

# ICC-ES Evaluation Report


**ESR-5498**

Issued May 2024

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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>REPORT HOLDER:</b> <b>HUNTSMAN BUILDING SOLUTIONS</b></p>	<p><b>EVALUATION SUBJECT:</b> <b>ICYNENE CLASSIC 45</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>

<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:

- Surface burning characteristics
- Physical properties
- Thermal performance (*R*-values)
- Attic and crawl space installation
- Fire-resistance-rated construction
- Air permeability
- Exterior walls of Types I–IV construction

### 1.2 Evaluation to the following green standard:

- 2008 [ICC 700 National Green Building Standard™](#) (ICC 700-2008)

### Attributes verified:

See Section 2.0.

## 2.0 USES

Icynene Classic 45 are used to provide thermal insulation in buildings and to seal areas such as plumbing and conduit penetrations against air infiltration. The insulations are for use in wall cavities and floor assemblies; and in attic and crawl space installations as described in Section 4.4.

The Icynene Classic 45 insulations are for use in Type V construction under the IBC and dwellings under the IRC; fire-resistance-rated construction when installed in accordance with Section 4.5; and in Types I through IV construction when installed in accordance with Section 4.6.

The attributes of the insulations 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:

**3.1.1 Icynene Classic 45:** Classic, Classic Ultra, and Classic Ultra Select are low-density, open-cell, polyurethane foam plastic insulations and air barrier systems that are 100 percent water-blown with an installed nominal density of 0.5 pcf (8 kg/m<sup>3</sup>). The insulations are two-component, spray-applied products. The two components of the insulation are polymeric isocyanate (A-Component, also known as Base Seal<sup>®</sup>) and proprietary resin (B-Component, Classic, Classic Ultra or Classic Ultra Select Resin). When stored at temperatures between 50°F (10°C) and 100°F (38°C), the components have a shelf life of six months.

### 3.2 Surface Burning Characteristics:

**3.2.1 Icynene Classic 45:** When tested in accordance with ASTM E84/UL 723, at a thickness of 6 inches (152 mm) and a nominal density of 0.5 pcf (8 kg/m<sup>3</sup>), Icynene Classic 45 have a flame spread index of 25 or less and a smoke-developed index of 450 or less. There is no thickness limit when installed behind a code-prescribed 15-minute thermal barrier, except as noted in Section 4.3.1.2 and [Table 2](#).

### 3.3 Thermal Resistance:

Icynene Classic 45 have thermal resistance (*R*-values) at a mean temperature of 75°F (24°C) as shown in [Table 1](#).

### 3.4 Air Permeability:

Huntsman Building Solutions LLC Icynene Classic 45 spray-applied foam plastic insulation is considered air-impermeable insulation in accordance with 2021 and 2018 IBC Section 1202.3 (2015 IBC Section 1203.3) and 2021, 2018, 2015 and 2012 IRC Sections R202 and R806.5 (2009 IRC Sections R202 and R806.4), at the following thicknesses:

- **Icynene Classic 45:** Minimum, 3 inches (76 mm) based on testing in accordance with ASTM E2178..

### 3.5 Intumescent Coatings:

**3.5.1 No Burn Plus XD:** No Burn Plus XD intumescent coating is a latex-based coating supplied in 1-gallon (4L) and 5-gallon (19L) pails and 55-gallon (208 L) drums. The coating material has a shelf life of 12 months when stored in factory-sealed containers at temperatures between 40°F (4.4°C) and 90°F (32.2°C).

**3.5.2 DC 315 Coating:** DC 315 coating ([ESR-3702](#)), manufactured by International Fireproof Technology, International Inc. / Paint To Protect Inc., is a water-based intumescent coating supplied in 5-gallon (19L) pails and 55-gallon (208L) drums. The coating material has a shelf life of 12 months when stored in factory-sealed containers at temperatures between 50°F (10°C) and 80°F (27°C).

