

SMITH FIBERCAST RED THREAD® II FM Fire Protection Piping Systems



FGS Smith Fibercast offers RED THREAD II FM Factory Mutual Approved pipe and fittings for use in underground fire protection systems.

These specially labeled systems are available on request and have the physical and mechanical properties as described in this bulletin.

Significant features that make RED THREAD II FM Fire Protection piping systems ideal:

- Internal and external corrosion resistance.
- Improved flow characteristics compared to traditional materials.
- Light weight and ease of installation.
- Pressure ratings up to 200 psig.



Dimensional Data

Nominal Pipe Size (In.)	Part Number	Nominal O.D. (In.)	Nominal I.D. (In.)	Nominal Wall Thickness (In.)	Nominal Weight (Lbs./Ft.)
4	011040-073-3	4.562	4.364	.099	1.2
6	011060-120-3	6.678	6.408	.135	2.4
8	011080-126-3	8.642	8.356	.143	3.3
10	011100-156-3	10.731	10.357	.187	5.3
12	011120-185-3	12.710	12.278	.216	7.2
14	011140-220-3	14.567	14.029	.269	10.1
16	011160-250-3	16.637	16.031	.303	13.2

General Specifications

Nominal Pipe Size (In.)	Rated Working Pressure (psig)	Mill Test Pressure (psig)	Min. Bending Radius(1) @ 75°F (Ft.)	Stiffness Factor @ 5% Deflection (In. ³ • Lbs.)/In. ²	Pipe Stiffness @ 5% Deflection (psi)
4	200	400	97	150	90
6	200	400	141	890	170
8	200	400	183	760	60
10	200	400	227	1620	75
12	200	400	269	1940	50
14	200	400	308	4400	80
16	200	400	352	6520	80

(1) Sharper bends should be eliminated and avoid stress concentration which could result in premature pipe failure under pressure conditions.

RED THREAD II FM Product Data

RED THREAD II FM piping systems should be installed according to instructions in Installation Handbook, Manual No.F6000.

RED THREAD II FM piping for Factory Mutual Approved systems must be joined using 8000 series adhesives. For installations that are installed in compliance with Factory Mutual procedures, anchoring (thrust blocking) must be in accordance with Factory Mutual installation standards.

Typical Physical Properties

Property	Value (psi) @ 75°F
Axial Tensile Strength, ASTM D-2105	10,300
Modulus of Elasticity in Tension, ASTM, D-2105	1.82 X 10 ⁶
Long Term Hydrostatic Strength, Cyclic Pressure 150 x 10 ⁶ Cycles, ASTM D-2992, Procedure A	13,040*
Thermal Expansion-Axial, ASTM D696	0.88 x 10 ⁻⁵ in./in./°F
Flow Factor, SF (Hazen-Williams Coefficient)	150

* For RED THREAD II pipe the hydrostatic design stress cyclic at 150°F is 10,450 psi, per ASTM D2992, Procedure A. Bases on complete data sets obtained at 150°F and 210°F, the extrapolated value at 75°F is 13,040 psi.

Flow Data

Pressure loss for other fluids in turbulent flow can be calculated using the following equation:

$$P = \frac{2.1673 \times 10^{-4} \rho f L G^2}{D^5}$$

Where:

- f = Friction Factor = a + bR^{-c}
- a = .0094 K^{0.225} = 0.53K
- b = 88K^{0.44}
- c = 1.62 K^{0.134}
- P = Pressure Loss, psig
- r = Density, lbs./ft.³
- R = Reynolds Number = $\frac{50.66 G \rho}{\mu D}$
- m = Viscosity, cps
- e = Absolute Roughness, in.
- G = Flow, gal./min.
- D = Inside Diameter, in.
- K = Relative Roughness, e/D
- L = Length, ft.
- m = (S.G.) 93,000 (Kinematic Viscosity, ft.²/sec.)

EQUATION FOR CONVERTING from Head Loss in psig to Head Loss in feet:

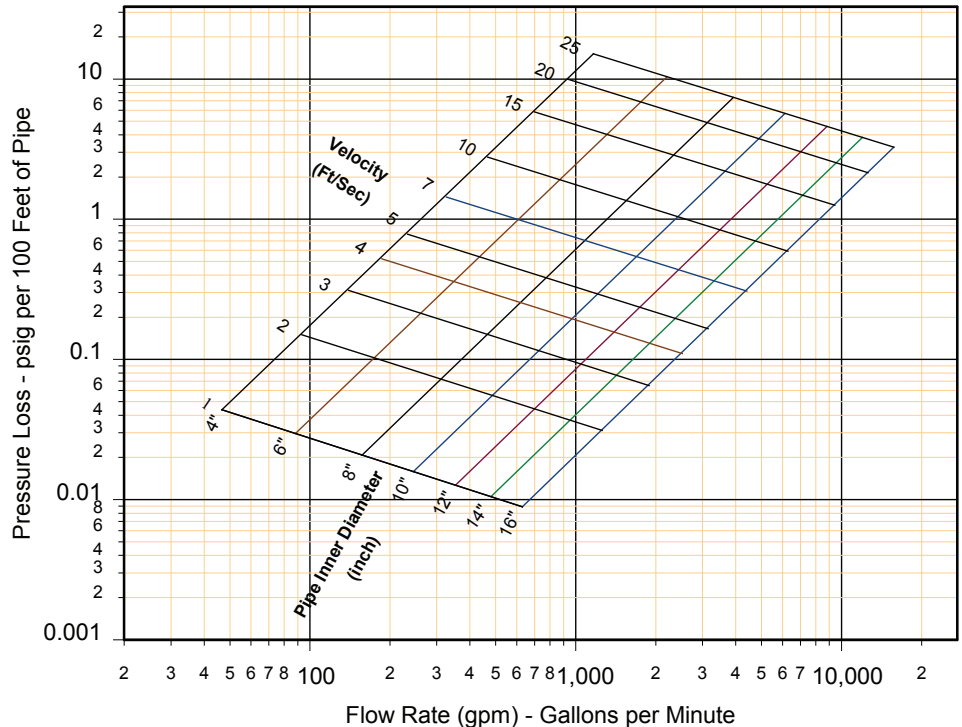
$$\Delta h = \frac{2.31 \Delta p}{S.G.}$$

Where:

- Dh = Head Loss in feet;
- Dp = Head Loss in psig;
- S.G. = Specific Gravity (Specific Gravity of water is 1.0).

FM Pipe Pressure Loss Curves for Water

Basis: Specific Gravity of 1.0 and Viscosity of 1.0 cps



Note: The above curves are based on a viscosity of 1.0 centipoise and a fluid density of 62.4 lbs./ft.³.

RED THREAD II FM Product Data

Equivalent pipe footage to be added for fittings when calculating pressure loss for RED THREAD II FM Piping Systems†

Fitting	4"	6"	8"	10"	12"	14"	16"
90° Elbow	10	15	21	27	32	38	44
45° Elbow	5	7	10	13	16	18	22
Tee-Flow-thru Run	6	9	13	16	60	70	81
Tee-Flow-thru Branch	18	28	38	49	20	23	27
One Step Concentric Reducers ⁽²⁾	-	2	3	3	3	3	4
Two Step Concentric Reducers ⁽²⁾	-		3	4	4	5	8

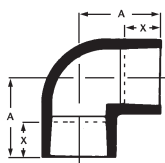
(2) Note: The equivalent footages to be added for concentric reducers are expressed in terms of the smaller pipe size, i.e. a 6" x 4" concentric reducer is equivalent to 3.5 feet of 4" pipe.

† Based on fluid velocity of 10ft./sec.

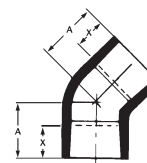
Fittings Dimensions

Available fittings are either molded (Type M) or filament wound (Type FW) as indicated in the tables below. The rated working pressure of all fittings is 200 psig.

90° Elbow
Bell x Bell



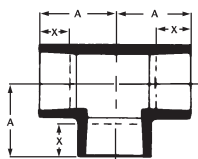
45° Elbow
Bell x Bell



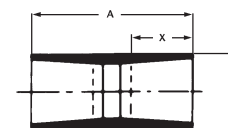
Nom. Pipe Size (In.)	Part Number	A (In.)	X(3) (In.)	Type
4	022040-360-3	5.125	1.500	M
6	022060-360-3	12.750	3.750	FW
8	022080-360-3	11.625	4.375	FW
10	022100-360-3	13.125	4.125	FW
12	022120-360-0	14.000	4.250	FW
14	022140-360-3	19.000	7.000	FW
16	022160-360-3	20.250	7.250	FW

Nom. Pipe Size (In.)	Part Number	A (In.)	X(3) (In.)	Type
4	022040-310-3	3.875	1.500	M
6	022060-310-3	7.500	3.750	FW
8	022080-310-3	8.125	4.375	FW
10	022100-310-3	8.625	4.125	FW
12	022120-310-3	9.500	4.250	FW
14	022140-310-3	12.500	7.000	FW
16	022160-310-3	13.250	7.250	FW

Tees
Belled



Sleeve Couplings
Bell x Bell



Nom. Pipe Size (In.)	Part Number	A (In.)	X(3) (In.)	Type
4	022040-410-3	5.125	1.500	M
6	022060-410-3	9.500	2.875	FW
8	022080-410-3	11.625	4.375	FW
10	022100-410-3	13.125	4.125	FW
12	022120-410-0	14.000	4.250	FW
14	022140-410-3	19.000	7.000	FW
16	022160-410-3	20.250	7.250	FW

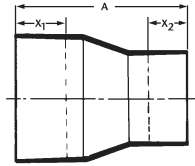
Nom. Pipe Size (In.)	Part Number	A (In.)	B (In.)	X(3) (In.)	Type
4	012040-101-5	7.000	4.875	2.875	FW
6	012060-101-3	8.375	7.125	3.375	FW
8	012080-101-3	10.000	9.000	3.875	FW
10	012100-101-3	10.500	11.125	3.500	FW
12	012120-101-0	11.000	13.500	5.750	FW
14	012140-101-3	15.000	15.500	6.000	FW
16	012160-101-3	17.000	17.625	6.250	FW

(3) X dimension is a nominal make-up dimension for drawing layout work only. Do not use for assembly dimensions.

