

1.0 Description

2001NB is a 245fa-blown, two-part, closed cell, spray applied, polyurethane foam having a nominal density of 2.0 p.c.f. (32 kg/m³). When spray applied, **2001NB** expands 30:1, filling voids, crevices and building cavities, and can reduce energy consumption needed for climate control by reducing infiltration. Once installed, **2001NB** assists in increasing thermal resistance, and can assist in reducing the risk of moisture accumulation within the building envelope.

2.0 Installation

2001NB 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 **2001NB**.

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

2001NB can be used in residential, commercial and industrial applications. The following design assemblies are a general design guide only. **2001NB** may be useful in other applications. Always consult with the local authority having jurisdiction before use.

5.1 General:

2001NB must be separated from the occupants by ½" (12.7 mm) 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 12" (305 mm) in the walls and 12" (305 mm) in the ceiling.

5.3 Application with an Ignition Barrier:

2001NB may be installed in attics and crawlspaces in accordance with section 5.3.1 through 5.3.4 with a 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 **2001NB** is installed in unvented attics in accordance with Section 806.4 of the IRC.

5.3.1 Conditioned Attics:

2001NB may be spray applied to the underside of the roof deck and rafters. **2001NB** is applied at a maximum thickness of 12" (304 mm) on horizontal and/or diagonal surfaces and a maximum of 12" (304 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):

2001NB may be installed at a maximum thickness of 7" (178 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:

2001NB 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 7" (178 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:

2001NB may be installed in crawlspace ceilings covered by an approved 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 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 12" (304mm).
- ✓ No insulation is applied to the crawlspace walls.

5.4 Application Below Grade:

2001NB 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 **2001NB**. Storage temperatures for both 'A' and 'B' components should be between 65°F (18° C) and 85°F (30°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*

Do not agitate or re-circulate 'B' side drums. Do not heat above 85°F. Depth per pass should be between ½" (12.7 mm) and 2" (51 mm). Thin passes (¼" [6.35 mm] 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 15 to 20 minute 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 2001NB.*

7.1 Flushing/Purging

7.1.1 Chemical blown foams followed by 2001NB chemical blown foam:

Flushing the system with solvent may not be necessary when switching from one chemical 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 2001NB product until test sprays indicate that no mixed foam is present in the system.

7.1.2 Water blown foams followed by 2001NB:

Flushing the system with solvent may not be necessary when switching from a water blown foam to 2001NB, 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 2001NB product until test sprays indicate that no mixed foam is present in the system. If a solvent is used, use only non-water based solvents in order to achieve maximum foam quality and yield.

7.2 Effect of Environment and Substrate Conditions on Application

The system settings required to achieve quality foam application will vary depending

	A Component	B Component	
Drum Temp.	Approx. 65°F to 85°F (18° to 30°C)	Approx. 65°F to 85°F (18° to 30°C)	Hose
Proportioner Temp.	125°F to 135°F (52 to 57°C)	125°F to 135°F (52 to 57°C)	125°F to 135°F (52 to 57°C)
Pressure	1000 to 1400 psi (68.9 to 96.5 bar)		
Relative Humidity	< 85%		
Substrate Temperature	> 20°F (-7°C)		
Substrate Moisture	Substrate must be dry < 12% WMC		
Max Service Temp	< 180°F (82°C)		

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

8.0 Containers

Shipping weight per set is 1,032 pounds (468 kg). A set 2001NB 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†		
1" (25 mm)	1.9 perms	ASTM E96
Air Leakage^Δ		
1" (25 mm) thick foam @ 75 PA	< 0.02 L/s/m ²	ASTM E283
Closed Cell Content	> 90%	ASTM D2856
Core Density (nominal)	2.0 p.c.f. (32 kg/m ³)	ASTM D1622
Compressive Strength	25 to 30 p.s.i. (1.7 - 2.1 bar)	ASTM D1621
Tensile Strength	40 to 48 p.s.i. (2.8 - 3.3 bar)	ASTM D1623
Dimensional Stability		
160°F (71°C), 100% Humidity	< 4%	ASTM D2126
Surface Burning Characteristics*	4" (102 mm)	ASTM E84
Flame Spread Index	≤ 25	ASTM E84
Smoke Developed Index	≤ 450	ASTM E84

Full Scale Room Corner Test

Test Method	Walls	Ceilings	Covering
NFPA 286	12" (304 mm)	12" (304 mm)	1/2" (12.7 mm) Gypsum

Aged R-Value	°F·h·ft ² /BTU	(K·m ² /W)	
1" (25 mm) nominal thickness	R – 6.3	RSI – 1.11	ASTM C518
2" (51 mm) nominal thickness	R – 12	RSI – 2.18	***
3" (76 mm) nominal thickness	R – 18	RSI – 3.22	***
4" (102 mm) nominal thickness	R – 24	RSI – 4.22	ASTM C518
5" (127 mm) nominal thickness	R – 30	RSI – 5.28	***
6" (153 mm) nominal thickness	R – 36	RSI – 6.34	***
7" (178 mm) nominal thickness	R – 42	RSI – 7.39	***
8" (203 mm) nominal thickness	R – 48	RSI – 8.45	***
9" (229 mm) nominal thickness	R – 54	RSI – 9.50	***

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.
 *** Calculated based on the K-Value at 4".

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.

