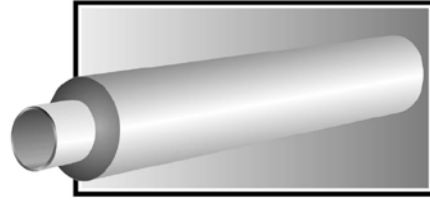


Submittal Data

Fiberglass Green Thread[®] CR Pipe



1) Product

Green Thread CR piping systems are suitable for use as the carrier piping for buried factory pre-insulated pumped condensate (hot water) return piping, domestic hot water piping, recirculating domestic hot water piping, chilled water piping, chilled-hot water piping, for service up to .061 kg/cm² (125 psig) at 121°C (250°F).

Green Thread CR, a fiberglass reinforced epoxy resin piping system, is engineered to solve tough corrosion problems such as those found in condensate return service. Two corrosion resistant materials – glass fibers and epoxy resin – are combined in a filament-wound, high strength and lightweight pipe that is not degraded by hot condensate (hot water) and water treatment chemicals.

In order to satisfy requirements of Military Specifications MIL-P-28584B, each size pipe and each size and configuration of fitting have been tested for performance in joint strength, impact resistance, boil resistance, beam strength, and pressure and temperature cyclic resistance, including water hammer effects and hydrostatic strength. The test report containing results of above program and copy of Military Specification MIL-P-28584B are available on request. For additional and more detailed data, consult Smith Fibercast Manual No. E5000, "Engineering and Design Guide." Consult Federal Agency Guide Specifications for specific requirements.

2) Fittings

Green Thread CR fittings are manufactured by filament winding or compression molding. All fittings that have been tested and certified to be in compliance with Military Specification MIL-P-28584B.

3) Joining System

The bell and spigot joint is designed for quick and reliable joining of pipe and fittings. Pipe is manufactured with one end tapered and the other end belled to accept the tapered end of the pipe. The joint is made by applying epoxy adhesive which, when cured, is compatible with the pipe system for joint strength and corrosion resistance.

4) Tapering

When Green Thread CR pipe is cut to length on the job site, the cut end must be retapered. Field tapering tools supplied by Smith Fibercast are used for this purpose. One tool is adaptable to pipe sizes 50mm, 80mm, 100mm, and 150mm (2", 3", 4", and 6"); another is used for 200mm (8") size pipe. The tools quickly apply the proper taper by a shaving operation-similar to a pencil sharpener.

5) Adhesive

The adhesive kit required for joint assembly of Green Thread CR piping components is Smith Fibercast epoxy adhesive kits DS-28584B. This adhesive kit contains epoxy resin and hardener in separate containers, with premeasured exact mixing ratio amounts, mixing stick, paint brush. DS-28584B adhesive kits have an approximate working life of 40 minutes at 24°C (75°F). A detailed instruction sheet is included with every adhesive kit.

Kit number	Adhesive Qty. (mixed)		Approx. No. of Bonds/Kit				
			50 mm (2")	75 mm (3")	100 mm (4")	150 mm (6")	200 mm (8")
	oz.	mils.					
DS 28584B-A	6.6	200	21	15	8	5	3
DS-28584B-B Twin Pack	2.8	84 ea.	18	12	7	4	-

6) Installation and Testing

Install Green Thread CR piping in accordance with good, accepted design practice. Green Thread CR pipe can be installed buried or aboveground. Complete installation instructions and design methods, charts, and tables are provided in Smith Fibercast Manuals F6000 and E5000, and Green Thread CR piping installation instructions, Manual No. B2250.

7) System Design Considerations

It is important to note that Green Thread CR pipe, as all fiberglass reinforced epoxy pipes, must be protected from excessive pressure and temperature, and water hammer caused by the operation of a trap at a drip point on a steam line. For connection to steam piping drips, to protect the Green Thread CR pipe against damage, consult applicable Federal Agency guide specifications. Steam traps should be the minimum workable size, and the vent pipe sizes should equal the trap size in case the trap hangs open.

8) System Connections

All connections between Green Thread CR piping and metal pipe should be made with flanges. Gasketing for Green Thread CR piping to Green Thread CR piping, and Green Thread CR piping to metallic flanged connections

should be 1/8 inch thick, fullfaced gaskets of a suitable elastomer such as an ethylene propylene rubber with a Shore A hardness of 60-70. Metal piping should be anchored near the connections to prevent metal piping loads being transferred into the Green Thread CR piping. Manholes should be bypassed whenever possible. If manholes cannot be bypassed, use Schedule 80 steel pipe inside the manhole and make flange connection from Green Thread CR piping to steel piping just inside the manhole wall. Penetrations through concrete, masonry, or metal walls should be made use of a metal sleeve, 50mm (2") larger in diameter than the piping. The annular opening between pipe and sleeve should be caulked with a waterproof compound, which will dry to a firm but pliable mass; or a Link-Seal® device may be used. (Link-Seal is a registered trademark of Thunderlink/Link-Seal, Livonia, MI.) For connections between Green Thread CR condensate return piping and steam piping drips, consult applicable Federal Agency guide specifications.

