ICC EVALUATION SERVICE®

# ICC-ES Evaluation Report

**ESR-2600**

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

**REPORT HOLDER:**

**DEMILEC (USA) INC.**

**EVALUATION SUBJECT:**

**AGRIBALANCE® SPRAY 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

### 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

Agribalance® spray foam insulation is used as a nonstructural thermal insulating material in Type V-B construction under the IBC and dwellings under the IRC. The insulation is for use in wall cavities, floor assemblies, roof/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.

## 3.0 DESCRIPTION

### 3.1 General:

Agribalance® is a spray-applied, semi-rigid, low- density, cellular polyurethane foam plastic that is installed as a nonstructural component of floor/ceiling and wall assemblies. The material is a two-component, open-cell spray-applied polyurethane foam plastic system. The product is a water-blown foam with nominal density of 0.7 pcf (11.2 kg/m$^3$) and installed density of 0.6-0.8 pcf (9.6 - 12.8 kg/m$^3$). The polyurethane foam is produced in the field by combining a polymeric isocyanate (component A) and a resin (component B). The products have a shelf life of one year, when stored in factory-sealed containers at temperatures between 50°F and 100°F (10°C and 38°C).

Agribalance® spray foam insulation is an air-impermeable insulation in accordance with 2018 IBC Section 1202.3 (2015 IBC Section 1203.3) and 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 insulation 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.

### 3.2 Surface-burning Characteristics:

The insulation at a maximum thickness of 5.5 inches (139.7 mm) and a density of 0.6 pcf (9.6 kg/m$^3$), has a flame-spread index of less than 25 and smoke-developed index of less than 450 when tested in accordance with ASTM E84 (UL 723). There is no thickness limitation when installed behind a code-prescribed 15-minute thermal barrier complying with, and installed in accordance with, IBC Section 2603.4 or IRC Section R316.4, as applicable.

### 3.3 Thermal Resistance, *R*-values:

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

### 3.4 Air Permeability:

Agribalance® spray-applied polyurethane foam insulation, at a minimum of 3.5 inches (89 mm), is considered air-impermeable insulation in accordance with 2018 IBC Section 1202.3 [2015 IBC Section 1203.3] and 2018, 2015 and 2012 IRC Section R806.5 (2009 IRC Section R806.4) based on testing in accordance with ASTM E283 and ASTM E2178.

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**3.5 Blazelok™ IB4 Intumescent Coating:**

Blazelok™ IB4 intumescent coating, manufactured by TPR[2] Corporation, is a one-component, water-based liquid coating. Blazelok™ IB4 is supplied in 5-gallon (19 L) pails and/or 55-gallon (208 L) drums and has a shelf life of one (1) year when stored in factory-sealed containers at temperatures between 45°F (7°C) and 90°F (32°C).

**3.6 Blazelok™ TBX Intumescent Coating:**

Blazelok™ TBX Coating, manufactured by TPR[2] Corporation (ESR-3997), is a one-component, water-based liquid-applied intumescent coating. Blazelok™ TBX is supplied in 5-gallon (19 L) pails and 55-gallon (208 L) drums and has a shelf life of one (1) year when stored in factory-sealed containers at temperatures between 45°F (7.2°C) and 95°F (35°C).

**3.7 DC 315 Coating:**

DC 315 Coating (ESR-3702), manufactured by International Fireproof Technology, 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 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:**

Agribalance® spray 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 insulation is spray-applied on the jobsite using a volumetric positive displacement pump as identified in the Demilec application manual. The insulation can be installed in one pass to the maximum thickness as specified in Sections 3.2 and 4.4.2. The foam plastic must not be used in electrical outlet or junction boxes or in contact with rain, water, 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. Agribalance® resin (component B) must be stored in areas where the ambient temperature is between 50°F and 100°F (10°C and 38°C). Agribalance® must be used in areas where maximum ambient temperature is equal or less than 180°F (82°C). The insulation must be protected from the weather during and after application.

