

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**

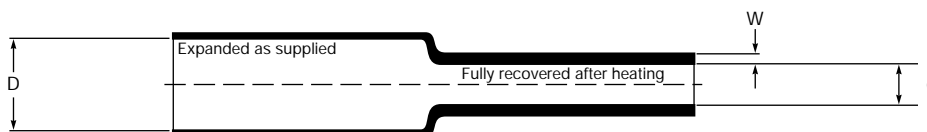
Full recovery temperature:	175°C
Continuous operating temperature:	MT1000: -55°C to 155°C    MT1000A: -55°C to 125°C
Recommended maximum temperature for use as a primary insulator:	135°C

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

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

**Ordering information**

Colors	Standard Nonstandard	Translucent 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 ( <i>inches</i> )	See reverse	ASTM D 2671
	Longitudinal change	percent	+0, -10	ASTM D 2671
	Tensile strength	psi ( <i>Mpa</i> )	5000 ( <i>34.5</i> ) minimum	ASTM D 2671
	Ultimate elongation	percent	150 minimum	ASTM D 2671
	Secant modulus (expanded)	Psi ( <i>Mpa</i> )	1 X 10 <sup>5</sup> ( <i>690</i> ) minimum	ASTM D 2671
	Heat resistance (168 hours at 250°C/482°F) Followed by test for:			
	Ultimate Elongation	percent	50 minimum	ASTM D 2671
Electrical	Dielectric strength	volts/mil ( <i>volts/mm</i> )		ASTM D 2671
	Sizes 3/64 through 1/2		800 ( <i>31,500</i> ) minimum	
	Sizes 3/4 through 1 1/2		600 ( <i>23,600</i> ) 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 ( <i>volts/mm</i> )		ASTM D 2671
	Sizes 3/64 through 1/2		700 ( <i>27,600</i> ) minimum	
	Sizes 3/4 through 1 1/2		500 ( <i>19,700</i> ) minimum	
	Tensile strength	psi ( <i>Mpa</i> )	5000 ( <i>34.5</i> ) 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 ( <i>47,244</i> )	
	0.010" < IWT ≤ 0.015"		1000 ( <i>39,370</i> )	
	0.015" < IWT ≤ 0.020"		700 ( <i>27,559</i> )	
Adhesive Properties (MT1000A only)***	Ring and bell softening point	°C	165 ± 10	ASTM E 28
	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.

Altera and Raychem are trademarks of Tyco Electronics Corporation. Teflon is a trademark of E.I. du Pont de Nemours and Company.

**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](http://www.tycoelectronics.com)**



Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



#### Как с нами связаться

**Телефон:** 8 (812) 309 58 32 (многоканальный)

**Факс:** 8 (812) 320-02-42

**Электронная почта:** [org@eplast1.ru](mailto:org@eplast1.ru)

**Адрес:** 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.