

Altera medical-grade, very thin wall, polyolefin heat-shrinkable tubing

Altera MT2000 heat-shrinkable tubing is made of a tough, modified polyolefin with a very thin wall construction. It is especially suitable for medical applications requiring lubricity, flexibility, and excellent electrical insulation performance. Altera MT2000 offers a cost-effective alternative to FEP while maintaining performance after gamma sterilization.

Altera MT2000 tubing can provide electrical insulation, mechanical protection, strain relief, color coding, and identification for many medical components and devices.

Altera MT2000A 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 MT2000 tubing may be sterilized by gamma radiation or ethylene oxide with no significant changes 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**

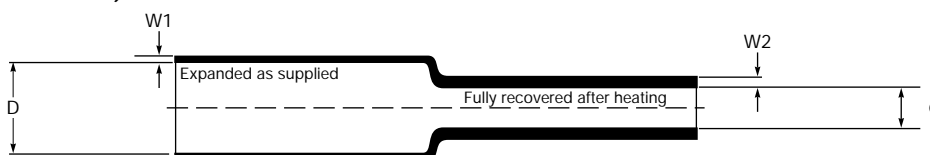
Full recovery temperature:	140°C
Continuous operating temperature:	-40°C to 105°C

**Specifications\***

Type	Raychem	Material	Master File Number
MT2000	MT2000 SCD	USP Class VI	MAF-727
MT2000A	MT2000A SCD	USP Class VI	MAF-799

\*When ordering, always specify latest issue.

**Dimensions (millimeters/inches)**



Size (mm)	Inside diameter		Wall thickness			
	D (min.) Expanded as supplied	d (max.) Recovered after heating	W1 As supplied (nominal)	W2 Recovered after heating**		
1.0	1.0 0.040	0.45 0.018	0.12 0.005	0.25 ± 0.05	0.010 ± 0.002	
2.0	2.0 0.080	0.80 0.032	0.12 0.005	0.25 ± 0.05	0.010 ± 0.002	
3.0	3.0 0.120	1.20 0.048	0.12 0.005	0.25 ± 0.05	0.010 ± 0.002	
6.0	6.0 0.240	2.40 0.096	0.12 0.005	0.25 ± 0.05	0.010 ± 0.002	
10.0	10.0 0.400	4.00 0.160	0.15 0.006	0.36 ± 0.05	0.014 ± 0.002	

\*\*Wall thickness will be less if tubing recovery is restricted during shrinkage.

**Ordering information**

Colors	<b>Standard</b> Black, clear <b>Nonstandard</b> White, red, yellow, blue, orange
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, MT2000-3.0-0 (0=Black). Specify MT2000A for adhesive-lined constructions in sizes 3.0 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	60 minimum	ASTM D 2671	
	Tensile strength	psi ( <i>Mpa</i> )	3000 ( <i>20.7</i> ) minimum	ASTM D 2671	
	Ultimate elongation	percent	200 minimum	ASTM D 2671	
	Secant modulus (expanded)	psi ( <i>Mpa</i> )	5.0 X 10 <sup>4</sup> ( <i>344</i> ) minimum	ASTM D 2671	
	Heat resistance (168 hours at 125°C/257°F)			ASTM D 2671	
	Followed by test for:				
	Ultimate Elongation	percent	200 minimum	ASTM D 2671	
Electrical	Dielectric strength	volts/mil ( <i>volts/mm</i> )	1000 ( <i>39,360</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*†			ASTM D 2671	
	Followed by tests for:				
		Dielectric strength	volts/mil ( <i>volts/mm</i> )	1000 ( <i>39,360</i> ) minimum	ASTM D 2671
		Tensile strength	psi ( <i>Mpa</i> )	3000 ( <i>20.7</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
Adhesive Properties (MT2000A only)**	Ring and ball 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 \*\*Not recommended for use on Teflon or silicone substrates.

†Or equivalent dilute glutaraldehyde sterilizing solution.

Note: Consult the MT2000 SCD for specific details about test procedures.

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

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