tyco Electronics

MT1000

Raychem

Altera medical-grade, thin wall, semirigid, fluoropolymer heat-shrinkable tubing

Altera MT1000 heat-shrinkable tubing is tough, semirigid tubing with a very thin wall construction. It is especially suitable for applications requiring high-temperature performance, outstanding resistance to abrasion and cut-through, and excellent resistance to a variety of fluids. In polar media, such as aqueous systems and alcohols, property retention and dimensional stability are exceptional.

The translucent polyvinylidene fluoride material permits visual inspection of covered components. Altera MT1000 tubing provides electrical insulation and strain relief for components that are exposed to high temperatures – either during operation or during sterilization. With its thin-wall construction, Altera MT1000 tubing is ideal for applications that have clearance constraints.

Altera MT1000A tubing provides an inner layer of adhesive. During installation, the USP Class VI adhesive layer will reflow around the substrate to provide sealing or blocking against fluids and other bioburden materials.

Altera MT1000 tubing may be sterilized by radiation, ethylene oxide, steam, and dry heat with no significant change in properties. It is fabricated from materials that meet the requirements of U.S. Pharmacopeia (USP) Class VI plastics (contact with injectables and body fluids or tissue).

Temperature rating

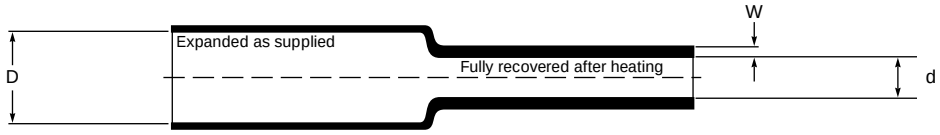
Full recovery temperature:	175°C	
Continuous operating temperature:	MT1000: –55°C to 155°C	MT1000A: -55°C to 125°C
Recommended maximum temperature for use as a primary insulator:	135°C	

*Specifications**

Type	Raychem	Material	Master File Number
MT1000	MT1000 SCD	USP Class VI	MAF-444
MT1000A	MT1000A SCD	USP Class VI	MAF-798

*When ordering, always specify latest issue.

Dimensions (millimeters/inches)



Size	Inside diameter D (min.) Expanded as supplied	Inside diameter d (max.) Recovered after heating	Wall thickness W Recovered after heating**
3/64***	1.2 *0.046*	0.6 *0.023*	0.25 ± 0.05 *0.010 ± 0.002*
1/16	1.6 *0.063*	0.8 *0.031*	0.25 ± 0.05 *0.010 ± 0.002*
3/32	2.4 *0.093*	1.2 *0.046*	0.25 ± 0.05 *0.010 ± 0.002*
1/8	3.2 *0.125*	1.6 *0.062*	0.25 ± 0.05 *0.010 ± 0.002*
3/16	4.7 *0.187*	2.4 *0.093*	0.25 ± 0.05 *0.010 ± 0.002*
1/4	6.4 *0.250*	3.2 *0.125*	0.33 ± 0.05 *0.013 ± 0.002*
3/8	9.5 *0.375*	4.7 *0.187*	0.33 ± 0.05 *0.013 ± 0.002*
1/2	12.7 *0.500*	6.4 *0.250*	0.33 ± 0.05 *0.013 ± 0.002*
3/4***	19.1 *0.750*	9.5 *0.375*	0.43 ± 0.08 *0.017 ± 0.003*
1***	25.4 *1.000*	12.7 *0.500*	0.48 ± 0.08 *0.019 ± 0.003*
1 1/2***	38.1 *1.500*	19.1 *0.750*	0.51 ± 0.08 *0.020 ± 0.003*

**Wall thickness will be less if tubing recovery is restricted during shrinkage.
***Nonstandard size; available by special order only.

Ordering information

Colors	**Standard**	Translucent
	Nonstandard	Black
Size selection	Always order the largest size that will shrink snugly over the component being covered.	
	A variety of special order sizes are available.	
Standard packaging	4-foot lengths, double-bagged	
Ordering description	Specify product name, size, and color; for example, MT1000-1/8-0 (0=Black).	
	Specify MT1000A for adhesive-lined constructions in sizes 1/8” and larger only (special order).	

Specification values

	Property	Unit	Requirement	Method of test
Physical	Dimensions	mm *(inches)*	See reverse	ASTM D 2671
	Longitudinal change	percent	+0, -10	ASTM D 2671
	Tensile strength	psi *(Mpa)*	5000 *(34.5)* minimum	ASTM D 2671
	Ultimate elongation	percent	150 minimum	ASTM D 2671
	Secant modulus (expanded)	Psi *(Mpa)*	1 X 10^5 *(690)* minimum	ASTM D 2671
	Heat resistance (168 hours at 250°C/*482°F*)			ASTM D 2671
	Followed by test for:			
	Ultimate Elongation	percent	50 minimum	ASTM D 2671
Electrical	Dielectric strength	volts/mil *(volts/mm)*		ASTM D 2671
	Sizes 3/64 through 1/2		800 *(31,500)* minimum	
	Sizes 3/4 through 1 1/2		600 *(23,600)* minimum	
	Dielectric withstand 3000 V, 60 Hz	seconds	60 minimum	ASTM D 2671
Chemical	Fluid resistance (24 hours at 23°C/*73°F*) in: Isopropyl Alcohol 5% Saline Solution Cidex*†			ASTM D 2671
	Followed by tests for:			
	Dielectric strength	volts/mil *(volts/mm)*		ASTM D 2671
	Sizes 3/64 through 1/2		700 *(27,600)* minimum	
	Sizes 3/4 through 1 1/2		500 *(19,700)* minimum	
	Tensile strength	psi *(Mpa)*	5000 *(34.5)* minimum	ASTM D 2671
	Heavy metals analysis Cadmium Mercury Lead Bismuth Antimony	ppm	1 maximum (total of all metals)	USP XXII Physiochemical Tests - Plastics

Typical performance values

	Property	Unit	Performance	Method of Test
Electrical	Dielectric strength**	volts/mil (volts/mm)		ASTM D 2671
	0.005" < IWT ≤ 0.010"		1200 *(47,244)*	
	0.010" < IWT ≤ 0.015"		1000 *(39,370)*	
	0.015" < IWT ≤ 0.020"		700 *(27,559)*	
Adhesive Properties	Ring and bell softening point	°C	165 ± 10	ASTM E 28
(MT1000A only)* **	Adhesion to:			
	Polypropylene		Poor	
	HDPE		Poor	
	Polyurethane		Excellent	
	PVC		Excellent	
	Steel		Excellent	

*Trademark of Johnson & Johnson Company **IWT = Installed wall thickness ***Not recommended for use on Teflon or silicone substrates.
†Or equivalent dilute glutaraldehyde sterilizing solution.
Note: Consult the MT1000 SCD for specific details about test procedures.

Users should independently evaluate the suitability of the product for their application.

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