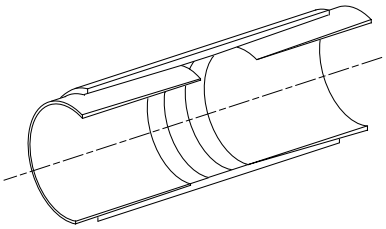
AMERON
INTERNATIONAL

FIBERGLASS - COMPOSITE PIPE GROUP

Dualoy® Guide Specification



Dualoy 3000/L Fiberglass Pipe and Fittings

nonmetallic underground piping for petroleum products, alcohols, alcohol-gasoline mixtures and MTBE fluids

Scope

This specification covers the approval, performance, materials and physical properties requirements for buried piping in 2 to 6-inch (50 to 150 mm) diameters for working pressures to 300 psi (2.07 MPa) and temperatures ranging from -40 to 150°F (-40 to 66°C) for petroleum products, alcohols and alcohol-gasoline mixtures.

Listings

Underwriters Laboratories Inc.®

All components furnished under this specification shall be listed with Underwriters Laboratories (UL) or Underwriters' Laboratories of Canada (ULC) for use as nonmetallic underground piping for petroleum products, alcohols and alcohol-gasoline mixtures. All pipe, fittings and adhesives must demonstrate performance which meets or surpasses testing specified in UL subject 971 for all fluids. Dualoy 3000/L pipe and fittings are also listed in the Netherlands with KIWA (Ref. ATA no. 2062/1-E) and in the U.K. with IP.

Performance requirements

Pipe and fittings and adhesives shall be suitable for continuous operation at the pressures listed below at a sustained temperature of 150°F (66°C). The pipe shall have an integral epoxy liner and a reinforced epoxy exterior coating.

Pressure Ratings

Nominal Pipe Size		Petroleum Products, Alcohols and Alcohol-Gasoline Mixtures	
(in)	(mm)	(psi)	(MPa)
2	50	250	1.72
3	80	150	1.03
4	100	125	0.86
6	150	100	0.69

ISO-9001

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Physical and mechanical property requirements

ASTM classification

Pipe shall conform to ASTM D2310 standard classification RTRP-11CX and ASTM D2996 specification RTRP 11CF1-5430.

Pipe Property	Units	Minimum Value[1]	ASTM Method
Tensile strength			
Longitudinal	10^3 psi	32.5	D2105
	MPa	224	
Circumferential	10^3 psi	65.0	D1599
	MPa	448	
Tensile modulus			
Longitudinal	10^6 psi	2.8	D2105
	GPa	19.3	
Circumferential	10^6 psi	4.0	
	GPa	27.6	
Compressive strength			
Longitudinal	10^3 psi	32.5	D695
	MPa	224	
Compressive modulus			
Longitudinal	10^6 psi	2.8	D695
	GPa	19.3	
Long-term hydrostatic design basis (static)	10^3 psi	21.0	D2992(B)
	MPa	145	
Thermal expansion			
Linear	10^{-6} in/in/°F	9.0(2)	D696
	10^{-6} m/m/°C	16.2(2)	

Stiffness factor(3) — D2412

Nominal Pipe Size (in)	Nominal Pipe Size (mm)	($lb \cdot in^3/in^2$)	(N•m)
2	50	45	5.1
3	80	65	7.3
4	100	55	6.2
6	150	250	28

1) Based on structural wall thickness
2) Maximum value
3) At 5% deflection

Materials

Pipe

All filament-wound pipe shall contain a resin-rich inner liner with a minimum thickness of 0.015 inches (0.38 mm). The liner resin system shall be a chemically resistant epoxy resin that has been demonstrated to be satisfactory for the intended service.

Structural wall

The resins, reinforcements, colorants and other materials when combined as a composite laminate structure shall meet the performance requirements of this specification. Glass fiber reinforcement shall be Type E glass with an epoxy-compatible finish. Glass fiber content shall not be less than 60% by weight of the reinforced structural wall.

Exterior coating

The pipe exterior shall have a 0.005-inch (0.13 mm) thick resin-rich coating with an organic fibrous reinforcement.

Dimensions and tolerances

Pipe dimensions
Pipe shall be manufactured to steel pipe outside diameters for all sizes. Pipe outside diameter tolerances shall not exceed ±1%.

Wall thickness
The total wall thickness of pipe furnished under this specification shall not at any point be greater than 120% nor less than 87½% of the nominal thickness.

Fittings dimensions
All fittings supplied under this specification shall have face-to-face dimensions and laying lengths as specified in the manufacturer's literature.

Joining methods

Tapered bell x spigot adhesive-bonded joints
Pipe and fittings shall be joined by means of a matching taper adhesive joint. Adhesives used for joining components shall be compatible with all intended fluids. The adhesive systems shall be used in accordance with the manufacturer's recommendations.

Adapters and crossovers
The following adapters and crossovers shall be provided as required:

- Bell x NPT threaded female
- Bell x NPT threaded male
- Spigot x NPT threaded female
- Spigot x NPT threaded male

Flanges
Flanges shall be two-piece (van Stone) type with raised grooves on the sealing face. Fiberglass-reinforced stub ends are to be adhesive bonded to the pipe or fitting.

Workmanship

The pipe and fittings shall be free from defects including delaminations, indentations, pinholes, foreign inclusions, bubbles and resin-starved areas which, due to their nature, degree or extent, detrimentally affect the strength and serviceability of pipe or fittings. The pipe and fittings shall be as uniform as commercially practicable in color, opacity, density and other physical properties.

Testing

Proof testing
Fittings shall be hydrostatically tested according to UL specifications by the manufacturer to rated pressure prior to shipment for signs of leakage or porosity.

Quality control testing
A sample of pipe shall be tested at a frequency specified by UL to determine conformance of the materials to the short-term circumferential stress requirement tabulated above.

Marking

Each component shall be marked to show the following:

- Underwriters' Laboratories listing mark
- Manufacturer's name
- Maximum pressure rating

Conversions

1 psi = 6895 Pa = 0.07031 kg/cm^2
1 bar = 10^5 Pa = 14.5 psi = 1.02 kg/cm^2
1 MPa = 10^6 Pa = 145 psi = 10.2 kg/cm^2
1 GPa = 10^9 Pa = 145,000 psi = 10,200 kg/cm^2
1 in = 25.4 mm
1 ft = 0.3048 m
1 lb•in = 0.113 N•m
1 in^4 = 4.162 x 10^{-7} m^4
°C = 5/9 (°F - 32)

Important Notice

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