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Overview

TE Connectivity's Raychem brand of tubing was developed when our scientists pioneered the application of radiation crosslinking and the development of heat-shrinkable polymer products. Today TE is recognized worldwide for its expertise in these areas.

The Raychem brand of tubings are made of polyolefins, fluoropolymers, and elastomers enhanced by radiation crosslinking and heat-shrinkability. When heated during installation,

our tubings shrink to conform to virtually any shape. They provide dependable insulation, mechanical protection, and strain relief, as well as aesthetic appeal.

Single wall tubings are available in thin-wall, medium-wall, and thick-wall versions. With dual wall tubings, an inner wall — either an encapsulant or an adhesive — melts and flows during installation heating, to protect against environmental damage.

Encapsulants protect connections and components from splashes and corrosion. Adhesives go a step further, sealing to plastic, metal, rubber, or other substrates.

You can choose from tubings that are highly flexible or semirigid, designed for operation in high- or low-temperature environments, halogen-free and flame-retardant to meet a range of industry standards.

Available in many sizes, constructions, lengths, and colors to meet commercial, military or medical specifications, our tubings can also be customized for special applications.

Installation is fast and easy with handheld heating tools or bench-mounted heaters. A range of automatic and semi-automatic installation equipment is available for high-volume applications.

Tubing Selection Guide

PRODUCT			Polyolefin	Fluoropolymer	Elastomer	Operating Temperature °C / [°F]	Min. shrink temperature (°C)	Min. full recovery temperature (°C)	Shrink ratio
Single Wall	Very flexible	Versafit	•			-55 to 135 [-67 to 275]	70	90	2:1
		CGPE-105	•			-70 to 105 [-94 to 221]	85	110	2:1
	Flexible	CGPT	•			-40 to 135 [-40 to 275]	80	120	2:1
		DCPT	•			-55 to 135 [-67 to 275]	95	120	2:1
		RNF-100	•			-55 to 135 [-67 to 275]	95	121	2:1
		RNF-3000	•			-55 to 135 [-67 to 275]	80	120	3:1
	Semirigid	RP-4800	•			-55 to 135 [-67 to 275]	95	121	4:1
		CRN	•			-55 to 135 [-67 to 275]	110	135	2:1
		RT-3	•			-55 to 135 [-67 to 275]	110	135	2.5:1
		ATUM	•			-55 to 110 [-67 to 230]	80	110	3:1
Dual wall [adhesive-and encapsulant-lined]	Semiflexible	DWP-125	•			-40 to 110 [-40 to 230]	80	125	3:1
		HTAT	•			-55 to 125 [-67 to 257]	80	110	4:1
		PTCM	•			-40 to 85 [-40 to 185]	60	80	6:1
	Flexible	RPPM	•			-40 to 85 [-40 to 185]	60	80	4:1
		TAT-125	•			-55 to 110 [-67 to 230]	95	121	2:1
		ES1000	•			-40 to 130 [-40 to 266]	110	135	4:1
		ES2000	•			-40 to 130 [-40 to 266]	110	135	4:1
		FL2500	•			-40 to 135 [-40 to 275]	110	135	4:1
		SCL	•			-55 to 110 [-67 to 230]	125	135	3:1
		SCT	•			-40 to 150 [-40 to 302]	110	135	4:1
Heavy Duty	Semirigid	BSTS/BSTS-FR	•			-55 to 90 [-67 to 194]	90	121	3:1
		HF	•			-55 to 90 [-67 to 194]	80	121	3:1
		HRHF/HRNF/HRSR	•			-55 to 90 [-67 to 194]	80	121	5.6:1
		RHW	•			-55 to 110 [-67 to 230]	110	125	3:1
		RMW	•			-55 to 110 [-67 to 230]	110	125	3:1
		SST/SST-FR	•			-55 to 90 [-67 to 194]	90	121	3:1
		DR-25			•	-75 to 150 [-103 to 302]	150	175	2:1
Special Purpose	Elastomers	HRHT							
		NT			•	-55 to 90 [-67 to 194]	90	135	1.8:1
		NT-MIL			•	-70 to 121 [-94 to 250]	90	135	1.8:1
		NTFR			•	-70 to 121 [-94 to 250]	90	135	2:1
		RW-200			•	-40 to 200 [-40 to 392]	100	175	2:1
		RW-200-E			•	-55 to 200 [-67 to 392]	100	175	2:1
		SFR			•	-75 to 180 [-103 to 356]	135	175	1.75:1
		SRFR			•	-75 to 200 [-103 to 392]	135	175	1.5:1
		URHT							
	Fluoropolymers	RNF-150		•		-55 to 150 [-67 to 302]	110	150	2:1
		RT-375		•		-55 to 150 [-67 to 302]	125	150	2:1
		RT555		•		-65 to 200 [-85 to 392]	150	220	2:1
		RT-770				-55 to 125 [-67 to 257]	135	150	2:1
		RT-780				-55 to 175 [-67 to 347]	180	200	2:1
		RT-790				-55 to 200 [-67 to 392]	235	250	2:1
		RW-175		•		-55 to 175 [-67 to 347]	155	175	2:1
		TFE and TFE-R		•		-67 to 250 [-89 to 482]	330	340	1.8:1/ 3.2:1
	Caps	ES Caps	•			-40 to 105 [-40 to 221]	100	135	4:1
		PD Caps	•			-55 to 110 [-67 to 230]	125	135	3:1
		TC Caps	•			-55 to 135 [-67 to 275]	110	135	2.5:1

*For specific MIL-Spec information for each product, refer to individual product pages or the Tubing Cross-Reference Guide on page 3-8.

**Sizes 9/3 through 70/21 only. †Clear is not flame-retardant.

Tubing Selection Guide (Continued)

Size range (inside diameter as supplied)	Colored	Clear	Flame- retardant	UL 224	CSA	VW-1 (UL/CSA)	MIL Spec*	USP Class VI	ABS	UL D486**	DESCRIPTION
3/64" to 4"	•		•	•	•	•	•				Highly flame-retardant, multi-spec polyolefin
3/64" to 2"	•	•									Brightly colored, general purpose polyolefin
1.6 mm to 38 mm	•	•	•	•	•						General purpose, flame-retardant polyolefin†
3 mm to 38 mm	•		•	•	•						Green and yellow striped polyolefin
3/64" to 5"	•	•	•	•	•		•				High-performance flexible polyolefin†
1.5 mm to 39 mm	•	•	•	•	•		•				3:1 shrink ratio general-purpose polyolefin†
3/4" to 4 1/2"	•		•	•			•				4:1 shrink ratio polyolefin
3/64" to 3/4"	•	•	•	•	•		•				Flame-retardant polyolefin†
.240" to .485"	•		•	•	•						Semirigid polyolefin for terminal insulation
3 mm to 40 mm	•	•	•	•			•				3:1 and 4:1 shrink ratio adhesive-lined polyolefin†
4 mm to 52 mm	•		•	•							
1/8" to 1"	•		•	•	•						3:1 shrink ratio adhesive-lined polyolefin
4 mm to 48 mm	•		•								High-temperature adhesive-lined polyolefin9 mm
	•										Very high shrink ratio, dual wall, flexible polyolefin tubing
4 mm to 16 mm	•	•									Dual wall, moisture-proof polyolefin
1/8" to 1 1/2"	•	•	•	•			•				2:1 adhesive-lined polyolefin†
.225" to .700"		•		•							Clear high-shrink-ratio adhesive-lined polyolefin
.225" to .700"	•		•	•							Flame-retardant adhesive-lined polyolefin
.300" to .700"	•		•								Fully flame-retardant, adhesive-lined polyolefin
1/8" to 1"	•			•			•				3:1 shrink ratio encapsulant-lined polyolefin
.300" to .700"	•		•								High-temperature adhesive-lined polyolefin
.3" to 4.5"	•	•	•						•		Rugged, general purpose, thick-wall polyolefin†
.4" to 2.7"	•		•						•		Highly flexible, thick-wall polyolefin
.6" to 4"	•		•						•		High-shrink-ratio repair sleeve
9 mm to 180 mm	•									•	Heavy wall adhesive-lined polyolefin
10 mm to 180 mm	•										Medium wall polyolefin
.3" to 4.5"	•		•				•		•		Self-sealing, dual wall polyolefin
1/8" to 3"	•		•				•				Diesel-resistant elastomer
1/8" to 4"	•		•								Flexible general-purpose modified elastomer
1/8" to 4"	•		•				•				Flexible rugged modified elastomer
1/8" to 3"	•		•				•				Very flexible rugged neoprene
1/8" to 2"	•		•				•				High-temperature flexible elastomer
1/8" to 2"	•		•				•				High-temperature flexible elastomer
1/4" to 2"	•		•				•				Very flexible silicone
2.9 mm to 51 mm	•		•	•		•					Very flexible silicone rubber
3/64" to 1"	•		•	•		•	•				High-performance flexible fluoropolymer
3/64" to 1 1/2"	•	•	•	•	•	•	•				Clear high-performance flexible fluoropolymer
1/8" to 2"	•		•	•		•	•				Fluid- and chemical-resistant fluoropolymer
3/64" to 1 1/2"	•	•	•	•	•	•	•				High-performance fluoropolymer
0.8 mm to 11.9 mm/		•	•				•				High-temperature PTFE® fluoropolymer resin
2 mm to 32 mm											
1/8" to 2"			•								NBCCS tubing rated to 125°C
1/8" to 2"			•								NBCCS tubing rated to 175°C
1/8" to 2"			•								NBCCS tubing rated to 200°C
1/16" to 1"	•	•						•			Autoclavable semirigid fluoropolymer
.225" to .427"	•	•	•	•							High-ratio, adhesive-lined caps†
1/8" to 1/2"	•			•							Semirigid encapsulant-lined polyolefin caps
1/16" to 1/4"	•		•	•							Semirigid flame-retardant polyolefin caps

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Tubing Selection Guide (Continued)

			Polyolefin	Fluoropolymer	Elastomer	Operating Temperature °C / [°F]		Min. shrink temperature (°C)	Min. full recovery temperature (°C)	Shrink ratio
PRODUCT										
Special Purpose	Conduit	HCTE		•		-55 to 200	[-67 to 392]	N/A	N/A	N/A
(Continued)	Kits	RayBlock 85	•			-40 to 85	[-40 to 185]	80	110	4:1
		RayBlock 105	•			-40 to 105	[-40 to 221]	80	110	4:1
		Tubing Kits and Mini-Spools	•			Various; see page 139-140		See page 139-140	See page 139-140	2:1 up to 4:1
	Low Toxicity	XFFR	•			-55 to 105	[-67 to 221]	70	121	3:1
		ZH-100	•			-30 to 105	[-22 to 221]	80	120	2:1
		ZHTM	•			-30 to 105	[-22 to 221]	80	121	2:1
	Edging Matl	Rayrim	•			-55 to 80	[-67 to 176]	120	150	N/A
	Fiber & Fabric	HFT5000				-40 to 125	[-40 to 257]	80	110	2:1
	Braids	Versaflex				-50 to 150	[-58 to 302]	N/A	N/A	N/A

*For specific MIL-Spec information for each product, refer to individual product pages or the Tubing Cross-Reference Guide on page 3-8.

**Sizes 9/3 through 70/21 only. †Clear is not flame-retardant.

Tubing Selection Guide (Continued)

Size range (inside diameter as supplied)	Colored	Clear	Flame- retardant	UL 224	CSA	VW-1 (UL/CSA)	MIL Spec*	USP Class VI	ABS	UL D486**	DESCRIPTION
.187" to 2"	•		•								Modified ETFE, helically convoluted tubing
12 mm to 32 mm	•		•								Heat-shrinkable water blocking system
12 mm to 32 mm	•		•								Heat-shrinkable water blocking system
See page 139-140	•	•	•	•	•	•	•				Smaller packaging options for single wall and adhesive-lined tubing
.4" to 3"	•		•						•		Halogen-free, flame-retardant polyolefin
1/8" to 2"	•		•								Thin-wall, low-fire-hazard polyolefin
3 mm to 40 mm	•		•								Low toxicity, flexible polyolefin
0.8 mm to 4.5 mm	•										Protective self-adhering edging material
12 mm to 80 mm	•										Heat-shrinkable, fabric tubing
3 mm to 50 mm	•										Expandable, braided polyester sleeving

Specification Cross-Reference Guide

Product Type	UL File	CSA File	AMS-DTL-23053* Sheet	AMS-DTL-23053* Class	MIL-PRF-46846 Type	MIL-PRF-46846 Class	TE Specification	Page No.
ATUM	E85381**		/4	3			RW-2063 & RK-6024	3-11
BSTS							RW-2017	3-13
BSTS-FR			/15	1 & 2***			RW-2017	3-13
CGPE-105							CGPE-105 SCD	3-15
CGPT	E35586	LR31929					RW-2059	3-17
CRN Type 1 (colors)	E35586	LR31929†	/6	1			RT-360, Type 1	3-19
CRN Type 2 (clear)			/6	2			RT-360, Type 2	3-19
DCPT	E35586	LR31929					RW-2056	3-21
DR-25			/16				RT-1116	3-23
DWP-125	E35586	LR31929					DWP-125 SCD	3-25
ES1000	E85381						RT-1113	3-27
ES2000	E85381						RT-1112	3-29
ES Caps	E85381						RW-3006	3-31
FL2500							FL2500 SCD	3-33
HCTE							RT-1162	3-35
HF			/15	1***			RW-2023	3-37
HFT5000	E199379						RW-2060	3-39
HRHF							RW-2013	3-41
HRNF							RW-2013	3-41
HRSR							RW-2013	3-41
HRHT							HRHT SCD	3-43
HTAT							RW-2052	3-45
NT							RT-510	3-47
NT-MIL			/1	1 & 2			RW-3030	3-49
NTFR							RT-511	3-51
PD Caps	E85381						PD Caps SCD	3-53
PTCM							RK-6768	3-55
RayBlock 85							RW-2101	3-57
RayBlock 105							RW-2102	3-59
Rayrim Edging Material							RK-6182	3-61
RaySpool								3-63
RHW	E91151***						RHW SCD	3-66
RMW							RMW SCD	3-68
RNF-100 Type 1 (colors)	E35586	LR31929	/5	1			RT-350, Type 1	3-70
RNF-100 Type 2 (clear)			/5	2			RT-350, Type 2	3-70
RNF-150	E35586 VW-1		/18	2			RT-370	3-72
RNF-3000	E35586	LR31929					RW-2053	3-74
RP-4800	E35586		/5	1††			RT-1122	3-76
RPPM							RK-6214	3-78
RT-3	E35586	LR31929†					RT-360†††	3-80
RT-375	E35586 VW-1	LR31929 VW-1	/18	2			RT-375	3-82
RT555	E85381						RT-555	3-84
RT-770								3-86
RT-780								3-88
RT-790								3-90
RW-175	E35586 VW-1	LR31929 VW-1	/8				RW-3029	3-92
RW-200			/13				RT-1146	3-94
RW-200-E							RK-6014/1	3-94
SCL	E85381		/4	1			RT-1301	3-96
SCT							SCT SCD	3-98
SFR			/10		II	1	RT-1140	3-100
SRFR	E85381 VW-1						RW-2057	3-102
SST							RW-2011	3-104
SST-FR			/15	1 & 2			RW-2011	3-104
TAT-125 Type 1 (colors)	E85381		/4	2			RW-3032	3-106

Specification Cross-Reference Guide (Continued)

Product Type	UL File	CSA File	AMS-DTL-23053*		MIL-PRF-46846		TE Specification	Page No.
TAT-125 Type 2 (clear)							RW-3032	3-106
TC Caps	E85381						TC Caps SCD	3-108
TFE/TFE-R							RW-2054, RW-2055	3-110
Tubing Kits							Various	3-112
URHT						II	URHT SCD	3-114
Versafit	E35586 VW-1	LR31929 VW-1	/5	1 & 3			RW-3009	3-116
Versaflex							RK-6772	3-118
Versaflex-FR	E306976							3-118
XFFR							RW-2016	3-120
ZH-100							RW-2031	3-122
ZHTM							RW-2058	3-124

*Formerly MIL-I-23053 and MIL-DTL-23053 **Black only, except sizes 3/1 and 4/1. ***Sizes 9/3 through 70/21 only.

†Black only †† Overexpanded †††With exception to dimensions and longitudinal change.

Tubing Categories

	Type	Product Name		
Single Wall	Very Flexible	Versafit		
	Flexible	CGPE-105 CGPT	DCPT RNF-100	RNF-3000 RP-4800
	Semirigid	CRN	RT-3	
Dual Wall	Semi-flexible	ATUM	DWP-125	HTAT
	Flexible	PTCM	RPPM	TAT-125
	Semirigid	ES1000 ES2000	FL2500 SCL	SCT
Heavy Duty		BSTS/BSTS-FR HF	HRHT HRHF/HRNF/HRSR RMW	RHW SST/SST-FR URHT
Special Purpose	Elastomers	DR-25 DR-25TH NT NT-MIL	NTFR RW-200 RW-200-E	SFR SRFR UPB
	Fluoropolymers	RNF-150 RT-375 RT555	RT-770 RT-780 RT-790	RW-175 RY-780 TFE and TFE-R
	Caps	ES Caps PD Caps	TC Caps	
	Conduit	HCTB	Maulflex	
	Kits	RayBlock 85 RayBlock 105	RaySpool Tubing Kits and Mini-Spools	
	Low toxicity	XFFR	ZH-100	ZHTM
	Edging material	Rayrim		
	Fiber and fabric	HFT5000		
	Braid	Versaflex		

ATUM

High-Shrink-Ratio, Adhesive-Lined Polyolefin Tubing

Product Facts

- 3:1 and 4:1 shrink ratios allow for connector-to-cable sealing
- Tubing environmentally seals and protects components and interconnections
- Medium wall provides increased mechanical protection
- The adhesive in ATUM tubing bonds to a wide variety of plastics, rubbers, and metals, including polyethylene, aluminum, steel, and copper
- RoHS compliant



Applications

Environmentally seals and protects a wide variety of electrical applications, including back end connector sealing, breakouts, and connector-to-cable transitions. High expansion ratio makes it possible to repair most damaged cable jackets without removing connectors.

Installation

Minimum shrink temperature: 80°C [176°F]
Minimum full recovery temperature: 110°C [230°F]

Operating Temperature Range

-55°C to 110°C
[-67°F to 230°F]

Specifications/Approvals

Series	UL** 	Military	TE
ATUM	E85381 600V, 110°C	AMS-DTL-23053/4,* Class 3	RW-2063 — Black RK-6024 — Colors and clear

*Formerly MIL-I-23053/4 and MIL-DTL-23053/4. Sizes 3/1, 6/2, 12/4, 24/8, and 40/13 only.

**Black only, except sizes 3/1 and 4/1.

Available in:	Americas	Europe	Asia Pacific
	■	■	■

ATUM (Continued)

Product Dimensions

Size	Inside Diameter		Recovered Wall Thickness**	
	Minimum Expanded as Supplied	Maximum Recovered After Heating	Total Wall After Heating	Adhesive Wall After Heating (Nominal)
3:1				
3/1	3.0 [0.118]	1.0 [0.039]	1.00 ± 0.28 [0.039 ± 0.010]	0.50 [0.020]
4.5/1.5	4.5 [0.177]	1.5 [0.059]	1.10 ± 0.25 [0.043 ± 0.011]	0.50 [0.020]
6/2	6.0 [0.236]	2.0 [0.079]	1.00 ± 0.28 [0.039 ± 0.010]	0.50 [0.020]
9/3	9.0 [0.354]	3.0 [0.118]	1.40 ± 0.28 [0.055 ± 0.010]	0.61 [0.024]
12/4	12.0 [0.472]	4.0 [0.157]	1.78 ± 0.38 [0.070 ± 0.015]	0.76 [0.030]
19/6	19.0 [0.748]	6.0 [0.236]	2.25 ± 0.55 [0.088 ± 0.022]	0.76 [0.030]
24/8	24.0 [0.940]	8.0 [0.315]	2.54 ± 0.55 [0.100 ± 0.022]	1.02 [0.040]
40/13	40.0 [1.570]	13.0 [0.512]	2.54 ± 0.55 [0.100 ± 0.022]	1.02 [0.040]
4:1				
4/1	4.0 [0.157]	1.0 [0.039]	1.00 ± 0.28 [0.039 ± 0.010]	0.50 [0.020]
8/2	8.0 [0.315]	2.0 [0.079]	1.00 ± 0.28 [0.039 ± 0.010]	0.50 [0.020]
12/3	12.0 [0.472]	3.0 [0.118]	1.40 ± 0.28 [0.055 ± 0.010]	0.61 [0.024]
16/4	16.0 [0.630]	4.0 [0.157]	1.78 ± 0.38 [0.070 ± 0.015]	0.76 [0.030]
24/6	24.0 [0.945]	6.0 [0.236]	2.25 ± 0.55 [0.088 ± 0.022]	0.76 [0.030]
32/8	32.0 [1.260]	8.0 [0.315]	2.54 ± 0.55 [0.100 ± 0.022]	1.02 [0.040]
52/13	52.0 [2.050]	13.0 [0.512]	2.54 ± 0.55 [0.100 ± 0.022]	1.02 [0.040]

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

Ordering Information

Color	Standard	Black (-0)
	Nonstandard	Clear in 3:1 sizes only (-X, non-flame-retardant jacket); other colors available on request.
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 or on spools.	
Ordering description****	Specify product name, size and color (for example, ATUM 8/2-0).	

***Only 1.2 meter [4-foot] lengths are standard in the Americas. ATUM tubing on spools is nonstandard.

****For supply to MIL spec., add -MS to ordering description.

BSTS/BSTS-FR

General Purpose, Heat-Shrinkable Tubing

Product Facts

- Excellent thick-wall insulation and abrasion protection
- No adhesive – can be removed easily
- Expansion ratios as high as 3:1
- Availability in flame-retardant material with FR callout (see “Ordering information and Part numbering system” on the next page)
- BSTS has the following agency approvals:
 - ABS (American Bureau of Shipping)
 - Lloyd's (Lloyd's Register of Shipping)
- RoHS compliant



3

Heat-Shrinkable Tubing

Applications

BSTS heat-shrinkable tubing is made of a rugged polymer that resists moisture, fungus, and weathering. It also has excellent electrical properties. This tubing is useful in applications where insulation, abrasion resistance, and strain relief are important. When used with sealant tape (S-1305 for flame-retardant or S-1278 for non-flame-retardant), it can provide a watertight system in nonpressurized applications.

Installation

Minimum shrink temperature: 90°C [194°F]
Minimum full recovery temperature: 121°C [250°F]

Operating Temperature Range

-55°C to 110°C
[-67°F to 230°F]

Specifications/Approvals

Series	Military	Industry	TE
BSTS	—	—	RW-2017
BSTS-FR	AMS-DTL-23053/15*, Class 1 and Class 2**	ASTM D 685, nonburning	RW-2017

*Formerly MIL-I-23053/15 and MIL-DTL-23053/15.

**Except for coatings requirement. Refer to SST-FR when coating is required.

Available in:	Americas	Europe	Asia Pacific
	■	■	■

BSTS/BSTS-FR (Continued)

Product Dimensions

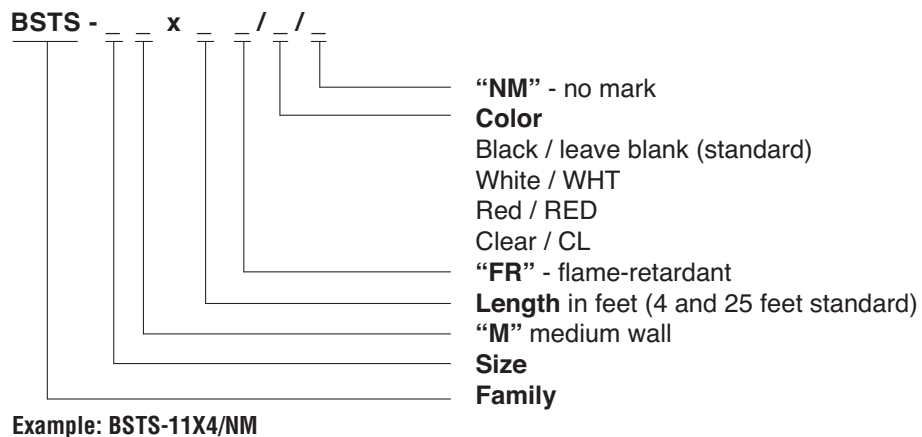
Size	Inside Diameter		Wall Thickness (Nominal)	
	Minimum Expanded as Supplied	Maximum Recovered After Heating	Expanded as Supplied	Recovered After Heating***
BSTS-03	7.62 [0.300]	2.54 [0.100]	0.63 [0.025]	1.78 [0.070]
BSTS-04	10.16 [0.400]	3.81 [0.150]	0.63 [0.025]	1.78 [0.070]
BSTS-07	19.05 [0.750]	5.59 [0.220]	0.76 [0.030]	2.41 [0.095]
BSTS-11	27.94 [1.100]	9.52 [0.375]	1.02 [0.040]	3.05 [0.120]
BSTS-13	33.02 [1.300]	9.52 [0.375]	0.89 [0.035]	3.05 [0.120]
BSTS-15	38.10 [1.500]	12.70 [0.500]	1.27 [0.050]	3.56 [0.140]
BSTS-17	43.18 [1.700]	12.70 [0.500]	1.14 [0.045]	3.56 [0.140]
BSTS-20	50.80 [2.000]	19.05 [0.750]	1.27 [0.050]	3.94 [0.160]
BSTS-27	65.58 [2.700]	22.86 [0.900]	1.27 [0.050]	3.94 [0.160]
BSTS-30	76.20 [3.000]	31.75 [1.250]	1.27 [0.050]	3.94 [0.160]
BSTS-35	88.90 [3.500]	31.75 [1.250]	1.27 [0.050]	3.94 [0.160]
BSTS-40	101.60 [4.000]	44.45 [1.750]	1.27 [0.050]	3.94 [0.160]
BSTS-45	114.30 [4.500]	44.45 [1.750]	1.27 [0.050]	3.94 [0.160]

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

Ordering Information

Color	Standard	Black
	Nonstandard	White, Yellow, Red and Clear (Clear is non-flame retardant)
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	1.2-meter [4-foot] or 7.5-meter [25-foot] lengths.	
Ordering description	See below.	

Part Numbering System



CGPE-105

Brightly Colored, Shiny, Non-Flame-Retardant Polyolefin Tubing

Product Facts

- Bright, shiny surface; clear version offers exceptional clarity
- Can be easily hot-stamped
- Economical, yet offers the improved performance of a crosslinked material
- Conforms to substrates more uniformly and with less longitudinal change than most PVC-based materials
- RoHS compliant



3

Heat-Shrinkable Tubing

Applications

Attractive covering for many automotive, appliance, and consumer-goods applications. Commercial grade tubing for applications where a flame-retardant product is not needed. Provides both insulation and protection of components and wires while also providing a smooth, glossy finish with a choice of seven colors as well as clear. Exceptional transparency of clear CGPE-105 makes it a well-suited choice for protecting marked surfaces.

Installation

Minimum shrink temperature: 85°C [185°F]
Minimum full recovery temperature: 110°C [230°F] for black; 100°C [212°F] for all other colors and clear

Operating Temperature Range

-70°C to 105°C
[-94°F to 221°F]

Specifications/Approvals

Series	TE
CGPE-105	CGPE-105 SCD

Available in:	Americas	Europe	Asia Pacific
	■		■

CGPE-105 (Continued)

Product Dimensions

Size	Inside Diameter		Recovered Wall Thickness**
	Minimum Expanded as Supplied	Maximum Recovered After Heating	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]	0.51 ± 0.08 [0.020 ± 0.003]
1/8	3.2 [0.125]	1.6 [0.062]	0.51 ± 0.08 [0.020 ± 0.003]
3/16	4.8 [0.187]	2.4 [0.093]	0.51 ± 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]	0.89 ± 0.12 [0.035 ± 0.005]
1 1/2	38.1 [1.500]	19.1 [0.750]	1.02 ± 0.15 [0.040 ± 0.006]
2	50.8 [2.000]	25.4 [1.000]	1.14 ± 0.18 [0.045 ± 0.007]

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

Ordering Information

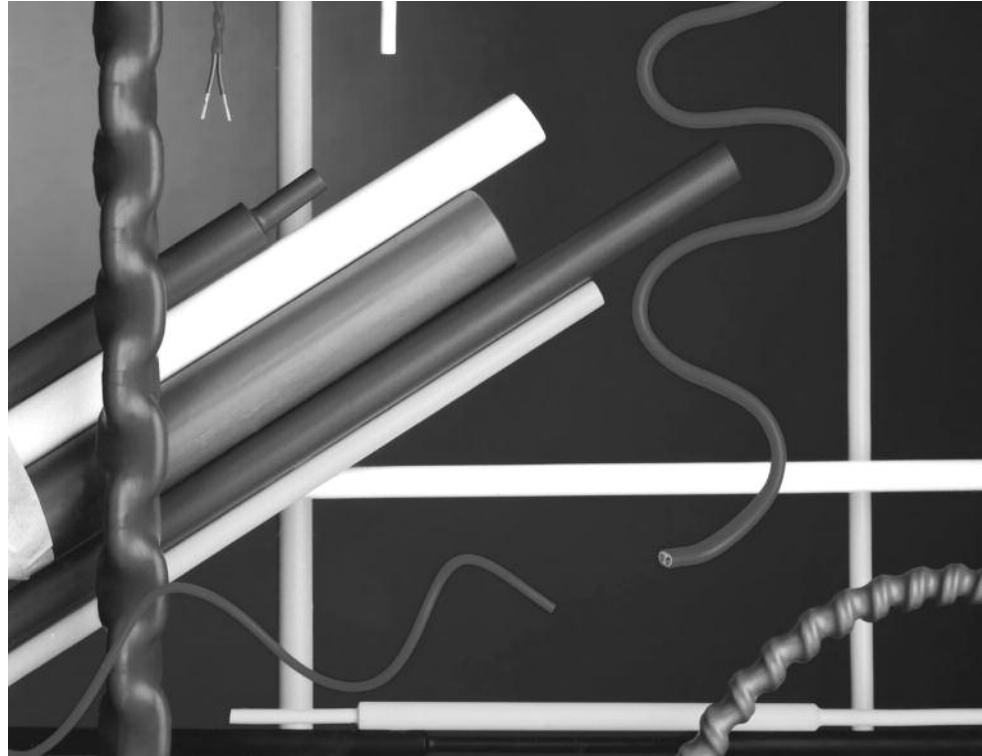
Color	Black (-0), White (-9), Clear (-X), Red (-2), Blue (-6), Yellow (-4) Green (-5), Violet (-7)
Size selection	Always order the largest size that will shrink snugly over the component to be covered. Special order sizes are available upon request.
Standard packaging	On spools.
Ordering description	Specify product name, size and color (for example, CGPE-105-1/4-0).

CGPT

General Purpose, Flame-Retardant* Polyolefin Tubing

Product Facts

- 2:1 and 3:1 shrink ratio
- Very good chemical and solvent resistance
- Flexible
- Excellent physical and electrical performance
- RoHS compliant



3

Heat-Shrinkable Tubing

Applications

CGPT is a tough, flexible, general purpose polyolefin tubing with good resistance to common fluids and solvents and a high dielectric strength. Its unique blend of chemical, electrical, and physical properties makes it suitable for a wide range of applications, including electrical insulation, strain relief, cable bundling, color-coding and identification of wires, cables, pipes, and electrical and electronic components, and mechanical protection.

Installation

Minimum shrink temperature: 80°C [176°F]
Minimum full recovery temperature: 120°C [248°F]

Operating Temperature Range

-40°C to 135°C
[-40°F to 275°F]

Specifications/Approvals

Series	UL 	CSA 	TE
CGPT	E35586 600 V, 125°C	LR31929 600 V, 125°C	RW-2059

*Clear product (-X) is not flame-retardant.

