TRYMER® 2500 - SERVICE TEMPERATURES BELOW -297°F

POLYISOCYANURATE FOAM INSULATION

DATA SHEET

DESCRIPTION

Trymer® 2500 insulation is a modified polyisocyanurate cellular material supplied in the form of bunstock for fabrication into sheets, pipe, tank and vessel covering and other shapes for a variety of thermal insulation applications. Although similar in physical form to polyurethane insulations, Trymer 2500 has better dimensional stability over a wider range of temperatures. Trymer 2500 has been specifically formulated to provide excellent thermal insulation properties without the use of CFC or HCFC blowing agents.

APPLICATIONS

Trymer 2500 is used extensively in cryogenic industrial applications with a service temperature below -297°F (-183°C). Special care must be given to the design and installation of cryogenic insulation systems to minimize the danger arising from the possible presence of liquid oxygen. Typical applications for Trymer 2500 insulation include:

- Fabricated pipe insulation, including elbows and fittings
- Core material for factory built panelized constructions
- Insulation for shipping containers, trucks or railcars
- Core material for architectural and structural panels
- Pipe, tank and vessel insulation
- Flat or tapered board stock for roof insulation

LOWER TEMPERATURE LIMIT

JM product literature states that the lower service temperature recommendation for Trymer PIR pipe insulation is -297°F (-183°C), which is the boiling point of oxygen. Trymer PIR pipe insulation does not have any inherent physical or thermal properties that would prevent its use at temperatures below this published limit. This -297°F limit is cited only as an attempt to caution end-users that there are significant additional design concerns when dealing with service temperatures this cold. The design concerns center on the fact that at service temperatures below -297°F, oxygen from the air can begin to condense on the cold pipe surface or in the cells of the insulation near the pipe resulting in local regions of higher liquid oxygen concentration. Also, if the pipe subsequently warms above -297°F, there could be a thin region of air within the insulation system with higher than normal levels of oxygen. Either situation poses a flammability and reactivity concern regardless of the type of insulation, sealant, vapor retarder, or jacket used.

SIZE

Height: 24" (61 cm)
Width: 48" (122 cm)
Length: 36" (91cm)
Custom lengths are also available. Contact your local JM representative for details.

AVAILABILITY

Trymer 2500 insulation is distributed through JM's extensive Authorized Fabricator Network.

DESIGN CONSIDERATIONS

A qualified and experienced design engineer should be consulted when designing cryogenic insulation systems. Furthermore, the quality of the workmanship assumes greater importance when dealing with the vapor drives that will be present when operating at these very cold temperatures. It is generally prudent to employ contractors who are experienced in multi-layer cryogenic insulation systems.

Key aspects of the insulation system design for cryogenic applications include multiple insulation layers, joint staggering, use of redundant very high quality and low permeance vapor retarders, joint sealants, vapor stops, contraction joints, suitable protective jacketing, and particular attention paid to design and installation details.

- JM recommends using a multiple layer insulation system whenever the total insulation thickness is greater than 2.5" or where the service temperature is below 0°F. This will create a more tortuous path for the water/water vapor to get to the pipe and will allow the inner layer of the insulation system to expand/contract.
- Anytime metal jacketing is used, it is recommend to specify to include a 3-mil polyfilm moisture retarder that is heat laminated to the interior surface of the jacket to help reduce the potential for corrosion of the interior surface of the jacket.
- The long-term success of this system will be very dependent on the quality and continuity of the vapor retarder used. This protects the system from water/water vapor intrusion. The vapor retarder must be continuous throughout the entire insulation system.

* Click here for the Trymer 2500 in non-Cryogenic applications data sheet

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INSTALLATION

Trymer 2500 insulation is easy to fabricate into various sizes and shapes to meet specific design needs. However, because of the critical technical design aspects of many of its applications, JM recommends that qualified designers or consultants design the total system.

PHYSICAL PROPERTIES

Like all cellular plastics, this product will degrade upon prolonged exposure to sunlight. A covering to block ultraviolet radiation must be used to prevent this degradation. Other coverings to protect the insulation from the elements and to meet applicable fire regulations may also be required. Consultation with local building code officials, design engineers/specifiers or insurance personnel is recommended before application.

