

1.0 Description

BioBased 501w® is a water blown, two-part, open cell, bio-based spray applied, polyurethane foam having a nominal density of 0.5 p.c.f. (8 kg/m³).

When spray applied, **BioBased 501w®** expands 100:1, filling voids, crevices and building cavities, and reduces energy consumption needed for climate control by reducing infiltration. Once installed, **BioBased 501w®** 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® must be installed by approved contractors 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 501w®**.

3.0 Evaluation Criteria

BioBased 501w® 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® Training Manual* and the following codes or guides:

2009 International Building Code® (IBC) – Chapter 26

2009 International Residential Code® (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® can be used in residential, commercial and industrial applications. The following design assemblies are a general design guide only. **BioBased 501w®** may be useful in other applications. Always consult with the local authority having jurisdiction before use.



5.1 General:

BioBased 501w® 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:

Flame Seal TB™ may be used to cover **BioBased 501w®** in lieu of a 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 at a coverage rate of 48 ft²/gal (1.2 m²/liter). 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. 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.

5.2.1 Impact Protection:

In areas where the Flame Seal TB™ covering **BioBased 501w®** may be subject to impact damage from moving vehicles, the handling of materials, or other activity, the assembly should be protected by an impact-resistant material consistent with the requirements for the type of construction to a height adequate to provide full protection, but not less than 5 ft from the finished floor.

5.3 Application With a Non-Prescriptive Ignition Barrier:

BioBased 501w® 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 501w®** is installed in unvented attics in accordance with Section 806.4 of the IRC.
- ✓ The surfaces of the foam must be covered with a minimum nominal thickness of 3 dry mils (4 wet mils) of Flame Seal TB™ at a coverage rate of 339 ft²/gal (8.3 m²/liter) OR 6 dry mils (11 wet mils) of Foam Kote 50-50a at a coverage rate of 131 ft²/gal (3.2 m²/liter).

5.3.1 Conditioned Attics:

BioBased 501w® may be spray applied to the underside of the roof deck and rafters. **BioBased 501w®** 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® 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® 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 ft² (4.7 m²) 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 ft² (4.7 m²) 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® may be installed in crawlspace ceilings 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 ft² (0.09 m²) per 150 ft² (14 m²) 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.

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® 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 ap-

plication 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 depending on environmental and substrate conditions. The following recommended parameters will help ensure optimum foam quality. Always consult the BioBased Insulation® Training Manual prior to installing any BioBased Insulation® product.

	A Component	B Component	
Drum Temp.	75 to 85°F (23.9 to 29.4°C)	75 to 85°F (23.9 to 29.4°C)	Hose
Proportioner Temp.	105 to 135°F (40.6 to 57.2°C)		
Pressure	1200 to 1600 psi (82.7 to 110 bar)		
Ambient Temp	50°F to 120°F (10°C to 49°C)		
Ambient Moisture	< 85% Relative Humidity		
Substrate Temperature	50°F to 120°F (10°C to 49°C)		
Moisture on Substrate	Substrate must be dry < 12% WMC		
Wind Velocity	< 12 m.p.h. < (19.3 km/h)		
Max Service Temp	< 180°F < (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' component and one (1) 55 gallon (208 L) drum of 'B' component.

Properties	Value	Test Method
Water Vapor Permeability†		
3.5" (89 mm)	9.2 perms	ASTM E96
5.5" (140 mm)	6.1 perms	ASTM E96
Air Leakage^Δ		
5.5" (140 mm) @ 75 PA	< 0.02 L/s/m ²	ASTM E283
Closed Cell Content	3.00%	ASTM D2856
Core Density (nominal)	0.5 pcf (8 kg/m ³)	ASTM D1622
Fungi Resistance	Pass	ASTM C1338
Dimensional Stability	< -5.0%	ASTM D2126
Finished Foam Bio-Content	3%	ASTM D6866
Sound Transmission Class (STC)		
2 x 4 (50.8 mm x 101.6 mm) wood studs, 1/2" (12.7 mm) gypsum	38	ASTM E90
Tensile Strength	3.0 psi (29.7 kPa)	ASTM D1623
Surface Burning Characteristics*	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 (AC 377 Appendix X)	5.5" (140 mm)	11.5" (292 mm)	Foam Kote 50-50a (11 mil WFT, 6 mil DFT)	3184159-SAT-004
NFPA 286 (AC 377 Appendix X)	11.5" (292 mm)	11.5" (292 mm)	Flame Seal TB™ (4 mil WFT, 3 mil DFT)	100294098-SAT-002A
UL 1715	5.5" (140 mm)	11.5" (292 mm)	Flame Seal TB™ (30 mil WFT, 18mil DFT)	3184159-SAT-003-A

R-Value Aged 90 days @ 140°F (60°C)

	ft ² ·°F·h/Btu	(K·m ² /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	***

- 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 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.



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