

**Part Number** BBT (1K-10K)**Header** BBT Heat-Shrinkable Bus Bar Tubing

**Description** Thermosleeve-USA BBT (1kV/10kV) is a well insulated and track-resistant, heat-shrinkable polyolefin used to protect rectangular, square and round bus bars found in low or medium voltage switching equipment.

**Agency Approval & Compliance** ROHS, Halogen Free, Flame Retardant, REACH

**Application** Thermosleeve-USA BBT (1kV/10kV) is used to protect rectangular, square and round bus bars found in low or medium voltage switching equipment or for inline bolted connections of bus bars.

**Shrink Ratio and Operating Temperature** BBT (1kV/10kV) is available as a 2:1 material, shrinking to one half (50%) of its supplied size. The tubing's wall thickness also changes proportionally to the degree of recovery.

BBT (1kV/10kV) high temperature heat shrink has a shrink temperature range of 90 degrees C (194 degrees F) to 120 degrees C (248 degrees F) <note: the certification shows a operating temperature of 125°C and a shrink temperature of 90 – 120°C>

**Standard Sizes and Dimension****BBT-1kV**

Size (inches)	Size (mm)	As Supplied (mm)		After Recovery (mm)		Bus Bar Size	
		Inside Dia. (D)	Wall Thick. (T)	Inside Dia. (d)	Wall Thick. (t)	Rectangle (W)	Round (D)
51/64"	20/10	20±1.0	0.55±0.25	10	1.20±0.25	20	15
1-1/4"	30/15	31.5±1.0	0.55±0.25	15	1.20±0.25	30	20
1-9/16"	40/20	40.5±1.5	0.60±0.30	20	1.20±0.25	40	30
2"	50/25	50.5±2	0.60±0.30	25	1.20±0.25	50	35
2-3/8"	60/30	60±3	0.60±0.30	30	1.20±0.25	60	45
2-3/4"	70/35	70±3	0.60±0.30	32	1.20±0.25	70	50
3"	80/40	80±3	0.70±0.35	40	1.45±0.30	80	55
3-1/2"	90/45	90±4	0.70±0.35	43	1.45±0.30	90	65
4"	100/50	100±4	0.70±0.35	50	1.45±0.30	100	75
5"	120/60	120±4	0.70±0.35	60	1.45±0.30	120	85
6"	150/75	150±4	0.70±0.35	75	1.45±0.30	150	105

**BBT-1kV Typical Properties**

Item	Test Method	Specifications
Shrink Temperature (°C)		90~120°C
Operating Temperature Range (°C)		125°C
Tensile Strength (Mpa)	ASTM D2671	≥10Mpa
Elongation at break (%)	ASTM D2671	≥300
Aging in Circulating-air Oven	ASTM D2671	158.0±2.0°C, 168hrs
After Aging - Tensile Strength (Mpa)	ASTM D2671	≥7.3
After Aging - Ultimate Elongation (%)	ASTM D2671	≥200
Flexibility at -40°C, 4h	ASTM D2671	No cracking
Volume Resistance (Ω.cm)	ASTM D876	≥10 <sup>14</sup>
Dielectric Strength (kV/mm)	ASTM D2671	≥25
Heat shock	200°C±3°C, 4h	No cracking
Oxygen index	ASTM D2863	≥30
Water absorption	ASTM D570A	<0.5%

**BBT-10kV**

Size (inches)	Size (mm)	As Supplied (mm)		After Recovery (mm)		Cable Range (mm <sup>2</sup> )
		Inside Dia. (D)	Wall Thick. (T)	Inside Dia. (d)	Wall Thick. (t)	
3/4"	20/8	20±0.8	1.10±0.30	8	2.60±0.20	20
63/64"	25/10	25±0.8	1.10±0.30	10	2.60±0.20	30
1-1/4"	30/12	30±0.8	1.10±0.30	12	2.70±0.20	30
1-3/8"	35/14	35±0.8	1.10±0.30	14	2.70±0.20	
1-1/2"	40/15	40±1.0	1.10±0.30	15	2.90±0.30	40
1-49/64"	45/18	45±1.0	1.10±0.30	18	2.90±0.30	
2"	50/20	50±2.0	1.10±0.30	20	2.90±0.30	50
2-1/16"	54/24	54±3.0	1.10±0.30	24	2.90±0.30	
2-3/8"	60/24	60±3.0	1.10±0.30	24	2.90±0.30	60
2-1/2"	65/25	65±3.0	1.10±0.30	25	2.90±0.30	
2-61/64"	75/30	70±3.0	1.10±0.30	30	2.90±0.30	
3"	80/32	80±4.0	1.10±0.30	32	2.90±0.30	80/100
3-11/32"	85/35	85	1.10±0.30	35	2.90±0.30	
4"	100/40	100±4.0	1.10±0.30	40	2.90±0.30	100/120

