



Natural-Therm™ 0.50 PCF

Spray Polyurethane Foam Insulation System

PRODUCT OVERVIEW

Natural-Therm™ 0.50 PCF Spray Foam Wall Insulation is the B-component of a two-component polyurethane foam insulation system processed at a 1:1 by volume. It has a 0.50 PCF spray in place density. Natural-Therm™ is a water blown hybrid foam insulation system. This product provides superior energy efficiency and air infiltration control. The product can be used in open wall cavities, crawlspaces, perimeter rim joists, cathedral ceilings and garage ceilings.

PRODUCT USE

Natural-Therm™ 0.50 PCF is designed as a high performance building envelope insulation system for both residential and commercial construction.

PRODUCT APPLICATION

Natural-Therm™ 0.50 PCF should be applied in 1" to 4" lifts. This procedure is in accordance with the manufacturer's recommendations detailed in the application manual.

Natural-Therm™ 0.50 pcf should only be applied to approved substrates recommended by the manufacturer. The product must be covered with an approved 15 minute thermal barrier equivalent to 1/2" Gypsum Wall Board or an approved ignition barrier.

The data presented here should only be used as a guide since the actual foam properties are influenced by the efficiency of the spray gun, component temperatures, foam thickness, and ambient conditions. Natural-Therm™ Series should be sprayed in uniform passes of 1" to 4" thickness. While the following technical information is based on the results of actual tests conducted by Natural Polymers, it should only be used as a guideline for typical chemical and physical properties. The user must test and qualify the product. Final determination of suitability is the responsibility of the user.

PHYSICAL PROPERTIES

DENSITY:	ASTM D-1622 @ 2" 0.50 PCF
OPEN CELL CONTENT:	ASTM D-6226 >92%
	R-VALUE: 3.81 per inch
THERMAL RESISTANCE:	ASTM C-518
DIMENSIONAL STABILITY:	ASTM D-2126 (% volume change)
	-20°F -0.1
	158°F 100% R.T. -0.40
	Humidity
	158°F Dry -0.20
FIRE PERFORMANCE:	ASTM E-84
	Flame Spread < 15
	Smoke Development < 300
AIR LEAKAGE:	ASTM E-283-91 0.00022 ft3/s.ft2
SOUND TRANSMISSION CLASS:	ASTM E-90 39
	ASTM C-423 75

THERMAL PERFORMANCE

THICKNESS (")	R-VALUE (h-ft2-°F)/BTU	THICKNESS (")	R-VALUE (h-ft2-°F)/BTU
1.0	3.81	6.0	22.85
1.5	5.71	6.5	24.75
2.0	7.62	7.0	26.66
2.5	9.50	7.5	28.57
3.0	11.42	8.0	30.50
3.5	13.33	8.5	32.40
4.0	15.25	9.0	34.28
4.5	17.14	9.5	36.20
5.0	19.00	10.0	38.11
5.5	21.00		

Tested in accordance with ASTM C518 at 75°F (24°C) mean temperature.

STORAGE & SHELF LIFE

Both components should be stored in their original containers and away from excessive heat and moisture, especially after the seals have been broken or some materials have been used. Drums must be stored indoors and jobsite tanks maintained between 50°F and 90°F. Containers should be opened carefully to allow any pressure buildup to be vented safely while wearing full safety protection. Excessive venting of the 'B' component may result in higher density foam and reduced yield. Materials stored at temperatures below 50°F will increase viscosity and some application equipment may not reach adequate spray temperature set points. Supply pumps and hoses must be sized to provide adequate supply when materials are cold and at a higher viscosity. **Shelf Life:** Excessive low or high temperatures may decrease shelf life. When stored in the original unopened container at 50°F-75°F, the shelf life of the "Part B" component is six months. Temperature above 90°F decreases the shelf life. The "Part A" component has a shelf life of 6 months in unopened containers when stored at 65°- 85°F.





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SURFACE PREPARATION

Surfaces to receive **NATURAL-THERM® 0.50 PCF** must be clean and dry, free of dirt, oil, solvent, grease, loose particulates, frost, ice and other foreign matter which could inhibit adhesion. Moisture content and surface conditions of substrate are critical to adhesion of **NATURAL-THERM® 0.50 PCF** and need to be verified by installing contractor in small test areas before proceeding with full application.

Plywood, OSB, and lumber shall not have greater than 15% moisture content. Generally a primer is not required for these surfaces. On substrates where the moisture content cannot be determined or exceeds 15%, a suitable primer is recommended. Adhesion spray tests may be performed with insulating foam and the interface line checked upon cure for good cell structure and adhesion. Warming of these surfaces during winter conditions may increase adhesion.

