ICC-ES Evaluation Report

ESR-4728

Reissued April 2025

This report also contains:

- CA Supplement

Subject to renewal February 2026

DIVISION: 07 00 00—THERMAL AND MOISTURE PROTECTION **Section: 07 21 00—Thermal Insulation** **Section: 07 27 00—Air Barriers**	**REPORT HOLDER:** **SOUDAL ACCUMETRIC** **ADDITIONAL LISTEE:** **BOSS PRODUCTS**	**EVALUATION SUBJECT:** **SOUDAFOAM MAXTWO HFO E84** **SOUDAFOAM MAXTWO HFO XL E84**	

1.0 EVALUATION SCOPE

1.1 Compliance with the following codes:

- 2024, 2021, 2018, 2015, 2012 and 2009 *International Building Code®* (IBC)
- 2024, 2021, 2018, 2015, 2012 and 2009 *International Residential Code®* (IRC)
- 2024 2021, 2018, 2015, 2012 and 2009 *International Energy Conservation Code®* (IECC)
- 2013 *Abu Dhabi International Building Code* (ADIBC)†

†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 (*R*-values)
- Attic and crawl space installation
- Air permeability

1.2 Evaluation to the following green standard:

- 2008 *ICC 700 National Green Building Standard™* (ICC 700-2008)

Attributes verified:

- See Section 3.5

2.0 USES

The Soudafoam MAXTWO HFO E84 and Soudafoam MAXTWO HFO XL E84 are used as a nonstructural thermal insulating material in buildings of Type V-B construction under the IBC and dwellings under the IRC. The insulation is for use in wall cavities, floor assemblies, and ceiling assemblies, and in attics and crawl spaces, sill plates, band joists and headers when installed in accordance with this report. Under the IRC, the insulation may be used as air-impermeable insulation when installed in accordance with Section 3.5; to seal the joints in site-fabricated metallic air ducts when installed as described in Section 4.5; as insulation material

on site-fabricated metallic air ducts when installed as described in Section 4.6, and as an air barrier material when installed as described in Section 4.7. The insulation may be used on sill plates, band joists and headers as described in Section 4.8, and in attics and crawlspaces as described in Section 4.4.

3.0 DESCRIPTION

3.1 Soudafoam MAXTWO HFO E84:

Soudafoam MAXTWO HFO E84 is a two-component, closed-cell, spray-applied, polyurethane foam plastic with a nominal density of 1.75 pcf (28 kg/m^3). The polyurethane foam is produced in the field by combining an isocyanate (A component) and a polyol resin (B component) in a 50:50 volumetric ratio. The product is available in a 26.5 lb (12 kg) package that includes pressurized "A" and "B" cylinders, valves, a dispensing gun and hose assembly and accessories. The "A" and "B" components have a shelf life of 12 months when stored in factory-sealed containers at temperatures between 59°F and 77°F (15°C and 25°C).

3.2 Soudafoam MAXTWO HFO XL E84:

Soudafoam MAXTWO HFO XL E84 is identical to Soudafoam MAXTWO HFO E84 with the exception of size where the Soudafoam MAXTWO HFO XL E84 product is available in an 88.2 lb (40 kg) package that includes pressurized "A" and "B" cylinders, valves, a dispensing gun and hose assembly, and accessories.

3.3 Surface-burning Characteristics:

The insulation, at a maximum thickness of 2 inches (51 mm) and a nominal density of 1.75 pounds per cubic foot (28 kg/m^3), has a flame-spread index of 25 or less and a smoke-developed index of 450 or less when tested in accordance with ASTM E84.

3.4 Thermal Resistance:

The insulation has a thermal resistance, *R*-value, at a mean temperature of 75°F (24°C) as shown in Table 1.

3.5 Air Permeability:

The insulation, at a minimum 1-inch (25.4 mm) thickness, are considered air-impermeable insulation in accordance with 2024, 2021 and 2018 IBC Section 1202.3 (2015 IBC Section 1203.3) and 2024, 2021, 2018, 2015 and 2012 IRC Section R806.5 (2009 IRC Section R806.4), based on testing in accordance with ASTM E283.