**3.5.3 Fireshell<sup>®</sup> F10E Coating:** Fireshell<sup>®</sup> F10E coating, manufactured by TPR2 Corporation ([ESR-3997](#)), is a water-based intumescent coating supplied in 5-gallon (19L) pails and 55-gallon (208L) drums. The coating material has a shelf life of 12 months when stored in factory-sealed containers at temperatures between 45°F (7.2°C) and 95°F (35°C).

## 4.0 INSTALLATION

### 4.1 General:

The manufacturer's published installation instructions and this report must be strictly adhered to and a copy of these instructions and this evaluation report must be available on the jobsite at all times during installation.

### 4.2 Application:

**4.2.1 General:** Icynene Classic 45 foam plastic insulation must be applied on the jobsite using two-component, 1-to-1 ratio, spray equipment specified by Huntsman Building Solutions LLC. The foam plastic must not be sprayed onto a substrate that is wet, or covered with frost or ice, loose scales, rust, oil or grease. The foam plastic insulation must not be used in electrical outlet or junction boxes or in contact with rain or water, and must be protected from the weather during and after application. Where the insulation is used as air-impermeable insulation, such as in unvented attic spaces regulated by 2021 and 2018 IBC Section 1202.3 (2015 IBC Section 1203.3) or 2021, 2018, 2015 and 2012 IRC Section R806.5 (2009 IRC Section R806.4), the insulation must be installed at a minimum thicknesses noted in Section 3.4. The insulation can be installed in one pass to the maximum thickness. Where multiple passes are required, the cure time between passes is negligible.

**4.2.2 Icynene Classic 45:** The insulation must be used in areas where the maximum service temperature is no greater than 180°F (82°C). The insulation must be applied when the temperature is at or above 14°F (-10°C) and be protected from the weather during and after application.

### 4.3 Thermal Barrier:

#### 4.3.1 Icynene Classic 45:

**4.3.1.1 Application with a Prescriptive Thermal Barrier:** Icynene Classic 45 foam plastic insulations must be separated from the interior of the building by an approved thermal barrier, such as 1/2-inch (12.7 mm) gypsum wallboard installed using mechanical fasteners in accordance with the applicable code, or an equivalent 15-minute thermal barrier complying with the applicable code. When installation is within an attic or crawl space as described in Section 4.4, a thermal barrier is not required between the foam plastic and the attic or crawl space, but is required between the foam plastic insulation and the interior of the building. There is no thickness limit when installed behind a code-prescribed 15-minute thermal barrier, except as noted in Section 4.3.1.2 and [Table 2](#).

**4.3.1.2 Application without a Prescriptive Thermal Barrier or Ignition Barrier:** The prescriptive 15-minute thermal barrier or ignition barrier may be omitted when installation is in accordance with the following requirements:

**4.3.1.2.1** The insulation must be covered on all surfaces with a fire protective coating at the minimum thickness set forth in [Table 2](#).

**4.3.1.2.2** The maximum installed thickness of the insulation must not exceed the thicknesses set forth in [Table 2](#).

**4.3.1.2.3** The coating must be applied over the insulation in accordance with the coating manufacturer's instructions and this report.

### 4.4 Attics and Crawl Spaces:

#### 4.4.1 Icynene Classic 45:

**4.4.1.1 Application with a Prescriptive Ignition Barrier:** When Icynene Classic 45 foam plastic insulation is installed within attics where entry is made only for service of utilities, an ignition barrier must be installed in accordance with IBC Section 2603.4.1.6 and IRC Sections R316.5.3 and R316.5.4, as applicable. 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. The Icynene Classic 45 insulation may be installed in unvented attics when the foam plastic is applied at a minimum thickness of 3 inches (76 mm) in accordance with 2021 and 2018 IBC Section 1202.3 (2015 IBC Section 1203.3) or 2021, 2018, 2015 and 2012 IRC Section R806.5 (2009 IRC Section R806.4), as applicable.

