

DIVISION: 07 00 00—THERMAL AND MOISTURE PROTECTION

Section: 07 21 00—Thermal Insulation

REPORT HOLDER:

THERMOSEAL, LLC

EVALUATION SUBJECT:

THERMOSEAL™ OCX SPRAY-APPLIED POLYURETHANE FOAM INSULATION

1.0 EVALUATION SCOPE

1.1 Compliance with the following codes:

- 2018, 2015, 2012 and 2009 *International Building Code*® (IBC)
- 2018, 2015, 2012 and 2009 *International Residential Code*® (IRC)
- 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.

- Other Codes (see Section 8.0)

Properties evaluated:

- Surface-burning characteristics
- Physical properties
- Thermal resistance
- Attic and crawl space installation
- Air permeability
- Fire-resistance-rated construction
- Exterior walls in Type I through 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

ThermoSeal™ OCX spray-applied polyurethane foam insulation is used as a nonstructural thermal insulating material in Type I, II, III, IV and Type V construction under the IBC and in dwellings under the IRC. The insulation is for

use in wall cavities, floor/ceiling assemblies, or attics and crawl spaces when installed in accordance with Section 4.0. Under the IRC and the 2018 and 2015 IBC, the insulation may be used as air-impermeable insulation when installed in accordance with Section 3.4. The insulation may be used in nonload-bearing, fire-resistance-rated walls when construction is in accordance with Section 4.5.

The attributes of the insulation have been verified as conforming to the provisions of ICC 700-2008 Section 703.2.1.1(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 Materials:

ThermoSeal™ OCX spray-applied foam insulation is semirigid, low-density, polyurethane foam plastic that is installed as a component of floor/ceiling and wall assemblies. The insulation is a two-component spray foam plastic with a nominal in-place density of 0.5 pcf (8 kg/m³). The insulation is produced in the field by combining a polymeric isocyanate (A-PMDI component, A-Side ISO) with a polymeric resin (*ThermoSeal™ OCX* B-Side component). The insulation liquid components are supplied in 55-gallon (208 L) drums and/or 250-gallon (946 L) totes and must be stored at temperatures between 50°F (10°C) and 100°F (38°C). The liquid components have a shelf life of one year when stored in factory-sealed containers at these temperatures.

3.2 Surface-burning Characteristics:

The insulation, at a maximum thickness of 6 inches (152 mm) and a nominal density of 0.5 pcf (8 kg/m³), 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 UL 723). Greater thicknesses are recognized as described in Sections 4.3 and 4.4. *ThermoSeal™ OCX* thickness is not limited when separated from the interior of the building by a prescriptive thermal barrier as complying with the IBC or IRC and as described in Section 4.3.1.

3.3 Thermal Resistance, R-values:

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

3.4 Air Permeability:

ThermoSeal™ OCX spray-applied polyurethane foam insulation, at a minimum thickness of 3.0 inches (76 mm), is considered air-impermeable insulation in accordance with

2018, 2015 and 2012 IRC Section R806.5 (2009 IRC Section R806.4) and 2018 IBC Section 1202.3 [2015 IBC Section 1203.3], based on testing in accordance with ASTM E2178.

3.5 Andek Firegard Intumescent Coating:

Andek Firegard intumescent coating, manufactured by Andek Corporation, is a one-component, water-based coating with specific gravity of 1.37. Andek Firegard is supplied in 5-gallon (19 L) pails and has a shelf life of one year when stored in factory-sealed containers at temperatures between 45°F (7°C) and 90°F (32°C).

3.6 No-Burn® Plus XD Intumescent Coating:

No-Burn® Plus XD intumescent coating, manufactured by No-Burn, Inc., is a translucent aqueous liquid in 1- and 5-gallon (3.8 and 18.8 L) pails and 55-gallon (208 L) drums. The coating has a shelf life of three years when stored in a factory-sealed container at temperatures between 40°F (4.5°C) and 90°F (32°C).

3.7 DC 315 Coating:

DC 315, manufactured by International Fireproof Technology, Inc., Paint To Protect® Inc. (ESR-3702), is a one-component, water-based, liquid coating with a specific gravity of 1.3. DC 315 is supplied in 5-gallon (19 L) pails and/or 55-gallon drums and has a shelf life of one year when stored in unopened factory-sealed containers between 50°F (10°C) to 80°F (27°C).

