

Altera medical-grade, flexible, polyolefin heat-shrinkable tubing

Altera MT5000 heat-shrinkable tubing is flexible tubing with a single-wall construction. It is especially suitable for applications requiring excellent electrical insulation performance and resistance to abrasion and harmful solvents.

Altera MT5000 tubing can provide electrical insulation, mechanical protection, strain relief, color coding,

and identification for many medical components and devices. A few sizes can cover a wide range of substrates.

Altera MT5000A 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 MT5000 tubing may be sterilized by radiation and ethylene oxide 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**

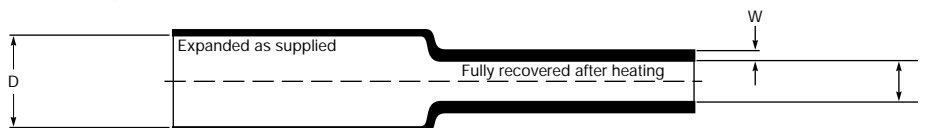
Full recovery temperature:	Black: 110°C	All other colors: 100°C
Continuous operating temperature:	-70°C to 105°C	

**Specifications\***

Type	Raychem	Material	Master File Number
MT5000	MT5000 SCD	USP Class VI	MAF-649
MT5000A	MT5000A SCD	USP Class VI	MAF-800

\*When ordering, always specify latest issue.

**Dimensions (millimeters/inches)**



Size	Inside diameter		Wall thickness	
	D (min.) Expanded as supplied	d (max.) Recovered after heating	W Recovered after heating**	
3/64***	1.2 0.046	0.6 0.023	0.40 ± 0.08	0.016 ± 0.003
1/16	1.6 0.063	0.8 0.031	0.43 ± 0.08	0.017 ± 0.003
3/32	2.4 0.093	1.2 0.046	0.50 ± 0.08	0.020 ± 0.003
1/8	3.2 0.125	1.6 0.062	0.50 ± 0.08	0.020 ± 0.003
3/16	4.8 0.187	2.4 0.093	0.50 ± 0.08	0.020 ± 0.003
1/4	6.4 0.250	3.2 0.125	0.64 ± 0.08	0.025 ± 0.003
3/8	9.5 0.375	4.8 0.187	0.64 ± 0.08	0.025 ± 0.003
1/2	12.7 0.500	6.4 0.250	0.64 ± 0.08	0.025 ± 0.003
3/4***	19.1 0.750	9.5 0.375	0.76 ± 0.08	0.030 ± 0.003
1***	25.4 1.000	12.7 0.500	0.88 ± 0.12	0.035 ± 0.005
1 1/2***	38.1 1.500	19.1 0.750	1.01 ± 0.15	0.040 ± 0.006

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

**Ordering information**

Colors	<b>Standard</b> Black, clear, blue <b>Nonstandard</b> White, red, yellow
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	On plastic spools, double-bagged
Ordering description	Specify product name, size, and color; for example, MT5000-1/8-0 (0=Black). Specify MT5000A for adhesive-lined constructions in sizes 1/8" and larger only (special order).

## 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> )	1800 ( <i>12.4</i> ) minimum	ASTM D 2671
	Ultimate elongation	percent	200 minimum	ASTM D 2671
	Secant modulus (recovered)	psi ( <i>Mpa</i> )	2.5 X 10 <sup>4</sup> ( <i>172</i> ) maximum	ASTM D 2671
	Heat resistance (168 hours at 125°C/257°F) Followed by test for:			ASTM D 2671
	Ultimate Elongation	percent	100 minimum	ASTM D 2671
Electrical	Dielectric strength	volts/mil ( <i>volts/mm</i> )	500 ( <i>19,680</i> ) 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*† Followed by tests for:			ASTM D 2671
	Dielectric strength	volts/mil ( <i>volts/mm</i> )	500 ( <i>19,680</i> ) minimum	ASTM D 2671
	Tensile strength	psi ( <i>Mpa</i> )	1800 ( <i>12.4</i> ) minimum	ASTM D 2671
	Heavy metals analysis Cadmium Mercury Lead Bismuth Antimony	ppm	1 maximum (total of all metals)	USP XXII Physiochemical Test - 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"		1500 ( <i>59,055</i> )	
	0.010" < IWT ≤ 0.015"		1000 ( <i>39,370</i> )	
	0.015" < IWT ≤ 0.020"		600 ( <i>23,622</i> )	
Adhesive Properties (MT5000A only)***	Ring and bell softening point	°C	121 ± 5	ASTM E 28
	Adhesion to:			
	Polypropylene		Poor	
	HDPE		Fair	
	Polyurethane		Good	
PVC		Good		
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 MT5000 SCD for specific details about test procedures.

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## 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

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