

FIBERBOND® Fiberglass Piping Systems

Series 20FR-E

Description:

The FIBERBOND® 20FR-E Fiberglass Piping Series is an ABS and USCG approved fiberglass reinforced pipe product manufactured by filament winding utilizing a premium grade fire retardant epoxy vinyl ester resin and a 20-mil (0.50mm) liner, suitable for design pressures up to 200 psig (13.8 bar) and temperatures up to 185F (85c). The 20FR-E standard product is available in 2" to 24" (51mm - 610mm) nominal inside diameters, with custom products up to 60" (1524mm) diameter. Series 20FR-EC, with an electrically conductive exterior, is also available. Series 20FR-E was formally known as 20FW-FR-E and 20FW-HV-FR-E.

Applications:

Design Range:	200 psig (13.8 bar) up to 12in. and 185F (85c) (with standard fittings) 150psig (10.3 bar) up to 24in. 100psig (6.9 bar) up to 36in. 50psig (3.5 bar) up to 60in.
Applications:	Fire water systems, USCG Fire Mains per PFM1-98 Offshore oil and gas systems where fire endurance is a requirement Marine applications requiring IMO A.753(18) Level 3 fire endurance

Piping Specifications:

Manufacture:	Contact molded and filament wound 2" (51mm) Filament wound 3" - 60" (76mm - 1524mm)
Construction:	Fire retardant epoxy vinyl ester resin 20 mil (0.02in./0.50mm) C-Veil reinforced resin rich liner 55degree wind pattern
Delivery:	Random lengths or part of a shop-fabricated system

Fittings Specifications:

Manufacture:	Contact molded 2" - 60" (51mm - 1524mm)
Dimensions:	Per FIBERBOND® Fittings Guide
Delivery:	Loose or part of a shop pre-fabricated system

Joining System Specifications:

Fabrication:	Plain End Butt and Strap 2" - 60" (51mm - 1524mm)
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Applicable Standards:

Testing:	ASTM D635, D638/D2105, D1599, D2412, IMO A.753(18) (L3 Fire Endurance)
QA:	ASTM D2563 Level I and Level II Visual Acceptance, D3567 EU Pressure Equipment Directive for Group 2 Liquids (Category 1, Module A - Internal Production Control); SEP may also be used for the sizes and ratings listed herein
Approvals:	USCG No. 164.141/2/0, Sizes 2" - 24" ABS Certificate No. 00 NO 32171-X, Sizes 2" - 24"

FIBERBOND® 20FR-E

Typical Dimensions

Nominal Size (in. / mm)	I.D. (in. / mm)	O.D. (in. / mm)	Min. Wall (in. / mm)	Span (ft / m)	Press. Rating (psig / bar)	Weight (lbs/ft - kg/m)
2" (50)	2.00 (51)	2.62 (66)	0.28 (7)	12.6 (3.8)	200 (13.8)	1.5 (2.2)
3" (80)	3.00 (76)	3.50 (89)	0.24 (6)	14.2 (4.3)	200 (13.8)	2.2 (3.3)
4" (100)	4.00 (102)	4.50 (114)	0.24 (6)	15.4 (4.7)	200 (13.8)	2.9 (4.3)
6" (150)	6.00 (152)	6.63 (168)	0.30 (8)	18.2 (5.5)	200 (13.8)	5.9 (8.8)
8" (200)	8.00 (203)	8.75 (222)	0.36 (9)	20.5 (6.3)	200 (13.8)	8.9 (13.3)
10" (250)	10.00 (254)	10.88 (276)	0.42 (11)	22.7 (6.9)	200 (13.8)	12.4 (18.5)
12" (300)	12.00 (305)	13.00 (330)	0.48 (12)	24.5 (7.4)	200 (13.8)	16.4 (24.4)
14" (350)	14.25 (362)	15.13 (384)	0.42 (11)	23.5 (7.1)	150 (10.3)	17.1 (25.5)
16" (400)	16.25 (413)	17.25 (438)	0.48 (12)	25.1 (7.6)	150 (10.3)	21.6 (32.2)
18" (450)	18.25 (463)	19.38 (492)	0.53 (14)	26.7 (8.1)	150 (10.3)	28.9 (43.1)
20" (500)	20.25 (514)	21.50 (546)	0.59 (15)	28.0 (8.5)	150 (10.3)	34.7 (51.7)
24" (600)	24.25 (616)	25.75 (654)	0.71 (18)	30.0 (9.0)	150 (10.3)	47.8 (71.3)

All spans rated for SG=1.0 (water) and is limited by 1) a bending stress of 1,000psi (6.9MPa) for dead weight only, 2) a temperature of 150F (65c), and 3) a deflection of 0.50in. (12mm) over three spans. Maximum spacing is 30ft (9.1m). Actual spacing in the field may be shorter due to other design conditions such as wind loads. Information on larger pipe sizes is available from Specialty Plastics.

Typical Properties

Property	Value (U.S.)	Value (S.I.)
Pipe Axial Tensile Strength	8,400 psi	57.9 MPa
Pipe Axial Tensile Modulus	1,400,000 psi	9.7 GPa
Pipe Hoop Tensile Strength	26,400 psi	182.0 MPa
Pipe Hoop Tensile Modulus	2,200,000 psi	15.2 GPa
Pipe Bending Strength	16,800 psi	115.8 MPa
Pipe Bending Modulus	1,400,000 psi	9.7 GPa

Property	Value (U.S.)	Value (S.I.)
Density	0.06 lb/cu in.	1.7 g/cu cm
Thermal Expansion Coeff.	0.00001 in./in./deg F	0.000018 mm/mm/deg C
Minor Poisson's Ratio	0.55	0.55
Major Poisson's Ratio	0.35	0.35
Hazen Williams Coeff.	150	150
Specific Roughness	0.0002 in.	0.0005 cm



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