

PROTECTION, INSULATION & MANUFACTURING AIDS FOR YOUR MEDICAL DEVICE

MEDICAL GRADE HEAT SHRINK TUBING

THE ENGINEERS OF HEAT SHRINK TUBING

1957

The discovery of crosslinking polymers by Paul Cook

60+

Years of polymeric science



329,500

SQ. FT dedicated manufacturing space, 2 sites



11

Dedicated polymer scientists & engineers



ISO 10993

Manufactured to standards



FDA

Registered master files*



APPLICATION GUIDE

FROM ROBUST ABRASION PROTECTION AND INSULATION TO PEELABLE PROCESS AIDS AND EVERYTHING IN BETWEEN

At TE Connectivity, we don't just manufacture heat shrink tubing, we design and optimize. We understand the difference advanced polymeric engineering can make to reflowing your complex catheter or protecting and insulating your electrosurgical devices and laparoscopic instruments.

We offer seven medical heat shrink tubing products formulated from a number of materials including FEP, PVDF and PEBAX.

APPLICATION	OPTION 1	OPTION 2
Manufacturing process aids for interventional applications	MT-FEP (FEP)	MT-LWA (LDPE)
Interventional shaft encapsulation	MT-PBX (PEBAX)	MT-PBX (PEBAX)
Abrasion protection for electrosurgical devices	MT-2000 (HDPE)	MT-1000 (PVDF)
Rigid abrasion protection for laparoscopic and in-vivo instruments	MT-1000 (PVDF)	MT-2000 (HDPE)
Insulation for electrosurgical devices	MT-2000 (HDPE)	MT-3000 (PVDF)
Strain relief	MT-5000 (LDPE)	MT-3000 (PVDF)

MEDICAL GRADE HEAT SHRINK TUBING - COMPARISON CHART

Product Family	Base Polymer	Primary Market	Full recovery	Shrink Ratio				Sterilization				Radiopaque Option	Adhesive Lining Option
				<= 1.67:1	<= 2:1	<= 3:1	Up to > 4:1	Auto-Clave	Gamma	ETO	Dry Heat		
MT1000	PVDF	Surgical instruments and shafts	175°C (347°F)		•			•	•	•	•	•	•
MT2000	HDPE	Surgical instruments and shafts	140°C (284°F)			•			•	•		•	•
MT3000	PVDF	Surgical instruments and shafts	150°C (302°F)			•		•	•	•	•	•	•
MT5000	LDPE	Surgical instruments and shafts	110°C (230°F)				•		•	•		•	•
MT5510	EMA	Surgical instruments and shafts	110°C (230°F)				•		•	•		•	•
MT-LWA	LDPE	Interventional shafts	110°C (230°F)				•	N/A	N/A	N/A	N/A	•	•
MT-FEP	FEP	Surgical and Interventional shafts	210°C (410°F)	•				•	•	•			
MT-PBX	PEBA	Surgical and Interventional shafts	190°C (374°F)				•		•	•		•	•

Product Family	Base Polymer	Primary Market	Full Recovery	Process Aid	Abrasion Protection	Pushability / Strain Relief Rigidity (Shaft)	Strain Relief	Insulation	Lubricity
MT1000	PVDF	Surgical instruments and shafts	175°C (347°F)	N/A	Better	Best	Better	Better	Best
MT2000	HDPE	Surgical instruments and shafts	140°C (284°F)	Average	Best	Good	Limited	Best	Better
MT3000	PVDF	Surgical instruments and shafts	150°C (302°F)	N/A	Good	Limited	Better	Better	Good
MT5000	LDPE	Surgical instruments and shafts	110°C (230°F)	N/A	Better	Limited	Best	Good	Limited
MT5510	EMA	Surgical instruments and shafts	110°C (230°F)	N/A	Better	Limited	Standard	Good	Limited
MT-LWA	LDPE	Interventional shafts	110°C (230°F)	Better	Good	Limited	Standard	Good	Limited
MT-FEP	FEP	Surgical and Interventional shafts	210°C (410°F)	Best	Better	Limited	Good	Good	Better
MT-PBX	PEBA	Surgical and Interventional shafts	190°C (374°F)	N/A	Better	72D - Better 63D - Good 55D - Limited	72D - Limited 63D - Better 55D - Better	Good	72D - Better 63D - Good 55D - Good