**4.4.1.2 Application without a Prescriptive Ignition Barrier:** Where Icynene Classic 45 foam plastic insulations are installed in an attic or crawl space without a prescriptive ignition barrier, in accordance with Sections 4.4.1.2.1, 4.4.1.2.2, 4.4.1.2.3 and 4.4.1.2.4, the following conditions apply:

1. Entry to the attic or crawl space is only for service of utilities and no storage is permitted.
2. There are no interconnected attic, crawl space or basement areas.
3. Air in the attic or crawl space is not circulated to other parts of the building.
4. Combustion air is provided in accordance with IMC Section 701.
5. 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 and 2018 IBC Section 1202.3 (2015 IBC Section 1203.3) or 2021, 2018, 2015 and 2012 IRC Section R806.5 (2009 IRC Section R806.4), as applicable.
6. Under-floor (crawl space) ventilation is provided when required by 2021 and 2018 IBC Section 1202.4 (2015 IBC Section 1203.4 or 2012 and 2009 IBC Section 1203.3) or IRC Section R408.1, as applicable.
7. If hot work is to be performed, all necessary procedures, precautions and limitations must be observed in accordance with OSHA 1926 Subpart J Standard 1926.352 requirements for hot work (welding / cutting) performed in the vicinity of combustible materials.
8. An installation certificate with the following information must be posted at each entrance:
  - Product name and installation thickness.
  - Manufacturer name, address and contact information.
  - Installation contractor name, address and contact information.
  - Attestation that the product(s) have been installed in accordance with the manufacturer's installation instructions and the requirements of the evaluation report.

- A notice that the certificate is not to be removed or altered.
- A list of limitations for the space including the following:
  - o Entry to the space is only to service utilities, and no storage is permitted.
  - o FIRE SAFETY WARNING: If hot work is to be performed, all necessary procedures, precautions and limitations must be observed in accordance with OSHA 1926 Subpart J Standard 1926.352 requirements for hot work (welding / cutting) performed in the vicinity of combustible materials.

**4.4.1.2.1 Attics—Icynene Classic 45:** In attics, Icynene Classic 45 foam plastic insulation may be spray-applied to the underside of the roof sheathing and/or rafters, as described in this section. The thickness of the foam plastic applied to the underside of the roof sheathing must not exceed 14 inches (356 mm). The thickness of the spray foam insulation applied to vertical wall surfaces must not exceed 5.5 inches (140 mm). The insulation must be covered on all surfaces with one of the coatings described in Section 3.5. The coating must be applied over the insulation in accordance with the coating manufacturer's instructions and this report. Surfaces to be coated must be dry, clean, and free of dirt, loose debris and other substances that could interfere with adhesion of the coating. The coating is applied in one coat with low-pressure airless spray equipment. The coating must be applied to a thickness as follows:

- No Burn Plus XD at a minimum thickness of 6 wet mils (0.15 mm) [4 dry mils (0.1 mm) dry film thickness], applied at a rate of 0.4 gallon (1.5 L) per 100 square feet (9.2 m<sup>2</sup>).
- DC 315 at a minimum thickness of 4 wet mils (0.1 mm) [3 dry mils], applied at a rate of 0.3 gallon (1.1 L) per 100 square feet (9.2 m<sup>2</sup>).

The coatings must be applied when ambient and substrate temperature is at least 60°F (16°C) and no more than 95°F (35°C). All other surfaces (including glass) must be protected against damage from the coating. The insulation may be installed in unvented attics when the foam plastic is applied at a minimum thickness of 3.5 inches (89 mm) as described in this section in accordance with 2021 and 2018 IBC Section 1202.3 (2015 IBC Section 1203.3) and 2021, 2018, 2015 and 2012 IRC Section R806.5 (2009 IRC Section R806.4), as applicable.

