ICC-ES Evaluation Report

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

REPORT HOLDER:

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EVALUATION SUBJECT:

***SEAL*ECTION® 500 SPRAY-APPLIED POLYURETHANE FOAM INSULATION**

1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2009 *International Building Code*® (IBC)
- 2009 *International Residential Code*® (IRC)
- 2009 *International Energy Conservation Code*® (IECC)
- 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

2.0 USES

*SEAL*ECTION® 500 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, 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.

3.0 DESCRIPTION

3.1 Materials:

*SEAL*ECTION® 500 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/m^3). The insulation is produced in the field by combining a polymeric isocyanate (A500 component) with a polymeric resin (B500 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 40ºF (4.5ºC) and 100ºF (38ºC). 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/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 E 84. Greater thicknesses are recognized as described in Sections 4.3 and 4.4.

3.3 Thermal Resistance, *R*-values:

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

3.4 Air Permeability:

*SEAL*ECTION® 500 spray-applied polyurethane foam insulation, at a minimum thickness of 3.5 inches (89 mm), is considered air-impermeable insulation in accordance with Section R806.4 of the IRC, based on testing in accordance with ASTM E 283 and ASTM E 2178.

3.5 Blazelok™ IB4 Intumescent Coating:

Blazelok™ IB4 intumescent coating, manufactured by TPR^2 Corporation, is a one-component, water-based liquid coating with specific gravity of 1.3. Blazelok™ IB4 is supplied in 5-gallon (19 L) pails and/or 55-gallon (208 L) drums and has a shelf life of one year when stored in factory-sealed containers at temperatures between 45ºF (7ºC) and 90ºF (32ºC).

3.6 Blazelok™ TB Intumescent Coating:

Blazelok™ TB intumescent coating, manufactured by TPR^2 Corporation, is a one-component, water-based liquid coating with specific gravity of 1.3. Blazelok™ TB is supplied in 5-gallon (19 L) pails and/or 55-gallon (208 L) drums and has a shelf life of one year when stored in factory-sealed containers at temperatures between 45ºF (7ºC) and 90ºF (32ºC).

3.7 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 45ºF (7ºC) and 90ºF (32ºC).

3.8 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 40ºF (4.5ºC) and 90ºF (32ºC).

4.0 INSTALLATION

4.1 General:

*SEAL*ECTION® 500 spray-applied foam insulation must be installed in accordance with the manufacturer's published installation instructions and this report. A copy of the manufacturer's published installation instructions must be available at all times on the jobsite during installation.

4.2 Application:

The *SEAL*ECTION® 500 insulation is spray-applied on the jobsite using a volumetric positive displacement pump as identified in the Demilec application manual. The insulation must be applied when the ambient temperature is greater than 23ºF (-5ºC). The insulation must not be used in areas that have a maximum in-service temperature greater than 180ºF (82ºC). 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 IRC Section R806.4, the insulation must be installed at a minimum thickness of 3.5 inches (89 mm).

4.3 Thermal Barrier:

4.3.1 Application with a Prescriptive Thermal Barrier: *SEAL*ECTION® 500 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. Thicknesses of up to $9^1/_4$ inches (235 mm) for wall cavities and 14 inches (356 mm) for floor/ceiling cavities are recognized, based on room corner fire testing in accordance with NFPA 286.

4.3.2 Application without a Thermal or Ignition Barrier: The prescriptive 15-minute thermal barrier or ignition barrier may be omitted when installation is in accordance with this section. *SEAL*ECTION® 500 spray foam insulation and Blazelok™ TB 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 $5^1/_2$ inches (140 mm) in walls and 10 inches (254 mm) in floors or ceilings. All foam surfaces must be covered with 14 dry mils (0.36 mm) [25 wet mils (0.64 mm)] of Blazelok™ TB intumescent coating, described in Section 3.6. The intumescent coating must be spray-applied over the insulation in accordance with the coating manufacturer's instructions and this report at a rate of 1 gallon (3.38 L) per 82 square feet (7.6 m^2) to obtain the recommended minimum dry film thickness noted in this section.

4.4 Attics and Crawl Spaces:

4.4.1 Application with a Prescriptive Ignition Barrier: When *SEAL*ECTION® 500 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. *SEAL*ECTION® 500 spray-applied foam insulation as described in this section may be installed in unvented attics in accordance with IRC Section R806.4.

4.4.2 Application without a Prescriptive Ignition Barrier:

4.4.2.1 General: *SEAL*ECTION® 500 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 IBC Section 1203.3 or IRC Section R408.1, as applicable.

e. Attic ventilation is provided when required by IBC Section 1203.2 or IRC Section R806, except when air-impermeable insulation is permitted in unvented attics in accordance with Section R806.4 of the IRC.

f. Combustion air is provided in accordance with IMC (*International Mechanical Code*®) Section 701.

4.4.2.2 Application with Blazelok™ IB4 Intumescent Coating: In attics, *SEAL*ECTION® 500 foam insulation may be spray-applied to the underside of the roof sheathing and/or rafters; and in crawl spaces, the insulation may be spray-applied to the underside of wood floors as described in this section. The thickness of the foam plastic applied to the underside of the top of the space must not exceed $11^1/_2$ inches (292 mm) and the vertical surfaces must not exceed $9^1/_2$ inches (241 mm). The foam plastic surface must be covered with a minimum nominal thickness of 5 dry mils (0.13 mm) [9 wet mils (0.23 mm)] of the Blazelok™ IB4 intumescent coating described in Section 3.5. The intumescent coating must be spray-applied over the insulation in accordance with the coating manufacturer's instructions and this report at a rate of 1 gallon (3.38 L) per 175 square feet (16.3 m^2) to obtain the recommended minimum dry film thickness noted in this section.

