPA 286

For SI: 1 inch = 25.4 mm; 1 mil = 0.0254 mm; 1 gallon = 3.38 L; 1 ft<sup>2</sup> = 0.093 m<sup>2</sup>; NA = not applicable.

<sup>1</sup>See Section 4.3.2.

<sup>2</sup>See Section 3.9, 3.10, 3.11 and 3.13.

**TABLE 3—USE OF INSULATION IN ATTICS AND CRAWL SPACES WITHOUT A PRESCRIPTIVE IGNITION BARRIER<sup>1</sup>**

INSULATION TYPE	MAXIMUM THICKNESS (in) (Wall Cavities & Attic Floors)	MAXIMUM THICKNESS (in) (Ceilings, Underside of Roof Sheathing/Rafters & Floors)	FIRE-PROTECTIVE COATING MINIMUM THICKNESS & TYPE (Applied to all Foam Surfaces) <sup>2</sup>	MINIMUM APPLICATION RATE OF FIRE-PROTECTIVE COATING	TESTS SUBMITTED (AC377)
<b>HANDIFOAM HVLP MD 2.0</b>	9 <sup>1</sup> / <sub>4</sub>	11 <sup>1</sup> / <sub>4</sub>	No coating required	NA	Appendix X
	9 <sup>1</sup> / <sub>4</sub>	11 <sup>1</sup> / <sub>4</sub>	Fireshell IB4 10 wet mils	0.60 gal / 100 ft <sup>2</sup>	Appendix X
	9 <sup>1</sup> / <sub>4</sub>	11 <sup>1</sup> / <sub>4</sub>	ALDOCOAT 800 18 wet mils	1.12 gal / 100 ft <sup>2</sup>	Appendix X
	9 <sup>1</sup> / <sub>4</sub>	11 <sup>1</sup> / <sub>4</sub>	NoBurn Plus 12 wet mils	0.75 gal / 100 ft <sup>2</sup>	Appendix X
	8	12	Flame Seal TB 25 wet mils	1.60 gal / 100 ft <sup>2</sup>	UL1715
	5 <sup>1</sup> / <sub>2</sub>	11 <sup>1</sup> / <sub>2</sub>	DC315 4 wet mils	0.25 gal / 100 ft <sup>2</sup>	Appendix X
<b>HANDIFOAM HVLP HFO 2.0</b>	7 <sup>1</sup> / <sub>2</sub>	11 <sup>1</sup> / <sub>4</sub>	No coating required	NA	Appendix X
	11 <sup>1</sup> / <sub>4</sub>	11 <sup>1</sup> / <sub>4</sub>	Flame Seal TB 24 wet mils	1.60 gal / 100 ft <sup>2</sup>	UL1715
	5 <sup>1</sup> / <sub>2</sub>	11 <sup>1</sup> / <sub>2</sub>	DC315 4 wet mils	0.25 gal / 100 ft <sup>2</sup>	Appendix X
	8	8	No Burn Plus XD 6 wet mils	0.31 gal / 100 ft <sup>2</sup>	Appendix X
	5 <sup>1</sup> / <sub>2</sub>	9 <sup>1</sup> / <sub>2</sub>	F10E 21 wet mils	1.16 gal / 100 ft <sup>2</sup>	NFPA 286
	11 <sup>1</sup> / <sub>2</sub>	11 <sup>1</sup> / <sub>2</sub>	FS-IB Ignition Barrier 8 wet mils	0.50 gal / 100 ft <sup>2</sup>	Appendix X

For SI: 1 inch = 25.4 mm; 1 mil = 0.0254 mm; 1 gallon = 3.38 L; 1 ft<sup>2</sup> = 0.093 m<sup>2</sup>; NA = not applicable.

<sup>1</sup>See Section 4.4.2.

