

GREEN THREAD® 175/175-C

Applications

- Firewater Systems
- Salt Water Supply Lines
- Cooling Water
- Waste Lines
- Potable Water
- Process Lines
- Ballast Piping
- Cargo Lines
- Bilge Piping
- Sprinkler Systems
- Fresh Water Lines
- Sanitary Lines
- Scuppers
- Sounding Tubes
- Vent Lines
- Drains
- Conduit

Characteristics

GREEN THREAD 175
Filament wound Glassfiber Reinforced Epoxy (GRE) pipe.

GREEN THREAD 175-C
Filament wound Glassfiber Reinforced Epoxy (GRE) pipe supplied with integral conductive carbon fibers.

Pipe Diameter: 50-900 mm (2-36 inch)
Maximum Operating Temperature: up to 110° C (230° F)
Maximum Operating Pressure: up to 12 bar (175 psig)

Pipe and fittings are manufactured as either non-conductive (GREEN THREAD 175) or electrically conductive (GREEN THREAD 175-C) versions.

Materials and Construction

Pipe
All pipe manufactured by filament winding process using an amine cured epoxy thermosetting resin to impregnate strands of continuous glass filaments.
All pipe supplied with square-cut ends for use with mechanical couplings or with positive-stop socket joint or matching tapered fittings.

Fittings and Flanges
All fittings manufactured using the same type material as the pipe; filament winding.
Standard flanges have ANSI B16.5 Class 150 bolt hole patterns, unless otherwise specified.

Conductive
A nominal 0.5 mm (0.020 in) thick conductive liner reinforced with conductive veil, to prevent the accumulation of potentially incendive static charge buildup.

Continuous conductive filaments are utilized throughout the pipe wall of GREEN THREAD 175-C at a predetermined pattern to prevent the accumulation of static charges and enable efficient grounding of charges through grounding saddles bonded to the pipe.

Fire Endurance
Fully qualified for IMO Resolution A.753(18) Level-3 fire resistance without any passive fire protection in 50-900 mm (2-36 in) sizes.

Joining Systems

Socket Joint
50-300 mm (2-12 in)
Positive stop lands simplify precise makeup of complex piping configurations



Bell & Spigot
350-900 mm (14-36 inch)
A matched-taper joint secured with epoxy adhesive.
Stronger than the pipe itself, in both internal-pressure and axial-tension capability.



Fittings

Filament Wound - 50-900 mm (2-36 in)
Standard radius in 200-900 mm (8-36 in); Long radius 200-900 mm (8-36 in) fittings are available upon request.
Long radius (1.5 D) in 50-150 mm (2-6 in)

Specifications

ASTM D2996 Designation Code

25-40 mm (1-1½ in); RTRP-11FF1-3111
 50-200 mm (2-8 in); RTRP-11FF1-3112
 250 mm (10 in); RTRP-11FF1-3114
 300-900 mm (12-36 in); RTRP-11FF1-3116

ISO 15840 Designation Code

50-150 mm (2-6 in) - Type 1, Resin 1, Class B, Rating Method 1, Fluid S, Fire Type IF, Fire Integrity B
 200-900 mm (8-36 in) - Type 1, Resin 1, Class B, Rating Method 1, Fluid S, Fire Type IF, Fire Integrity A

Type Approvals

- American Bureau of Shipping (ABS)
- Bureau Veritas
- China Classification Society (CCS)
- Det Norske Veritas (DNV)
- Germanischer Lloyd's
- Lloyd's Register
- United States Coast Guard (USCG)
- Korean Register of Shipping

