

Insulation

# Choose an insulation that benefits you and the environment

**S**pray foam is an effective insulation because it forms an air barrier around your structure — sealing and insulating in one step. BioBased Insulation® is committed to developing and marketing a family of spray polyurethane foam products that help to lessen the impact that buildings have on the environment.

Our goal is to reduce dependence on petroleum products, first by correctly sealing and insulating buildings to make them more energy efficient. Next, we utilize the latest technology to integrate rapidly renewable ingredients and ingredients that have less of an impact on the environment into our products. For example, we have integrated bio-based materials as a replacement for a portion of the petroleum in our products and replaced chemical blowing agents with water without sacrificing product performance.

When BioBased Insulation® is used with other responsible building practices, you can typically save up to 50% on heating and cooling costs compared to traditionally insu-



BioBased Insulation® being applied



lated structures. That means you use less energy, reducing your CO<sub>2</sub> emissions and saving you money.

BioBased Insulation® products expand upon application and form a sealed thermal envelope that will not sag, settle or deteriorate over time. That seal helps block harmful outside irritants such as pollen or allergens. It also keeps conditioned air inside and undesirable air outside which allows you to reduce drafts and maintain a uniform temperature throughout the building.

All BioBased Insulation® products are tested to ASTM standards and installed by certified dealers trained in product application and building science. Contact us to learn more about BioBased Insulation® or to find a certified dealer in your area.



# BioBased Insulation® Family of Products

Download complete Technical Data Sheets at [biobased.net/products](http://biobased.net/products)



BUILD HEALTHY. BUILD SMART.®

## Open Cell Products



### BioBased 501w®

- 0.5 lb open cell insulation
  - Released in 2003
  - ICC Rated – ESR 1383
  - 2003 Outstanding Green Product of the Year, National Green Building Conference
  - Class I Fire Rated at 4 inches\*
  - Low VOCs in finished foam
- R-13 @ 3.5 inches  
R-20 @ 5.5 inches  
R-28 @ 7.5 inches  
R-37 @ 10 inches

### BioBased® 502

- 0.5 lb open cell insulation
  - Released in 2008
  - Class I Fire Rated at 3.5 inches\*
  - Low VOCs in finished foam
- R-13 @ 3.5 inches



## Closed Cell Products



### BioBased 1701s®

- 1.7 lb closed cell insulation
  - Released in 2006
  - GREENGUARD Certified for Children and Schools
  - Class I fire rated at 1.5 inches\*
  - Class II vapor retarder at 2.5 inches\*\*
- R-12 @ 2 inches    R-28 @ 5 inches  
R-15 @ 2.5 inches    R-39 @ 7 inches  
R-18 @ 3 inches    R-44 @ 8 inches  
R-19 @ 3.5 inches

### BioBased® 3001

- 3.0 lb closed cell sealant
- Released in 2008
- Class I fire rated at 1.5 inches\*
- Class I vapor retarder at 1.5 inches\*\*



BioBased Insulation® products are spray polyurethane foams. During application, precautions should be taken by applicators, helpers and building occupants to protect them from fumes, mists and spills. For more information view our product MSDS at [biobased.net/products](http://biobased.net/products).

[biobased.net](http://biobased.net) | 800.803.5189

## What You Should Know About R-Values

These charts show the R-value of this insulation. R means resistance to heat flow. The higher the R-value, the greater the insulating power. Compare insulation R-values before you buy. There are other factors to consider. The amount of insulation you need depends mainly on the climate you live in. Also, your fuel savings from insulation will depend upon the climate, the type and size of your house, the amount of insulation already in your house, and your fuel use patterns and family size. If you buy too much insulation, it will cost you more than what you'll save on fuel. To get the marked R-value, it is essential that this insulation be installed properly.

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\*This numerical flame spread and all other data presented is not intended to reflect the hazards presented by this or any other material under actual fire conditions.

\*\*ASHRAE defines a Class II vapor retarder as having less than 1 perm.

### 1.0 Description

**BioBased 501w<sup>®</sup>** is a water blown, two-part, open cell, bio-based spray applied, polyurethane foam having a nominal density of 0.5pcf (8 kg/m<sup>3</sup>).

When spray applied, **BioBased 501w<sup>®</sup>** expands 100:1, filling voids, crevices and building cavities, and reduces energy consumption needed for climate control by reducing infiltration. Once installed, **BioBased 501w<sup>®</sup>** assists in increasing thermal resistance, minimizes sound transfer, and can reduce the risk of moisture accumulation within the building envelope.

### 2.0 Installation

**BioBased 501w<sup>®</sup>** must be installed by certified dealers who have successfully completed a BioBased Insulation<sup>®</sup> approved training program or BioBased Insulation<sup>®</sup> approved field certification training which covers proper application techniques, environmental health and safety, building science and building code standards.