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.

3.6 Vapor Retarder:

3.6.1 The insulation has a vapor permeance of greater than 1 perm and less than or equal to 10 perm when tested in accordance with ASTM E96 (desiccant method), and qualifies as a Class III vapor retarder (1.0 < perm ≤ 10 perm) when installed at a thickness of 2 inches (51 mm).

3.7 Intumescent Coatings:

3.7.1 DC 315 Coating: DC 315 Coating, manufactured by International Fireproof Technology Inc., (see ESR-3702), is a water-based intumescent coating supplied in 5-gallon (19 L) pails and 55-gallon (208 L) drums. The coating material 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).

4.0 DESIGN AND INSTALLATION

4.1 General:

The manufacturer's published installation instructions, the applicable code and this report must be strictly adhered
to. A copy of the manufacturer's published installation instructions must be available on the jobsite at all times during installation.

4.2 Application:

The Soudafoam MAXTWO HFO E84 and Soudafoam MAXTWO HFO XL E84 insulations must be applied using a dispensing system provided by Soudal Accumetric. The insulation is applied in single or multiple passes. The minimum thickness per pass is ½ inch (12.7 mm) and the maximum thickness per pass is 2 inches (51 mm). The insulation must not exceed a total thickness of 2 inches (51 mm) in wall, floor, ceiling cavities,

attics and crawl spaces, sill plates, band joists and headers. Each pass must be allowed to fully expand and cure prior to the application of an additional pass. The substrate must be free of moisture, frost or ice, dirt, loose debris, oil or grease. The foam plastic insulation must not be used inside electrical outlets or junction boxes or in contact with rain or water and must be protected from the weather during and after application. The maximum service temperature must not exceed that specified in the manufacturer's installation instructions. Where the foam plastic insulation is used as an air-impermeable barrier, such as in unventilated attic spaces, the insulation must be installed at a minimum thickness of 1 inch (25.4 mm) as described in Section 3.5.

4.3 Thermal Barrier:

4.3.1 Application with a Prescriptive Thermal Barrier: The Soudafoam MAXTWO HFO E84 and Soudafoam MAXTWO HFO XL E84 insulations are installed at a maximum thickness of 2 inches (51 mm) and must be separated from the interior of the building by an approved thermal barrier of $^1/_2$-inch-thick (12.7 mm) gypsum board or an equivalent thermal barrier complying with, and installed in accordance with, IBC Section 2603.4, 2024 IRC Section R303.4 or IRC Section R316.4, as applicable. 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 as described in Section 4.4 but is required between the insulation and the interior of the building.

4.3.2 Application without a Prescriptive Thermal Barrier:

The code-prescribed thermal barrier or ignition barrier may be omitted when installation is in accordance with this section. The insulation and coating may be spray-applied to the interior facing of walls, the underside or roof sheathing of roof rafters, and in crawl spaces, and may be left exposed as an interior finish without a code-prescribed thermal barrier or ignition barrier as follows:

4.3.2.1 Soudafoam MAXTWO HFO E84 and Soudal MAXTWO HFO XL E84: The thickness of the foam plastic applied to the underside of the roof sheathing must not exceed 2 inches (51 mm). The thickness of the spray foam insulation applied to vertical wall surfaces must not exceed 2 inches (51 mm). The foam plastic must be covered on all surfaces with DC 315 coating (ESR-3702) at a minimum thickness of 18 wet mils [12 dry mils], applied at a theoretical application rate of 1.13 gallons (3.8 L) per 100 square feet (9.2 m^2). The coating must be applied over the insulation in accordance with the coating manufacturer's instructions, this report and ESR-3702.

