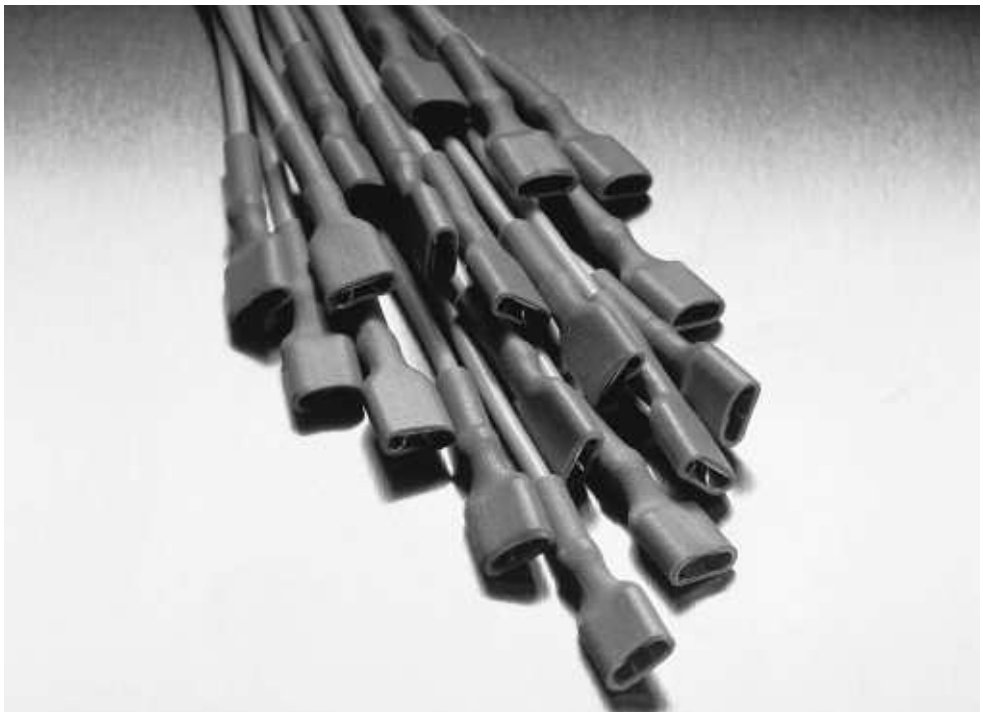
LSTT

Low-Shrink-Temperature, Non-Flame-Retardant, Heat-Shrinkable, Polyolefin tubing

Product Facts

- 2:1 shrink ratio
- Rapid recovery at low temperatures
- Can be used with temperature-sensitive materials
- Flexible
- Not flame-retardant
- Excellent physical and electrical performance
- RoHS compliant



Applications

LSTT is a highly flexible, low-shrink-temperature, heat-shrinkable tubing. Its low shrink temperature offers exceptionally fast recovery for maximum efficiency in high-volume commercial applications and makes it suitable for use on or near delicate, temperature-sensitive materials, such as PVC jacketed wire and cable. Although not flame-retardant, LSTT meets the automotive flame propagation standard MVSS 302.

Typical applications include electrical termination insulation, color-coding, covering of heat-sensitive devices, cosmetic coverings, and mechanical protection.

Installation

Minimum shrink temperature: 65°C [149°F]

Minimum full recovery temperature: 110°C [230°F]

Operating Temperature Range

-40°C to 125°C
[-40°F to 257°F]

Specifications/Approvals

Series	Industry	Raychem
LSTT	MVSS302	RW-2051

Available in:	Americas	Europe	Asia Pacific
		■	

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USA: 1-800-522-6752
Canada: 1-905-475-6222
Mexico: 52-55-1106-0800
L. & S. America: 54-11-4733-2200

Germany: 49-6251-133-1999
China: 86-400-820-6015
Japan: 81-44-844-8013
UK: 44-800-267-666

LSTT (Continued)

Product Dimensions

Size	Inside Diameter		Recovered Wall Thickness*
	Minimum Expanded as Supplied	Maximum Recovered After Heating	Nominal After Heating
1.6	1.6 [0.063]	0.8 [0.031]	0.50 ± 0.12 [0.018 ± 0.005]
2.4	2.4 [0.093]	1.2 [0.046]	0.55 ± 0.12 [0.022 ± 0.005]
3.2	3.2 [0.125]	1.6 [0.062]	0.55 ± 0.12 [0.022 ± 0.005]
4.8	4.8 [0.187]	2.4 [0.093]	0.55 ± 0.12 [0.022 ± 0.005]
6.4	6.4 [0.250]	3.2 [0.125]	0.65 ± 0.15 [0.026 ± 0.006]
9.5	9.5 [0.375]	4.8 [0.187]	0.65 ± 0.15 [0.026 ± 0.006]
12.7	12.7 [0.500]	6.4 [0.250]	0.65 ± 0.15 [0.026 ± 0.006]
19.0	19.0 [0.748]	9.5 [0.375]	0.80 ± 0.15 [0.032 ± 0.006]
25.4	25.4 [1.000]	12.7 [0.500]	0.95 ± 0.18 [0.037 ± 0.007]
32.0	32.0 [1.260]	16.0 [0.630]	1.05 ± 0.20 [0.041 ± 0.008]
38.0	38.0 [1.496]	19.0 [0.748]	1.05 ± 0.20 [0.041 ± 0.008]
52.0**	52.0 [2.047]	26.0 [1.024]	1.14 ± 0.18 [0.045 ± 0.007]

*Wall thickness will be les if tubing recovery is restricted during shrinkage.
**Available in black only.

Ordering Information

Color	Standard	Black (-0), red (-2), blue (-6), yellow (-4)
	Nonstandard	Green (-5), grey (-8), white (-9), clear (-X)
Size selection	Always order the largest size that will shrink snugly over the component to be covered. Other sizes are available upon request.	
Standard packaging	On spools***	
Ordering description	Specify product name, size and color (for example, LSTT 6.4-0).	

***Available in the convenient RaySpool packaging/dispensing system, for sizes 2.4 up to 25.4

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Japan: 81-44-844-8013
UK: 44-800-267-666

MicroFit

Small-Diameter, High-Shrink-Ratio Tubing

Product Facts

- Small diameter
- High shrink ratio
- Thin wall
- Polyolefin and fluoropolymer materials
- RoHS compliant
- ISO 10993-1 compliant
- USP Class VI material, no heavy metals
- Compatibility with gamma, ETO, steam and dry-heat sterilization

Applications

The family of MicroFit small diameter, high-shrink-ratio tubing is suitable for electrical insulation, mechanical protection, and strain relief in smaller, more compact medical devices and commercial electronics products. Offered in a variety of materials.

Installation

Minimum full recovery temperature:

175°C [347°F] (MT1000)

140°C [284°F] (MT2000)

Operating Temperature Range

MT1000: -55°C to 150°C [-67°F to 302°F]

MT2000: -40°C to 105°C [-40°F to 221°F]

Specifications/Approvals

Series	Material	Raychem
MT1000 is semi-rigid polyvinylidene fluoride material	USP Class VI (MT1000)	Altera MicroFit SCD
MT2000 is medical grade polyolefin material	USP Class VI (MT2000)	

Available in:	Americas	Europe	Asia Pacific
	■	■	■

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Japan: 81-44-844-8013
UK: 44-800-267-666

MicroFit (Continued)

Product Dimensions

Size	As Supplied mm [inches]	Recovered mm [inches]	
	Expanded I.D. Minimum (D)	Recovered I.D. Maximum (d)	Recovered Wall Maximum (W)
MFT-*-No. 14-**	0.356 [0.014]	0.203 [0.008]	0.152 [0.006]
MFT-*-No. 2-**	0.610 [0.024]	0.305 [0.012]	0.152 [0.006]
MFT-*-No. 33-**	1.143 [0.045]	0.432 [0.017]	0.118 [0.007]
MFT-*-No. 65-**	0.635 [0.025]	0.254 [0.010]	0.330 [0.013]

*Replace single asterisk with material type: MT1000 or MT2000.
**Replace double asterisk with color-code number.
***Wall thickness will be less if tubing recovery is restricted during shrinkage.