**4.4.1.2.2 Attics—Icynene Classic 45:** When Icynene Classic 45 is applied in unvented attics conforming to 2021 and 2018 IBC Section 1202.3 (2015 IBC Section 1203.3) and 2021, 2018, 2015 and 2012 IRC Section R806.5 (2009 IRC Section R806.4), the insulation may be applied to the underside of roof sheathing and/or rafters to a minimum thickness of 3½ inches (90 mm) and may be applied to vertical wall surfaces to a minimum thickness of 3½ inches (90 mm). Maximum thickness on the underside of roof sheathing or on vertical wall surfaces is 20 inches (508 mm). The insulation may be left exposed to the attic without a prescriptive ignition barrier or an intumescent coating.

The attic must have attic access complying with IRC Section R807, horizontally placed in the floor, and opening outward toward the living space. Items penetrating the roof deck or walls, such as skylight wells and vents, must be covered with a minimum of 3½ inches (90 mm) of the Icynene Classic 45 insulation.

**4.4.1.2.3 Crawl Spaces:** In crawl spaces, Icynene Classic 45 insulation may be spray-applied to vertical walls and the underside of floors, as described in this section. The thickness of the foam plastic applied to the underside of the floors must not exceed 14 inches (356 mm). The thickness of the spray foam plastic insulation applied to vertical wall surfaces must not exceed 3½ inches (88.9 mm). The foam plastic does not require an ignition barrier or a coating.

**4.4.1.2.4 Use on Attic Floors:** When used on attic floors, Icynene Classic 45 foam plastic insulation may be installed at a maximum thickness of 11½ inches (292 mm) between joists in attic floors. The insulation must be separated from the interior of the building by an approved thermal barrier. The coatings specified in Section 4.4.1.2.1 and the ignition barrier in accordance with IBC Section 2603.4.1.6 and IRC Section R316.5.3, may be omitted.

## 4.5 One-hour Fire-resistance-rated Assemblies:

### 4.5.1 Icynene Classic 45:

**4.5.1.1 Assembly 1 (Limited Load-bearing Wood Stud Wall):** Minimum nominally 2-by-4 [1½ by 3½ inches (38 mm by 89 mm)] southern pine (G = 0.55), No. 2 grade studs spaced 16 inches (406 mm) on center with a base layer of ½-inch-thick (12.7 mm) wood fiber sound board installed horizontally on each face with vertical joints located over the studs, attached with 6d box nails, 2 inches (51 mm) long and spaced 24 inches (610 mm) on center along the studs, and a second layer of ⅝-inch-thick (15.9 mm) Type X gypsum wallboard installed vertically on each face, attached with 8d box nails, 2½ inches (64 mm) long and spaced 7 inches (178 mm) on center along the studs. The stud cavity contains Icynene Classic 45 insulation nominally 2 inches (51 mm) thick.

Axial loads applied to the wall assembly must be limited to the least of the following:

- 1,805 pounds (8029 N) per stud.
- Design stress of  $0.78 F'c$ .
- Design stress of  $0.78 F'c$  at a maximum  $l_e/d$  of 33.

**4.5.1.2 Assembly 2 (Limited Load-bearing Wood Stud Wall):** Minimum nominally 2-by-4 [ $1\frac{1}{2}$  by  $3\frac{1}{2}$  inches (38 mm by 89 mm)] southern pine ( $G = 0.55$ ), No. 2 grade studs spaced 16 inches (406 mm) on center with two layers of  $\frac{1}{2}$ -inch-thick (12.7 mm) Type X gypsum wallboard installed vertically with joints staggered on each face, attached with 8d box nails,  $2\frac{1}{2}$  inches (64 mm) long and spaced 7 inches (178 mm) on center along the studs for the face layer and 6d cement coated box nails, 2 inches (51 mm) long and spaced 24 inches (610 mm) on center along the studs. The stud cavity contains Icynene Classic 45 insulation nominally 2 inches (51 mm) thick.