5"	120/48	120±4.0	1.10±0.30	48	2.90±0.30	150
6"	150/60	150±4.0	1.10±0.30	60	2.90±0.30	200
7"	180/70	180±4.0	1.10±0.30	70	2.90±0.30	

**BBT-10kV Typical Properties**

Item	Test Method	Specifications
Shrink Temperature (°C)		90~120°C
Operating Temperature Range (°C)		125°C
Tensile Strength (Mpa)	ASTM D2671	≥10Mpa
Elongation at break (%)	ASTM D2671	≥450
Aging in Circulating-air Oven	ASTM D2671	158.0±2.0°C, 168hrs
After Aging - Tensile Strength (Mpa)	ASTM D2671	≥7.3
After Aging - Ultimate Elongation (%)	ASTM D2671	≥200
Flexibility at -40°C, 4h	ASTM D2671	No cracking
Volume Resistance (Ω .cm)	ASTM D876	≥10 <sup>14</sup>
Dielectric Strength (kV/mm)	ASTM D2671	≥25
Heat shock	200°C±3°C, 4h	No cracking
Oxygen index	ASTM D2863	≥30
Water absorption	ASTM D570A	<0.5%

**Availability** Four-foot lengths, master reels and cut pieces

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**Part Number** MPG (1KV)**Header** MPG Heat-Shrinkable Bus Bar Tubing

**Description** Thermosleeve-USA MPG (1KV) is a flexible, low smoke, heavy wall, heat-shrinkable polyolefin used to protect rectangular, square and round bus bars found in low or medium voltage switching equipment. Available in various standard and custom colors.

**Agency Approval & Compliance** ROHS, Halogen Free, Flame Retardant, REACH

**Application** Thermosleeve-USA MPG (1KV) is used to protect large equipment, Commercial Industries, Electrical, Bus bars, etc. Provides electrical insulation, protection of wire and cable bundles from corrosion and damage.

**Shrink Ratio and Operating Temperature** MPG (1KV) is available as a 2:1 material, shrinking to one half (50%) of its supplied size. The tubing's wall thickness also changes proportionally to the degree of recovery.

MPG (1KV) high temperature heat shrink has an operating temperature range of -55°C to 125°C and a shrink temperature of 90°C – 120°C.

**Standard Sizes and Dimension****MPG-1kV**

Size (inches)	Size (mm)	As Supplied (mm)		After Recovery (mm)		Bus Bar Size	
		Inside Dia. (D)	Wall Thick. (T)	Inside Dia. (d)	Wall Thick. (t)	Rectangle (W)	Round (D)
51/64"	20/10	20±1.0	0.55±0.25	10	1.20±0.25	20	15
1-1/4"	30/15	31.5±1.0	0.55±0.25	15	1.20±0.25	30	20
1-9/16"	40/20	40.5±1.5	0.60±0.30	20	1.20±0.25	40	30
2"	50/25	50.5±2	0.60±0.30	25	1.20±0.25	50	35
2-3/8"	60/30	60±3	0.60±0.30	30	1.20±0.25	60	45
2-3/4"	70/35	70±3	0.60±0.30	35	1.20±0.25	70	50
3"	80/40	80±3	0.70±0.35	40	1.45±0.30	80	55
3-1/2"	90/45	90±4	0.70±0.35	43	1.45±0.30	90	65
4"	100/50	100±4	0.70±0.35	50	1.45±0.30	100	75
5"	120/60	120±4	0.70±0.35	60	1.45±0.30	120	85
6"	150/75	150±4	0.70±0.35	75	1.45±0.30	150	105

**MPG-1kV Typical Properties**

Item	Specifications
Shrink Temperature (°C)	90~120°C
Operating Temperature Range (°C)	125°C
Longitudinal Shrink Ratio	±10%
Tensile Strength (Mpa)	≥10Mpa
Elongation at break (%)	≥300
Aging in Circulating-air Oven	158.0±2.0°C, 168hrs
After Aging - Tensile Strength (Mpa)	≥7.3
After Aging - Ultimate Elongation (%)	≥200
Volume Resistivity (Ω .cm)	≥10 <sup>14</sup>
Dielectric Strength (kV/mm)	≥25
Oxygen index	≥30
Water absorption	<0.5%