Always consult with local building code inspectors prior to installing **BioBased 501w<sup>®</sup>**.

### 3.0 Evaluation Criteria

**BioBased 501w<sup>®</sup>** meets or exceeds the evaluation criteria for ICC (International Code Council) approval as a building insulation. Its ICC-ES approval number is ESR-1383, and shall be installed in full compliance with the *BioBased Insulation<sup>®</sup> Certified Dealer Training Manual* and the following codes or guides:

**2009 International Building Code<sup>®</sup>**  
(IBC) – Chapter 26

**2009 International Residential Code<sup>®</sup>**  
(IRC) – Section 314

**API publication Ax-230:** Fire and Safety Guidelines for Use of Rigid Polyurethane and Polyisocyanurate Foam Insulation in Building Construction.

### 4.0 Architectural Reference

**Division: 07**—Thermal and Moisture Protection

**Section: 07210**—Building Insulation

Model architectural specifications in CSI three-part format are available upon request.

### 5.0 Recommended Uses

**BioBased 501w<sup>®</sup>** can be used in residential, commercial and industrial applications. The following design assemblies are a general design guide only. **BioBased 501w<sup>®</sup>** may be useful in other applications. Always consult with the local authority having jurisdiction before use.



#### 5.1 General:

**BioBased 501w<sup>®</sup>** must be separated from the occupants by ½" (12.7mm) thick gypsum wallboard or an equivalent 15-minute thermal barrier complying with, and installed in accordance with, IBC Section 2603.4 or IRC Section 316.4 as applicable, except when installed in attics and crawlspaces. The maximum thickness of the insulation is 7" (192.5 mm) in the walls and 11.5" (292.1 mm) in the ceiling.

#### 5.2 Application With a Non-Prescriptive Thermal Barrier:

In areas above 8' feet in height and where the foam plastic insulation will not be damaged, punctured or torn, Flame Seal TB™ may be used to cover **BioBased 501w<sup>®</sup>** in lieu of the prescribed 15-minute thermal barrier. The foam plastic insulation thickness must not exceed 5.5" (140 mm) in walls and 11.5" (292 mm) in ceilings, and the insulation must be covered with 18.3 dry mils (30 wet mils) of Flame Seal TB™ intumescent. The insulation must be dry, clean and free of dirt and loose debris or other substances that could interfere with the adhesion of the coating. The foam plastic insulation must not be shaved, with the original "skin" intact. Flame Seal TB™ may be applied by airless sprayer at ambient temperatures between 50°F and 115°F (100°C and 46°C) and relative humidity of less than 70 percent.

#### 5.3 Application With a Non-Prescriptive Ignition Barrier:

**BioBased 501w<sup>®</sup>** may be installed in attics and crawl spaces in accordance with section 5.3.1 through 5.3.4 with a non-prescriptive ignition barrier on the interior side of the insulation provided that all of the following conditions are met:

- ✓ Entry to the attic or crawl space is only for the service of utilities.
- ✓ No open combustion appliances are permitted in the attic or crawl space.
- ✓ Combustion air is provided in accordance with IMC Section 701.
- ✓ There are no interconnected basement or attic areas.
- ✓ Ventilation of the attic or crawl space is provided in accordance with the applicable code,

except when **BioBased 501w<sup>®</sup>** is installed in unvented attics in accordance with Section 806.4 of the IRC.

- ✓ The vertical surfaces must be covered with a minimum nominal thickness of 5.7 dry mils (11 wet mils) of Foam Kote 50-50a intumescent coating OR 7.3 dry mils (12 wet mils) of Flame Seal TB.

#### 5.3.1 Conditioned Attics:

**BioBased 501w<sup>®</sup>** may be spray applied to the underside of the roof deck and rafters. **BioBased 501w<sup>®</sup>** is applied at a maximum thickness of 11.5" (292 mm) on horizontal and/or diagonal surfaces and a maximum of 5.5" (140 mm) on vertical surfaces.

- ✓ The attic floor/ceiling must not be insulated.
- ✓ No vapor retarders are installed on the attic floor/ceiling.
- ✓ Bathroom exhaust ventilation ducts extend to the exterior of the envelope.

#### 5.3.2 Vented Attics (use on attic floors):

**BioBased 501w<sup>®</sup>** may be installed at a maximum thickness of 11.5" (292.1 mm) between joists in attic floors/ceilings. The attic must be separated from the interior of the building by an approved 15-minute thermal barrier.