Ordering Information

		MT1000	MT2000
Color	Standard	Translucent (-X)	Black (-0), clear (-X)
	Nonstandard	Black (-0)	White (-9), red (-2), yellow (-4), blue (-6), orange (-3)
Size selection	Always order the largest size that will shrink snugly over the component to be covered.		
Standard packaging	On plastic spools****		
Ordering description	Specify product name, material, size and color (for example, MFT-MT2000-NO.14-0).		

****MFT-MT1000 and MFT-MT2000 are double bagged.

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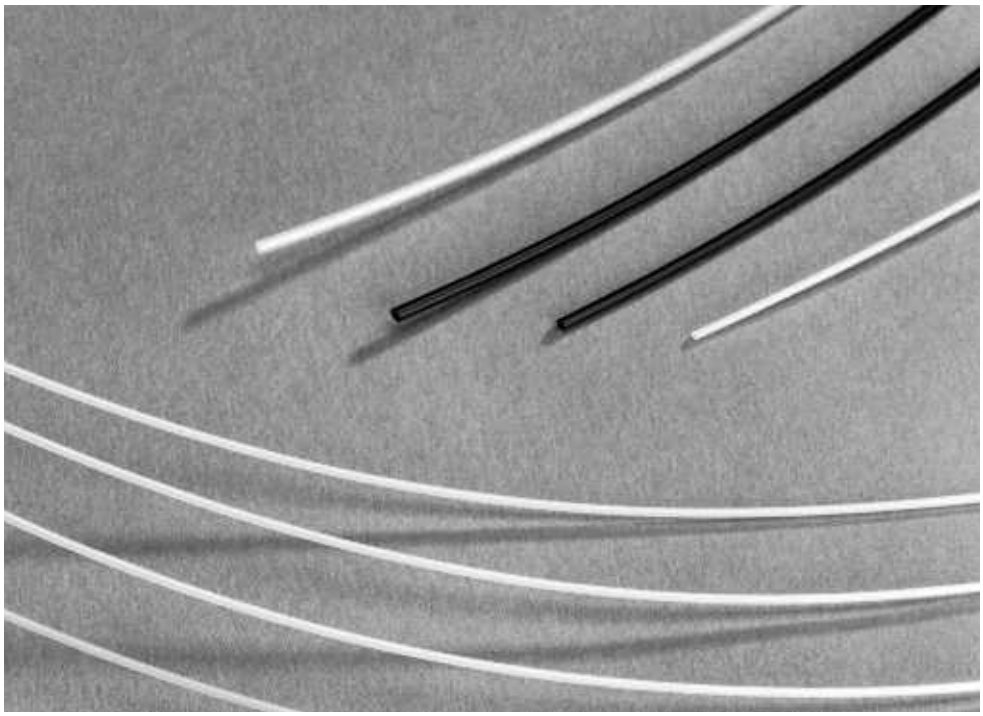
Japan: 81-44-844-8013
UK: 44-800-267-666

MT1000

Altera Medical-Grade, USP Class VI, High-Temperature, Semirigid, Fluoropolymer Tubing

Product Facts

- **2:1 shrink ratio**
- **Tough, semirigid, very-thin-wall insulation**
- **Excellent resistance to a variety of fluids**
- **Optional inner adhesive lining (MT1000A)**
- **USP Class VI material, no heavy metals**
- **ISO 10993-1 compliant**
- **Double-bagged packaging**
- **Compatibility with gamma, ETO, steam, and dry-heat sterilization**
- **RoHS compliant**



Applications

Well-suited for electrical insulation and strain relief of components that are exposed to high temperatures - either during operation or during sterilization.

Thin-wall construction is well-suited for applications with clearance constraints.

Installation

Minimum shrink temperature: 155°C [311°F]

Minimum full recovery temperature: 175°C [347°F]

Operating Temperature Range

-55°C to 150°C [-67°F to 302°F]

Specifications/Approvals

Series	Material	Raychem
MT1000	USP Class VI	MT1000 SCD
MT1000A	USP Class VI	MT1000A SCD

Available in:	Americas	Europe	Asia Pacific
	■	■	■

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UK: 44-800-267-666

MT1000 (Continued)

Product Dimensions

Size	As Supplied mm [inches]	Recovered mm [inches]			
	Inside Diameter Minimum (D)	Inside Diameter Maximum (d)	Wall Thickness (W) Minimum	Maximum	Nominal
3/64	1.17 [0.046]	0.58 [0.023]	0.20 [0.008]	0.31 [0.12]	0.25 [0.010]
1/16	1.60 [0.063]	0.79 [0.031]	0.20 [0.008]	0.31 [0.12]	0.25 [0.010]
3/32	2.36 [0.093]	1.17 [0.046]	0.20 [0.009]	0.31 [0.12]	0.25 [0.010]
1/8	3.18 [0.125]	1.58 [0.062]	0.20 [0.009]	0.31 [0.12]	0.25 [0.010]
3/16	4.75 [0.187]	2.36 [0.093]	0.20 [0.009]	0.31 [0.12]	0.25 [0.010]
1/4	6.35 [0.250]	3.18 [0.125]	0.28 [0.011]	0.38 [0.15]	0.33 [0.013]
3/8	9.53 [0.375]	4.75 [0.187]	0.28 [0.011]	0.38 [0.15]	0.33 [0.013]
1/2	12.70 [0.500]	6.35 [0.250]	0.28 [0.011]	0.38 [0.15]	0.33 [0.013]

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

Ordering Information

Color	Standard	Black (-0), Translucent (-X)
	Nonstandard	White (-9)
Size selection	Always order the largest size that will shrink snugly over the component to be covered. Special order sizes are available upon request.	
Standard packaging	In 1.2-meter (4-foot) lengths, double bagged.	
Ordering description	Specify product name, size and color (for example, MT1000-1/8-X). Specify MT1000A for adhesive-lined constructions (special order).	

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Japan: 81-44-844-8013
UK: 44-800-267-666

MT2000

Altera Medical-Grade, USP Class VI, Lubricious, Thin-Wall, Polyolefin Tubing

Product Facts

- **2.5:1 shrink ratio**
- **Lubricity comparable to FEP**
- **Excellent electrical insulation properties**
- **Can be manufactured with a very thin wall**
- **Optional inner adhesive lining (MT2000A)**
- **USP Class VI material, no heavy metals**
- **ISO 10993-1 compliant**
- **Plastic spools and double-bagged packaging**
- **Compatibility with gamma and ETO sterilization**
- **RoHS compliant**

Applications

Especially suitable for medical applications requiring lubricity, flexibility, and excellent electrical insulation performance. A cost-effective alternative to FEP (fluorinated ethylene-propylene) while maintaining performance after gamma sterilization.