Available in: Americas Europe Asia Pacific

CGPT (Continued)

Product Dimensions

Size	Inside Diameter		Recovered Wall Thickness**
	Minimum Expanded as Supplied	Maximum Recovered After Heating	After Heating
2:1			
1.2/0.6	1.2 [0.046]	0.6 [0.023]	0.45 ± 0.12 [0.018 ± 0.005]
1.6/0.8	1.6 [0.062]	0.8 [0.031]	0.45 ± 0.12 [0.018 ± 0.005]
2.4/1.2	2.4 [0.093]	1.2 [0.046]	0.50 ± 0.12 [0.019 ± 0.005]
3.2/1.6	3.2 [0.125]	1.6 [0.062]	0.50 ± 0.12 [0.019 ± 0.005]***
4.8/2.4	4.8 [0.187]	2.4 [0.093]	0.50 ± 0.12 [0.019 ± 0.005]***
6.4/3.2	6.4 [0.250]	3.2 [0.125]	0.65 ± 0.15 [0.026 ± 0.006]***
9.5/4.8	9.5 [0.375]	4.8 [0.187]	0.65 ± 0.15 [0.026 ± 0.006]***
12.7/6.4	12.7 [0.500]	6.4 [0.250]	0.65 ± 0.15 [0.026 ± 0.006]***
19/9.5	19.0 [0.748]	9.5 [0.375]	0.75 ± 0.15 [0.029 ± 0.006]***
25.4/12.7	25.4 [1.000]	12.7 [0.500]	0.90 ± 0.20 [0.035 ± 0.008]***
32/16	32.0 [1.250]	16.0 [0.630]	0.95 ± 0.20 [0.037 ± 0.008]
38/19	38.0 [1.496]	19.0 [0.748]	1.00 ± 0.20 [0.039 ± 0.008]***
51/26	51.0 [2.000]	26.0 [1.000]	1.15 ± 0.25 [0.045 ± 0.010]
76/38	76.0 [2.992]	38.0 [1.496]	1.25 ± 0.25 [0.049 ± 0.010]
102/51	102.0 [4.016]	51.0 [2.008]	1.40 ± 0.30 [0.055 ± 0.012]
3:1			
1.5/0.5	1.5 [0.059]	0.5 [0.020]	0.45 ± 0.12 [0.018 ± 0.005]
3/1	3.0 [0.118]	1.0 [0.040]	0.55 ± 0.12 [0.022 ± 0.005]
6/2	6.0 [0.236]	2.0 [0.079]	0.65 ± 0.12 [0.026 ± 0.005]
9/3	9.0 [0.354]	3.0 [0.118]	0.75 ± 0.15 [0.030 ± 0.006]
12/4	12.0 [0.472]	4.0 [0.157]	0.75 ± 0.15 [0.030 ± 0.006]
18/6	18.0 [0.709]	6.0 [0.236]	0.85 ± 0.15 [0.033 ± 0.006]
24/8	24.0 [0.945]	8.0 [0.315]	1.00 ± 0.20 [0.039 ± 0.008]
39/13	39.0 [1.540]	13.0 [0.512]	1.15 ± 0.25 [0.045 ± 0.010]

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

Ordering Information

Color	Standard	Black (-0), White (-9), Red (-2), Blue (-6), Yellow (-4), Green (-5), Brown (-1), Grey (-8), Clear (-X), Yellow/Green (-45) as indicated by an ***
	Nonstandard	Orange (-3), Violet (-7), in 2:1 sizes, 1.2/0.6 through 51/26 only.
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, CGPT 4.8/2.4-0).	

****Available in the convenient RaySpool packaging/dispensing system for sizes:

2:1 - 2.4/1.2 up to 25.4/12.7

3:1 - 3/1 up to 24/8

CRN

Semirigid, Flame-Retardant, Polyolefin Tubing

Product Facts

- 2:1 shrink ratio
- High abrasion resistance
- Transfer of flex stress away from typically weak points such as solder and crimp joints, helping ensure a reliable connection
- Flame-retardance (black only)
- Outstanding physical and electrical performance
- Excellent chemical and solvent-resistance properties
- RoHS compliant



Applications

Well-suited for wire strain-relief applications such as soldered or crimped connections, wire splices, and terminations. Provides mechanical protection for delicate components. Can be used for component packaging and for rugged marking of cables.

Installation

Minimum shrink temperature: 110°C [230°F]
Minimum full recovery temperature: 135°C [275°F]

Operating Temperature Range

-55°C to 135°C
[-67°F to 275°F]

Specifications/Approvals

Series	UL 	CSA 	Military	TE
CRN Type 1 (black)	E35586 600 V, 125°C	LR31929 (black only) 600 V, 125°C	AMS-DTL-23053/6*, Class I	RT-360, Type 1 RK-6003
CRN Type 2 (clear)	—	—	AMS-DTL-23053/6*, Class 2	RT-360, Type 2

*Formerly MIL-I-23053/6 and MIL-DTL-23053/6.

Available in:	Americas	Europe	Asia Pacific
	■	■	■

CRN (Continued)

Product Dimensions

Size	Inside Diameter		Recovered Wall Thickness**
	Minimum Expanded as Supplied	Maximum Recovered After Heating	After Heating
3/64	1.2 [0.046]	0.6 [0.023]	0.51 ± 0.08 [0.020 ± 0.003]
1/16	1.6 [0.063]	0.8 [0.031]	0.51 ± 0.08 [0.020 ± 0.003]
3/32	2.4 [0.093]	1.2 [0.046]	0.51 ± 0.08 [0.020 ± 0.003]
1/8	3.2 [0.125]	1.6 [0.062]	0.51 ± 0.08 [0.020 ± 0.003]
3/16	4.8 [0.187]	2.4 [0.093]	0.64 ± 0.08 [0.025 ± 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]	0.76 ± 0.08 [0.030 ± 0.003]
1/2	12.7 [0.500]	6.4 [0.250]	0.76 ± 0.08 [0.030 ± 0.003]
3/4	19.1 [0.750]	9.5 [0.375]	0.89 ± 0.12 [0.035 ± 0.005]

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

Ordering Information

Color	Standard	Black (-0)
	Nonstandard	Clear (-X, not flame-retardant)
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.	
Ordering description***	Specify product name, size and color (for example, CRN 1/4-0).	

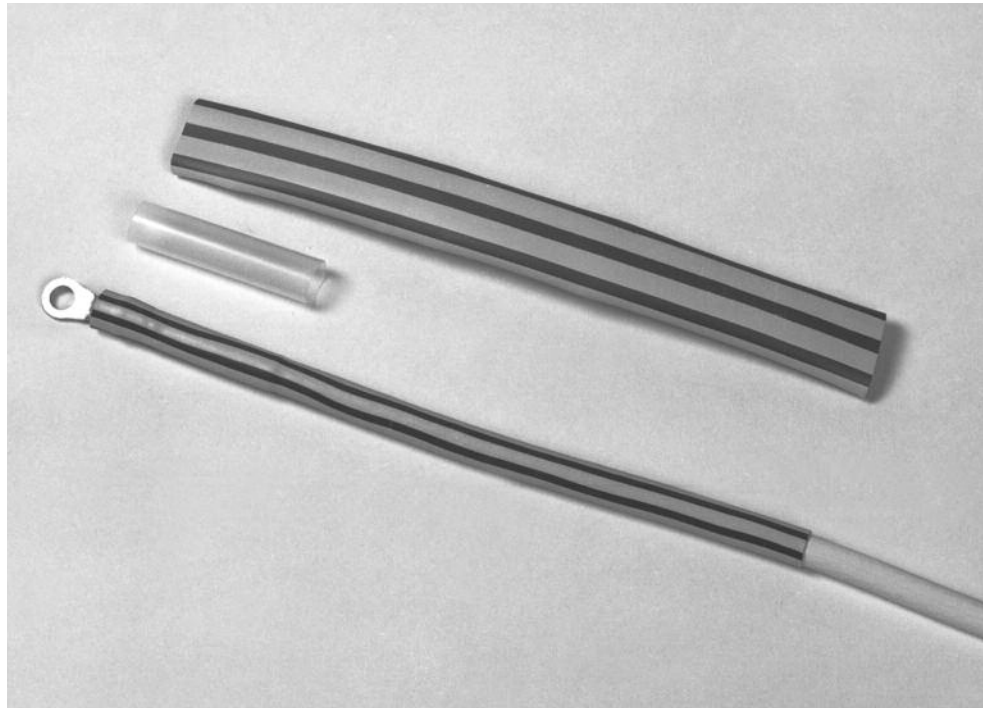
***Europe only. For supply to MIL spec., add -MS to ordering description.

DCPT

Flexible, Flame-Retardant, Dual-Color, Polyolefin Tubing

Product Facts

- 2:1 and 3:1 shrink ratio
- Dual colors (yellow/green) for instant identification
- Co-extrusion of tubing colors, giving color permanence superior to that of conventional ink marking
- Flame-retardance
- Flexibility: able to conform to irregular shapes
- Excellent physical, chemical, and electrical properties that meet industry standards for highly reliable, general purpose tubing
- RoHS compliant



Applications

Used to identify "ground" on wires and in cables, and to jacket and insulate light-duty harnesses.

Easily marked by conventional techniques for additional identification of wires and cables.

Installation

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

Minimum full recovery temperature: 120°C [248°F]

Operating Temperature Range

-55°C to 135°C
[-67°F to 275°F]

Specifications/Approvals

Series	UL 	CSA 	Military	Agency	TE
DCPT	E35586 600 V, 125°C	LR31929 600 V, 125°C	VG 95343 Pt 5 Type A	AFS 2270 DIN 29807 VDE 0341 Pt 9005 Type A	RW-2056

Available in:	Americas	Europe	Asia Pacific
	■	■	■

DCPT (Continued)

Product Dimensions

Size	Inside Diameter		Recovered Wall Thickness**
	Minimum Expanded as Supplied	Maximum Recovered After Heating	After Heating
2:1			
3/1.5	3.0 [0.118]	1.5 [0.059]	0.51 ± 0.10 [0.020 ± 0.004]
6/3	6.0 [0.236]	3.0 [0.118]	0.58 ± 0.10 [0.023 ± 0.004]
8/4	8.0 [0.315]	4.0 [0.158]	0.64 ± 0.10 [0.025 ± 0.004]
10/5	10.0 [0.394]	5.0 [0.197]	0.64 ± 0.10 [0.025 ± 0.004]
12/6	12.0 [0.472]	6.0 [0.236]	0.64 ± 0.10 [0.025 ± 0.004]
19/9	19.0 [0.748]	9.0 [0.354]	0.76 ± 0.12 [0.030 ± 0.005]
26/13	26.0 [1.024]	13.0 [0.512]	0.89 ± 0.12 [0.035 ± 0.005]
38/19	38.0 [1.500]	19.0 [0.748]	1.00 ± 0.12 [0.039 ± 0.005]
51/19	51.0 [2.000]	19.0 [0.748]	1.02 ± 0.15 [0.040 ± 0.006]
3:1 (Europe only)			
3/1	3.0 [0.118]	1.0 [0.039]	0.55 ± 0.10 [0.022 ± 0.004]
6/2	6.0 [0.236]	2.0 [0.079]	0.65 ± 0.10 [0.026 ± 0.004]
9/3	9.0 [0.354]	3.0 [0.118]	0.75 ± 0.15 [0.030 ± 0.006]
12/4	12.0 [0.472]	4.0 [0.157]	0.75 ± 0.15 [0.030 ± 0.006]
18/6	18.0 [0.709]	6.0 [0.236]	0.85 ± 0.15 [0.033 ± 0.006]
24/8	24.0 [0.945]	8.0 [0.315]	1.00 ± 0.20 [0.039 ± 0.008]
39/13	39.0 [1.535]	13.0 [0.512]	1.15 ± 0.20 [0.045 ± 0.008]

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

Ordering Information

Color	Standard	Yellow/green stripe (-45)
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, DCPT 8/4-45).	

DR-25

Heat-Shrinkable, Flexible, Chemical and Abrasion Resistant Tubing

Product Facts

- Flame-retardant
- System 25 tubing
- Shrink ratio 2:1
- RoHS compliant



Applications

Specially formulated for optimum high-temperature fluid resistance, and long term heat resistance. Resistant to aviation and diesel fuels, hydraulic fluids and lubricating oils.

Particularly suitable as a jacketing material for military ground vehicle cables and harnesses. It is also well suited for the demands of motorsport cable harnesses. When

used in conjunction with System 25 heat-shrinkable molded shapes and S1125 high performance adhesive, these products provide a complete cable harness system.

Installation

Minimum shrink temperature: 150°C [302°F]

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

Operating Temperature Range

-75°C to 150°C
[-103°F to 302°F]
(per VG 95343 Part 5 Type D)

Specifications/Approvals

Series	Military	TE
DR-25	AMS-DTL-23053/16* VG95343 Part 5 Type D VDE 0341/Pt 9005 Def Stan 59-97 Issue 3 Type 6B BS 4G-198 Part 3 10A	RT-1116 RK-6008/1

*Formerly MIL-I-23053/16 and MIL-DTL-23053/16.

Available in:	Americas	Europe	Asia Pacific
	■	■	■

DR-25 (Continued)

Product Dimensions

MIL Spec No.	Size	Inside Diameter		Recovered Wall Thickness**
		Minimum Expanded as Supplied	Maximum Recovered After Heating	After Heating
—	1/8	3.2 [0.125]	1.6 [0.062]	0.76 ± 0.15 [0.030 ± 0.006]
—	3/16	4.8 [0.187]	2.4 [0.093]	0.84 ± 0.15 [0.033 ± 0.006]
-001	1/4	6.4 [0.250]	3.2 [0.125]	0.89 ± 0.15 [0.035 ± 0.006]
-002	3/8	9.5 [0.375]	4.8 [0.187]	1.02 ± 0.20 [0.040 ± 0.008]
-003	1/2	12.7 [0.500]	6.4 [0.250]	1.22 ± 0.20 [0.048 ± 0.008]
-004	3/4	19.0 [0.748]	9.5 [0.375]	1.45 ± 0.28 [0.057 ± 0.011]
-005	1	25.4 [1.000]	12.7 [0.500]	1.78 ± 0.28 [0.070 ± 0.011]
-006	1 1/2	38.0 [1.500]	19.1 [0.750]	2.41 ± 0.41 [0.095 ± 0.016]
-007	2	51.0 [2.000]	25.4 [1.000]	2.79 ± 0.41 [0.110 ± 0.016]
-008	3	76.0 [3.000]	38.0 [1.500]	3.18 ± 0.50 [0.125 ± 0.020]
-009	4	101.6 [4.000]	50.8 [2.00]	3.55 ± 0.50 [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, DR-25 1/8-0)	

***Europe only. For supply to Def Stan and BS add -DS or -BS to ordering description.

DR-25-TW

Heat-Shrinkable, Flexible, Thin Wall, Chemical and Abrasion Resistant Tubing

The DR-25-TW flexible fluid resistant elastomeric tubing, developed from DR-25, is a thin wall version ideal for use where space and weight saving are important. It also offers excellent resistance to fluids at high temperature and to long-term heat exposure. It is fast to install and may be used with other products from the TE Raychem System 25 range of compact and tough harnessing systems. The product is printed with the product description and size.



Key Features

- Operating temperature range -75°C to +150°C (-103°F to +302°F) (per VG 95343 Part 5 Type D)
- Flame-retardant
- System 25 tubing
- Shrink ratio 2:1
- Thin wall

Applications

Specially formulated for optimum high temperature fluid resistance and long term heat resistance. Resistant to aviation and diesel fuels, hydraulic fluids and lubricating oils. Particularly suitable as a jacketing material for military ground vehicle cables and harnesses. It is also

ideally suited for the demands of motorsport cable harnesses. When used in conjunction with Raychem brand System 25 heat-shrinkable moulded shapes and S1125 high performance adhesive, these products provide a complete cable harness system.

Installation

Minimum shrink temperature: 125°C [257°F]
Minimum full recovery temperature: 175°C [347°F]

Specifications/Approvals

Series	Military	Raychem
DR-25-TW	VG95343 Part 5 Type D	RK-6008/2

Available in:	Americas	Europe	Asia Pacific
	■	■	■

DR-25-TW (Continued)

Product Dimensions

Size	Inside Diameter		Recovered Wall Thickness
	Minimum Inside Diameter as Supplied	Maximum Inside Diameter After Recovery	
3/32	2.4 (0.094)	1.2 (0.047)	0.51 ± 0.08
1/8	3.2 (0.125)	1.6 (0.062)	0.51 ± 0.10
3/16	4.8 (0.187)	2.4 (0.093)	0.51 ± 0.10
1/4	6.4 (0.250)	3.2 (0.125)	0.64 ± 0.10
3/8	9.5 (0.375)	4.8 (0.187)	0.64 ± 0.10
1/2	12.7 (0.500)	6.4 (0.250)	0.64 ± 0.10
3/4	19.0 (0.748)	9.5 (0.375)	0.76 ± 0.12
1	25.4 (1.000)	12.7 (0.500)	0.89 ± 0.16
1 1/2	38.0 (1.500)	19.0 (0.748)	1.02 ± 0.18

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, DR-25-TW-1/8-0-SP).	

DWP-125

Flexible, High-Shrink-Ratio, Adhesive-Lined, Polyolefin Tubing

Product Facts

- 3:1 shrink ratio allows for insulation and sealing of irregular shapes
- Medium wall provides increased mechanical protection while maintaining flexibility when installed
- Adhesive bonds to a wide variety of plastics, rubber, and metals, including polyethylene, neoprene, and steel
- RoHS compliant



3

Heat-Shrinkable Tubing

Applications

Environmentally seals and protects a wide variety of electrical applications, including wire splices, breakouts, and connector-to-cable transitions. Suitable for applications where UL recognized/CSA certified adhesive-lined tubing is required.

Installation

Minimum shrink temperature: 80°C [176°F]
Minimum full recovery temperature: 125°C [257°F]

Operating Temperature Range

-40°C to 110°C
[-40°F to 230°F]

Specifications/Approvals

Series	UL 	CSA 	Military	TE
DWP-125	E35586 600 V, 125°C	LR31929 600 V, 125°C	AMS-DTL-23053/4* Class 3 (colors only)	DWP-125 SCD

*Formerly MIL-I-23053/4 and MIL-DTL-23053/4. Meets the material properties except for Sealing Efficiency.

Available in:	Americas	Europe	Asia Pacific
	■	■	■

DWP-125 (Continued)

Product Dimensions

Size	Inside Diameter		Recovered Wall Thickness*	
	Minimum Expanded as Supplied	Maximum Recovered After Heating	Nominal Total Wall After Heating	Nominal Adhesive Wall After Heating
1/8	3.2 [0.125]	1.0 [0.040]	1.07 [0.042]	0.07 [0.018]
3/16	4.8 [0.187]	1.5 [0.060]	1.32 [0.052]	0.17 [0.043]
1/4	6.4 [0.250]	2.0 [0.080]	1.45 [0.057]	0.56 [0.022]
3/8	9.5 [0.375]	3.1 [0.120]	1.65 [0.065]	0.68 [0.027]
1/2	12.7 [0.500]	4.0 [0.157]	1.70 [0.067]	0.27 [0.068]
3/4	19.1 [0.750]	5.8 [0.230]	2.03 [0.080]	0.76 [0.030]
1	25.4 [1.000]	8.1 [0.320]	2.50 [0.100]	0.76 [0.030]

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

Ordering Information

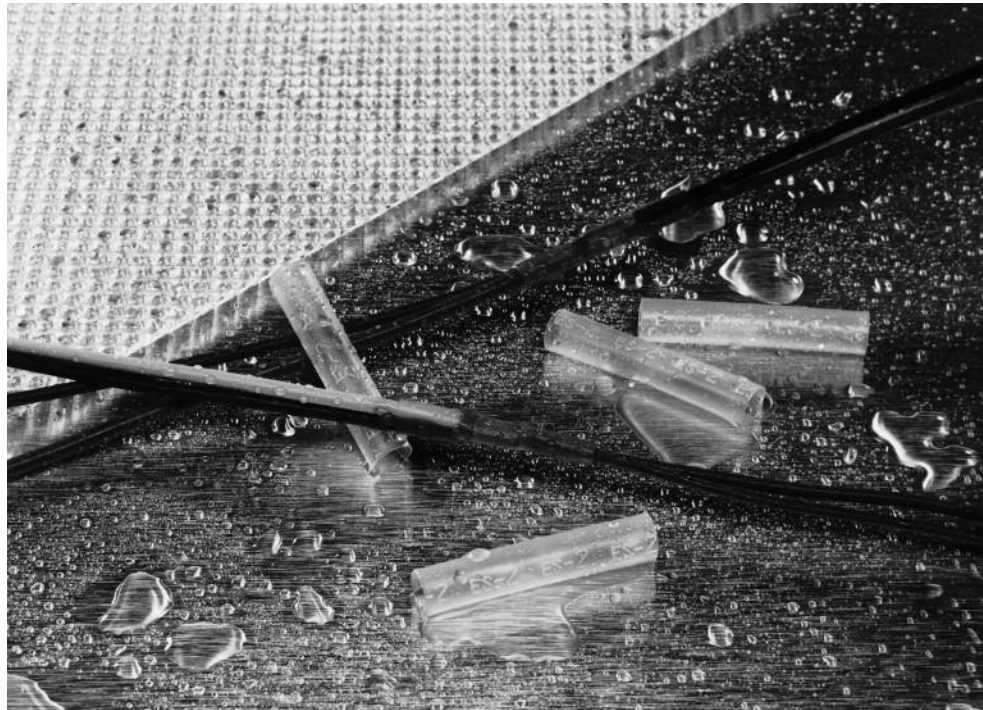
Color	Standard	Black (-0)
	Nonstandard	White (-9), Red (-2), Blue (-6), Yellow (-4), Green (-5), Clear (-X, non-flame-retardant jacket). Other colors available upon request.
Size selection	Always order the largest size that will shrink snugly over the component to be covered. Special order sizes are available upon request.	
Standard packaging	In 1.2-meter [4-foot] lengths.	
Ordering description	Specify product name, size and color (for example, DWP-125 1/4-0).	

ES1000

Clear, High-Shrink-Ratio, Adhesive-Lined, Semirigid Polyolefin Tubing

Product Facts

- 4:1 shrink ratio allows a few sizes to cover a wide range of splice and component diameters
- Mechanically tough tubing provides strain relief and abrasion protection of wire splices, terminals and other components
- Thick adhesive liner forms an effective barrier against fluids and moisture and performs well at an extended temperature range
- UL recognized
- RoHS compliant



Applications

Specially designed for environmental sealing and electrical insulation of wire splices, terminations, and components where see-through inspection is required.

Installation

Minimum shrink temperature: 110°C [230°F]
Minimum full recovery temperature: 135°C [275°F]

Operating Temperature Range

-40°C to 130°C
[-40°F to 266°F]

Specifications/Approvals

Series	UL* 	TE
ES1000	E85381 600 V, 125°C	RT-1113

Available in:	Americas	Europe	Asia Pacific
	■		■

ES1000 (Continued)

Product Dimensions

Part Number	Inside Diameter (Including Core)		Recovered Wall Thickness*		
	Minimum Expanded as Supplied	Maximum Recovered After Heating	Minimum Total Wall After Heating	Minimum Jacket Wall After Heating	Minimum Adhesive Wall After Heating
ES1000-No.1	5.72 [0.225]	1.27 [0.050]	1.20 [0.047]	0.64 [0.025]	0.56 [0.022]
ES1000-No.2	7.44 [0.293]	1.65 [0.065]	1.52 [0.060]	0.76 [0.030]	0.76 [0.030]
ES1000-No.3	10.85 [0.427]	2.41 [0.095]	1.91 [0.075]	0.89 [0.035]	1.02 [0.040]
ES1000-No.4	17.78 [0.700]	4.45 [0.175]	2.41 [0.095]	1.04 [0.041]	1.37 [0.054]

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

Ordering Information

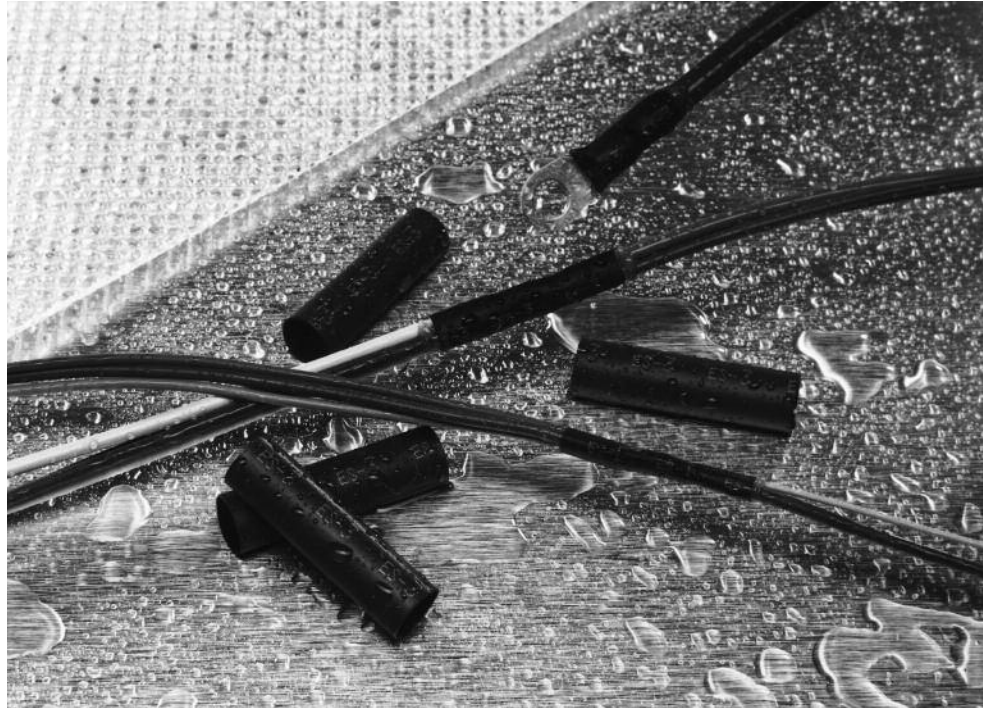
Color	Standard	Clear (-X)
Size selection	Always order the largest size that will shrink snugly over the component to be covered.	
Standard packaging	Cut pieces.	
Marking	Tubing will be printed with its numbered size (such as ES-1, ES-2, ES-3, or ES-4).	
Ordering description	Specify product name, numbered size, color, and cut length (for example, ES1000-NO. 2-X-50MM).	

ES2000

Flame-Retardant, High-Shrink-Ratio, Adhesive-Lined Semirigid Polyolefin Tubing

Product Facts

- 4:1 shrink ratio allows a few sizes to cover a wide range of splice and component diameters
- Flame-retardant and mechanically tough, the tubing provides strain relief and abrasion protection of wire splices, terminals, and other components
- Thick adhesive liner forms an effective barrier against fluids and moisture and performs well at an extended temperature range
- UL recognized
- RoHS compliant



Applications

Specially designed for environmental sealing and electrical insulation of wire splices, terminations, and components.

Installation

Minimum shrink temperature: 110°C [230°F]
Minimum full recovery temperature: 135°C [275°F]

Operating Temperature Range

-40°C to 130°C
[-40°F to 266°F]

Specifications/Approvals

Series	UL* 	TE
ES2000	E85381 600 V, 125°C	RT-1112

ES2000 (Continued)

Product Dimensions

Part Number	Inside Diameter (Including Core)		Recovered Wall Thickness*		
	Minimum Expanded as Supplied	Maximum Recovered After Heating	Minimum Total Wall After Heating	Minimum Jacket Wall After Heating	Minimum Adhesive Wall After Heating
ES2000-No.1	5.72 [0.225]	1.27 [0.050]	1.20 [0.047]	0.64 [0.025]	0.56 [0.022]
ES2000-No.2	7.44 [0.293]	1.65 [0.065]	1.52 [0.060]	0.76 [0.030]	0.76 [0.030]
ES2000-No.3	10.85 [0.427]	2.41 [0.095]	1.91 [0.075]	0.89 [0.035]	1.02 [0.040]
ES2000-No.4	17.78 [0.700]	4.45 [0.175]	2.41 [0.095]	1.04 [0.041]	1.37 [0.054]

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

Ordering Information

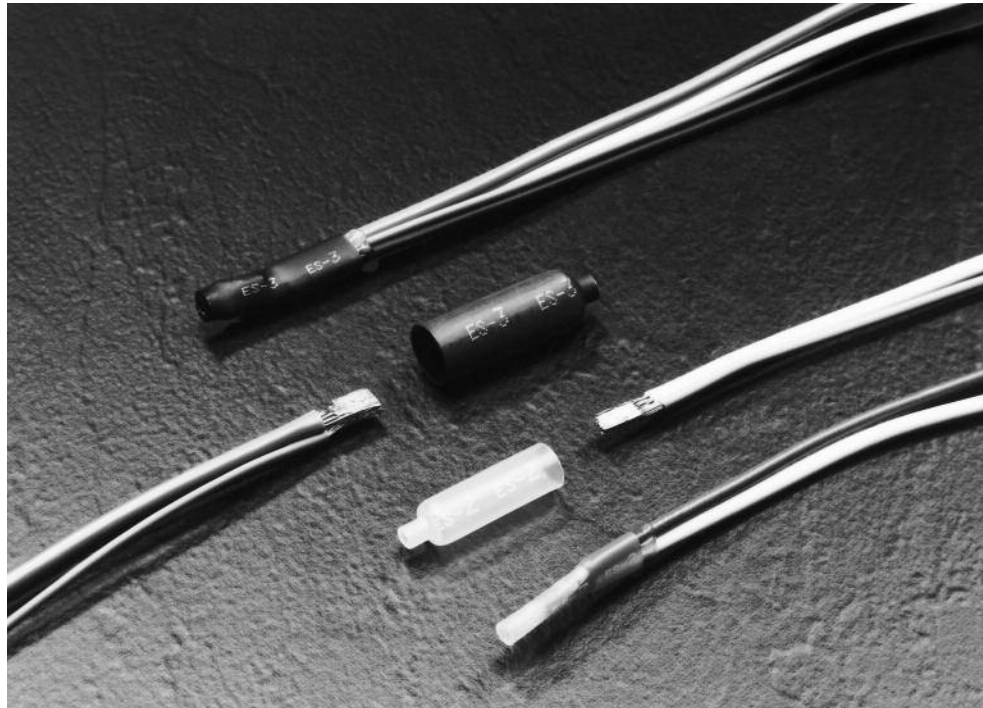
Color	Standard Black (-0)
Size selection	Always order the largest size that will shrink snugly over the component to be covered.
Standard packaging	Cut pieces.
Marking	Tubing will be printed with its numbered size (such as ES-1, ES-2, ES-3, or ES-4).
Ordering description	Specify product name, numbered size, color, and cut length (for example, ES2000-NO. 2-0-50MM).

ES Caps

High-Shrink-Ratio, Adhesive-Lined, Semirigid Polyolefin Caps

Product Facts

- 4:1 shrink ratio allows a few sizes to cover a wide range of splice and component diameters
- Mechanically tough jacket provides strain relief and abrasion protection
- Thick adhesive liner forms an effective barrier against fluids and moisture and performs well at an extended temperature range
- RoHS compliant



Applications

Specially designed to provide mechanical and environmental protection of stub splices in electrical harnesses. Clear caps allow see-through inspection; black caps are flame-retardant.

Installation

Minimum shrink temperature: 100°C [212°F]
Minimum full recovery temperature: 135°C [275°F]

Operating Temperature Range

-40°C to 105°C
[-40°F to 221°F]

Specifications/Approvals

Series	UL* 	TE
ES Caps	E85381 600 V, 125°C	RW-3006

Available in:	Americas	Europe	Asia Pacific
	■	■	■

ES Caps (Continued)

Product Dimensions

Part Number	Standard Length* as Supplied (Millimeters)	Inside Diameter (Including Core)		Recovered Wall Thickness**		
		Minimum Expanded as supplied	Maximum Recovered After Heating	Minimum Total Wall After Heating	Minimum Jacket Wall After Heating	Minimum Adhesive Wall After Heating
ES Cap-No.1	30, 35	5.72 [0.225]	1.27 [0.050]	1.20 [0.047]	0.64 [0.025]	0.56 [0.022]
ES Cap-No.2	30, 35	7.44 [0.293]	1.65 [0.065]	1.52 [0.060]	0.76 [0.030]	0.76 [0.030]
ES Cap-No.3	40, 50	10.85 [0.427]	2.41 [0.095]	1.91 [0.075]	0.89 [0.035]	1.02 [0.040]

*Other cap lengths available upon request.

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

Ordering Information

Color	Standard	Black (-0), clear (-X)
Size selection	Always order the largest size that will shrink snugly over the component to be covered. Other cap lengths available on request.	
Standard packaging	In pieces.	
Marking	Caps will be marked with their numbered size (such as ES-1, ES-2, or ES-3).	
Ordering description	Specify product name, size, color, and length (for example, ES CAP-NO. 2-X-35MM).	

FL2500

Fully Flame-Retardant, Adhesive-Lined, Polyolefin Heat-Shrinkable Tubing

Product Facts

- 4:1 shrink ratio allows a few sizes to cover a wide range of wire terminations and components
- Flame-retardant tubing jacket and adhesive provide full flame-retardancy
- Fully flame-retardant and mechanically tough, the tubing provides strain relief and abrasion protection of wire splices, terminals and other components
- Thick high-performance adhesive lining offers permanent sealing of splices, fusible links, terminals and in-line components
- RoHS compliant



Applications

Tough flame-retardant polyolefin tubing lined with a flame-retardant adhesive provides the optimum solution for applications where full flame-retardancy is preferred or specified.

