ICC EVALUATION SERVICE
Most Widely Accepted and Trusted

ICC-ES Evaluation Report

ESR-3210*

Issued March 1, 2011
This report is subject to renewal in one year.

www.icc-es.org | (800) 423-6587 | (562) 699-0543 *A Subsidiary of the International Code Council®*

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

REPORT HOLDER:

DEMILEC (USA) LLC
2925 GALLERIA DRIVE
ARLINGTON, TEXAS 76011
(817) 640-4900
www.demilecusa.com
info@demilecusa.com

EVALUATION SUBJECT:

HEATLOK SOY® 200 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
- Water vapor transmission
- Water-resistive barrier
- Fire-resistance-rated construction
- Exterior walls in Types I through IV construction

2.0 USES

HEATLOK SOY® 200 spray-applied polyurethane foam plastic insulation is used as a nonstructural thermal insulating material in Types I, II, III, IV and 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 4.4. Under the IRC, the insulation may be used as air-impermeable insulation when installed in accordance with Section 3.4. When installed in accordance with Section 4.5, the insulation may be used as an alternative to the water-resistive barriers required in IBC Section 1404.2 and IRC Section R703.2. The insulation may be used in nonload-bearing, fire-resistance-rated walls when construction is in accordance with Section 4.6. The insulation also may be used in exterior walls of Type I, II, III or IV construction when used as described in Section 4.7.

3.0 DESCRIPTION

3.1 General:

HEATLOK SOY® 200 spray-applied foam insulation is rigid, medium-density, polyurethane foam plastic that is installed as a component of floor/ceiling and wall assemblies. The insulation is a two-component, spray-applied foam plastic with a nominal in-place density of 2.0 pcf (32 kg/m^3). The insulation is produced in the field by combining a polymeric isocyanate (A100 component) with a polymeric resin (B200 component). The insulation liquid components are supplied in 55-gallon (208 L) drums and/or 250-gallon (946 L) totes and have a shelf life of one year when stored in factory-sealed containers at temperatures between 59°F (15°C) and 77°F (25°C).

3.2 Surface-burning Characteristics:

The insulation, at a maximum thickness of 4 inches (102 mm) and a nominal density of 2.0 pcf (32 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. Thicknesses of up to $9^1/_4$ inches (235 mm) for wall cavities and $11^1/_4$ inches (286 mm) for ceiling cavities are recognized, based on testing in accordance with NFPA 286, when the insulation is covered with a minimum $^1/_2$-inch-thick (12.7 mm) gypsum board or an equivalent thermal barrier complying with, and installed in accordance with, the applicable code.

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 Vapor Retarder:

The insulation has a vapor permeance of less than 1 perm [5.7×10^{-11} kg/(Pa-s-m^2)], in accordance with ASTM E 96, when applied at a minimum thickness of 1.2 inches (30.5 mm), and qualifies as Class II vapor retarder under the IRC.

3.5 Air Permeability:

The insulation, at a minimum thickness of $1^1/_2$ inches (38 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.

3.6 Intumescent Primer and Coating:

3.6.1 BlazeLok™ TB 200 Primer: BlazeLok™ TB 200 primer is a one-component, water-based liquid coating manufactured by TPR[2] Corporation. The gray-colored coating 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. The coating is supplied in 5-gallon (19L) 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 45°F (7°C) and 90°F (32°C). The coating is applied in one coat with a manufacturer-recommended spray gun to a substrate with a temperature of at least 50°F (10°C). The primer requires 1.5 hours of drying time before application of the coating.

3.6.2 BlazeLok™ TB 200 Intumescent Coating: Blazelok™ TB 200 intumescent coating, manufactured by TPR[2] Corporation, is a one-component, water-based liquid coating that is white in color. Blazelok™ TB 200 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 45°F (7°C) and 90°F (32°C). The coating is applied in one coat with a manufacturer recommended spray gun to a substrate with a temperature of at least 50°F (10°C).