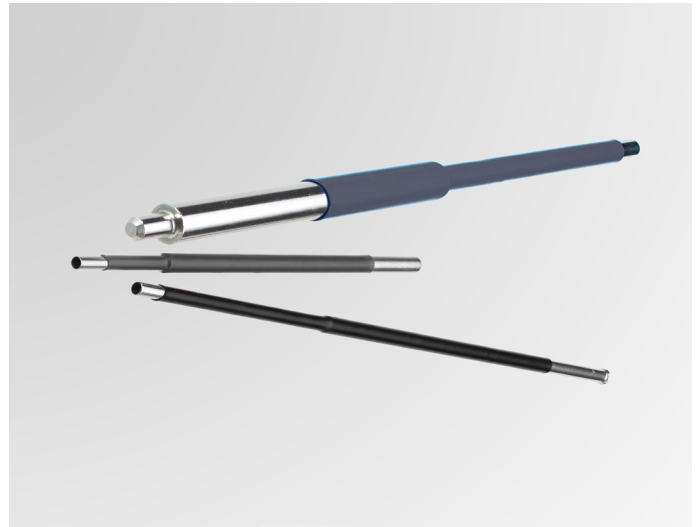
MT-1000 – PVDF

APPLICATION

- Abrasion protection for laparoscopic and in-vivo instruments
- Insulation for electrosurgical instruments
- Strain relief applications

PROFILE

- Shrink ratio $\leq 2:1$
- Full recovery at 175°C (347°F) minimum
- Supports sterilization environments: gamma, ethylene oxide (ETO), steam, dry heat and autoclave
- Custom sizing, colors, finishing and value-add options available
- Radiopacity can be customized



ABOUT

MT-1000 is a crosslinked PVDF heat shrink tubing. PVDF offers excellent chemical and abrasion resistance, high dielectric strength and superior tensile strength. Its homogeneous structure (properties evenly distributed) contributes to its consistency and high performance, making our MT-1000 essentially free from flaws, defects, pinholes, seams, cracks or inclusions.

MT-1000 is rigid and highly-lubricious, and works very well at providing abrasion protection for rigid laparoscopic and in-vivo instruments.

MT-2000 – HDPE

APPLICATION

- Abrasion protection for electrosurgical devices
- High performance insulation for electrosurgical devices

PROFILE

- Shrink ratio $\leq 2.5:1$
- Full recovery at 140°C (284°F) minimum
- Supports sterilization environments: gamma and ethylene oxide (ETO)
- Custom sizing, colors, finishing and value-add options available
- Radiopacity can be customized

**Select sizes*



ABOUT

MT-2000 is a crosslinked high density polyethylene (HDPE) heat shrink tubing. HDPE offers excellent abrasion protection and high performance insulation.

It's homogeneous structure (properties evenly distributed) contributes to its consistency and high performance, making our MT-2000 essentially free from flaws, defects, pinholes, seams, cracks or inclusions. MT-2000 is semi-rigid and mechanically tough, combined with high insulating properties, making our MT-2000 a great option for electrosurgical device applications.

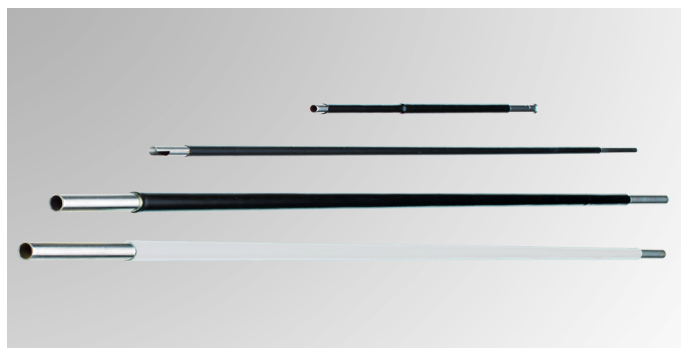
MT-3000 – PVDF

APPLICATION

- Abrasion protection for surgical and in-vivo instruments
- Strain relief applications

PROFILE

- Shrink ratio $\leq 3:1$
- Full recovery at 150°C (302°F) minimum
- Supports sterilization environments: gamma, ethylene oxide (ETO), steam, dry heat and autoclave
- Custom sizing, colors, finishing and value-add options available
- Radiopacity can be customized



ABOUT

MT-3000 is a crosslinked PVDF heat shrink tubing. PVDF offers excellent chemical and abrasion resistance, high dielectric strength and superior tensile strength. Its homogeneous structure (properties evenly distributed) contributes to its consistency and high performance, making our MT-3000 essentially free from flaws, defects, pinholes, seams, cracks or inclusions.

MT-3000 is semi-lubricious and more flexible than our other PVDF heat shrink tubing. MT-3000 offers abrasion protection for surgical and in-vivo instruments.