Rated to 135°C [275°F] for 3000 hours, FL2500 is suitable for use in the automotive harness market and other harsh environments. As the tubing shrinks, the adhesive lining melts and flows to fill all voids and create a complete seal against moisture, oils, chemicals and other fluids.

Installation

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

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

Operating Temperature Range

-40°C to 135°C
[-40°F to 275°F]

Specifications/Approvals

Series	TE
FL2500	FL2500 SCD

FL2500 (Continued)

Product Dimensions

Part Number	Inside Diameter (Including Core)		Recovered Wall Thickness*	
	Minimum Expanded as Supplied	Maximum Recovered After Heating	Total Wall After Heating	Minimum Adhesive Wall After Heating
FL2500-No. 1	7.62 [0.300]	1.65 [0.065]	1.52 ± 0.3 [0.060 ± 0.012]	0.71 [0.028]
FL2500-No. 2	9.02 [0.355]	2.29 [0.090]	1.52 ± 0.3 [0.060 ± 0.012]	0.71 [0.028]
FL2500-No. 3	11.56 [0.455]	2.54 [0.100]	2.29 ± 0.3 [0.090 ± 0.012]	1.32 [0.052]
FL2500-No. 4	17.79 [0.700]	4.45 [0.175]	2.54 ± 0.3 [0.100 ± 0.012]	1.35 [0.053]

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

Ordering Information

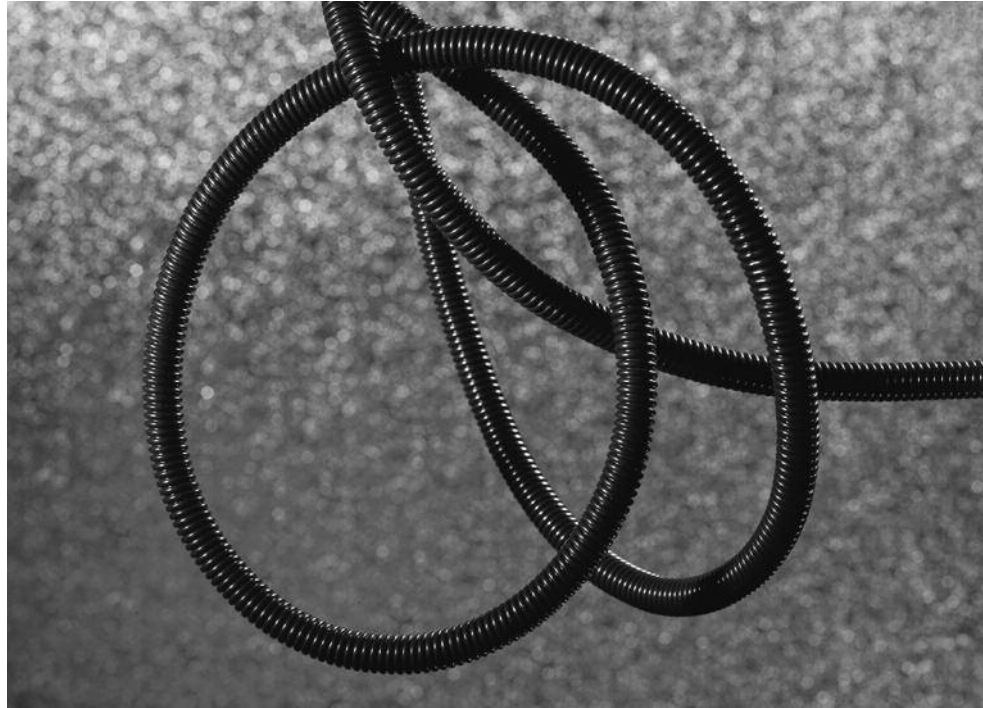
Color	Black (-0) with a white adhesive liner
Size selection	Always order the largest size that will shrink snugly over the component to be covered.
Standard packaging	Cut pieces.
Marking	Tubing will be marked with its numbered size (such as FL-1, FL-2, FL-3, or FL-4).
Ordering description	Specify product name, size, color, and cut length (for example, FL2500-NO.2-0-50MM).

HCTE

Helical Convolex Tubing with a High Crush Resistance

Product Facts

- Highly flame-retardant
- Highly flexible and fluid resistant
- Not heat-shrinkable
- High crush resistance
- System 300 conduit tubing
- RoHS compliant



Applications

Used as a conduit to provide mechanical protection for electrical wiring systems in applications requiring flexibility, high-temperature performance and good resistance to a variety of fluids. Widely used in the military and commercial aerospace industries. Can be used in conjunction with other Raychem brand components to form an integrated harnessing system.

Installation

It is recommended that no more than 70% of the internal area ("fill factor") of the HCTE conduit be occupied by wires in any application.

Operating Temperature Range

-55°C to 200°C
[-67°F to 392°F]

Specifications/Approvals

Series	Military	TE
HCTE	VG 96936 Part 6	RT-1162

Available in:	Americas	Europe	Asia Pacific
	■	■	■

HCTE (Continued)

Product Dimensions

Size	Inside Diameter Minimum	Outside Diameter Maximum	Maximum Wall Thickness
0187	4.60 [0.181]	8.10 [0.320]	0.46 [0.018]
0281	6.90 [0.273]	10.50 [0.414]	0.46 [0.018]
0312	7.70 [0.306]	11.80 [0.450]	0.46 [0.018]
0375	9.20 [0.364]	12.90 [0.510]	0.46 [0.018]
0437	10.80 [0.427]	14.50 [0.571]	0.46 [0.018]
0500	12.30 [0.485]	16.50 [0.650]	0.58 [0.023]
0625	15.40 [0.608]	19.50 [0.770]	0.58 [0.023]
0750	17.90 [0.730]	23.60 [0.930]	0.58 [0.023]
0875	21.80 [0.860]	27.20 [1.073]	0.58 [0.023]
1000	24.70 [0.975]	31.10 [1.226]	0.58 [0.023]
1250	30.70 [1.210]	35.30 [1.539]	0.58 [0.023]
1500	36.50 [1.437]	46.50 [1.832]	0.58 [0.023]
1625	39.60 [1.562]	50.17 [1.975]	0.58 [0.023]
1750	42.67 [1.688]	52.88 [2.082]	0.58 [0.023]
2000	49.20 [1.937]	59.23 [2.332]	0.58 [0.023]

Ordering Information

Color	Standard	Black (-0)
Size selection	Always order a conduit size that will ensure that a "fill factor" of 70% is not exceeded.	
Standard packaging	On spools.	
Ordering description	Specify product name, size and color (for example, HCTE-0187-0).	

HF

High-Flex, Heavy-Wall, Heat-Shrinkable Tubing

Product Facts

- Offers high flexibility
- Provides excellent insulation and abrasion protection, per U.S. Mine Safety and Health Administration (MSHA) regulations
- Flame-retardant
- HF has the following agency approvals:
 - ABS (American Bureau of Shipping)
 - Lloyd's (Lloyd's Register of Shipping)
- RoHS compliant



Applications

Developed for cable jacketing applications where cable flexibility is important, high-flex (HF) tubing is good for jacketing cables where sharp bends or turns are required. Also suitable for situations where the cable is subject to motion. Such situations are common for industrial machinery, transportation equipment, robotics, welding, and many other

cabling applications. To complete the cable jacket seal, the ends may be sealed for further water and corrosion protection by using available tape sealant or adhesive.

Installation

Minimum shrink temperature: 80°C [176°F]

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

Operating Temperature Range

-55°C to 90°C
[-67°F to 194°F]

Specifications/Approvals

Series	Military	Agency	TE
HF	AMS-DTL-23053/15* Class 2**	ABS, Lloyd's	RW-2023

*Formerly MIL-I-23053/15 and MIL-DTL-23053/15.

**Except for coatings requirement.

HF (Continued)

Product Dimensions

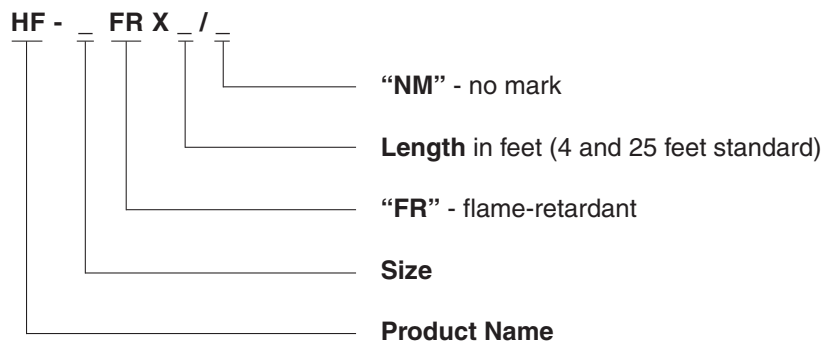
Size	Standard Nominal Length (m/ft)	Inside Diameter		Wall Thickness**
		Minimum Expanded as Supplied	Maximum Recovered After Heating	Nominal Recovered After Heating
HF04	1.2, 7.5 [4, 25]	10.16 [0.400]	3.81 [0.150]	1.52 [0.060]
HF07	1.2, 7.5 [4, 25]	19.05 [0.750]	5.59 [0.220]	1.52 [0.060]
HF11	1.2, 7.5 [4, 25]	27.94 [1.100]	9.52 [0.375]	2.67 [0.105]
HF13	1.2, 7.5 [4, 25]	33.02 [1.300]	9.52 [0.375]	2.67 [0.105]
HF15	1.2, 7.5 [4, 25]	38.10 [1.500]	12.70 [0.500]	3.05 [0.120]
HF17	1.2, 7.5 [4, 25]	43.14 [1.700]	12.70 [0.500]	3.05 [0.120]
HF20	1.2, 7.5 [4, 25]	50.80 [2.000]	19.05 [0.750]	3.56 [0.140]
HF27	1.2, 7.5 [4, 25]	68.58 [2.700]	22.86 [0.900]	3.94 [0.155]

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

Ordering Information

Color	Standard	Black
Size selection	Always order the largest size that will shrink snugly over the component to be covered.	
Standard packaging	1.2-meter [4-foot] or 7.5-meter [25-foot] lengths. Nonstandard lengths are available upon request.	
Ordering description	See below.	

Part Numbering System



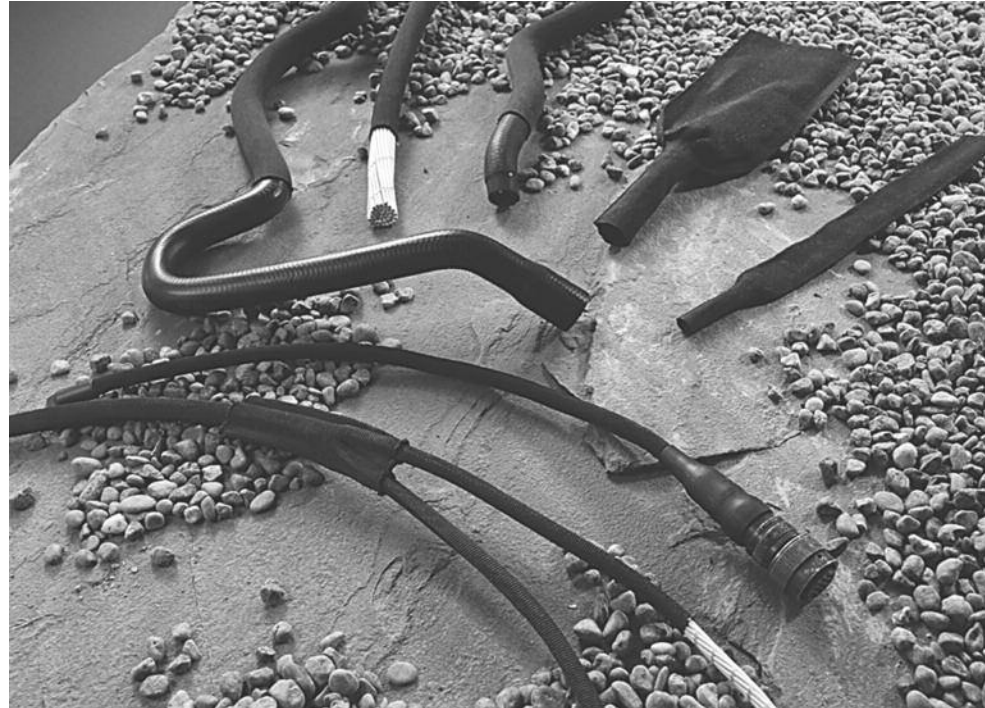
Example: HF-17FRX25/NM

HFT5000

Heat-Shrinkable Fabric Tubing

Product Facts

- Highly flexible woven fabric tubing
- Polyethylene/polyester construction for excellent abrasion resistance
- Halogen free
- Heat-shrinkable to grip substrates tightly without additional fixing
- 2:1 shrink ratio for easy installation onto different substrate diameters and sizes
- Highly flexible woven fabric construction for easy, compliant installation onto awkward substrates such as bent hoses
- Outstanding abrasion resistance over a wide temperature range
- Easily cut with standard industrial cutting equipment
- Resistant to harsh environments
- Multifilament construction that ensures soft, safe handling
- Low shrink temperature for safe installation onto heat sensitive substrates
- RoHS compliant



Applications

Designed primarily to provide mechanical abrasion protection for components such as rubber hoses, plastic pipes, and harness wiring bundles. Also suitable for other applications, such as noise and rattle suppression.

The woven construction makes HFT5000 extremely flexible and resistant to trapping water, heat and humidity. Provides outstanding abrasion, chafing and cutting protection, even at high-temperatures.

Installation

Minimum shrink temperature: 80°C [176°F]
 Minimum full recovery temperature: 110°C [230°F]
 Maximum storage temperature: 60°C [140°F]

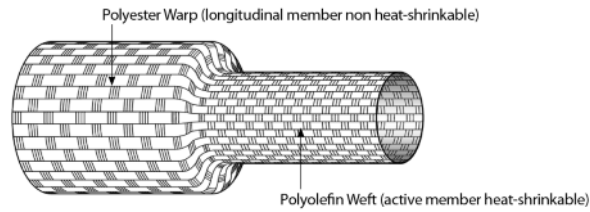
Operating Temperature Range

3000 hours:
 -40°C to 125°C
 [-40°F to 257°F]
 1000 hours:
 -40°C to 150°C
 [-40°F to 302°F]

Specifications/Approvals

Series	UL* 	TE
HFT5000	E199379 Rated 135°C	RW-2060

HFT5000 (Continued)

Product Dimensions


Size	Inside Diameter	
	Minimum Expanded as Supplied	Maximum Recovered After Heating
Standard		
12/6	12 [0.47]	6 [0.24]
20/10	20 [0.79]	10 [0.39]
30/15	30 [1.18]	15 [0.59]
40/20	40 [1.57]	20 [0.79]
50/25	50 [1.97]	25 [0.98]
60/30	60 [2.36]	30 [1.18]
70/35	70 [2.76]	35 [1.38]
Non-Standard High Volume		
25/12	25 [0.98]	12 [0.47]
34/17	34 [1.34]	17 [0.67]
80/40	80 [3.15]	40 [1.57]

Ordering Information

Color	Standard	Black (-0)
Standard packaging	On spools.	
Ordering description	Specify product name, size and color (for example, HFT5000-12/6-0)	

HRHF/HRNF/HRSR

High-Ratio, Heat-Shrinkable Tubing

Product Facts

- Offers toughness and durability
- Provides excellent insulation and abrasion protection
- Is available in flame-retardant material
- Shrinks to fit (5.6:1)
- FR callouts meet all of the requirements of AMS-DTL-23053/15*, except for some of the tubing sizes, which do not meet the exact recovered wall thickness requirements
- HRHF and HRSR have the following agency approvals:
 - ABS (American Bureau of Shipping)
 - Lloyd's (Lloyd's Register of Shipping)
- RoHS compliant



Applications

High-ratio (HR) heat-shrinkable tubing, with expansion ratios as high as 5.6 to 1, is designed to accommodate large size differences between cables and cable connectors and backshells, thus simplifying repair of damaged cable. High-ratio tubing is available in semirigid flame-retardant (SR), standard (NF), or high-flex flame-retardant (HF)

material and with or without factory-applied sealants and adhesives. The water-proofing sealant provides environmental sealing and is watertight in wet and corrosive locations. The thermoplastic adhesive coating offers excellent strain relief and environmental sealing.

Installation

Minimum shrink temperature: 80°C [176°F]

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

Operating Temperature Range

-55°C to 110°C
[-67°F to 230°F]

Specifications/Approvals

Series	Agency	TE
HRSR	ABS, Lloyd's	RW-2013
HRHF	ABS, Lloyd's	RW-2013
HRNF	—	RW-2013

HRHF/HRNF/HRSR (Continued)

Product Dimensions

Size†	Inside Diameter		Recovered Wall Thickness††
	Minimum Expanded as Supplied	Maximum Recovered After Heating	Nominal After Heating
HR**060	15.24 [0.600]	3.81 [0.150]	1.52 [0.060]
HR**125	31.75 [1.250]	6.10 [0.240]	1.52 [0.060]
HR**175	44.45 [1.750]	8.00 [0.315]	2.41 [0.095]
HR**200	50.80 [2.000]	9.52 [0.375]	2.67 [0.105]
HR**250	63.50 [2.500]	12.70 [0.500]	3.05 [0.120]
HR**300	76.20 [3.000]	19.05 [0.750]	3.05 [0.120]
HR**400	101.60 [4.000]	22.86 [0.900]	3.56 [0.140]

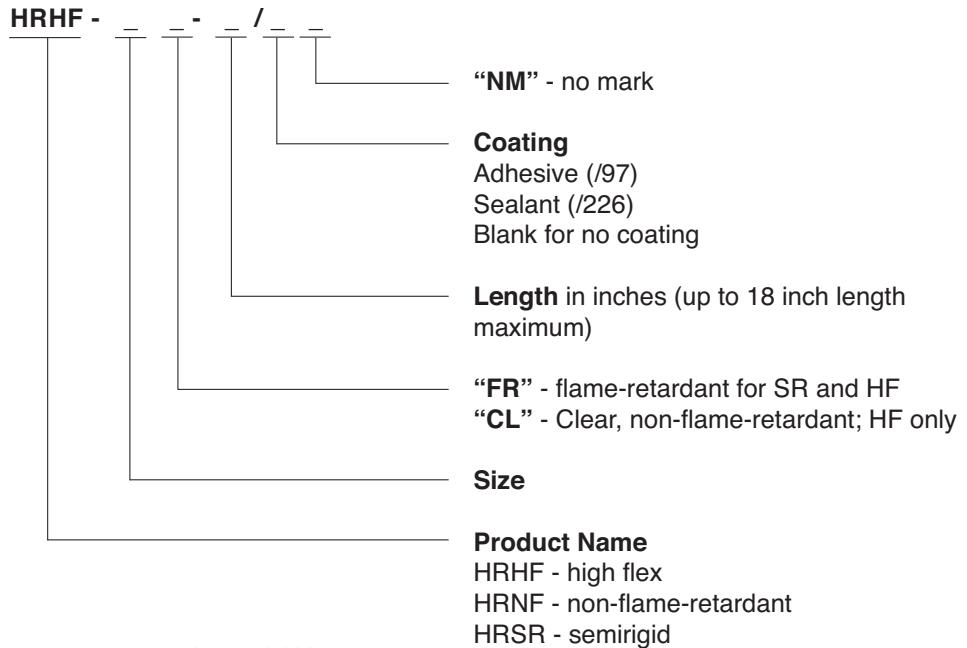
†For ** substitute HF, NF or SR for material required.

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

Ordering Information

Color	Standard	Black (-0)
	Nonstandard	Clear available on request (not flame-retardant; HRHF only)
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	Up to 18 inch lengths maximum.*	
Ordering description	See below.	

*Cutting tolerance is $\pm 0.125"$.

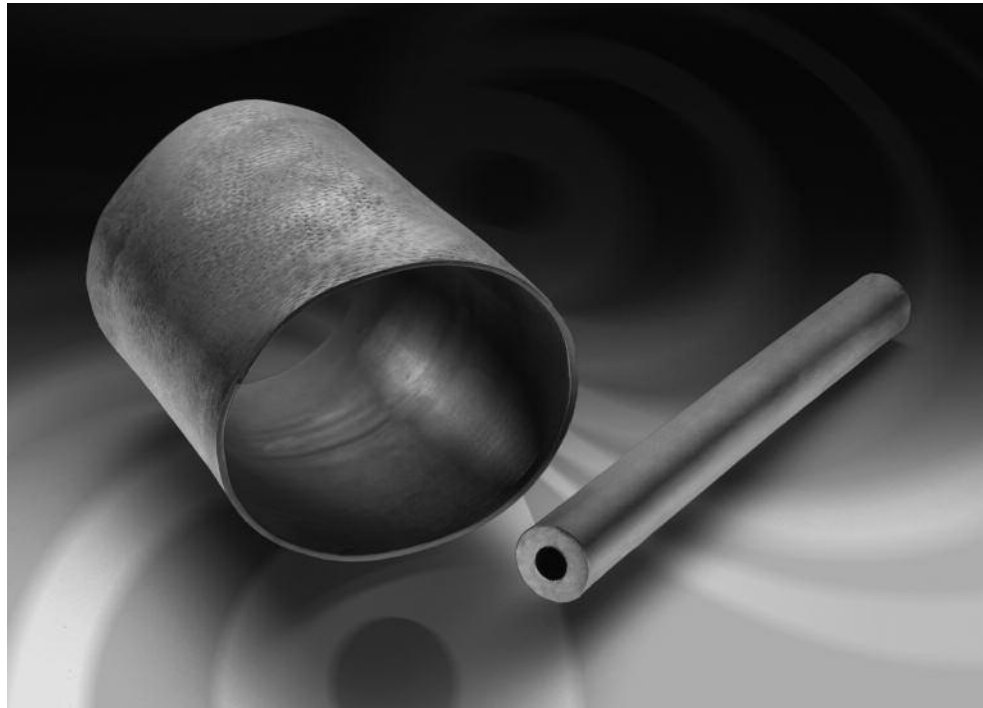
Part Numbering System

Example: HRHF-125FR-10/226-NM

HRHT

High-Ratio, High-Temperature, Flexible, Thick Wall Polyolefin Heat-Shrinkable Tubing

Product Facts

- Shrink ratios as high as 6:1
- Specially formulated for thick wall insulation, strain relief and abrasion protection
- Flame retardant passing ASTM D 635
- Excellent performance in both hot and cold environments
- Optional factory applied adhesive provides watertight environmental sealing in wet and corrosive locations
- RoHS compliant



Applications

High-ratio (HR), high-temperature (HT) heat-shrinkable tubing, with shrink ratios as high as 6-to-1, is designed to conform to odd shapes and shrink over large transitions, allowing for the repair and sealing of cable connectors and equipment. This product can be used to seal the back end of a connector or simply repair the damaged outer insulation of a cable or wire.

Cable harnesses can be repaired and released without disassembly.

HRHT tubing is available with an optional hot melt adhesive lining. A high-performance adhesive is also available for more demanding applications.

Installation

Minimum shrink temperature: 135°C [275°F]

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

Operating Temperature Range

-55°C to 135°C
[-67°F to 275°F]

Specifications/Approvals

Series	Military	TE
HRHT	SAE-AS81765/1, Type II*	HRHT SCD

*heat-shrinkable, crosslinked, flexible polyolefin

HRHT (Continued)

Product Dimensions

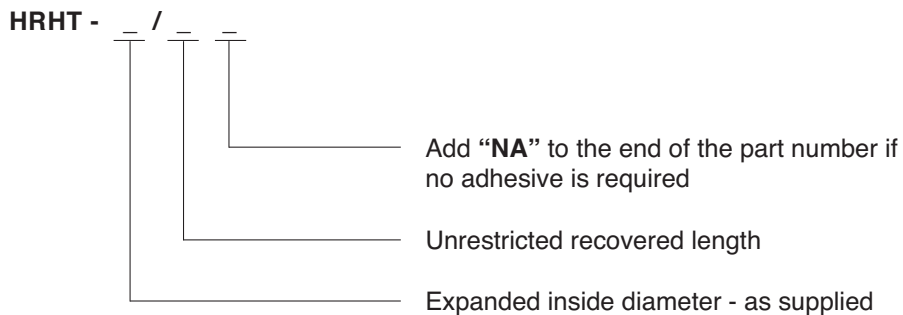
Size†	Inside Diameter		Wall Thickness††
	Minimum Expanded as Supplied	Maximum Recovered After Heating	Nominal Recovered After Heating
HRHT-1/X	19.05 [0.750]	3.05 [0.120]	3.94 [0.155]
HRHT-2/X	38.16 [1.500]	5.84 [0.230]	3.94 [0.155]
HRHT-3/X	50.80 [2.000]	9.14 [0.360]	3.94 [0.155]
HRHT-4/X	76.20 [3.000]	12.70 [0.500]	3.94 [0.155]
HRHT-5/X	114.30 [4.500]	19.05 [0.750]	3.94 [0.155]

†"X" indicates recovered length in inches (e.g. for 3.0-inch length: HRHT-2/3). The tolerance shall be +/- 10% of the specified recovered length.

††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.	
Standard packaging	In pieces.	
Ordering description	Specify product name, size and cut length (for example, HRHT-1/3).	

Part Numbering System


HTAT

Semiflexible, Dual Wall, Moisture-Resistant, Heat-Shrinkable Tubing

Product Facts

- 4:1 shrink ratio
- Environmental sealing
- High-strength bonding
- Well-suited connector sealing covering large diameter differences
- RoHS compliant



Applications

Designed to provide environmental sealing for a range of substrates, at elevated temperatures. Manufactured by TE from radiationcrosslinked polyolefins, the inner wall melts when heated and is forced into interstices by the shrinking of the outer wall so that, when cooled, the substrate is encapsulated by a tough, protective moisture barrier.

An operating range of -55°C to 125°C [-67°F to 257°F] and a high-shrink-ratio as standard, mean that the tubing offers superior environmental protection to a wide range of irregular shapes with varying dimensions. The jacket is flame-retardant to reduce flame propagation.

Installation

Minimum shrink temperature: 80°C [176°F]

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

Operating Temperature Range

-55°C to 125°C
[-67°F to 257°F]

Specifications/Approvals

Series	TE
HTAT	RW-2052

Available in:	Americas	Europe	Asia Pacific
	■	■	■

HTAT (Continued)

Product Dimensions

Size	Inside Diameter		Recovered Wall Thickness*	
	Minimum Expanded as Supplied	Maximum Recovered After Heating	Nominal Total Wall After Heating	Nominal Adhesive Wall After Heating
4/1	4.0 [0.158]	1.0 [0.039]	1.00 [0.039]	0.40 [0.016]
8/2	8.0 [0.315]	2.0 [0.079]	1.00 [0.039]	0.50 [0.020]
12/3	12.0 [0.472]	3.0 [0.118]	1.40 [0.055]	0.60 [0.024]
16/4	16.0 [0.630]	4.0 [0.158]	1.75 [0.069]	0.75 [0.030]
24/6	24.0 [0.945]	6.0 [0.236]	2.25 [0.088]	0.80 [0.032]
32/8	32.0 [1.260]	8.0 [0.315]	2.50 [0.098]	1.00 [0.039]
48/13	48.0 [1.890]	13.0 [0.512]	2.55 [0.100]	1.00 [0.039]

*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	In 1.2-meter [4-foot] lengths.	
Ordering description	Specify product name, size and color (for example, HTAT 8/2-0).	

Maulflex Conduit System

Lightweight, Flexible, Abrasion-Resistant, Shielded Electrical Conduit

Maulflex conduit systems protect integrated harnessing systems while allowing re-entry and repair.

Crosslinked outer convoluted material is highly durable and abrasion-resistant

Maulflex conduit system is a three-component integrated harnessing system. Helical conduit construction of the outer layer provides crush-resistant characteristics as well as flexibility and resistance to many chemicals, fluids and solvents. The shielding layer provides EMI protection. The internal expando layer protects wires from chafing.

Product Facts

- Circuit design flexibility
- Wire-protective Expando® lining
- Reusability
- Increased service life cycle
- Lightweight
- Crush resistant
- Stands up to heavy abuse/abrasion
- Strain relief/strength member
- Total environmentally sealed system
- Line of backshells are available for reliable termination



3

Heat-shrinkable Tubing

Applications

To be used in ground support test equipment cables which are constantly coiled and uncoiled in and out of metal boxes/cabinets

Electrical

RFI and EMI shielding: Either one or two layers of tinned-copper braid are available to meet shielding requirements.

Sizes of Maulflex conduit range from .240 inches with two layers of shielding to 1.430 inches with one layer of shielding.

Materials

Harness fabrication involves using TE specified Mod M Tinel-Lock adapters, and Uniboosts with light-weight Maulflex conduit.

Part Numbers

Dimensions are inches over millimeters

Size Number	1 Layer Shield		2 Layer Shield		(B) Maximum Bend Radius 7*		Helical Convolex® Size
	(A) Minimum	Weight per 100 Feet	(A) Minimum	Weight per 100 Feet			
1	.240 (6,10)	4.1 (1,86)	.200 (5,08)	6.0 (2,72)	.510 (12,96)	.88 (22,35)	3/8
2	.312 (7,92)	5.0 (2,27)	.270 (6,86)	7.2 (3,27)	.571 (14,50)	.88 (22,35)	7/16
3	.360 (9,14)	5.8 (2,63)	.320 (8,13)	8.6 (3,90)	.650 (16,51)	1.25 (31,75)	1/2
4	.480 (12,19)	9.6 (4,35)	.440 (11,18)	13.4 (6,08)	.770 (19,56)	1.50 (38,10)	5/8
5	.600 (15,24)	11.3 (5,13)	.560 (14,22)	18.0 (8,16)	.930 (23,62)	1.75 (44,45)	3/4
6	.720 (18,29)	16.6 (7,53)	.680 (17,27)	24.1 (10,93)	1.073 (27,25)	2.00 (50,80)	7/8
7	.840 (21,34)	19.1 (8,66)	.800 (20,32)	27.7 (12,56)	1.226 (31,14)	2.37 (60,20)	1
8	1.050 (26,67)	28.8 (13,06)	1.000 (25,40)	43.6 (19,78)	1.539 (39,30)	2.75 (69,85)	1-1/4
9	1.430 (36,32)	38.4 (17,42)	1.375 (34,93)	56.2 (25,49)	1.975 (50,17)	3.63 (92,20)	1-5/8

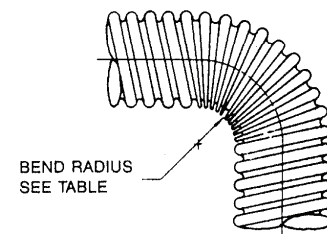
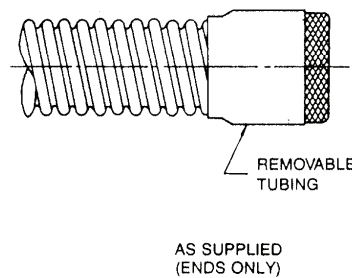
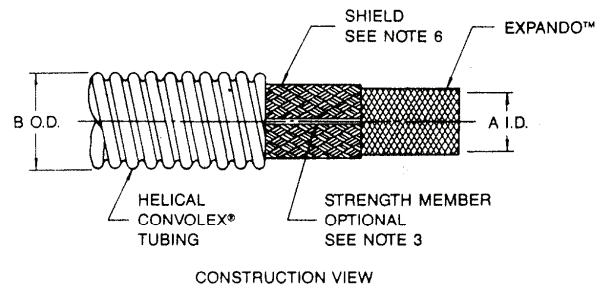
Available in:

Americas

Europe

Asia Pacific

Maulflex Conduit System (Continued)



Ordering Information

Product Family Name **MAULFLEX - 6 X X - SM - XX** Length in inches _____

Helical Convolox® type _____ Add if strength member is required (see note 3) _____

-6 XLETFE per RT-1162 (see note 8) _____

Shield (see note 6) _____ Size number (see table for dimensions) _____

1. Single layer tinned copper

2. Two layers tinned copper

Expando is a registered trademark of Federal Mogul.