<sup>2</sup>See Section 3.6, 3.7, 3.8, 3.9, 3.10, 3.11, 3.12 and 3.14



TABLE 4—NFPA 285 COMPLYING WALLS—SPF ON EXTERIOR

WALL COMPONENTS	MATERIALS
Base wall system— Use either 1, 2 or 3	1—Concrete wall 2—Concrete masonry wall 3—1 layer of 5/8-inch-thick Type X gypsum wallboard on interior, installed over minimum 3 5/8-inch-depth, minimum No. 20-gage steel studs at a maximum of 24 inches on center with lateral bracing every 4 feet vertically
Floorline firestopping	4 pcf mineral-fiber insulation friction-fit in each wall stud cavity at each floor line.
Cavity insulation— Use either 1, 2, or 3	1—None 2—Fiberglass batt insulation <sup>1</sup> 3—Mineral-fiber insulation <sup>1</sup>
Exterior sheathing— Use either 1, or 2	1—None 2—Minimum 1/2-inch-thick Type X exterior gypsum sheathing
Exterior Insulation	Maximum 3-inch thickness of HandiFoam (HVLP HFO 2.0 or HVLP MD 2.0)
Exterior wall covering—Use either 1, 2, 3 or 4	1—Brick —Standard type brick veneer anchors installed maximum 24 inches on center, vertically on each stud —Maximum 2-inch air gap between exterior insulation and brick —Standard nominal 4-inch-thick, clay brick 2—Stucco – Minimum 3/4 -inch-thick, exterior cement plaster and lath. A secondary water-resistive barrier can be installed between the exterior insulation and the lath. The secondary water-resistive barrier shall not be full-coverage asphalt or butyl-based self-adhered membranes. 3—Natural stone veneer –Minimum 2-inch-thick using any standard non-open-jointed installation technique, such as ship-lap, etc. 4—Cast artificial stone – minimum 1 1/2-inch-thick, complying with ICC-ES AC51 using any standard non-open-jointed installation technique, such as ship-lap, etc. 5—Terracotta cladding – Use any terracotta cladding system in which the terracotta is minimum 1 1/4 inch. Any standard non-open-jointed installation technique such as ship-lap, etc. can be used.

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pcf = 16.01 kg/m<sup>3</sup>.

<sup>1</sup>Insulation must comply with the applicable requirements of 2021, 2018, 2015 or 2012 IBC Section 720.2 (2009 IBC Section 719.2).

TABLE 5—NFPA 285 COMPLYING WALLS—SPF IN WALL CAVITY

WALL COMPONENTS	MATERIALS
Base wall system— Use either 1, 2 or 3	1—Concrete wall 2—Concrete masonry wall 3—1 layer of 5/8-inch-thick Type X gypsum wallboard on interior, installed over minimum 3 5/8-inch-depth minimum No. 20-gage steel stud at a maximum of 24 inches on center with lateral bracing every 4 feet vertically
Floorline firestopping	4 pcf mineral fiber insulation friction-fit in each wall stud cavity at each floor line.
Cavity Insulation— Use either 1, 2, 3 or combination of 1 and 2 or combination of 1 and 3	1—Maximum 3 5/8- inch thickness of HandiFoam (HVLP HFO 2.0 or HVLP MD 2.0) applied using exterior gypsum sheathing as the substrate and covering the width of the cavity and the inside the steel stud framing flange. 2—Fiberglass batt insulation (faced or unfaced) on the exterior side of the foam plastic 3—Mineral wool insulation (faced or unfaced) on the exterior side of the foam plastic
Exterior sheathing	5/8-inch-thick Type X exterior gypsum sheathing
Exterior wall covering <sup>1</sup>	1 – Any non-combustible exterior wall covering material using any standard installation technique 2 – Any non-combustible exterior wall covering system with a combustible water-resistive barrier that has successfully been tested in accordance with NFPA 285 Details of the exterior wall covering must be provided to the code official by the report holder, designer or specifier, with an engineering analysis demonstrating that (1) the exterior wall covering conforms to ASTM E136 and (2) the addition of the wall covering and/or water-resistive barrier to the assembly described in this table does not negatively affect conformance of the assembly with the requirements of IBC Section 2603.5.

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pcf = 16.01 kg/m<sup>3</sup>.

<sup>1</sup>Under the 2021 IBC, the non-combustible exterior wall with or without a combustible water-resistive barrier must be tested in accordance with the 2019 edition of NFPA 285.