4.4.2.3 Application with Andek Firegard Intumescent Coating: In attics, *SEAL*ECTION® 500 foam insulation may be spray-applied to the underside of the roof sheathing and/or rafters and in crawl spaces. The

insulation may be spray-applied to the underside of wood floors as described in this section. The thickness of the foam plastic applied to the underside of the top of the space must not exceed $11^1/_2$ inches (292 mm) and the vertical surfaces must not exceed $9^1/_2$ inches (241 mm). The foam plastic surface must be covered with a minimum nominal thickness of 10 dry mils (0.25 mm) [20 wet mils (0.51 mm)] of the Andek Firegard intumescent coating described in Section 3.7. The intumescent coating must be spray-applied over the insulation in accordance with the coating manufacturer's instructions and this report at a rate of 1 gallon (3.38 L) per 100 square feet (9.3 m^2) to obtain the recommended minimum dry film thickness noted in this section.

4.4.2.4 Application with No-Burn® Plus XD Intumescent Coating: In attics, *SEAL*ECTION® 500 foam insulation may be spray-applied to the underside of the roof sheathing and/or rafters and in crawl spaces. The insulation may be spray-applied to the underside of wood floors as described in this section. The thickness of the foam plastic applied to the underside of the top of the space must not exceed $11^1/_2$ inches (292 mm), and the application to vertical surfaces must not exceed $9^1/_2$ inches (241 mm). The foam plastic surfaces must be covered with a minimum nominal thickness of 6 dry mils (0.15 mm) [10 wet mils (0.25 mm)] of the No-Burn® Plus XD intumescent coating described in Section 3.8. The intumescent coating must be spray-applied over the insulation in accordance with the coating manufacturer's instructions and this report, at a rate of 1 gallon (3.38 L) per 160 square feet (14.9 m^2) to obtain the recommended minimum dry film thickness noted in this section.

4.4.2.5 Use on Attic Floors: *SEAL*ECTION® 500 spray-applied foam insulation may be installed at a maximum thickness of $9^1/_2$ inches (241 mm) between and over the joists in attic floors. All exposed foam plastic surfaces must be covered with a minimum nominal thickness of 9 wet mils (0.23 mm)] of the Blazelok™ IB4 intumescent coating; 20 wet mils (0.51 mm) of the Andek Firegard intumescent coating; or 10 wet mils (0.25 mm) of No-Burn® Plus XD intumescent coatings as described in this report. 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):

*SEA*LECTION® 500 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 C 36 or ASTM C 1396 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 C 840 or GA-216. Fastener heads must also be treated with joint compound in accordance with ASTM C 840 or GA-216.

4.5.2 Stud Cavity: A nominally $5^1/_2$-inch (140 mm) thickness of *SEAL*ECTION® 500 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 *SEAL*ECTION® 500 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 installation instructions and this section. The potential heat of Demilec *SEAL*ECTION® 500 spray polyurethane foam insulation is 496 Btu/ft^2 (5.6 MJ/m^2) 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 C 36 or ASTM C 1396 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 C 840 or GA-216. Fastener heads must also be treated with joint compound in accordance with ASTM C 840 or GA-216.

4.6.1.2 Stud Cavity: *SEAL*ECTION® 500 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

SEALECTION® 500 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 manufacturer's published installations 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 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 certified by Demilec USA LLC.

5.6 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.

5.7 When use is on exterior walls of buildings of Type I, II, III, and IV, construction must be as described in Section 4.6.

5.8 See Section 4.5 for the fire-resistance-rated wall assemblies.

5.9 Jobsite certification and labeling of the insulation must comply with IRC Sections N1101.4 and N1101.4.1 and IECC Sections 102.1.1 and 102.2.11, as applicable.

5.10 The insulation is produced in Arlington, Texas, under a quality control program with inspections by Intertek Testing Services NA, Inc. (AA-647).

6.0 EVIDENCE SUBMITTED

6.1 Data in accordance with the ICC-ES Acceptance Criteria for Spray-applied Foam Plastic Insulation (AC377), dated October 2010, 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 E 283.

6.4 Reports of air permeance tests in accordance with ASTM E 2178.

6.5 Reports of room corner tests in accordance with NFPA 286.

6.6 Reports of tests in accordance with ASTM E 119.

6.7 Reports of potential heat tests in accordance with NFPA 259.

7.0 IDENTIFICATION

Components of the spray foam insulation are identified with the manufacturer's name (Demilec USA LLC), address and telephone number; the product name (*SEAL*ECTION® A500 or *SEAL*ECTION® B500); use instructions; the density; the flame-spread and smoke-developed indices; the date of manufacture; thermal resistance values; the evaluation report number (ESR-1172); and the name of the inspection agency (Intertek Testing Services NA).

Each pail of the Blazelok™ IB4 and the Blazelok™ TB intumescent coating is labeled with the manufacturer's name (TPR[2] Corporation), the product name, and use instructions. Each pail of Andek Corporations Firegard intumescent coating is labeled with the manufacturers name (Andek Corporation) and address, the product trade name, and use instructions.

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.

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 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.ft^2.h/Btu)
1	3.8
3.5	13
4	15
5.5	21
7	27
9.5	36
10	38
11.5	43.7
14	52.5

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

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