Axial loads applied to the wall assembly must be limited to the least of the following:

- 1,805 pounds (8029 N) per stud.
- Design stress of  $0.78 F'c$ .
- Design stress of  $0.78 F'c$  at a maximum  $l_e/d$  of 33.

**4.5.1.3 Assembly 3 (Floor/Ceiling):** Minimum nominally 2-by-10 [ $1\frac{1}{2}$  by  $9\frac{1}{4}$  inches (38 mm by 235 mm)] Douglas fir, No. 2 grade wood joists spaced 24 inches (610 mm) on center, with minimum 1-by-3 [ $\frac{3}{4}$  by  $2\frac{1}{2}$  inches (19.1 by 64 mm)] spruce bridging at mid-span. Floor decking must be minimum  $\frac{1}{2}$ -inch-thick (12.7 mm) exterior grade plywood installed perpendicular to joists and fastened with 2-inch-long (51 mm) ring shank nails 6 inches (152 mm) on center at the joints and 12 inches (305 mm) on center at the intermediate joists. Plywood joints must occur over joists. Icynene Classic 45 insulation must be applied to the underside of the plywood deck between the joists to a depth of 5 inches (127 mm). Two layers of minimum  $\frac{5}{8}$ -inch-thick (15.9 mm), Type X gypsum wallboard must be attached perpendicular to the joists on the ceiling side of the assembly. The first layer must be attached with  $1\frac{1}{4}$ -inch-long (32 mm), Type W drywall screws, spaced 24 inches (610 mm) on center. The second layer must be applied perpendicular to the joists, offset 24 inches (610 mm) from the base layer. The second layer must be attached with 2-inch-long (51 mm), Type S drywall screws spaced 12 inches (305 mm) on center. Additional fasteners must be installed along the butt joints of the second layer, securing the two layers together. These fasteners must be  $1\frac{1}{2}$ -inch-long (38 mm), Type G drywall screws placed 2 inches (51 mm) back from each end of the butt joint and spaced 12 inches (305 mm) on center. The wallboard joints on the exposed side must be treated with paper tape embedded in joint compound and topped with an added coat of compound, and the fastener heads must be coated with joint compound in accordance with ASTM C840 or GA-216.

**4.5.1.4 Assembly 4 (Non-loadbearing Steel Stud Wall):** Nominally 6-inch-deep (152.4 mm), No. 18 gage, galvanized steel studs spaced 16 inches (406.4 mm) on center, are friction-fit into No. 18 gage galvanized steel floor and ceiling track with a layer of  $\frac{5}{8}$ -inch-thick (15.9 mm), Type X gypsum board applied to the interior side with the long edge parallel to steel studs and secured using No. 6,  $1\frac{1}{4}$ -inch-long (31.7 mm), self-drilling drywall screws spaced 8 inches (203 mm) on center around the perimeter and 12 inches (305 mm) on center in the field. The gypsum board joints must be treated with vinyl or casein, dry or premixed joint compound applied in two coats to cover all exposed screw heads and gypsum board butt joints, and a minimum 2-inch-wide (51 mm) paper, plastic, or fiberglass tape embedded in the first layer of compound over butt joints of the gypsum board. The stud cavity is filled with Icynene Classic 45 insulation up to 6 inches (152 mm) thick. DensGlass® Exterior Sheathing,  $\frac{1}{2}$  inch (12.7 mm) thick, is installed parallel to steel studs with vertical joints offset a minimum of 16 inches (406 mm) from the vertical joints of the gypsum board and the horizontal joints offset a minimum of 24 inches (610 mm) from the horizontal joints of the gypsum board. The sheathing is attached using No. 6,  $1\frac{1}{4}$ -inch-long (31.7 mm), self-drilling drywall screws spaced 8 inches (203 mm) on center around the perimeter and in the field. Hohmann & Barnard DW-10 brick ties, 6 inches (152 mm) long by  $1\frac{1}{2}$ -inches (38 mm) wide, are spaced 16 inches (406.4 mm) on center vertically on each steel stud, and secured, using two  $1\frac{5}{8}$ -inch-long (41.3 mm) self-drilling screws, through 4-inch (102 mm) red clay brick [ $3\frac{1}{2}$  inches (88.9 mm) by  $2\frac{1}{4}$  inches (57.1 mm) by  $7\frac{3}{4}$  inches (197 mm)] laid in a running bond pattern with Type S mortar, leaving a nominally 1-inch (25.4 mm) air gap between the brick and the exterior sheathing.