#### 5.3.3 Conditioned Crawlspaces:

**BioBased 501w<sup>®</sup>** may be installed in crawlspace walls provided that all of the following conditions are met:

- ✓ One of the following methods of ventilation is provided:
  - Continuously operated mechanical exhaust ventilation at a rate equal to 1 cfm (0.47 L/s) for each 50 ft<sup>2</sup> (4.7 m<sup>2</sup>) of crawlspace floor area, including an air pathway to the common area (such as a duct or transfer grille).
  - Conditioned air supply sized to deliver at a rate equal to 1 cfm (0.47 L/s) for each 50 ft<sup>2</sup> (4.7 m<sup>2</sup>) of crawlspace floor area, including a return air pathway to the common area.
- ✓ The insulation is applied at a maximum thickness of 5.5" (140 mm) on walls.
- ✓ The exposed earth is covered with a continuous vapor barrier. Joints of the vapor barrier shall be overlapped by a minimum of 6" (152 mm) and be taped or sealed. The edges of the vapor barrier shall extend up the stem wall a minimum of 6" (152 mm).
- ✓ The insulation is not installed within 6" (152 mm) of the ground.
- ✓ The insulation fills and seals the rim/band joist area.
- ✓ The crawlspace ceiling must not be insulated.

#### 5.3.4 Vented Crawlspaces:

**BioBased 501w<sup>®</sup>** may be installed in crawlspace ceilings and coated with Flame Control Foam Kote 50-50a ignition barrier provided that all of the following conditions are met:

- ✓ Ventilation openings are located in the foundation walls with a net free opening area of

- not less than 1 ft<sup>2</sup> (0.09 m<sup>2</sup>) per 150 ft<sup>2</sup> (14 m<sup>2</sup>) of under-floor area.
- √ One ventilation opening is provided within 3' (0.9 m) of each corner.
- √ The insulation is applied in direct contact with the underside of the sub floor at a maximum thickness of 11.5" (254mm).
- √ No insulation is applied to the crawlspace walls.
- √ Foam Kote 50-50a is applied to the surface of the foam insulation at a minimum nominal thickness of 12 wet mils.

**6.0 Safety and Handling**

Refer to the Material Safety Data Sheet (MSDS) for **BioBased 501w®**. Storage temperatures for both 'A' and 'B' components should be between 60°F (15.6°C) and 90°F (32.2°C) out of direct sunlight. Conditioned trailers or storage areas may be necessary.

Use adequate ventilation to keep airborne particulates below the exposure level. Wear respiratory protection if material is heated, sprayed, or if the exposure limit is exceeded. Empty drums should be dry, punctured with a non-sparking tool and sent to a qualified drum recycler. Liquid product should be incinerated in a licensed facility in accordance with local, state and federal regulations. Do not discharge to waterways or sewer systems or dispose of on the ground.

**In case of Chemical Emergencies:**  
 Call CHEMTREC (800) 424-9300 or (Collect) (703) 527-3887 (USA)

**7.0 Application Guidelines\***

While prepping equipment, heating drums and re-circulating for spray foam application, agitate the 'B' component mildly for 15 to 30 minutes before application using

a pneumatic or equivalent performing mixer. Agitate for the remainder of the spray period on a low setting to prevent frothing. Allow a 5 to 10 second time interval between passes to allow foam to cure and reduce the likelihood of blowing the uncured foam away from the substrate.

*\*It is important that applicators review and understand the BioBased Insulation® Certified Dealer Training Manual prior to use or application of BioBased 501w®. Failure to follow the manufacturer's recommended guidelines may cause the warranty to become null and void.*

**7.1 Flushing/Purging**

**7.1.1 Chemical blown foams followed by BioBased 501w® water blown foam:**  
 When using **BioBased 501w®** after a chemically blown spray polyurethane foam it is necessary to flush the entire B-side hoses and gun with a non-water based solvent in order to achieve maximum foam quality and yield.

**7.1.2 Water blown foams followed by BioBased 501w®:**  
 Flushing the B-side hoses and gun with solvent may not be necessary when switching from one water blown foam system to the next, but it is important that any remaining product from the previous application is completely removed and flushed from applicator guns, lines and pumps by a throughput of **BioBased 501w®** product until test sprays indicate that the previous system has been completely replaced with **BioBased 501w®**.

**7.2 Effect of Environment and Substrate Conditions on Application**  
 The system settings required to achieve quality foam application will vary depend-

ing on environmental and substrate conditions. The following recommend parameters will help ensure optimum foam quality. Always consult the *BioBased Insulation® Certified Dealer Training Manual* prior to installing any BioBased Insulation® product.

|                       | A Component                           | B Component                    |      |
|-----------------------|---------------------------------------|--------------------------------|------|
| Drum Temp.            | 75 to 85°F<br>(23.9 to 29.4°C)        | 75 to 85°F<br>(23.9 to 29.4°C) | Hose |
| Proportioner Temp.    | 105 to 135°F<br>(40.6 to 57.2°C)      |                                |      |
| Pressure              | 1200 to 1600 psi<br>(82.7 to 110 bar) |                                |      |
| Ambient Temp          | 50°F to 120°F<br>(10°C to 49°C)       |                                |      |
| Ambient Moisture      | < 85% Relative Humidity               |                                |      |
| Substrate Temperature | 50°F to 120°F<br>(10°C to 49°C)       |                                |      |
| Moisture on Substrate | Substrate must be dry<br>< 12% WMC    |                                |      |
| Wind Velocity         | < 12 m.p.h.<br>< (19.3 km/h)          |                                |      |
| Max Service Temp      | < 180°F<br>< (82.2°C)                 |                                |      |

