

Fluoropolymer Tubing

IN A CHOICE OF STANDARD AND HIGH-PURITY RESIN FORMULATIONS

FEATURES

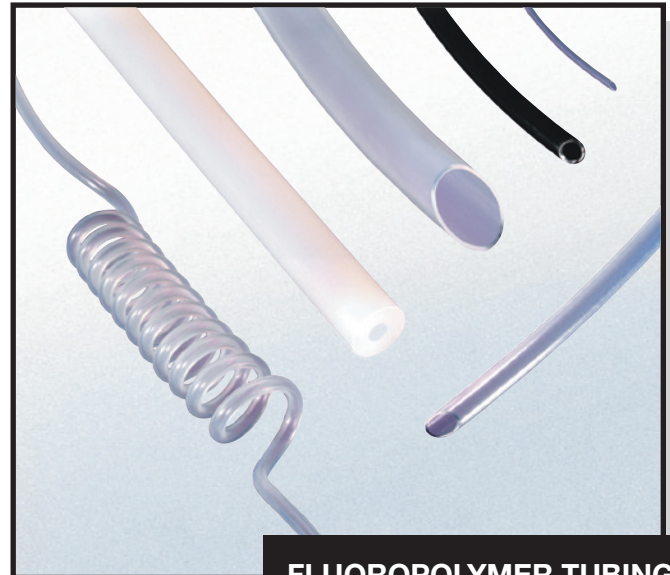
- Custom configurations and shapes
- Dual, bonded tubing
- Wide range of sizes
- Natural and custom colors
- FEP, PFA, PFA/HP, UHP-FEP, and TEFZEL® resins available
- Custom packaging and spooling
- TQM quality
- Stocking program for JIT delivery
- Competitive pricing
- Meets ASTM D-3296

APPLICATIONS

- Semiconductor manufacturing
- Pharmaceutical processing
- Medical equipment
- Chemical processing
- Food and beverage processing
- Aerospace
- Automotive
- Electrical sleeving
- Gas and water analysis

DESCRIPTION

AMETEK Fluoropolymer Tubing—in FEP, PFA, PFA-HP, and TEFZEL® resins—is designed for a wide range of high-purity and corrosive-resistant applications covering temperature ranges from -275° to 400°F. The nonstick characteristics of fluoropolymer resins, combined with their low extractable levels and chemically inert nature, make AMETEK tubing ideal for aerospace, automotive, electronics, food and beverage, medical, pharmaceutical, and chemical processing applications.



FLUOROPOLYMER TUBING

High-Purity Tubing—AMETEK produces Fluoropolymer Tubing designed to meet the exacting high purity requirements of the semiconductor and pharmaceutical industries. AMETEK produces tubing under strict standards utilizing high-purity UHP-FEP as well as the traditional high-purity PFA resins. Specifications defining exact resin grade and/or manufacturer can easily be accommodated. Tubing produced from the UHP-FEP resin exhibits the surface smoothness typical of FEP, while exceeding the cleanliness (low extractable levels) typical of HP-PFA. UHP-FEP also allows significant cost savings over PFA tubing. HP-PFA exhibits a high temperature capability, along with the low extractable levels and low reactivity characteristics required in ultrahigh-purity applications.

Packaging and Handling—AMETEK Fluoropolymer Tubing is produced and packaged under strict standards of cleanliness, with capped ends and tubing sealed in plastic for clean storage. AMETEK Fluoropolymer Tubing can also be supplied on plastic spools, overwrapped with plastic for added protection.

TEFZEL® is a registered trademark of the DuPont Company

CHEMICAL PROPERTIES

- Chemically inert, non-contaminating
- Resistant to corrosive agents
- Nonsoluble
- Non-adhesive
- Non-flammable
- Low permeability

ELECTRICAL PROPERTIES

- Low dielectric content
- Low dissipation factor
- High arc resistant
- High surface and volume resistivity

MECHANICAL PROPERTIES

- Temperature stability and flexibility (-275 to 400°F)
- Low friction coefficient
- Resists thermal and mechanical shock
- Non-aging

PHYSICAL PROPERTIES	RESIN TYPE			
	FEP	PFA	PFA HP	TEFZEL® 280
Ultimate Tensile Strength, psi (ASTM D-638)	3,000 (73°F)	4,000 (73°F) 2,000 (482°F)	4,000 (73°F) 2,000 (482°F)	6,700 (73°F)
Ultimate Elongation, %	300 (73°F) 500 (482°F)	300 (73°F) 500 (482°F)	300 (73°F)	300 (73°F)
Coefficient of Friction (Dynamic)	0.30 (Avg.)	0.25 (Avg.)	0.25 (Avg.)	0.23 (Avg.)
Flexural Modulus psi x 10 ³ (ASTM D-790)	90 (73°F)	90 (73°F) 10 (482°F)	90 (73°F) 10 (482°F)	170
Impact Strength Notched Izod (ft.lb./in.) (ASTM D-256)	no break (73°F) 2.9 (-65°F)	no break (73°F) 1.2 (-320°F)	no break (73°F) 1.2 (-320°F)	no break (73°F)
Continuous Use Temperature, °F	400	500	500	302
Specific Gravity (ASTM D-792)	2.12 - 2.17	2.12 - 2.17	2.12 - 2.17	1.70
Dielectric Strength (ASTM D-149) Short term Volts/Mil	2,000	2,000	2,000	1,800
Dielectric Constant (ASTM D-150)	2.10	2.03	2.03	2.5
Melting Point, °F	500	582	582	280

