

GREEN THREAD® 250-JF/250-CJF

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
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Characteristics

GREEN THREAD 250-JF

Filament wound Glassfiber Reinforced Epoxy (GRE) pipe supplied with a reinforced "Fire Jacket" qualified for Level-3 Modified (Wet/Dry) (a.k.a. L3-W/D) fire endurance which has also passed Jet Fire endurance testing according to OTI-95 634 and ASTM F1173-01 Appendix X2.5 test procedures.

GREEN THREAD 250-CJF

Filament wound Glassfiber Reinforced Epoxy (GRE) pipe supplied with integral conductive carbon fibers and supplied with a reinforced "Fire Jacket" qualified for Level-3 Modified (Wet/Dry) (a.k.a. L3-W/D) fire endurance which has also passed Jet Fire endurance testing according to OTI-95 634 and ASTM F1173-01 Appendix X2.5 test procedures.

Pipe Diameter: 25-300 mm (1-12 in)

Maximum Operating Temperature: up to 110° C (230° F)

Maximum Operating Pressure: up to 18 bar (250 psig)

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; compression molding or 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 250-C/250-CF 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

GREEN THREAD 250-JF/250-CJF is supplied with a unique reinforced "Fire Jacket" that has been fully qualified for Level-3 Modified (Wet/Dry) (L3-W/D) in accordance with USCG PFM 1-98 and has passed Jet Fire resistance testing according to OTI-95 634 and ASTM F1173-01 Appendix X2.5 test procedures. Pipe protected by the Fire Jacket exhibits zero heat release when tested in accordance with IMO A.653(16) and therefore complies with the low flame spread requirements of IMO A.753(18)..

Joining Systems

Socket Joint

25-300 mm (1-12 in)

Positive stop lands simplify precise makeup of complex piping configurations



Fittings

Filament Wound - 25-300 mm (1-12 in)

Standard radius in 200-300 mm (8-12 in); Long radius 200-300 mm (8-12 in) fittings are available upon request

Long radius (1.5 D) in 25-150 mm (1-6 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 (12 in); RTRP-11FF1-3116

ISO 15840 Designation Code

25-300 mm (1-12 in) - Type 1, Resin 1, Class B, Rating Method 1, Fluid EF, Fire Type JF, Fire Integrity C

Type Approvals

- Det Norske Veritas (DNV)
- Lloyd's Register
- Korean Register of Shipping

Pipe Dimensions and Weights

Nominal Pipe Size		Nominal I.D.		Nominal O.D. ⁽¹⁾		Nominal Wall Thickness ⁽²⁾		Nominal Weight	
in	mm	in	mm	in	mm	in	mm	lbs/ft	kg/m
1	25	1.00	25.0	1.33	34.0	0.16	4.2	1.5	2.2
1 ½	40	1.50	38.1	1.96	49.8	0.21	5.4	2.2	3.3
2	50	2.15	54.6	2.51	63.7	0.19	4.7	2.7	4.0
2½	65	2.72	69.1	3.11	79.0	0.19	4.8	3.3	4.9
3	80	3.28	83.3	3.66	93.0	0.19	4.8	3.8	5.7
4	100	4.28	108.7	4.66	118.4	0.19	4.8	4.8	7.2
5	125	5.20	132.1	5.73	144.9	0.23	5.8	6.2	9.2
6	150	6.35	161.3	6.80	172.7	0.23	5.8	7.3	10.9
8	200	8.36	212.3	8.95	227.3	0.30	7.6	10.7	15.9
10	250	10.36	263.1	11.06	280.9	0.35	8.9	14.4	21.4
12	300	12.28	311.9	13.09	332.5	0.41	10.4	18.4	27.4

⁽¹⁾ Nominal O.D. is for the primary pipe. The Fire Jacket thickness is 7.5 mm (0.30 in), resulting in the finished product to have a Nominal O.D. dimension that is 15mm (0.60 in) greater than shown.

⁽²⁾ Nominal Wall Thickness is for primary pipe only. The Fire Jacket thickness is 7.5 mm (0.30 in) but does not add any structural strength to the pipe.

Engineering Data

Nominal Pipe Size		Pressure Rating		Vacuum/External Pressure @ Ambient Temperature ⁽¹⁾			
				Ultimate Collapse Pressure		Rated Pressure	
in	mm	psig	bar	psig	bar	psig	bar
1	25	250	18	>3000	>210	>1000	>70
1 ½	40	250	18	>3000	>210	>1000	>70
2	50	250	18	>1700	>117	>563	>38.8
2½	65	250	18	>1500	>100	500	34.5
3	80	250	18	855	59.0	210	14.5
4	100	250	18	305	21.0	96	6.6
5	125	250	18	380	26.2	55	3.8
6	150	250	18	175	12.1	55	3.8
8	200	250	18	175	12.1	55	3.8
10	250	250	18	175	12.1	55	3.8
12	300	250	18	175	12.1	55	3.8

⁽²⁾ Long term rating incorporating the DEP Safety Factor of 3.0

Pipe Lengths

Nominal Pipe Size		Americas		Asia	
in	(mm)	ft	(m)	ft	(m)
1	25	18, 13	5.5, 4.0	13.0	4.0
1.5	40	18, 29.5	5.5, 9.0	29.5	9.0
2-4	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*

Pipe Size		75° F (24° C)		200° F (93° C)	
in	(mm)	ft	(m)	ft	(m)
1	25	12.8	3.9	11.2	3.4
1½	40	15.2	4.6	13.3	4.1
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	26.6	8.1	23.4	7.1
10	250	29.5	9.0	25.9	7.9
12	300	32.0	9.8	28.1	8.6

* 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)
1	25	0.5	303	0.08	0.34
1½	40	0.9	592	0.34	1.41
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

* Based on Minimum Reinforced Wall

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