RED THREAD II FM Product Data

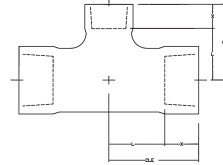
Concentric Reducers

Bell x Bell



Reducing Tees

Belled

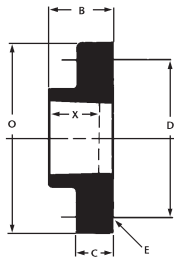


Nom. Pipe Size (In.)	Part Number	A (In.)	X ₁ (In.)	X ₂ (3) (In.)	Type
6 x 4	022060-236-3	9.000	2.375	1.500	M
8 x 4	022080-237-3	18.750	5.625	3.750	FW
8 x 6	022080-235-3	14.314	4.375	2.875	FW
10 x 6	022100-237-3	20.000	5.625	3.750	FW
10 x 8	022100-235-3	16.500	4.125	4.375	FW
12 x 8	022120-237-3	23.125	6.000	5.625	FW
12 x 10	022120-235-3	17.750	4.250	4.125	FW
14 x 10	022140-237-3	28.625	7.000		FW
14 x 12	022140-235-3	22.750	7.000		FW
16 x 12	022160-237-3	33.75	7.250		FW
16 x 14	022160-235-3	28.125	7.250		FW

Nom. Pipe Size (In.)	Part Number	AT (In.)	AS (In.)	X ₁ (In.)	X ₂ (3) (In.)	Type
8 x 6	022080-460-3	11.625	10.25	5.625	3.750	FW
10 x 6	022100-460-3	13.125	11.75	5.625	3.750	FW
10 x 8	022100-480-3	13.250	13.625	5.625	5.625	FW
12 x 6	022120-460-3	13.875	13.25	5.875	3.750	FW
12 x 8	022120-480-3	13.125	15.125	5.875	5.625	FW
12 x 10	022120-490-3	13.875	15.125	5.875	5.625	FW
14 x 6	022140-460-3	19.125	13.75	8.500	3.750	FW
14 x 8	022140-480-3	19.125	15.625	8.500	5.625	FW
14 x 10	022140-490-3	19.125	15.625	8.500	5.625	FW
14 x 12	022140-492-3	19.125	15.875	8.500	5.875	FW
16 x 6	022160-460-3	20.250	14.75	9.000	3.750	FW
16 x 8	022160-480-3	20.250	16.625	9.000	5.625	FW
16 x 10	022160-490-3	20.250	16.625	9.000	5.625	FW
16 x 12	022160-492-3	20.250	16.875	9.000	5.875	FW
16 x 14	022160-494-3	20.250	19.5	9.000	8.500	FW

Flanges

Bell End



Nom. Pipe Size (In.)	Part Number	B (In.)	C (In.)	D (In.)	E (In.)	O (In.)	X(3) (In.)	Req'd Torquing of Flanges(4) Torque (ft. * Lbs.)		Type
								To Seal	Max.	
4	022040-172-3	2.625	1.375	7.500	.75 D-8 Holes	9.000	1.875	25	30	M
6	022060-172-3	3.000	1.500	9.500	.875 D-8 Holes	11.000	2.000	25	30	M
8	022080-172-3	4.000	1.750	11.750	.875 D-8 Holes	13.500	3.500	80	100	M
10	022100-172-3	4.750	2.000	14.000	1 D-12 Holes	16.000	3.500	80	100	FW
12	022120-172-0	5.000	2.250	17.000	1 D-12 Holes	19.000	3.875	80	100	FW
14	022140-172-3	3.125	2.500	18.750	1.125 D-12 Holes	20.750	3.000	80	100	FW
16	022160-172-3	5.000	4.375	21.250	1.125 D-12 Holes	23.375	3.000	80	100	FW

(3) X dimension is a nominal make-up dimension for drawing layout work only. Do not use for assembly dimensions.

(4) Use only with full-face 60-70 Durometer gaskets and flat-faced flanges.



It is the policy of Fiber Glass Systems to improve its products continually. In accordance with that policy, the right is reserved to make changes in specifications, descriptions, and illustrative material contained in this bulletin as conditions warrant. Always cross-reference the bulletin date with the most current version listed at www.smithfibercast.com. The information contained herein is general in nature and is not intended to express any warranty of any type whatsoever, nor shall any be implied.