**Availability** Continuous reel reels, various colors

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**Part Number** KYNAR**Header** KYNAR Semi-Rigid PVDF Heat Shrink Tubing

**Description** Thermosleeve-USA KYNAR offers excellent chemical resistant properties and maintains its mechanical strength even at high temperatures. Fabricated from the "Polyvinylidene Fluoride" compound, KYNAR offers excellent resistance and cut through properties along with high dielectric strength. Kynar tubing is usually purchased in clear, which makes it a popular choice when selecting a rugged, high temperature, chemical resistant and transparent heat shrink material. KYNAR heat shrink tubing is flame retardant and has a minimum shrink temperature rating of 150 degrees C (302 degrees F) for KYNAR150 and 155 degrees C (311 degrees F) for KYNAR175.

**Agency Approval & Compliance** UL, cUL, RoHS, Halogen-Free, MIL, Flame Retardant, UL224, REACH, VW1

**Application** KYNAR heat shrink tubing provides electrical insulation and strain relief of multipoint connectors and solder joints. Ideal for applications that require dense packing of components or visual inspection of covered components.

**Shrink Ratio and Operating Temperature** KYNAR has a 2:1 shrink ratio and when fully recovered, the 2:1 material will shrink to one half (50%) of its original supplied diameter.

KYNAR is available in two temperature ranges -55 degrees C (-67 degrees F) to 150 degrees C (302 degrees F) and -55 degrees C (-67 degrees F) to 175 degrees C (347 degrees F)

**Standard Sizes and Dimension**

Size (inch)	Min. inside diameter as Supplied (mm) (D)	Max. Inside Diameter after recovery (mm) (d)	Recovered Wall Thickness (mm) (t)
3/64	1.2	0.6	0.25 ± 0.05
1/16	1.6	0.8	0.25 ± 0.05
3/32	2.4	1.2	0.25 ± 0.05
1/8	3.2	1.6	0.25 ± 0.05
3/16	4.8	2.4	0.25 ± 0.05
1/4	6.4	3.2	0.33 ± 0.05
3/8	9.5	4.8	0.33 ± 0.05
1/2	12.7	6.4	0.33 ± 0.05
4/3	19.1	9.5	0.43 ± 0.08
1	25.4	12.7	0.48 ± 0.08
1 1/2	38.1	19.1	0.48 ± 0.08

**Typical Properties****KYNAR (150 degree C)**

Item	Specification
Shrink Temperature (°C)	150°C
Temperature Range (°C)	-55°C ~150°C
Radial Shrinking Ratio (%)	50
Longitudinal Change (%)	≥5
Tensile Strength (MPa)	≥24.5
Ultimate Elongation (%)	≥300
Aging in Circulating-air Oven	225 ±1.0, 168 Hrs
Ultimate Elongation (%) - After Aging	250
Dielectric Voltage Withstand (V)	600
Volume Resistivity (Ω.cm)	≥10 <sup>13</sup>
Dielectric Strength (kV/mm)	≥15.7
Flammability	Pass
Concentricity (%)	≥15.7
Heat Shock	No Cracking
Cold Shock	No Cracking
Specific Gravity	1.80

**KYNAR (175 degree C)**

Item	Specification
Shrink Temperature (°C)	175°C
Temperature Range (°C)	-55°C ~175°C
Radial Shrinking Ratio (%)	50
Longitudinal Change (%)	5
Tensile Strength (MPa)	≥30
Ultimate Elongation (%)	≥150
Aging in Circulating-air Oven	225 ±1.0, 168 Hrs
Ultimate Elongation (%) - After Aging	≥75
Dielectric Voltage Withstand (V)	600
Volume Resistivity (Ω.cm)	≥10 <sup>14</sup>
Dielectric Strength (kV/mm)	≥15.7

Flammability	VW1
Concentricity (%)	≥15.7

**Availability** Four-foot lengths, master reels and cut pieces

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**Part Number** FKM**Header** FKM High Temperature Fluoroelastomer Heat Shrink Tubing

