Johns Manville
A Berkshire Hathaway Company

TRYMER® PIR

DATA SHEET LIBRARY

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DESCRIPTION

Trymer® 1800 insulation is a polyurethane modified polyisocyanurate cellular material. The rigid insulation is supplied in the form of bunstock for fabrication into sheets, pipe shells, tank and vessel coverings, and other shapes for a variety of thermal insulation applications. Trymer 1800 insulation features improved dimensional stability over a wider range of temperatures than standard polyurethane insulation. Trymer insulation is not a known nutrient source for mold and mildew.

APPLICATIONS

Trymer 1800 insulation is used extensively in industrial and commercial applications with moderate density/strength requirements, within the service temperature range* of -297°F to +300°F (-183°C to +149°C). Typical applications for Trymer 1800 insulation include:

- Fabricated pipe insulation, including elbows and fittings
- Core material for factory built panelized constructions
- Insulation for containers, trucks or railcars
- Core material for architectural and structural panels
- Tank and vessel insulation

*Trymer PIR can be used at temperatures below -297°F but certain system design precautions may be necessary. Please consult JM for more information.

SIZE

Height: 24" (41cm)
Width: 48" (122 cm)
Length: 36" (91cm)
96" (244 cm)

Custom lengths are also available. Contact your local JM representative for details.

ENVIRONMENTAL DATA

Trymer 1800 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 1800 insulation is manufactured with hydrocarbon blowing agents, which have no ozone depletion potential.

AVAILABILITY

Trymer 1800 insulation is distributed through JM's extensive Authorized Fabricator Network.

PHYSICAL PROPERTIES

Trymer 1800 insulation exhibits the properties and characteristics indicated in Table 1 when tested as represented. Consultation with local building code officials, and design engineers/specifiers is recommended before application. 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.

INSTALLATION

Trymer 1800 insulation is easy to fabricate into various 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.

SAFETY CONSIDERATIONS

Trymer 1800 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.

PHYSICAL PROPERTIES OF TRYMER 1800 (1,2)

ASTM C591, Grade 2, Type I	Complies		
Density, ASTM D1622 [3]	1.8 lb/ft^3 (28.8 kg/m^3)		
Compressive Strength, ASTM D1621	25 lb/in^2 (172 kPa) parallel to rise 21 lb/in^2 (144 kPa) perpendicular to rise - width 29 lb/in^2 (200 kPa) perpendicular to rise - length		
Compressive Modulus, ASTM D1621	600 lb/in^2 (4136 kPa) parallel to rise 450 lb/in^2 (3278 kPa) perpendicular to rise - width 600 lb/in^2 (4136 kPa) perpendicular to rise - length		
Shear Strength, ASTM C273	13 lb/in^2 (90 kPa) parallel and perpendicular avg.		
Shear Modulus, ASTM C273	200 lb/in^2 (1379 kPa) parallel and perpendicular avg.		
Tensile Strength, ASTM D1623	20 lb/in^2 (138 kPa) parallel to rise - thickness		
Flexural Strength, ASTM C203	30 lb/in^2 (207 kPa) parallel to rise		
Flexural Modulus, ASTM C203	700 lb/in^2 (4826 kPa) parallel to rise		
Closed cell Content, ASTM D6226	95%		
k-Factor, ASTM C518, @75°F (24°C) mean temp Aged 180 Days[4]	0.19 Btu•in/hr•ft2•°F 0.027 W/m°C		
R-value per Inch, ASTM C518, @75°F (24°C) mean temp Aged 180 Days[4]	5.3 hr•ft^2 •°F/Btu 0.93 m^2 •°C/W		
Water Absorption, ASTM C272	<0.7% by vol. after 24-hour immersion		
Water Vapor Permeability, ASTM E96	4 perm-inches (5.8 ng/Pa•s•m)		
Dimensional Stability[(5)], ASTM D2126 (%Change)		Length	Volume
	At -40°F (-40°C), 7 days	-0.5%	-1.0%
	At -10°F (-23°C), 7 days	0.2%	0.5%
	At 158°F (70°C), 7 days	1.5%	3.0%
	At 158°F (70°C), 97% R.H. 7 days	2.5%	3.5%
	At 300°F (149°C), 97% R.H. 7 days	4.5%	5.0%
Service Temperature [(6,7)]	-297°F to 300°F (-183°C to 149°C)		
Surface Burning Characteristics, ASTM E84	≤ 25 Flame Spread ≤ 450 Smoke Developed (up to 6" thickness)		
Color	Light Gray		

(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 Insulation Systems for more information.

