



Dualoy® 3000/LCX Coaxial Fiberglass Pipe and Fittings

contained underground fuel-handling system with rigid fiberglass primary and integral rigid fiberglass containment layers*

Uses and applications

Rigid fiberglass coaxial fuel handling systems requiring Underwriters Laboratories Listing for containment piping and primary lines conveying the following fuels:

alcohols	leaded gasolines
alcohol-gasoline mixtures	oxygenated fuels
diesel fuels	unleaded gasolines
MTBE fluids	

Description

Ameron Dualoy 3000/LCX rigid fiberglass coaxial piping is a cost-effective solution for contained piping systems. LCX is used for product delivery lines in underground fuel handling systems to convey fuel from the tank to the dispensers. Dualoy 3000/LCX pipe is UL Listed for use with motor vehicle (MV), high blend (HB), concentrated (CT) and aviation and marine (A&M) fuels.

The LCX pipe is manufactured as an integral unit. The primary is made of chemically inert, non-permeable, fiberglass reinforced epoxy resin which is inherently resistant to deterioration due to water and microbial attack. This layer is covered with a porous layer to provide the small interstitial space which facilitates rapid leak detection. Then, the containment layer, comprised of the same material as the primary, is wound over the primary and porous layers.

The containment system is installed with custom designed Ameron clamshell containment fittings. Both the primary and containment systems are bonded for long-term, reliable performance.

- **Dualoy 3000/LCX containment fittings are typically bolted in place while the adhesive cures.**
- **Dualoy 3000/LCX reduces installation and inspection time dramatically, retaining system integrity.**
- **The Dualoy 3000/LCX double wall design significantly improves impact resistance over single wall pipe.**
- **Dualoy 3000/LCX fittings provide true double wall design which permits communication of the interstitial space throughout the system.**

Listings and approvals



The rigid fiberglass piping used in Dualoy 3000/LCX is Listed in the United States with Underwriters Laboratories for nonmetallic underground piping for MV, HB, CT and A&M fuels under File No. MH9162. Dualoy 3000/LCX pipe and fittings are also Listed with Underwriters Laboratories of Canada for Petroleum Products and Oxygenated Fuels (File CMH715). Underwriters Laboratories has also approved Dualoy 3000/L and Dualoy 3000/LCX for use with MTBE fluids. In Great Britain the Dualoy 3000/L system has been tested and accepted by the London Fire and Civil Defence Authority. Dualoy 3000/L has been issued a Certificate of Compliance to the Institute of Petroleum (IP) Specification by ERA Technology, Ltd.

Performance

Primary operating pressures to 300 psi (20 bar)

Continuous operating temperature to 150°F (66°C)

Containment system pressures to 50 psi (3.45 bar)

Individual system components may not have the same ratings as the pipe. Refer to the detailed product information for the specific components to determine the pressure rating for the system as a whole.

Composition

Primary pipe: Filament-wound fiberglass reinforced epoxy pipe with integral epoxy liner and exterior coating. When classified in accordance with ASTM D2310 and ASTM D2996, the pipe meets the following cell limits: RTRP 11CX-5430.

Pipe containment: Filament-wound fiberglass reinforced epoxy pipe.

Interstitial space: Dry, graded glass beads secured in place with adhesive backed tape.

Fittings: Compression molded or filament-wound fiberglass reinforced epoxy primary fittings. Containment fittings are molded.

Adhesive: Ameron PSX™•20 or PSX™•34 ambient-cure, two-part epoxy for all services (including alcohols and MTBE).

Joining system

Primary: Bell and spigot taper/taper adhesive-bonded joint

Containment: Adhesive-bonded clamshell fittings. Parts are compression molded for exact fit and match. Material is identical to primary fittings and is fully Listed by UL for all services, including use in MTBE fluids.

Pipe lengths

Standard 20 ft. (6.1 m) random lengths 17 to 21 ft. (5.2 to 6.4 m) and 30 ft. (9.1 m) random lengths 27 to 32 ft. (8.2 to 9.7 m)

Other lengths up to 42 ft. available upon request.

Fittings

Primary–	Adapters: bell x NPT male ¹	Flange stub ends ¹	
	Adapters: bell x NPT female ²	Isolation bushings ¹	
	Adapters: spigot x NPT female ²	Nipples ²	
	Adapters: spigot x NPT male ²	Reducer bushings ¹	
	45° elbows ¹	Repair couplings ¹	
	90° elbows ¹	Sleeve couplings ²	
	End caps ¹	Tees ¹	
	Flange rings ¹	Dispenser pan penetration fittings ¹	
	Containment–	45° elbows ¹	Couplings ¹
		90° elbows ¹	Tees ¹
Termination sleeves ^{1,3}			

1 Molded fitting

2 Filament-wound fitting

3 2-inch available with or without test valve. 3- and 4-inch available only with test valve

