

# NATURAL-THERM® 450

Natural-Therm® 450 is a water-blown, open cell, two-component, semi-rigid spray polyurethane foam insulation with a nominal 0.45 PCF in-place density. This product provides energy efficiency and air infiltration control as a high-performance building envelope insulation system. Natural-Therm® 450 offers a self-adhering, seamless insulation that can be used in many areas of the building envelope, including open wall cavities, crawl spaces, perimeter rim joists, cathedral ceilings, and garage ceilings.

## Features

- Low VOC[1]
- Low GWP Blowing Agent (water blown)
- R-Value 3.7/inch (Nominal)
- Air Seal
- Sound Absorbing

1 UL GREENGUARD Gold Certificate Number 419598

## Standards, Codes Compliance

- Meets ICC-ES AC377 Type V-B
- Code Evaluation Report IAPMO ER-992
- UL GREENGUARD Gold Certificate Number 419598

## Applications

- Wall Cavities
- Vented Attics
- Unvented Attics
- Ceilings
- Unvented Crawl Spaces
- Vented Crawl Spaces
- Rim Joists
- Floors

## Packaging, Storage, and Shelf Life

**A Component:** 55 US Gallons, Closed-Top Steel Drum – 500 lb. net wt.
**B Component:** 55 US Gallons, Open-Top Steel Drum – 435 lb. net wt.

Store containers 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.

Shelf Life: 6 months when stored in the original unopened container at 50°F–90°F. Excessive low or high temperatures may decrease shelf life.

Processing: Drum temperatures should be conditioned to 70°F–90°F before application to ensure optimal viscosity and mixing.

## Equipment

The proportioning equipment must 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 150°F.

## Physical Properties

| PROPERTY | TEST METHOD | VALUE |
|---|---|---|
| Thermal Resistance | See Table Below | |
| R-Value at 1 inch[1, 2] | ASTM C518 | 3.7 |
| R-Value at 3.5 inches | | 13 |
| Core Density | ASTM D1622 | Nominal 0.45 PCF |
| Tensile Strength[3] | ASTM D1623 | 3.20 psi |
| Dimensional Stability | ASTM D2126 | |
| 158°F 100% RH (168 h) | | < 15% |
| Vapor Permeance (> 3.5 inches) | ASTM E96 | 7.6 perms |
| Air Permeance (> 3.5 inches) | ASTM E283 | <0.02 L/s/m$^2$ |
| Open Cell Content | ASTM D6226 | > 90% |
| **FIRE TEST RESULTS[4]** | | |
| Flame Spread | ASTM E84 (Complies with Class 1)[4] | < 25 |
| Smoke Developed | | < 450 |
| Thermal Barrier[5] | NFPA 286 | Pass with 18 mils (wet) DC 315 |
| Ignition Barrier[5] | NFPA 286<br>AC 377 Appendix X | Pass with 6 mils (wet) DC 315<br>Pass with 6 mils (wet) No-Burn Plus ThB |

1 Properties shown are representative values for 1-inch-thick material, unless otherwise specified.
2 R means the resistance to heat flow; the higher the value, the greater the insulation power. This insulation must be installed properly to get the marked R-value.
3 Value at yield or 10% deflection, whichever occurs first.
4 These laboratory tests are not intended to describe the hazards presented by this material under actual fire conditions.
5 Reference IAPMO ER-992 for guidance on maximum application thicknesses on vertical and horizontal surfaces.

## Thermal Resistance — R-Values[1]

| THICKNESS (INCHES) | °F*FT$^2$*H/BTU |
|---|---|
| 1 | 3.7 |
| 2 | 7.5 |
| 3.5 | 13 |
| 4 | 15 |
| 5 | 19 |
| 5.5 | 20 |
| 6 | 22 |
| 7 | 26 |
| 7.5 | 28 |
| 8 | 30 |
| 9 | 33 |
| 9.5 | 35 |
| 10 | 37 |

For SI: 1 inch = 25.4 mm, °F *ft2*h/Btu = 0.176 K*m$^2$/W
1 R-values are calculated based on tested K values at 1-inch and 4-inch thickness for Natural-Therm® 450.

## Safety and Handling

**Exposure** — Read and understand the Safety Data Sheet (SDS) for this product before use. Personnel must use appropriate respiratory, skin, and eye Personal Protective Equipment (PPE) when handling and applying polyurethane spray foam systems. (eg. full body chemical-resistant suit, full-face supplied air respirator, nitrile gloves, chemical safety goggles, required ventilation, emergency eyewash) Both Components A and B can cause severe inhalation and skin sensitization. For interior applications: full body protection required. A comprehensive review of SPF safety and handling can be found on the CPI website.