**8.0 Containers**

Shipping weight per set is 1,032 pounds (468.1 kg). A set **BioBased 501w®** consists of one (1) 55 gallon (208 L) drum of 'A' componet and one (1) 55 gallon (208 L) drum of 'B' component.

| Properties   | Value                          | Test Method |
|--|--------------------------------|-------------|
| <b>Water Vapor Permeability†</b>                             |                                |             |
| 3.5" (89 mm)   | 9.2 perms                      | ASTM E96    |
| 5.5" (140 mm)  | 6.1 perms                      | ASTM E96    |
| <b>Air Leakage△</b>  |                                |             |
| 5.5" (140 mm) @ 75 PA  | < 0.02 L/s/m <sup>2</sup>      | ASTM E283   |
| <b>Closed Cell Content</b>                                   | 3.00%                          | ASTM D2856  |
| <b>Core Density (nominal)</b>                                | 0.5 pcf (8 kg/m <sup>3</sup> ) | ASTM D1622  |
| <b>Fungi Resistance</b>                                      | Pass                           | ASTM C1338  |
| <b>Dimensional Stability</b>                                 | < -5.0%                        | ASTM D2126  |
| <b>Finished Foam Bio-Content</b>                             | 3%                             | ASTM D6866  |
| <b>Sound Transmission Class (STC)</b>                        |                                |             |
| 2 x 4 (50.8 mm x 101.6 mm) wood studs, 1/2" (12.7 mm) gypsum | 38                             | ASTM E90    |
| <b>Tensile Strength</b>                                      | 3.0 psi (29.7 kPa)             | ASTM D1623  |
| <b>Surface Burning Characteristics*</b>                      | 4" (101.6 mm)                  | ASTM E84    |
| Flame Spread Index   | ≤ 25                           | ASTM E84    |
| Smoke Developed Index  | ≤ 450                          | ASTM E84    |

**Full-Scale Room Corner Tests**

| Test Method                           | Walls              | Ceilings       | Covering  | Report Number  |
|---------------------------------------|--------------------|----------------|---|--|
| NFPA 286                              | 7" (178 mm)        | 11.5" (292 mm) | 1/2" Gypsum   | 01.13544.01.218  |
| NFPA 286<br>(AC 377 Appendix A 1.2.2) | 5.5"<br>(140 mm)** | 11.5" (292 mm) | Foam Kote 50-50a (11 mil wet)<br>or<br>Flame Seal TB (12 mil wet) | 3184159-SAT-001-A2<br>3184159-SAT-001-B<br>3184159-SAT-001-C |
| NFPA 286<br>(AC 377 Appendix X)       | 5.5" (140 mm)      | 11.5" (292 mm) | Foam Kote 50-50a (11 mil wet)                                     | 3184159-SAT-004  |
| UL 1715                               | 5.5" (140 mm)      | 11.5" (292 mm) | Flame Seal TB (30 mil wet)  | 3184159-SAT-003-A  |

**R-Value Aged 90 days @ 140°F (60°C)**

|                  | ft <sup>2</sup> ·°F·h/Btu | (K·m <sup>2</sup> /W) |           |
|------------------|---------------------------|-----------------------|-----------|
| 1" (25.4 mm)     | R – 3.8                   | RSI – 0.67            | ASTM C518 |
| 3.5" (88.9 mm)   | R – 13                    | RSI – 2.29            | ASTM C518 |
| 5.5" (139.7 mm)  | R – 20                    | RSI – 3.52            | ***       |
| 7.5" (190.5 mm)  | R – 28                    | RSI – 4.93            | ***       |
| 10" (254 mm)     | R – 37                    | RSI – 6.52            | ***       |
| 11.5" (292.1 mm) | R – 43                    | RSI – 7.57            | ***       |

- △ The International Residential Code defines air impermeable as having less than 0.02 L/m-s at 75 Pa.
- \* This numerical flame spread and all other data presented is not intended to reflect the hazards presented by this or any other material under actual fire conditions.
- † ASHRAE defines a Class III vapor retarder as a material having between 1 and 10 perms.
- \*\* Coating applied to vertical surfaces only.
- \*\*\* Calculated Per ICC AC-377 and FTC Guidelines based on the K-Value at 3.5" (88.9 mm).