(8) This numerical flame spread data is not intended to reflect hazards presented by this or any other material under actual fire conditions

Johns Manville

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DESCRIPTION

Trymer® 2000XP insulation is a closed-cell insulation that features improved dimensional stability over a wider range of temperatures than standard polyurethane insulation. Trymer 2000XP insulation is polyurethane modified polyisocyanurate (PIR) cellular plastic. The rigid insulation is supplied in the form of bunstock for fabrication into sheets, pipe shells, tank and vessel coverings, and other shapes for a variety of thermal insulation applications. Trymer insulation is not a known nutrient source for mold and mildew..

APPLICATIONS

Trymer 2000XP insulation is suitable for applications that require a Flame Spread Index of 25 or less and a Smoke Developed Index of 450 or less when tested as per ASTM E84. These are typical requirements for pipe insulation located in non-plenum locations so Trymer 2000XP Insulation is particularly ideal for use as pipe insulation in the non-plenum areas of commercial buildings. For pipe insulation up to 1.5" located inside plenums of commercial buildings, JM recommends the use of our Trymer 25-50 PIR Insulation. Trymer 2000XP can be used within the service temperature range* of -297°F to 300°F (-183°C to 149°C). Typical applications for Trymer 2000XP insulation include:

- Industrial pipe insulation, including elbows and fittings
- Core material for architectural and structural panels
- Core material for factory built panelized constructions
- Insulation for shipping containers, trucks or railcars
- Commercial chilled water insulation
- Tank and vessel insulation
- Flat or tapered board stock for roof insulation

SIZE

Height: 24" (61 cm)
Width: 48" (122 cm)
Length: 36" (91cm)
96" (244 cm)
108" (274 cm)
Custom lengths are also available. Contact your local JM representative for details.

AVAILABILITY

Trymer 2000XP insulation is distributed through JM's extensive Authorized Fabricator Network.

PHYSICAL/CHEMICAL PROPERTIES

Trymer 2000XP insulation exhibits the properties and characteristics indicated in Table 1 when tested as represented. Consultation with local code officials and design engineers/ specifiers is recommended before application. As with all cellular polymers, Trymer 2000XP insulation will degrade upon prolonged exposure to sunlight. A covering to block ultra-violet radiation must be used to help prevent degradation. Other coverings to protect the insulation from the elements may be required.

ENVIRONMENTAL DATA

Trymer 2000XP 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 2000XP insulation is manufactured with hydrocarbon blowing agents, which have no ozone depletion potential.

SAFETY CONSIDERATIONS

Trymer 2000XP 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.

INSTALLATION

Trymer 2000XP insulation is specifically formulated for easy fabrication into many shapes, such as pipe coverings, valve and fitting covers, and others to meet specific design needs. Because of the critical technical design aspects in many applications, JM recommends contacting qualified designers to specify the total system.

TRYMER® 2000XP

POLYISOCYANURATE FOAM INSULATION

DATA SHEET

PHYSICAL PROPERTIES OF TRYMER 2000XP [1,2,3]