Notes:

- Dimensions in table are in $\frac{\text{Inches}}{\text{(millimeters)}}$; $\frac{\text{lbs.}}{\text{(kgms)}}$
- Service rating: -55°C (-67°F) to + 150°C (+302°F).
- Two Kevlar® strength members placed longitudinally 180° apart between shield and convolex tubing. These Kevlar strength members are to be a minimum of about 12 inches longer than the convolex tubing with a minimum of 6 inches out each end and stored under the removable tubing.
- Consult factory for optional configurations.
- Standard lengths supplied: 4 feet minimum; 24 feet maximum (lengths to be specified when ordering).
- Shield material, tin coated copper per A-A-59569 and QQ-B-575.
- * The recommended minimum bend radius that can be achieved without cross sectional area reduction.
- When used as Maulflex paragraphs 4.3.1, 4.3.2, 4.3.3, 4.3.4, 4.3.5, and Table 2 inside diameter of RT-1162 are not applicable.

Kevlar is a registered trademark of E.I. duPont de Nemours & Co.

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	TE
NT	RT-510

Available in:	Americas	Europe	Asia Pacific
	■	■	■

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).	

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	TE
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

NT-MIL (Continued)

Product Dimensions

MIL SPEC No. (CL1/CL2)	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]
-101/-201	1/4	6.4 [0.250]	3.6 [0.143]	0.89 ± 0.25 [0.035 ± 0.010]
-102/-202	3/8	9.5 [0.375]	5.4 [0.211]	1.01 ± 0.25 [0.040 ± 0.010]
-103/-203	1/2	12.7 [0.500]	7.3 [0.286]	1.21 ± 0.38 [0.048 ± 0.015]
-104/-204	5/8	15.9 [0.625]	9.1 [0.357]	1.32 ± 0.38 [0.052 ± 0.015]
-105/-205	3/4	19.1 [0.750]	10.9 [0.428]	1.44 ± 0.38 [0.057 ± 0.015]
-106/-206	7/8	22.2 [0.875]	12.7 [0.500]	1.65 ± 0.38 [0.065 ± 0.015]
-107/-207	1	25.4 [1.000]	14.5 [0.570]	1.77 ± 0.51 [0.070 ± 0.020]
-108/-208	1 1/4	31.8 [1.250]	18.1 [0.714]	2.20 ± 0.51 [0.087 ± 0.020]
-109/-209	1 1/2	38.1 [1.500]	21.8 [0.857]	2.41 ± 0.51 [0.095 ± 0.020]
-110/-210	1 3/4	44.5 [1.750]	25.4 [1.000]	2.71 ± 0.51 [0.107 ± 0.020]
-111/-211	2	50.8 [2.000]	29.0 [1.140]	2.79 ± 0.51 [0.110 ± 0.020]
-112/-212	3	76.2 [3.000]	43.4 [1.710]	3.17 ± 0.51 [0.125 ± 0.020]
-113/-213	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

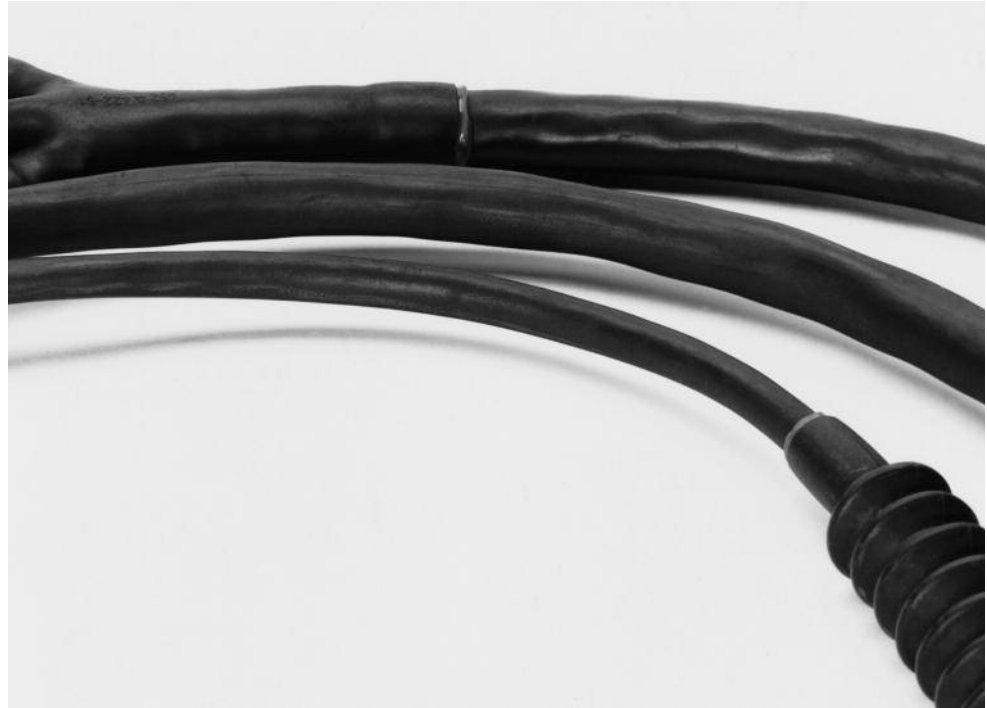
Color	Standard	Black (-0)
Size selection	Always order the largest size that will shrink snugly over the component to be covered. Special order sizes are available upon request.	
Standard packaging	On spools.	
Ordering description	Specify product name, size and color (for example, NT-MIL 1/4-0).	

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 TE 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	Specification	Agency	TE
NTFR	SC-X-15112	AMS 3623	RT-511

Available in:

Americas

Europe

Asia Pacific



NTFR (Continued)

Product Dimensions

SC-X15112		Inside Diameter		Recovered Wall Thickness**
Spec. No.	Size	Minimum Expanded as Supplied	Maximum Recovered After Heating	After Heating
-001	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]
-002	1/4	6.4 [0.250]	3.6 [0.143]	0.89 ± 0.25 [0.035 ± 0.010]
-003	3/8	9.5 [0.375]	5.5 [0.214]	1.01 ± 0.25 [0.040 ± 0.010]
-004	1/2	12.7 [0.500]	7.3 [0.286]	1.21 ± 0.38 [0.048 ± 0.015]
-005	5/8	15.9 [0.625]	9.1 [0.357]	1.32 ± 0.38 [0.052 ± 0.015]
-006	3/4	19.1 [0.750]	10.9 [0.428]	1.44 ± 0.38 [0.057 ± 0.015]
-007	7/8	22.2 [0.875]	12.7 [0.500]	1.65 ± 0.38 [0.065 ± 0.015]
-008	1	25.4 [1.000]	14.5 [0.570]	1.77 ± 0.51 [0.070 ± 0.020]
-009	1 1/4	31.8 [1.250]	18.1 [0.714]	2.20 ± 0.51 [0.087 ± 0.020]
-010	1 1/2	38.1 [1.500]	21.8 [0.857]	2.41 ± 0.51 [0.095 ± 0.020]
-011	1 3/4	44.5 [1.750]	25.4 [1.000]	2.71 ± 0.51 [0.107 ± 0.020]
-012	2	50.8 [2.000]	29.0 [1.140]	2.79 ± 0.51 [0.110 ± 0.020]
-013	3	76.2 [3.000]	43.4 [1.710]	3.17 ± 0.51 [0.125 ± 0.020]
-014	4	101.6 [4.000]	57.9 [2.280]	3.55 ± 0.50 [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, NTFR 1/4-0).	

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 	TE
PD Caps	E85381 600 V, 125°C	PD Caps SCD

Available in:	Americas	Europe	Asia Pacific
	■	■	■

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

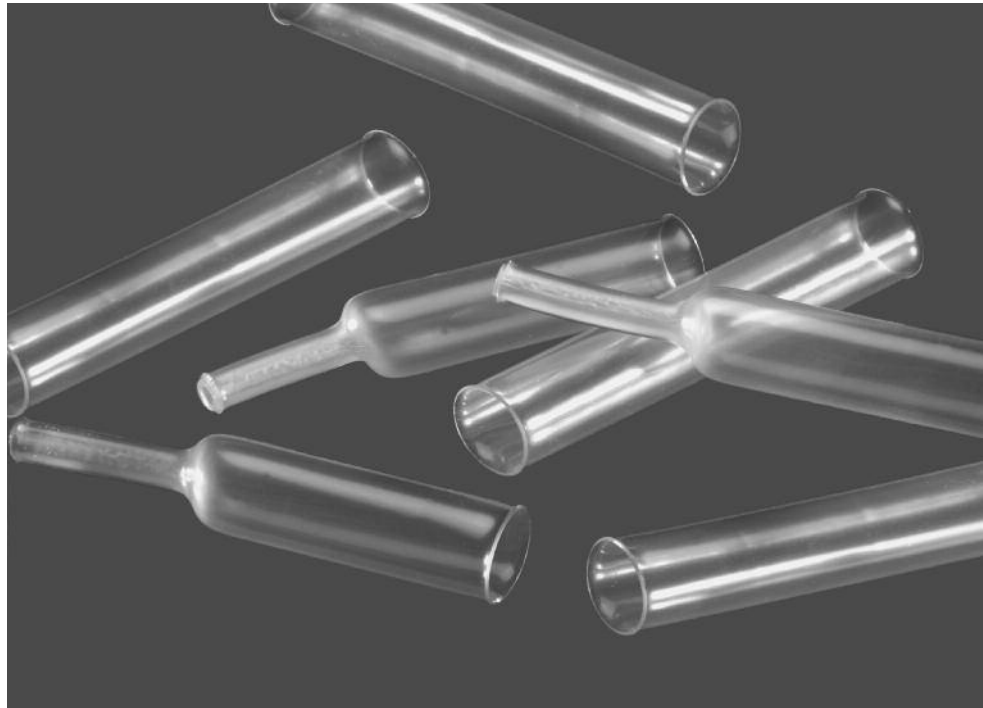
Color	Standard	Black (-0)
Size selection	Always order the largest size that will shrink snugly over the component to be covered. Special order sizes are available upon request.	
Standard packaging	In pieces.	
Ordering description	Specify product name, size and color (for example, PD Caps 1/4-0).	

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	TE
PTCM	RK-6768

Available in:	Americas	Europe	Asia Pacific
		■	

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	

RayBlock 85

Heat-Shrinkable Water-Blocking System

Product Facts

- Environmentally seals wire bundles of up to 20 wires
- Withstands temperature excursions to 105°C [221°F]
- Provides excellent strain relief and reduces noise
- Offers a low-profile installed product only marginally larger than the cable bundle itself
- RoHS compliant



Applications

Designed to provide consistent sealing for cable bundles and the back of connectors. The wires are placed within the channels of a specially formulated hot-melt adhesive profile, then covered by dual-wall, heat-shrinkable tubing with a flame-retardant, radiation-crosslinked outer wall and hot-melt-adhesive inner wall. When the tubing is heated, the hot-melt

adhesive melts and the tubing shrinks, forcing the molten adhesive to fill all the voids within the wire bundle and tubing. The result is a solid plug of adhesive molded around each wire in the bundle, creating a moisture-resistant seal.

Installation

Minimum shrink temperature: 80°C [176°F]

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

Operating Temperature Range

-40°C to 85°C
[-40°F to 185°F]

Specifications/Approvals

Series	TE
RayBlock 85	RayBlock 85 SCD RW-2101

Available in:	Americas	Europe	Asia Pacific
	■	■	■

RayBlock 85 (Continued)

Product Dimensions

Part No.	No. of Channels	Profile			Tubing Inside Diameter		
		Outside Height	Length	Width	Minimum Expanded as Supplied	Maximum Recovered After Heating	Nominal Length
RayBlock 85 Kit 0102-A0	2	8.5 [0.335]	2.75 [0.108]	8.50 [0.335]	12.0 [0.472]	3.0 [0.118]	40 [1.57]
RayBlock 85 Kit 0203-A0	3	8.5 [0.335]	2.75 [0.108]	12.25 [0.482]	24.0 [0.945]	6.0 [0.236]	47 [1.85]
RayBlock 85 Kit 0504-A0	4	8.5 [0.335]	2.75 [0.108]	16.00 [0.630]	16.0 [0.630]	4.0 [0.158]	40 [1.57]
RayBlock 85 Kit 0405-A0	5	8.5 [0.335]	2.75 [0.108]	19.75 [0.778]	24.0 [0.945]	6.0 [0.236]	45 [1.77]
RayBlock 85 Kit 0107-A0	7	8.5 [0.335]	2.75 [0.108]	27.25 [1.070]	24.0 [0.945]	6.0 [0.236]	65 [2.56]
RayBlock 85 Kit 0510-A0	10	8.5 [0.335]	2.75 [0.108]	38.50 [1.520]	32.0 [1.260]	8.0 [0.315]	55 [2.17]

Ordering Information

Color	Standard	Black (-0)
Size selection	For wire with an outside diameter smaller than 2.8 [0.110] , use a maximum of two wires per channel. For wire with an outside diameter of 2.8–3.5 [0.110 to 0.138], use a maximum of one wire per channel. Special order sizes are available upon request.	
Standard packaging	One kit (contains 1000 pcs. of profile and 1000 pcs. of tubing).	

RayBlock 105

Heat-Shrinkable Water-Blocking System

Product Facts

- Environmentally seals wire bundles of up to 20 wires
- Withstands temperature excursions to 120°C [248°F]
- Provides excellent strain relief and reduces noise
- Offers a low-profile installed product only marginally larger than the cable bundle itself
- RoHS compliant



Applications

Designed to provide consistent sealing for cable bundles and the back of connectors. The wires in the bundle are placed within the channels of a specially formulated hot-melt adhesive profile, and then covered by dual wall, heat-shrinkable tubing with a flame-retardant radiation-crosslinked outer wall and hot-melt-adhesive inner wall. When the tubing is heated, the hot-melt

adhesive melts and the tubing shrinks, forcing the molten adhesive to fill all the voids within the wire bundle and tubing. The result is a solid plug of adhesive molded around each wire in the bundle, creating a moisture-resistant seal.

Installation

Minimum shrink temperature: 80°C [176°F]

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

Operating Temperature Range

-40°C to 105°C
[-40°F to 221°F]

Specifications/Approvals

Series	TE
RayBlock 105	RayBlock 105 SCD RW-2102

RayBlock 105 (Continued)

Product Dimensions

Part No.	No. of Channels	Profile			Tubing Inside Diameter		
		Outside Height	Length	Width	Minimum Expanded as Supplied	Maximum Recovered After Heating	Nominal Length
RayBlock 105 Kit 0102-A0	2	8.5 [0.335]	2.75 [0.108]	8.50 [0.335]	12.0 [0.472]	3.0 [0.118]	40 [1.57]
RayBlock 105 Kit 0103-A0	3	8.5 [0.335]	2.75 [0.108]	12.25 [0.482]	16.0 [0.630]	4.0 [0.158]	40 [1.57]
RayBlock 105 Kit 0504-A0	4	8.5 [0.335]	2.75 [0.108]	16.00 [0.630]	16.0 [0.630]	4.0 [0.158]	45 [1.77]
RayBlock 105 Kit 0105-A0	5	8.5 [0.335]	2.75 [0.108]	19.75 [0.778]	24.0 [0.945]	6.0 [0.236]	45 [1.77]
RayBlock 105 Kit 0107-A0	7	8.5 [0.335]	2.75 [0.108]	27.20 [1.070]	24.0 [0.945]	6.0 [0.236]	65 [2.56]
RayBlock 105 Kit 0110-A0	10	8.5 [0.335]	2.75 [0.108]	38.50 [1.520]	32.0 [1.260]	8.0 [0.315]	65 [2.56]

Ordering Information

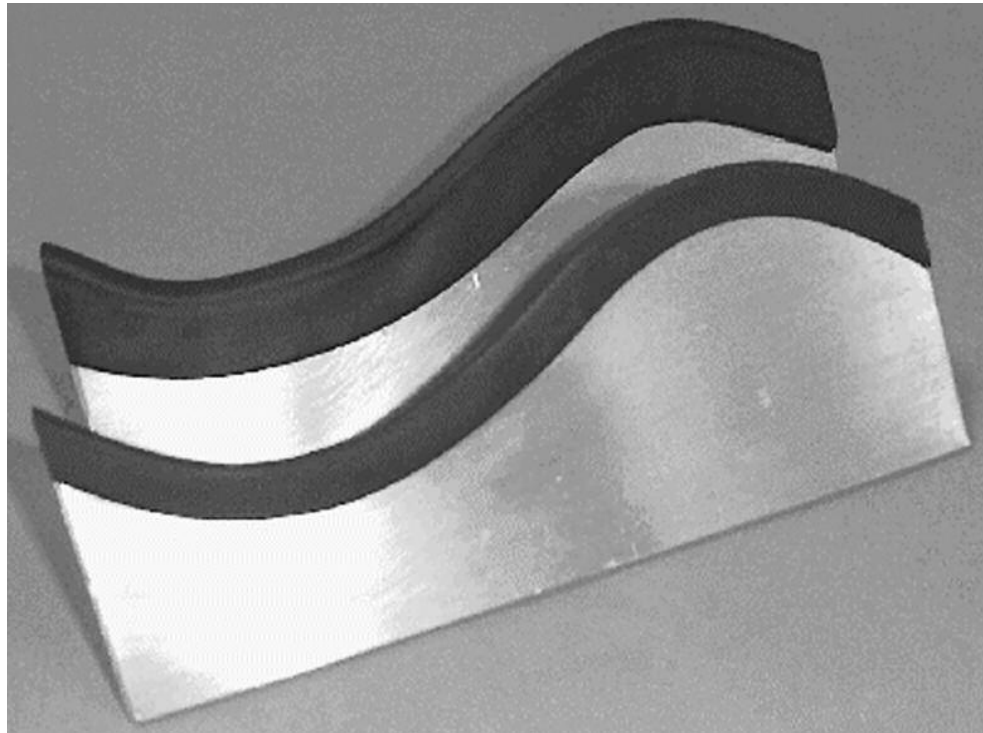
Color	Standard	Black (-0)
Size selection	For wire with an outside diameter smaller than 2.8 [0.110], use a maximum of two wires per channel. For wire with an outside diameter of 2.8–3.5 [0.110–0.138], use a maximum of one wire per channel. Special order sizes are available upon request.	
Standard packaging	One kit (contains 1000 pcs. of profile and 1000 pcs. of tubing).	

Rayrim Edging Material

Commercial Protective, Self-Adhering, Edging Material

Product Facts

- Flexible to allow for protection of curved edges
- RoHS compliant



Applications

Rayrim edging material is an extruded strip internally coated with a heat activated adhesive, so that on heating the profile changes from a "V" to a "U" section and the adhesive bonds to the substrate profile.

Manufactured from a radiation cross-linked polyolefin material, the profile offers a clean and rapid means of covering metal, wood and glass edges for all-round protection.

The flexible nature of the product allows application to both internal and external radii, as well as straight edges, and the continuous operating temperature of -55°C to +80°C [-67°F to 176°F] means that the product can give protection under the most testing circumstances.

Installation

Minimum shrink temperature: 120°C [248°F]

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

Operating Temperature Range

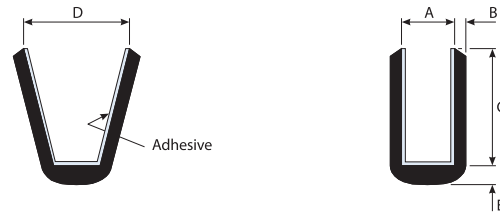
-55°C to 80°C
[-67°F to 176°F]

Specifications/Approvals

Series	TE
Rayrim	RK-6182

Rayrim Edging Material (Continued)

Product Dimensions



Size	A (maximum)	B (minimum)	C (minimum)	D (minimum)	E (typical)
Nr. 6	0.6 [0.024]	0.5 [0.020]	3.5 [0.138]	0.8 [0.032]	1.25 [0.049]
Nr. 7	1.0 [0.039]	0.9 [0.035]	4.8 [0.189]	1.6 [0.063]	1.25 [0.049]
Nr. 8	2.0 [0.079]	0.9 [0.035]	6.6 [0.260]	2.5 [0.098]	2.25 [0.089]
Nr. 9	4.2 [0.165]	0.9 [0.035]	13.5 [0.532]	4.5 [0.177]	2.20 [0.087]

Application Range

Plate SWG	Thickness	Recommended minimum bend radius
30-24	0.31-0.56 [0.012-0.022]	10 [0.394]
23-16	0.61-1.63 [0.026-0.064]	15 [0.591]
15-10	1.83-3.25 [0.072-0.128]	20 [0.787]
9-5	3.66-5.38 [0.144-0.212]	25 [0.984]

Ordering Information

Color	Standard	Black (-0)
Size selection	Always order the largest size that will shrink snugly on edge of the panel.	
Standard packaging	1.2-meter [4-foot] lengths.	
Ordering description	Specify product name, size number and color (for example, Rayrim Nr.6-0).	

RaySpool

Convenient packaging and dispensing system for heat-shrinkable tubing

Product Facts

- Easy to store
- Easy to dispense
- Well-suited for repairs
- Single wall and adhesive-lined tubings
- Wide variety of colors, sizes and kits available
- Also available are RaySpool kits comprised of 6 sizes and supplied with a mounting rack
- Stand alone racks and packaging sets also available
- RoHS compliant



Applications

The RaySpool system offers a convenient packaging and dispensing option for a range of heat-shrinkable tubings. The tubing is supplied on small reels which are overboxed and feature a dispensing window allowing the tubing to be easily and readily accessed. The RaySpool system is a suitable method of storing and for use in the workshop, service vehicle or laboratory. A varied selection of tubings is offered which will cover a diverse range of

applications including electrical insulation, strain relief, cable bundling and environmental protection. RaySpool packaging is available for CGPT, LSTT and CGAT.

Installation

See individual product pages.

Operating Temperature Range

See individual product pages.

Specifications/Approvals

See individual product pages.

Available in:	Americas	Europe	Asia Pacific

RaySpool (Continued)

CGPT 2:1 Product Dimensions

Size	Inside Diameter		Recovered Wall Thickness*	Spool Quantity - Black (meters)	Spool Quantity - Green/Yellow (meters)	Ordering Description
	Minimum Expanded as Supplied	Maximum Recovered After Heating	After Heating			
1.6/0.8	1.6 (0.062)	0.8 (0.031)	0.45 ± 0.12	10.0	-	CGPT-R-1.6-col code
2.4/1.2†	2.4 (0.093)	1.2 (0.046)	0.50 ± 0.12	10.0	-	CGPT-R-2.4-col code
3.2/1.6†•	3.2 (0.125)	1.6 (0.062)	0.50 ± 0.12	10.0	5.0	CGPT-R-3.2-col code
4.8/2.4†	4.8 (0.187)	2.4 (0.093)	0.50 ± 0.12	9.0	-	CGPT-R-4.8-col code
6.4/3.2†•	6.4 (0.250)	3.2 (0.125)	0.65 ± 0.15	8.0	3.5	CGPT-R-6.4-col code
9.5/4.8•	9.5 (0.375)	4.8 (0.187)	0.65 ± 0.15	6.0	3.0	CGPT-R-9.5-col code
12.7/6.4†•	12.7 (0.500)	6.4 (0.250)	0.65 ± 0.15	6.0	2.5	CGPT-R-12.7-col code
19/9.5•	19.0 (0.748)	9.5 (0.375)	0.75 ± 0.15	5.0	2.0	CGPT-R-19.0-col code
25.4/12.7†•	25.4 (1.000)	12.7 (0.500)	0.90 ± 0.20	3.0	1.5	CGPT-R-25.4-col code
KIT CONTAINS SIZES INDICATED BY †						CGPT-R-KIT-2

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

Ordering Information

Color	Standard	Black (-0) Green/yellow (-45) available in sizes indicated by •
Size selection	Always order the largest size that will shrink snugly over the component to be covered.	
Standard packaging	On mini spools.	
Ordering description	See above for description	

CGPT 3:1 Product Dimensions

Size	Inside Diameter		Recovered Wall Thickness*	Spool Quantity (meters)	Ordering Description
	Minimum Expanded as Supplied	Maximum Recovered After Heating	After Heating		
3/1†	3.0 (0.118)	1.0 (0.040)	0.55 ± 0.12	10.0	CGPT-R-3/1-col code
6/2†	6.0 (0.236)	2.0 (0.079)	0.65 ± 0.12	7.0	CGPT-R-6/2-col code
9/3†	9.0 (0.354)	3.0 (0.118)	0.75 ± 0.15	5.0	CGPT-R-9/3-col code
12/4†	12.0 (0.472)	4.0 (0.157)	0.75 ± 0.15	4.0	CGPT-R-12/4-col code
18/6†	18.0 (0.709)	6.0 (0.236)	0.85 ± 0.15	3.0	CGPT-R-18/6-col code
24/8†	24.0 (0.945)	8.0 (0.315)	1.00 ± 0.20	3.0	CGPT-R-24/8-col code
KIT CONTAINS SIZES INDICATED BY † (black only)					CGPT-R-KIT-1

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

Ordering Information

Color	Standard	Black (-0) Red (-2) Yellow (-4) Blue (-6)
Size selection	Always order the largest size that will shrink snugly over the component to be covered.	
Standard packaging	On mini spools.	
Ordering description	See above for description	

RaySpool (Continued)

LSTT 2:1 Product Dimensions

Size	Inside Diameter		Recovered Wall Thickness*	Spool Quantity - Black (meters)	Ordering Description
	Minimum Expanded as Supplied	Maximum Recovered After Heating	After Heating		
2.4/1.2†	2.4 (0.093)	1.2 (0.046)	0.55 ± 0.12	10.0	LSTT-R-2.4-0
3.2/1.6†	3.2 (0.125)	1.6 (0.062)	0.55 ± 0.12	10.0	LSTT-R-3.2-0
4.8/2.4†	4.8 (0.187)	2.4 (0.093)	0.55 ± 0.12	9.0	LSTT-R-4.8-0
6.4/3.2†	6.4 (0.250)	3.2 (0.125)	0.65 ± 0.15	8.0	LSTT-R-6.4-0
9.5/4.8	9.5 (0.375)	4.8 (0.187)	0.65 ± 0.15	6.0	LSTT-R-9.5-0
12.7/6.4†	12.7 (0.500)	6.4 (0.250)	0.65 ± 0.15	6.0	LSTT-R-12.7-0
19/9.5	19.0 (0.748)	9.5 (0.375)	0.80 ± 0.15	5.0	LSTT-R-19.0-0
25.4/12.7†	25.4(1.000)	12.7 (0.500)	0.95 ± 0.18	3.0	LSTT-R-25.4-0
KIT CONTAINS SIZES INDICATED BY † (black only)					LSTT-R-KIT-1

*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.	
Standard packaging	On mini spools.	
Ordering description	See above for description	

CGAT 3:1 Product Dimensions

Size	Inside Diameter		Recovered Wall Thickness*	Spool Quantity (meters)	Ordering Description
	Minimum Expanded as Supplied	Maximum Recovered After Heating	After Heating		
3/1†	3.0 (0.118)	1.0 (0.040)	1.00 ± 0.25	5.0	CGAT-R-3/1-0
6/2†	6.0 (0.236)	2.0 (0.079)	1.00 ± 0.25	3.5	CGAT-R-6/2-0
9/3†	9.0 (0.354)	3.0 (0.118)	1.35 ± 0.25	3.0	CGAT-R-9/3-0
12/4†	12.0 (0.472)	4.0 (0.157)	1.50 ± 0.25	2.5	CGAT-R-12/4-0
18/6†	18.0 (0.709)	6.0 (0.236)	1.70 ± 0.25	2.0	CGAT-R-18/6-0
24/8†	24.0 (0.945)	8.0 (0.315)	1.90 ± 0.25	1.5	CGAT-R-24/8-0
KIT CONTAINS SIZES INDICATED BY † (black only)					CGAT-R-KIT-1

*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.	
Standard packaging	On mini spools.	
Ordering description	See above for description	

RHW

Rugged, Heavy Wall, Adhesive-Lined, Polyolefin Heat-Shrinkable Tubing

Product Facts

- Withstands mechanical abuse for increased product reliability
- Highly resistant to impact and abrasion
- Provides high level of strain relief when installed on splices and joints
- Resistant to chemicals, moisture and oils
- Provides a complete moisture-proof seal preventing corrosion of underlying components
- RoHS compliant



Applications

Rugged, heavy wall RHW tubing is specifically designed for insulating, protecting and sealing electrical connections and joints in low-voltage cables. It provides splice insulation thickness equal to or greater than standard wire insulation manufactured to common industry standards.

RHW is a suitable choice for applications where maximum reliability and product performance, and simplified installation are required. Because RHW is heat-shrinkable, a minimum number of sizes are needed to cover a wide range of cables and splice diameters.

Installation

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

Minimum full recovery temperature: 125°C [257°F]

Operating Temperature Range

-55°C to 110°C
[-67°F to 230°F]

Specifications/Approvals

Series	UL* 	TE
RHW	File E91151	RHW SCD

*Sizes 9/3 through 70/21 only.

RHW (Continued)

Product Dimensions

Size	Inside Diameter		Recovered Wall Thickness**	
	Minimum Expanded as Supplied	Recovered After Heating	Nominal Jacket Wall	Nominal Adhesive Wall
9/3	9 [0.354]	3 [0.118]	2.0 [0.079]	0.25 [0.010]
13/4	13 [0.512]	4 [0.158]	2.4 [0.094]	0.30 [0.012]
20/6	20 [0.787]	6 [0.236]	2.5 [0.098]	0.35 [0.014]
33/8	33 [1.299]	8 [0.315]	3.2 [0.126]	0.35 [0.014]
43/12	43 [1.693]	12 [0.472]	4.3 [0.169]	0.40 [0.016]
51/16	51 [2.008]	16 [0.630]	4.5 [0.177]	0.40 [0.016]
70/21	70 [2.756]	21 [0.827]	4.4 [0.173]	0.40 [0.016]
85/25	85 [3.346]	25 [0.984]	4.3 [0.169]	0.40 [0.016]
105/30	105 [4.134]	30 [1.181]	4.3 [0.169]	0.45 [0.018]
130/36	130 [5.118]	36 [1.417]	4.3 [0.169]	0.45 [0.018]
160/50	160 [6.299]	50 [1.968]	4.3 [0.169]	0.45 [0.018]
180/50	180 [7.087]	50 [1.968]	4.3 [0.169]	0.50 [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***	1200mm lengths	
Marking	Tubing will be marked with the product name, size and batch number. Sizes 9/3 through 70/21 will also be marked with the UL Logo	
Ordering description	Specify product name, size, cut length, coating option and color (for example, RHW 20/6-1200/ADH-0 (ADH = Adhesive-lined, 0= Black	

***Europe only. Standard packaging 1000mm lengths

RMW

Medium Wall, Polyolefin Heat-Shrinkable Tubing

Product Facts

- Withstands mechanical abuse for increased product reliability
- Highly resistant to impact and abrasion
- Installation is fast and easy
- Resistant to chemicals and moisture
- Adhesive-lined version provides a complete moisture-proof seal preventing corrosion of underlying components
- RoHS compliant



Applications

Medium wall, general purpose RMW tubing is specifically designed for use in a broad range of low-voltage applications. RMW is tough and flexible, making it particularly suited for the insulation and protection of cable joints as well as for cable repair. Uncoated RMW provides insulation and strain relief. Adhesive-lined RMW also provides an environmental seal.

RMW is a suitable choice for applications where maximum reliability and product performance, and simplified installation are required. Because RMW is heat-shrinkable, a minimum number of sizes are needed to cover a wide range of cables and splice diameters.

