

ISO-C1/4.0 Polyisocyanurate Insulation

4.0 lb/ft³ (64 kg/m³) density

ISO-C1/4.0 is Dyplast Products' 4.0 lb/ft³ polyisocyanurate rigid, closed cell, foam insulation. ISO-C1/4.0 is certified by independent laboratory to meet demanding Class 1 flame spread and smoke development requirements per ASTM E84. ISO-C1/4.0 is ideally suited for low temperature piping and refrigeration applications where added compressive, shear, flexural, or tensile strength beyond that available in 3.0 lb/ft³ polyiso is appropriate. Dyplast Products offers ISO-C1/4.0 as variable-sized bunstock or as sheets and blocks with tolerances to ¹/₃₂ inch. Our extensive network of fabricators can provide special shapes for pipe, fittings, vessels, or other mechanical applications.

Polyisocyanurate exhibits the highest R-factor (insulating value) to thickness ratio of commercially available insulation, and our ISO-C1 product line provides higher R-factors and reduced thermal aging at lower temperatures. Ideal for low-temperature and cryogenic applications, ISO-C1 offers superior performance when compared to polystyrene, polyurethane, phenolic, fiberglass, and cellular glass alternatives. Our ISO-C1 product line is also available in 2, 2.5, 3, and 6 lb/ft³ densities, which each provide successively improved strength and other attributes for physically demanding applications.

APPLICATIONS

ISO-C1/4.0 is designed for use where temperatures range from -297F to +300F, making ideal for refrigeration and freezers, commercial HVAC and chill water systems, cryogenic processes such as LNG and LOX, panel insulation for transportation containers, duct and air plenum insulation, and core material for architectural and panel construction.

SURFACE BURNING CHARACTERISTICS

The International Mechanical Code defines Class 1 insulation as meeting the 25/450 flame spread/smoke development rating. ISO-C1/4.0 performs well within this range with a 25/300 rating. When comparing surface burning characteristics of alternative products, care must be taken to consider the installed insulation system as a whole, including sprinkler systems. For example, a well-designed ISO-C1 insulation system can improve overall fire/smoke performance of the polyiso insulation. On the other hand, an alternative insulation's fire/smoke ratings may be compromised by the sealants or jacketing often recommended by suppliers. There is also the matter of insulation system integrity during a fire. ISO-C1/4.0 may be charred by flame, but maintains its integrity and continues to protect the insulated system.

NOTE TO ENGINEERS AND CONTRACTORS

Visit www.dyplastproducts.com for easily accessible information on specifications in CSI format as well as installation, MSDS, and other safety information. Relevant documents are retrievable within two clicks from our home page.

Dyplast Products is the preeminent manufacturer of polyisocyanurate and expanded polystyrene rigid foam products, and also distributes a variety of complementary products. With new world-class production facilities in Miami, Florida, Dyplast Products offers its customers unsurpassed technology, responsiveness, wide-ranging product configurations, and state-of-the-art quality control. Our customer-focused staff, combined with our sound financial footing, ensure we deliver incomparable value to our customers far into the future. **For information on Dyplast Products or additional technical data on this product, visit our website at www.dyplastproducts.com.**

WATER ABSORPTION

Water absorption by insulation can degrade thermal insulating performance. ISO-C1/4.0's extraordinary resistance to water absorption (<0.1%) helps ensure long-term thermal performance remains superior to polystyrenes, phenolic foams, fiberglass, and even cellular glass - - which for example has water absorption of 0.2% (per manufacturer data), as well as considerably lower insulating value. Proper installation of vapor barriers can further improve performance of the complete ISO-C1/4.0 insulating system.

THERMAL EFFICIENCY

With its high R-factor, ISO-C1/4.0 can achieve the same insulating value with as little as half the thickness required by alternative insulating materials. Less insulation leads to thinner walls, more space, and fewer and tighter energy-losing seams - - further enhanced by the availability of larger pieces (for example, 24-foot lengths). Less insulation in mechanical applications also equates to reduced quantities of expensive vapor retarders, jackets, and mastics. The lighter weight of ISO-C1/4.0 compared to cellular glass (roughly one-third) reduces structural support requirements.

LONG TERM R-FACTOR

High thermal insulation efficiency is achieved by infusing cells with gases having low thermal conductivity. All such rigid foam insulation (including polyurethane, extruded polystyrene, and polyisocyanurate) thus lose a small amount of their insulating value over time as air displaces insulating gases. Our ISO-C1 line's smaller, stronger cell structure and our proprietary cell-gas formulation work together to impede gas transfer across cell boundaries, thus reducing loss of thermal efficiency. At a testpoint of 75F, the average R-factor of ISO-C1 over a 15 year period is comparable to the six-month "aged" R-factor. It is important to note that ISO-C1's service temperatures is normally well below 75F, and that thermal aging is reduced considerably at lower operating temperatures. Thicker insulation, vapor barriers, and metal constraints also limit gas diffusion. Existing Long Term Thermal Resistance calculation standards are not accurate for ISO-C1 bunstock, particularly as-installed in low temperature applications.