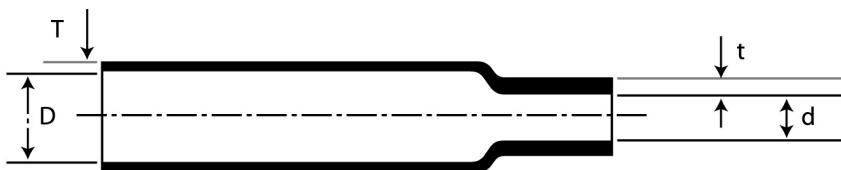
**Description** Thermosleeve USA FKM offers excellent chemical resistant properties and maintains its mechanical strength even at high temperatures. Manufactured using "Viton" Fluoroelastomer compound, FKM heat shrink tubing is flame retardant and has a minimum shrink temperature rating of 175 degrees C (347 degrees F).

**Agency Approval & Compliance** UL, cUL, ROHS, Halogen free, SAE, MIL Spec, Flame Retardant, REACH, VW1

**Application** FKM is the perfect heat shrink tubing solution for protecting a wide assortment of wiring and component covers in a broad range of aircraft/aerospace applications. FKM tubing is also ideal for those applications involving electronic control systems and hydraulic fluid transport mechanisms. Superior in both its chemical resistance properties and its ability to perform in high continuous operating temperatures, this incredibly resilient tubing is also highly abrasive and cut-through resistant. FKM tubing can easily withstand any potential damage that could be caused by an array of fuels, lubricants, acids, and other exceedingly corrosive fluids at extreme temperatures.

Shrink Ratio and Operating Temperature FKM has a 2:1 shrink ratio and when fully recovered, the 2:1 material will shrink to one half (50%) of its original supplied diameter.

FKM operating temperature range -55 degrees C (-67 degrees F) to 200 degrees C (392 degrees F)

**Standard Sizes and Dimension****FKM Fluoroelastomer Heat Shrink Tubing**

Size (inch)	Inside Diameter (mm)		Recovered Wall (mm) (t)	Standard Length (m/spool)
	Minimum Expanded as Supplied (D)	Maximum Recovered after Heating (d)		
1/8	3.2	1.6	0.76	50
3/16	4.8	2.4	0.84	50
1/4	6.4	3.2	0.89	50
3/8	9.5	4.8	1.02	50
1/2	12.7	6.4	1.22	30
3/4	19	9.5	1.45	30
1	25.4	12.7	1.78	30
1 1/2	38.1	19.1	2.41	1.22
2	50.8	25.4	2.79	1.22

**FKM (TW) Fluoroelastomer Thin Wall Tubing**

Size (inch)	Inside Diameter (mm)		Recovered Wall (mm) (t)	Standard Length (m/spool)
	Minimum Expanded as Supplied (D)	Maximum Recovered after Heating (d)		
1/8	3.2	1.6	0.76	50
3/16	4.8	2.4	0.89	50
1/4	6.4	3.2	0.89	50
3/8	9.5	4.7	0.89	50
1/2	12.7	6.4	0.89	30
5/8	15.9	7.9	1.07	30
3/4	19.1	9.5	1.07	30
7/8	22.2	11.1	1.25	30
1	25.4	12.7	1.25	30
1 1/4	31.8	15.9	1.40	30
1 1/2	38.1	19.1	1.40	1.22
2	50.8	25.4	1.65	1.22

**Specifications:**

Item	Specification
Shrink Temperature (°C)	175
Temperature Range (°C)	-55 °C to + 200°C
Radial Shrinking Ratio (%)	20
Longitudinal Change (%)	≤10
Tensile Strength (MPa)	≥8.5
Ultimate Elongation (%)	≥250
Aging in Circulating-air Oven	250 ±1.0°C, 168 Hrs
Ultimate Elongation (%) - After Aging	≥200 MPa
Volume Resistivity (Ω.cm)	≥10 <sup>9</sup>
Dielectric Strength (kV/mm)	≥7.9
Flammability	VW1
Concentricity (%)	≥70
Heat Shock	No cracking or dripping
Cold Shock	No cracking or dripping

**Property Comparison with heat shrinkable silicone rubber tubing**

Item	FKM Fluoroelastomer Shrinkable tubing	Silicone rubber shrinkable tubing
Operating Temperature (°C)	-55°C~+200°C	-60°C~+200°C
Mechanics	Good	Poor
Acid and alkali resistance	Good	Poor
Oil resistance	Excellent	Normal
Flammability	Good Flame Retardancy	Poor Flame Retardancy
Abrasion resistance	Normal	Poor
Sealing	Good	Poor
Insulation	Normal	Good
Water proof	Good	Normal