Installation

Minimum shrink temperature: 110°C [230°F]

Minimum full recovery temperature: 140°C [284°F]

Operating Temperature Range

-40°C to 105°C [-40°F to 221°F]

Specifications/Approvals

Series	Material	Raychem
MT2000	USP Class VI	MT2000 SCD
MT2000A	USP Class VI	MT2000A SCD

Available in:	Americas	Europe	Asia Pacific
	■	■	■

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Germany: 49-6251-133-1999
China: 86-400-820-6015
Japan: 81-44-844-8013
UK: 44-800-267-666

MT2000 (Continued)

Product Dimensions

Size	As Supplied mm [inches]	Recovered mm [inches]			
	Inside Diameter Minimum (D)	Inside Diameter Maximum (d)	Wall Thickness (W) Minimum	Maximum	Nominal
1 mm	1.0 [0.040]	0.45 [0.018]	0.20 [0.008]	0.30 [0.12]	0.25 [0.010]
2 mm	2.0 [0.080]	0.80 [0.032]	0.20 [0.008]	0.30 [0.12]	0.25 [0.010]
3 mm	3.0 [0.120]	1.20 [0.048]	0.20 [0.008]	0.30 [0.12]	0.25 [0.010]
6 mm	6.0 [0.240]	2.40 [0.096]	0.20 [0.008]	0.30 [0.12]	0.25 [0.010]
10 mm	10.0 [0.400]	4.00 [0.160]	0.30 [0.012]	0.41 [0.16]	0.36 [0.014]

Ordering Information

Color	Standard	Black (-0), clear (-X)
	Nonstandard	White (-9), red (-2), blue (-6), yellow (-4), orange (-3)
Size selection	Always order the largest size that will shrink snugly over the component to be covered. Special order sizes are available upon request.	
Standard packaging	On plastic spools, double-bagged.	
Ordering description	Specify product name, size and color (for example, MT2000-3.0-0). Specify MT2000A for adhesive-lined constructions (special order).	

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L. & S. America: 54-11-4733-2200

Germany: 49-6251-133-1999
China: 86-400-820-6015
Japan: 81-44-844-8013
UK: 44-800-267-666

MT3000

Altera Medical-Grade, USP Class VI, High-Temperature, Flexible, Fluoropolymer Tubing

Product Facts

- **2:1 shrink ratio**
- **Tough, flexible, very-thin-wall insulation**
- **Excellent resistance to a variety of fluids**
- **Optional inner adhesive lining (MT3000A)**
- **USP Class VI material, no heavy metals**
- **ISO 10993-1 compliant**
- **Plastic spools and double-bagged packaging**
- **Compatibility with steam (limited cycles), gamma, ETO, and dry-heat sterilization**
- **RoHS compliant**

Applications

Used for electrical insulation and strain relief of components that are exposed to high temperatures - either during operation or during sterilization. Exceptional flexibility and thin-wall construction are well-suited for applications where pliancy coupled with small overall bundle size is desired.

Installation

Minimum shrink temperature: 140°C [284°F]

Minimum full recovery temperature: 150°C [302°F]

Operating Temperature Range

-55°C to 140°C [-67°F to 284°F]

Specifications/Approvals

Series	Material	Raychem
MT3000	USP Class VI	MT3000 SCD
MT3000A	USP Class VI	MT3000A SCD

Available in:	Americas	Europe	Asia Pacific
	■	■	■

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Germany: 49-6251-133-1999
China: 86-400-820-6015
Japan: 81-44-844-8013
UK: 44-800-267-666

MT3000 (Continued)

Product Dimensions

Size	As Supplied mm [inches]	Recovered mm [inches]			
	Inside Diameter Minimum (D)	Inside Diameter Maximum (d)	Wall Thickness (W) Minimum	Maximum	Nominal
3/64	1.17 [0.046]	0.58 [0.023]	0.20 [0.008]	0.31 [0.12]	0.25 [0.010]
1/16	1.60 [0.063]	0.79 [0.031]	0.20 [0.008]	0.31 [0.12]	0.25 [0.010]
3/32	2.36 [0.093]	1.17 [0.046]	0.20 [0.008]	0.31 [0.12]	0.25 [0.010]
1/8	3.18 [0.125]	1.58 [0.062]	0.20 [0.008]	0.31 [0.12]	0.25 [0.010]
3/16	4.75 [0.187]	2.36 [0.093]	0.20 [0.008]	0.31 [0.12]	0.25 [0.010]
1/4	6.35 [0.250]	3.18 [0.125]	0.28 [0.009]	0.38 [0.15]	0.33 [0.012]
3/8	9.53 [0.375]	4.75 [0.187]	0.28 [0.009]	0.38 [0.15]	0.33 [0.012]
1/2	12.70 [0.500]	6.35 [0.250]	0.28 [0.009]	0.38 [0.15]	0.33 [0.012]

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

Ordering Information

Color	Standard	Black (-0)
	Nonstandard	White (-9)
Size selection	Always order the largest size that will shrink snugly over the component to be covered. Special order sizes are available upon request.	
Standard packaging	On plastic spools, double-bagged.	
Ordering description	Specify product name, size and color (for example, MT3000 1/4-0).	

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China: 86-400-820-6015
Japan: 81-44-844-8013
UK: 44-800-267-666

MT5000

Altera Medical-Grade, USP Class VI, Flexible, Polyolefin Tubing

Product Facts

- 2:1 shrink ratio
- Flexibility; variety of colors
- Excellent electrical insulation properties
- Inner adhesive lining optional (MT5000A)
- USP Class VI material, no heavy metals
- ISO 10993-1 compliant
- Plastic spools and double-bagged packaging
- Compatibility with gamma and ETO sterilization
- RoHS compliant

Applications

Especially suitable for applications requiring excellent electrical insulation performance and resistance to abrasion and harmful solvents such as electrosurgical instruments. Also used for strain relief, color coding, and identification of many medical components and devices.

Installation

Minimum shrink temperature: 90°C [194°F]

Minimum full recovery temperature: 110°C [230°F]

Operating Temperature Range

-70°C to 90°C
[-94°F to 194°F]

Specifications/Approvals

Series	Material	Raychem
MT5000	USP Class VI	MT5000 SCD
MT5000A	USP Class VI	MT5000A SCD

Available in:	Americas	Europe	Asia Pacific
	■	■	■

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Japan: 81-44-844-8013
UK: 44-800-267-666

MT5000 (Continued)

Product Dimensions

Size	As Supplied mm [inches]	Recovered mm [inches]			
	Inside Diameter Minimum (D)	Inside Diameter Maximum (d)	Wall Thickness (W) Minimum	Wall Thickness (W) Maximum	Wall Thickness (W) Nominal
3/64	1.17 [0.046]	0.58 [0.023]	0.33 [0.013]	0.48 [0.019]	0.40 [0.016]
1/16	1.60 [0.063]	0.79 [0.031]	0.35 [0.014]	0.50 [0.020]	0.43 [0.017]
3/32	2.36 [0.093]	1.17 [0.046]	0.43 [0.017]	0.58 [0.023]	0.50 [0.020]
1/8	3.18 [0.125]	1.58 [0.062]	0.43 [0.017]	0.58 [0.023]	0.50 [0.020]
3/16	4.75 [0.187]	2.36 [0.093]	0.43 [0.017]	0.58 [0.023]	0.50 [0.020]
1/4	6.35 [0.250]	3.18 [0.125]	0.56 [0.022]	0.71 [0.028]	0.64 [0.025]
3/8	9.53 [0.375]	4.75 [0.187]	0.56 [0.022]	0.71 [0.028]	0.64 [0.025]
1/2	12.70 [0.500]	6.35 [0.250]	0.56 [0.022]	0.71 [0.028]	0.64 [0.025]
3/4	19.05 [0.750]	9.53 [0.375]	0.69 [0.027]	0.84 [0.033]	0.76 [0.030]

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

Ordering Information

Color	Standard	Black (-0), clear (-X), and blue (-6)
	Nonstandard	White (-9), red (-2), yellow (-4), green (-5)
Size selection	Always order the largest size that will shrink snugly over the component to be covered. Special order sizes are available upon request.	
Standard packaging	On plastic spools, double-bagged.	
Ordering description	Specify product name, size and color (for example, MT5000-1/4-0). Specify MT5000A for adhesive-lined constructions (special order).	