ASTM C591, Grade 2, Type IV	Complies		
Density, ASTM D1622	2.05 lb/ft^3 (32.8 kg/m^3)		
Compressive Strength, ASTM D1621	25 lb/in^2 (172 kPa) parallel to rise 24 lb/in^2 (165 kPa) perpendicular to rise - width 30 lb/in^2 (207 kPa) perpendicular to rise - length		
Compressive Modulus, ASTM D1621	650 lb/in^2 (4481 kPa) parallel to rise 475 lb/in^2 (3275 kPa) perpendicular to rise - width 600 lb/in^2 (4137 kPa) perpendicular to rise - length		
Shear Strength, ASTM C273	15 lb/in^2 (104 kPa) parallel and perpendicular avg.		
Shear Modulus, ASTM C273	250 lb/in^2 (1725 kPa) parallel and perpendicular avg.		
Tensile Strength, ASTM D1623	20 lb/in^2 (138 kPa) parallel to rise - thickness		
Flexural Strength, ASTM C203	33 lb/in^2 (228 kPa) parallel to rise		
Flexural Modulus, ASTM C203	720 lb/in^2 (4968 kPa) parallel to rise		
Closed cell Content, ASTM D6226	90%		
Water Absorption, ASTM C272	<0.7% by vol. after 24-hour immersion		
Water Vapor Permeability, ASTM E96	4 perm-inches (5.8 ng/Pa•s•m)		
Dimensional Stability[5], ASTM D2126 (%Change)		Length	Volume
	At -40°F (-40°C), 7 days	0.4%	0.6%
	At -10°F (-23°C), 7 days	0.2%	0.2%
	At 158°F (70°C), 7 days	1.5%	3.0%
	At 158°F (70°C), 97% R.H. 7 days	1.6%	3.4%
	At 300°F (149°C), 97% R.H. 7 days	2.7%	4.5%
Service Temperature [6,7]	-297°F to 300°F (-183°Cto 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) Trymer PIR complies with the ASTM C591 material specification. Contact JM for details on actual tested results.
(4) Frequent, severe thermal cycling can produce dimensional changes significantly greater than those stated here. Special design consideration must be made in systems that cycle frequently.
(5) Above 300°F, discoloration and charring will occur, resulting in an increased k-factor in the discolored area.
(6) Trymer PIR can be used at temperatures below -297°F but certain system design precautions may be necessary. Please consult JM for more information.
(7) This numerical flame spread data is not intended to reflect hazards presented by this or any other material under actual fire conditions.

THERMAL PROPERTIES OF TRYMER 2000XP

	Temperature (°F)	Btu-in/h-ft^2-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

Johns Manville

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JM.com

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 industrial and commercial applications within the service temperature range of -297°F to +300°F (-183°C to +149°C). Because of the critical technical design aspects of many of these applications, qualified designers or consultants should design the total system. JM can provide general guidelines and recommendations on many typical applications for Trymer 2500. 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

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.

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.

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

TRYMER® 2500

POLYISOCYANURATE FOAM INSULATION

DATA SHEET

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)	-297°F to 300°F (-183°C 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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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 Cryogenic applications data sheet.

TRYMER® 2500 - SERVICE TEMPERATURES BELOW -297°F

POLYISOCYANURATE FOAM INSULATION

DATA SHEET

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.

TRYMER® 2500 - SERVICE TEMPERATURES BELOW -297°F

POLYISOCYANURATE FOAM INSULATION

DATA SHEET

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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07/18/24 (Replaces 09/18/23)

TRYMER® 3000

POLYISOCYANURATE FOAM INSULATION

DESCRIPTION

Trymer® 3000 insulation is a polyurethane modified polyisocyanurate cellular material. The rigid insulation is supplied in the form of bunstock for fabrication into sheets, pipe shells, tank and vessel coverings, and other shapes for a variety of thermal insulation applications. Trymer 3000 insulation features improved dimensional stability over a wider range of temperatures than standard polyurethane insulation. Trymer insulation is not a known nutrient source for mold and mildew.

APPLICATIONS

Trymer 3000 insulation is used extensively in industrial and commercial applications with moderate density/strength requirements, within the service temperature range* of -297°F to +300°F (-183°C to +149°C). Typical applications for Trymer 3000 insulation include:

- Fabricated pipe insulation, including elbows and fittings
- Core material for factory built panelized constructions
- Cryogenic system insulation, such as liquefied natural gas (LNG)
- Core material for architectural and structural panels
- Tank and vessel insulation

* Trymer PIR can be used at temperatures below -297°F but certain system design precautions may be necessary. Please consult JM for more information

SIZE

Height: 18" (61 cm)
Width: 48" (122 cm)
Length: 36" (91cm)
Custom lengths are also available. Contact your local JM representative for details.