**4.3 Thermal Barrier:**

**4.3.1 Application with a Prescriptive Thermal Barrier:** Agribalance® 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 when installation is in attics and crawl spaces, as described in Section 4.4. There is no thickness limitation when installed behind a code-prescribed 15-minute thermal barrier.

**4.3.2 Application without a Prescriptive Thermal Barrier:** Agribalance® spray foam insulation may be installed without the prescriptive 15-minute thermal barrier described in Section 4.3.1 when installation is in accordance with the following:

**4.3.2.1** The insulation must be covered on all surfaces with a fire protective coating at the minimum thickness set forth in Table 2.

**4.3.2.2** The maximum installed thickness of the insulation must not exceed the thickness set forth in Table 2.

**4.3.2.3** 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 Application with a Prescriptive Ignition Barrier:** When Agribalance® 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 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. Agribalance® insulation as described in this section may be installed in unvented attics in accordance with 2018 IBC Section 1202.2 (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:** Where Agribalance® insulation is installed without a prescriptive ignition barrier in attics and crawl spaces in accordance with Sections 4.4.2 and 4.4.3, 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. 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 2015 and 2012 IRC Section R806.5 (2009 IRC Section R806.4).

e. 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.

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

**4.4.2.2 Application with Blazelok™ IB4 Coating:** In attics, Agribalance® insulation may be spray-applied to the underside of roof sheathing and/or rafters; and the underside of wood floors and/or floor joists in crawl spaces as described in this section. The thickness of the foam plastic applied to the underside of the wood floor and roof sheathing must not exceed $11^1/_4$ inches (286 mm). The spray foam insulation applied to vertical wall surfaces in attics and crawl spaces must not exceed $9^1/_4$ inches (235 mm) in depth. The foam plastic surface must be covered with a minimum 5-dry-mil [9 wet mils (0.23 mm)] thickness of Blazelok™ IB4 intumescent coating as 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. Surfaces to be coated must be dry and clean, and free of dirt, loose debris and any other substances that could interfere with adhesion of the coating.

**4.4.2.3 Application with DC 315 Coating:** In attics, Agribalance® 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 thickness on vertical surfaces must not exceed $7^1/_2$ inches (191 mm). The foam plastic surface must be covered with a minimum nominal thickness of 3 dry mils (0.08 mm) [4 wet mils (0.10 mm)] of the DC 315 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 401 square feet (373. $m^2$) to obtain the recommended minimum dry film thickness noted in this section. Surfaces to be coated must be dry and clean, and free of dirt, loose debris and any other substances that could interfere with adhesion of the coating.

**4.4.3 Use on Attic Floors:** Agribalance® spray-applied insulation may be installed exposed at a maximum thickness of $7^1/_2$ inches (191 mm) between and over the joists in attic floors, when covered with the DC 315 coating described in Section 4.4.2.3. Agribalance® spray-applied insulation may be installed exposed at a maximum thickness of $5^1/_2$ inches (140 mm) between and over the joists in attic floors, when covered with the Blazelok™ TBX intumescent coating described in Section 4.4.2.2. The insulation must be separated from the interior of the building by an approved thermal barrier. The ignition barrier in accordance with IBC Section 2603.4.1.6 and IRC Section R316.5.3 may be omitted.

## 5.0 CONDITIONS OF USE

The Agribalance® spray-applied 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** 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 products must be installed in accordance with the manufacturer's published installation instructions, this evaluation report and the applicable code. The instructions within this report govern if there are any conflicts between the manufacturers' published installation instructions and this report.

**5.3** 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 Section 4.3.1 or in attics and crawl spaces as described in Section 4.4.

**5.4** The insulation must not exceed the density and thicknesses noted in Sections 3.2, 4.4.2 and 4.4.3 of this report.

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

**5.6** The insulation must be applied by contractors authorized by Demilec USA.

**5.7** 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.

**5.8** The insulation has been evaluated only for use in Type V-B construction under the IBC and non-fire-resistance rated assemblies in dwellings under the IRC.

**5.9** Jobsite certification and labeling of the insulation must comply with 2018 or 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 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.

**5.10** A vapor retarder must be installed when required by the applicable code.

**5.11** The insulation is produced in Arlington, Texas and Boisbriand, Quebec, Canada, under a quality control program with inspections by ICC-ES.