TABLE 6—NFPA 285 COMPLYING WALLS—SPF ON EXTERIOR WITH OPTIONAL SPF IN WALL CAVITY

WALL COMPONENTS	MATERIALS
Base wall system— Use either 1, 2 or 3	1—Concrete wall 2—Concrete masonry wall 3—1 layer of 5/8-inch-thick Type X gypsum wallboard on interior, installed over minimum 3/8-inch-depth, minimum No. 25-gage steel studs at a maximum of 24 inches on center
Floorline firestopping	4 pcf mineral-fiber insulation friction-fit in each wall stud cavity at each floor line
Cavity insulation— Use either 1, 2, 3 or 4	1—None 2— Maximum 3/8-inch thickness of HandiFoam (HVL P HFO 2.0 or HVL P MD 2.0) applied to Base wall 3 and covering the width of the cavity and the inside the steel stud framing flange 3—Fiberglass batt insulation <sup>1</sup> 4—Mineral-fiber insulation <sup>1</sup>
Exterior sheathing— Use 1 with Base Wall 1 or 2, Use 2 with Base Wall 3	1—None 2—Minimum 5/8-inch-thick ASTM C1177 exterior sheathing covered with Master Builders Solutions US, LLC's MasterSeal AWB (ESR-3209) at a maximum nominal thickness of 40 mils wet film thickness
Exterior Insulation— Use 1 with Exterior wall coverings 1, 2, 3, 4 or 5 Use 2 with Exterior wall coverings 1, 2, 3, 4, 5 or 6	1—Maximum 3-inch thickness of HandiFoam (HVL P HFO 2.0 or HVL P MD 2.0) 2—Maximum 3 1/2-inch thickness of HANDIFOAM (HVL P HFO 2.0 or HVL P MD 2.0) applied directly to the exterior face of the exterior sheathing of Base wall 3 or directly to the exterior face of Base wall 1 or 2 and covered with ICP Construction Fireshell F10E intumescent coating installed at a minimum 18 mils wet film thickness covered with Fireshell F1 topcoat installed at a minimum 7 mils wet film thickness <sup>2</sup>
Exterior wall covering—Use either 1, 2, 3, 4 or 5	1—Brick —Standard type brick veneer anchors installed maximum 24 inches on center, vertically on each stud —Maximum 2-inch air gap between exterior insulation and brick —Standard nominal 4-inch-thick, clay brick 2—Stucco – Minimum 3/4 -inch-thick, exterior cement plaster and lath. A secondary water-resistive barrier can be installed between the exterior insulation and the lath. The secondary water-resistive barrier shall not be full-coverage asphalt or butyl-based self-adhered membranes 3— Natural stone veneer – Minimum 2-inch-thick, using any standard non-open-jointed installation technique such as ship-lap, etc. 4—Cast artificial stone – Minimum 1 1/2-inch-thick, complying with ICC-ES AC51 using any standard non-open-jointed installation technique such as ship-lap, etc. 5—Terracotta cladding – Use any terracotta cladding system in which the terracotta is minimum 1 1/4 inch. Any standard non-open-jointed installation technique such as ship-lap, etc. can be used 6—Alucobond Plus ACM panels (ESR-1185) and framing system consisting of maximum 4-inch galvanized steel or fiberglass clips/brackets <sup>3</sup> that meet wind load requirements with No. 18-gage, 1-inch-deep galvanized steel subgirts installed directly to the clips/brackets. The clips/brackets and subgirts are fastened through the SPF and sheathing to the steel studs with corrosion-resistant as required to meet design wind loads with the clips spaced a maximum of 24 inches on center horizontally and at a maximum 30 1/4 inches on center vertically at the top, bottom and center of the panels. The Alucobond Plus ACM panels are fastened to the subgirts with minimum 1-inch-long, No.12 stainless steel, self-drilling screw hex washer head screw spaced a maximum of 12 inches on center at horizontal joints and at a minimum at the middle of the panels at vertical joints.
Opening Flashing	Minimum No. 22-gage corrosion-resistant steel flashing installed at all openings to completely cover the opening header, jambs and sill

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pcf = 16.01 kg/m<sup>3</sup>.

<sup>1</sup>Insulation must comply with the applicable requirements of 2021, 2018, 2015 or 2012 IBC Section 720.2 (2009 IBC Section 719.2).

<sup>2</sup>Coating must be applied in accordance with the coating manufacturer's published installation instructions.

<sup>3</sup>Clips/brackets shall be sized so that the maximum air space between the exterior face of the foam and the back of the panels does not exceed 3 1/2 inches.