9) Handling and Storage

Green Thread CR pipe is packaged in compact bundles of eight (2" sizes) or six (3" & 4" sizes) or two (6" size) or one (8" size) length of pipe per bundle. Bundles of Green Thread CR pipe can be safely stored on level ground or on racks with 10-foot (or less) support spacing. Reasonable care must be used in handling Green Thread CR pipe: Do not drop or throw pipe on the ground; do not drop stones or heavy objects on pipe.

Pipe Dimensions, Weights & Capacity

Nom. Pipe Size (mm)	Nom. Pipe Size (in.)	Nom. I.D. (mm)	Nom. I.D. (in.)	Nom. O.D. (mm)	Nom. O.D. (in.)	Nom. Total Wall (mm)	Nom. Total Wall (in.)	Nom. Reinforced Wall (mm)	Nom. Reinforced Wall (in.)	Nom. Weight (kg./m)	Nom. Weight (lbs./ft)	Nom. Cap. (Lit/m)	Nom. Capacity	
													(Gal/ft)	(Cu.ft./ft)
50	2	54.5	2.145	60.3	2.375	2.92	.115	2.29	.090	0.89	0.6	2.4	.19	.025
80	3	83.1	3.270	88.9	3.500	2.92	.115	2.29	.090	1.34	0.9	5.5	.44	.058
100	4	108	4.270	114	4.500	2.92	.115	2.29	.090	1.79	1.2	9.2	.74	.100
150	6	161	6.335	168	6.625	3.68	.145	2.79	.110	3.58	2.4	20.4	1.64	.219
200	8	212	8.360	220	8.675	4.01	.158	3.12	.123	5.07	3.4	35.3	2.85	.380

Recommended Pipe Operating Ratings

Nom. Pipe Size (mm)	Nom. Pipe Size (in.)	Max. Internal Pressure (Mpa)	Max. Internal Pressure (psig)	Max. Tensile Load (kg)		Max. Tensile Load (lbs.)		Min. Bending Radius (m)	Min. Bending Radius (ft)
				@24°C	@121°C	@75°F	@250°F		
50	2	0.86	125	898	581	1980	1280	21	70
80	3	0.86	125	1343	866	2960	1910	34	110
100	4	0.86	125	1719	1111	3790	2450	43	140
150	6	0.86	125	3606	2332	7950	5140	64	210
200	8	0.86	125	5688	3674	12540	8100	82	270

Ultimate & Allowable Design Stresses & Other Physical Properties

Property	Test Method	@24°C	@121°C	@75°F	@250°F
Axial Tensile					
Ultimate Stress	ASTM D2105	105 MPa	66 MPa	15,200 psi	9,540 psi
Design Stress		26 MPa	16 MPa	3,800 psi	2,390 psi
Modules of Elasticity	ASTM D2105	12,411 MPa	4,964 MPa	1.80 x 10 ⁶ psi	0.72 x 10 ⁶ psi
Axial Compressive					
Ultimate Stress	ASTM D695	230 MPa	123 MPa	33,300 psi	17,800 psi
Design Stress		57 MPa	31 MPa	8,300 psi	4,450 psi
Modules of Elasticity psi		8,687	3,723	1.26 x 10 ⁶ psi	0.54 x 10 ⁶ psi
Hydrostatic Burst					
Ult. Hoop Stress	ASTM D1599	319 MPa	N/A	46,300 psi	N/A
Coeff. Of Linear					
Thermal Expansion	AOSI TM16-3	2.27 x 10 ⁻⁵ mm/mm/°C		1.26 x 10 ⁻⁵ in./in.°F	
Thermal Conductivity	AOSI TM16-15	40 W/m/K		2.8 BTU/(ft. ²)(hr.)(F/in.)	
Specific Gravity	ASTM D792	1.8		1.8	
Flow Factor	Hazen-Williams	150		150	

Note: Installation instructions, recommendations, and design methods referred to on these pages combine information from Smith Fibercast Manual No. F6000, "General Installation Instructions for Adhesive Bonded Piping Systems," Smith Fibercast Manual No E5000, "Engineering & Design Guide," and Federal Agency guide specifications. For complete information, consult these documents, which are available on request.

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