4.0 INSTALLATION

4.1 General:

ThermoSeal™ OCX spray-applied foam insulation must be installed in accordance with the Center for Polyurethane Industries' *Guidance on Best Practices for the Installation of Spray Polyurethane Foam*, the manufacturer's published technical data sheet and product application guide and this report. A copy of each document must be available at all times on the jobsite during installation.

4.2 Application:

The *ThermoSeal™* OCX insulation is spray-applied on the jobsite using a volumetric positive displacement pump as identified in the *ThermoSeal* application guide. The insulation must be applied when the ambient temperature is greater than 23°F (-5°C). The insulation must not be used in areas that have a maximum in-service temperature greater than 180°F (82°C). The foam plastic must not be used in electrical outlet or junction boxes or in contact with water, rain or soil. 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 insulation must be protected from the weather during and after application. The insulation may be applied to the maximum thickness in a single pass. Where insulation is used as an air-impermeable insulation, such as in unvented attic assemblies under 2018, 2015 and 2012 IRC Section R806.5 (2009 IRC Section R806.4) or 2018 IBC 1202.3 [2015 IBC Section 1203.3], the insulation must be installed at a minimum thickness of 3.0 inches (76 mm).

4.3 Thermal Barrier:

4.3.1 Application with a Prescriptive Thermal Barrier: *ThermoSeal™* OCX spray foam insulation 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 15-minute thermal barrier complying with, and installed in accordance with, IBC Section 2603.4 or IRC Section R316.4, as applicable, except where insulation is in an attic or crawl space as described in Section 4.4.

ThermoSeal™ OCX thickness is not limited when separated from the interior of the building by a prescriptive thermal barrier as complying with the IBC or IRC.

4.3.2 Application without a Prescriptive Thermal Barrier:

The prescriptive 15-minute thermal barrier may be omitted when installation is in accordance with this section and Table 2. *ThermoSeal™* OCX spray foam insulation and DC 315 (ESR-3702) intumescent coating may be spray-applied to the interior facing of walls, the underside of roof sheathing or roof rafters, and in crawl spaces, and may be left exposed as an interior finish without a prescribed 15-minute thermal barrier or ignition barrier. The foam plastic insulation thickness must not exceed thicknesses stated in Table 2. All foam surfaces must be covered with intumescent coating, described in Section 3.7, at the minimum thicknesses stated in Table 2. The intumescent coating must be spray-applied over the insulation in accordance with the coating manufacturer's instructions and this report at a rate stated in Table 2 to obtain the recommended minimum dry film thickness noted in this section.

4.4 Ignition Barrier – Attics and Crawl Spaces:

4.4.1 Application with a Prescriptive Ignition Barrier:

When *ThermoSeal™* OCX spray foam insulation is 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 Section R316.5.3 or 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. *ThermoSeal™* OCX spray-applied foam insulation as described in this section may be installed in unvented attics in accordance with 2018 IBC Section 1202.3 [2015 IBC Section 1203.3] or 2018, 2015 and 2012 IRC Section R806.5 (2009 IRC Section R806.4).

4.4.2 Application without a Prescriptive Ignition Barrier:

4.4.2.1 General: *ThermoSeal™* OCX spray-applied foam insulation may be installed in attics and crawl spaces, without a prescriptive ignition barrier as described in IBC Section 2603.4.1.6 and IRC Sections R316.5.3 and R316.5.4, in accordance with Section 4.4.2.2, 4.4.2.3, 4.4.2.4, or 4.4.2.5, when all of the following conditions apply:

- a. Entry to the attic or crawl space is only 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. Under-floor (crawl space) ventilation is provided when required by 2018 IBC Section 1202.4 [2015 IBC Section 1203.4 (2012 and 2009 IBC Section 1203.3)] or IRC Section R408.1, as applicable.
- e. Attic ventilation is provided when required by 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 2018 IBC Section 1202.3 [2015 IBC Section 1203.3] or 2018, 2015 and 2012 IRC Section R806.5 (2009 IRC Section R806.4).
- f. Combustion air is provided in accordance with IMC (*International Mechanical Code*®) Section 701.