CMU, structural and poured-in-place concrete must have a minimum 28-day cure and moisture content below 15%. Residential footings, stem-walls, and basements generally do not require priming. Commercial controlled atmosphere structures, cold storage, and freezer buildings require an appropriate primer to insure adequate adhesion where curing agents may have been used. Generally a two-component epoxy primer designed to seal and provide adhesion to concrete surfaces such as **Natural Polymers PREPRIM™100** is recommended.

Painted Steel, galvanized steel, and aluminum panels: check surfaces for mill oil used in the manufacturing process and moisture condensate. All oil must be removed and the surface clean and dry before priming. Washed and dry painted steel panels may not require priming. All aluminum and galvanized panels must be primed using **Cardinal 4860-420** or **Sherwin Williams® DTM Wash Primer**.

PROCESSING CHARACTERISTICS & RECOMMENDATIONS

RECOMMENDED PROCESSING TEMPERATURES – Ambient

	65-80°F	>80°F	30-50°F
Component A	120°F	118°F	130°F
Component B	120°F	118°F	130°F
Hose	120°F	115°F	120°F

These temperatures are typical of those required to produce acceptable product using conventional Gusmer or Graco equipment. It is the responsibility of the applicator to determine the specific temperature settings to match the environmental conditions and specific spray equipment.

PROCESSING CHARACTERISTICS

Machine Mix at recommended processing temperatures	
Cream Time	4 seconds
Tack Free Time	On Rise
Initial Cure Time	<1 Hour**

The nominal physical properties reported were achieved using a Graco H25 Proportioner and Fusion gun with #02 module with a static proportioner pressure setting

of 1200 psi. Older equipment may be upgraded with “Arctic Booster Pack” heaters or minimum E-20 proportioners are required to adequately pre-heat the components. Spray guns such as; D-gun, GAP gun, GX-7, Fusion gun, or Probler guns fitted with smaller output tips (15-18 lbs/min.) for better spray control for stud wall applications at recommended processing temperatures are recommended. ** Complete cure will depend on temperature, humidity and degree of ventilation. Complete cure usually occurs within 24-72 hours.

RECOMMENDED SUBSTRATE TEMPERATURES

Minimum	32°F
Maximum	120°F

For applications below 32°F, Natural Polymers, LLC technical personnel should be consulted. Flash passes should be avoided.

CLIMATIC CONDITIONS & HUMIDITY

Moisture in the form of rain, dew, frost can seriously affect the quality and adhesion of the **NATURAL-THERM® 0.50 PCF** to the substrate or itself. Natural Polymers Company does not recommend the spraying of this system when the relative humidity (RH) exceeds 85%. When heating the interior of a building the relative humidity can change dramatically and should be constantly monitored.

Application

Equipment

The proportioning equipment shall be manufactured specifically for heating, mixing, and spray application of polyurethane foam and be able to maintain 1:1 metering with a +2% variance and adequate main heating capacity to deliver heated and pressurized materials up to 130°F. Heated hose must be able to maintain pre-set temperatures for the full length of the hose. Minimum 2:1 on the A side and 1:1 on the B side ratio feeder pumps are required to supply stored materials through minimum ½-inch supply hoses. Pressurized and heated tanks systems may be used if sized appropriately to provide adequate flow at maximum operating capacity and temperatures.

Guns such as **D-gun, Gap Pro, Fusion-gun, Probler** with tip size approximately 16 lbs/min are suitable for most residential applications. Commercial cold storage, freezer applications, and large metal buildings may utilize higher output guns.

Processing Temperatures

Recommended processing temperatures; ‘Part A’ Main 100-115°F, ‘Part B’ Main 130-135°F, Hose 110-120°F are critical settings to achieve viscosity to allow balanced pressure during spraying. Balanced chemical output pressures are important to producing good mix. Foam output pressures greater than 200 psi differential indicate either improper chemical temperatures, or worn gun/packing parts. Unequal pressures will cause poor chemical mixing through the module and uneven backpressure. A critical requirement for good spray mixing requires appropriate tip/module sizing to the proportioner and adequate heating capacity. Unequal pressure (>200 psi) can cause excessive pump wear.



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Spraying

Thin “flash passes” to very cold surfaces are not recommended. Thin passes (1/4” or less) should be avoided. They may result in reduced yield and loss of adhesion. It is recommended that the total design thickness be completed each day.