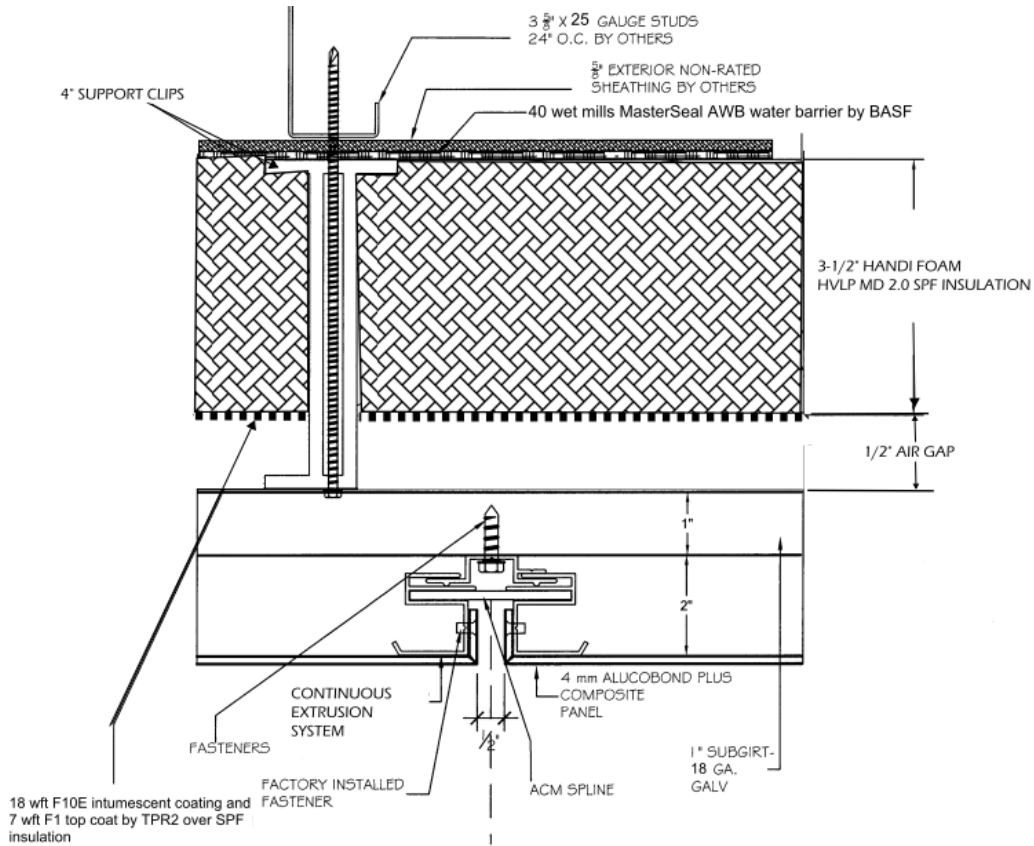


FIGURE 1—VERTICAL JOINT<sup>1</sup>

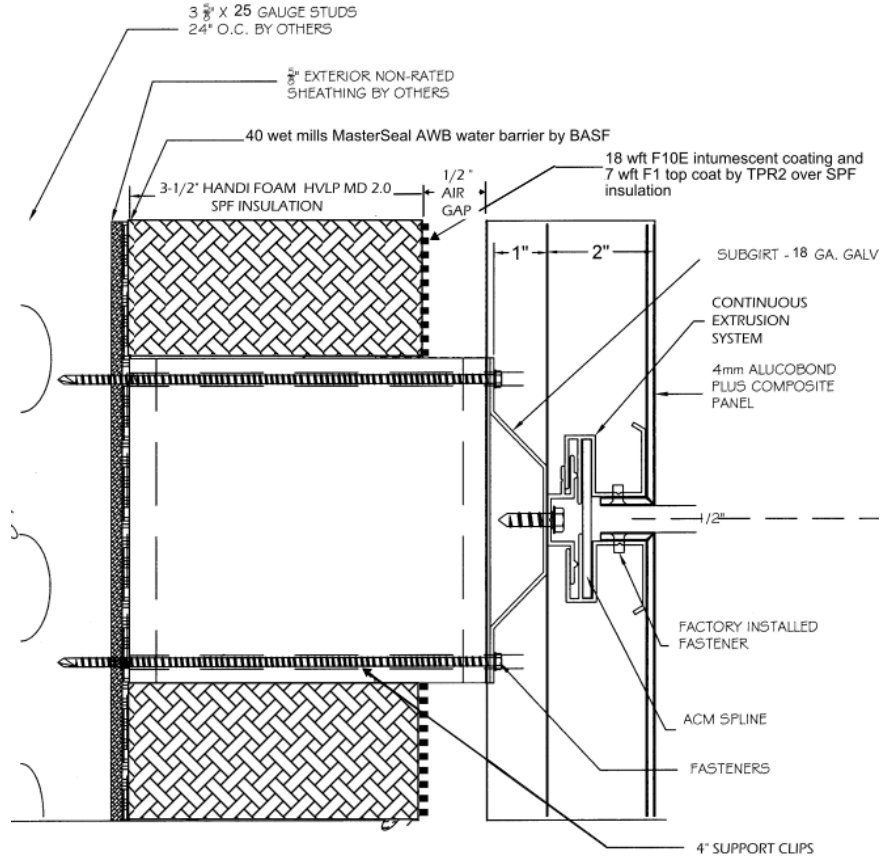