SPECIFICATIONS—Typical Sizes

INDUSTRIAL WALL

SIZE I.D.	O.D.	WALL THICKNESS	I.D./O.D. TOL.
1/32 x 1/16	0.015 ±0.003	0.004	
1/32 x 3/32	0.030 ±0.005	0.004	
1/16 x 1/8	0.030 ±0.005	0.005	
3/32 x 5/32	0.030 ±0.005	0.005	
1/8 x 3/16	0.030 ±0.005	0.005	
3/16 x 1/4	0.030 ±0.005	0.005	
5/32 x 1/4	0.047 ±0.005	0.005	
1/4 x 5/16	0.030 ±0.005	0.005	
5/16 x 3/8	0.030 ±0.005	0.006	
3/8 x 7/16	0.030 ±0.005	0.006	
7/16 x 1/2	0.030 ±0.005	0.007	
1/2 x 9/16	0.030 ±0.005	0.007	
9/16 x 5/8	0.030 ±0.007	0.007	
5/8 x 11/16	0.030 ±0.007	0.008	
11/16 x 3/4	0.030 ±0.007	0.009	
3/4 x 13/16	0.030 ±0.007	0.009	
7/8 x 31/32	0.047 ±0.007	0.010	
1 x 1-3/32	0.047 ±0.007	0.010	

HEAVY WALL

SIZE I.D.	O.D.	WALL THICKNESS	I.D./O.D. TOL.
1/16 x 3/16	0.062 ±0.008	0.005	
1/8 x 1/4	0.062 ±0.008	0.005	
3/16 x 5/16	0.062 ±0.008	0.005	
1/4 x 3/8	0.062 ±0.008	0.005	
5/16 x 7/16	0.062 ±0.008	0.006	
3/8 x 1/2	0.062 ±0.008	0.006	
7/16 x 9/16	0.062 ±0.008	0.007	
1/2 x 5/8	0.062 ±0.008	0.007	
9/16 x 11/16	0.062 ±0.008	0.008	
5/8 x 3/4	0.062/0.008	0.008	
11/16 x 13/16	0.062/0.008	0.009	
3/4 x 7/8	0.062 ±0.008	0.009	
7/8 x 1	0.062 ±0.008	0.010	
1 x 1-1/8	0.062 ±0.008	0.010	

TUBING BURST PRESSURE

An approximate value for burst pressure may be calculated using the following formulas:

$$P_B = S (OD/ID - 1)$$

$$S = X - YT$$

Where:

P_B = Burst pressure, psi

S = Material strength, psi

OD = Outer diameter of tubing, in.

ID = Inner diameter of tubing, in.

X = Material constant: X (FEP) = 1929

X (PFA) = 2278

Y = Material constant: Y (FEP) = 4.285

Y (PFA) = 3.77

T = Maximum temperature of the fluid in the tubing, °F

NOTE: This formula is only valid for values of T between 0°F and 500°F.

Packaging will normally be coils of random production lengths. Tubing O.D.s greater than 1/2 inch may require packaging in straight lengths. Custom lengths, packaging, and spooling upon request.

Supplied in natural color. Specific colors upon request.

Contact AMETEK for other sizes (AWG, metric, custom).

Fluoropolymer resins are generally considered inert to most chemicals. Under certain conditions of pressure and temperature, or combinations of chemicals, fluoropolymer tubing should not be used. Please contact AMETEK for discussion of your specific process to be certain that our products are appropriate for your intended use.

Adequate ventilation should be used where fluoropolymers are heated during tube repairs. Flu-like symptoms may occur from exposure to vapors evolved from fluoropolymers at very high temperatures, up to 800°F or from smoking materials that contain particles of fluoropolymers. Symptoms pass within 48 hours and are the only adverse effects observed in humans to date. Unheated fluoropolymers are essentially inert and are nonirritating to the skin.

This information set forth herein is furnished free of charge and is based on technical data which AMETEK believes to be reliable. It is intended for use by persons having technical skill and at their own discretion and risk. Since conditions of use are outside our control, we make no warranties, express or implied, and assume no liability in connection with your use of this information. Nothing herein is to be taken as a license to operate under or a recommendation to infringe any patents.

AMETEK®

FLUOROPOLYMER PRODUCTS

455 CORPORATE BOULEVARD, NEWARK, DELAWARE 19702 U.S.A.

TEL: (302) 995-0400 • (800) 441-7777 • FAX: (302) 456-4444 • www.ametekhaveg.com • E-mail: info.haveg@ametek.com

© 2005, by AMETEK, Inc. All rights reserved.

605PDF (040039)



BULLETIN T2001