

■ ELFOAM® P400

Product Description

ELFOAM P400 is a 4.0 lb/ft³ (64 kg/m³), rigid, unfaced, closed cell polyisocyanurate foam supplied as blocks, sheets and fabricated shapes for a variety of insulation, core material and carving applications. Polyisocyanurate foam (polyiso) is similar to polyurethane foam but offers greater dimensional stability over a wider service temperature range.

ELFOAM P400 is manufactured in bunstock form 21" (53 cm) thick; 48" (122cm) wide; and 96" (244cm) long. Cut sheets are offered in thicknesses from 1/8" to 8" (.32cm to 20cm) in 1/32" (.08cm) increments. Custom sizes and fabricated parts up to 21" (53cm) thick, 48" (122cm) wide and 192" (488cm) in length are available for customers wanting to eliminate in-house cutting, handling, and scrap disposal. Contact the Indianapolis Sales Office for additional information.

Design Considerations

ELFOAM P400 is designed for use in environments where temperatures range from -297 to +300°F (-183 to +149°C). However, in non-laminated applications where temperatures exceed 140°F (60°C) and/or have relative humidity above 70% as well as in processes where frequent and severe thermal cycling occurs, allowances for foam dimensional changes may need to be incorporated into engineering design. Regardless of operating conditions, a qualified design engineer should review all foam applications.

ELFOAM, like all cellular plastics, will degrade with prolonged exposure to sunlight. To prevent such degradation, foam materials should be covered. Other barriers to protect exposed foam surfaces from the elements and to meet applicable fire and safety regulations may also be required.

Environmental Data

ELFOAM P400 is specifically formulated to provide excellent physical properties without the use of chlorofluorocarbon (CFC) or hydrochlorofluorocarbon (HCFC) blowing agents. In compliance with the Montreal Protocol and the Clean Air Act, ELFOAM P400 is manufactured with hydrocarbon blowing agents which have no ozone depletion or global warming potential.

Applications

Typical products incorporating ELFOAM P400 include:

- Laminated wall and roof panels
- Truck/Trailer bodies, shipping containers and railcars
- FRP panels, tanks and shelters
- Pultrusion and infusion processes
- Pipe, tank and vessel insulation
- Plugs, patterns and carved products

Note that application testing is often required to determine suitability of the foam for a specific application. Potential users should perform pertinent testing to determine the suitability of the product for the intended application. Final determination of fitness of the product for any particular use is the responsibility of the buyer.

Compliances and Approvals

ELFOAM P400 meets industry standards, specifications, regulations and technical guidelines put forth by numerous commercial, federal and military entities including ASTM International, Underwriters Laboratories, and the US Departments of Transportation and Defense. Contact the Indianapolis Sales Office for additional information.

Safety

All persons who work with ELFOAM products should follow proper handling procedures. The ELFOAM Safety Data Sheet (SDS) contains information about proper handling, storage and use of this material. A copy of this document may be downloaded at elliottfoam.com or obtained by calling the Indianapolis Sales Office.

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TECHNICAL DATA SHEET

ELFOAM® P400

ELFOAM P400 is a rigid, closed cell, preformed, unfaced, polyisocyanurate foam material (polyiso). This CFC and HCFC free product provides outstanding physical properties in applications having a service temperature between -297 and +300°F (-183 and +149°C). ELFOAM P400 is yellow in color and is available in blocks, sheets and fabricated shapes.

Physical Properties ^{1, 2}	ASTM Method	Typical Values ³	
		English	Metric
Density	D1622	4.0 lb/ft ³	64.0 kg/m ³
Thermal Conductivity, k-factor ⁴	C518		
Initial at 75°F (24°C)		0.170 (BTUin)/(hrft ² °F)	0.025 W/(m°C)
Aged 10 days at 158°F (70°C)		0.185 (BTUin)/(hrft ² °F)	0.027 W/(m°C)
Thermal Conductivity, R-value per inch ⁴	C518		
Initial at 75°F (24°C)		5.9 (hrft ² °F)/BTU	1.04 (m ² °C)/W
Aged 10 days at 158°F (70°C)		5.4 (hrft ² °F)/BTU	0.96 (m ² °C)/W
Compressive Strength / Modulus	D1621		
Parallel to Rise		85 / 2,100 lb/in ²	585 / 14,469 kPa
Perpendicular to Rise ⁵		62 / 1,400 lb/in ²	427 / 9,646 kPa
Shear Strength / Modulus	C273		
Parallel to Rise		55 / 850 lb/in ²	379 / 5,856 kPa
Perpendicular to Rise ⁵		50 / 750 lb/in ²	344 / 5,167 kPa
Tensile Strength / Modulus	D1623		
Parallel to Rise		80 / 2,700 lb/in ²	551 / 18,603 kPa
Perpendicular to Rise ⁵		59 / 1,560 lb/in ²	406 / 10,748 kPa
Flexural Strength / Modulus	C203		
Parallel to Rise		119 / 2,872 lb/in ²	820 / 19,788 kPa
Perpendicular to Rise ⁵		80 / 1,809 lb/in ²	551 / 12,464 kPa
Closed Cell Content (by volume)	D6226		95%
Water Absorption (by volume)	C272		<0.70%
Water Vapor Transmission	E96	2.0 permsin	2.9 ng/Pasm
Dimensional Stability ⁶ (length / volume change)	D2126		
+158°F(70°C), 97 ± 3% relativity humidity, 14 days			+1.1 / +2.3%
-40°F(-40°C), ambient relativity humidity, 14 days			+0.1 / -0.1%
+212°F(100°C), ambient relative humidity, 14 days			+0.2 / +0.0%
Coefficient of Linear Thermal Expansion	E228		
0 to +250°F (-17 to +121°C)		35 x 10 ⁻⁶ in/in°F	63 x 10 ⁻⁶ mm/mm°C
Hot Surface Performance at 300°F (149°C)	C411		Pass
Surface Burning Characteristics ⁷	E84		
Flame Spread, thicknesses up to 4 in (10.2 cm)			25
Smoke Developed, thicknesses up to 4 in (10.2 cm)			<450
Polyisocyanurate Insulation Requirements	C591		Grade 2, Type V compliant

1 Data shown are typical values obtained from representative production samples. For specific property ranges, consult Elliott Company.

2 All properties measured at 73 ± 4°F (23 ± 2°C) unless otherwise indicated.

3 To be used only as a guide for design engineering purposes. Potential user is responsible for performing pertinent tests required to determine product suitability for the intended application.

4 k-factors and R-values vary with age and use conditions. Contact Elliott Company for values at other mean temperatures.

5 Represents the lowest typical value across all axes related to Perpendicular to Rise performance. Contact the Elliott Company for additional information.

6 Frequent and severe thermal cycling can produce dimensional changes significantly greater than those stated here. Special design consideration must be made in applications that cycle frequently.

7 Published data is not intended to reflect hazards represented by this or any other material under actual fire conditions. This material is combustible when exposed to large fire sources.

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