Typical pipe dimensions and weights

Nominal Pipe Size	Primary I.D.		Primary O.D. ¹		Primary Wall Thickness		Containment O.D.		Volume		Weight		
	in.	mm	in.	mm	in.	mm	in.	mm	gal/ft	l/m	lb/ft	kg/m	
2	50	2.21	56	2.37	60	0.080	2.03	2.59	66	0.20	.76	0.90	0.41
3	80	3.32	84	3.50	89	0.085	2.16	3.70	94	0.45	1.70	1.30	0.59
4	100	4.33	110	4.50	114	0.087	2.21	4.70	119	0.77	2.92	1.74	0.79

1) Typical outside diameters of 2- through 4-inch pipe are within API, ASTM and ANSI fiberglass and steel pipe dimensions.

Typical primary pipe performance

Nominal Pipe Size	Pressure Rating ¹		Ultimate Internal Pressure ¹		Ultimate Collapse Pressure ²		
	(in)	(mm)	(psig)	(MPa)	(psig)	(MPa)	
2	50	300	2.07	3200	22.1	153	1.05
3	80	200	1.38	2400	16.5	90	0.62
4	100	175	1.21	2000	13.8	39	0.27

1) At 150°F (66°C).

2) At 80°F (27°C). For continuous service do not exceed 75% of these values.

Note: Values shown for primary only

Fittings pressure performance

For dimensions of fittings, consult Ameron publication DUALOY 3000/L FITTINGS DIMENSIONS, FP266. Pressure ratings of fittings without UL Listing are available on request.

Nominal Pipe Size	Primary All Fittings		Containment Clamshell Fittings			
	(in)	(mm)	(psig)	(MPa)	(psig)	(kPa)
2	50	250	1.72	50	345	345
3	80	150	1.03	50	345	345
4	100	125	0.86	20	138	138

Typical physical properties of primary pipe

Dualoy 3000/LCX piping systems are designed to function at temperatures ranging from -40 to 150°F (-40 to 66°C) at service pressures between -15 to 300 psi (-1 and 20 bar). Dualoy 3000/LCX pipe conforms to ASTM D2310, D2517 and D2996.

Pipe Property ¹	Units	Value	Method	
			ASTM	ATM ¹
Thermal conductivity	Btu-in/(h·ft ² ·°F)	1.7	C177	23
	W/m·°C	7.6		
Linear thermal expansion	10 ⁻⁶ in/in/°F	8.5	D696	21
	10 ⁻⁶ cm/cm/°C	15.3		
Friction factor	Hazen-Williams	150.0	—	156
Absolute roughness	10 ⁻⁶ ft	50.0	—	—
	10 ⁻⁶ m	15.0		
Specific gravity	—	1.81	D792	—
Barcol Hardness	Impressor 934-1	65.0	D2583	—

1) Ameron test method.

Typical mechanical properties of primary pipe

Pipe Property ¹	Units	Value ¹	Method	
			ASTM	ATM ²
Tensile strength Longitudinal	10 ³ psi MPa	35.0 241	D2105	161
Tensile modulus Longitudinal	10 ⁶ psi GPa	3.0 20.7	D2105	161
Compressive strength Longitudinal	10 ³ psi MPa	35.0 241	—	142
Long-term hydrostatic design basis Static	10 ³ psi MPa	31.5 217	D2992(B)	—
Poisson's ratio ³ ν_{yx}	—	0.16	—	—

- 1) Based on structural wall thickness.
- 2) Ameron test method.
- 3) The first subscript denotes the direction of contraction and the second that of the applied stress.
x denotes longitudinal direction.
y denotes circumferential direction.

Bending radius

Nominal Pipe Size		Minimum Bending Radius ¹		Maximum Deflection per 20-ft Joint	Minimum Length Required for 10° Change	
(in)	(mm)	(ft)	(m)	(deg)	(ft)	(m)
2	50	75	23	15	13	4
3	80	125	38	9	22	7
4	100	150	46	7.5	27	8

- 1) At rated pressure. Sharper bends may create excessive stress concentrations. **Do not** bend pipe until adhesive has cured.

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

9720 Cypresswood Dr., Suite 325 • Houston, TX 77070 • Tel: (832) 912-8282 • Fax: (832) 912-9393 • <http://www.ameron-fpg.com>

Asia
Ameron (Pte) Ltd.
No. 7A, Tuas Avenue 3
Singapore 639407
Tel: 65 6861 6118
Fax: 65 6862 1302/861 7834
email: info@ameron.com.sg

Europe
Ameron B.V.
J.F. Kennedylaan 7
4191 MZ Geldermalsen
The Netherlands
Tel: +31 345 587 587
Fax: +31 345 587 561
email: info@ameron-fpg.nl

Americas
P.O. Box 878
Burkburnett, TX 76354
Tel: (940) 569-1471
Fax: (940) 569-2764
email: marcom@ameronfpd.com

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