4.4 Attics and Crawl Spaces:

4.4.1 Application with a Prescriptive Ignition Barrier: When the Soudafoam MAXTWO HFO E84 and Soudafoam MAXTWO HFO XL E84 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, 2024 IRC Section R303.5.3 and R303.5.4 or 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 the foam plastic insulation is not exposed. The insulation may be installed in unvented attics in accordance with 2024, 2021 and 2018 IBC Section 1202.3 (2015 IBC Section 1203.3) and 2024, 2021, 2018, 2015 and 2012 IRC Section R806.5 (2009 IRC Section R806.4).

The attic or crawl space area must be separated from the interior, habitable space of the building by an approved thermal barrier.

4.4.2 Application without a Prescriptive Ignition Barrier: When the insulations are installed in an attic or crawl space without a prescriptive ignition barrier, in accordance with Sections 4.4.2.1 and 4.4.2.2, the following conditions apply:

1. Entry to the attic or crawl space is only for the 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 (*International Mechanical Code*®) Section 701.
5. Attic ventilation is provided when required by 2024, 2021 and 2018 IBC Section 1202.2 (2015 IBC Section 1203.2) or IRC Section R806, except when air-impermeable insulation is permitted in unvented attics in accordance with 2024, 2021 and 2018 IBC Section 1202.3 (2015 IBC Section 1203.3) and 2024, 2021, 2018, 2015 and 2012 IRC Section R806.5 [2009 IRC Section R806.4].
6. Under-floor (crawl space) ventilation is provided when required by 2024, 2021 and 2018 IBC Section 1202.4 (2015 IBC Section 1203.4) or IRC Section R408.1, as applicable.

4.4.2.1 Attics and Crawl Spaces: In attics, the insulation may be spray-applied to vertical surfaces and the underside of roof sheathing or roof rafters, and in crawl spaces to the underside of floors, as described in this section. The thickness of the insulation applied to wall surfaces must not exceed 2 inches (51 mm).

The foam plastic must be covered on all surfaces with one of the DC315 intumescent coating described in Section 3.7.1. The coating must be applied over the foam plastic 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 must be applied over the foam plastic as follows:

- International Fireproof Technology Inc. DC 315 Coating at a minimum 4 wet mils thickness [3 dry mils (0.08 mm)], applied at a theoretical application rate of 0.25 gallons (0.9 L) per 100 square feet (9.2 m^2).

The insulation may be installed in unvented attics in accordance with 2024, 2021 and 2018 IBC Section 1202.3 (2015 IBC Section 1203.3) and 2024, 2021, 2018, 2015 and 2012 IRC Section R806.5 [2009 IRC Section R806.4].

4.4.2.2 Use on Attic Floors: The insulations may be installed at a maximum thickness of 2 inches (51 mm) between joists in attic floors when the exposed surfaces of the foam plastic insulation are covered with the intumescent coating applied as described in Section 4.4.2.1 of this report. The intumescent coating must be applied in accordance with the coating manufacturer's instructions, ESR-3702 and this report. The insulation must be separated from the interior of the building by an approved thermal barrier.

4.5 Joint Sealant on Metallic Air Ducts:

The insulations, installed at a maximum thickness of 2 inches (51 mm) and width of 6 inches (152 mm), may be used to seal the joints of non-factory-made (non-listed) metallic air ducts, in accordance with Exception 1 of Section M1601.4.1 of the IRC. (See Figure 1)

4.6 Use as Insulation Material on Metallic Air Ducts:

The Soudafoam MAXTWO HFO E84 and Soudafoam MAXTWO HFO XL E84 insulations, at a maximum thickness of 2 inches (51 mm), may be used as an insulation material on non-factory-made (non-listed) metallic air ducts when installed in accordance with the Exception to Section M1601.3 of the IRC.

4.7 Applications as Air Barrier Material:

The insulations may be used in any type of construction as an air barrier material for wall/floor and roof/wall junctions in the exterior building envelope when installed at a maximum thickness of 2 inches (51 mm) and maximum width of 6 inches (152 mm) with unlimited length. (See Figures 2 and 3).

In wall/floor junctions, the foam plastic may be applied over a fire-resistant joint without affecting the fire resistance rating provided the foam plastic installation is limited to 2 inches by 2 inches (51 mm by 51 mm) and unlimited length.