AVAILABILITY

Trymer 3000 insulation is distributed through JM's extensive Authorized Fabricator Network.

INSTALLATION

Trymer 3000 insulation is easy to fabricate into various shapes, such as pipe coverings, valve and fitting covers, 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

Trymer 3000 insulation exhibits the properties and characteristics indicated in Table 1 when tested as represented. Consultation with local building code officials, and design engineers/specifiers is recommended before application. 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.

ENVIRONMENTAL DATA

Trymer 3000 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 3000 insulation is manufactured with hydrocarbon blowing agents, which have no ozone depletion potential.

SAFETY CONSIDERATIONS

Trymer 3000 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.

01/25/21 (Replaces T3000-05/18/20)

TRYMER®3000

POLYISOCYANURATE FOAM INSULATION

PHYSICAL PROPERTIES OF TRYMER 3000 (1,2)

ASTM C591, Grade 2, Type III	Complies		
Density, ASTM D1622(3)	3 lb/ft³ (48.0 kg/m³)		
Compressive Strength, ASTM D1621	65 lb/in² (450 kPa) parallel to rise 45 lb/in² (310 kPa) perpendicular to rise - width 55 lb/in² (380 kPa) perpendicular to rise - length		
Compressive Modulus, ASTM D1621	1200 lb/in² (8270 kPa) parallel to rise 800 lb/in² (5500 kPa) perpendicular to rise - width 1200 lb/in² (8270 kPa) perpendicular to rise - length		
Shear Strength, ASTM C273	25 lb/in² (172 kPa) parallel and perpendicular avg.		
Shear Modulus, ASTM C273	375 lb/in² (2600 kPa) parallel and perpendicular avg.		
Tensile Strength, ASTM D1623	40 lb/in² (275 kPa) parallel to rise - thickness		
Flexural Strength, ASTM C203	60 lb/in² (413 kPa) parallel to rise		
Flexural Modulus, ASTM C203	1230 lb/in² (8480 kPa) parallel to rise		
Closed cell Content, ASTM D6226	95%		
k-Factor, ASTM C518, @75°F (24°C) mean temp, Aged 180 Days	0.19 Btu•in/hr•ft²•°F 0.027 W/m°C		
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	0.2%	0.2%
	At 158°F (70°C), 7 days	1.5%	3.0%
	At 158°F (70°C), 97% R.H. 7 days	1.0%	2.4%
	At 300°F (149°C), 97% R.H. 7 days	1.4%	2.0%
Service Temperature (6,7)	-297°F to 300°F (-183°C to 149°C)		
Surface Burning Characteristics, ASTM E84 (8)	≤ 25 Flame Spread ≤ 450 Smoke Developed (up to 6" 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.

(8) This numerical flame spread data is not intended to reflect hazards presented by this or any other material under actual fire conditions.

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01/25/21 (Replaces T3000-05/18/20)

TRYMER® 4000
POLYISOCYANURATE FOAM INSULATION

DESCRIPTION
Trymer® 4000 insulation is a polyurethane modified polyisocyanurate cellular material. The rigid insulation is supplied in the of bunstock for fabrication into sheets, pipe shells, tank and vessel coverings, and other shapes for a variety of thermal insulation applications. Trymer 4000 insulation features improved dimensional stability over a wider range of temperatures than standard polyurethane insulation. Trymer insulation is not a known nutrient source for mold and mildew.

APPLICATIONS
Trymer 4000 insulation is used extensively in industrial and commercial applications with moderate density/strength requirements, within the service temperature range* of -297°F to +300°F (-183°C to +149°C). Typical applications for Trymer 4000 insulation include:

- Fabricated pipe insulation, including elbows and fittings
- Core material for factory built panelized constructions
- Pipe hangers, saddles and supports
- Core material for architectural and structural panels
- Tank and vessel insulation

* Trymer PIR can be used at temperatures below -297°F but certain system design precautions may be necessary. Please consult JM for more information

SIZE
Height: 16" (41 cm)
Width: 48" (122 cm)
Length: 36" (91cm)
96" (244cm)
Custom lengths are also available. Contact your local JM representative for details.

