ISO-HT (High Temperature)

ISO-HT Polyisocyanurate Insulation

2.5 lb/ft³ (40 kg/m³) density for High Temperature Applications

ISO-HT is Dyplast Products' 2.5 lb/ft³ polyisocyanurate rigid, closed cell, foam insulation for higher temperature applications up to 400°F (204°C). ISO-HT is suitable for constant temperature or heat cycling environments. ISO-HT is certified by independent laboratory to meet demanding Class 1 flame spread and smoke development requirements per ASTM E84. Dyplast Products offers ISO-HT as bunstock or as sheets and blocks, with tolerances up to 1/32 inch on surfaces. 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 ISO-HT provides higher R-factors and reduced thermal aging at lower temperatures. Ideal for applications over a wide range of temperature, from cryogenic liquids to low-temperature steam (up to 400°F), ISO-HT offers superior performance when compared to polystyrene, polyurethane, phenolic, fiberglass, and cellular glass alternatives. When temperatures are limited to less than 300°F, our ISO-C1 product line is also available in 2, 3, 4, and 6 lb/ft³ densities, which each provide successively improved strength and other attributes for physically demanding applications.

Dyplast's ISO product line is produced as a continuous foam bunstock. For specific standard stock bun sizes contact the sales department or logon to our website for ISO sizing (www.dyplastproducts.com/ISO_bun_ sizing.htm).

APPLICATIONS

ISO-HT is designed for use where temperatures range from -297F to +400F, making it ideal for low-temperature steam applications and refinery liquids, as well as commercial HVAC and chill water systems, cryogenic processes such as LNG and LOX, panel insulation for transportation containers, and core material for architectural and panel construction.

WATER ABSORPTION

Water absorption by insulation can degrade thermal insulating performance. ISO-HT'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-HT insulating system.

NOTE TO ENGINEERS AND CONTRACTORS

Visit www.dyplastproducts.com for easily accessible information on specifications in CSI format as well as 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. With 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.**

SURFACE BURNING CHARACTERISTICS

The International Mechanical Code defines Class 1 insulation as meeting the 25/450 flame spread/smoke development rating. ISO-HT performs well within this range with a 25/160 (at 4") 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-HT insulation system can improve overall flame/smoke performance of the polyiso insulation. On the other hand, an alternative insulation's flame/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-HT may be charred by flame, but maintains its integrity and continues to protect the insulated system.

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. ISO-HT'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-HT over a 15 year period is comparable to the six-month "aged" R-factor. Thicker insulation, vapor barriers, and metal constraints also limit gas diffusion. Current LTTR calculation standards are primarily applicable to "faced" polyiso board, and are not appropriate for ISO-HT bunstock.

INSTALLATION RECOMMENDATIONS

ISO-HT is designed for constant temperature exposure up to 400F. ISO-HT should be installed on pipe at room temperature and installation onto high temperature or live steam lines is discouraged, since this will cause dimensional stability problems. ISO-HT should be used with an appropriate ASJ or Vapor Barrier held in place with SSL tape. The use of ¾ inch filament tape with a 25% overlap is recommended, as is a PVC or Metal Jacket secured with metal banding.

ISO-HT POLYISOCYANURATE INSULATION: (2.5 lb/ft³ density)

Physical Properties[1]		ASTM Method	English Units[2]	Metric Units[2]
Density[3]		D 1622	2.5 lb/ft³	40.1 kg/m³
Compressive Strength[3] (10% deflection)		D 1621		
Parallel to Rise			37 lb/in²	255 kPa
Perpendicular to Rise			31 lb/in²	214 kPa
Compressive Strength (28 day exposure to 400F)		C 273		
Parallel to Rise			18.26 lb/in²	126 kPa
Thermal Conductivity: K-Factor (@ 1" 10-day initial)		C 518	0.15 BTU·in/hr·ft²·F	0.022 W/m·C
Thermal Conductivity: K-Factor (@ 1" aged 6 months @ 75F)		C 518	0.18 BTU·in/hr·ft²·F	0.026 W/m·C
Thermal Conductivity: K-Factor (@ 1" aged 3 months @ 140F)		C 518	Pending	Pending
Closed Cell Content		D 2856	>95 %	>95 %
Water Absorption (24-hour immersion)		C 272	0.1 % by volume	0.1 % by volume
Water Vapor Transmission		E 96	2.23 perm-inch	3.25 ng/Pa·s·m
Service Temperature			-297 to +400F	-183 to +204C
Dimensional Stability[4]		D 2126		
@ -30F (-34C), 7 days:	Length		<+0.1 % Change	<+0.1 % Change
	Volume		<+0.1 % Change	<+0.1 % Change
@ 158F (70C)/95% RH, 7 days:	Length		<+1.0 % Change	<+1.0 % Change
@ 212F (100C), 7 days:	Length		<+0.2 % Change	<+0.2 % Change
	Volume		<+1.2 % Change	<+1.2 % Change
@ 400F (204C), 28 days, dry heat			No Change	No Change
Surface Burning Characteristics[5]				
Flame Spread @ 4" (10 cm)		E 84	25	25
Smoke Density @ 4" (10 cm)		E 84	160	160
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. *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.*
5. *This numerical flame spread data is not intended to reflect hazards presented by this or any other material under actual fire conditions.*
6. *FITNESS FOR USE MUST BE DETERMINED BY BUYER AND ENGINEER; DYPLAST PRODUCTS DOES NOT WARRANT FITNESS FOR USE.*
7. *CAUTION: Severe degradation of the foam can result if water gets into the insulation system on a high temperature pipe. These include accelerated degradation and extensive charring, and loss of insulation performance. Thus it is critical that the jacketing and joint sealers are designed and installed correctly to prevent water ingress.*

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-HT's combination of superior R-factor and low water vapor permeance of 2.23 perm-inch.

FEATURES AND BENEFITS

- Fabrication available to virtually any shape/size
- Variable bunstock sizing in 3 dimensions
- Environmentally friendly (Zero-ODP)
- Up to 1/32" cut tolerance on surfaces
- 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 thermal efficiency, ISO-HT 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-HT compared to cellular glass (roughly one-third) reduces structural support requirements.

LIMITATIONS AND DISCLAIMER OF WARRANTIES AND LIABILITIES

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