4.8 Use on Sill Plates, Band Joists and Headers:

The Soudafoam MAXTWO HFO E84 and Soudafoam MAXTWO HFO XL E84 insulations, in a maximum thickness of 2 inches (51 mm), may be applied to sill plates, band joists and headers without a thermal barrier or ignition barrier in Type V construction in accordance with IBC Section 2603.4.1.13, 2024 IRC Section R303.5.11, and 2021, 2018, 2015, 2012 and 2009 IRC Section R316.5.11.

5.0 CONDITIONS OF USE:

The Soudafoam MAXTWO HFO E84 and Soudafoam MAXTWO HFO XL E84 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 insulation must be installed in accordance with the manufacturer's published installation instructions, this evaluation report and the applicable code. If there are any conflicts between the manufacturer's published installation instructions and this report, this report governs.

5.2 The insulation must be separated from the interior of the building by an approved thermal barrier as described in Section 4.3, except when installed as described in Sections 4.3.2 4.4, 4.5, 4.6 and 4.7.

5.3 The insulation must not exceed the thicknesses noted in Sections 3.3, 4.2, 4.3, 4.4, 4.5, 4.6, 4.7 and 4.8 of this report.

5.4 The insulation must be protected from the weather during and after application.

5.5 The insulation must be applied by installers certified by Soudal Accumetric.

5.6 Use of the insulation in areas where the probability of termite infestation is "very heavy" must be in accordance with 2021, 2018, 2015 and 2009 IBC Section 2603.8 (2012 IBC Section 2603.9), or IRC Section R318.4 as applicable.

5.7 Jobsite certification and labeling of the insulation must comply with 2021, 2018 and 2015 IRC Section N1101.10.1 and N1101.10.1.1 [(2012 IRC Section N1101.12.1 and N1101.12.1.1) 2009 IRC Sections N1101.4 and N1101.4.1] and 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 303.1.2), as applicable.

5.8 A vapor retarder must be installed in accordance with the applicable code.

5.9 The Soudafoam MAXTWO HFO E84 and Soudafoam MAXTWO HFO XL E84 insulations must not be used as a component of a fire-resistant joint system. The integrity of all fire-resistant joints must be inspected and verified. The insulation may be applied over the top of a fire-resistant joint system, as described in Section 4.7.

5.10 The A and B components of the insulation are produced in Belgium and Kentucky 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, editorially revised June 2024, including reports of tests in accordance with Appendix X and Appendix Y of AC377.

6.2 Report of tests in accordance with NFPA 286 for application without a prescriptive 15-minute thermal barrier (See Section 4.3.2).

6.3 Report of test for air leakage rate in accordance with ASTM E283.

6.4 Report of test for water vapor transmission in accordance with ASTM E96 desiccant method.

6.5 Engineering analysis addressing use as an air barrier material and duct joint sealant.

7.0 IDENTIFICATION

7.1 The ICC-ES mark of conformity, electronic labeling, or the evaluation report number (ICC-ES ESR-4728) along with the name, registered trademark, or registered logo of the report holder (or additional listee) must be included in the product label.

7.2 In addition, containers of the A and B components of Soudafoam MAXTWO HFO E84 and Soudafoam MAXTWO HFO XL E84 are identified with a label bearing the Soudal Accumetric name and address; the product name; the flame spread and smoke-developed indices; the lot number; mixing instructions; shelf life and the expiration date; and evaluation report number (ESR-4728).

Alternately, containers of the A and B components are identified with a label bearing the additional listee's name (BOSS Products) and address; the product name (See Table 2 of this report); the flame spread and smoke-developed indices; the lot number; mixing instructions; shelf life and the expiration date; and evaluation report number (ESR-4728).

The International Fireproof Technology, Inc. DC 315 Coating described in Section 3.7.1 is identified with the manufacturer's name, the product trade name, date of manufacture, shelf life or expiration date, manufacturer's instructions and evaluation report number (ESR-3702).