4.4.2.2 The insulation must be covered on all surfaces with a fire protective coating at the minimum thickness set forth in Table 3.

4.4.2.3 The maximum installed thickness of the insulation must not exceed the thicknesses set forth in Table 3.

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

4.4.2.5 Use on Attic Floors: *ThermoSeal™* OCX spray-applied foam insulation may be installed at a maximum thickness between and over the joists in attic floors as set forth in Table 3. All exposed foam plastic surfaces must be covered with a minimum nominal thickness of the fire protective coatings as set forth in Table 3. The intumescent coatings must be applied over the insulation in accordance with the coating manufacturer's instructions and this report.

4.5 One-hour Fire-resistance-rated Wall Assemblies (Nonload-bearing):

ThermoSeal™ OCX foam insulation may be used as a component of a one-hour fire-resistance-rated, nonload-bearing wall assembly as described in this section (Section 4.5).

4.5.1 Interior and Exterior Face: One layer of 5/8-inch-thick (16 mm), Type X gypsum wallboard complying with ASTM C36 or ASTM C1396 is installed on the interior and exterior side of nominally 2-by-6, No. 1, Southern yellow pine wood studs spaced 16 inches (406 mm) on center. The wallboard is attached with 1 5/8-inch-long (41 mm), coarse-thread drywall screws located 8 inches (203 mm) on center along the perimeter and 12 inches on center (305 mm) in the field of the wallboard. Wallboard joints must be taped and treated with joint compound in accordance with ASTM C840 or GA-216. Fastener heads must also be treated with joint compound in accordance with ASTM C840 or GA-216.

4.5.2 Stud Cavity: A nominally 5 1/2-inch (140 mm) thickness of *ThermoSeal™* OCX foam insulation is spray-applied in all stud cavities.

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

When used on exterior walls of Type I, II, III and IV construction, the *ThermoSeal™* OCX foam insulation must comply with Section 2603.5 of the IBC at a maximum thickness of 3 5/8 inches (92 mm), when installed per the manufacturer's published product application guide and this section. The potential heat of *ThermoSeal™* OCX spray polyurethane foam insulation is 496Btu/ft² (5.6 MJ/m²) per inch of thickness when tested in accordance with NFPA 259.

4.6.1 Nonload-bearing NFPA 285-tested Wall Assembly:

4.6.1.1 Interior Face: One layer of 5/8-inch-thick (16 mm), Type X gypsum wallboard complying with ASTM C36 or ASTM C1396 is installed with the long dimension perpendicular to 3 5/8-inch-deep (92 mm), 20 gage steel studs spaced a maximum of 24 inches (609 mm) on center. The wallboard is attached with 1 1/4-inch-long (31.8 mm), bugle head screws located 8 inches (203 mm) on center along the perimeter and 12 inches on center (305 mm) in the field of the wallboard. Wallboard joints must be taped and treated with joint compound in accordance with ASTM C840 or GA-216. Fastener heads must also be treated with joint compound in accordance with ASTM C840 or GA-216.

4.6.1.2 Stud Cavity: *ThermoSeal™* OCX foam insulation, in a maximum thickness of 3 5/8 inches (92 mm), is spray-applied in all stud cavities.

4.6.1.3 Exterior Face: One layer of 5/8-inch-thick (16 mm) GP DensGlass® sheathing attached to steel studs using 1 1/4-inch-long (31.8 mm), self-tapping screws spaced

8 inches (203 mm) on center along the perimeter and 12 inches on center (305 mm) in the field of the sheathing. Details of the exterior wall covering must be provided by the report holder, designer or specifier to the code official, with a fire engineering analysis demonstrating that the addition of the wall covering will not negatively affect conformance of the assembly with the requirements of IBC Section 2603.5.

