

# FIBERBOND® Piping Specification - Series 20FR16 and 20FR16-C

Rev: F

Rating:	ANSI B16.5 150# FF - FIBERBOND® FRP/GRP
Service:	16barg Firewater Systems Marine applications requiring IMO A.753(18) Level 3 fire endurance 16barg Firewater ringmains per USCG PFM1-98

Pressure:	232psig (16.0barg) up to 24" 150psig (10.3barg) up to 36"
Temp:	Up to 185F (85c)



1"	1.5"	2"	3"	4"	6"	8"	10"	12"	14"	16"	18"	20"	24"
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Pipe	FIBERBOND® Series 20FR16, plain ends, ASTM D2310 / D2996 RTRP-12ET1 or RTRP-11FT1; 232psig pressure rating up to 24"; 150psig up to 36"; all pipes have plain ends. ASTM F1173 / ISO15840 Type I, Resin 2, Class B, Rating Method 1&4, Fire Endurance: Fluid S, Fire Type IF, Integrity B, Duration 30. Series 20FR16-C with an electrically conductive exterior is also available.													
Min. Thk	0.25"	0.25"	0.28"	0.25"	0.25"	0.25"	0.32"	0.39"	0.46"	0.54"	0.62"	0.69"	0.76"	0.91"
Nom. Thk	0.28"	0.28"	0.31"	0.28"	0.28"	0.28"	0.35"	0.42"	0.49"	0.58"	0.66"	0.73"	0.80"	0.95"
Nom. I.D.	1.00"	1.50"	2.00"	3.00"	4.00"	6.00"	8.00"	10.00"	12.00"	14.25"	16.25"	18.25"	20.25"	24.25"
Nom. O.D.	1.56"	2.06"	2.62"	3.56"	4.56"	6.56"	8.70"	10.84"	12.98"	15.41"	17.57"	19.71"	21.85"	26.15"
Flanges	FIBERBOND® Series 20FR16, long welding neck, ANSI B16.5 150# drilling, flange thicknesses differ from 150#; ASTM D5421 CM-B4I; ASTM D4024 RTR-111D (232psig up to 24") and RTR-141C (150psig up to 36")													
Nom. Thk	0.50"	0.52"	0.64"	0.77"	1.01"	1.19"	1.36"	1.69"	1.95"	2.03"	2.34"	2.32"	2.57"	2.88"
Neck Lg	6"	6"	6"	6"	6"	8"	10"	12"	14"	15"	17"	18"	20"	24"
Torque	See Torque Charts													
Elbows	FIBERBOND® Series 20FR16, Fig.20 90degree elbows and Fig.30 45degree elbows with plain ends; ASTM D5685 RTRF 54K4E (232psig up to 24") and RTRF 52E4D (150psig up to 36"). These elbows have long radius dimensions. Other special angle elbows are available. Mitered elbows are available.													
Tees	FIBERBOND® Series 20FR16, Fig.40 Tee, plain ends; ASTM D5685 RTRF 54K4E (up to 24") and RTRF 52E4D (up to 36").													
Couplings	Couplings are not required nor necessary in FIBERBOND® piping systems.													
Reducing Branches	FIBERBOND® Series 20FR16, Fig.43 Reducing Tee, Fig.46 Flanged End "Olet" and Fig.48 Plain End "Olet".													
Reducers	FIBERBOND® Series 20FR16, Fig.60 Concentric Reducer and Fig.61 Eccentric Reducer, plain ends; ASTM D5685 RTRF 54K4E (up to 24") and RTRF 54K4E (up to 36").													
Threaded Branches	FIBERBOND® Series 20FR-E, Fig.47JF Threaded Alloy (316SS, 90/10 Cu-Ni, Gr2 Ti, Monel, etc.) MNPT Olet is available. Fig.47JF limited to 2" MNPT and smaller and is limited to certain applications (See Fittings Guide). If this is not suitable, a Fig.46 Flanged End Olet should be used with an alloy blind flange bolted to it; the alloy blind flange would be drilled-and-tapped for the necessary NPT size. A 2in. Fig.46 Flanged End Olet is recommended as this is more durable than the 1" size; however, a 1" size can be used. A FRP MNPT or FNPT connection is not available.													
Laterals	FIBERBOND® Series 20FR16, Fig.80 Lateral, plain ends; pressure rating limited to 100psig (up to 16") and 50psig (above 16"). Fig.88 Reducing Laterals are also available.													

