Bondstrand 5000 Pipe and Fittings

Vinylester reinforced thermosetting resin pipe for plant piping fiberglass piping systems

Scope

This specification defines the reinforced thermosetting resin (RTR) piping system to be used in those sections of Plant Piping General Services calling for fiberglass piping systems.

References, Quality Assurance

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

Physical and Mechanical Properties

Typical Pipe Property	Units	70°F 21°C	140°F 60°C	170°F 77°C	200°F 93°C	ASTM Method
Circumferential Tensile Strength at Weeping	10^3 psi MPa	24.0 138.0				D1599
Circumferential Tensile Modulus	10^6 psi GPa	3.13 21.6	2.79 19.2	2.32 16.0	1.25 8.62	
Circumferential Poisson's Ratio		.45	.45	.66	1.03	D2105
Longitudinal Tensile Strength	10^3 psi MPa	7.0 48.3	6.50 44.8	5.50 37.9	4.00 27.6	D2105
Longitudinal Tensile Modulus	10^6 psi GPa	1.45 10.1	1.31 9.03	1.00 6.89	.52 3.59	D2105
Longitudinal Poisson's Ratio		.35	.35	.43		D2105
Beam Apparent Elastic Modulus	10^6 psi GPa	1.40 9.65	.78 5.40	.44 3.00	.18 1.24	D2925
Hydrostatic Design Basis (cyclic)	10^3 psi MPa		6.0 41.4			D2992
	Value					
Thermal Expansion–Linear	10^6in./in./°F) 10^{-6}mm/mm/°C)	10.0 18.0				
Thermal Conductivity	BTU-in./(hr. ft.^{2} °F) W/m °C	2.0 .28				
Flow Coefficient	Hazen Williams 150					

Performance Requirements

The pipe shall be manufactured in accordance with ASTM D2996 Specification for RTRP. When classified under ASTM D2310, the pipe shall meet Type I, Grade 2 and Class E (RTRP-12ED) for 2" through 16" nominal pipe sizes.

Pipe shall be rated for a minimum internal pressure of 150 psig at 200°F in sizes 1" through 16" and shall have full vacuum capability at 80°F in sizes 1" through 10" when installed above ground.

Materials

ISO-9001

DNV

CERTIFICATED FIRM

Pipe Construction

Filament-wound fiberglass reinforced vinylester resin pipe shall be Bondstrand 5000 as manufactured by Ameron International Fiberglass Pipe Group, or approved equal. The pipe shall have an integral corrosion barrier, nominally 50 mils thick, constructed with the same vinylester resin as the pipe structural wall. Non-reinforced liners or corrosion barriers shall not be allowed due to potential for fracturing during lower temperature, transportation, and installation.

Materials (cont'd)

Structural wall
The pipe shall have the following nominal wall thickness:

Pipe Diameter inches	Nominal Wall Thickness inches	mm
1	.160	4.1
1.5	.160	4.1
2	.160	4.1
3	.160	4.1
4	.206	5.2
6	.206	5.2
8	.229	5.8
10	.229	5.8
12	.229	5.8
14	.256	6.5
16	.286	7.3

Pipe end preparation options
The piping manufacturer will provide 30 foot RL joints, if the contractor requests them, in sizes 2" through 8" to reduce field labor assembly time in those sections of the system where longer joint lengths may be employed. In addition, the pipe manufacturer will provide pipe joints with the spigot ends already prepared for adhesive application to reduce field labor time on all pipe sizes (1"-16") along with factory installed bells or couplings.

Fittings

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

Filament-wound fittings
Fittings in 1" through 16" nominal 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.

Compression Molded Fittings
Fittings in sizes 2" through 6" nominal sizes may be used in low pressure and gravity service only. Where fast closure of valves may produce surges (water hammer), filament wound fittings will be used.

Contact molded, spray up or hand lay-up fittings shall not be allowed.

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 the pipe 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

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