This spray system should be applied in uniform minimum pass thickness of 2-inch, maximum pass thickness 6-inches. Application temperatures below 40°F may require reduction in single pass application thickness. Additional thickness may be applied after a note no waiting period for ½ pcf foams they cool down fast you may spray multiple pass over the same lift. Yield and in-place-density is dependent upon the temperature of the substrate, ambient air temperature, gun speed application, gun tip size, and the output of the proportioning unit. **NATURAL-THERM® 0.50 PCF** is designed to provide maximum yield when sprayed in 2” thick passes. Excessive pass thickness can reduce density and physical properties, and cause local overheating and possible fire.

Precautions

Read and understand the Material Safety Data Sheet for this product before use. The 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. Polyurethane foam may present a fire hazard if exposed to fire or excessive heat (i.e. cutting torches). The use of polyurethane foam in interior applications on walls or ceiling presents an unreasonable fire risk unless protected by an approved fire resistant thermal barrier with a fire rating of not less than 15 minutes. A UBC or IRC code definition of an approved “thermal barrier” is a material equal in fire resistance to ½” gypsum board. Each firm, person, or corporation engaged in the use, manufacture, or production or application of the polyurethane foams produced from these resins should carefully examine the end use to determine any potential fire hazard associated with such product in a specific use and to utilize appropriate precautionary and safety measures. Consult with local building code officials and insurance agency personnel before application. Re-circulating the ‘B’ component is not recommended if the drum temperature is below 65°F re-circulating the ‘B’ component can be used as a means of warming the material. If re-circulating the ‘B’ component the material must be agitated with a mixer while the material is being re-circulated. Polyurethane foams will burn when exposed to fire. Caution during application must be observed with signs posted for other trades, **“Caution Combustible Insulation, No Welding or Hot Work Allowed”**. On a daily basis remove all debris and shavings from the job site leaving a clean work area. In freezing conditions [below 32°F], jobsite air temperature must be maintained above 50 degrees F. during the cure cycle so extreme temperature drops to the curing [green] foam are not experienced. **When using fuel fired heating units the exhaust must be vented directly outdoors to prevent unsafe carbon monoxide conditions in the work area.** Electric heating units are preferred. All heaters must be turned off before the application of foam begins. Natural Polymers Technical Personnel should be consulted in all cases where application conditions are marginal.

Worker Exposure Hazards – Both Components A and B can cause severe inhalation and skin sensitization. For interior applications: full body protection required including air supplying respirator such as a self-contained breathing apparatus

(SCBA) or a supplied air respirator (SAR) in the positive pressure or continuous flow mode (this includes air supplied hoods). For exterior applications: required either a full face air purifying respirator or half face worn in combination with chemical safety goggles. The recommended APR cartridge is an organic vapor/particulate filter combination cartridge (OV/P100). It is recommended that all applicators and workers obtain recurrent formal training before exposure to or applying this product. More product information and training materials can be found at Natural Polymers Company www.NaturalPolymersllc.com – or on SPFA or CPI websites including: www.spraypolyurethane.com, www.polyurethane.org, www.sprayfoam.org

Product Sizes

Component A – 500 lbs drums, 2,500 lbs totes (disposable or returnable)
Component B – 465 lbs drums

Freight Classification

Component A - Resin Compounds Item 46030, Class 55, NOIBN Non-Hazardous
Component B - Resin Compounds Item 46030, Class 55, NOIBN Non-Hazardous

Limited Warranty

We, the manufacturer, warranty only that this product is free of defects, since many factors which affect the results obtained from this product - such as weather, workmanship, equipment utilized and prior condition of the substrate - are all beyond our control. We will replace at no charge any product proved to be defective within 6 months of purchase, provided it has been applied in accordance with our written directions for uses we recommended as suitable for this product. Proof of purchase must be provided.

DISCLAIMER OF WARRANTIES: The Limited Warranty is IN LIEU OF any other warranties express or implied including but not limited to any implied warranty of MERCHANTABILITY or fitness for a particular purpose, and we, the manufacturer, shall have no further liability of any kind including liability for consequential or incidental damages resulting from any defects or any delays caused by replacement or otherwise. Furthermore, all polyurethane foam burns in varying degrees, which in turn liberates toxic gasses and should be evaluated in its final form for compliance to existing standards in your industry. The information presented herein is based on our own research and that of others and is believed to be correct, however, no warranty is expressed or implied. No statement herein extends any license, either expressed or implied, in connection with any patents issued or pending which may be the property of Natural Polymers or others. The manufacturer shall not be liable (regardless of fault) to the vendor's employees, or anyone for any direct, special or consequential damages arising out of or in connection with the accuracy, completeness, adequacy or furnishings of such information.