Installation

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

Minimum full recovery temperature: 125°C [257°F]

Operating Temperature Range

-55°C to 110°C
[-67°F to 230°F]

Specifications/Approvals

Series	TE
RMW	RMW SCD

Available in:	Americas	Europe	Asia Pacific
	■	■	■

RMW (Continued)

Product Dimensions

Size	Inside Diameter		Recovered Wall Thickness**
	Minimum Expanded as Supplied	Recovered After Heating	Nominal Jacket Wall
10/3	10 [0.394]	3 [0.118]	1.0 [0.039]
16/5	16 [0.630]	5 [0.197]	1.4 [0.055]
25/8	25 [0.984]	8 [0.315]	2.0 [0.079]
35/12	35 [1.378]	12 [0.472]	2.0 [0.079]
50/16	50 [1.968]	16 [0.630]	2.0 [0.079]
63/19	63 [2.480]	19 [0.748]	2.4 [0.095]
75/22	75 [2.953]	22 [0.866]	2.7 [0.106]
85/25	85 [3.346]	25 [0.984]	2.8 [0.110]
95/29	95 [3.740]	29 [1.142]	3.1 [0.122]
115/34	115 [4.527]	34 [1.339]	3.1 [0.122]
140/42	140 [5.512]	42 [1.654]	3.1 [0.122]
160/50	160 [6.299]	50 [1.968]	3.2 [0.126]
180/60	180 [7.087]	60 [2.362]	3.2 [0.126]

**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***	1200mm lengths	
Marking	Tubing will be marked with the product name, size and batch number.	
Ordering description	Specify product name, size, cut length, coating option and color (for example, RMW 25/8-1200/ADH-0 or RMW 75/22-1200/U-0 (ADH = Adhesive-lined, U = Uncoated, 0= Black)	

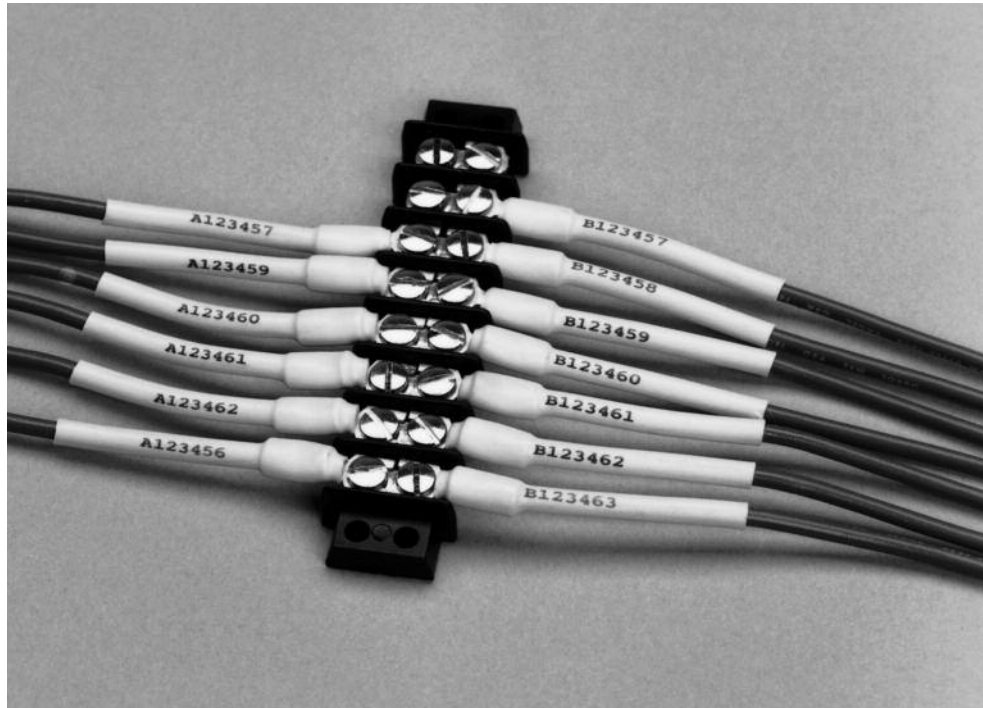
***Europe only. Standard packaging 1000mm lengths

RNF-100

Flexible, Flame-Retardant, General Purpose, Polyolefin Tubing

Product Facts

- 2:1 shrink ratio
- Superior abrasion and solvent resistance when compared with that of many flexible, general purpose polyolefin tubings
- Excellent physical, chemical, and electrical properties that meet or exceed industrial and military standards for highly reliable, general purpose tubing
- Flexible; conforms to irregular shapes
- Flame-retardant (colors only)
- Wide range of sizes and colors
- RoHS compliant



Applications

Designed to provide superior mechanical (abrasion, cut-through, and strain relief), thermal, and fluid-resistance performance in demanding environments. Widely used to provide insulation and strain relief of wire terminations and connections. Used for jacketing wire bundles and light-duty harnesses where superior abrasion resistance is a plus. Also used to identify and color-code electrical connections and wire bundles.

Installation

Minimum shrink temperature: 95°C [203°F]
Minimum full recovery temperature: 121°C [250°F]

Operating Temperature Range

-55°C to 135°C
[-67°F to 275°F]

Specifications/Approvals

Series	UL 	CSA 	Military	Industry	TE
RNF-100 Type 1 (colors)	E35586 600 V, 125°C	LR31929 600 V, 125°C	AMS-DTL-23053/5*, Class 1 Def. Stan. 59-97 Type 2B	VDE 0341 Pt 9005 Type A and B	RT-350, Type 1 RK-6001
RNF-100 Type 2 (clear)	—	—	AMS-DTL-23053/5*, Class 2 VG 95343 Pt 5 Type B	—	RT-350, Type 2 RK-6001

*Formerly MIL-I-23053/5 and MIL-DTL-23053/5.

Available in:	Americas	Europe	Asia Pacific
	■	■	■

RNF-100 (Continued)

Product Dimensions

Size	Inside Diameter		Recovered Wall Thickness** After Heating
	Minimum Expanded as Supplied	Maximum 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]	0.51 ± 0.08 [0.020 ± 0.003]
1/8	3.2 [0.125]	1.6 [0.062]	0.51 ± 0.08 [0.020 ± 0.003]
3/16	4.8 [0.187]	2.4 [0.093]	0.51 ± 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]	0.89 ± 0.12 [0.035 ± 0.005]
1 1/4	31.8 [1.250]	15.9 [0.625]	1.02 ± 0.15 [0.040 ± 0.006]
1 1/2	38.1 [1.500]	19.1 [0.750]	1.02 ± 0.15 [0.040 ± 0.006]
2	50.8 [2.000]	25.4 [1.000]	1.14 ± 0.16 [0.045 ± 0.007]
3	76.2 [3.000]	38.1 [1.500]	1.27 ± 0.20 [0.050 ± 0.008]
4	101.6 [4.000]	50.8 [2.000]	1.40 ± 0.23 [0.055 ± 0.009]
5	127.0 [5.000]	63.5 [2.500]	1.52 ± 0.23 [0.060 ± 0.009]

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

Ordering Information

Color	Standard***	Black (-0, BK), white (-9, WH), red (-2, RD), blue (-6, BU), yellow (-4, YO), green (-5, GN), clear (-X, CL)
	Nonstandard	Brown (-1, BN), orange (-3, OR), violet (-7, VT), gray (-8, GY)
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 or in 1.2-meter [4-foot] lengths.	
Ordering description*****	Specify product name, size and color (for example, RNF-100 1/4-0 [Europe] or RNF-100 1/4-BK [Americas]).	

***Green (-5, GN) is nonstandard in all sizes in Europe, and nonstandard in sizes 1-1/4 through 5-inches in Americas.

****Available in the convenient Mini-Spool packaging/dispensing system, for sizes 3/64" up to 1".

*****Europe only. For supply to MIL, Def Stan and BS add -MS, -DS or -BS to ordering description.

RNF-150

High-Performance, Flame-Resistant, Flexible, Fluoropolymer Tubing

Product Facts

- 2:1 shrink ratio
- Approximately 40 percent thinner walls than most general purpose polyolefin tubings
- High flame-resistance
- Excellent physical and electrical properties after exposure to many chemicals and solvents at 50°C [122°F] (but not recommended for use in direct contact with ketones)
- Recommended maximum temperature for use as a primary insulator: 135°C [275°F]
- RoHS compliant



Applications

Can be used for jacketing and bundling of wires to form light-duty harnesses, especially where a low profile, abrasion resistance, and flexibility are needed. Can also be used to provide insulation and strain relief of electrical connections and wire terminations, identification of wires, and packaging of components.

Installation

Minimum shrink temperature: 110°C [230°F]
Minimum full recovery temperature: 150°C [302°F]

Operating Temperature Range

-55°C to 150°C
[-67°F to 302°F]

Specifications/Approvals

Series	UL 	Military	TE
RNF-150	E35586 VW-1 600 V, 150°C	AMS-DTL-23053/18*, Class 2	RT-370

*Formerly MIL-I-23053/18 and MIL-DTL-23053/18.

Available in:	Americas	Europe	Asia Pacific
	■	■	■

RNF-150 (Continued)

Product Dimensions

Size	Inside Diameter		Recovered Wall Thickness** After Heating
	Minimum Expanded as Supplied	Maximum Recovered After Heating	
3/64	1.2 [0.046]	0.6 [0.023]	0.25 ± 0.05 [0.010 ± 0.002]
1/16	1.6 [0.063]	0.8 [0.031]	0.25 ± 0.05 [0.010 ± 0.002]
3/32	2.4 [0.093]	1.2 [0.046]	0.25 ± 0.05 [0.010 ± 0.002]
1/8	3.2 [0.125]	1.6 [0.062]	0.25 ± 0.05 [0.010 ± 0.002]
3/16	4.8 [0.187]	2.4 [0.093]	0.25 ± 0.05 [0.010 ± 0.002]
1/4	6.4 [0.250]	3.2 [0.125]	0.30 ± 0.08 [0.012 ± 0.003]
3/8	9.5 [0.375]	4.8 [0.187]	0.30 ± 0.08 [0.012 ± 0.003]
1/2	12.7 [0.500]	6.4 [0.250]	0.30 ± 0.08 [0.012 ± 0.003]
3/4	19.1 [0.750]	9.5 [0.375]	0.43 ± 0.08 [0.017 ± 0.003]
1	25.4 [1.000]	12.7 [0.500]	0.48 ± 0.08 [0.019 ± 0.003]

**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 spools.	
Ordering description***	Specify product name, size and color (for example, RNF-150 1/4-0).	

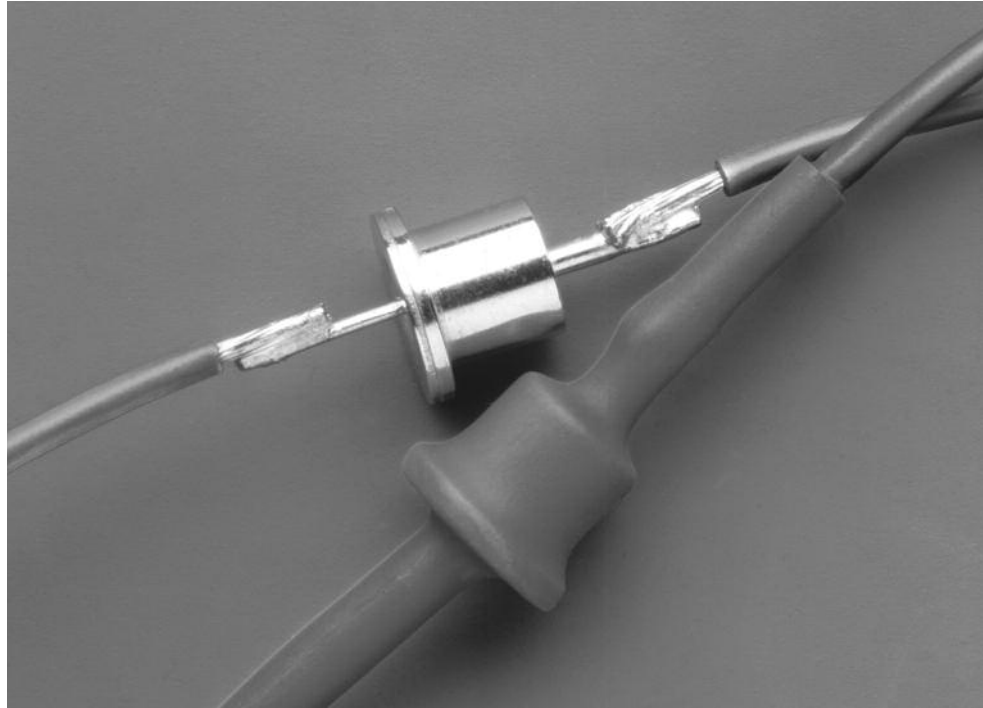
***Europe only. For supply to MIL, Def Stan and BS add -MS, -DS or -BS to ordering description.

RNF-3000

Flexible, High-Shrink-Ratio, Flame-Retardant, General Purpose, Polyolefin Tubing

Product Facts

- 3:1 shrink ratio easily accommodates awkward, irregular shapes
- Few sizes cover a wide range of diameters, allowing reduced inventory
- Excellent physical, chemical, and electrical properties meet industry standards for highly reliable, general purpose tubing
- Flame-retardant (colors only)
- RoHS compliant



Applications

Used for insulation and strain relief of wire terminations and electrical connections. Also suitable for light-duty harnessing, jacketing, and identification of wires, cables, and electrical and electronic components.

Installation

Minimum shrink temperature: 80°C [176°F]
Minimum full recovery temperature: 120°C [248°F]

Operating Temperature Range

-55°C to 135°C
[-67°F to 275°F]

Specifications/Approvals

Series	UL 	CSA 	Military	Industry	TE
RNF-3000	E35586 600 V, 125°C	LR31929 600 V, 125°C	Def. Stan. 59-97 Type 2B VG 95343 Pt 5 Type A (color) VG 95343 Pt 5 Type B (clear)	VDE 0341 Pt. 9005 Type A and B	RW-2053

Available in:

Americas

Europe

Asia Pacific

RNF-3000 (Continued)

Product Dimensions

Size	Inside Diameter		Recovered Wall Thickness* After Heating
	Minimum Expanded as Supplied	Maximum Recovered After Heating	
1.5/0.5	1.5 [0.060]	0.5 [0.019]	0.45 ± 0.10 [0.018 ± 0.003]
3/1	3 [0.118]	1 [0.039]	0.55 ± 0.10 [0.022 ± 0.003]
4.5/1.5	4.5 [0.177]	1.5 [0.059]	0.55 ± 0.10 [0.022 ± 0.003]
6/2	6 [0.236]	2 [0.079]	0.65 ± 0.10 [0.026 ± 0.003]
9/3	9 [0.354]	3 [0.118]	0.75 ± 0.12 [0.030 ± 0.004]
12/4	12 [0.472]	4 [0.157]	0.75 ± 0.12 [0.030 ± 0.004]
18/6	18 [0.709]	6 [0.236]	0.85 ± 0.12 [0.033 ± 0.004]
24/8	24 [0.944]	8 [0.315]	1.00 ± 0.18 [0.039 ± 0.007]
39/13	39 [1.534]	13 [0.512]	1.15 ± 0.20 [0.045 ± 0.008]

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

3

Heat-shrinkable Tubing

Ordering Information

Color	Standard**	Black (-0), white (-9), red (-2), blue (-6), yellow (-4), clear (-X)
	Nonstandard	Brown (-1), orange (-3), green (-5), violet (-7), gray (-8)
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 or in 1.2-meter [4-foot] lengths.	
Ordering description****	Specify product name, size and color (for example, RNF-3000 6/2-0).	

**Black is the only standard color in the Americas. All other colors are nonstandard.

***Only spools are standard in the Americas. 1.2 meter [4-foot] lengths are nonstandard.

****Europe only. For supply to Def Stan and BS add -DS or -BS to ordering description.

RP-4800

High-Shrink-Ratio, Flame-Retardant, Polyolefin Tubing

Product Facts

- 4:1 shrink ratio
- Conforms well to highly variable substrate dimensions
- Has excellent physical, chemical, and electrical properties that meet or exceed industrial and military standards
- Shows no significant degradation when exposed to common solvents and chemicals, including aviation fuel and hydraulic fluid
- RoHS compliant



Applications

Well-suited for repairing harnesses or cables; will pass over a large-diameter connector or transition, and then shrink down onto a smaller-diameter jacket. Can insulate or protect a substrate of varying dimensions. Also provides the abrasion and fluid resistance required in harnessing applications.

Installation

Minimum shrink temperature: 95°C [203°F]
Minimum full recovery temperature: 121°C [250°F]

Operating Temperature Range

-55°C to 135°C
[-67°F to 275°F]

Specifications/Approvals

Series	UL 	Military	Industry	TE
RP-4800	E35586 600V, 125°C (black only)	AMS-DTL-23053/5*, Class 1 Overexpanded VG 95343 Pt 5 Type A	VDE 0341 Pt 9005 Type A	RT-1122

*Formerly MIL-I-23053/5 and MIL-DTL-23053/5.

Available in:

Americas

Europe

Asia Pacific

RP-4800 (Continued)

Product Dimensions

Size	Inside Diameter		Recovered Wall Thickness**
	Minimum Expanded as Supplied	Maximum Recovered After Heating	
No. 1	25.4 [1.000]	7.0 [0.275]	1.14 ± 0.18 [0.045 ± 0.007]
No. 2	50.8 [2.000]	14.0 [0.550]	1.14 ± 0.18 [0.045 ± 0.007]
No. 3	76.2 [3.000]	20.6 [0.810]	1.14 ± 0.18 [0.045 ± 0.007]
No. 4	101.6 [4.000]	26.7 [1.050]	1.14 ± 0.18 [0.045 ± 0.007]
No. 5	25.4 [1.000]	11.7 [0.462]	1.14 ± 0.18 [0.045 ± 0.007]
No. 6	60.3 [2.375]	17.3 [0.680]	1.14 ± 0.18 [0.045 ± 0.007]
No. 7	76.2 [3.000]	21.3 [0.840]	1.14 ± 0.18 [0.045 ± 0.007]
No. 8	95.3 [3.750]	23.6 [0.930]	1.14 ± 0.18 [0.045 ± 0.007]
No. 9	114.3 [4.500]	36.8 [1.450]	1.14 ± 0.18 [0.045 ± 0.007]
No. 10	38.1 [1.500]	9.5 [0.375]	1.14 ± 0.18 [0.045 ± 0.007]
No. 11	19.1 [0.750]	4.6 [0.180]	1.14 ± 0.18 [0.045 ± 0.007]

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

Ordering Information

Color	Standard	Black (-0)
	Nonstandard	White (-9), red (-2), blue (-6), yellow (-4), green (-5), brown (-1), orange (-3), violet (-7), gray (-8)
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 or in 1.2-meter [4-foot] lengths.	
Ordering description***	Specify product name, size and color (for example, RP-4800 NO.1-0).	

***Europe only. For supply to MIL, Def Stan and BS add -MS, -DS or -BS to ordering description.

RPPM

**Flexible, Dual Wall,
Moisture-Proof,
Heat-Shrinkable Tubing**

Product Facts

- Environmental sealing
- Excellent mechanical strength
- Abrasion resistance
- 4:1 shrink ratio
- RoHS compliant



Applications

RPPM is a flexible, heat-shrinkable, dual wall tubing with an integrally bonded meltable adhesive liner. Available in clear and black, the tough outer jacket offers excellent mechanical strength. RPPM is used for moisture-proof encapsulation of a wide variety of components. In particular, it adheres well to PVC. The high-shrink-ratio allows RPPM to be used

with a range of dimensions. Clear RPPM offers excellent clarity for protection of substrates that may need to be inspected during service. Black RPPM has a high gloss finish suitable for cosmetic applications.

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	TE
RPPM	RK-6214

Available in:	Americas	Europe	Asia Pacific
	■	■	■

RPPM (Continued)

Product Dimensions

Size	Inside Diameter		Recovered Wall Thickness*	
	Minimum Expanded as Supplied	Maximum Recovered After Heating	Nominal Total Wall After Heating	Nominal Adhesive Wall After Heating
4/1	4.0 [0.158]	1.0 [0.039]	0.8 [0.032]	0.3 [0.012]
8/2	8.0 [0.315]	2.0 [0.079]	0.9 [0.035]	0.3 [0.012]
12/3	12.0 [0.472]	3.0 [0.118]	1.2 [0.047]	0.4 [0.016]
16/4	16.0 [0.630]	4.0 [0.158]	1.5 [0.059]	0.5 [0.020]

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

Ordering Information

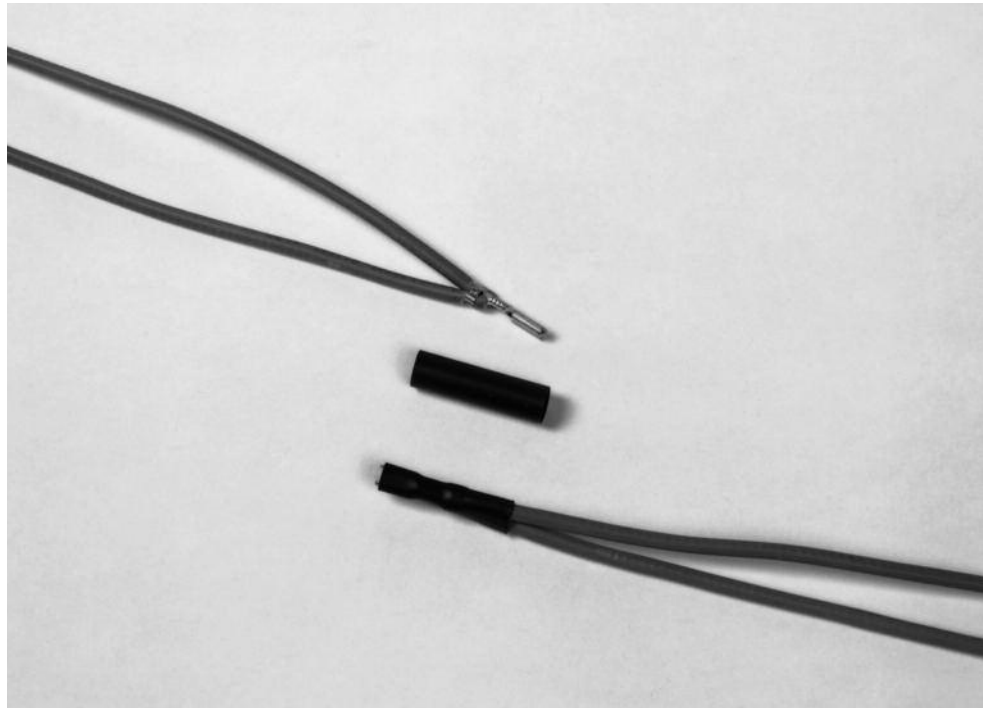
Color	Standard	Clear (-X)
	Nonstandard	Black (-0)
Size selection	Always order the largest size that will shrink snugly over the component to be covered. Special order sizes are available upon request.	
Standard packaging	On spools, in 1.2 meter [4-foot] lengths or cut pieces.	
Ordering description	Specify product name, size and color (for example, RPPM 4/1-X).	

RT-3

Semirigid, Flame-Retardant, Polyolefin Tubing

Product Facts

- 2.5:1 shrink ratio
- Tightly controlled expanded diameters
- High abrasion resistance
- Semirigidity that transfers flex stress away from typically weak points such as solder and crimp joints, helping to ensure a reliable connection
- Excellent chemical and solvent resistance
- Outstanding physical and electrical performance
- RoHS compliant



Applications

Suitable for wire strain-relief applications — soldered or crimped connections, wire splices, terminations. Well-suited for use with semiautomated production equipment requiring tubing with a tightly controlled expanded diameter. Acts as a tough covering for delicate components; provides mechanical protection.

Installation

Minimum shrink temperature: 110°C [230°F]
Minimum full recovery temperature: 135°C [275°F]

Operating Temperature Range

-55°C to 135°C
[-67°F to 275°F]

Specifications/Approvals

Series	UL 	CSA 	TE
RT-3	E35586 600 V, 125°C	LR31929 (black only) 600 V, 125°C	RT-360*

*Except dimensions and longitudinal change.

Available in:

Americas

Europe

Asia Pacific

RT-3 (Continued)

Product Dimensions

Size	Inside Diameter		Recovered Wall Thickness**
	Minimum Expanded as Supplied	Maximum Recovered After Heating	After Heating
No. 1	6.1 ± 0.4 [0.240 ± 0.015]	2.4 [0.095]	0.79 ± 0.08 [0.031 ± 0.003]
No. 2	8.1 ± 0.4 [0.320 ± 0.015]	3.2 [0.125]	0.79 ± 0.08 [0.031 ± 0.003]
No. 3	9.5 ± 0.5 [0.375 ± 0.020]	3.8 [0.150]	0.79 ± 0.08 [0.031 ± 0.003]
No. 4	12.3 ± 0.5 [0.485 ± 0.020]	5.1 [0.200]	0.79 ± 0.08 [0.031 ± 0.003]

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

Ordering Information

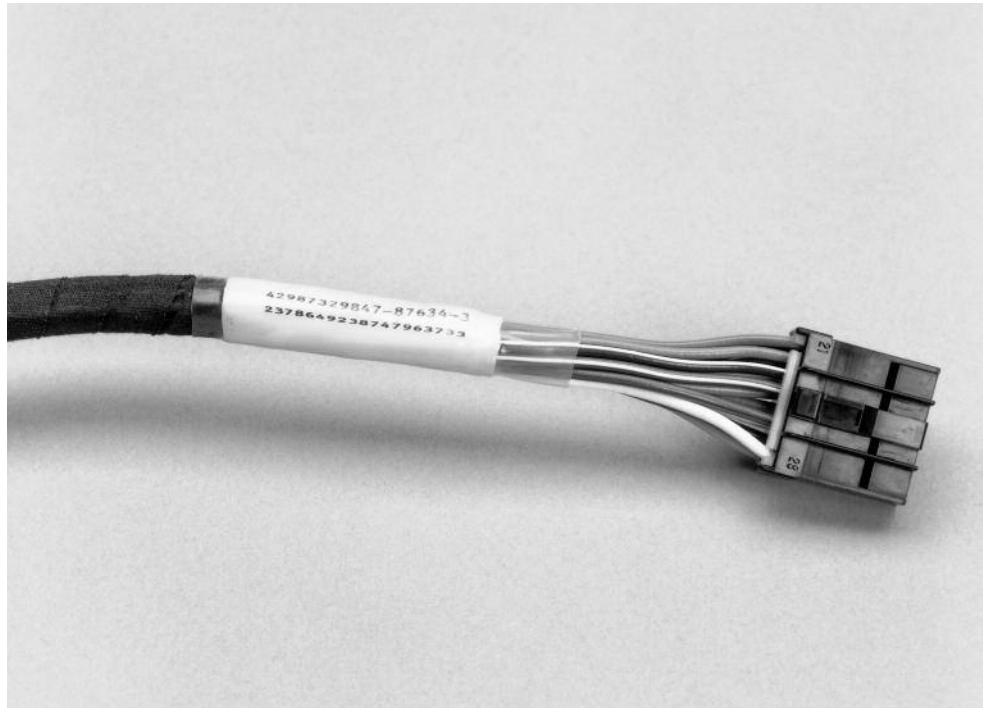
Color	Black (-0) only
Size selection	Always order the largest size that will shrink snugly over the component to be covered. Special order sizes are available upon request.
Standard packaging	In 1-inch cut pieces or in 1.2-meter [4-foot] lengths.
Ordering description	Specify product name, size and color (for example, RT-3 No. 1-0).

RT-375

**Clear, Flame-Resistant,
Flexible, Fluoropolymer
Tubing**

Product Facts

- 2:1 shrink ratio
- Exceptional clarity and clarity stability
- Toughness, chemical resistance, and high-temperature performance
- High flame-resistance
- Approximately 40 percent thinner walls than most general purpose polyolefin tubings
- Recommended maximum temperature for use as a primary insulator: 135°C [275°F]
- RoHS compliant



Applications

Protects wire and cable markers subject to extreme abuse, while permitting full inspectability of each item covered. Provides bundling and jacketing of wires and cables, protecting them from mechanical and chemical abuse. Protects electronic components while permitting their identification and inspection.

Installation

Minimum shrink temperature: 125°C [257°F]
Minimum full recovery temperature: 150°C [302°F]

Operating Temperature Range

-55°C to 150°C
[-67°F to 302°F]

Specifications/Approvals

Series	UL 	CSA 	Military	TE
RT-375	E35586 VW-1 600 V, 150°C	LR31929 VW-1 600 V, 150°C	AMS-DTL-23053/18*, Class 2	RT-375

*Formerly MIL-I-23053/18 and MIL-DTL-23053/18.

Available in:

Americas

Europe

Asia Pacific



RT-375 (Continued)

Product Dimensions

Size	Inside Diameter		Recovered Wall Thickness** After Heating
	Minimum Expanded as Supplied	Maximum Recovered After Heating	
3/64	1.2 [0.046]	0.6 [0.023]	0.25 ± 0.05 [0.010 ± 0.002]
1/16	1.6 [0.063]	0.8 [0.031]	0.25 ± 0.05 [0.010 ± 0.002]
3/32	2.4 [0.093]	1.2 [0.046]	0.25 ± 0.05 [0.010 ± 0.002]
1/8	3.2 [0.125]	1.6 [0.062]	0.25 ± 0.05 [0.010 ± 0.002]
3/16	4.8 [0.187]	2.4 [0.093]	0.25 ± 0.05 [0.010 ± 0.002]
1/4	6.4 [0.250]	3.2 [0.125]	0.30 ± 0.08 [0.012 ± 0.003]
3/8	9.5 [0.375]	4.8 [0.187]	0.30 ± 0.08 [0.012 ± 0.003]
1/2	12.7 [0.500]	6.4 [0.250]	0.30 ± 0.08 [0.012 ± 0.003]
3/4	19.1 [0.750]	9.5 [0.375]	0.43 ± 0.08 [0.017 ± 0.003]
1	25.4 [1.000]	12.7 [0.500]	0.48 ± 0.08 [0.019 ± 0.003]

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

3

Heat-shrinkable Tubing

Ordering Information

Color	Standard	Clear (-X)
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, RT-375 1/4-X).	

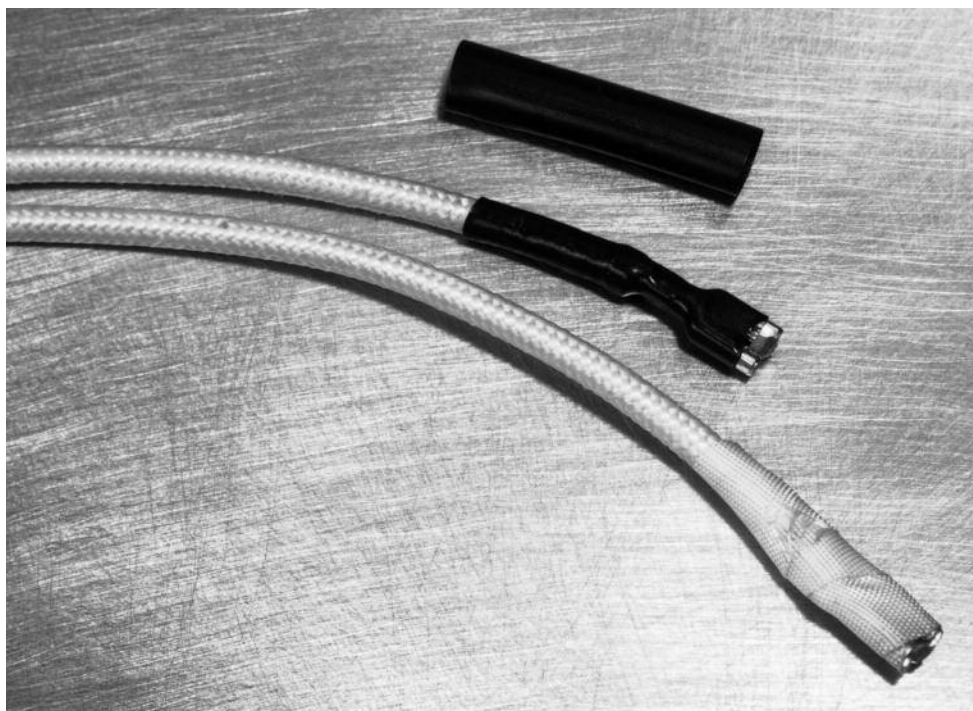
***Europe only. For supply to MIL, Def Stan and BS add -MS, -DS or -BS to ordering description.

RT555

Fluid-Resistant, Chemical-Resistant, Crosslinked Fluoropolymer Tubing with Extended Temperature Range

Product Facts

- Resistance to high temperatures, solvents, corrosive chemicals, and radiation
- Extreme resistance to hydrocarbons
- Low outgassing (successfully tested for NASA outgassing requirements)
- Highly flame-retardant
- 40 percent lighter weight than tubing made with Viton® fluoroelastomer
- System 300 tubing
- RoHS compliant



Applications

Suitable for commercial applications requiring heat resistance (electrical and hydraulic systems near aircraft or automotive engines or in fuel tanks), applications in chemically exposed environments (industrial process equipment in the pulp and paper, steel, and chemical industries), and equipment for handling caustic or dangerous chemicals or

inks. Use for insulation and strain relief on appliances (electric ranges, microwave ovens, gas grills, and industrial paint-drying equipment) and for protection of delicate electronic instruments in down-hole applications.

Installation

Minimum shrink temperature: 150°C [302°F]

Minimum full recovery temperature: 220°C [428°F]

Operating Temperature Range

-65°C to 200°C
[-85°F to 392°F]

Specifications/Approvals

Series	UL 	TE
RT555	Listed for 185°C for 100,000-hr continuous use (File E85381) Listed for 200°C for 40,000-hr cumulative intermittent exposure	RT-555

Viton is a trademark of Dupont Performance Elastomers LLC.