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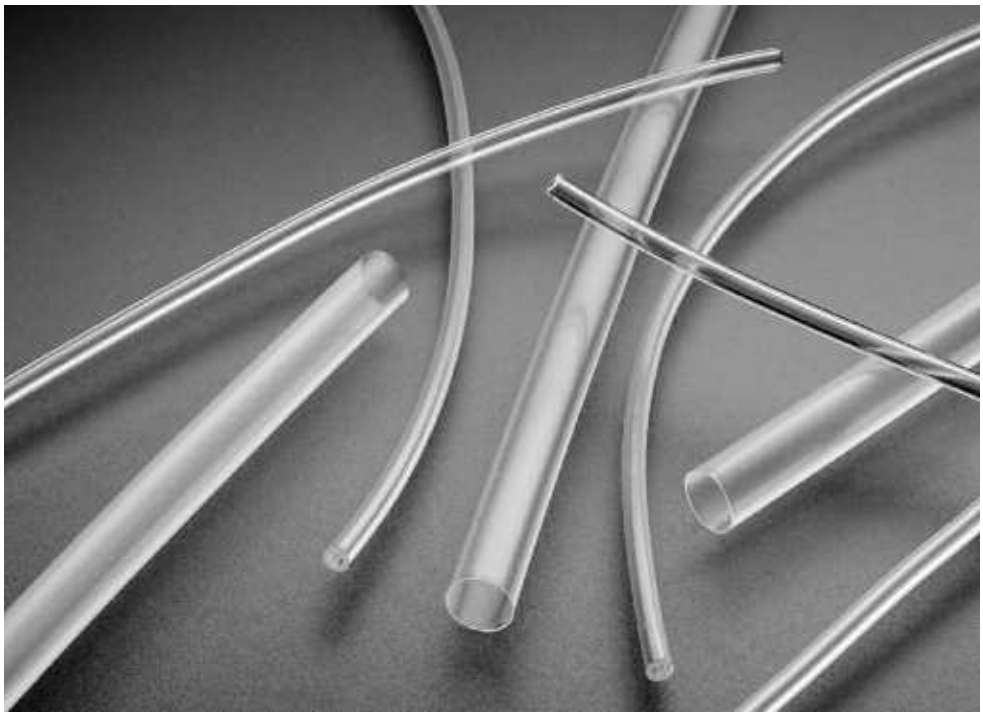
UK: 44-800-267-666

MT6000

Altera Medical-Grade, USP Class VI, High Shrink Ratio, Polyolefin Tubing

Product Facts

- **4:1 shrink ratio or greater**
- **Custom and larger shrink ratios available**
- **Flexible; variety of colors**
- **Excellent electrical insulation properties**
- **Inner adhesive lining optional (MT6000A)**
- **USP Class VI material, no heavy metals**
- **ISO 10993-1 compliant**
- **Plastic spools and double-bagged packaging**
- **Compatibility with gamma and ETO sterilization**
- **RoHS compliant**



Applications

Designed for applications that need 4:1 or larger shrink ratios. Provides excellent electrical insulation performance and resistance to abrasion and harmful solvents. Also used for strain relief, color coding, identification of components and devices, and process aid.

Installation

Minimum shrink temperature: 90°C [194°F]

Minimum full recovery temperature: 110°C [230°F]

Operating Temperature Range

-70°C to 90°C
[-94°F to 194°F]

Specifications/Approvals

Series	Material	Raychem
MT6000	USP Class VI	MT6000 SCD
MT6000A	USP Class VI	MT6000A SCD

Available in:	Americas	Europe	Asia Pacific
	■	■	■

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Germany: 49-6251-133-1999
China: 86-400-820-6015
Japan: 81-44-844-8013
UK: 44-800-267-666

MT6000 (Continued)

Product Dimensions

Size	As Supplied mm [inches]	Recovered mm [inches]			
	Inside Diameter Minimum (D)	Inside Diameter Maximum (d)	Wall Thickness (W) Minimum	Maximum	Nominal
3/16	4.75 [0.187]	1.17 [0.046]	0.43 [0.017]	0.58 [0.023]	0.51 [0.020]
1/4	6.35 [0.250]	1.57 [0.062]	0.43 [0.017]	0.58 [0.023]	0.51 [0.020]
3/8	9.53 [0.375]	2.36 [0.093]	0.43 [0.017]	0.58 [0.023]	0.51 [0.020]
1/2	12.70 [0.500]	3.18 [0.125]	0.56 [0.022]	0.71 [0.028]	0.64 [0.025]

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

Ordering Information

Color	Standard	Black (-0), clear (-X)
	Nonstandard	Blue (-6), red (-2), white (-9), yellow (-4), green (-5)
Size selection	Always order the largest size that will recover snugly over the substrate. Special order sizes are available upon request.	
Standard packaging	On plastic spools, double-bagged.	
Ordering description	Specify product name, size and color (for example, MT6000-3/16-X) Specify MT6000A for adhesive-lined constructions (special order).	

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Dimensions are in inches and millimeters unless otherwise specified. Values in brackets are metric equivalents.

Dimensions are shown for reference purposes only. Specifications subject to change.

USA: 1-800-522-6752
Canada: 1-905-475-6222
Mexico: 52-55-1106-0800
L. & S. America: 54-11-4733-2200

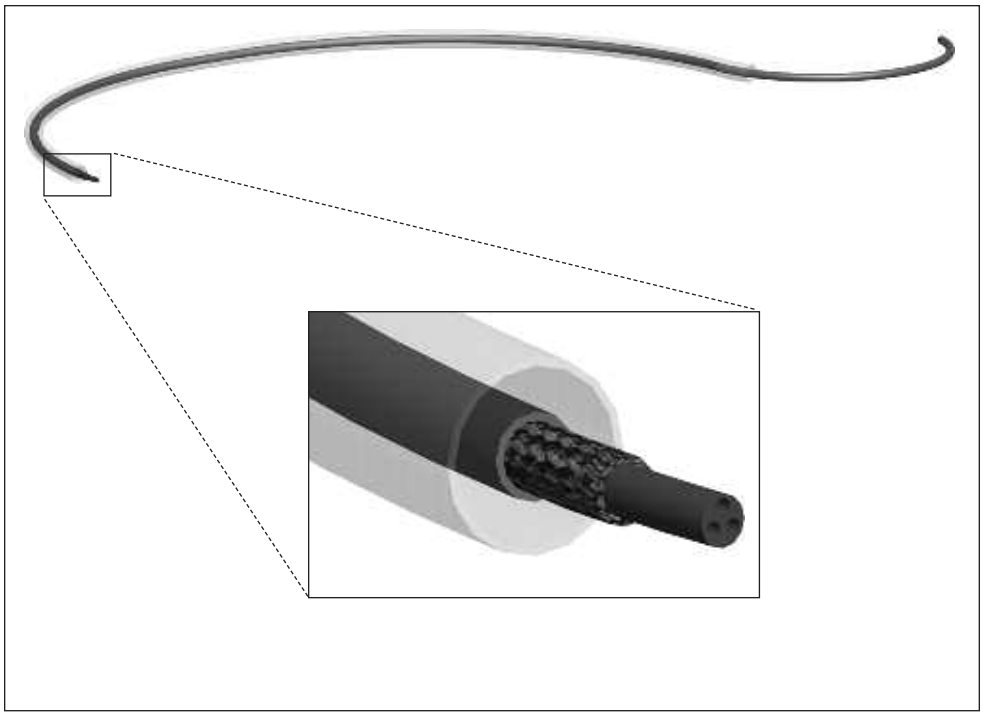
Germany: 49-6251-133-1999
China: 86-400-820-6015
Japan: 81-44-844-8013
UK: 44-800-267-666

MT-FEP (Heat-Shrinkable Fluorinated Ethylene Propylene)

Altera Medical-Grade, USP Class VI, Heat-Shrinkable FEP Tubing

Product Facts

- **Standard 1.6:1 shrink ratio**
- **Tight control of longitudinal change, standard +/- 5%**
- **High temperature, low friction, non-reactive material**
- **Excellent electrical insulation, mechanical protection, and chemical resistance**
- **Cut pieces, double bagged**
- **Transparent and resistant to UV damage**
- **USP Class VI material, no heavy metals**
- **ISO 10993-1 compliant**
- **Compatible with autoclave sterilization; ethylene oxide, steam, and dry-heat**
- **RoHS compliant**



Applications

Designed specifically to meet the demanding needs of the catheter and medical device industry. Well-suited for process aid as well as electrical insulation, mechanical protection, and chemical resistance.