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

SOUDAL ACCUMETRIC
350 RING ROAD
ELIZABETHTOWN, KENTUCKY 42701
(270) 769-3385
info@soudalusa.com
www.soudalusa.com

7.4 The additional listee's contact information is the following:

BOSS PRODUCTS
350 RING ROAD
ELIZABETHTOWN, KENTUCKY 42701
(270) 769-3385
sales@bossproducts.com
www.bossproducts.com

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

SOUDAFOAM MAXTWO HFO E84		SOUDAFOAM MAXTWO HFO XL E84	
THICKNESS (inches)	***R*-VALUE (°F.ft².h/Btu)**	**THICKNESS (inches)**	***R*-VALUE (°F.ft².h/Btu)**
1.0	6.2	1.0	6.2
2.0	13	2.0	13

For **SI:** 1 inch = 25.4 mm; 1°F.ft².h/Btu = 0.176110°K.m².W.

[1]*R*-values are based on tested K-values at 1- and 2-inch thicknesses.

TABLE 2—COMPANY NAME AND PRODUCT NAME CORRELATION

Soudal Accumetric	BOSS Products
Soudafoam MAXTWO HFO E84	BOSS 2284
Soudafoam MAXTWO HFO XL E84	BOSS 2684

FIGURE 1—TYPICAL JOINT SEALANT APPLICATION ON METALLIC AIR DUCT

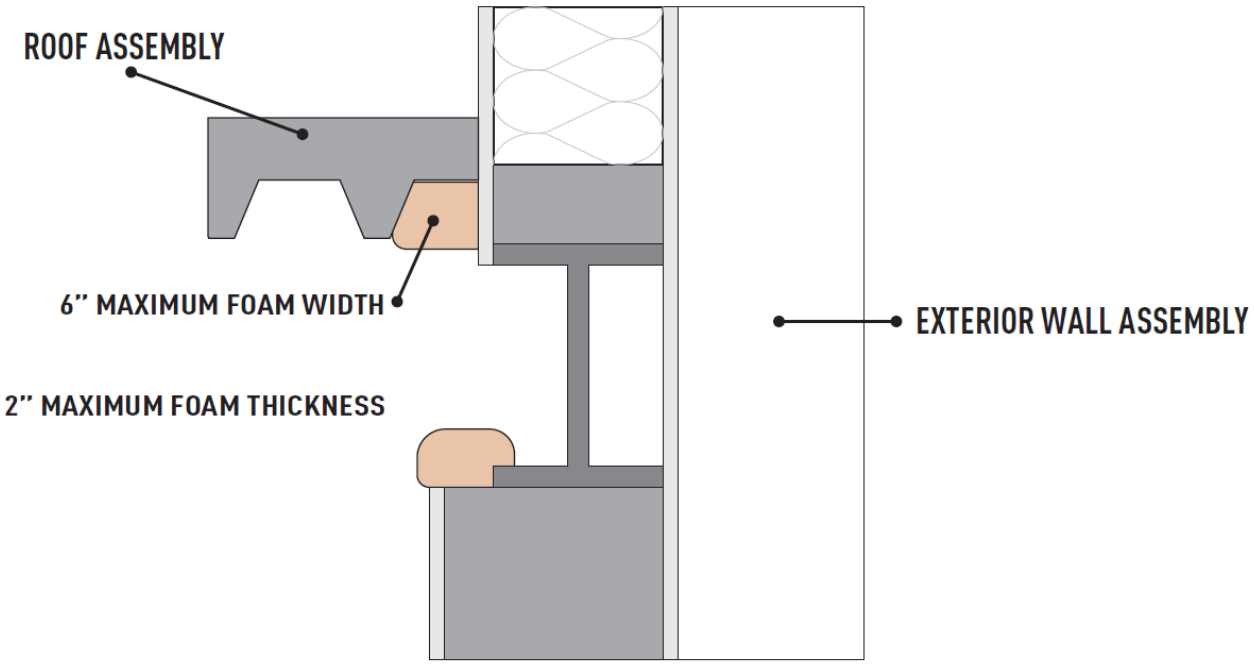

FIGURE 2—TYPICAL EXTERIOR WALL – ROOF INTERSECTION

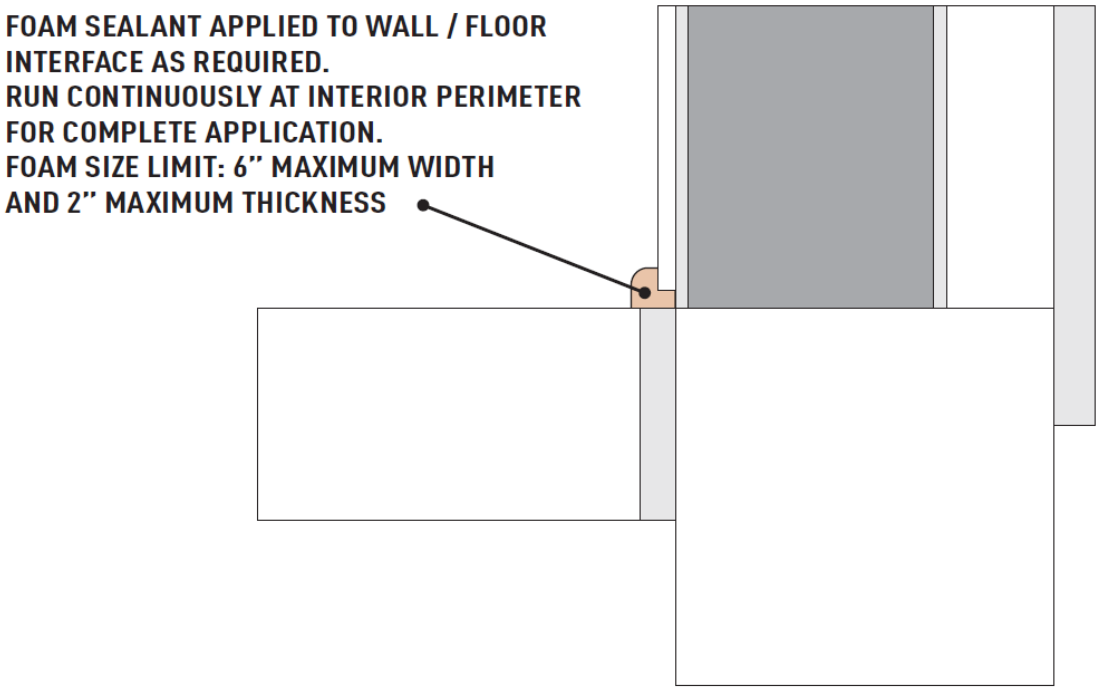

FIGURE 3—TYPICAL EXTERIOR WALL - FLOOR INTERSECTION

DIVISION: 07 00 00—THERMAL AND MOISTURE PROTECTION
Section: 07 21 00—Thermal Insulation
Section: 07 27 00—Air Barriers

REPORT HOLDER:

SOUDAL ACCUMETRIC

EVALUATION SUBJECT:

SOUDAFOAM MAXTWO HFO E84 AND SUDAFOAM MAXTWO HFO XL E84

1.0 REPORT PURPOSE AND SCOPE

Purpose:

The purpose of this evaluation report supplement is to indicate that the Soudal Accumteric MAXTWO HFO E84 and Soudafoam MAXTWO HFO XL E84, described in ICC-ES evaluation report ESR-4728, 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 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 Soudal Accumteric MAXTWO HFO E84 and Soudafoam MAXTWO HFO XL E84, described in Sections 2.0 through 7.0 of the evaluation report ESR-4728, 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 Soudal Accumteric MAXTWO HFO E84 and Soudafoam MAXTWO HFO XL E84, described in Sections 2.0 through 7.0 of the evaluation report ESR-4728, 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

This supplement expires concurrently with the evaluation report, reissued April 2025.