FIGURE 2—HORIZONTAL JOINT<sup>1</sup>

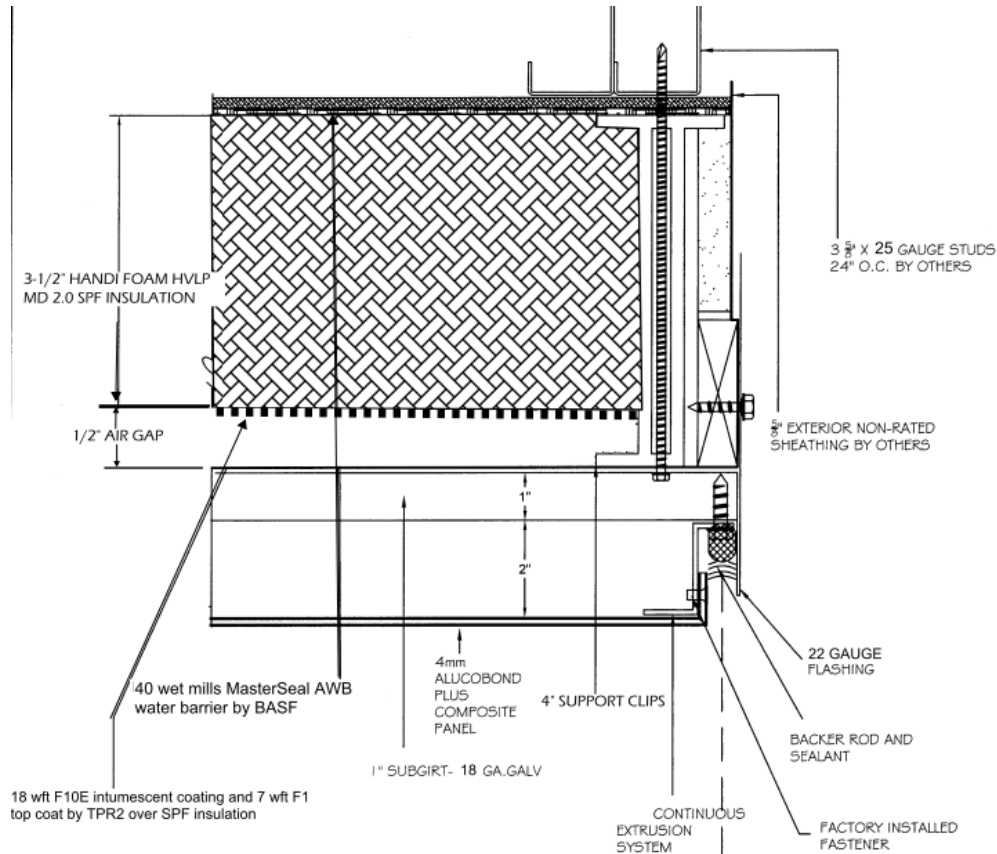


FIGURE 3—WINDOW JAMB