RT555 (Continued)

Product Dimensions

Size	Inside diameter		Recovered wall thickness* After heating		
	Minimum expanded as supplied	Maximum recovered after heating	Minimum	Maximum	Nominal
1/8	3.18 [0.125]	1.57 [0.062]	0.25 [0.010]	0.41 [0.016]	0.30 [0.012]
3/16	4.75 [0.187]	2.36 [0.093]	0.28 [0.011]	0.46 [0.018]	0.36 [0.014]
1/4	6.35 [0.250]	3.18 [0.125]	0.33 [0.013]	0.51 [0.020]	0.41 [0.016]
3/8	9.53 [0.375]	4.75 [0.187]	0.41 [0.016]	0.58 [0.023]	0.48 [0.019]
1/2	12.70 [0.500]	6.35 [0.250]	0.41 [0.016]	0.58 [0.023]	0.48 [0.019]
5/8	15.88 [0.625]	7.95 [0.313]	0.48 [0.019]	0.66 [0.026]	0.56 [0.022]
3/4	19.05 [0.750]	9.53 [0.375]	0.61 [0.024]	0.79 [0.031]	0.69 [0.027]
1	25.40 [1.000]	12.70 [0.500]	0.71 [0.028]	0.89 [0.035]	0.79 [0.031]
1 1/4	31.75 [1.250]	15.88 [0.625]	0.76 [0.030]	0.94 [0.037]	0.84 [0.033]
1 1/2	38.10 [1.500]	19.05 [0.750]	0.86 [0.034]	1.04 [0.041]	0.94 [0.037]
2	50.80 [2.000]	25.40 [1.000]	0.94 [0.037]	1.12 [0.044]	1.02 [0.040]

*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, RT555 1/8-0-SP).	

Part Numbering

RT555 **- 1/8** **-0** **-SP**

Material Size Color Package

High Temperature Sealing Sleeves

High Temperature, Heat Shrinkable, Fluid Resistant Sealing Sleeves

High temperature fluoropolymer sealing sleeve provides a robust, lightweight cover which shrinks to environmentally seal in-line compression joints and terminal lugs.

Product Facts

- Sealing material is pre-installed in high temperature heat shrink sleeve
- No oven curing equipment needed
- Available in four product sizes in two different lengths
- Labor saving preinstall sealing sleeves
- Temperature and fluid resistant fluoropolymer tubing rated to 200°C continuous with excursions to 260°C
- TE's product is thin, tough and lightweight with robust fluid resistance



Applications

High temperature circuit lug and splice covers

Aerospace

Ground Vehicles

Commercial Aviation

Materials

Insulation Sleeve:

Heat-shrinkable, radiation cross-linked modified fluoropolymer.

Color: Black

Meltable Insert:

Environmentally resistant modified thermoplastic fluoroelastomer.

Color: Light Blue

Standards & Specs

Meets TE RT-555 high temperature fluoropolymer fluid specification.

Meets FAR Part 25 appendix F of the FAA standards.

Application Tooling

A heat gun rated at 2200 watts or greater is recommended.

Available in:

Americas



Europe



Asia Pacific

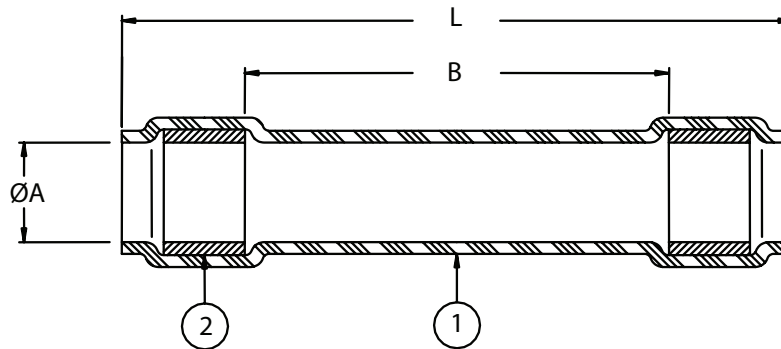


High Temperature Sealing Sleeves (Continued)

Product Dimensions

Part Description	Product Dimensions		
	L Maximum	B Nominal	ØA Minimum
RT-555-3/8-2.75-A260-0	69.9 [2.75]	25.4 [1.00]	8.3 [0.33]
RT-555-3/8-4.75-A260-0	120.7 [4.75]	76.2 [3.00]	8.4 [0.33]
RT-555-1/2-2.75-A260-0	69.9 [2.75]	25.4 [1.00]	11.4 [0.45]
RT-555-1/2-5.75-A260-0	146.1 [5.75]	101.6 [4.00]	11.4 [0.45]
RT-555-3/4-3.00-A260-0	76.2 [3.00]	31.8 [1.25]	17.7 [0.70]
RT-555-3/4-6.75-A260-0	171.5 [6.75]	127.0 [5.00]	17.7 [0.70]
RT-555-1.0-3.75-A260-0	95.3 [3.75]	50.8 [2.00]	22.8 [0.90]
RT-555-1.0-6.75-A260-0	171.5 [6.75]	127.0 [5.00]	22.8 [0.90]

Dimensions are mm [inches]



Ordering Information

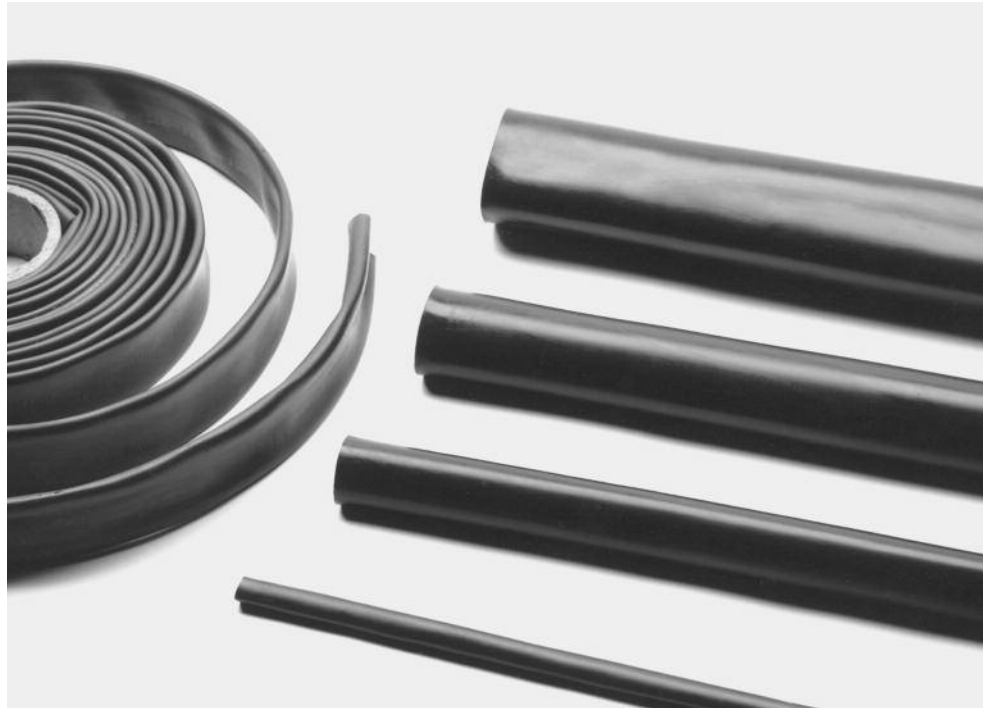
Minimum Order Quantity: 200 pieces for all sizes

RT-770

NBCCS Harness Tubing

Product Facts

- Hardened to withstand effect of NBC decontamination agents including DS-2 and STB
- Tested in live agent tests with HD, VX and TGD for interior and exterior exposure
- Meets the demands of flammability and fluid resistance of current military ground vehicles
- Offered with compatible adhesive, wire and other harness components for a survivable system



Applications

RT-770 heat-shrinkable tubing is made of a chemically resistant fluoroelastomer that is suited for use where moisture, fungus and vehicle fluids and fuels are a concern.

Chemical resistance has been tested in accordance with Army TOP 8-2-510 for NBC contamination survivability.

Installation

Tubing shrinks with temperatures in excess of 150°C

Product is provided with a 2:1 expansion ratio

Optimum application range is 10% above recovered ID to 85% of the expanded ID.

Operating Temperature Range

-55°C to 125°C
[-67°F to 257°F]

Available in:

Americas

Europe

Asia Pacific



RT-770 (Continued)

Product Dimensions

Size	Inside Diameter		Recovered Wall Thickness		
	Minimum Expanded as Supplied	Maximum Recovered After Heating	Minimum	Maximum	Nominal
1/8	3.17 [0.125]	1.57 [0.062]	0.28 [0.011]	0.43 [0.017]	0.35 [0.014]
3/16	4.74 [0.187]	2.36 [0.093]	0.33 [0.013]	0.48 [0.019]	0.41 [0.016]
1/4	6.35 [0.250]	3.17 [0.125]	0.38 [0.015]	0.56 [0.022]	0.46 [0.018]
3/8	9.50 [0.375]	4.74 [0.187]	0.46 [0.018]	0.61 [0.024]	0.51 [0.020]
1/2	12.70 [0.500]	6.35 [0.250]	0.51 [0.020]	0.66 [0.026]	0.56 [0.022]
5/8	15.90 [0.625]	7.93 [0.312]	0.58 [0.023]	0.76 [0.030]	0.66 [0.026]
3/4	19.05 [0.750]	9.50 [0.375]	0.74 [0.029]	0.91 [0.036]	0.81 [0.032]
1	25.40 [1.000]	12.70 [0.500]	0.86 [0.034]	1.04 [0.041]	0.99 [0.037]
1 1/4	31.75 [1.250]	15.87 [0.625]	0.94 [0.037]	1.12 [0.044]	1.01 [0.040]
1 1/2	38.10 [1.500]	19.05 [0.750]	1.04 [0.041]	1.22 [0.048]	1.14 [0.045]
2	50.80 [2.000]	25.40 [1.000]	1.12 [0.044]	1.32 [0.052]	1.22 [0.048]

Ordering Information

Color	Black (-0) only
Size selection	Always order the largest size that will shrink snugly over the component to be covered. Special order sizes are available upon request and are subject to a minimum purchase.
Standard packaging	On spools. Quantity varies by size.
Ordering description	Specify product name, size and color (for example, RT-770-1/8-0-SP).

Part Numbering
RT-770 - 1/8 -0 -SP

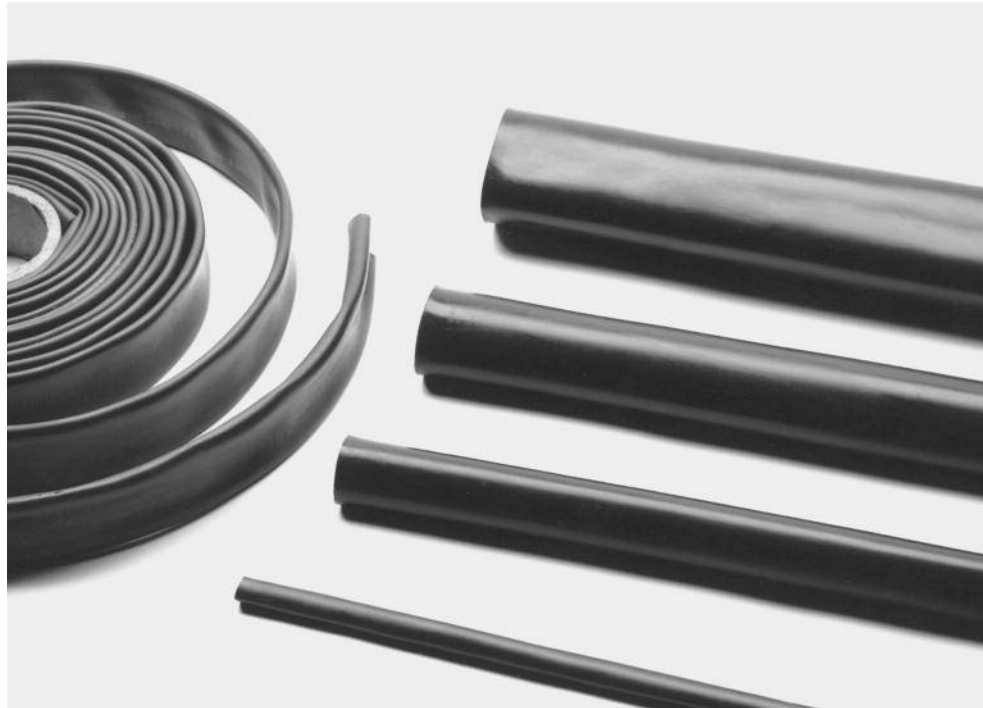
Material Size Color Package

RT-780

NBCCS Harness Tubing

Product Facts

- Hardened to withstand effect of NBC decontamination agents including DS-2 and STB
- Tested in live agent tests with HD, VX and TGD for interior and exterior exposure
- Meets the demands of flammability and fluid resistance of current military ground vehicles
- Offered with compatible adhesive, wire and other harness components for a survivable system



Applications

RT-780 heat-shrinkable tubing is made of a chemically resistant fluoroelastomer that is suited for use where moisture, fungus and vehicle fluids and fuels are a concern.

Chemical resistance has been tested in accordance with Army TOP 8-2-510 for NBC contamination survivability.

Installation

Tubing shrinks with temperatures in excess of 200°C

Product is provided with a 2:1 expansion ratio

Optimum application range is 10% above recovered ID to 85% of the expanded ID.

Operating Temperature Range

-55°C to 175°C
[-67°F to 347°F]

Available in:

Americas

Europe

Asia Pacific



RT-780 (Continued)

Product Dimensions

Size	Inside Diameter		Recovered Wall Thickness		
	Minimum Expanded as Supplied	Maximum Recovered After Heating	Minimum	Maximum	Nominal
1/8	3.17 [0.125]	1.57 [0.062]	0.28 [0.011]	0.43 [0.017]	0.35 [0.014]
3/16	4.74 [0.187]	2.36 [0.093]	0.33 [0.013]	0.48 [0.019]	0.41 [0.016]
1/4	6.35 [0.250]	3.17 [0.125]	0.38 [0.015]	0.56 [0.022]	0.46 [0.018]
3/8	9.50 [0.375]	4.74 [0.187]	0.46 [0.018]	0.61 [0.024]	0.51 [0.020]
1/2	12.70 [0.500]	6.35 [0.250]	0.51 [0.020]	0.66 [0.026]	0.56 [0.022]
5/8	15.90 [0.625]	7.93 [0.312]	0.58 [0.023]	0.76 [0.030]	0.66 [0.026]
3/4	19.05 [0.750]	9.50 [0.375]	0.74 [0.029]	0.91 [0.036]	0.81 [0.032]
1	25.40 [1.000]	12.70 [0.500]	0.86 [0.034]	1.04 [0.041]	0.99 [0.037]
1 1/4	31.75 [1.250]	15.87 [0.625]	0.94 [0.037]	1.12 [0.044]	1.01 [0.040]
1 1/2	38.10 [1.500]	19.05 [0.750]	1.04 [0.041]	1.22 [0.048]	1.14 [0.045]
2	50.80 [2.000]	25.40 [1.000]	1.12 [0.044]	1.32 [0.052]	1.22 [0.048]

Ordering Information

Color	Standard	Black (-0)
	Nonstandard	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 and are subject to a minimum purchase.	
Standard packaging	On spools. Quantity varies by size.	
Ordering description	Specify product name, size and color (for example, RT-780-1/8-0-SP).	

Part Numbering

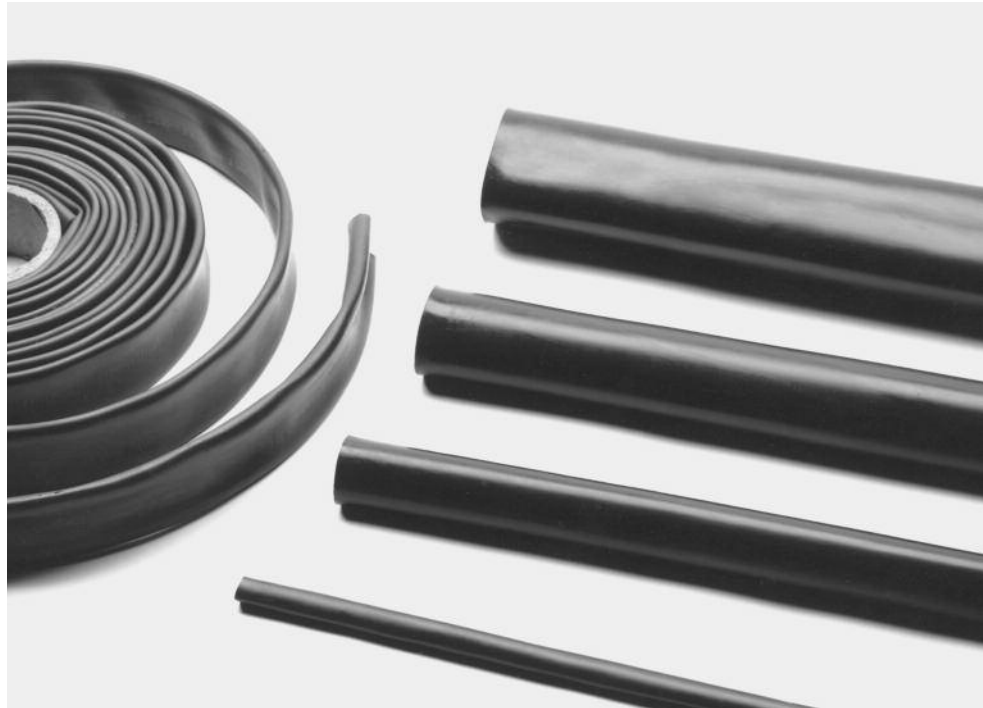
RT-780	- 1/8	-0	-3	-SP
Material	Size	Black	Orange	Package

RT-790

NBCCS Harness Tubing

Product Facts

- Hardened to withstand effect of NBC decontamination agents including DS-2 and STB
- Tested in live agent tests with HD, VX and TGD for interior and exterior exposure
- Meets the demands of flammability and fluid resistance of current military ground vehicles
- Offered with compatible adhesive, wire and other harness components for a survivable system



Applications

RT-790 heat-shrinkable tubing is made of a chemically resistant fluoroelastomer that is suited for use where moisture, fungus and vehicle fluids and fuels are a concern.

Chemical resistance has been tested in accordance with Army TOP 8-2-510 for NBC contamination survivability.

Installation

Tubing shrinks with temperatures in excess of 250°C

Product is provided with a 2:1 expansion ratio

Optimum application range is 10% above recovered ID to 85% of the expanded ID.

Operating Temperature Range

-55°C to 200°C
[-67°F to 392°F]

Available in:

Americas

Europe

Asia Pacific



RT-790 (Continued)

Product Dimensions

Size	Inside Diameter		Recovered Wall Thickness		
	Minimum Expanded as Supplied	Maximum Recovered After Heating	Minimum	Maximum	Nominal
1/8	3.17 [0.125]	1.57 [0.062]	0.25 [0.010]	0.41 [0.016]	0.30 [0.012]
3/16	4.74 [0.187]	2.36 [0.093]	0.28 [0.011]	0.46 [0.018]	0.36 [0.014]
1/4	6.35 [0.250]	3.17 [0.125]	0.33 [0.013]	0.51 [0.020]	0.41 [0.016]
3/8	9.50 [0.375]	4.74 [0.187]	0.41 [0.016]	0.58 [0.023]	0.48 [0.019]
1/2	12.70 [0.500]	6.35 [0.250]	0.41 [0.016]	0.58 [0.023]	0.48 [0.019]
5/8	15.90 [0.625]	7.95 [0.313]	0.48 [0.019]	0.66 [0.026]	0.56 [0.022]
3/4	19.05 [0.750]	9.50 [0.375]	0.61 [0.024]	0.79 [0.031]	0.69 [0.027]
1	25.40 [1.000]	12.70 [0.500]	0.71 [0.028]	0.89 [0.035]	0.79 [0.031]
1 1/4	31.75 [1.250]	15.87 [0.625]	0.76 [0.030]	0.94 [0.037]	0.84 [0.033]
1 1/2	38.10 [1.500]	19.05 [0.750]	0.86 [0.034]	1.04 [0.041]	0.94 [0.037]
2	50.80 [2.000]	25.40 [1.000]	0.94 [0.037]	1.12 [0.044]	1.02 [0.040]

Ordering Information

Color	Black (-0) only
Size selection	Always order the largest size that will shrink snugly over the component to be covered. Special order sizes are available upon request and are subject to a minimum purchase.
Standard packaging	On spools. Quantity varies by size.
Ordering description	Specify product name, size and color (for example, RT-790-1/8-0-SP).

Part Numbering
RT-790 - 1/8 -0 -SP

Material Size Color Package

RW-175

High-temperature, Chemical-Resistant, Polyvinylidene Fluoride Tubing

Product Facts

- 2:1 shrink ratio
- Tough, semirigid, very-thin-wall insulation
- High flame-resistance, meeting the requirements of AMS-DTL-23053*, Test C, with UL and CSA VW-1 rating
- High-temperature performance that meets or exceeds military and industrial standards
- Protection from most industrial solvents, fuels, and chemicals
- Recommended maximum temperature for use as a primary insulator: 135°C [275°F]
- RoHS compliant



Applications

Especially suitable for applications requiring high-temperature performance, outstanding abrasion resistance and cut-through resistance, or superior chemical and solvent properties. Provides electrical insulation and strain relief of multipin connectors and solder joints. Well-suited for applications that require dense packing of components or visual inspection of covered components.

Installation

Minimum shrink temperature: 155°C [311°F]
Minimum full recovery temperature: 175°C [347°F]

Operating Temperature Range

-55°C to 175°C
[-67°F to 347°F]

Specifications/Approvals

Series	UL 	CSA 	Military	Industry	TE
RW-175	E35586 VW-1 600 V, 150°C	LR31929 VW-1 600 V, 150°C	AMS-DTL-23053/8* Def. Stan. 59-97 Type 3 VG 95343 Pt 5 Type F BS 3G 198 Pt4	VDE 0341 Pt 9005	RW-3029/1 RW-3029/2

*Formerly MIL-I-23053 and MIL-DTL-23053/8.

Available in:

Americas

Europe

Asia Pacific



RW-175 (Continued)

Product Dimensions

Size	Inside Diameter		Recovered Wall Thickness** After Heating
	Minimum Expanded as Supplied	Maximum Recovered After Heating	
3/64	1.2 [0.046]	0.6 [0.023]	0.25 ± 0.05 [0.010 ± 0.002]
1/16	1.6 [0.063]	0.8 [0.031]	0.25 ± 0.05 [0.010 ± 0.002]
3/32	2.4 [0.093]	1.2 [0.046]	0.25 ± 0.05 [0.010 ± 0.002]
1/8	3.2 [0.125]	1.6 [0.062]	0.25 ± 0.05 [0.010 ± 0.002]
3/16	4.8 [0.187]	2.4 [0.093]	0.25 ± 0.05 [0.010 ± 0.002]
1/4	6.4 [0.250]	3.2 [0.125]	0.33 ± 0.05 [0.013 ± 0.002]
3/8	9.5 [0.375]	4.8 [0.187]	0.33 ± 0.05 [0.013 ± 0.002]
1/2	12.7 [0.500]	6.4 [0.250]	0.33 ± 0.05 [0.013 ± 0.002]
3/4	19.1 [0.750]	9.5 [0.375]	0.43 ± 0.08 [0.017 ± 0.003]
1	25.4 [1.000]	12.7 [0.500]	0.48 ± 0.08 [0.019 ± 0.003]
1 1/2	38.1 [1.500]	19.1 [0.750]	0.51 ± 0.08 [0.020 ± 0.003]

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

Ordering Information

Color	Standard	Clear (-X)
	Nonstandard	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 1.2-meter [4-foot] lengths.	
Ordering description***	Specify product name, size and color (for example, RW-175 3/64-X).	

***Europe only. For supply to MIL spec., Def Stan and BS add -MS, -DS or -BS to ordering description.

RW-200/RW-200E

Heat-Shrinkable, Chemical-Resistant, High-Temperature Tubing

Product Facts

- High resistance to impact and abrasion
- Resistance to a wide variety of fuels, lubricants, acids, and solvents at elevated temperatures
- Flexibility at low temperatures without cracking
- RoHS compliant



Applications

Raychem brand premium heat-shrinkable tubing is fabricated from modified, crosslinked fluoroelastomeric materials designed for a wide range of applications. It is available in two configurations. RW-200-E is the heavy wall version. RW-200 meets the requirements of 23053/13.

Offering fluid resistance, RW-200 tubing can be used in applications up to 200°C [392°F].

Installation

Minimum shrink temperature: 100°C [212°F]

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

Operating Temperature Range

RW-200: -40°C* to 200°C
[-40°F to 392°F]

RW-200-E: -55°C to 200°C
[-67°F to 392°F]

Specifications/Approvals

Series	Military	TE
RW-200	AMS-DTL 23053/13*	RW-3037
RW-200-E	Def. Stan. 59-97 Issue 3 Type 4A VG 95343 Part 5 Type E VDE 0341/Pt9005 BS 4G-198 Part 3 12A	RW-3037

*Formerly MIL-I-23053/13 and MIL-DTL-23053/13.

Available in:	Americas	Europe	Asia Pacific
	■	■	■

RW-200/RW-200E (Continued)

Product Dimensions

MIL Spec No.	Size	Inside Diameter		Recovered Wall Thickness**	
		Minimum Expanded as Supplied	Maximum Recovered After Heating	After Heating (Nominal)	
				RW-200-E	RW-200
-012	1/8	3.2 [0.125]	1.6 [0.062]	0.76 [0.030]	0.76 [0.030]
-001	3/16	4.8 [0.187]	2.4 [0.093]	0.84 [0.033]	0.89 [0.035]
-002	1/4	6.4 [0.250]	3.2 [0.125]	0.89 [0.035]	0.89 [0.035]
-003	3/8	9.5 [0.375]	4.8 [0.187]	1.02 [0.040]	0.89 [0.035]
-004	1/2	12.7 [0.500]	6.4 [0.250]	1.22 [0.048]	0.89 [0.035]
-005	5/8	15.9 [0.625]	7.9 [0.312]	—	1.07 [0.042]
-006	3/4	19.1 [0.750]	9.5 [0.375]	1.45 [0.057]	1.07 [0.042]
-007	7/8	22.2 [0.875]	11.1 [0.437]	—	1.25 [0.049]
-008	1	25.4 [1.000]	12.7 [0.500]	1.78 [0.070]	1.25 [0.049]
-009	1 1/4	31.8 [1.250]	15.9 [0.625]	—	1.40 [0.055]
-010	1 1/2	38.1 [1.500]	19.1 [0.750]	2.41 [0.095]	1.40 [0.055]
-011	2	50.8 [2.000]	25.4 [1.000]	2.79 [0.110]	1.65 [0.065]

**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, RW-200 1/4-0-SP).	

***Europe only. For supply to MIL, Def Stan and BS add -MS, -DS or -BS to ordering description.

SCL

Semirigid, Encapsulant-Lined, Polyolefin Tubing

Product Facts

- 3:1 shrink ratio
- Splash-resistant, moisture-resistant covering; not intended for use where immersion in fluids is required
- Rugged protection against abrasion, vibration, and flexing
- Excellent strain relief and insulation of weak points
- RoHS compliant



Applications

Encapsulates components, splices, and terminations where moisture resistance and mechanical protection are required. Encapsulant melts and flows to fill surface irregularities of the substrate. While still hot, the tubing can be blocked to form a wire breakout.

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 	Military	TE
SCL	E85381 600 V, 125°C	AMS-DTL-23053/4*, Class 1	RT-1301

*Formerly MIL-I-23053/4 and MIL-DTL-23053/4.

Available in:	Americas	Europe	Asia Pacific
	■	■	■

SCL (Continued)

Product Dimensions

Size	Additional Standard Color	Inside Diameter		Recovered Wall Thickness**	
		Minimum Expanded as Supplied	Maximum Recovered After Heating	Total Wall After Heating	Melttable Wall After Heating (Nominal)
1/8	Brown	3.2 [0.125]	0.6 [0.023]	0.96 ± 0.15 [0.038 ± 0.006]	0.51 [0.020]
3/16	Gray	4.8 [0.187]	1.5 [0.060]	1.09 ± 0.15 [0.043 ± 0.006]	0.64 [0.025]
1/4	White	6.4 [0.250]	2.0 [0.080]	1.19 ± 0.15 [0.047 ± 0.006]	0.69 [0.027]
3/8	Red	9.5 [0.375]	3.4 [0.135]	1.27 ± 0.18 [0.050 ± 0.007]	0.76 [0.030]
1/2	Blue	12.7 [0.500]	5.0 [0.195]	1.39 ± 0.18 [0.055 ± 0.007]	0.89 [0.035]
3/4	Yellow	19.1 [0.750]	8.0 [0.313]	1.65 ± 0.18 [0.065 ± 0.007]	1.02 [0.040]
1	N/A	25.4 [1.000]	10.2 [0.400]	1.90 ± 0.18 [0.075 ± 0.007]	1.02 [0.040]

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

3

Heat-shrinkable Tubing

Ordering Information

Color	Standard	Black (-0) for all sizes, plus one additional color per size per Product Dimensions table.
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.	
Ordering description***	Specify product name, size and color (for example, SCL 1/4-0).	

***Europe only. For supply to MIL spec., Def Stan and BS add -MS, -DS or -BS to ordering description.

SCT

Flame-Retardant, Adhesive-Lined, Semirigid Polyolefin Tubing (Extended Temperature Range)

Product Facts

- 4:1 shrink ratio allows a few sizes to cover a wide range of splice and component diameters
- Flame-retardant and mechanically tough, the tubing provides strain relief and abrasion protection of wire splices, terminals, and other components
- Thick adhesive liner forms an effective barrier against fluids and moisture and performs well at an extended temperature range
- RoHS compliant



Applications

Specially designed to insulate and seal automotive wire splices and components in an under-the-hood automotive environment. Specially formulated to function at an extended temperature range.

Installation

Minimum shrink temperature: 110°C [230°F]
Minimum full recovery temperature: 135°C [266°F]

Operating Temperature Range

-40°C to 150°C
[-40°F to 302°F]

Specifications/Approvals

Series	TE
SCT	SCT SCD

Available in:	Americas	Europe	Asia Pacific
	■	■	■

SCT (Continued)

Product Dimensions

Part Number	Inside Diameter		Recovered Wall Thickness*	
	Minimum Expanded as Supplied	Maximum Recovered After Heating	Total Wall After Heating	Melttable Wall After Heating (Nominal)
SCT No. 1	7.6 [0.300]	1.7 [0.065]	1.52 ± 0.30 [0.060 ± 0.012]	0.76 [0.030]
SCT No. 2	9.0 [0.355]	2.3 [0.090]	1.52 ± 0.30 [0.060 ± 0.012]	0.76 [0.030]
SCT No. 3	11.6 [0.455]	2.5 [0.100]	2.29 ± 0.30 [0.090 ± 0.012]	1.40 [0.055]
SCT No. 4	17.8 [0.700]	4.4 [0.175]	2.54 ± 0.30 [0.100 ± 0.012]	1.52 [0.060]

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

Ordering Information

Color	Black
Size selection	Always order the largest size that will shrink snugly over the component being covered. Special order sizes are available upon request.
Standard packaging	Cut pieces.
Marking	Tubing will be printed with its numbered size (such as SCT-1, SCT-2, SCT-3, SCT-4).
Ordering description	Specify product name, numbered size, color and cut length (for example, SCT-NO.3-0-75MM).

SFR

**Very Flexible,
Flame-Retardant,
Silicone Elastomer
Tubing**

Product Facts

- Outstanding low-temperature flexibility
- Resistance to hydraulic fluids, fuel, and lubricating oil
- Very good ablative characteristics: when exposed to flame, surface turns to insulative char or "ablates"
- RoHS compliant



Applications

Provides cable jacketing, harness protection, and strain relief for electronic components, semi-conductor leads, and wire splices. Suitable for applications that require flexibility over a wide range of operating temperatures.

Installation

Minimum shrink temperature: 135°C [285°F]
Minimum full recovery temperature: 175°C [347°F]

Operating Temperature Range

-75°C to 180°C
[-103°F to 356°F]

Specifications/Approvals

Series	Military	TE
SFR	AMS-DTL-23053/10*	RT-1140

*Formerly MIL-I-23053/10 and MIL-DTL-23053/10.

