

Bondstrand 2000 MP Pipe and Fittings

Fiberglass reinforced thermosetting epoxy resin pipe for plant piping hot water, chilled water, and condensate return services

Scope

This specification defines the reinforced thermosetting resin (RTR) piping system to be used in those sections of Plant Piping—hot water, chilled water and condensate return services calling for fiberglass piping systems.

References, Quality Assurance

References are made to other standards and tests which are a part of this section as modified. Where conflict exists between the requirements of this specification and listed references, the specification shall prevail.

Physical and Mechanical Properties

Pipe Property	Units	70°F 21°C		200°F 93°C		ASTM Method
		2"-6"	8"-10"	2"-6"	8"-10"	
Nominal Pipe Size		2"-6"	8"-10"	2"-6"	8"-10"	
Circumferential						
Tensile stress at weeping	10 ³ psi MPa	32.00 22.00	24.00 165.00	- -	- -	D1599
Tensile modulus	10 ⁶ psi GPa	4.20 29.00	3.65 25.20	3.70 25.50	3.20 22.10	
Poisson's ratio		0.26	0.56	0.32	0.70	D2105
Longitudinal						
Tensile strength	10 ³ psi MPa	16.00 110.00	8.50 58.60	13.00 90.00	6.90 47.60	D2105
Tensile modulus	10 ⁶ psi GPa	3.00 20.70	1.60 11.00	2.40 16.50	1.24 8.50	D2105
Poisson's ratio		0.16	0.37	0.20	0.41	D2105
Beam apparent						
Elastic modulus	10 ⁶ psi GPa	2.40 16.60	1.70 11.70	1.77 12.20	1.00 6.90	D2925
Hydrostatic design						
basis (cyclic)	10 ³ psi MPa	16.00 ^{1,2} 110.00	6.00 ¹ 41.40	- -	- -	D2992
Thermal conductivity						
Pipe wall	Btu•in/(hr•ft ² •°F) W/m•°C	1.70 0.25	1.70 0.25	- -	- -	C177
Thermal expansion						
Linear	10 ⁻⁶ in/in/°F 10 ⁻⁶ mm/mm°C	8.50 15.30	10.00 18.00	- -	- -	D696
Flow coefficient	Hazen-Williams	150.00	150.00	-	-	-
Absolute roughness	10 ⁻⁶ ft 10 ⁻⁶ m	17.40 3.30	17.40 5.30	-	-	-
Specific gravity	-	1.80	1.80	-	-	D792
Density	lb/in ³ g/cm ³	0.07 1.80	0.07 1.80	-	-	

1) At 150°F (66°C). 2) Static

Performance Requirements

ISO-9001



The piping system in sizes 2" through 10" must comply with MIL-P-28584B and U.S. Federal Regulations 21CFR 175.105 and 21CFR 177.2280. Piping will be manufactured according to ASTM D2996 for RTRP. When classified under ASTM D2310, the pipe shall meet Type I, Grade I and Class F (RTRP-11FE) cell limits in 2" through 10" nominal pipe sizes. Piping shall be listed for "Commercial Hot" service by NSF under Standard 61 - Drinking Water System Components.

Materials

Pipe Construction

Filament-wound fiberglass reinforced epoxy resin pipe shall be Bondstrand® 2000 MP as manufactured by Ameron Fiberglass Pipe Group, or approved equal. The integral reinforced corrosion barrier shall have a nominal 20 mil thickness, and be constructed with the same epoxy resin as the pipe structural wall. Non-reinforced corrosion barriers shall not be allowed due to potential for fracturing during lower temperatures, transportation and installation.

Structural wall

The pipe shall have the following nominal wall thickness:

Pipe Diameter (inches)	Nominal Wall Thickness	
	inches	mm
2	.123	3.1
3	.126	3.2
4	.151	3.8
6	.181	4.6
8	.226	5.7
10	.226	5.7

Pipe end preparation options

The piping manufacturer will provide 20' or 40' RL joints if the installer requests them in sizes 2" through 6"

to reduce field labor assembly time in those sections of the system where longer pipe joints may be employed. Additionally, the pipe manufacturer will provide pipe joints with the spigot ends already prepared to reduce field labor time.

Pressure rating

Aromatic amine cured epoxy resin piping shall be suitable for use at 125 psi up to 250°F.

Fittings

It is important to maintain compatibility of fittings, piping and adhesives to ensure that the system performs as specified. Therefore, the pipe, fittings and adhesive shall be supplied by the same manufacturer.

Filament-wound fittings

Fittings in 2" through 10" sizes shall be filament-wound with a reinforced resin-rich liner of equal or greater thickness than the pipe liner and shall be manufactured with the same resin type as the pipe.

Only filament-wound fittings and flanges will be used. Compression molded, contact molded, spray up or hand lay-up fittings shall not be allowed.

Testing

Inspection and testing

Inspection and testing of the piping will be performed in accordance with the requirements of ANSI B31.1. Hydrostatic testing of all installed piping shall be performed with water at 1½ times the design pressure of the lowest rated piping system component.

Test and repair procedures

The RTRP manufacturer will provide test and repair procedures in the event field repairs are required.

Installation

Installation procedures and techniques as well as system design criteria including burial, anchoring, guiding and supporting shall be in accordance with manufacturer's recommendations.

Piping system installers and fitters will be trained by a direct factory employee of the piping system manufacturer and certified by the trainer prior to system assembly in the field.

Important Notice

This literature and the information and recommendations it contains are based on data reasonably believed to be reliable. However, such factors as variations in environment, application or installation, changes in operating procedures, or extrapolation of data may cause different results. Ameron makes no representation or warranty, express or implied, including warranties of merchantability or fitness for purpose, as to the accuracy, adequacy or completeness of the recommendations or information contained herein. Ameron assumes no liability whatsoever in connection with this literature or the information or recommendations it contains. Product specifications are subject to change.



FIBERGLASS - COMPOSITE PIPE GROUP - HEADQUARTERS

P.O. Box 801148 • Houston, TX 77280 • Tel: (713) 690-7777 • Fax: (713) 690-2842 • <http://www.ameron.com>

Asia

Ameron (Pte) Ltd.
No. 7A, Tuas Avenue 3
Singapore 639407
Tel: 65 861 6118
Fax: 65 862 1302/861 7834

Europe

Ameron B.V.
J.F. Kennedylaan 7
4191 MZ Geldermalsen
The Netherlands
Tel: +31 345 587 587
Fax: +31 345 587 561

Americas

P.O. Box 878
Burkburnett, TX 76354
Tel: (940) 569-1471
Fax: (940) 569-2764

Composites

P.O. Box 71370
11 McBride Street
Newnan, Georgia 30263
Tel: (770) 253-2000
Fax: (770) 253-9234

Centron International

P.O. Box 490
600 FM 1195 South
Mineral Wells, Texas 76068
Tel: (940) 325-1341
Fax: (940) 325-9681