**Read This Before You Buy - What You Should Know About R-Values**

The chart shows the R-value of this insulation. R means resistance to heat flow. The higher the R-value, the greater the insulating power. Compare insulation R-values before you buy. There are other factors to consider. The amount of insulation you need depends mainly on the climate you live in. Also, your fuel savings from insulation will depend upon the climate, the type and size of your house, the amount of insulation already in your house, and your fuel use patterns and family size. If you buy too much insulation, it will cost you more than what you'll save on fuel. To get the marked R-value, it is essential that this insulation be installed properly.

**Notice:** The technical data contained herein is true and accurate to the best knowledge and information available to BioBased Insulation® on the date of publication. The technical data is subject to change, however, and the user should contact BioBased Insulation® prior to use or application to verify that the technical data is current. In addition, the technical data is provided for your guidance only. Because many factors can affect the processing or application of the product and/or its use, it is the user's responsibility to first test the product to determine its suitability for the user's intended use. The sale and use of this product is subject to all of the terms and conditions set forth in the BioBased Insulation® sales order, including the LIMITED WARRANTY, DISCLAIMER OF WARRANTY AND RELEASE, and EXCLUSION OF CONSEQUENTIAL AND OTHER DAMAGES. This technical data does not create an express warranty of any kind. The only warranty applicable to this product is the written, limited express warranty contained in the BioBased Insulation® sales order, which is extended to the purchaser only.



## 1.0 Description

**BioBased 1701s®** is a water blown, two-part, closed cell, bio-based spray applied, polyurethane foam having a nominal density of 1.7 p.c.f. (27.3 kg/m<sup>3</sup>).

When spray applied, **BioBased 1701s®** expands 30:1, filling voids, crevices and building cavities, and can reduce energy consumption needed for climate control by reducing infiltration. Once installed, **BioBased 1701s®** assists in increasing thermal resistance, and can assist in reducing the risk of moisture accumulation within the building envelope.

## 2.0 Installation

**BioBased 1701s®** must be installed by certified dealers who have successfully completed a BioBased Insulation® approved training program or BioBased Insulation® approved field certification training which covers proper application techniques, environmental health and safety, building science and building code standards.

Always consult with local building code inspectors prior to installing **BioBased 1701s®**.

## 3.0 Evaluation Criteria

For proper use of this material, refer to the *BioBased Insulation® Certified Dealer Training Manual* and the following building codes and guides:

**2009 International Building Code® (IBC) — Chapter 26**

**2009 International Residential Code® (IRC) — Section R314**

**API publication Ax-230:** Fire & Safety Guidelines for Use of Rigid Polyurethane and Polyisocyanurate Foam Insulation in Building Construction.

## 4.0 Architectural Reference

**Division: 07**—Thermal and Moisture Protection

**Section: 07210**—Building Insulation

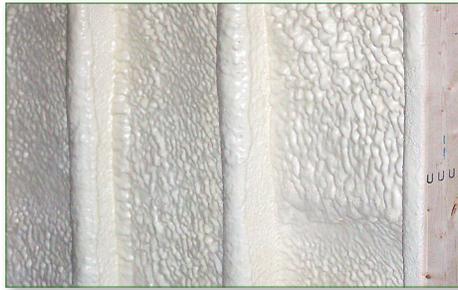
Model architectural specifications in CSI three-part format are available upon request.

## 5.0 Recommended Uses

**BioBased 1701s®** can be used in residential, commercial and industrial applications. The following design assemblies are a general design guide only. **BioBased 1701s®** may be useful in other applications. Always consult with the local authority having jurisdiction before use.

### 5.1 General:

**BioBased 1701s®** must be separated from the occupants by ½" (12.7mm) thick



gypsum wallboard or an equivalent 15-minute thermal barrier complying with, and installed in accordance with, IBC Section 2603.4 or IRC Section 316.4 as applicable, except when installed in attics and crawlspaces. The maximum thickness of the insulation is 7" (192.5 mm) in the walls and 11.5" (292.1 mm) in the ceiling.

### 5.2 Application with a Non-Prescriptive Thermal Barrier:

In areas above 8' in height and where the foam plastic insulation will not be damaged, punctured, or torn, Flame Seal TB™ may be used to cover **BioBased 1701s®** in lieu of the prescribed 15-minute thermal barrier. The foam plastic insulation thickness must not exceed 8" (203 mm) in walls and 8" (203 mm) in ceilings, and the insulation must be covered with 15.25 dry mils (25 wet mils) of Flame Seal TB™ intumescent. The insulation must be dry, clean and free of dirt and loose debris or other substances that could interfere with the adhesion of the coating. The foam plastic insulation must not be shaved, with the original "skin" intact. Flame Seal TB™ may be applied by airless sprayer at ambient temperatures between 50°F and 115°F (100°C and 46°C) and relative humidity of less than 70 percent.