WITH FLASHING<sup>1</sup>

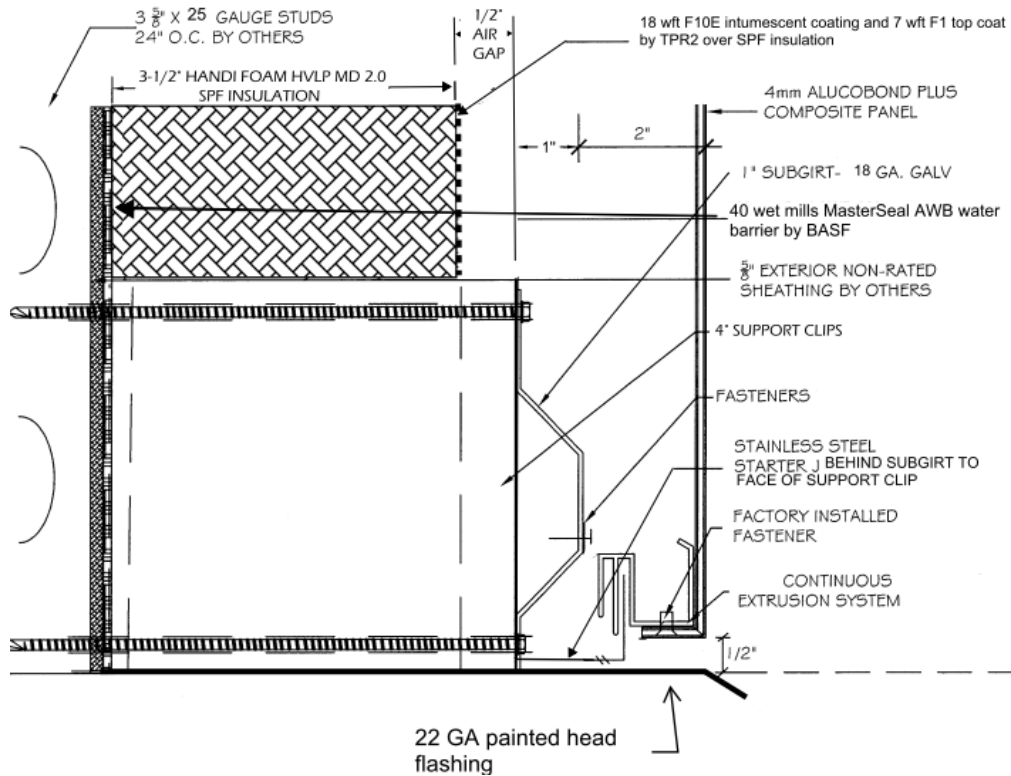
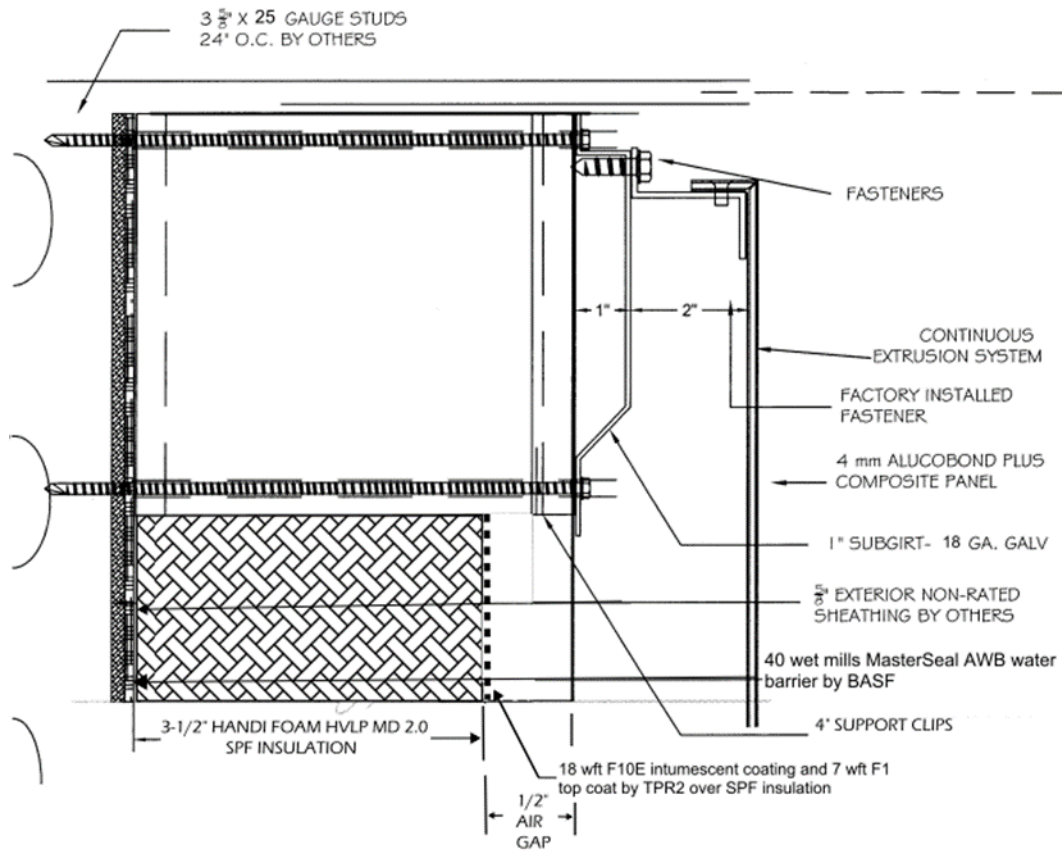


