

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

Altera MT3000 heat-shrinkable tubing is tough, flexible tubing with a very thin wall construction. It is especially suitable for applications requiring high temperature performance and resistance to abrasion, cut-through, and a variety of fluids. In polar media, such as aqueous systems and alcohols, property retention and dimensional stability are exceptional.

Altera MT3000 tubing provides electrical insulation and strain relief for components that are exposed to high temperatures - either during operation or during sterilization. With its exceptional flexibility and thin-wall construction, Altera MT3000 tubing is ideal for applications where pliancy coupled with small overall bundle size is desired.

Altera MT3000 tubing may be sterilized by radiation, ethylene oxide, 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

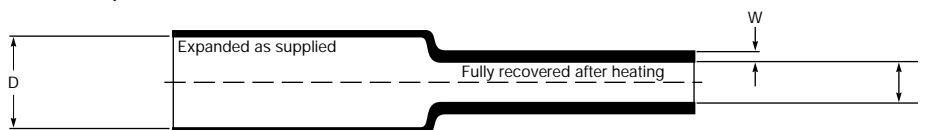
Full recovery temperature:	150°C
Continuous operating temperature:	-55°C to 150°C
Recommended maximum temperature for use as a primary insulator:	135°C

Specifications*

Type	Raychem	Material	Master File Number
MT3000	MT3000 SCD	USP Class VI	MAF-472

*When ordering, always specify latest issue.

Dimensions (millimeters/inches)



Size	Inside diameter		d (max.)		Wall thickness	
	D (min.) Expanded as supplied		Recovered after heating		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	4.8	0.187	2.4	0.093	0.25 ± 0.05	0.010 ± 0.002
1/4	6.4	0.250	3.2	0.125	0.30 ± 0.05	0.012 ± 0.003
3/8	9.5	0.375	4.8	0.187	0.30 ± 0.05	0.012 ± 0.003
1/2	12.7	0.500	6.4	0.250	0.30 ± 0.05	0.012 ± 0.003
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

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

Ordering information

Colors	Standard Nonstandard	Black White
Size selection	Always order the largest size that will shrink snugly over the component being covered. A variety of special order sizes may be made available upon request.	
Standard packaging	On plastic spools, double-bagged	
Ordering description	Specify product name, size, and color, for example MT3000 1/4-0 (0=Black).	

Specification values

	Property	Unit	Requirement	Method of test	
Physical	Dimensions	mm (<i>inches</i>)	See reverse	ASTM D 2671	
	Longitudinal change	percent	+0, -10	ASTM D 2671	
	Concentricity as supplied	percent	70 minimum	ASTM D 2671	
	Tensile strength	psi (<i>Mpa</i>)	4000 (27.6) minimum	ASTM D 2671	
	Ultimate elongation	percent	300 minimum	ASTM D 2671	
	Secant modulus (recovered)	psi (<i>Mpa</i>)	50,000 (345) maximum	ASTM D 2671	
	Heat resistance (336 hours at 225°C/437°F)			ASTM D 2671	
	Followed by test for:				
	Ultimate Elongation	percent	250 minimum	ASTM D 2671	
Electrical	Dielectric strength	volts/mil (<i>volts/mm</i>)	500 (19,680) minimum	ASTM D 2671	
	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 (<i>volts/mm</i>)	400 (15,760) minimum	ASTM D 2671
		Tensile strength	psi (<i>Mpa</i>)	3500 (24.1) 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 (<i>volts/mm</i>)		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)	

*Trademark of Johnson & Johnson Company **IWT = Installed wall thickness.

†Or equivalent dilute glutaraldehyde sterilizing solution.

Note: Consult the MT3000 SCD for specific details about test procedures.

Altera and Raychem are trademarks of Tyco Electronics Corporation.

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

Tyco Electronics Corporation

300 Constitution Drive
Menlo Park, CA 94025-1164
USA
Tel: (800) 926-2425 (US & Canada)
Tel: +1 (650) 361-3860 (All other countries)

Faraday Road
Dorcan, Swindon, SN3 5HH
United Kingdom
Tel: +44 1793 528171

3816 Noborito, Tama-ku
Kawasaki, Kanagawa 214-8533
Japan
Tel: +81 44 900 5102

Asia Pacific Headquarters
26 Ang Mo Kio, Industrial Park 2
Singapore 569507
Tel: +65 4866 151

All information, including illustrations, is believed to be reliable. Users, however, should independently evaluate the suitability of each product for their application. Tyco Electronics Corporation makes no warranties as to the accuracy or completeness of the information, and disclaims any liability regarding its use. Tyco Electronics Corporation's only obligations are those in the Standard Terms and Conditions of Sale for these products and in no case will Tyco Electronics Corporation be liable for any incidental, indirect, or consequential damages arising from the sale, resale, use, or misuse of the product. Tyco Electronics Corporation's Specifications are subject to change without notice. In addition, Tyco Electronics Corporation reserves the right to make changes in materials or processing without notification to the Buyer which do not affect compliance with any applicable specification.

For more information about this product visit www.tycoelectronics.com