Optional: It is permitted to add code-complying, expanded polystyrene (EPS), extruded polystyrene (XPS), foil-faced, rigid polyurethane board stock or polyurethane spray foam on the exterior of the wall (between the DensGlass® sheathed wall and the brick), while maintaining the 1-inch (25.4 mm) air space. The length of the brick ties must be increased to account for the thickness of the insulation.

#### 4.6 Exterior Walls in Type I, II, III and IV Construction:

**4.6.1 General:** When used on exterior walls of Types I, II, III or IV construction, the assembly must comply with 2018, 2015, 2012, and 2009 IBC Section 2603.5 and this section, and the Icynene Classic 45 insulation

must be installed at a maximum thickness described in [Table 3](#). The potential heat of Huntsman Building Solutions insulations tested in accordance with NFPA 259 is as follows:

- **Icynene Classic 45:** 494 Btu/ft<sup>2</sup> (5.6 MJ/m<sup>2</sup>) per inch of thickness

**4.6.2 Specific Wall Assemblies:** Wall assemblies complying with Section 4.6 must be as described in [Table 3](#).

## 5.0 CONDITIONS OF USE:

The Icynene Classic 45 spray-applied polyurethane foam plastic insulation described in this report complies with, or is a suitable alternative to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:

- 5.1 This evaluation report and the manufacturer's published installation instructions, when required by the code official, must be submitted at the time of permit application.
- 5.2 The insulation must be installed in accordance with the manufacturer's published installation instructions, this evaluation report and the applicable code. If there is a conflict between the installation instructions and this report, this report governs.
- 5.3 The insulation must be separated from the interior of the building by an approved 15-minute thermal barrier, except as noted in this report.
- 5.4 Since the performance of Icynene Classic 45, when installed in unvented attics without a code-prescribed ignition barrier or an intumescent coating, is based on fire performance of an unvented attic, the installation must be approved by the code official as conforming with the provisions of Section 4.4.1.2.2 and Conditions 1 to 5 of Section 4.4.1.2.
- 5.5 When Icynene Classic 45 insulation is installed under Section 4.4.1.2.2 of this report, a certificate must be placed in the attic stating that the foam plastic insulation has been installed in accordance with Conditions 1 through 5 of Section 4.4.1.2 and the terms of Section 4.4.1.2.2 of ESR-5498; any alterations to the attic or insulation must be consistent with those requirements.
- 5.6 The insulation must not exceed the thicknesses and densities noted in this report.
- 5.7 The insulation must be protected from the weather during and after application.
- 5.8 The insulation must be applied by licensed dealers and installers certified by Huntsman Building Solutions LLC.
- 5.9 Use of the insulation in areas where the probability of termite infestation is "very heavy" must be in accordance with IRC Section R318.4 or IBC Section 2603.8, as applicable.
- 5.10 Jobsite certification and labeling of the insulation must comply with 2021, 2018, 2015 IRC Sections N1101.10.1 and N1101.10.1.1 (2012 IRC Sections N1101.12.1 and N1101.12.1.1 or 2009 IRC Sections N1101.4 and N1101.4.1) and 2021, 2018 2015 and 2012 IECC Sections C303.1.1, C303.1.1.1, R303.1.1 and R303.1.1.1 (2009 IECC Sections 303.1.1 and 303.1.1.1), as applicable.
- 5.11 When installed in accordance with Section 4.4.1.2 of this report, the associated installation certificate(s) containing the required information referenced in Section 4.4.1.2 must be installed at each entrance to the crawlspace or attic, as applicable. The certificate(s) must be red in color and constructed of durable materials, such as metal, plastic, or laminated paper.
- 5.12 When used in unvented attics in accordance with Section 4.4.1.2 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.
- 5.13 A vapor retarder must be installed in accordance with the applicable code.
- 5.14 Icynene Classic 45 foam plastic insulation is manufactured in Mississauga, Ontario, Canada and Arlington, Texas, 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 June 2023.
- 6.2 Reports of tests in accordance with AC377 Appendix X and Appendix C].
- 6.3 Test report on air leakage rate in accordance with ASTM E2178.
- 6.4 Reports of room corner fire testing in accordance with NFPA 286.