### 5.3 Application with a Non-Prescriptive Ignition Barrier:

**BioBased 1701s®** may be installed in attics and crawlspaces in accordance with section 5.3.1 through 5.3.4 with a non-prescriptive ignition barrier on the interior side of the insulation provided that all of the following conditions are met:

- ✓ Entry to the attic or crawlspace is only for the service of utilities.
- ✓ No open combustion appliances are permitted in the attic or crawlspace.
- ✓ Combustion air is provided in accordance with IMC Section 701.
- ✓ There are no interconnected basement or attic areas.
- ✓ Ventilation of the attic or crawlspace is provided in accordance with the applicable code, except when **BioBased 1701s®** is installed in unvented attics in accordance with Section 806.4 of the IRC.

- ✓ The vertical surfaces must be covered with a minimum nominal thickness of 5.7 dry mils (11 wet mils) of Foam Kote 50-50a intumescent coating OR 7.3 dry mils (12 wet mils) of Flame Seal TB.

### 5.3.1 Conditioned Attics:

**BioBased 1701s®** may be spray applied to the underside of the roof deck and rafters. **BioBased 1701s®** is applied at a maximum thickness of 5.5" (140 mm) on horizontal and/or diagonal surfaces and a maximum of 4.5" (114 mm) on vertical surfaces.

- ✓ The attic floor/ceiling must not be insulated.
- ✓ No vapor retarders are installed on the attic floor/ceiling.
- ✓ Bathroom exhaust ventilation ducts extend to the exterior of the envelope.

### 5.3.2 Vented Attics (use on attic floors):

**BioBased 1701s®** may be installed at a maximum thickness of 5.5" (140 mm) between joists in attic floors/ceilings. The attic must be separated from the interior of the building by an approved 15-minute thermal barrier.

### 5.3.3 Conditioned Crawlspaces:

**BioBased 1701s®** may be installed in crawlspace walls provided that all of the following conditions are met:

- ✓ One of the following methods of ventilation is provided:
  - Continuously operated mechanical exhaust ventilation at a rate equal to 1 cfm (0.47 L/s) for each 50 ft<sup>2</sup> (4.7 m<sup>2</sup>) of crawlspace floor area, including an air pathway to the common area (such as a duct or transfer grille).
  - Conditioned air supply sized to deliver at a rate equal to 1 cfm (0.47 L/s) for each 50 ft<sup>2</sup> (4.7 m<sup>2</sup>) of crawlspace floor area, including a return air pathway to the common area.
- ✓ The insulation is applied at a maximum thickness of 4.5" (114 mm) on walls.
- ✓ The exposed earth is covered with a continuous vapor barrier. Joints of the vapor barrier shall be overlapped by a minimum of 6" (152 mm) and be taped or sealed. The edges of the vapor barrier shall extend up the stem wall a minimum of 6" (152 mm).
- ✓ The insulation is not installed within 6" (152 mm) of the ground.
- ✓ The insulation fills and seals the rim/band joist area.
- ✓ No insulation is applied to the crawlspace ceiling.

### 5.3.4 Vented Crawlspaces:

**BioBased 1701s®** may be installed in crawlspace ceilings and coated with Flame Control Foam Kote 50-50a ignition barrier provided that all of the following conditions are met:

- ✓ Ventilation openings are located in the foundation walls with a net free opening area of not less than 1 ft<sup>2</sup> (0.09 m<sup>2</sup>) per 150 ft<sup>2</sup> (14 m<sup>2</sup>) of under-floor area.

- ✓ One ventilation opening is provided within 3' (0.9 m) of each corner.
- ✓ The insulation is applied in direct contact with the underside of the sub floor at a maximum thickness of 11.5" (254 mm).
- ✓ No insulation is applied to the crawlspace walls.
- ✓ Foam Kote 50-50a is applied to the surface of the foam insulation at a minimum nominal thickness of 12 wet mils.

**5.4 Application Below Grade:**

BioBased 1701s® may be installed on the exterior of foundation walls. For application guidance follow SPFA AY-140 "Spray Polyurethane Foam for Exterior Subgrade Thermal and Moisture Protection" and local building code.

**6.0 Safety and Handling**

Refer to Material Safety Data Sheet (MSDS) prior to application of BioBased 1701s®.

Storage temperatures for both 'A' and 'B' components should be between 60°F (15.6° C) and 90°F (32.2°C) out of direct sunlight. Conditioned trailers or storage areas may be necessary.

Use adequate ventilation to keep airborne particulates below the exposure level. Wear respiratory protection if material is heated, sprayed, or if the exposure limit is exceeded. Empty drums should be dry, punctured with a non-sparking tool and sent to a qualified drum recycler. Liquid product should be incinerated in a licensed facility

in accordance with local, state and federal regulations. Do not discharge to waterways or sewer systems or dispose of on the ground.