**Fire** — Polyurethane foam may present a fire hazard if exposed to fire or excessive heat (i.e., cutting torches). Polyurethane foam systems should not be left exposed and must be protected by a minimum 15-minute thermal barrier or other code-compliant material as prescribed by applicable building code(s). Proper authorities with jurisdiction over a particular area should always be consulted for additional or specific requirements prior to beginning any project.




## Ventilation and Implications for Re-Entry/Re-Occupancy

During application of Natural Polymers Natural-Therm® 450, a minimum of 10 ACH is recommended and maintained **for at least two hours post spraying prior to re-entry** of trade workers and **24 hours for re-occupancy**. Cross-ventilation is required with negative pressure in the spray area and exhaust to a secured empty area. If recommended ventilation rates cannot be achieved, a 24-hour re-entry time and re-occupancy time is recommended for trade workers and building occupants. For more detailed information, please visit American Chemistry Council.

## Temperature and Humidity

Recommended substrate temperatures:
Minimum 32°F Maximum 120°F

Moisture in the form of rain, dew, and frost can seriously affect the quality and adhesion of the Natural-Therm® 450 to the substrate or itself. Natural Polymers does not recommend the spraying of this system when the relative humidity (RH) exceeds 85% or when temperatures are less than 5°F above dew point. When heating the interior of a building, the relative humidity can change dramatically and should be constantly monitored to ensure proper application.

## Surface Preparation

Natural-Therm® 450 must be applied to surfaces that are clean and dry and free of dirt, oil, solvent, grease, loose particulates, frost, ice, and other foreign matter that could inhibit adhesion.

| SUBSTRATE | CONSIDERATIONS | PRIMING |
|---|---|---|
| Wood (OSB, Plywood, Lumber) | Moisture <18% | Not required unless porosity or moisture issue exist[1] |
| Concrete (CMU, Structural, Pour-in-Place) | 28-day min. cure | Not required unless specified or adhesion testing supports[1] |
| Metal (Steel, Painted, Aluminum,[1] Galvanized[1]) | Clean of oils, dry | May be required based on adhesion testing; Recommended for Al, Galvanized Surfaces[1] |
| Plastics (PVC, CPVC) | Compatible | Not required |

1 SPFA-143 — Primers for Spray Polyurethane Foam Insulation and Roofing Systems.

## Spraying

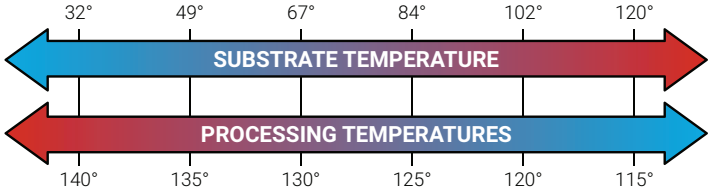
This spray system should be applied in uniform minimum pass thickness of 1 inch, maximum pass thickness 6 inches. Additional thickness may be applied with a 5-to-10-minute waiting period between lifts. Natural-Therm® 450 will cool down fast, so you may spray multiple passes over the same lift. Excessive pass thickness can reduce density and physical properties and cause local overheating and possible fire.

Re-circulating the B Component is recommended if the drum temperature is below 65°F. The re-circulation of the B Component can be used as a means of warming the material. If re-circulating the B Component, the material should be agitated with a mixer while the material is being re-circulated to ensure even distribution of heat. When re-circulating, do not set pre-heaters above 100°F. If drum temps exceed 100°F, mixing will be necessary. If recirculation is not performed, light mixing to improve yield is optional. In freezing conditions, job site air temperature must be consistently maintained above 32 degrees to ensure proper curing.

## Processing Guidance

| | |
|---|---|
| **AMBIENT TEMPERATURE** | 50°F–100°F |
| **MACHINE SETTING TEMPERATURE** | |
| A Component Pre-heaters | 115°F–140°F |
| B Component Pre-heaters | |
| Hoses | |
| Spray Pressure (Dynamic)[1] | 1000–1,400 psi (HVLP 250 psi)[2] |
| **PROCESSING CHARACTERISTICS** | |
| Cream Time | 1–2 (Seconds) |
| Tack-Free Time | 5–6 (Seconds) |
| Initial Cure Time | <1 Hour[3] |

1 Higher pressures improve mixing and influence physical property performance.
2 High-Volume Low-Pressure Application
3 Complete cure will depend on temperature, humidity, and degree of ventilation. Complete cure usually occurs within 24–72 hours.




## Certifications and Sustainable Features

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