Pipe Dimensions and Weights

Nominal Pipe Size		Nominal I.D.		Nominal O.D.		Nominal Wall Thickness		Nominal Weight	
in	(mm)	in	(mm)	in	(mm)	in	(mm)	lbs/ft	(kg/m)
2	50	2.15	54.6	2.51	63.7	0.19	4.7	0.9	1.34
2½	65	2.72	69.1	3.11	79.0	0.19	4.8	1.2	1.79
3	80	3.28	83.3	3.66	93.0	0.19	4.8	1.4	2.08
4	100	4.28	108.7	4.66	118.4	0.19	4.8	1.8	2.68
5	125	5.2	132.1	5.73	144.9	0.23	5.8	2.5	3.73
6	150	6.35	161.3	6.80	172.7	0.23	5.8	3.1	4.61
8	200	8.36	212.3	8.84	224.5	0.24	6.1	4.3	6.40
10	250	10.36	263.1	10.93	277.6	0.28	7.1	6.0	8.93
12	300	12.28	311.9	12.92	328.2	0.32	8.0	8.3	12.35
14	350	14.04	356.6	14.74	374.4	0.35	8.9	10.5	15.63
16	400	16.04	407.4	16.82	427.2	0.39	9.9	13.3	19.79
18	450	17.83	452.8	18.68	474.5	0.43	10.9	16.1	23.96
20	500	19.83	503.6	20.77	527.6	0.47	11.9	19.6	29.17
24	600	23.84	605.5	24.94	633.5	0.55	14.0	27.9	41.52
26	650	25.59	650.0	26.71	678.4	0.56	14.2	39.0	58.16
28	700	27.56	700.0	28.76	730.5	0.60	15.2	45.0	67.11
30	750	29.53	750.0	30.81	782.5	0.64	16.3	52.0	77.55
32	800	31.50	800.0	32.86	834.5	0.68	17.3	58.0	86.49
63	900	35.43	900.0	36.95	938.6	0.76	19.3	74.0	110.35

Engineering Data

Nominal Pipe Size		Fiber Glass Systems Pressure Rating		Vacuum/External Pressure @ Ambient Temperature ⁽¹⁾			
				Ultimate Collapse Pressure		Rated Pressure	
In	mm	psig	bar	psig	bar	psig	bar
2	50	175	12	>1700	>117	>563	>38.8
2½	65	175	12	>1500	>100	500	34.5
3	80	175	12	855	59.0	210	14.5
4	100	175	12	305	21.0	96	6.6
5	125	175	12	380	26.2	55	3.8
6	150	175	12	175	12.1	55	3.8
8	200	175	12	85	5.9	28	1.9
10	250	175	12	80	5.5	26	1.8
12	300	175	12	75	5.2	24	1.7
14	350	175	12	75	5.2	23	1.6
16	400	175	12	70	4.8	23	1.6
18	450	175	12	70	4.8	22	1.5
20	500	175	12	70	4.8	22	1.5
24	600	175	12	70	4.8	22	1.5
26	650	175	12	70	4.8	22	1.5
28	700	175	12	70	4.8	22	1.5
30	750	175	12	70	4.8	22	1.5
32	800	175	12	70	4.8	22	1.5
36	900	175	12	70	4.8	22	1.5

⁽¹⁾ Long term rating incorporating the DEP Safety Factor of 3.0

Pipe Lengths

Nominal Pipe Size		Americas		Asia	
in	(mm)	ft	(m)	ft	(m)
2	50	19.25, 39.0	5.9, 11.9	29.5	9.0
2 ½-4	65-100	19.25, 39.0	5.9, 11.9	16.5, 33.0	5.0, 10.0
5-36	125-900	19.25, 39.0	5.9, 11.9	19.5, 39.0	5.9, 11.9