**In case of Chemical Emergencies:**  
Call CHEMTREC (800) 424-9300 or (Collect) (703) 527-3887 (USA)

**7.0 Application Guidelines\***

While prepping equipment, heating drums and re-circulating for spray foam application, agitate the 'B' component mildly for 15 to 30 minutes before application using a pneumatic or equivalent performing mixer. Agitate for approximately 1 to 2 hours for a maximum of 4 hours each day during application to prevent frothing.

Depth per pass should be between ½" (12.7mm) and 1½" (38 mm). Thin passes, ¼" [6.35mm] or less, should be avoided and may result in reduced yield. Exceeding an overall depth of 4" (102 mm) in 24 hours can cause internal charring of the foam and spontaneous combustion. Do not exceed 4" (102 mm) in 24 hours at any depth per pass.

Allow a 5 to 10 second time interval between passes to allow foam to cure and reduce the likelihood of blowing the uncured foam away from the substrate.

*\*It is important that applicators review and understand the BioBased Insulation® Certified Dealer Training Manual prior to use or application of BioBased 1701s®. Failure to follow the manufacturer's recommended guidelines may cause the warranty to become null and void.*

**7.1 Flushing/Purging**

**7.1.1 Chemical blown foams followed by BioBased 1701s® water blown foam:**

When using BioBased 1701s® after a chemically blown spray polyurethane foam it is necessary to flush the entire system with a non-water based solvent in order to achieve maximum foam quality and yield.

**7.1.2 Water blown foams followed by BioBased 1701s®:**

Flushing the system with solvent may not be necessary when switching from one water blown foam system to the next, but it is imperative that any remaining product from the previous application is completely removed or flushed from applicator guns, lines and pumping system by a throughput of BioBased 1701s® product until test sprays indicate that no mixed foam is present in the system.

**7.2 Effect of Environment and Substrate Conditions on Application**

The system settings required to achieve quality foam application will vary depending on environmental and substrate conditions. The following recommend parameters will help ensure optimum foam quality. Always consult the BioBased Insulation® Certified Dealer Training Manual prior to installing any BioBased Insulation® product.

|                       | A Component  | B Component                 | Hose                        |
|-----------------------|--|-----------------------------|-----------------------------|
| Drum Temp.            | Approx. 70°F (21°C)                                  | Approx. 110°F (43°C)        |                             |
| Proportioner Temp.    | 140°F to 145°F (60 to 63°C)                          | 150°F to 155°F (66 to 68°C) | 140°F to 145°F (60 to 63°C) |
| Pressure              | 1200 to 1600 psi (83 to 110 bar)                     |                             |                             |
| Ambient Temp          | 50°F to 120°F (10 to 49°C)                           |                             |                             |
| Relative Humidity     | < 85%  |                             |                             |
| Substrate Temperature | > 50°F (10°C) Wood or >60°F (15°C) Concrete or Metal |                             |                             |
| Substrate Moisture    | Substrate must be dry < 12% WMC                      |                             |                             |
| Wind                  | < 12 mph (19 km/h)                                   |                             |                             |
| Max Service Temp      | < 180°F (82°C)                                       |                             |                             |

**8.0 Containers**

Shipping weight per set is 1,032 pounds (468 kg). A set BioBased 1701s® consists of one (1) 55 gallon (208 L) drum of 'A' component and one (1) 55 gallon (208 L) drum of 'B' component.

**GREENGUARD Certification Program®**

BioBased 1701s® is a third-party certified product that meets the stringent level requirements of the GREENGUARD Certification Program®, and has passed the GREENGUARD Certification Program for Children & Schools.



view listing at [greenguard.org](http://greenguard.org)

|                 | Indoor Air Quality Criteria | Product Measurement after 7 days | Product IAQ Compliance |
|-----------------|-----------------------------|----------------------------------|------------------------|
| TVOC            | ≤ 0.5 mg/m³                 | < 0.003 mg/m³                    | Yes                    |
| Formaldehyde    | ≤ 0.5 ppm                   | < 0.002 ppm                      | Yes                    |
| Total Aldehydes | ≤ 0.1 ppm                   | 0.002 ppm                        | Yes                    |
| Individual VOCs | All ≤ 1/10 TLV              | None                             | Yes                    |

\*GREENGUARD Children & Schools products have been tested for their chemical emissions performance according to California Specification 01350.