Available in:	Americas	Europe	Asia Pacific
	■	■	■

SFR (Continued)

Product Dimensions

Size	Inside Diameter		Recovered Wall Thickness** After Heating
	Minimum Expanded as Supplied	Maximum Recovered After Heating	
1/4	6.4 [0.250]	3.6 [0.143]	0.88 ± 0.25 [0.035 ± 0.010]
3/8	9.5 [0.375]	5.4 [0.214]	1.02 ± 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]	2.21 ± 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]

**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, SFR 1/4-0-SP).	

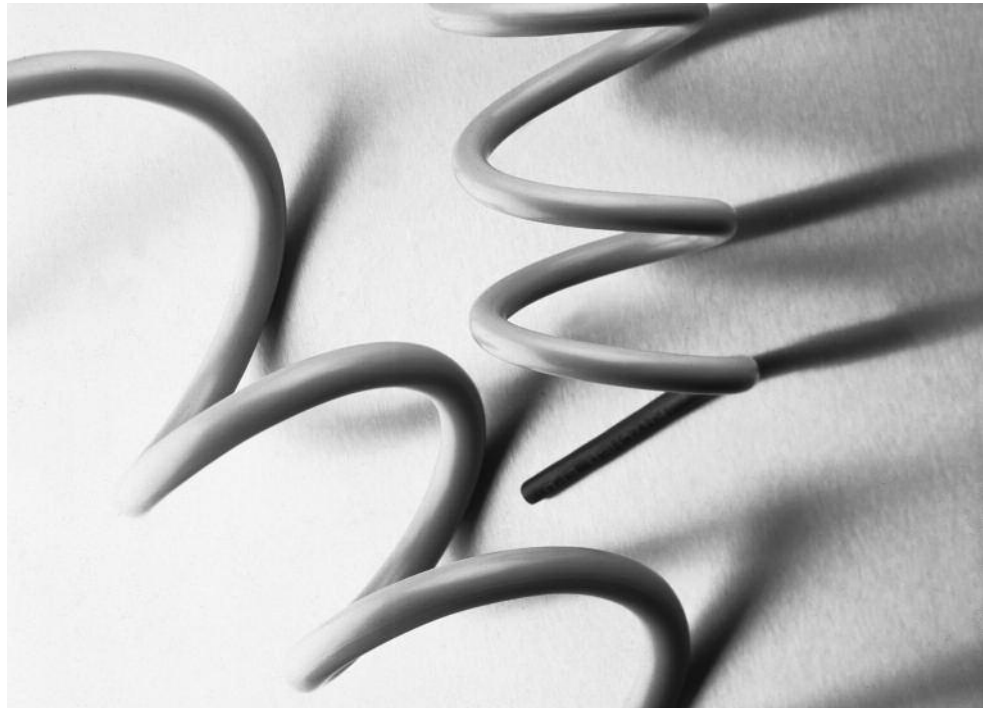
***Europe only. For supply to MIL spec., Def Stan and BS add -MS, -DS or -BS to ordering description.

SRFR

Highly Flexible, Silicone Rubber Tubing

Product Facts

- Highly flame-retardant
- Extremely flexible at high and low temperatures
- Shrink ratio 1.5:1 minimum except sizes 4/2.9 and 29/20
- RoHS compliant



Applications

Highly flexible and resistant to high and low temperatures. Unlike other silicone materials, SRFR displays outstanding physical strength. It resists extreme heat shocks, and exhibits good thermal insulation. SRFR is non-burning and has outstanding ablative properties as well as excellent physical and

electrical properties. SRFR is used in medical equipment where its key properties are outstanding flexibility and ability to withstand exposure to sterilization conditions. Other applications include thyristor power cable insulation, heating element and bus bar insulation, fiber optic bundle sheathing, and rocketry support cable protection.

Installation

Minimum shrink temperature: 135°C [275°F]

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

Operating Temperature Range

-75°C to 200°C
[-103°F to 392°F]

Specifications/Approvals

Series	UL 	TE
SRFR	E85381 VW-1 600V, 200°C	RW-2057

Available in:	Americas	Europe	Asia Pacific
	■	■	■

SRFR (Continued)
Product Dimensions

Size	Inside Diameter		Recovered Wall Thickness* After Heating
	Minimum Expanded as Supplied	Maximum Recovered After Heating	
2.9/1.7	2.9 [0.114]	1.7 [0.067]	1.0 ± 0.50 [0.039 ± 0.020]
4/2.9	4.0 [0.158]	2.9 [0.114]	1.0 ± 0.50 [0.039 ± 0.020]
7.8/4.6	7.8 [0.307]	4.6 [0.181]	1.0 ± 0.50 [0.039 ± 0.020]
10/6.5	10.0 [0.394]	6.5 [0.256]	1.5 ± 0.50 [0.059 ± 0.020]
15/9.6	15.0 [0.591]	9.6 [0.378]	1.5 ± 0.50 [0.059 ± 0.020]
21/13	21.0 [0.827]	13.0 [0.512]	2.0 ± 0.75 [0.079 ± 0.030]
29/20	29.0 [1.142]	20.0 [0.787]	2.0 ± 0.75 [0.079 ± 0.030]
41/27	41.0 [1.614]	27.0 [1.063]	3.0 ± 1.00 [0.118 ± 0.039]
51/33	51.0 [2.008]	33.0 [1.299]	3.0 ± 1.00 [0.118 ± 0.039]

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

3

Heat-shrinkable Tubing

Ordering Information

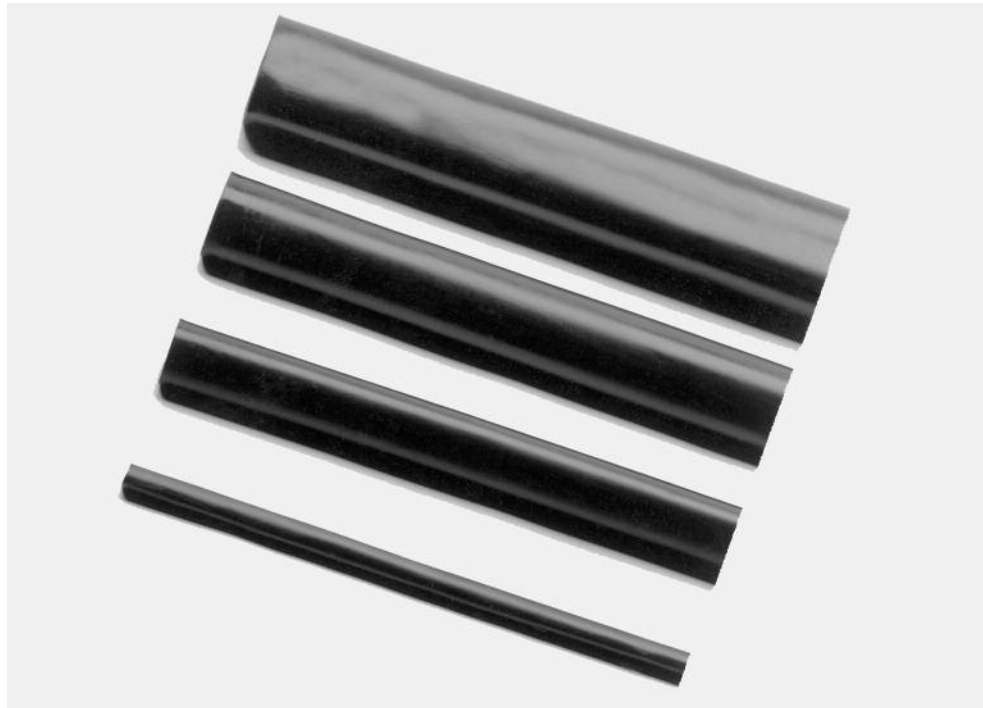
Color	Standard	Gray (-8)
Size selection	Always order the largest size that will shrink snugly over the component to be covered.	
Standard packaging	On spools.	
Ordering description	Specify product name, size and color (for example, SRFR 2.9/1.7-8-SP).	

SST/SST-FR

Self-Sealing, Heat-Shrinkable Tubing

Product Facts

- Thick adhesive liner forms an effective barrier against fluids and moisture
- Thick-wall insulation, strain relief and abrasion protection
- No need for greases, tape, or epoxy
- Expansion ratios as high as 3:1
- Available in flame-retardant material
- SST has the following agency approvals:
 - ABS (American Bureau of Shipping)
 - Lloyd's (Lloyd's Register of Shipping)
- RoHS compliant



Applications

SST provides a simple, positive splice-sealing method that offers protection under adverse environmental conditions. Tubing supplied with standard sealant provides water sealing and environmental protection in wet or underground applications. The thermoplastic adhesive not only seals, but also provides mechanical strain

relief. The polymer tubing has excellent insulating, abrasion-resistance, and strain-relief properties.

Installation

Minimum shrink temperature: 90°C [195°F]

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

Operating Temperature Range

-55°C to 110°C
[-67°F to 230°F]

Specifications/Approvals

Series	Military	Industry	Agency	TE
SST	—	—	—	RW-2011
SST-FR	AMS-DTL-23053/15*, Classes 1 and 2	ASTM D 685, nonburning	ABS, Lloyd's	RW-2011

*Formerly MIL-I-23053/15 and MIL-DTL-23053/15.

Available in:	Americas	Europe	Asia Pacific
	■	■	■

SST/SST-FR (Continued)

Product Dimensions

Size†	Standard Nominal Length	Inside Diameter		Wall Thickness		Recommended Cable Range for 600-Volt Cable
		Minimum Expanded as Supplied	Maximum Recovered After Heating	Expanded	Nominal Wall After Heating††	
SST*-03	30**, 48	0.300	0.100	0.025	0.070	18 through 14 AWG
SST*-04	30**, 48	0.400	0.150	0.025	0.070	14 through 10 AWG
SST*-07	48	0.750	0.220	0.030	0.095	8 through 1 AWG
SST*-11	48	1.100	0.375	0.040	0.120	2 through 4/0 AWG
SST*-13	48	1.300	0.375	0.035	0.120	2 through 4/0 AWG
SST*-15	48	1.500	0.500	0.050	0.140	2/0 AWG through 500 MCM
SST*-17	48	1.700	0.500	0.045	0.140	2/0 AWG through 500 MCM
SST*-20	48	2.000	0.750	0.050	0.160	350 MCM through 1000 MCM
SST*-27	48	2.700	0.900	0.050	0.160	500 MCM through 1250 MCM
SST*-30	48	3.000	1.250	0.050	0.160	900 MCM through 1500 MCM
SST*-40	48	4.000	1.750	0.050	0.160	1500 MCM through 2500 MCM
SST*-45	48	4.500	1.750	0.050	0.160	1500 MCM through 2500 MCM

†In place of asterisk* substitute length of tubing to be ordered. For example, SST*-11, as the second column indicates, comes in 48-inch lengths, so a 48-inch cut piece of SST tubing would be SST 48-11.

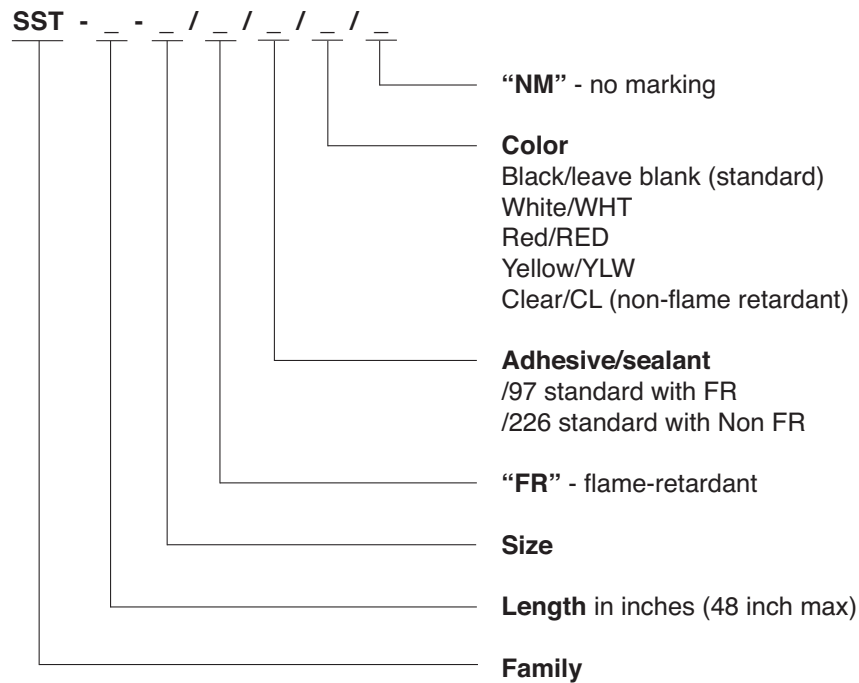
††Wall thickness will be less if tubing recovery is restricted during shrinkage.

**30-inch length standard for /226 coating only.

Ordering Information

Color	Standard	Black
	Nonstandard	White, Red, Yellow and Clear (Clear is non-flame-retardant)
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	See Product Dimensions table.	
Ordering description	Specify product name, cut length, size and color (for example, SST 48-07/FR/97).	

Part Numbering System



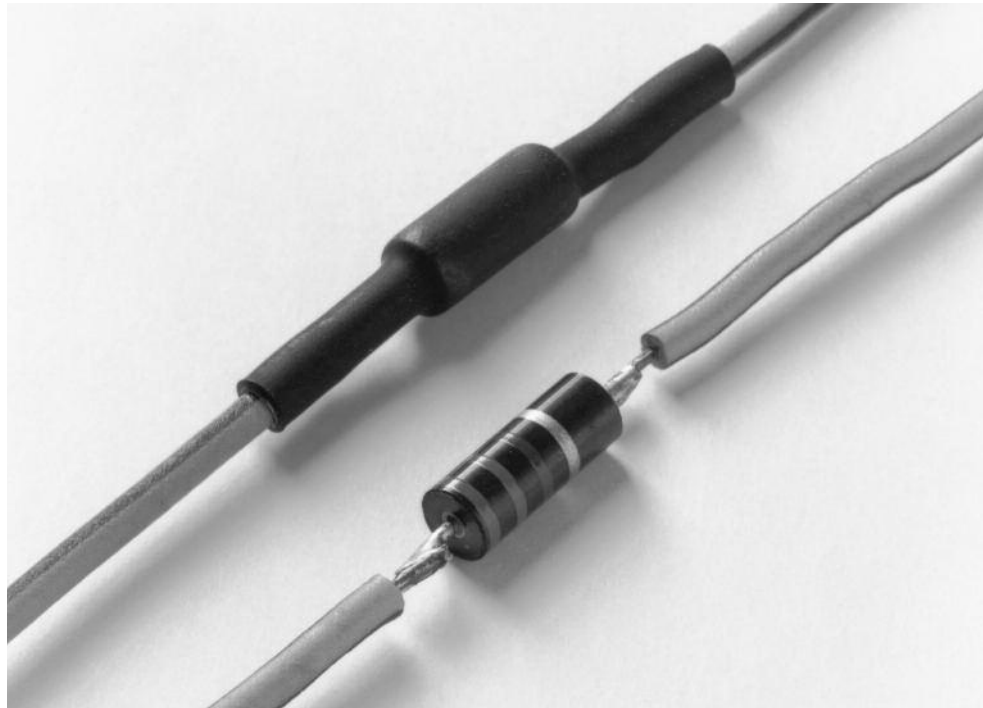
Example: SST-48-07/FR/97/NM

TAT-125

Adhesive-Lined, Flexible, Polyolefin Tubing

Product Facts

- 2:1 shrink ratio
- Thin adhesive lining that bonds to outer tubing and surface below, forming a positive environmental seal
- Flexibility of both tubing and adhesive
- Moisture seal that is resistant to bending of the substrate
- Good mechanical strength and cut-through resistance
- Adhesive that bonds to a wide variety of plastics, rubbers, and metals, including polyethylene, neoprene, lead, and steel
- RoHS compliant



Applications

Seals and protects simple in-line splices, bimetallic joints, and components from fluids, moisture, and corrosion. Repairs damaged wire insulation, especially where flexibility is required. Provides one-step electrical insulation and moisture sealing.

Installation

Minimum shrink temperature: 95°C [203°F]
Minimum full recovery temperature: 121°C [250°F]

Operating Temperature Range

-55°C to 110°C
[-67°F to 230°F]

Specifications/Approvals

Series	UL* 	Military	TE
TAT-125 Type 1 (colors)	E85381 600 V, 125°C	AMS-DTL-23053/4*, Class 2	RW-3032
TAT-125 Type 2 (clear)	—	—	RW-3032

*Formerly MIL-I-23053/4 and MIL-DTL-23053/4. Sizes 1/4" through 1 1/2" only.

Available in:	Americas	Europe	Asia Pacific
	■		■

TAT-125 (Continued)

Product Dimensions

Size	Inside Diameter		Recovered Wall Thickness**	
	Minimum Expanded as Supplied	Maximum Recovered After Heating	Total Wall After Heating (Nominal)	Adhesive Wall After Heating (Nominal)
1/8	3.2 [0.125]	1.6 [0.062]	0.69 [0.027]	0.23 [0.009]
3/16	4.8 [0.187]	2.4 [0.093]	0.71 [0.028]	0.25 [0.010]
1/4	6.4 [0.250]	3.2 [0.125]	0.74 [0.029]	0.13 [0.005]
3/8	9.5 [0.375]	4.8 [0.187]	0.74 [0.029]	0.13 [0.005]
1/2	12.7 [0.500]	6.4 [0.250]	0.76 [0.030]	0.15 [0.006]
3/4	19.1 [0.750]	9.5 [0.375]	0.89 [0.035]	0.15 [0.006]
1	25.4 [1.000]	12.7 [0.500]	1.07 [0.042]	0.20 [0.008]
1 1/2	38.1 [1.500]	19.1 [0.750]	1.19 [0.047]	0.28 [0.011]

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

3

Heat-shrinkable Tubing

Ordering Information

Color	Standard	Black (-0)
	Nonstandard	White (-9), red (-2), blue (-6), yellow (-4), green (-5), brown (-1), orange (-3), violet (-7), gray (-8), clear (-X, not flame-retardant)
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.	
Ordering description	Specify product name, size and color (for example, TAT-125 1/4-0).	

TC Caps

Semirigid, Flame-Retardant Polyolefin Caps

Product Facts

- 2.5:1 shrink ratio
- Flame-retardant
- Permanent or temporary method to terminate wires
- Rapid, simple installation
- Rugged protection against abrasion, vibration, and flexing
- RoHS compliant



Applications

Widely used for wire terminations because of their light weight, small size and durability. Vibration-proof caps are used to insulate and terminate dead-end electrical cables, fixtures, connectors, and other electrical equipment. Also used to protect the ends of wire during storage.

Installation

Minimum shrink temperature: 110°C [230°F]
Minimum full recovery temperature: 135°C [275°F]

Operating Temperature Range

-55°C to 135°C
[-67°F to 275°F]

Specifications/Approvals

Series	UL 	TE
TC Caps	E85381 600 V, 125°C	TC Caps SCD

Available in:	Americas	Europe	Asia Pacific
	■	■	■

TC Caps (Continued)

Product Dimensions

Size	Color	Length		Inside Diameter		Recovered Wall Thickness** After Heating
		Nominal Overall as Supplied	Minimum Open Barrel after Recovery*	Minimum Expanded as Supplied	Maximum Recovered After Heating	
TC 4001	White (-9)	19.1 (0.750)	10.2 (0.400)	1.6 (0.063)	0.8 (0.030)	0.51 ± 0.12 (0.020 ± 0.005)
TC 4003	Red (-2)	25.4 (1.000)	14.0 (0.550)	3.2 (0.125)	1.3 (0.050)	0.64 ± 0.12 (0.025 ± 0.005)
TC 4005	Gray (-8)	28.6 (1.125)	14.0 (0.550)	6.4 (0.250)	2.5 (0.100)	0.69 ± 0.12 (0.027 ± 0.005)

*See glossary for definition of "barrel".

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

Ordering Information

Color	Standard	One color per size per the Product Dimensions table.
Size selection	Always order the largest size that will shrink snugly over the component to be covered.	
Standard packaging	In pieces.	
Ordering description	Specify product name, size and color (for example, TC-CAPS-4003-2).	

TFE and TFE-R

**High-Temperature,
Chemically Inert, Modified
Tubing made with PTFE®
Fluoropolymer**

Product Facts

- Shrink ratio: 1.8:1 (TFE)
3.2:1 (TFE-R)
- High flame-resistance
- Excellent chemical resistance
- RoHS compliant



Applications

Designed to provide insulation and mechanical protection in severe chemical and thermal environments. Used to cover hydraulic hose and couplings to prevent contamination and corrosion. The high mechanical strength and extremely low coefficient of friction make it good for reducing damage to bearing shafts and similar applications.

Installation

Minimum shrink temperature: 330°C [625°F]
Minimum full recovery temperature: 340°C [644°F]

Operating Temperature Range

-67°C to 250°C
[-88.6°F to 482°F]

Specifications/Approvals

Series	Military	TE
TFE, TFE-R	AMS-DTL-23053/12*, Classes 3 and 5 Def. Stan. 59-97 Type 5A (TFE) Def. Stan. 59-97 Type 5B (TFE-R)	RW-2055 (TFE) RW-2054 (TFE-R)

*Formerly MIL-I-23053/12 and MIL-DTL-23053/12.

PTFE is a trademark of E. I. du Pont de Nemours and Company.

Available in:	Americas	Europe	Asia Pacific
		■	■

TFE and TFE-R (Continued)

Product Dimensions

TFE

Size	Inside Diameter		Wall Thickness**
	Minimum Expanded as Supplied	Maximum Recovered After Heating	Nominal Recovered After Heating
30	0.8 [0.032]	0.38 [0.015]	0.23 [0.009]
28	0.9 [0.035]	0.46 [0.018]	0.23 [0.009]
26	1.1 [0.043]	0.56 [0.022]	0.25 [0.010]
24	1.2 [0.047]	0.68 [0.027]	0.25 [0.010]
22	1.4 [0.055]	0.81 [0.032]	0.30 [0.012]
20	1.5 [0.059]	0.99 [0.039]	0.30 [0.012]
18	1.9 [0.075]	1.24 [0.049]	0.30 [0.012]
16	2.3 [0.091]	1.55 [0.061]	0.30 [0.012]
14	3.0 [0.118]	1.83 [0.072]	0.30 [0.012]
12	3.8 [0.150]	2.26 [0.089]	0.30 [0.012]
10	4.8 [0.189]	2.84 [0.112]	0.30 [0.012]
8	6.1 [0.240]	3.58 [0.141]	0.38 [0.015]
6	7.6 [0.299]	4.52 [0.178]	0.38 [0.015]
4	9.4 [0.370]	5.69 [0.224]	0.38 [0.015]
2	10.9 [0.429]	7.06 [0.278]	0.38 [0.015]
0	11.9 [0.469]	8.81 [0.347]	0.38 [0.015]

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

TFE-R

Size	Inside Diameter		Wall Thickness**
	Minimum Expanded as Supplied	Maximum Recovered After Heating	Nominal Recovered After Heating
5/64	2.0 [0.079]	0.6 [0.024]	0.23 [0.009]
1/8	3.2 [0.126]	1.0 [0.039]	0.25 [0.010]
1/4	6.4 [0.252]	1.6 [0.063]	0.30 [0.012]
3/8	9.5 [0.374]	2.4 [0.095]	0.30 [0.012]
1/2	12.7 [0.500]	3.7 [0.146]	0.38 [0.015]
5/8	15.9 [0.626]	4.5 [0.177]	0.38 [0.015]
3/4	19.0 [0.748]	5.7 [0.224]	0.38 [0.015]
1	25.4 [1.000]	7.1 [0.230]	0.38 [0.015]
1-1/4	32.0 [1.260]	8.8 [0.347]	0.38 [0.015]

**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. Special order sizes are available upon request.	
Standard packaging	In 1.2-meter [4-foot] lengths.	
Ordering description***	Specify product name, size and color (for example, TFE 22-X).	

***Europe only. For supply to MIL spec., Def Stan and BS add -MS, -DS or -BS to ordering description.

Tubing Kits and Mini-Spools

Smaller Packaging Options for Single Wall and Adhesive-Lined Tubing Products

Product Facts

- VERSAFIT and RNF-100 tubing: 2:1 shrink ratio
- DWP-125: 3:1 shrink ratio
- ES1000: 4:1 shrink ratio
- VERSAFIT tubing's low full recovery temperature reduces installation time and the risk of damage to temperature-sensitive components
- RNF-100 offers excellent physical, chemical, and electrical properties that meet or exceed commercial, industrial and military standards for highly reliable, general purpose tubing
- DWP-125 and ES1000 have high-shrink-ratios to allow for insulation and sealing of irregular shapes; few sizes cover a wide range of diameters
- RoHS compliant



Applications

Single wall VERSAFIT and RNF-100 tubing provide electrical insulation and strain relief of in-line components, electrical connections, wire terminations, and splices. They can be used to bundle wires for flexible light duty harnesses. Also to identify or color code wires, cables, terminals and electronic components.

Adhesive-lined DWP-125 and ES1000 environmentally seal and protect a

wide variety of electrical applications, including wire splices, terminations, break-outs and connector-to-cable transitions.

Installation

Minimum full recovery temperature:

VERSAFIT: 90°C [194°F]

RNF-100: 121°C [250°F]

DWP-125: 125°C [257°F]

ES1000: 135°C [275°F]

Operating Temperature Range

VERSAFIT and RNF-100:
-55°C to 135°C
[-67°F to 275°F]

DWP-125:
-40°C to 110°C
[-40°F to 230°F]

ES1000:
-40°C to 130°C
[-40°F to 266°F]

Specifications/Approvals

Series	UL 	CSA 	Military	TE
VERSAFIT	E35586 VW-1 600 V, 125°C	LR31929 VW-1 600 V, 125°C	AMS-DTL-23053/5*, Classes 1 & 3	RW-3009
RNF-100	E35586 600 V, 125°C	LR31929 600 V, 125°C	AMS-DTL-23053/5*, Class 1	RT-350
DWP-125	E35586 600 V, 125°C	—	—	DWP-125 SCD
ES1000	E85381 600 V, 125°C	—	—	RT-1113

*Formerly MIL-I-23053/5 and MIL-DTL-23053/5.

Available in:	Americas	Europe	Asia Pacific
	■		■

Tubing Kits and Mini-Spools (Continued)

Single Wall Tubing

KIT 1 – 2 to 1 Shrink Ratio • Black • 600V, 125°C, UL/CSA VW-1 (KIT 1 PN: A55251-000)

Expanded I.D.	Quantity (6 Inch Pieces)	Fits Wire Gauge Size	Refill Part Number
VERSAFIT-3/16"	30	18 – 14 AWG	D76139-000
VERSAFIT-1/4"	28	12 – 10 AWG	F37063-000
VERSAFIT-3/8"	24	8 AWG	D27573-000
VERSAFIT-1/2"	20	6 – 3 AWG	C02462-000
VERSAFIT-3/4"	14	2 – 1/0 AWG	A92664-000
VERSAFIT-1"	10	2/0 – 4/0 AWG	C21270-000

KIT 2 – 2 to 1 Shrink Ratio • 7 Colors • 600V, 125°C, UL/CSA VW-1 (except clear) (KIT 2 PN: D54859-000)**

Expanded I.D.	Quantity (6 Inch Pieces)	Fits Wire Gauge Size	Refill Part Number
VERSAFIT-3/32"	35	18 AWG	E31091-000
VERSAFIT-1/8"	28	16 AWG	349256-000
VERSAFIT-3/16"	21	14 AWG	C53800-000
VERSAFIT-1/4"	21	12 – 10 AWG	C87605-000
VERSAFIT-3/8"	14	8 AWG	A82691-000
VERSAFIT-1/2"	14	6 – 3 AWG	E10896-000

Adhesive-Lined Tubing

KIT 3 – Black/White/Red/Clear • 600V, 125°C, UL (KIT 3 PN: E42160-000)

Expanded I.D.	Quantity (6 Inch Pieces)	Fits Wire Gauge Size	Refill Part Number
DWP-125-1/8"	25	20 – 16 AWG (3 to 1 Shrink Ratio)	D14889-000
DWP-125-3/16"	25	14 – 10 AWG (3 to 1 Shrink Ratio)	E87367-000
DWP-125-1/4"	24	12 – 10 AWG (3 to 1 Shrink Ratio)	F91864-000
DWP-125-1/2"	10	6 – 3 AWG (3 to 1 Shrink Ratio)	F41454-000
DWP-125-3/4"	5	2 – 1/0 AWG (3 to 1 Shrink Ratio)	C67617-000
DWP-125-1"	3	2/0 – 4/0 AWG (3 to 1 Shrink Ratio)	F66623-000
ES1000-NO.1	6	16 – 12 AWG (4 to 1 Shrink Ratio)	
ES1000-NO.2	5	12 – 10 AWG (4 to 1 Shrink Ratio)	
ES1000-NO.3	5	10 – 8 AWG (4 to 1 Shrink Ratio)	
ES1000-NO.4	3	6 – 3 AWG (4 to 1 Shrink Ratio)	

KITS 1, 2 and 3 are comprised of a durable six section plastic box with hinged lid. Inside the lid are product selection guidelines. Ask your Sales Representative about KIT 4 and KIT 6, our Economy Tubing Kits in a reclosable plastic bag, also used on "point of sale" racks. Here are Part Numbers for those Kits and their content:

KIT 4: E32151-000 (Three pieces each of 3/16", 1/4", 3/8", 1/2", 3/4" and 1" Black tubing in 6 inch pieces)

KIT 6: C72402-000 (Three pieces each of 3/64", 1/16", 3/32" and 1/8" Black tubing in 6 inch pieces)

VERSAFIT MINI-SPOOLS

2 to 1 Shrink Ratio • Black • 600V, 125°C, UL/CSA VW-1

Expanded I.D.	Quantity (Feet)	Part Number
VERSAFIT-3/64"	100	C16404-000
VERSAFIT-1/16"	75	E40870-000
VERSAFIT-3/32"	65	D70981-000
VERSAFIT-1/8"	60	C17600-000
VERSAFIT-3/16"	50	F27135-000
VERSAFIT-1/4"	40	F64479-000
VERSAFIT-3/8"	35	D57591-000
VERSAFIT-1/2"	30	E37316-000
VERSAFIT-3/4"	25	449582-000
VERSAFIT-1"	15	F27156-000

VERSAFIT is a very flexible, highly flame-retardant polyolefin tubing, 90°C full recovery temperature, good fluid resistance with a UL 224/CSA VW-1 flammability rating.

RNF-100 MINI-SPOOLS

2 to 1 Shrink Ratio • Black • 600V, 125°C, UL/CSA

Expanded I.D.	Quantity (Feet)	Part Number
RNF-100-3/64"	100	D00409-000
RNF-100-1/16"	75	A66551-000
RNF-100-3/32"	65	D42391-000
RNF-100-1/8"	60	F56629-000
RNF-100-3/16"	50	E77288-000
RNF-100-1/4"	40	F75818-000
RNF-100-3/8"	35	D12330-000
RNF-100-1/2"	30	A81736-000
RNF-100-3/4"	25	E40866-000
RNF-100-1"	15	E62131-000

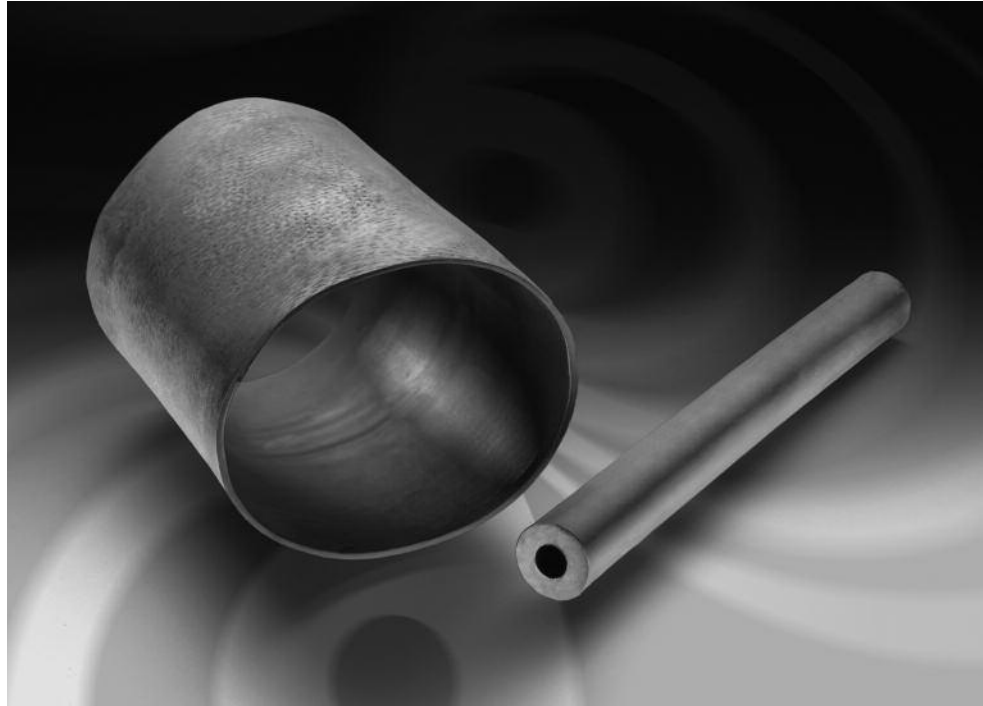
RNF-100 is a flexible, flame-retardant polyolefin tubing, 121°C full recovery temperature, excellent fluid resistance with a UL 224/CSA All Tubing flammability rating.