MT-5000 – LDPE

APPLICATION

- Strain relief applications

PROFILE

- Shrink ratio $\leq 4:1$
- Full recovery at 110°C (230°F) minimum
- Supports sterilization environments: gamma and ethylene oxide (ETO)
- Custom sizing, colors, finishing and value-add options available
- Radiopacity can be customized
- Adhesive-layer option available



ABOUT

MT-5000 is a crosslinked low density polyethylene (LDPE) heat shrink tubing. LDPE offers excellent flexibility and is a great option for strain relief applications.

Its homogeneous structure (properties evenly distributed) contributes to its consistency and high performance, making our MT-5000 essentially free from flaws, defects, pinholes, seams, cracks or inclusions. MT-5000 is flexible with a high shrink ratio making it a great option for strain relief applications.

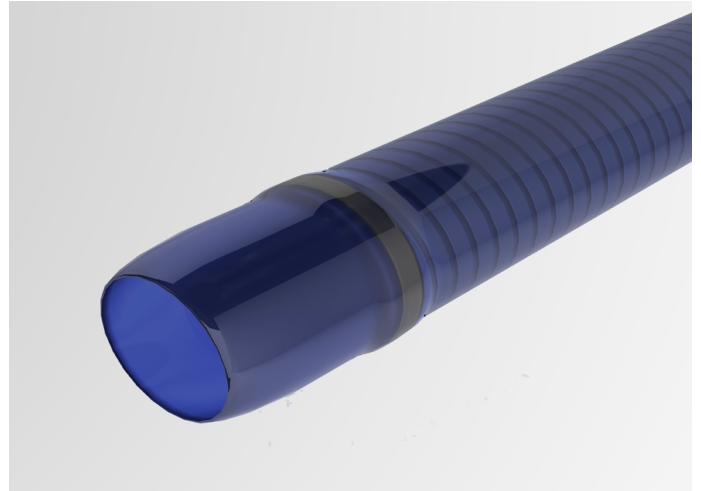
MT-FEP

APPLICATION

- Process aid for catheter shaft reflow
- Process aid for reflowing catheter shafts

PROFILE

- Shrink ratio $\leq 1.6:1$
- Full recovery at 210°C (410°F) minimum
- Tight longitudinal change control as low as $\pm 2\%$
- Custom sizing, finishing options available
- Translucent for high optical clarity



ABOUT

MT-FEP is a fluorinated ethylene propylene heat shrink tubing. FEP offers excellent consistency, high dielectric strength and is chemically inert. MT-FEP is lubricious and semi-rigid with shrink ratios up to 2:1*.

FEP is the industry gold standard for reflowing catheter shafts and bonding joints. For our MT-FEP, we can control longitudinal growth $\pm 2\%$ ensuring consistency on lot to lot, reducing cost and waste.

**Upper limit on select applications. Optimal shrink ratio is 1.6:1*

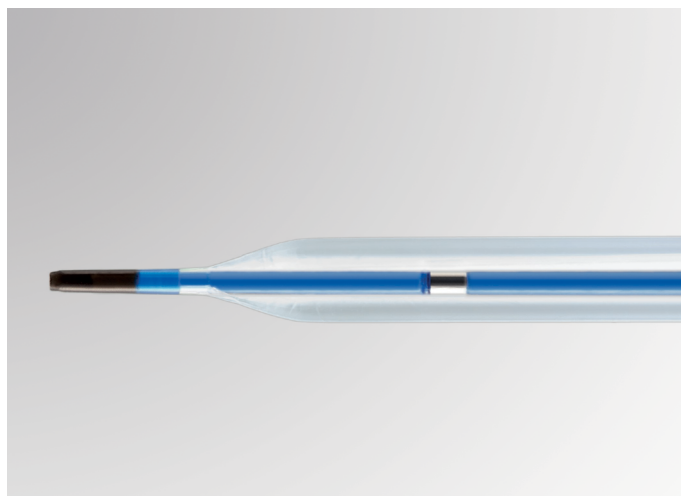
MT-LWA

APPLICATION

- Process aid for catheter shaft reflow
- Process aid for balloon & joint bonding

PROFILE

- Shrink ratio $\leq 4:1$
- Full recovery at 110°C (230°F) minimum
- Custom sizing, finishing options available
- Radiopacity can be customized
- Adhesive-layer option available
- Translucent for high optical clarity
- Color blending option available



ABOUT

MT-LWA is a crosslinked modified polyolefin heat shrink tubing designed for use as a process aid in minimally invasive applications.

Its homogeneous structure (properties evenly distributed) contributes to its consistency and high performance, making our MT-LWA essentially free from flaws, defects, pinholes, seams, cracks or inclusions. MT-LWA offers customizable compressions strengths, shrink ratios $\leq 4:1$, is peelable with axial tear propagation and you can remove it while its warm, making it an excellent choice for reflowing catheter shafts when MT-FEP isn't suitable.

TE.com/medical

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