AVAILABILITY
Trymer 4000 insulation is distributed through JM's extensive Authorized Fabricator Network.

INSTALLATION
Trymer 4000 insulation is easy to fabricate into various 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
Trymer 4000 insulation exhibits the properties and characteristics indicated in Table 1 when tested as represented. Consultation with local building code officials, and design engineers/specifiers is recommended before application. 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.

ENVIRONMENTAL DATA
Trymer 4000 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 4000 insulation is manufactured with hydrocarbon blowing agents, which have no ozone depletion potential..

SAFETY CONSIDERATIONS
Trymer 4000 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.

05/18/20 (Replaces T4000-05/07/20)

PHYSICAL PROPERTIES OF TRYMER 4000 (1,2)

ASTM C591, Grade 2, Type V	Complies		
Density, ASTM D1622(3)	4 lb/ft³ (64.0 kg/m³)		
Compressive Strength, ASTM D1621	95 lb/in² (655 kPa) parallel to rise 80 lb/in² (550 kPa) perpendicular to rise - width 100 lb/in² (690 kPa) perpendicular to rise - length		
Compressive Modulus, ASTM D1621	2100 lb/in² (14470 kPa) parallel to rise 1800 lb/in² (12400 kPa) perpendicular to rise - width 2600 lb/in² (17900 kPa) perpendicular to rise - length		
Shear Strength, ASTM C273	42 lb/in² (290 kPa) parallel and perpendicular avg.		
Shear Modulus, ASTM C273	650 lb/in² (4480 kPa) parallel and perpendicular avg.		
Tensile Strength, ASTM D1623	60 lb/in² (413 kPa) parallel to rise - thickness		
Flexural Strength, ASTM C203	150 lb/in² (1030 kPa) parallel to rise		
Flexural Modulus, ASTM C203	3850 lb/in² (26540 kPa) parallel to rise		
Closed cell Content, ASTM D6226	95%		
k-Factor, ASTM C518, @75°F (24°C) mean temp, Aged 180 Days	0.19 Btu•in/hr•ft²•°F 0.027 W/m°C		
R-value per Inch, ASTM C578, @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	2.9 perms-inch (4.4 ng/Pa•s•m)		
Dimensional Stability(5), ASTM D2126 (%Change)		Length	Volume
	At -40°F (-40°C), 7 days	-0.4%	-0.9%
	At -10°F (-23°C), 7 days	-1.6%	-2.0%
	At 158°F (70°C), 7 days	1.0%	2.0%
	At 158°F (70°C), 97% R.H. 7 days	-1.5%	-1.5%
	At 300°F (149°C), 97% R.H. 7 days	-1.3%	-1.1%
Service Temperature (6,7)	-297°F to 300°F (-183°C to 149°C)		
Surface Burning Characteristics, ASTM E84 (8)	≤ 25 Flame Spread ≤ 450 Smoke Developed (up to 6" 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.

(8) This numerical flame spread data is not intended to reflect hazards presented by this or any other material under actual fire conditions.

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05/18/20 (Replaces T4000-05/07/20)

TRYMER® 6000
POLYISOCYANURATE FOAM INSULATION

DESCRIPTION
Trymer® 6000 insulation is a polyurethane modified polyisocyanurate cellular material. The rigid insulation is supplied in the of bunstock for fabrication into sheets, pipe shells, tank and vessel coverings, and other shapes for a variety of thermal insulation applications. Trymer 6000 insulation features improved dimensional stability over a wider range of temperatures than standard polyurethane insulation. Trymer insulation is not a known nutrient source for mold and mildew.

APPLICATIONS
Trymer 6000 insulation is used extensively in industrial and commercial applications with moderate density/strength requirements, within the service temperature range* of -297°F to +300°F (-183°C to +149°C). Typical applications for Trymer 6000 insulation include:

- Fabricated pipe insulation, including elbows and fittings
- Core material for factory built panelized constructions
- Pipe hangers, saddles and supports
- Core material for architectural and structural panels
- Tank and vessel insulation

* Trymer PIR can be used at temperatures below -297°F but certain system design precautions may be necessary. Please consult JM for more information

SIZE
Height: 12" (31 cm)
Width: 48" (122 cm)
Length: 36" (91cm)
96" (244cm)
Custom lengths are also available. Contact your local JM representative for details.