5.0 CONDITIONS OF USE

ThermoSeal™ OCX spray foam 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** The products must be installed in accordance with the Center for Polyurethane Industries "Guidance on Best Practices for the Installation of Spray Polyurethane Foam", the manufacturer's published technical data sheet and product application guide, 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 15-minute thermal barrier, except when installation is as described in Sections 4.3.2 or 4.4.1 through 4.4.2.5.
- 5.3** The insulation must not exceed the thicknesses noted in Sections 3.2, 4.2, 4.3, 4.4, 4.5, and 4.6.
- 5.4** The insulation must be protected from exposure to weather during and after application.
- 5.5** The insulation must be applied by contractors approved by ThermoSeal LLC. 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 2018, 2015 and 2009 IBC Section 2603.8 (2012 IBC Section 2603.9), as applicable.
- 5.6** When use is on exterior walls of buildings of Type I, II, III, and IV, construction must be as described in Section 4.6.
- 5.7** See Section 4.5 for the fire-resistance-rated wall assemblies.
- 5.8** Jobsite certification and labeling of the insulation must comply with 2018 or 2015 IRC Section N1101.10, 2012 IRC Section N1101.14 (2012 IRC Sections N1101.12.1 and N1101.12.1.1 or 2009 IRC Sections N1101.4 and N1101.4.10), 2018, 2015 or 2012 IECC Sections C303.1, R303.1 and R401.3 [2009 IECC Section 303.1 and 401.3], as applicable.
- 5.9** The insulation is produced in the USA, 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 2016 (editorially revised April 2018), including reports of tests in accordance with Appendix X.
- 6.2** Reports of fire propagation characteristics tests in accordance with NFPA 285.
- 6.3** Reports of air leakage testing in accordance with ASTM E283.
- 6.4** Reports of air permeance tests in accordance with ASTM E2178.

- 6.5 Reports of room corner tests in accordance with NFPA 286.
- 6.6 Reports of tests in accordance with ASTM E119.
- 6.7 Reports of potential heat tests in accordance with NFPA 259.

7.0 IDENTIFICATION

7.1 Components of the spray foam insulation are identified with the manufacturer’s name (ThermoSeal LLC), address and telephone number; the product name (*ThermoSeal™* A-PMDI or *ThermoSeal™* OCX B-Side); use instructions; the density; the flame-spread and smoke-developed indices; the date of manufacture; thermal resistance values; and the evaluation report number (ESR-4614).

International Fireproof Technology, Inc. / Paint to Protect Inc., DC 315 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 evaluation report number ([ESR-3702](#)).

No-Burn® Plus XD intumescent coating is identified with the manufacturer’s name (No-Burn, Inc) and address, the product trade name, and use instructions.

7.2 The report holder’s contact information is the following:

THERMOSEAL, LLC
POST OFFICE BOX 32
NEW CANNAN, CONNECTICUT 06840
800-853-1577
www.thermosealusa.com
info@thermosealusa.com

8.0 OTHER CODES

8.1 Evaluation Scope:

In addition to the codes referenced in Section 1.0, the products recognized in this report have also been evaluated in accordance with the following codes:

- 2006 *International Building Code*® (2006 IBC)
- 2006 *International Residential Code*® (2006 IRC)
- 2006 *International Energy Conservation Code*® (2006 IECC)

- 2003 *International Building Code*® (2003 IBC)
- 2003 *International Residential Code*® (2003 IRC)
- 2003 *International Energy Conservation Code*® (2003 IECC)

8.2 Uses:

The products comply with the above-mentioned codes as described in Sections 2.0 through 7.0 of this report except as noted below:

- **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 R314.1.12 of the 2003 IRC.
- **Application without a Prescriptive Thermal Barrier:** See Section 4.3.2.
- **Application with a Prescriptive Ignition Barrier:** See Section 4.4.1, except attics must be vented in accordance with Section 1203.2 of the 2006 and 2003 IBC or Section R806 of the 2003 IRC, and crawl space ventilation must be in accordance with IBC Section 1203.3 of the 2006 and 2003 IBC or IRC Section R408, as applicable. Additionally, an ignition barrier must be installed in accordance with Sections R314.5.3 or R314.5.3 of the 2006 IRC or Section R314.2.3 of the 2003 IRC, as applicable.
- **Application without a Prescriptive Ignition Barrier:** See Section 4.4.2, except attics must be vented in accordance with Section 1203.2 of the 2006 and 2003 IBC or Section R806 of the IRC, and crawl space ventilation must be in accordance with Section 1203.3 of the 2006 and 2003 IBC or IRC Section R408, as applicable.
- **Protection against Termites:** See Section 5.6, except use of the insulation in areas where the probability of termite infestation is “very heavy” must be in accordance with Section R320.5 of the 2006 IRC or Section R320.4 of the 2003 IRC.
- **Jobsite Certification and Labeling:** See Section 5.9, except jobsite certification and labeling must comply with Sections 102.1.1 and 102.1.11, as applicable, of the 2006 IECC.