4.0 INSTALLATION

4.1 General:

HEATLOK SOY® 200 spray-applied polyurethane foam insulation must be installed in accordance with the manufacturer's published installation instructions, the applicable code 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 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 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, except as specified in Section 4.5. 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 1.5 inches (38 mm). The insulation must be applied in passes not exceeding 2 inches (51 mm) per pass and must be allowed to fully expand and cure for a minimum of 20 minutes prior to the application of the next additional pass.

4.3 Thermal Barrier:

4.3.1 Application with a Prescriptive Thermal Barrier: HEATLOK SOY® 200 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 $11^1/_4$ inches (286 mm) for floor/ceiling cavities are recognized, based on room corner fire testing in accordance with NFPA 286.

4.3.2 Application without a Prescriptive Thermal Barrier: The prescriptive 15-minute thermal barrier or ignition barrier may be omitted when installation is in accordance with this section (Section 4.3.2). The insulation, primer and intumescent coating may be spray-applied to the interior facing of walls, the underside of the roof sheathing or roof rafter, and in crawl spaces, and may be left exposed as an interior finish without a prescribed 15-minute thermal barrier or ignition barrier. The thickness of the foam plastic applied to the underside of roof sheathing must not exceed $11^1/_4$ inches (286 mm). The thickness of the spray foam insulation applied to vertical wall surfaces must not exceed $9^1/_4$ inches (235 mm). The foam plastic must be covered on all surfaces with BlazeLok™ TB 200 primer applied over the foam plastic at a minimum wet film thickness of 7 mils (4 mils dry or 170 square feet per gallon). BlazeLok™ TB 200 intumescent coating must be applied over the primer at a minimum wet film thickness of 14 mils (8 mils dry or 120 square feet per gallon). The primer and 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.

4.4 Attics and Crawl Spaces:

4.4.1 Application with a Prescriptive Ignition Barrier: When the spray-applied 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. The 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: HEATLOK SOY® 200 spray-applied polyurethane foam insulation may be installed in attics and crawl spaces as described in this section without the ignition barriers required by IBC Section 2603.4.1.6 and IRC Sections R316.5.3 and R316.5.4, subject to the following conditions:

a. Entry to the attic or crawl space is 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 Section 701.

4.4.2.1.1 Attics and Crawl Spaces: In attics and crawl spaces, the insulation may be spray-applied to the underside of the roof sheathing and/or rafters, to the underside of wood floors, and to vertical surfaces 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 thickness when applied to vertical surfaces must not exceed $7^1/_2$ inches (190.5 mm).

4.4.2.1.2 Use on Attic Floors: The spray-applied foam insulation may be installed at a maximum thickness of $7^1/_2$ inches (190.5 mm) between and over the joists in attic floors.

4.5 Water-resistive Barrier:

HEATLOK SOY® 200 insulation may be used as the water-resistive barrier prescribed in IBC Section 1404.2 and IRC Section R703.2, when installed on exterior walls as described in this section. The insulation must be spray-applied to the exterior side of sheathing, masonry or other suitable exterior wall substrates to form a continuous layer of $1^1/_2$ inches (38 mm) minimum thickness. All construction joints and penetrations must be sealed with HEATLOK SOY® 200 insulation**.**

4.6 One-hour Nonload-bearing Fire-resistance-rated Wall Assemblies:

HEATLOK SOY® 200 insulation may be used as a component of a one-hour fire-resistance-rated, nonload-bearing wall assembly as described in this section (Section 4.6).

4.6.1 Interior and Exterior Face: Two layers of $^5/_8$-inch-thick (16 mm), Type X gypsum board complying with ASTM C 36 or ASTM C 1396 is installed on both the interior and exterior sides of $3^5/_8$-inch (92 mm), No. 20 gage, galvanized steel studs spaced 24 inches (610 mm) on center. The base layer of the wallboard is secured with No. 6 by $1^1/_4$-inch-long (32 mm), self-drilling drywall screws 8 inches (203 mm) on center along the perimeter and 12 inches on center (305 mm) in the field of the wallboard. The face layer of the wallboard is secured with No. 6 by $1^7/_8$-inch-long (48 mm), self-drilling drywall screws 8 inches (203 mm) on center along the perimeter and in the field of the wallboard. Gypsum board joints must be taped and joints and fasteners heads treated with joint compound in accordance with ASTM C 840 or GA-216.