| Properties                             | Value               | Test Method |
|--|---------------------|-------------|
| <b>Water Vapor Permeability†</b>       |                     |             |
| 1" (25 mm)                             | 2.06 perms          | ASTM E96    |
| 2.5" (63.5 mm)                         | 0.73 perms          | ASTM E96    |
| <b>Water Absorption</b>                | 0.2%                | ASTM D2842  |
| <b>Air LeakageΔ</b>                    |                     |             |
| 1" (25 mm) thick foam @ 75 PA          | < 0.02 L/s/m²       | ASTM E283   |
| <b>Closed Cell Content</b>             | > 90%               | ASTM D2856  |
| <b>Core Density (nominal)</b>          | 1.7 lbs./ft³        | ASTM D1622  |
| <b>Compressive Strength</b>            | 23 p.s.i. (1.6 bar) | ASTM D1621  |
| <b>Tensile Strength</b>                | 19 p.s.i. (1.3 bar) | ASTM D1623  |
| <b>Finished Foam Bio-Content</b>       | 16%                 | ASTM D6866  |
| <b>Fungi Resistance</b>                | Pass                | ASTM C1338  |
| <b>Dimensional Stability</b>           |                     |             |
| 180°F (82°C), Ambient Humidity         | < 1%                | ASTM D2126  |
| 73°F (23°C), 50% Relative Humidity     | < 1%                | ASTM D2126  |
| -4°F (-20°C), Ambient Humidity         | < 1%                | ASTM D2126  |
| <b>Surface Burning Characteristics</b> | 1.625" (41 mm)      | ASTM E84    |
| <b>Flame Spread Index</b>              | ≤ 25                | ASTM E84    |
| <b>Smoke Developed Index</b>           | ≤ 450               | ASTM E84    |

**Full Scale Room Corner Test**

| Test Method                           | Walls           | Ceilings      | Covering                                | Report Number   |
|---------------------------------------|-----------------|---------------|---|---|
| NFPA 286                              | 8" (203 mm)     | 8" (203 mm)   | 1/2" (12.7 mm) Gypsum                   |   |
| NFPA 286<br>(AC 377 Appendix A 1.2.2) | 4.5" (114 mm)** | 5.5" (140 mm) | Foam Kote 50-50a<br>or<br>Flame Seal TB | 3184159-SAT-001-E<br>3184159-SAT-001-F<br>3184159-SAT-001-D |
| UL 1715                               | 8" (203 mm)     | 8" (203 mm)   |   | 3184159-SAT-003-B   |

| Initial R-Value                | °F-h-ft²/BTU | (K-m²/W)   |           |
|--------------------------------|--------------|------------|-----------|
| 1" (25 mm) nominal thickness   | R – 5.9      | RSI – 1.04 | ASTM C518 |
| 2" (51 mm) nominal thickness   | R – 12       | RSI – 2.11 | ***       |
| 3" (76 mm) nominal thickness   | R – 18       | RSI – 3.17 | ***       |
| 3.5" (89 mm) nominal thickness | R – 19       | RSI – 3.35 | ***       |
| 5" (127 mm) nominal thickness  | R – 28       | RSI – 4.93 | ***       |
| 7" (178 mm) nominal thickness  | R – 39       | RSI – 6.87 | ***       |
| 8" (203 mm) nominal thickness  | R – 44       | RSI – 7.75 | ***       |
| 9" (229 mm) nominal thickness  | R – 50       | RSI – 8.81 | ***       |

- Δ The International Residential Code defines air impermeable as having less than 0.02 L/m-s at 75 Pa.
- \* This numerical flame spread and all other data presented is not intended to reflect the hazards presented by this or any other material under actual fire conditions.
- † ASHRAE defines a Class II vapor retarder as a material having between 0.1 and 1 perms.
- \*\* Coating applied to vertical surfaces only.
- \*\*\* Calculated based on the K-Value at 3.5".

**Read This Before You Buy - What You Should Know About R-Values**

The chart shows the R-value of this insulation. R means resistance to heat flow. The higher the R-value, the greater the insulating power. Compare insulation R-values before you buy. There are other factors to consider. The amount of insulation you need depends mainly on the climate you live in. Also, your fuel savings from insulation will depend upon the climate, the type and size of your house, the amount of insulation already in your house, and your fuel use patterns and family size. If you buy too much insulation, it will cost you more than what you'll save on fuel. To get the marked R-value, it is essential that this insulation be installed properly.

**Notice:** The technical data contained herein is true and accurate to the best knowledge and information available to BioBased Insulation® on the date of publication. The technical data is subject to change, however, and the user should contact BioBased Insulation® prior to use or application to verify that the technical data is current. In addition, the technical data is provided for your guidance only. Because many factors can affect the processing or application of the product and/or its use, it is the user's responsibility to first test the product to determine its suitability for the user's intended use. The sale and use of this product is subject to all of the terms and conditions set forth in the BioBased Insulation® sales order, including the LIMITED WARRANTY, DISCLAIMER OF WARRANTY AND RELEASE, and EXCLUSION OF CONSEQUENTIAL AND OTHER DAMAGES. This technical data does not create an express warranty of any kind. The only warranty applicable to this product is the written, limited express warranty contained in the BioBased Insulation® sales order, which is extended to the purchaser only.