- 6.5 Test reports in accordance with ASTM E119.
- 6.6 Test report in accordance with NFPA 285, and related engineering analysis.
- 6.7 Reports of tests in accordance with NFPA 259.
- 6.8 Reports of fire tests in accordance with ASTM E970.
- 6.9 For Icynene Class 45, an engineering evaluation, including full-scale fire testing, small-scale testing and fire modeling (Section 4.4.1.2.2).

**7.0 IDENTIFICATION**

7.1 All packages and containers of Icynene Classic 45 insulation must be labeled with the Huntsman Building Solutions LLC name and address; the product name; component designation (A or B); the flame spread index and the smoke-developed index; the expiration date; the name of the inspection body (ICC-ES); and the evaluation report number (ESR-5498).

No Burn Plus XP Intumescent coating described in Section 3.5.1 is identified with the manufacturer’s name and address, the product trade name and use instructions.

The International Fireproof Technology, Inc. / Paint To Protect Inc. DC 315 coating described in Section 3.5.2 is identified with the manufacturer’s name and address, the product trade name, date of manufacture, shelf life or expiration date, the manufacturer’s application instructions and the evaluation report number ([ESR-3702](#)).

Fireshell F10E coating is labeled with the manufacturer’s name and address; the product name; the date of manufacture; the shelf life or expiration date; the manufacturer’s instructions for application; and the evaluation report number ([ESR-3997](#)).

7.2 The report holder’s contact information is as follows:

**HUNTSMAN BUILDING SOLUTIONS**  
**3315 EAST DIVISION STREET**  
**ARLINGTON, TEXAS 76011**  
**(817) 640-4900**  
[www.huntsmanbuilding.com](http://www.huntsmanbuilding.com)

**TABLE 1—THERMAL RESISTANCE (R-VALUES)**

THICKNESS (inches)	R-VALUE (°F·ft²·h/Btu)	
	Icynene Classic 45	
1	3.7	
2	7.4	
3	11	
3.5	13	
4	14	
5	18	
5.5	20	
6	22	
7	25	
7.5	27	
8	29	
9	32	
9.5	34	
10	36	
11.5	41	
13.5	—	
14	50	

For SI: 1 inch = 25.4 mm, 1°F·ft²·h/Btu = 0.176 110°K·m²/W.

<sup>1</sup>R-values are calculated based on tested K values at 1- and 3.5-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.) (Walls & Vertical Surfaces)	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 THEORETICAL APPLICATION RATE OF FIRE-PROTECTIVE COATING <sup>3</sup>	TESTS SUBMITTED
Icynene Classic 45	8½	14	DC315 14 mils WFT / 9 mils DFT	0.88 gal / 100 ft <sup>2</sup>	NFPA 286
	7½	11½	Fireshell F10E 21 mils WFT / 14 mils DFT	1.31 gal / 100 ft <sup>2</sup>	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 4.3.1.2.

<sup>2</sup>See Sections 3.5.2 and 3.5.3.