## 6.0 EVIDENCE SUBMITTED

**6.1** Data in accordance with ICC-ES Acceptance Criteria for Spray-applied Foam Plastic Insulation (AC377), dated April 2016 (editorially revised April 2018), including testing in accordance with Appendix X.

**6.2** Reports of room corner fire tests in accordance with NFPA 286.

**6.3** Reports of air leakage tests in accordance with ASTM E283.

**6.4** Reports of air permeance tests in accordance with ASTM E2178.

## 7.0 IDENTIFICATION

**7.1** Components of Agribalance® spray foam insulation are identified with the manufacturer's name (Demilec USA), address and telephone number; the product trade name (Agribalance®); use instructions; the density; the flame-spread and smoke-development indices; and the evaluation report number (ESR-2600).

Each pail of Blazelok™ IB4 intumescent coating is labeled with the manufacturer's name ($TPR^2$ Corporation), the product name and use instructions.

Blazelok TBX 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-3997).

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).

**7.2** The report holder's contact information is the following:

**DEMILEC (USA) INC.**
**3315 EAST DIVISION STREET**
**ARLINGTON, TEXAS 76011**
**(817) 640-4900**
**www.demilecusa.com**

## 8.0 OTHER CODES

In addition to the codes referenced in Section 1.0, the products described in this report have 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)

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, 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 2006 and 2003 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 2006 and 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 2006 and 2003 IRC, as applicable.
- **Protection against Termites:** See Section 5.7, 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 (INCH) | *R*-VALUE[1] (°F.ft$^2$.h/Btu) |
|---|---|
| 1 | 4.5 |
| 2 | 8.9 |
| 3 | 13 |
| 3.5 | 16 |
| 4 | 18 |
| 5.5 | 24 |
| 6 | 27 |
| 7.5 | 33 |
| 9.25 | 41 |
| 9.5 | 42 |
| 10 | 44 |
| 11.25 | 50 |
| 11.5 | 51 |
| 14 | 62 |

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.

**TABLE 2—USE OF INSULATION WITHOUT A PRESCRIPTIVE THERMAL BARRIER (TESTED IN ACCORDANCE WITH NFPA 286)[1]**

| INSULATION TYPE | MAXIMUM THICKNESS (in.) (Vertical Surfaces) | MAXIMUM THICKNESS (in.) (Overhead Surfaces) | COATING TYPE & MINIMUM THICKNESS (Applied to all Foam Surfaces) [2, 3] | MINIMUM APPLICATION RATE OF COATING |
|---|---|---|---|---|
| Agribalance® | 5 1/2 | 11 1/2 | Blazelok TBX<br>15 mils DFT<br>23 mils WFT | 1.23 gal / 100 ft$^2$ |
| Agribalance® | 7 1/2 | 11 1/2 | DC 315<br>12 mils DFT<br>18 mils WFT | 1.25 gal / 100 ft$^2$ |

For **SI:** 1 inch = 25.4 mm; 1 mil = 0.0254 mm; 1 gallon = 3.38 L; 1 ft$^2$ = 0.093 m$^2$.

**Notes:**

[1] See Section 4.3.2.

[2] See Section 3.6 and 3.7.

[3] DFT = Dry Film Thickness; WFT = Wet Film Thickness

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**DEMILEC (USA) INC.**

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**AGRIBALANCE® SPRAY FOAM INSULATION**

## 1.0 REPORT PURPOSE AND SCOPE

**Purpose:**

The purpose of this evaluation report supplement is to indicate that Agribalance® spray foam insulation, described in ICC-ES evaluation report ESR-2600, has also been evaluated for compliance with the codes noted below.

**Applicable code edition*(s)*:**

- 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 Agribalance® spray foam insulation, described in Sections 2.0 through 7.0 of the evaluation report ESR-2600, 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.

#### 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.

### 2.2 CEC:

The Agribalance® spray foam insulation, described in Sections 2.0 through 7.0 of the evaluation report ESR-2600, 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, reissued February 2021.

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