AVAILABILITY
Trymer 6000 insulation is distributed through JM's extensive Authorized Fabricator Network.

INSTALLATION
Trymer 6000 insulation is easy to fabricate into various 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
Trymer 6000 insulation exhibits the properties and characteristics indicated in Table 1 when tested as represented. Consultation with local building code officials, and design engineers/specifiers is recommended before application. Like all cellular polymers, 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 may be required.

ENVIRONMENTAL DATA
Trymer 6000 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 6000 insulation is manufactured with hydrocarbon blowing agents, which have no ozone depletion potential.

SAFETY CONSIDERATIONS
Trymer 6000 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.

05/18/20 (Replaces T6000-05/07/20)

TRYMER®6000

POLYISOCYANURATE FOAM INSULATION

PHYSICAL PROPERTIES OF TRYMER 6000 (1,2)

ASTM C591, Grade 2, Type VI	Complies		
Density, ASTM D1622(3)	6 lb/ft³ (96.0 kg/m³)		
Compressive Strength, ASTM D1621	140 lb/in² (970 kPa) parallel to rise 130 lb/in² (900 kPa) perpendicular to rise - width 130 lb/in² (900 kPa) perpendicular to rise - length		
Compressive Modulus, ASTM D1621	3100 lb/in² (21400 kPa) parallel to rise 2800 lb/in² (19300 kPa) perpendicular to rise - width 2800 lb/in² (19300 kPa) perpendicular to rise - length		
Shear Strength, ASTM C273	80 lb/in² (550 kPa) parallel and perpendicular avg.		
Shear Modulus, ASTM C273	800 lb/in² (5500 kPa) parallel and perpendicular avg.		
Tensile Strength, ASTM D1623	95 lb/in² (654 kPa) parallel to rise - thickness		
Flexural Strength, ASTM C203	160 lb/in² (1100 kPa) parallel to rise		
Flexural Modulus, ASTM C203	5800 lb/in² (40000 kPa) parallel to rise		
Closed cell Content, ASTM D6226	95%		
k-Factor, ASTM C518, @75°F (24°C) mean temp, Aged 180 Days	0.20 Btu•in/hr•ft²•°F 0.029 W/m°C		
R-value per Inch, ASTM C578, @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	1.1 perms-inch (1.6 ng/Pa•s•m)		
Dimensional Stability(5), ASTM D2126 (%Change)		Length	Volume
	At -40°F (-40°C), 7 days	-0.3%	-0.1%
	At -10°F (-23°C), 7 days	-0.2%	-0.7%
	At 158°F (70°C), 7 days	1.0%	0.5%
	At 158°F (70°C), 97% R.H. 7 days	0.4%	0.7%
	At 300°F (149°C), 97% R.H. 7 days	-0.4%	-1.0%
Service Temperature (6,7)	-297°F to 300°F (-183°C to 149°C)		
Surface Burning Characteristics, ASTM E84 (8)	≤ 25 Flame Spread ≤ 450 Smoke Developed (up to 6" 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.

(8) This numerical flame spread data is not intended to reflect hazards presented by this or any other material under actual fire conditions.

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Technical specifications as shown in this literature are intended to be used as general guidelines only. Please refer to the Safety Data Sheet and product label prior to using this product. The physical and chemical properties of the products listed herein represent typical, average values obtained in accordance with accepted test methods and are subject to normal manufacturing variations. They are supplied as a technical service and are subject to change without notice. Any references to numerical flame spread or smoke developed ratings are not intended to reflect hazards presented by these or any other materials under actual fire conditions. Check with the Regional Sales Office nearest you for current information.

All Johns Manville products are sold subject to Johns Manville's standard Terms and Conditions, which includes a Limited Warranty and Limitation of Remedy. For a copy of the Johns Manville standard Terms and Conditions or for information on other Johns Manville thermal insulation and systems, visit www.jm.com/terms-conditions or call (800) 654-3103.

04/14/25