<sup>3</sup>As reported in the manufacturer's application instructions. Actual application rate, based on specific project conditions, must be in accordance with the manufacturer's application instructions.

TABLE 3—NFPA 285 COMPLYING EXTERIOR WALL ASSEMBLIES<sup>1,2</sup>

WALL COMPONENT	MATERIALS
Base Wall System – Use either 1, 2 or 3	1 – Concrete wall. 2 – Concrete masonry wall. 3 – Minimum 3 <sup>5</sup> / <sub>8</sub> -inch-deep (92 mm), No. 20 gage, C-shaped steel studs, spaced a maximum of 24 inches on center with lateral bracing every 4 feet (1219 mm) as required by code. Sheathing shall be as described in Exterior Sheathing below.
Floorline Firestopping	Minimum 4 pcf mineral wool in each stud cavity at each floorline, attached with Z-clips. Thickness must match stud cavity depth.
Cavity Insulation – Use either 1, 2, 3, 4 or 5	1 – None. 2 – Partial cavity fill with a maximum air space of 2 inches (51 mm) or full cavity depth not exceeding 7 <sup>5</sup> / <sub>8</sub> inches (194 mm) of Icynene Classic 45(ESR-5498); MD-R-210 (ESR-3493); MD-C-200 (ESR-3199); or Proseal (ESR-3500). 3 – Any insulation qualified as noncombustible in accordance with ASTM E136. 4 – Glass fiber batt insulation <sup>a</sup> . 5 – Mineral fiber insulation <sup>a</sup> . <sup>a</sup> Insulation must comply with the applicable requirements of 2018, 2015 or 2012 IBC Section 720.2 (2009 IBC Section 719.2).
Exterior Sheathing – Only for Base Wall System No.3 – Use either 1 or 2	1 – Minimum ½-inch-thick (12.7 mm), glass mat gypsum sheathing complying with ASTM C1177. 2 – Sheathing shall be attached with No. 6, 1¼-inch-long (32 mm) self-tapping screws located 8 inches (203 mm) on center along the perimeter and 12 inches (302 mm) on center in the field of wallboard. Joints must be taped and treated with joint compound in accordance with ASTM C840 or GA-216.
Exterior Insulation	Maximum thickness of 5½ inches (140 mm) of Proseal Eco (MD-R-210) (ESR-3493) or Proseal (ESR-3500).
Exterior Wall Covering – Use either 1, 2, 3, 4, 5, 6 or 7	1 – Brick - standard nominally 4-inch-thick (102 mm) clay brick; brick veneer anchors – standard types installed a maximum of 24 inches OC vertically on each stud <sup>b</sup> . 2 – Stucco - minimum ¾-inch-thick (19.1 mm), exterior cement plaster and lath with a secondary water-resistive barrier may be installed between the exterior insulation and the lath. 3 – Natural stone (limestone, granite, marble, sandstone), minimum 2-inch-thick (51 mm) <sup>c</sup> . 4 – Cast artificial stone, minimum 1½-inch-thick (38 mm), complying with AC51 and subject of a current ICC-ES evaluation report <sup>c</sup> . 5 – Terracotta cladding, minimum of 1¼-inch-thick (32 mm) <sup>c</sup> . 6 – Precast concrete panels, minimum of 1½-inch-thick (32 mm) <sup>c</sup> . 7 – Concrete masonry units (CMU), minimum of 1½-inch-thick (38 mm) <sup>c</sup> . <sup>b</sup> The maximum air gap between exterior insulation and cladding shall be 2 inches (51 mm). <sup>c</sup> Any standard non-open-jointed installation technique such as ship-lap, etc., may be used.

<sup>1</sup> When used on exterior walls of Types I, II, III or IV construction, the specific wall assembly must comply with 2018, 2015, 2012, and 2009 IBC Section 2603.5.

<sup>2</sup> The exterior wall assemblies described in Table 3 comply with 2018, 2015, 2012 and 2009 IBC Section 2603.5.5.