Installation

Minimum shrink temperature: 190°C [374°F]

Minimum full recovery temperature: 210°C [410°F]

Specifications/Approvals

Series	Material	Raychem
MT-FEP	USP Class VI	MT-FEP SCD

Available in:	Americas	Europe	Asia Pacific
	■	■	■

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USA: 1-800-522-6752
Canada: 1-905-475-6222
Mexico: 52-55-1106-0800
L. & S. America: 54-11-4733-2200

Germany: 49-6251-133-1999
China: 86-400-820-6015
Japan: 81-44-844-8013
UK: 44-800-267-666

MT-FEP (Continued)

Product Dimensions

Size	As Supplied mm [inches]	Recovered mm [inches]			
	Inside Diameter Minimum (D)	Inside Diameter Maximum (d)	Wall Thickness (W) Minimum	Wall Thickness (W) Maximum	Wall Thickness (W) Nominal
1/32	0.9 [0.035]	0.6 [0.025]	0.15 [0.006]	0.25 [0.010]	0.20 [0.008]
3/64	1.1 [0.045]	0.8 [0.032]	0.15 [0.006]	0.25 [0.010]	0.20 [0.008]
1/16	1.6 [0.063]	1.0 [0.040]	0.15 [0.006]	0.25 [0.010]	0.20 [0.008]
3/32	2.7 [0.093]	1.4 [0.056]	0.15 [0.006]	0.25 [0.010]	0.20 [0.008]
1/8	3.2 [0.125]	1.9 [0.075]	0.18 [0.007]	0.33 [0.013]	0.25 [0.010]
3/16	4.8 [0.188]	2.9 [0.115]	0.18 [0.007]	0.33 [0.013]	0.25 [0.010]
1/4	6.4 [0.250]	3.8 [0.150]	0.18 [0.007]	0.33 [0.013]	0.25 [0.010]
3/8	9.5 [0.375]	5.7 [0.225]	0.23 [0.009]	0.38 [0.015]	0.30 [0.012]
1/2	12.7 [0.500]	7.6 [0.300]	0.28 [0.011]	0.48 [0.019]	0.38 [0.015]

Ordering Information

Color	Clear (-X) standard
Size selection	Order the appropriate FEP size based on your substrate. Special order sizes are available upon request.
Standard packaging	In 4-foot (1.2 meter) lengths (-stk) double bagged.
Ordering description	Specify product name and size (for example, MT-FEP-093-056-X-STK).

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L. & S. America: 54-11-4733-2200

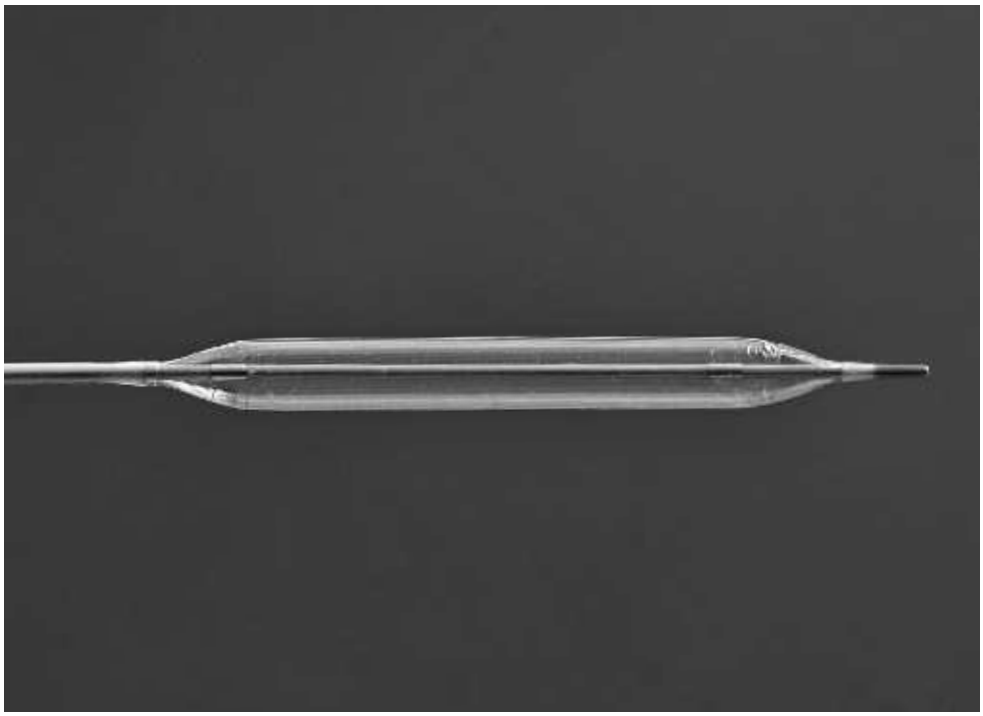
Germany: 49-6251-133-1999
China: 86-400-820-6015
Japan: 81-44-844-8013
UK: 44-800-267-666

MT-LWA

Altera Medical Grade, Laser-Welding Application Process Aid, Polyolefin Tubing

Product Facts

- **3:1 shrink ratio, custom ratios and sizes available**
- **Flexible; forms to irregular shapes**
- **Good clarity needed for laser welding and other bonding operations**
- **Excellent electrical insulation properties**
- **Removes easily after application, good axial tear propagation**
- **On plastic spools double bag packaging**
- **USP Class VI, no heavy metals**
- **ISO 10993-1 compliant**
- **RoHS compliant**



Applications

Well-suited for laser-welding operations of stents and balloons, hot jaw bonding or other secondary value-added processes. Heat-shrinkable product will hold joints in place during operation and removes easily without residue or damage to the end product.

Installation

Minimum shrink temperature: 95°C [203°F]

Minimum full recovery temperature: 121°C [250°F]

Specifications/Approvals

Series	Raychem
MT-LWA	MT-LWA SCD

Available in:	Americas	Europe	Asia Pacific
	■	■	■

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USA: 1-800-522-6752
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Mexico: 52-55-1106-0800
L. & S. America: 54-11-4733-2200

Germany: 49-6251-133-1999
China: 86-400-820-6015
Japan: 81-44-844-8013
UK: 44-800-267-666

MT-LWA (Continued)

Product Dimensions

2:1 Expansion Ratio Dimensions (±)

Size	As Supplied mm [inches] Inside Diameter (D)	Recovered mm [inches] Inside Diameter (d)	Recovered mm [inches] Wall Thickness (W)
1/32	1.02 ± 0.13 [0.040 ± 0.005]	0.33 ± 0.05 [0.013 ± 0.002]	0.25 ± 0.05 [0.010 ± 0.002]
3/64	1.40 ± 0.13 [0.055 ± 0.005]	0.51 ± 0.08 [0.020 ± 0.003]	0.31 ± 0.05 [0.012 ± 0.002]
1/16	1.83 ± 0.13 [0.072 ± 0.005]	0.69 ± 0.10 [0.027 ± 0.004]	0.43 ± 0.08 [0.017 ± 0.003]
3/32	2.72 ± 0.20 [0.107 ± 0.008]	1.07 ± 0.10 [0.042 ± 0.004]	0.51 ± 0.08 [0.020 ± 0.003]
1/8	3.56 ± 0.25 [0.140 ± 0.010]	1.45 ± 0.13 [0.057 ± 0.005]	0.51 ± 0.08 [0.020 ± 0.003]
3/16	5.21 ± 0.25 [0.205 ± 0.010]	2.18 ± 0.18 [0.086 ± 0.007]	0.51 ± 0.08 [0.020 ± 0.003]
1/4	6.99 ± 0.38 [0.275 ± 0.015]	2.97 ± 0.20 [0.117 ± 0.008]	0.64 ± 0.08 [0.025 ± 0.003]
3/8	10.54 ± 0.51 [0.415 ± 0.020]	4.34 ± 0.41 [0.171 ± 0.016]	0.64 ± 0.08 [0.025 ± 0.003]