URHT

Ultra-High-Ratio, Flame-Retardant, Polyolefin Heat-Shrinkable Tubing

Product Facts

- Shrink ratios as high as 8:1
- Specially formulated for thick wall insulation, strain relief and abrasion protection
- Flame retardant passing ASTM D 635
- Excellent performance in both hot and cold environments
- Optional factory applied adhesive provides watertight environmental sealing in wet and corrosive locations
- RoHS compliant



Applications

Ultra-high-shrink-ratio, heat-shrinkable tubing, with expansion ratios as high as 8-to-1, is designed to conform to odd shapes and shrink over large transitions, allowing for the repair and sealing of cable connectors and equipment. Cable harnesses can be repaired and released without disassembly. This product can be used to seal the back end of a connector or

simply repair a damaged outer insulation of a cable or wire.

URHT tubing is available with or without a hot melt adhesive lining.

Installation

Minimum shrink temperature: 135°C [275°F]

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

Operating Temperature Range

-55°C to 135°C
[-67°F to 275°F]

Specifications/Approvals

Series	Military	TE
URHT	SAE-AS81765/1, Type II*	URHT SCD

*heat-shrinkable, crosslinked, flexible polyolefin

Available in:	Americas	Europe	Asia Pacific
	■	■	■

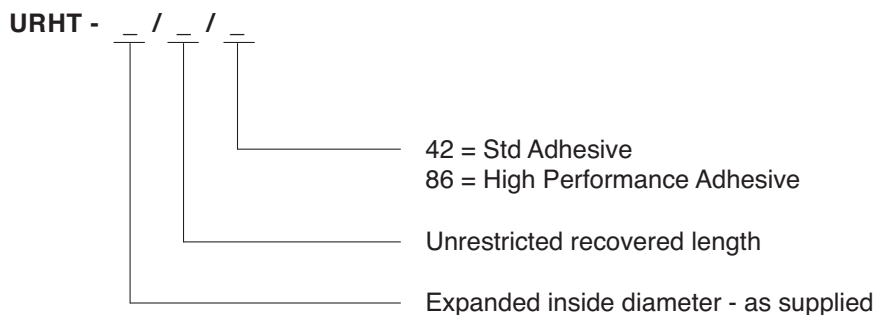
URHT (Continued)

Product Dimensions

Size	Inside Diameter		Wall Thickness	Unrestricted Full Recovered Length ± 6.35 (.250)
	Minimum Expanded as Supplied	Maximum Recovered After Heating	Nominal Recovered After Heating	
URHT-200	50.80 (2.000)	5.84 (0.230)	3.56 (0.140)	7.62, 101.60, 152.40, 254.00 (3, 4, 6, 10)
URHT-300	76.20 (3.000)	8.64 (0.340)	3.56 (0.140)	7.62, 101.60, 152.40, 254.00 (3, 4, 6, 10)

Ordering Information

Color	Standard	Black (-0)
Size selection	Always order the largest size that will shrink snugly over the component to be covered.	
Standard packaging	In pieces.	
Ordering description	Specify product name, size, cut length and color (for example, URHT-200-10-0).	

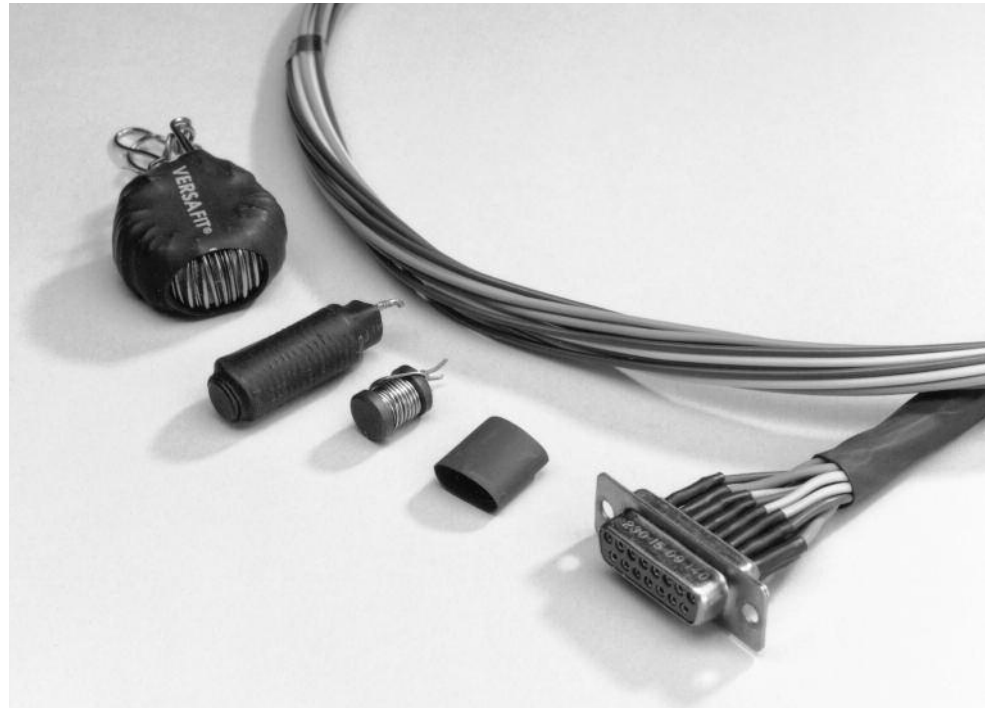
Part Numbering System


Versafit

**Highly Flame-Retardant,
Very Flexible, Low-Shrink-
Temperature, Polyolefin
Tubing**

Product Facts

- 2:1 shrink ratio
- Low shrink temperature reduces installation time and the risk of damage to temperature-sensitive components
- Very flexible; doesn't easily wrinkle when bent
- Highly flame-retardant
- Hot stamps extremely well
- Higher temperature rating, better thermal stability, and higher resistance to physical abuse than noncrosslinked materials
- Free of polybrominated biphenyls (PBBs) and polybrominated biphenyl oxides and ethers (PBBOs and PBBEs), which are classified as environmentally hazardous substances
- RoHS compliant



Applications

Cost-effective choice for many commercial and military applications; electrically insulates and protects in-line components, disconnect terminals, and splices. Bundles wires for very flexible light-duty harnesses. Strain-relieves electrical wire connections for commercial applications. Identifies or color-codes wires, cables, terminals, and components.

Installation

Minimum shrink temperature: 70°C [158°F]
Minimum full recovery temperature: 90°C [194°F]

Operating Temperature Range

-55°C to 135°C
[-67°F to 275°F]

Specifications/Approvals

Series	UL 	CSA 	Military	TE
Versafit	E35586 VW-1 600 V, 125°C	LR31929 VW-1 600 V, 125°C	AMS-DTL-23053/5* Classes 1 & 3	RW-3009

*Formerly MIL-I-23053/5 and MIL-DTL-23053/5.

Available in:	Americas	Europe	Asia Pacific
	■	■	■

Versafit (Continued)

Product Dimensions

Size	Inside Diameter		Recovered Wall Thickness**
	Expanded as Supplied	Maximum Recovered After Heating	
3/64	1.63 ± 0.2 [0.064 ± 0.008]	0.6 [0.023]	0.40 ± 0.08 [0.016 ± 0.003]
1/16	1.85 ± 0.2 [0.073 ± 0.008]	0.8 [0.031]	0.43 ± 0.08 [0.017 ± 0.003]
3/32	2.79 ± 0.2 [0.110 ± 0.008]	1.2 [0.046]	0.51 ± 0.08 [0.020 ± 0.003]
1/8	3.43 ± 0.2 [0.135 ± 0.008]	1.6 [0.062]	0.51 ± 0.08 [0.020 ± 0.003]
3/16	5.21 ± 0.3 [0.205 ± 0.010]	2.4 [0.093]	0.51 ± 0.08 [0.020 ± 0.003]
1/4	7.11 ± 0.3 [0.280 ± 0.010]	3.2 [0.125]	0.64 ± 0.08 [0.025 ± 0.003]
3/8	10.16 ± 0.4 [0.400 ± 0.015]	4.8 [0.187]	0.64 ± 0.08 [0.025 ± 0.003]
1/2	13.72 ± 0.4 [0.540 ± 0.015]	6.4 [0.250]	0.64 ± 0.08 [0.025 ± 0.003]
5/8***	16.90 ± 0.4 [0.665 ± 0.015]	8.0 [0.315]	0.76 ± 0.08 [0.030 ± 0.003]
3/4	20.45 ± 0.4 [0.805 ± 0.015]	9.5 [0.375]	0.76 ± 0.08 [0.030 ± 0.003]
1	25.53 ± 0.4 [1.055 ± 0.015]	12.7 [0.500]	0.89 ± 0.12 [0.035 ± 0.005]
1 1/4***	33.40 ± 0.7 [1.315 ± 0.025]	15.9 [0.625]	1.02 ± 0.15 [0.040 ± 0.006]
1 1/2	39.88 ± 0.8 [1.570 ± 0.030]	19.1 [0.750]	1.02 ± 0.15 [0.040 ± 0.006]
2	52.83 ± 1.0 [2.080 ± 0.040]	25.4 [1.000]	1.14 ± 0.16 [0.045 ± 0.007]
3	78.49 ± 1.0 [3.090 ± 0.040]	38.1 [1.500]	1.27 ± 0.20 [0.050 ± 0.008]
4	104.14 ± 1.3 [4.100 ± 0.050]	50.8 [2.000]	1.40 ± 0.23 [0.055 ± 0.009]

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

***Nonstandard size; available by special order only.

Ordering Information

Color	Standard	Black (-0), white (-9), red (-2), blue (-6), yellow (-4), green (-5), sizes 3/64 through 1-inch only)
	Nonstandard	Brown (-1), orange (-3), violet (-7), gray (-8)
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, Versafit 1/4-0).	

****Available in the convenient Mini-Spool packaging/dispensing system, for sizes 3/64" up to 1".

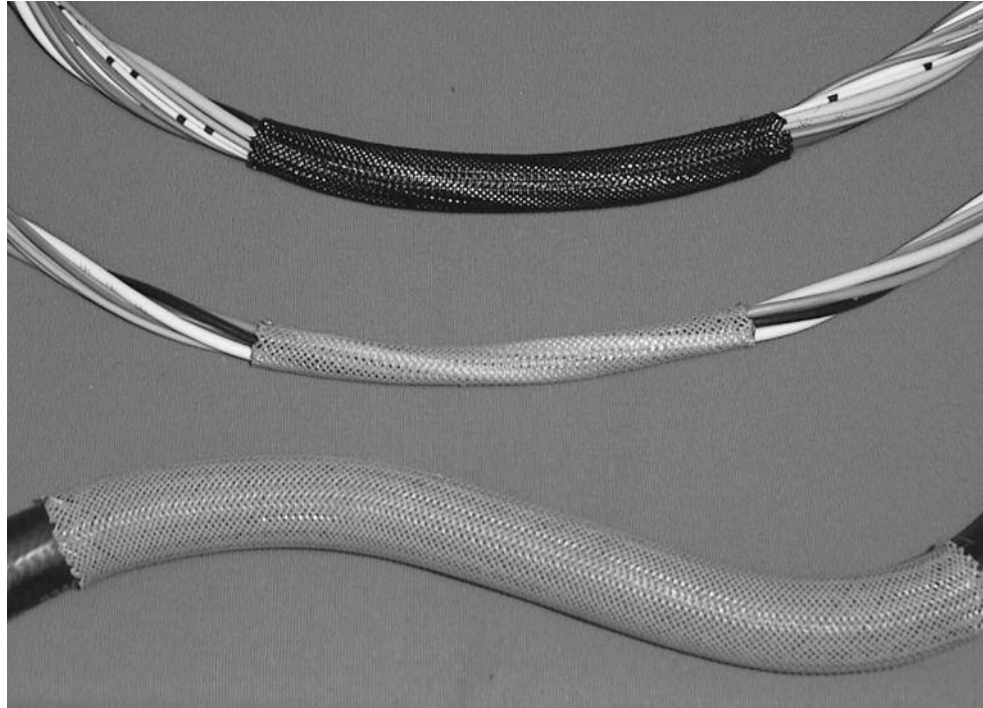
*****Europe only. For supply to MIL, Def Stan and BS add -MS, -DS or -BS to ordering description.

Versaflex

Expandable, Braided, Polyester Sleeving

Product Facts

- Excellent abrasion and cut-through resistance
- Lightweight
- Flexible (even at low temperatures)
- Fungus proof
- Not affected by most chemical and solvents, non-hygroscopic
- Versaflex-FR sleeving meets UL VW-1 and is self-extinguishing
- Wide range of sizes available
- RoHS compliant



Applications

Versaflex sleeving is suited for the mechanical protection of wire harnesses, hoses, and all other applications where exceptional flexibility combined with superior abrasion/cut resistance is required. It also serves as an economical

means for wire bundling that will not trap heat or moisture; expanding easily to fit over irregular shapes, then contracting to conform and grip. To prevent fraying, these products should be cut to length using a hot knife.

Installation

This product is cold applied.

Operating Temperature Range

-50°C to 150°C
[-58°F to 302°F]
(220°C [-58°F to 302°F] for short periods)

Specifications/Approvals

Series	UL 	TE
Versaflex-FR	E306976 VW-1, 125°C	
Versaflex	—	RK-6772

Available in:	Americas	Europe	Asia Pacific
		■	■

Versaflex (Continued)

Product Dimensions

Versaflex (metric)		
Nominal Size	Size Range	
	Minimum	Maximum
3 (0.118)	1 (0.039)	5 (0.197)
4 (0.158)	2 (0.079)	7 (0.276)
5 (0.197)	3 (0.118)	9 (0.354)
6 (0.236)	4 (0.158)	12 (0.472)
8 (0.315)	5 (0.197)	12 (0.472)
10 (0.394)	7 (0.276)	15 (0.591)
12 (0.472)	8 (0.315)	17 (0.669)
15 (0.591)	10 (0.394)	20 (0.787)
20 (0.787)	14 (0.551)	26 (1.024)
25 (0.984)	18 (0.709)	34 (1.339)
30 (1.181)	20 (0.787)	40 (1.575)
40 (1.575)	30 (1.181)	50 (1.969)
50 (1.969)	40 (1.575)	60 (2.362)

Versaflex (Imperial)		
Size	Nominal Size	Size Range
1/8	3 (0.118)	2.4 – 6.4 (0.094 – 0.252)
1/4	6 (0.236)	3.2 – 9.5 (0.125 – 0.375)
3/8	10 (0.394)	4.7 – 16 (0.185 – 0.630)
1/2	13 (0.512)	6.4 – 19 (0.252 – 0.748)
3/4	19 (0.748)	13 – 32 (0.512 – 1.260)
1-1/4	32 (1.256)	19 – 45 (0.748 – 1.772)
1-3/4	45 (1.772)	32 – 70 (1.260 – 2.756)
2	51 (2.008)	38 – 76 (1.496 – 2.992)

Versaflex-FR flame retardant, expandable polyester braid		
Size	Nominal Size	Size Range
1/8	3 (0.118)	2.4 – 6.4 (0.094 – 0.252)
1/4	6 (0.236)	3.2 – 9.5 (0.125 – 0.375)
3/8	10 (0.394)	4.7 – 16 (0.185 – 0.630)
1/2	13 (0.512)	6.4 – 19 (0.252 – 0.748)
3/4	19 (0.748)	13 – 32 (0.512 – 1.260)
1-1/4	32 (1.256)	19 – 45 (0.748 – 1.772)
1-3/4	45 (1.772)	32 – 70 (1.260 – 2.756)
2	51 (2.008)	38 – 76 (1.496 – 2.992)

Ordering Information

Color	Standard	Versaflex (metric) : Black (-0) Grey (-8) Versaflex (imperial) : Black (-0) Versaflex-FR : Black with a white X tracer (-09)
Standard packaging	On spools.	
Ordering description	Specify product name, size and color (for example, VERSAFLEX-FR-1/4-09-SP)	

XFFR

Halogen-Free, Flame-Retardant, Heat-Shrinkable Tubing

Product Facts

- Emits minimal amounts of toxic or acid gasses during combustion
- Meets performance requirements of MIL-C-24640 and MIL-C-24643 cable jackets
- Resists moisture, fungus, and weathering
- Available in expansion ratios as high as 3:1
- XFFR has the following approvals:
 - ABS (American Bureau of Shipping)
 - Lloyd's (Lloyd's Register of Shipping)
- RoHS compliant



Applications

XFFR halogen-free tubing can be used for re-jacketing and repairing halogen-free cables in any enclosed area where a flame-retardant, halogen-free environment is required. These environments include tunnels, buildings, mass transit vehicles, and ships. When installed with S-1305 tape, the tubing can also be used in applications requiring water sealing and protection from abrasion and corrosion.

Installation

Minimum shrink temperature: 70°C [158°F]
Minimum full recovery temperature: 121°C [250°F]

Operating Temperature Range

-55°C to 110°C
[-67°F to 230°F]

Specifications/Approvals

Series	Military	Industry	TE
XFFR	MIL-C-24640 MIL-C-24643	NES 713 NES 711	RW-2016

Available in:

Americas

Europe

Asia Pacific



XFFR (Continued)

Product Dimensions

Size	Inside Diameter		Recovered Wall Thickness*
	Minimum Expanded as Supplied	Maximum Recovered After Heating	After Heating (Nominal)
XFFR-03	7.62 [0.300]	2.54 [0.100]	2.03 [0.080]
XFFR-04	10.16 [0.400]	3.81 [0.150]	2.03 [0.080]
XFFR-07	19.05 [0.750]	5.59 [0.220]	2.03 [0.080]
XFFR-11	27.94 [1.100]	9.52 [0.375]	2.67 [0.105]
XFFR-15	38.10 [1.500]	12.70 [0.500]	3.05 [0.120]
XFFR-20	50.80 [2.000]	19.05 [0.750]	3.05 [0.120]
XFFR-30	76.20 [3.000]	31.75 [1.250]	4.06 [0.160]

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

3

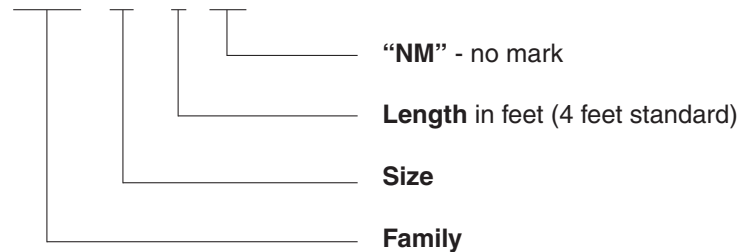
Heat-shrinkable Tubing

Ordering Information

Color	Standard	Black (-0)
Size selection	Always order the largest size that will shrink snugly over the component to be covered.	
Standard packaging	1.2-meter [4-foot] or 7.5-meter [25-foot] lengths.	

Part Numbering System

XFFR - 03 X 4 / NM

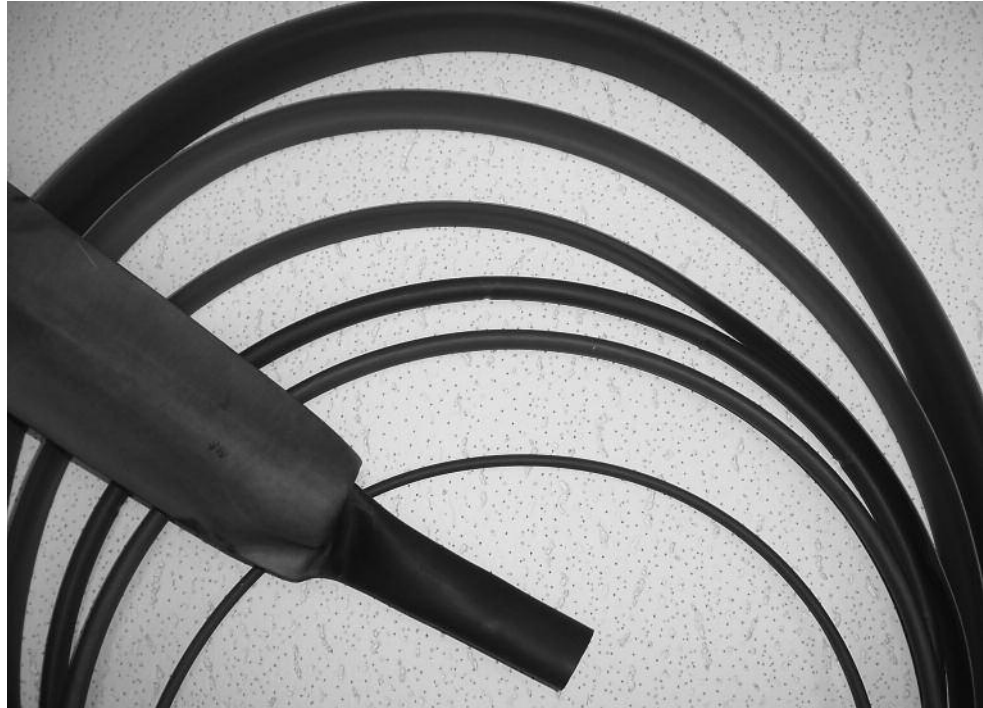


ZH-100

Flexible, Thin-Wall, Low-Fire-Hazard Tubing

Product Facts

- 2:1 shrink ratio
- Low smoke emissions
- Flexible, flame-retardant
- No added halogens
- Low evolution of acid gases
- RoHS compliant



Applications

ZH-100 is a flexible, thin-wall, heat-shrinkable tubing designed for low-fire-hazard applications. ZH-100 contains no added halogens, and exhibits excellent fire safety characteristics combined with low evolution of acid gases, while retaining good mechanical and fluid resistance properties.

Installation

Minimum shrink temperature: 80°C [176°F]
Minimum full recovery temperature: 120°C [248°F]

Operating Temperature Range

-30°C to 105°C
[-22°F to 221°F]

Specifications/Approvals

Series	Industry	TE
ZH-100	BR 1326A	RW-2031

Available in:	Americas	Europe	Asia Pacific
	■	■	■

ZH-100 (Continued)

Product Dimensions

Size	Inside Diameter		Recovered Wall Thickness* After Heating
	Minimum Expanded as Supplied	Maximum Recovered After Heating	
1/8	3.2 [0.125]	1.6 [0.062]	0.50 ± 0.10 [0.019 ± 0.004]
3/16	4.8 [0.187]	2.4 [0.093]	0.50 ± 0.10 [0.019 ± 0.004]
1/4	6.4 [0.250]	3.2 [0.125]	0.65 ± 0.15 [0.026 ± 0.006]
3/8	9.5 [0.375]	4.8 [0.187]	0.65 ± 0.15 [0.026 ± 0.006]
1/2	12.7 [0.500]	6.4 [0.250]	0.65 ± 0.15 [0.026 ± 0.006]
3/4	19.0 [0.750]	9.5 [0.375]	0.75 ± 0.15 [0.030 ± 0.006]
1	25.4 [1.000]	12.7 [0.500]	0.90 ± 0.15 [0.035 ± 0.006]
1 1/2	38.0 [1.500]	19.0 [0.750]	1.00 ± 0.20 [0.039 ± 0.008]
2	51.0 [2.000]	25.4 [1.000]	1.15 ± 0.25 [0.045 ± 0.010]

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

3

Heat-shrinkable Tubing

Ordering Information

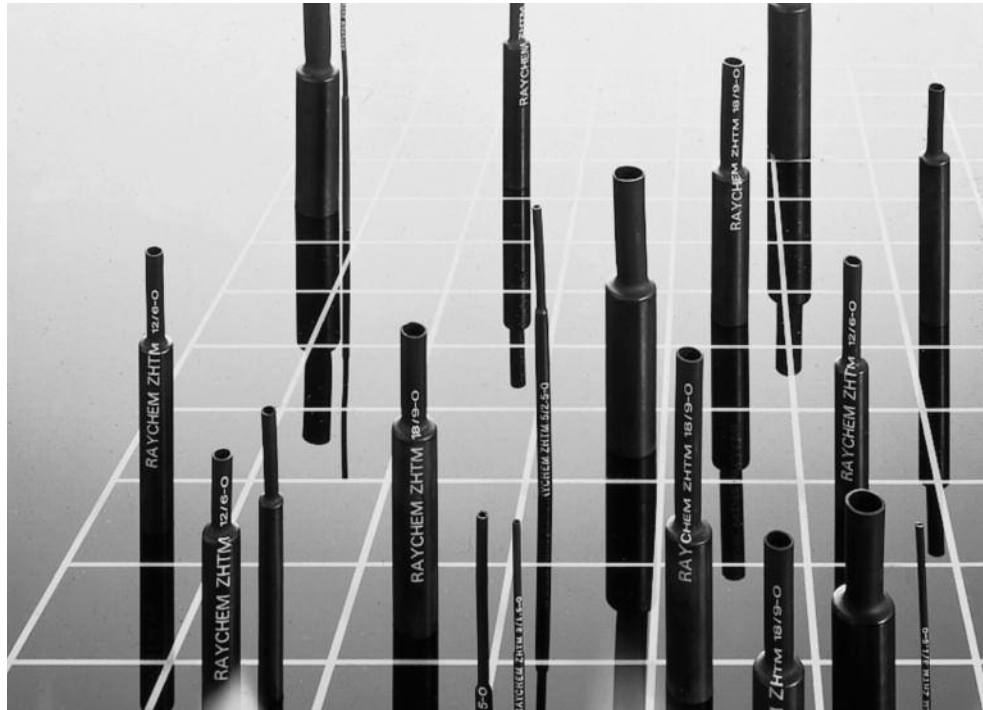
Color	Standard	Black (-0)
Size selection	Always order the largest size that will shrink snugly over the component to be covered. Special order sizes are available upon request.	
Standard packaging	On spools.	
Ordering description	Specify product name, size and color (for example, ZH-100 1/8-0).	

ZHTM

Heat-Shrinkable, Flexible Tubing with Low Toxicity for Fire Safety Applications

Product Facts

- 2:1 shrink ratio
- Low smoke emission
- System 100 tubing
- RoHS compliant



Applications

A flexible, thick-wall, heat-shrinkable tubing to be used in conjunction with -100 molded parts and Zerohal cable to form System 100. This material exhibits excellent fire safety characteristics combined with low smoke emission and low evolution of acid gases while retaining good mechanical and fluid-resistance properties.

Used for insulation and protection of cables, harnesses, and electrical and electronic components in enclosed spaces, such as in marine applications, mass transit systems, and offshore installations, to reduce toxicity risks, or where equipment would be irreparably damaged by corrosive products of combustion.

Installation

Minimum shrink temperature: 80°C [176°F]

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

Operating Temperature Range

-30°C to 105°C
[-22°F to 221°F]

Specifications/Approvals

Series	Military	Agency	Industry	TE
ZHTM	Def. Stan. 59-97 Issue 3 Type 8	BS 4G-198 Part 3 Type 15 VG 95343 Part 5 Type L VDE 0341/Pt 9005	BR 1326A	RW-2058

Available in:

Americas

Europe

Asia Pacific

ZHTM (Continued)

Product Dimensions

Size	Inside Diameter		Recovered Wall Thickness*
	Minimum Expanded as Supplied	Maximum Recovered After Heating	After Heating
3/1.5	3.0 [0.118]	1.5 [0.059]	0.70 ± 0.10 [0.028 ± 0.004]
5/2.5	5.0 [0.197]	2.5 [0.098]	0.75 ± 0.12 [0.030 ± 0.005]
8/4	8.0 [0.315]	4.0 [0.157]	0.80 ± 0.15 [0.031 ± 0.006]
12/6	12.0 [0.472]	6.0 [0.236]	0.90 ± 0.15 [0.035 ± 0.006]
18/9	18.0 [0.709]	9.0 [0.354]	1.00 ± 0.18 [0.039 ± 0.007]
24/12	24.0 [0.945]	12.0 [0.472]	1.10 ± 0.20 [0.043 ± 0.008]
40/20	40.0 [1.575]	20.0 [0.789]	1.30 ± 0.23 [0.051 ± 0.009]
50/30	50.0 [1.969]	30.0 [1.181]	1.50 ± 0.28 [0.059 ± 0.011]

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

3

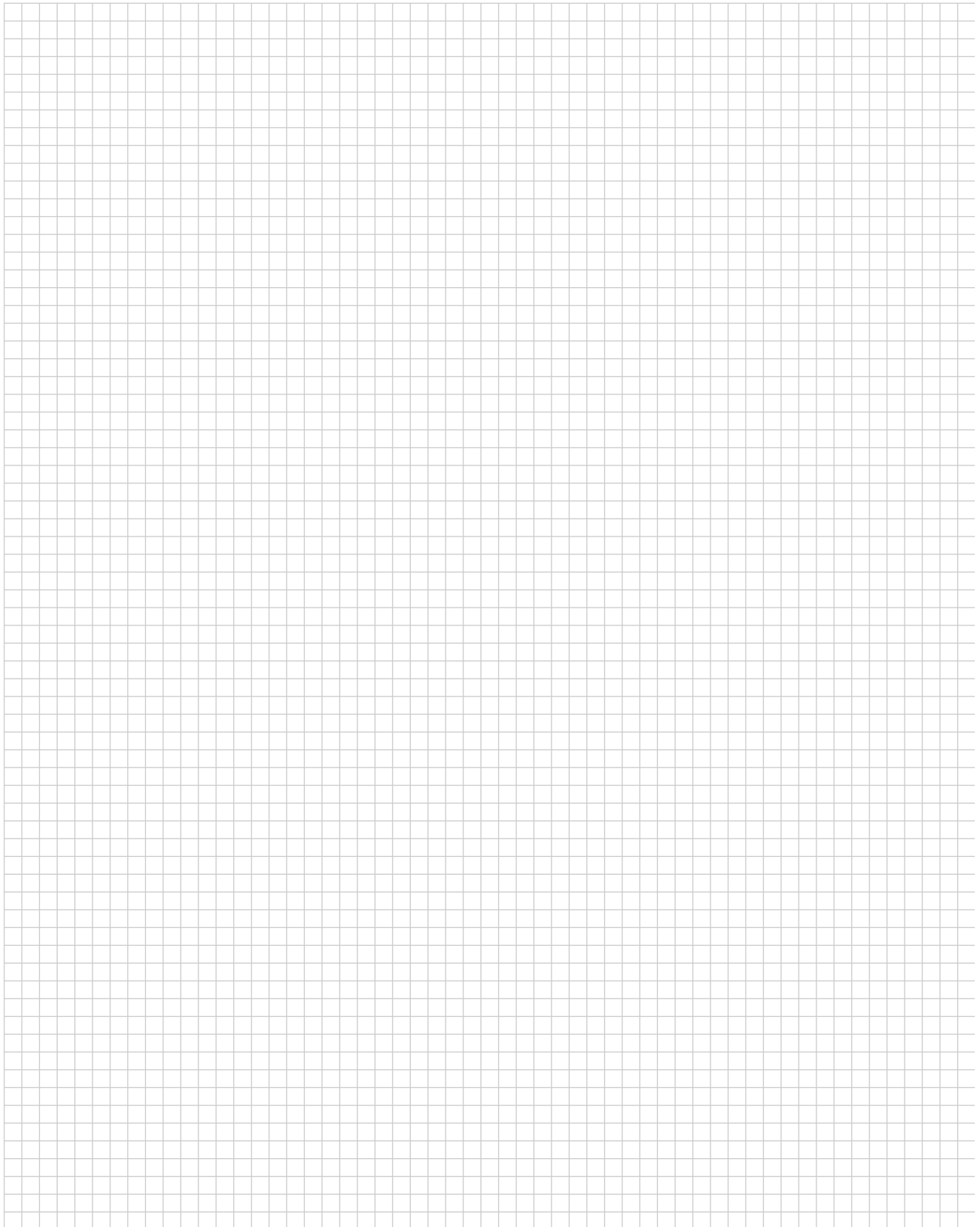
Heat-shrinkable Tubing

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, ZHTM 8/4-0-SP).	

**Europe only. For supply to Def Stan and BS add -DS or -BS to ordering description.

Engineering Notes

A large rectangular area filled with a fine grid of squares, intended for handwritten engineering notes or calculations.