4.6.2 Stud Cavity: Nominally $3^5/_8$-inch-thick (92 mm) HEATLOK SOY® 200 foam insulation is spray-applied in all stud cavities.

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

4.7.1 General: When used on exterior walls of Type I, II, III, and IV construction, the HEATLOK SOY® 200 insulation must comply with Section 2603.5 of the IBC and this section (Section 4.7), and the insulation must be installed at a maximum thickness of 3.4 inches (86.4 mm). The potential heat of Demilec HEATLOK SOY® 200 insulation is 1791 Btu/ft^2 (20.3 Mj/m^2) per inch of thickness when tested in accordance with NFPA 259.

4.7.2 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), No. 20 gage steel studs spaced a maximum of 24 inches (609 mm) on center. The wallboard is attached with No. 6, $1^1/_4$-inch-long (31.8 mm), self-tapping screws located 8 inches (203 mm) on center along the perimeter and 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.

4.7.3 Exterior Face: One layer of $^5/_8$-inch-thick (16 mm) GP DensGlass® sheathing is 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 in the field of the sheathing. HEATLOK SOY® 200 spray-applied polyurethane foam insulation, at a maximum thickness of 3.4 inches (86.4 mm), is spray-applied onto the exterior of GP DensGlass® sheathing. Brick ties, $3^1/_2$ inches long (89 mm), must be installed at a nominal 24 inches (609 mm) on center to each vertical steel stud, using two No.14 by 5-inch-long (127 mm) hex head screws. Exterior veneer must be 4-inch-thick (102 mm) standard brick with a nominally 2-inch (51 mm) air gap between brick and the foam plastic insulation.

5.0 CONDITIONS OF USE

The HEATLOK SOY® 200 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 and 4.4.2. A thermal barrier must be installed between the insulation and the interior space above (crawl space) or below (attic).

5.3 The insulation must not exceed the thicknesses noted in Sections 3.2, 4.3, 4.4, 4.6, and 4.7.

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 IBC Section 2603.8 or IRC Section R318.4, as applicable.

5.7 When use is on exterior walls of buildings of Types I, II, III, and IV, construction must be as described in Section 4.7.

5.8 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.

5.9 The insulation components A and B are produced in Arlington, Texas, under a quality control program with inspections by Intertek Testing Services NA (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 AC377 Appendix X.

6.2 Reports of air leakage testing in accordance with ASTM E 283.

6.3 Reports of air permeance tests in accordance with ASTM E 2178

6.4 Reports of water vapor transmission test in accordance with ASTM E 96.

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 fire propagation characteristics tests in accordance with NFPA 285.

6.8 Reports of potential heat of foam plastic tests in accordance with NFPA 259.

6.9 Data in accordance with the ICC-ES Acceptance Criteria for Foam Plastic Sheathing Panels Used as Water-resistive Barriers (AC71), dated February 2003 (editorially revised June 2008).

7.0 IDENTIFICATION

Components of the insulation are identified with the manufacturer's name [Demilec (USA) LLC], address and telephone number; the product name (A100 component or B200 component); use instructions; the density; the flame-spread and smoke-developed indices; the date of manufacture; thermal resistance values; the evaluation report number (ESR-3210); and the name of the inspection agency (Intertek Testing Services NA).

Each Pail of Blazelok™ TB 200 intumescent coating and primer is identified with the manufacturer's name (TPR[2] Corporation) and address, the product name and use instructions.

8.0 OTHER CODES

8.1 Evaluation Scope:

In addition to the codes referenced in Section 1.0, the products described in this report have also been evaluated for compliance 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, with the revisions 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 Section 1203.3 of the 2006 and 2003 IBC, or Section R408 of the IRC, as applicable. Additionally, an ignition barrier must be installed in accordance with Section 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 Section R408 of the IRC, 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 5.8, 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	7.4
1.2	8.8
1.5	10.9
2	14.3
3.5	23.6
4	26.6
5.5	36.5
7.5	49.8
9.25	61.5
9.5	63
10	66.4
11.25	74.8
11.5	76.4

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.