ENVIRONMENTAL DATA

Trymer 2500 insulation is specifically formulated to provide excellent thermal insulation properties without the use of chlorofluorocarbon (CFC) or hydrochlorofluorocarbon (HCFC) blowing agents. In compliance with the Montreal Protocol and the Clean Air Act, Trymer 2500 insulation is manufactured with hydrocarbon blowing agents, which have no ozone depletion potential.

SAFETY CONSIDERATIONS

Trymer 2500 insulation requires care in handling. All persons working with this material must know and follow the proper handling procedures. The current Safety Data Sheet (SDS) and General Handling Recommendations for Trymer contain information on the safe handling, storage and use of this material, and can be found at www.JM.com.

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PHYSICAL PROPERTIES OF TRYMER 2500 (1,2)

ASTM C591, Grade 2, Type II	Complies		
Density, ASTM D1622(3)	2.5 lb/ft³ (40.0 kg/m³)		
Compressive Strength, ASTM D1621	39 lb/in² (268 kPa) parallel to rise 30 lb/in² (206 kPa) perpendicular to rise - width 40 lb/in² (275 kPa) perpendicular to rise - length		
Compressive Modulus, ASTM D1621	790 lb/in² (5446 kPa) parallel to rise 490 lb/in² (3377 kPa) perpendicular to rise - width 1000 lb/in² (6894 kPa) perpendicular to rise - length		
Shear Strength, ASTM C273	17 lb/in² (117 kPa) parallel and perpendicular avg.		
Shear Modulus, ASTM C273	285 lb/in² (1967 kPa) parallel and perpendicular avg.		
Tensile Strength, ASTM D1623	35 lb/in² (241 kPa) parallel to rise - thickness		
Flexural Strength, ASTM C203	42 lb/in² (289 kPa) parallel to rise		
Flexural Modulus, ASTM C203	780 lb/in² (5377 kPa) parallel to rise		
Closed cell Content, ASTM D6226	95%		
R-value per Inch, ASTM C518, @75°F (24°C) mean temp, Aged 180 Days (4)	5.3 hr•ft² •°F/Btu 0.93 m² •°C/W		
Water Absorption, ASTM C272	<0.7% by vol. after 24-hour immersion		
Water Vapor Permeability, ASTM E96	3 perm-inches (4.6 ng/Pa•s•m)		
Dimensional Stability(5), ASTM D2126 (%Change)		Length	Volume
	At -40°F (-40°C), 7 days	-0.1%	-0.2%
	At -10°F (-23°C), 7 days	0.1%	0.1%
	At 158°F (70°C), 7 days	0.4%	0.6%
	At 158°F (70°C), 97% R.H. 7 days	1.5%	3.0%
	At 300°F (149°C), 97% R.H. 7 days	2.6%	3.6%
Service Temperature (6,7)	Up to 300°F (Up to 149°C)		
Surface Burning Characteristics, ASTM E84	≤ 25 Flame Spread ≤ 450 Smoke Developed (up to 4" thickness)		
Color	Tan		

(1) All properties are measured at 74° (23°C), unless otherwise indicated.
(2) Unless otherwise indicated, data shown are typical values obtained from representative production samples. This data may be used as a guide for design purposes but should not be construed as specifications. For property ranges and specifications, consult your JM representative.
(3) Average value through insulation cross section
(4) R means resistance to heat flow. The higher the R-value, the greater the insulating power.
(5) Frequent and severe thermal cycling can produce dimensional changes significantly greater than those stated here. Special design consideration must be made in systems that cycle frequently.
(6) Above 300°F, discoloration and charring will occur, resulting in an increased k-factor in the discolored area.
(7) Trymer PIR can be used at temperatures below this but certain system design precautions may be necessary. Please consult JM for more information.

THERMAL PROPERTIES OF TRYMER 2500

	Temperature (°F)	Btu-in/h-ft²-F	Temperature (°C)	W/m°C
ASTM C177	-200	0.13	-129	0.019
	-150	0.15	-101	0.022
	-100	0.17	-73	0.025
	-50	0.19	-46	0.027
	0	0.19	-18	0.027
	50	0.18	10	0.026
ASTM C518	75	0.19	24	0.027

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