3:1 Expansion Ratio Dimensions (Min./Max)

Size	As Supplied mm [inches] Inside Diameter (D) Minimum	Recovered mm [inches] Inside Diameter (d) Maximum	Recovered mm [inches] Wall Thickness (W) Nominal
0.032	0.81 [0.032]	0.28 [0.011]	0.25 ± 0.05 [0.010 ± 0.002]
0.063	1.60 [0.063]	0.53 [0.021]	0.41 ± 0.05 [0.016 ± 0.002]
0.078	1.98 [0.078]	0.64 [0.025]	0.41 ± 0.05 [0.016 ± 0.002]
0.094	2.39 [0.094]	0.79 [0.031]	0.51 ± 0.08 [0.020 ± 0.003]
0.110	2.79 [0.110]	0.86 [0.034]	0.51 ± 0.08 [0.020 ± 0.003]
0.125	3.18 [0.125]	1.07 [0.042]	0.51 ± 0.08 [0.020 ± 0.003]
0.188	4.78 [0.188]	1.60 [0.063]	0.51 ± 0.08 [0.020 ± 0.003]
0.250	6.35 [0.250]	2.11 [0.083]	0.64 ± 0.08 [0.025 ± 0.003]
0.375	9.53 [0.375]	3.18 [1.125]	0.64 ± 0.08 [0.025 ± 0.003]

Ordering Information

Color	Clear (-X) Only
Size selection	Always order the largest size that will recover snugly over the substrate. Special order sizes are available upon request.
Standard packaging	On plastic spools (SP), double-bagged.
Ordering description	Specify product name and size (for example, MT-LWA-032-X-SP).

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Dimensions are shown for reference purposes only. Specifications subject to change.

USA: 1-800-522-6752
Canada: 1-905-475-6222
Mexico: 52-55-1106-0800
L. & S. America: 54-11-4733-2200

Germany: 49-6251-133-1999
China: 86-400-820-6015
Japan: 81-44-844-8013
UK: 44-800-267-666

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China: 86-400-820-6015
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UK: 44-800-267-666

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Mexico: 52-55-1106-0800
L. & S. America: 54-11-4733-2200

Germany: 49-6251-133-1999
China: 86-400-820-6015
Japan: 81-44-844-8013
UK: 44-800-267-666

NT

Flexible, General Purpose Modified Elastomeric Tubing

Product Facts

- **Remains flexible at temperatures as low as -55˚C [-67˚F]**
- **Offers good resistance to abrasion and physical abuse while providing the flexibility and strain relief needed in general-purpose harnessing applications**
- **Resistant to most common fluids and solvents**
- **RoHS compliant**

Applications

Widely used for insulation, strain relief, and abrasion protection on cable harnesses and wire bundles in the commercial electronics industries where a reliable general-purpose tubing is needed. Suitable for applications requiring some exposure to common fluids and solvents.

Installation

Minimum shrink temperature: 90°C [194°F]

Minimum full recovery temperature: 135°C [275°F]

Operating Temperature Range

-55°C to 90°C [-67°F to 194°F]

Specifications/Approvals

Series	Raychem
NT	RT-510

Available in:	Americas	Europe	Asia Pacific
	■	■	■

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Dimensions are shown for reference purposes only. Specifications subject to change.

USA: 1-800-522-6752
Canada: 1-905-475-6222
Mexico: 52-55-1106-0800
L. & S. America: 54-11-4733-2200

Germany: 49-6251-133-1999
China: 86-400-820-6015
Japan: 81-44-844-8013
UK: 44-800-267-666

NT (Continued)

Product Dimensions

Size	Inside Diameter		Recovered Wall Thickness**
	Minimum Expanded as Supplied	Maximum Recovered After Heating	After Heating
1/8	3.2 [0.125]	1.6 [0.061]	0.69 ± 0.20 [0.027 ± 0.008]
3/16	4.8 [0.187]	2.5 [0.100]	0.84 ± 0.25 [0.033 ± 0.010]
1/4	6.4 [0.250]	3.6 [0.143]	0.89 ± 0.25 [0.035 ± 0.010]
3/8	9.5 [0.375]	5.5 [0.214]	1.01 ± 0.25 [0.040 ± 0.010]
1/2	12.7 [0.500]	7.3 [0.286]	1.21 ± 0.38 [0.048 ± 0.015]
5/8	15.9 [0.625]	9.1 [0.357]	1.32 ± 0.38 [0.052 ± 0.015]
3/4	19.1 [0.750]	10.9 [0.428]	1.44 ± 0.38 [0.057 ± 0.015]
7/8	22.2 [0.875]	12.7 [0.500]	1.65 ± 0.38 [0.065 ± 0.015]
1	25.4 [1.000]	14.5 [0.570]	1.77 ± 0.51 [0.070 ± 0.020]
1 1/4	31.8 [1.250]	18.1 [0.714]	2.20 ± 0.51 [0.087 ± 0.020]
1 1/2	38.1 [1.500]	21.8 [0.857]	2.41 ± 0.51 [0.095 ± 0.020]
1 3/4	44.5 [1.750]	25.4 [1.000]	2.71 ± 0.51 [0.107 ± 0.020]
2	50.8 [2.000]	29.0 [1.140]	2.79 ± 0.51 [0.110 ± 0.020]
3	76.2 [3.000]	43.4 [1.710]	3.17 ± 0.51 [0.125 ± 0.020]
4	101.6 [4.000]	57.9 [2.280]	3.55 ± 0.51 [0.140 ± 0.020]

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

Ordering Information

Color	Standard Black (-0)
Size selection	Always order the largest size that will shrink snugly over the component to be covered. Special order sizes are available upon request.
Standard packaging	On spools.
Ordering description	Specify product name, size and color (for example, NT 1/4-0).

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Canada: 1-905-475-6222
Mexico: 52-55-1106-0800
L. & S. America: 54-11-4733-2200

Germany: 49-6251-133-1999
China: 86-400-820-6015
Japan: 81-44-844-8013
UK: 44-800-267-666

NT-MIL

Flexible, Rugged, Modified Elastomeric Tubing

Product Facts

- **Remains flexible at temperatures as low as -70°C [94°F] without cracking**
- **Withstands heat shock at 200°C [392°F] without dripping, flowing or cracking**
- **Offers outstanding resistance to abrasion and physical abuse while providing flexibility and strain relief needed in rugged harnessing applications**
- **Resistant to most fluids and solvents, including aviation and ground vehicle fuels, lubricating oil, and hydraulic fluids**
- **Meets the stringent requirements of SAE-AMS-DTL-23053/1, Classes 1 and 2**
- **RoHS compliant**

Applications

Widely used for insulation, strain relief and abrasion protection on cable harnesses and wire bundles in the military and aerospace industries where a reliable rugged tubing is needed. Especially suitable for applications requiring exposure to common fluids and solvents.

