11-033 SPRAY FOAM SYSTEM TECHNICAL DATA

DESCRIPTION:
11-033 InsulStar®1.7 is a two component, self-adhering, seamless, closed cell, spray applied polyurethane foam system. This system has been formulated with highly insulating HFO as the blowing agent. This spray foam is suitable for interior building insulation, air barrier, and moisture vapor retarder applications in Type I, II, III, IV and V construction.

DISTINGUISHING CHARACTERISTICS:

- Low GWP
- Passed Appendix X with no Ignition Barrier
- High Yields
- Air Impermeable Insulation at ½"
- Approved with DC315 coating in lieu of code prescribed thermal barrier
- Class II Moisture Vapor Retarder @1"
- Approved for use in Type I, II, III, IV, V construction. Contact NCFI regarding the specific approved wall assemblies.
- IAPMO ER 667
- Low VOC per CDPH Standard V 1.2, 2017
- Fungal Resistant - Passed ASTM C1338

R-Values*		
Thickness (inches)	R-Value (°F·hr·ft² / Btu)	Moisture Vapor Perm
1"	7.0	0.947
2"	14	0.474
3"	20	0.316
3.5"	23	0.271
5.5"	37	0.172
6"	40	0.158
7"	47	0.135
8	53	0.118
9.5	64	0.102
*Note: As with all insulating materials, the R-value will vary with age and use conditions.		

TYPICAL PHYSICAL PROPERTIES*[1]:

Free Rise Core Density*[2] ASTM D 1622	1.7 pcf
Closed Cell Content ASTM D 6226	>90%
R-value @ 1" - ASTM C 518	7.0
Air Perm @1/2" & 75 Pa ASTM E2178	0.0048 L(m-s²)
Moisture Vapor Perm ASTM E96 @ 1"	0.95 perms
Compressive Strength ASTM D1621	21psi
Flammability ASTM E-84 @ 4 inches	Flame Spread ≤25 Smoke Dev ≤450
Max Service Temperature	180ºF

*[1]The above values are average values obtained from laboratory experiments and should serve only as guide lines.

*[2]Free rise core density should not be confused with overall density. Overall densities are always higher than free rise core densities and take into account skin formation, thickness of application, environmental conditions, etc.

For proper use of this NCFI insulating material refer to the NCFI Application Information and any of the following codes or guides:

- 2015 International Building Code Chapter 26 or Residential Code Section R316 & R806
- 2018 International Building Code Chapter 26 or Residential Code Section R316 & R806
- Go to: polyurethane.americanchemistry.com and find the "Products, Resources, and Documents Library" tab.

11-033 Application Information

STORAGE AND USE OF CHEMICALS:
The 11-033 chemicals should be between 65°F and 80°F for proper processing through the spray equipment. Chemicals shipped during winter or summer months may need extra time in moderate temperature storage to stabilize back in the proper application range. Cold chemicals can cause poor mixing, pump cavitation or other process problems due to higher viscosity at lower temperatures. Storing chemicals above 90°F should be avoided as much as possible. Excessively warm chemicals should be cooled prior to opening the drums. Do not store in direct sunlight. Keep drums tightly closed when not in use and under dry air or nitrogen pressure of 2-3 psi after they have been opened. The shelf life of 11-033 is six months

SAFE HANDLING OF LIQUID COMPONENTS:
Use caution in removing bungs from the container. Loosen the small bung first to allow any built-up vapor pressure to stabilize before completely removing. **B component will froth at elevated temperatures.** Avoid prolonged breathing of vapors. In case of chemical contact with eyes, flush with water for at least 15 minutes and get medical attention. For further information go to www.spraypolyurethane.org and click on the Resources tab in the Professional Contractors section.

APPLICATION GUIDELINES:
11-033 is suitable for application to most construction materials including wood, masonry, concrete, and metal. 11-033 should not be applied to surfaces that will be in contact with soil and intermittent contact with water.
NCFI provides a Fast version for applications in temperatures below 60°F. To ensure proper adhesion, all substrate surfaces should be dry, clean of dust or flaking surface rust, ice or frost. All metal surfaces must be free of oil, grease, etc. Uncoated metals may require a primer coat.
No flammable chemicals, such as wasp and hornet sprays, should be sprayed in the area of the foam application 24 hours before the application. No such chemical can be sprayed after the foam application until the foam has cooled to room temperature.

APPLICATION AROUND PLASTIC PIPES:
Based on a series of extensive studies, the 11-033 system can be applied in contact with PVC, CPVC, ABS, PP-R and PEX plastic pipes. The pipes must not be pressurized during the foam application. The foam pass applied in contact with the pipe should not exceed 2" thickness in order to prevent excessive exothermic heat at the pipe to foam interface. Allow 2 minutes cooling between each additional foam pass. The total foam thickness is limited to that thickness permitted in that area of the building assembly.