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Pressure: 232psig (16.0barg) up to 24"  
 150psig (10.3barg) up to 36"  
 Temp: Up to 185F (85c)



1"	1.5"	2"	3"	4"	6"	8"	10"	12"	14"	16"	18"	20"	24"
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Other Special Fittings	Refer to the FIBERBOND® Fittings Guide for other fittings. These include Fig.10-O Orifice Flanges, Fig.11 Vanstone "Stub" Flanges, Fig.17 Bleed Rings, and Fig.90 & Fig.91 "Dummy Legs"
Valves	Per customer specifications.
Unions	Unions are not available.
Plugs	Fig.16 Blind Flanges are available in all sizes. Thicknesses match flange thicknesses. Fig.96 Hemicaps are available in sizes 2" and larger. Threaded NPT plugs are not available - use alloy materials such as 316SS or 90/10 Cu-Ni.
Bonding Method	All pipes and fittings have plain ends suitable for the TigerWrap™ bonding method.
Bolting	Per customer specifications. Either heavy hex or hex nuts may be used. SAE "Narrow" series washers must be used with FIBERBOND® flanges. USS washers will not fit.
Gaskets	1/8" thick full-face rubber gaskets, such as "SBR" red rubber or "CR" neoprene, are suitable for sizes up to 1.5" diameter. Garlock "Stress Saver" or CTG "ET-Energizer" gaskets are suitable for all sizes. "NBR" Buna-N "o-ring" gaskets are suitable for sizes 2" and larger (300psig, 20.7bar hydrotest). "O-ring" gaskets are not available in sizes smaller than 2" diameter. "O-ring" gaskets require a special groove in one of the mating pairs of flanges. The location of this groove is normally determined by the FIBERBOND(R) shop prefabricator. O-ring gaskets have zero takeout after torquing.
Notes	<ol style="list-style-type: none"> <li>1. Larger sizes are available (30", 36", 42", 48", and 60"; other custom sizes may be available).</li> <li>2. All components have an external corrosion barrier pigmented "red" with UV absorbers ("black" for 20FR16-C).</li> <li>3. FIBERBOND® flanges can be bolted to raised-face flanges, however, care should be taken when torquing these flanges.</li> <li>4. A "filler" ring, made out of teflon or other suitable material, may be used to "shim" the raised-face flange.</li> <li>5. An "o-ring" gasket can be used to mate to a raised-face flange, but a full-face rubber gasket is also suitable.</li> <li>6. Lower torque values may be needed for bolting to raised-face surfaces; higher values may be needed for flat-face surfaces.</li> </ol>

## FIBERBOND® Piping Specification - Series 20FR16 and 20FR16-C

Rev: D

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 Marine applications requiring IMO A.753(18) Level 3 fire endurance  
 16barg Firewater ringmains per USCG PFM1-98

Pressure: 232psig (16.0barg) up to 24"  
 150psig (10.3barg) up to 36"  
 Temp: Up to 185F (85c)



Branch Size	Header (Run) Size													
	1"	1.5"	2"	3"	4"	6"	8"	10"	12"	14"	16"	18"	20"	24"
0.50"	MNPT	MNPT	MNPT	MNPT	MNPT	MNPT	MNPT	MNPT	MNPT	MNPT	MNPT	MNPT	MNPT	MNPT
.75"	MNPT	MNPT	MNPT	MNPT	MNPT	MNPT	MNPT	MNPT	MNPT	MNPT	MNPT	MNPT	MNPT	MNPT
1"	TEE	MNPT/RS	MNPT/RS	MNPT/RS	MNPT/RS	MNPT/RS	MNPT/RS	MNPT/RS	MNPT/RS	MNPT/RS	MNPT/RS	MNPT/RS	MNPT/RS	MNPT/RS
1.5"		TEE	MNPT/RS	MNPT/RS	MNPT/RS	MNPT/RS	MNPT/RS	MNPT/RS	MNPT/RS	MNPT/RS	MNPT/RS	MNPT/RS	MNPT/RS	MNPT/RS
2"			TEE	MNPT/RS	MNPT/RS	MNPT/RS	MNPT/RS	MNPT/RS	MNPT/RS	MNPT/RS	MNPT/RS	MNPT/RS	MNPT/RS	MNPT/RS
3"				TEE	RS	RS	RS	RS	RS	RS	RS	RS	RS	RS
4"					TEE	RS	RS	RS	RS	RS	RS	RS	RS	RS
6"						TEE	RT/RS	RT/RS	RS	RS	RS	RS	RS	RS
8"							TEE	RT/RS	RT/RS	RS	RS	RS	RS	RS
10"								TEE	RT	RT	RT	TEE/RED	TEE/RED	TEE/RED
12"									TEE	RT	RT	RT	TEE/RED	TEE/RED
14"										TEE	RT	RT	RT	TEE/RED
16"											TEE	RT	RT	RT
18"												TEE	RT	RT
20"													TEE	RT
24"														TEE

- TEE FIBERBOND® Fig.40 Tee
- RT FIBERBOND® Fig.43 Reducing Tee
- RS FIBERBOND® Fig.46 Flanged End Olet (Saddle) or Fig.48 Plain End Olet (Saddle)
- TEE/RED FIBERBOND® Fig.40 Tee or Fig.43 Reducing Tee with Fig.60 or Fig.61 Reducer
- MNPT FIBERBOND® Fig.47JF Metallic MNPT Olet (Saddle) (limited applications)
- FNPT FIBERBOND® Fig.97 FRP FNPT Olet (Saddle) (limited pressure rating and applications)
- NPT Either the Fig.47JF Metallic MNPT Olet or the Fig.97 FRP FNPT Olet

Other branch options may be available. Please consult with Future Pipe Industries for any requests.