Typical Physical Properties

Property	Value (psi)		Value (MPa)	
	@ 75°F	@ 200°F	@ 24°C	@ 93°C
Axial Tensile - ASTM D2105				
Ultimate Stress	10,550	7,680	71	52.9
Design Stress	2,637	1,920	17.8	13.2
Modulus of Elasticity	1.61 x 10 ⁶	1.16 x 10 ⁶	12411	7997
Poisson's Ratio	0.38		0.38	
Axial Compression - ASTM D695				
Ultimate Stress	33,300	20,383	230.0	140.5
Design Stress	8,300	5,090	57.4	35.1
Modulus of Elasticity	1.26 x 10 ⁶	0.66 x 10 ⁶	8687	4550
Beam Bending - ASTM D2925				
Ultimate Stress	23,000	17,166	159	118.3
Design Stress ⁽¹⁾	2,900	2,145	20.0	14.8
Modulus of Elasticity (long-term)	2.18 x 10 ⁶	1.29 x 10 ⁶	15031	8894
Hydrostatic Burst - ASTM D1599				
Ultimate Hoop Tensile Stress	46,300	47,990	319	330
Hydrostatic Design - ASTM D2992				
Procedure A - Hoop Tensile Stress				
Cyclic 150 x 10 ⁶ Cycles LTHS	8,850	6,090	61.0	41.9
Procedure B - Hoop Tensile Stress LTHS		16,945		116.8
Static 20 Year Life at 200°F LCL		14,654		101.0
Coefficient of Linear Thermal Expansion ASTM D696	1.26 x 10 ⁻⁵ in/in/°F		2.27 x 10 ⁻⁵ mm/mm/°C	
Thermal Conductivity	0.23 BTU/(ft)(hr)(°F)		0.4 W/(m)(°C)	
Specific Gravity - ASTM D792	1.8		1.8	
Flow Factor - SF Hazen-Williams Coefficient	150		150	

⁽¹⁾ Beam bending design stress is 1/8 of ultimate to account for combined stress (i.e. bending and pressure)

Maximum Support Spacing*

Nominal Pipe Size		75° F (24° C)		200° F (93° C)	
in	(mm)	ft	(m)	ft	(m)
2	50	16.2	5.0	14.2	4.3
2½	65	17.2	5.2	15.0	4.6
3	80	18.6	5.7	16.3	5.0
4	100	20.0	6.1	17.5	5.3
5	125	22.0	6.7	19.0	5.8
6	150	23.1	7.0	20.2	6.2
8	200	25.4	7.7	22.3	6.8
10	250	28.0	8.5	24.5	7.5
12	300	30.1	9.2	26.4	8.1
14	350	32.0	9.8	28.1	8.6
16	400	34.1	10.4	29.9	9.1
18	450	35.8	10.9	31.4	9.6
20	500	37.7	11.5	33.1	10.1
24	600	41.2	12.6	36.1	11.0
26	650	38.9	11.9	35.3	10.8
28	700	43.4	13.2	36.6	11.2
30	750	44.8	13.7	37.9	11.6
32	800	46.3	14.1	39.1	11.9
36	900	49.0	14.9	41.5	12.6

* Values are based on continuous (4 or more spans) beam equations.

For other span conditions, please refer to Brochure E5000 "Engineering Piping Design" or the "Success by Design" software available from Fiber Glass Systems

Properties of Pipe Sections*

Nominal Pipe Size		Minimum Cross Sectional Area		Minimum Moment of Inertia	
in	(mm)	in ²	(mm ²)	in ⁴	(mm ⁴ x10 ⁵)
2	50	1.0	666	0.7	2.93
2½	65	1.4	903	1.5	6.24
3	80	1.6	1052	2.5	10.2
4	100	2.1	1355	5.3	21.9
5	125	3.1	2000	11.3	47.0
6	150	3.7	2387	19.9	82.8
8	200	5.2	3368	48.2	201
10	250	7.6	4923	108	449
12	300	10.2	6581	203	845
14	350	13.1	8452	337	1400
16	400	16.7	10774	563	2340
18	450	20.3	13097	845	3520
20	500	24.8	16000	1276	5310
24	600	35.5	22903	2633	11000
26	650	39.0	25161	3301	13740
28	700	45.0	29032	4426	18422
30	750	51.0	32903	5818	24216
32	800	58.0	37419	7513	31271
36	900	73.0	47097	1199	4991

* Based on Minimum Reinforced Wall

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