Physical Properties ¹	ASTM Method	English Units ²	Metric Units ²
Density ³	D 1622	4.0 lb/ft ³	64.2 kg/m ³
Compressive Strength ³	D 1621		
Parallel to Rise		82 lb/in ²	564 kPa
Perpendicular to Rise		73 lb/in ²	501 kPa
Shear Strength:	C 273	34.4 lb/in ²	237 kPa
Shear Modulus	C 273	315 lb/in ²	2171 kPa
Tensile Strength:	D 1623	61 lb/in ²	421 kPa
Flexural Strength:	C 203	123 lb/in ²	847 kPa
Flexural Modulus	C 203	2331 lb/in ²	16058 kPa
K-Factor (10-day initial)	C 518	0.15 BTU·in/hr·ft ² ·F	0.022 W/m·C
K-Factor (aged 6 months)	C 518	0.175 BTU·in/hr·ft ² ·F	0.025 W/m·C
R-Factor (@ 1" aged 6 months)	C 518	5.7 hr·ft ² ·F/BTU	1.00 m ² ·C/W
Closed Cell Content	D 2856	>98 %	>98 %
Water Absorption (24-hour immersion)	C 272	<0.1 % by volume	<0.1 % by volume
Water Vapor Transmission	E 96	0.7 perm-inch	1.03 ng/Pa·s·m
Service Temperature ⁴		-297 to +300F	-183 to +149C
Dimensional Stability ⁵	D 2126		
@ -10F (-23C), 7 days:			
Length		<+0.1 % Change	<+0.1 % Change
Volume		<+0.2 % Change	<+0.2 % Change
@ 158F (70C)/97% RH, 7 days:			
Length		<+1.5 % Change	<+1.5 % Change
@ 300F (149C), 7 days:			
Length		<+1.0 % Change	<+1.0 % Change
Volume		<+1.0 % Change	<+1.0 % Change
Surface Burning Characteristics ⁶			
Flame Spread @ 4" (10 cm)	E 84	25	25
Smoke Density @ 4" (10 cm)	E 84	300	300
Hot Surface	C 411	TBD	TBD

1. Physical properties are measured at 70-75F, unless otherwise indicated, and all test values are from independent certified testing laboratories.

2. These are nominal values obtained from representative product samples, and are subject to normal manufacturing variances.

3. Average value through the foam cross section.

4. Above 300F, discoloration and charring will occur, resulting in an increased K-Factor in the discolored area.

5. Frequent and severe thermal cycling can produce dimensional changes significantly greater than those listed here. Special design considerations must be made in systems subject to severe cycling.

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

CONDENSATION

For optimum performance and longevity, insulation systems for low temperature applications must be designed to control condensation. One primary design strategy is to specify high insulation efficiency since if the surface temperature of the insulation system can be maintained above the dewpoint, condensation will not occur. Since a minimal amount of condensation may be acceptable (or unavoidable) in humid environments, a secondary design strategy is to also demand insulation with low water vapor transmission. In this regard, no other insulation alternative offers ISO-C1/4.0's combination of superior R-factor and extremely low water vapor permeance of 0.7 perm-inch.

FEATURES AND BENEFITS

- Fabrication available to virtually any shape/size
- Variable bunstock sizing in 3 dimensions
- Environmentally friendly (Zero-ODP)
- Sheets can be cut to 1/32" tolerance
- Easy to handle, shape in the field
- Excellent Moisture Resistance
- Superior insulating value
- High flexural strength
- Dimensionally stable
- Chemically resistant
- Low life-cycle cost
- Light-weight

THERMAL EFFICIENCY

With its high R-factor, ISO-C1/4.0 can achieve the same insulating value with as little as half the thickness required by alternative insulating materials. Less insulation leads to thinner walls, more space, and fewer and tighter energy-losing seams - further enhanced by the availability of larger pieces (for example, 24-foot lengths). Less insulation in mechanical applications also equates to reduced quantities of expensive vapor retarders, jackets, and mastics. The lighter weight of ISO-C1/4.0 compared to cellular glass (roughly one-third) reduces structural support requirements.

LIMITATIONS AND DISCLAIMER OF WARRANTIES AND LIABILITIES

Characteristics, properties, performance of materials, and application specifications herein described are based on data obtained under controlled conditions. Information is supplied upon the condition that the persons receiving same will make their own determination as to its suitability for their purposes prior to use. Dyplast Products makes no implied warranties of any type, including without limitation, any warrant of merchantability or fitness of purpose. In no event will Dyplast Products be responsible for damages of any nature whatsoever resulting from the use of or reliance upon this information or the product to which information refers. No agent, sales representative, or employee is empowered to change, alter, or amend this provision, unless approved in writing by a duly authorized officer of Dyplast Products.



(800) 433-5551
 info@dyplastproducts.com
 www.dyplastproducts.com
 12501 N.W. 38th Ave.
 Miami, FL 33054