TABLE 1—THERMAL RESISTANCE (R-VALUES)

THICKNESS (inches)	R-VALUE (°F.ft².h/Btu)
1	3.8
3.5	13
4	15
5.5	21
7	27
9.5	36
10	38
11.5	44
14	52

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

¹R-values are calculated based on tested K-values at 1- and 4-inch thicknesses.

TABLE 2—USE OF INSULATION WITHOUT A PRESCRIPTIVE THERMAL BARRIER¹

Coating ²	Maximum Insulation Thickness (in.) Vertical Surfaces	Maximum Insulation Thickness (in.) Ceiling Surfaces	Fire Protective Coating (Applied to all Foam Surfaces)		
			Minimum Coating Dry Film Thickness (mils)	Minimum Coating Wet Film Thickness (mils)	Minimum Application Rate
DC315	7½	11½	12	18	1 gal/90 ft ²

For SI: 1 inch= 25.4 mm; 1 gal = 3.785 L; 1 ft² = 0.093 m².

¹See Section 4.3.2.

² See Section 3.7.

TABLE 3—ATTIC OR CRAWL SPACE ASSEMBLIES WITHOUT A PRESCRIPTIVE IGNITION BARRIER¹

Coating ²	Maximum Insulation Thickness (in.) Vertical Surfaces and Attic Floors	Maximum Insulation Thickness (in.) Ceiling Surfaces	Fire Protective Coating (Applied to all Foam Surfaces)		
			Minimum Coating Dry Film Thickness	Minimum Coating Wet Film Thickness	Minimum Application Rate
Andek Firegard	9½	11½	10	20	1 gal/100 ft ²
No-Burn Plus XD	9½	11½	6	10	1 gal/160 ft ²
DC 315	7½	11½	3	4	1 gal/360 ft ²

For SI: 1 inch= 25.4 mm; 1 gal = 3.785 L; 1 ft² = 0.093 m².

¹See Section 4.4.2.

² See Sections 3.6 and 3.7.

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1.0 REPORT PURPOSE AND SCOPE

Purpose:

The purpose of this evaluation report supplement is to indicate that *ThermoSeal™* OCX spray-applied foam insulation, recognized in ICC-ES evaluation report ESR-4614, has also been evaluated for compliance with the codes noted below.

Applicable code editions:

- 2019 *California Building Code* (CBC)

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

- 2019 *California Residential Code* (CRC)
- 2019 *California Energy Code* (CEC)

2.0 CONCLUSIONS

2.1 CBC and CRC:

The *ThermoSeal™* OCX spray-applied foam insulation, described in Sections 2.0 through 7.0 of the evaluation report ESR-4614, complies with the 2019 CBC and CRC, when installed in accordance with the 2018 *International Building Code®* (IBC) and *International Residential Code®* (IRC) provisions, as applicable, of the evaluation report.

The insulation has not been evaluated under CBC Chapter 7A or CRC Section R337, for use in the exterior design and construction of new buildings located in a Fire Hazard Severity Zone within State Responsibility Areas or any Wildland–Urban Interface Fire Area.

2.1.1 OSHPD:

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

2.1.2 DSA:

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

The products recognized in this supplement have not been evaluated for compliance with the *International Wildland–Urban Interface Code®*.

2.2 CEC:

The *ThermoSeal™* OCX spray-applied foam insulation, described in Sections 2.0 through 7.0 of evaluation report ESR-4614, complies with 2019 CEC, provided the design and installation are in accordance with the 2018 *International Building Code®* (IBC) provisions noted in the evaluation report.

2.2.1 Conditions of Use:

In accordance with Section 110.8 of the 2019 CEC, 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". The certification must be verified with the DCA Bureau of Household Goods and Services. The following link may be used for verification: https://bhgs.dca.ca.gov/consumers/ti_directory.pdf.

This supplement expires concurrently with the evaluation report, issued July 2020.