APPLICATION AROUND ELECTRICAL WIRES:
Based on NCFI testing, the 11-033 system can be applied in contact with electrical wires. Spray foam applicators must spray the foam in such a manner that the expanding foam does not stretch and distort the wires. Light gauge wires which will be encapsulated in the foam layer should have the foam installed behind the wires and allowed to cool prior to applying a top layer to cover the wire. Use a shallow lift of 3/4" of foam to cover the wire. Wait the required 2 minutes between passes when adding more foam thickness to achieve the desired R-value.

APPLICATION PASS THICKNESS:
Spraying foam will generate heat. Foam which is applied too thick in single passes can build temperatures which will degrade cell structure and not produce foam with optimum properties. In the most extreme case, 11-033 could reach dangerously high temperatures inside the finished foam which could lead to splitting, charring, or even spontaneous combustion. The maximum pass thickness for 11-033 is 4 inches. Wait 10 minutes or until the foam surface has cooled to ambient temperature before adding additional foam passes. Multiple layers can be applied to achieve the desired R-value.

11-033 Application Information

EQUIPMENT AND COMPONENT RATIOS:
The 11-033 system, consisting of an A and B component, is formulated for spraying with a two component pump specifically designed for spray polyurethane foam systems. The B drum is connected to the resin pumps and the A drum is connected to the isocyanate pumps. The proportioning pump ratio is 1 to 1. Dispensing temperature should be set at approximately 130°F to give a good pattern. Due to equipment variations, the application temperature settings may need to be adjusted to achieve a good spray pattern. For higher-pressure settings above 1,000 psi, the temperature settings can be slightly lower.

OPTIMUM ADHESION TEMPERATURE OF SURFACE TO BE SPRAYED:
The surface should be between 40°F and 120°F when applying 11-033. In this range the warmer the surface, the better the adhesion. When surface temperatures fall below 60°F, adhesion may be aided by applying a 1/4-inch flash coat followed by a full thickness pass while the flash coat is still warm but no longer tacky to the touch. Alternatively, NCFI has formulated a Fast version for cooler temperatures in the 40-60°F range. Another technique to improve adhesion in studwall assemblies is to apply a cant along the side of the studs before filling in the center of the stud bay.

CODE-COMPLIANT FIRE RESISTANCE:
Building Codes require foam plastic insulation, such as 11-033, be separated from the interior of the building by a 15 minute thermal barrier of ½" gypsum board or other approved material. Refer to specific building codes for details. 11-033 has passed testing with the DC315 intumescent coating in lieu of the thermal barrier. When covering with DC315, the maximum foam thickness in walls is 5.5 inches and in roof/ceiling assemblies the maximum foam thickness is 9.5 inches. The DC315 is applied at 14 mils wet film thickness, or 1 gallon per 115 square feet.

ATTICS and CRAWL SPACES
11-033 has passed testing for application in limited access attics and crawl spaces without the code prescribed ignition barrier covering. The foam thickness can be up to 8" on wall cavities and 10" in ceiling cavities.

BACTERIA AND FUNGUS RESISTANCE:
11-033 is naturally able to inhibit the growth of bacteria and fungus (mold) per the ASTM C1338. The anti-microbial properties do not protect occupants of spaces insulated with 11-033 from potential deleterious effects of molds, mold spores, or disease organisms that may be present in the environment.

OTHER APPLICATION AND SAFETY CONSIDERATIONS:
Before 11-033 is to be applied, there are many safety and application situations to consider. All spray foam applicators must evaluate the job prior to beginning the spray foam application. It is impossible to anticipate every issue and provide explicit guidance in this product data sheet. If there is a question regarding some aspect of the planned application, consult with NCFI for more guidance. The NCFI Product Stewardship Manual contains additional information and should be reviewed often enough by all spray foam applicators to remain familiar with the contents. The American Chemistry Council (ACC), the Center for Polyurethanes Industry (CPI) and the Spray Polyurethane Foam Alliance (SPFA) also publish information regarding the safe handling and application of spray foam chemicals. If there are any questions regarding the application of the 11-033 system, contact an NCFI representative.

VENTILATION OF SPRAY AREA:
Spraying foam will generate a mist and fumes with a distinct odor. For interior applications the building area must be vented with fresh air to dissipate the odor. The amount of air flow and time for venting will vary based on each situation. A closed attic area may require fans to force air into and out of the space. An open building that does not have the doors and windows installed may have sufficient air flow to vent the odor fairly quickly. Reentry time for closed-in areas being vented with fans is typically about 24 hours. Other workers should remain out of the immediate area during this venting time period.

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