Installation

Minimum shrink temperature: 90°C [194°F]

Minimum full recovery temperature: 135°C [275°F]

Operating Temperature Range

-70°C to 121°C
[-94°F to 250°F]

Specifications/Approvals

Series	Military	Raychem
NT-MIL	AMS-DTL-23053/1*, Classes 1 & 2	RW-3030

*Formerly MIL-I-23053/1 and MIL-DTL-23053/1

Available in:	Americas	Europe	Asia Pacific
	■	■	■

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USA: 1-800-522-6752
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Germany: 49-6251-133-1999
China: 86-400-820-6015
Japan: 81-44-844-8013
UK: 44-800-267-666

NT-MIL (Continued)

Product Dimensions

Size	Inside Diameter		Recovered Wall Thickness*
	Minimum Expanded as Supplied	Maximum Recovered After Heating	After Heating
1/8	3.2 [0.125]	1.6 [0.061]	0.69 ± 0.20 [0.027 ± 0.008]
3/16	4.8 [0.187]	2.5 [0.100]	0.84 ± 0.25 [0.033 ± 0.010]
1/4	6.4 [0.250]	3.6 [0.143]	0.89 ± 0.25 [0.035 ± 0.010]
3/8	9.5 [0.375]	5.4 [0.211]	1.01 ± 0.25 [0.040 ± 0.010]
1/2	12.7 [0.500]	7.3 [0.286]	1.21 ± 0.38 [0.048 ± 0.015]
5/8	15.9 [0.625]	9.1 [0.357]	1.32 ± 0.38 [0.052 ± 0.015]
3/4	19.1 [0.750]	10.9 [0.428]	1.44 ± 0.38 [0.057 ± 0.015]
7/8	22.2 [0.875]	12.7 [0.500]	1.65 ± 0.38 [0.065 ± 0.015]
1	25.4 [1.000]	14.5 [0.570]	1.77 ± 0.51 [0.070 ± 0.020]
1 1/4	31.8 [1.250]	18.1 [0.714]	2.20 ± 0.51 [0.087 ± 0.020]
1 1/2	38.1 [1.500]	21.8 [0.857]	2.41 ± 0.51 [0.095 ± 0.020]
1 3/4	44.5 [1.750]	25.4 [1.000]	2.71 ± 0.51 [0.107 ± 0.020]
2	50.8 [2.000]	29.0 [1.140]	2.79 ± 0.51 [0.110 ± 0.020]
3	76.2 [3.000]	43.4 [1.710]	3.17 ± 0.51 [0.125 ± 0.020]
4	101.6 [4.000]	57.9 [2.280]	3.55 ± 0.51 [0.140 ± 0.020]

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

Ordering Information

Color	Standard Black (-0)
Size selection	Always order the largest size that will shrink snugly over the component to be covered. Special order sizes are available upon request.
Standard packaging	On spools.
Ordering description	Specify product name, size and color (for example, NT-MIL 1/4-0).

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Mexico: 52-55-1106-0800
L. & S. America: 54-11-4733-2200

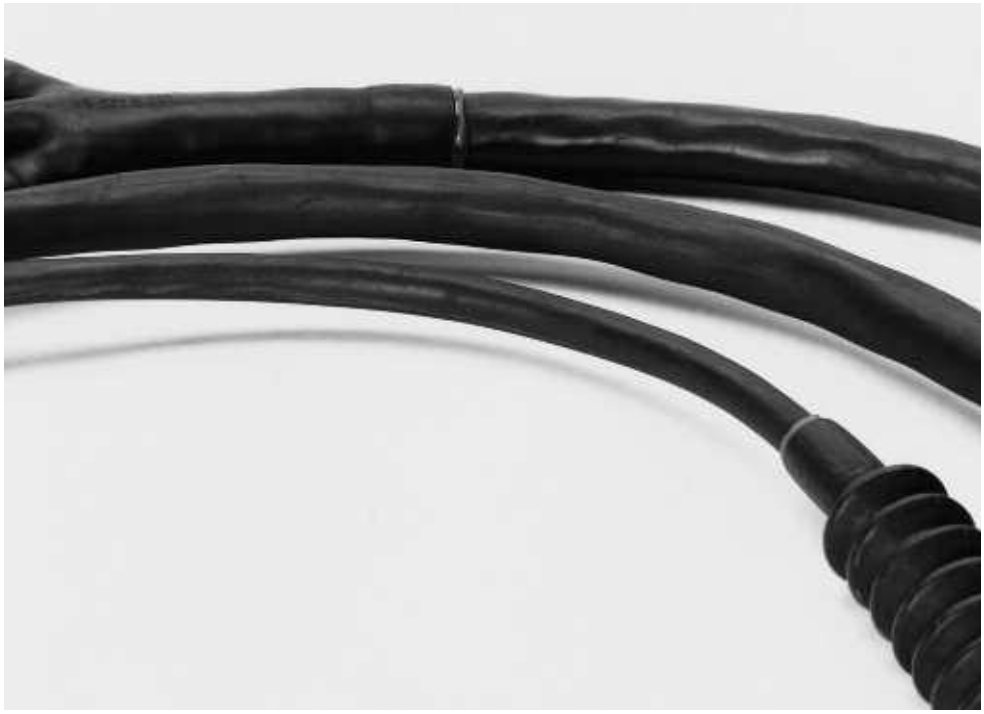
Germany: 49-6251-133-1999
China: 86-400-820-6015
Japan: 81-44-844-8013
UK: 44-800-267-666

NTFR

Very Flexible, Rugged Neoprene Elastomer Tubing

Product Facts

- Remains flexible at low temperatures without cracking
- Offers outstanding resistance to abrasion and physical abuse while providing the flexibility and strain relief needed for rugged applications
- Resistant to most fluids and solvents, including aviation and ground-vehicle fuels, lubricating oil, and hydraulic fluids (see Raychem Specification RT-511)
- Performance exceeds the stringent requirements of SAE-AMS-DTL-23053/1, Class 2
- System 20
- RoHS compliant



Applications

Widely used for insulation, strain relief, and abrasion protection on cable harnesses and wire bundles in the military and aerospace industries. Especially suitable for applications requiring exposure to fluids and solvents at elevated temperatures.

Installation

Minimum shrink temperature: 90°C [194°F]

Minimum full recovery temperature: 135°C [275°F]

Operating Temperature Range

-70°C to 121°C
[-94°F to 250°F]

Specifications/Approvals

Series	Military	Agency	Raychem
NTFR	SC-X-15112	AMS 3623	RT-511

Available in:	Americas	Europe	Asia Pacific
	■	■	■

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China: 86-400-820-6015
Japan: 81-44-844-8013
UK: 44-800-267-666

NTFR (Continued)

Product Dimensions

Size	Inside Diameter		Recovered Wall Thickness**
	Minimum Expanded as Supplied	Maximum Recovered After Heating	After Heating
1/8	3.2 [0.125]	1.6 [0.061]	0.69 ± 0.20 [0.027 ± 0.008]
3/16	4.8 [0.187]	2.5 [0.100]	0.84 ± 0.25 [0.033 ± 0.010]
1/4	6.4 [0.250]	3.6 [0.143]	0.89 ± 0.25 [0.035 ± 0.010]
3/8	9.5 [0.375]	5.5 [0.214]	1.01 ± 0.25 [0.040 ± 0.010]
1/2	12.7 [0.500]	7.3 [0.286]	1.21 ± 0.38 [0.048 ± 0.015]
5/8	15.9 [0.625]	9.1 [0.357]	1.32 ± 0.38 [0.052 ± 0.015]
3/4	19.1 [0.750]	10.9 [0.428]	1.44 ± 0.38 [0.057 ± 0.015]
7/8	22.2 [0.875]	12.7 [0.500]	1.65 ± 0.38 [0.065 ± 0.015]
1	25.4 [1.000]	14.5 [0.570]	1.77 ± 0.51 [0.070 ± 0.020]
1 1/4	31.8 [1.250]	18.1 [0.714]	2.20 ± 0.51 [0.087 ± 0.020]
1 1/2	38.1 [1.500]	21.8 [0.857]	2.41 ± 0.51 [0.095 ± 0.020]
1 3/4	44.5 [1.750]	25.4 [1.000]	2.71 ± 0.51 [0.107 ± 0.020]
2	50.8 [2.000]	29.0 [1.140]	2.79 ± 0.51 [0.110 ± 0.020]
3	76.2 [3.000]	43.4 [1.710]	3.17 ± 0.51 [0.125 ± 0.020]

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

Ordering Information

Color	Standard Black (-0)
Size selection	Always order the largest size that will shrink snugly over the component to be covered. Special order sizes are available upon request.
Standard packaging	On spools.
Ordering description	Specify product name, size and color (for example, NTFR 1/4-0).