FIGURE 4—WINDOW HEAD WITH FLASHING<sup>1</sup>



**FIGURE 5—WINDOWSILL WITH FLASHING<sup>1</sup>**

<sup>1</sup>See [Table 6](#) for specific details on wall construction. In the event of conflict between the written descriptions in [Table 6](#) and the Figures, the written description applies.

DIVISION: 07 00 00—THERMAL AND MOISTURE PROTECTION

Section: 07 21 00—Thermal Insulation

Section: 07 25 00—Water-Resistive Barriers/Weather Barriers

**REPORT HOLDER:**

ICP CONSTRUCTION INC.

**EVALUATION SUBJECT:**

ICP ADHESIVES &amp; SEALANTS HANDIFOAM (HVLP HFO 2.0 AND HVLP MD 2.0) SPRAY-APPLIED INSULATIONS

**1.0 REPORT PURPOSE AND SCOPE****Purpose:**

The purpose of this evaluation report supplement is to indicate that the ICP Adhesives & Sealants Spray-Applied Insulations, described in ICC-ES evaluation report ESR-4287, have also been evaluated for the codes noted below.

**Applicable code editions:**

- 2022 California Building Code (CBC)

For evaluation of applicable chapters adopted by the California Office of Statewide Health Planning and Development (OSHPD) AKA: California Department of Health Care Access and Information (HCAI) and the Division of the State Architect (DSA), see Sections 2.1.1 and 2.1.2 below.

- 2022 California Residential Code (CRC)
- 2022 California Energy Code (CEC)

**2.0 CONCLUSIONS****2.1. CBC and CRC:**

The ICP Adhesives & Sealants. Spray-Applied Insulations, described in Sections 2.0 through 7.0 of the evaluation report ESR-4287, comply with the CBC and CRC, provided the design and installation are in accordance with the 2021 *International Building Code*® (IBC) and *International Residential Code*® (IRC) provisions noted in the evaluation report.

**2.1.1. OSHPD:**

The applicable OSHPD Sections and Chapters of the CBC are beyond the scope of this supplement.

**2.1.2. DSA:**

The applicable DSA Sections and Chapters of the CBC are beyond the scope of this supplement.

**2.2. CEC:**

The ICP Adhesives & Sealants Spray-Applied Insulations, described in Sections 2.0 through 7.0 of the evaluation report ESR-4287, comply with the CEC, provided the design and installation are in accordance with the 2021 *International Building Code*® (IBC) provisions noted in the evaluation report.

**2.2.1. Conditions of Use:**

In accordance with Section 110.8 of the California Energy Code, verification of certification by the Department of Consumer Affairs, Bureau of Household Goods and Services, must be provided to the code official, demonstrating that the insulation conductive thermal performance is approved pursuant to the California Code of Regulations, Title 24, Part 12, Chapters 12-13, Article 3, "Standards for Insulating Material." Certification can be verified with the DCA Bureau of Household Goods and Services using the following link to the bureau's Directory of Certified Insulation Materials: [https://bhgs.dca.ca.gov/consumers/ti\\_directory.pdf](https://bhgs.dca.ca.gov/consumers/ti_directory.pdf)

This supplement expires concurrently with the evaluation report, reissued April 2024.