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Dimensions are in inches and millimeters unless otherwise specified. Values in brackets are metric equivalents.

Dimensions are shown for reference purposes only. Specifications subject to change.

USA: 1-800-522-6752
Canada: 1-905-475-6222
Mexico: 52-55-1106-0800
L. & S. America: 54-11-4733-2200

Germany: 49-6251-133-1999
China: 86-400-820-6015
Japan: 81-44-844-8013
UK: 44-800-267-666

PD Caps

Semirigid, Encapsulant-Lined, Polyolefin Caps

Product Facts

- 3:1 shrink ratio
- Permanent or temporary way to terminate wires
- Rapid, simple installation
- Rugged protection against abrasion, vibration, and flexing
- PD caps provide a splash-resistant, moisture-resistant covering (but not intended for use where immersion in fluids is required)
- RoHS compliant

Applications

PD Caps offer an improved, inexpensive way to encapsulate crimped electrical connections, including those on motor coils. Their encapsulant lining melts and flows to fill surface irregularities of the substrate. These vibration-proof caps are used to insulate and terminate dead-end electrical cables, fixtures, connectors, and other electrical components.

Installation

Minimum shrink temperature: 125°C [257°F]

Minimum full recovery temperature: 135°C [275°F]

Operating Temperature Range

-55°C to 110°C
[-67°F to 230°F]

Specifications/Approvals

Series	UL	Raychem
PD Caps	E85381 600 V, 125°C	PD Caps SCD

Available in:	Americas	Europe	Asia Pacific
	■	■	■

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PD Caps (Continued)

Product Dimensions

Size	Length		Inside Diameter		Recovered Wall Thickness** Total Wall After Heating
	Nominal Overall as Supplied	Minimum Open Barrel as Supplied*	Minimum Expanded as Supplied	Maximum Recovered After Heating	
1/8	25.4 [1.00]	12.7 [0.50]	3.18 [0.125]	0.58 [0.023]	1.22 ± 0.15 [0.048 ± 0.006]
3/16	25.4 [1.00]	15.2 [0.60]	4.75 [0.187]	1.52 [0.060]	1.57 ± 0.20 [0.062 ± 0.008]
1/4	28.4 [1.12]	15.2 [0.60]	6.35 [0.250]	2.03 [0.080]	1.98 ± 0.25 [0.078 ± 0.010]
3/8	31.8 [1.25]	18.3 [0.72]	9.53 [0.375]	2.29 [0.090]	2.08 ± 0.25 [0.082 ± 0.010]
1/2	38.1 [1.50]	21.6 [0.85]	12.70 [0.500]	2.29 [0.090]	2.54 ± 0.25 [0.100 ± 0.010]

*See glossary for definition of “barrel.”
**Wall thickness will be less if recovery is restricted during shrinkage.

Ordering Information

Color	Standard Black (-0)
Size selection	Always order the largest size that will shrink snugly over the component to be covered. Special order sizes are available upon request.
Standard packaging	In pieces.
Ordering description	Specify product name, size and color (for example, PD Caps 1/4-0).

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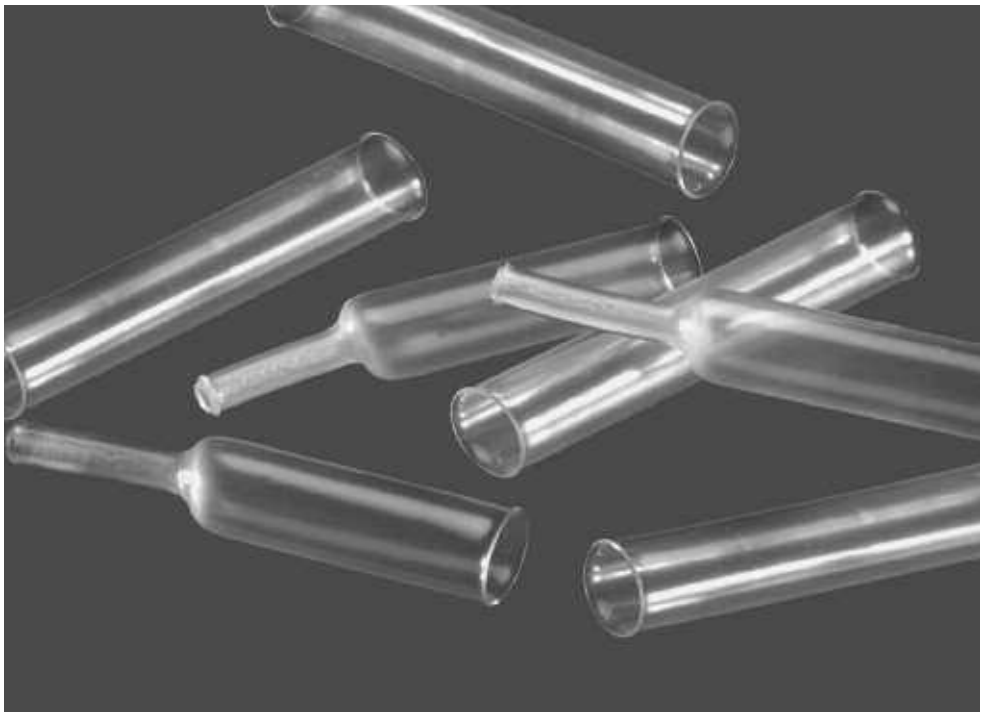
PTCM

Very High-Shrink-Ratio, Dual Wall, Flexible Heat-Shrinkable Tubing

Product Facts

- 6:1 shrink ratio
- Exceptional abrasion and cut through resistance
- Low shrink temperature for rapid installation
- Excellent mechanical strength
- RoHS compliant



Applications

PTCM is a flexible, heat-shrinkable, dual wall tubing with an integrally bonded meltable adhesive liner. PTCM offers outstanding mechanical and environmental protection to wire splices and terminals and is used for moisture proof encapsulation of a wide variety of components. In particular, it adheres well to PVC. With an impressive 6:1 expansion ratio, one product can protect and insulate a wide range of applications. PTCM also offers exceptional clarity for protection of substrates that may need to be inspected during service.

Installation

Minimum shrink temperature: 60°C [140°F]

Minimum full recovery temperature: 80°C [176°F]

Operating Temperature Range

-40°C to 85°C
[-40°F to 185°F]

Specifications/Approvals

Series	Raychem
PTCM	RK-6768

Available in:	Americas	Europe	Asia Pacific
		■	

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UK: 44-800-267-666

PTCM (Continued)

Product Dimensions

Size	Inside Diameter		Recovered Wall Thickness*
	Minimum Expanded as Supplied	Maximum Recovered After Heating	After Heating
9/1.5	9.0 [0.354]	1.5 [0.059]	1.60 ± 0.20 [0.062 ± 0.008]

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

Ordering Information

Color	Standard Clear (-X)
Size selection	Always order the largest size that will shrink snugly over the component to be covered.
Standard packaging	On spools.
Ordering description	PTCM-9/1.5-X-SP

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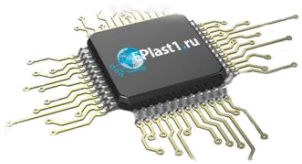
Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

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

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Факс: 8 (812) 320-02-42
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