**Availability** Four-foot lengths, master reels and cut pieces

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### Part Number RSF

#### Header RSF Heat Shrinkable Braided Tubing

**Description** RSF is halogen free, flexible flame-retardant braided cloth fiber heat shrink tubing that combines the protection of braided sleeving with the conforming and bundling abilities of heat shrink tubing. Its woven material provides protection from cuts and chafing, as well as temperature resistance and vibration and noise suppression. An excellent choice for automotive as well as industrial applications, this product protects, conforms and looks great. RSF has a shrink temperature rating of 110 degrees C (230 degrees F).

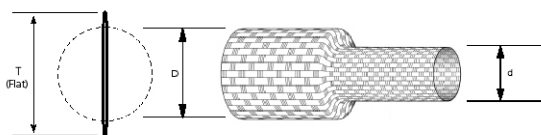
**Agency Approval & Compliance** RoHS, Halogen Free, Flame Retardant, REACH, VW1

**Application** RSF heat shrinkable braided tubing provides outstanding mechanical abrasion protection for components such as rubber hoses, plastic pipes and harness wiring bundles.

**Shrink Ratio and Operating Temperature** RSF has a 2:1 shrink ratio and when fully recovered, the 2:1 material will shrink to one half (50%) of its original supplied diameter.

RSF has a continuous operating temperature rating of -40 degrees C (-40 degrees F) and 125 degrees C (257 degrees F).

#### Standard Sizes and Dimension



Part No.	As Supplied			After Recovery
	Inside Diameter D (mm)	Inside Diameter D (inch)	Flat Width T (mm)	Inside Diameter d (mm)
CB-RSF-12/6-B	12	1/2"	≥18	≤6
CB-RSF-20/10-B	20	7/8"	≥30	≤10
CB-RSF-30/15-B	30	1-1/4"	≥47	≤15
CB-RSF-40/20-B	40	1-5/8"	≥60	≤20
CB-RSF-50/25-B	50	2"	≥78	≤25
CB-RSF-60/30-B	60	2-3/8"	≥93	≤30
CB-RSF-70/35-B	70	3"	≥108	≤35

#### Non-Standard Sizes

Part No.	As Supplied			After Recovery
	Inside Diameter D (mm)	Inside Diameter D (inch)	Flat Width T (mm)	Inside Diameter d (mm)
CB-RSF-25/12.5-B	25	1/2"	≥35	≤12.5

## SINGLE WALL SPECIALTY HEAT SHRINK TUBING

CB-RSF-35/17/5-B	35	7/8"	≥54	≤17.5
CB-RSF-80/40-B	80	1-1/4"	≥125	≤40

### Basic Performance

Performance	Test Conditions	Results
Wear resistance: 200g load, radius 0.3mm metal blade, 10mm impact, 144000 cycles	23°C	Coated rubber tube is not subject to wear
Thermal aging properties	168 hours, 125°C	Wear resistance at 23°C, not weakened
Low temperature flexibility	4 hours at -40°C, wrap around 10 times diameter mandrel	Uncracked
Cold shock test	200g weight drops from 100mm at -40°C	Uncracked
Thermal stress test	-40°C~125°C, 100 cycles	Wear resistance at 23°C, not weakened
Solvent resistance: 1. Antifreeze 50% (Ethylene glycol) 2. Oil (SAE 10W) 3. Inorganic Hydraulic Fluid 4. Detergent 5. Brake Fluid (DOT 4) 6. Unleaded Gasoline 7. Diesel 8. Battery Acid Electrolyte (1.25 SG H2SO4)	23°C, 24 hours soaking	Wear resistance at 23°C, not weakened

**Availability** cut pieces and master reels

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**Part Number** PTFE**Header** PTFE 1.8x High Temp Teflon Heat Shrink Tubing

**Description** Thermosleeve-USA PTFE tubing has superior chemical resistance and very low friction properties. It is designed to provide insulation and mechanical protection in severe chemical and thermal environments. PTFE heat shrink tubing has a high temperature tolerance range, high mechanical strength and extremely low friction properties. Used widely in the medical, aviation, aerospace, and scientific instrumentation industries.

**Agency Approval & Compliance** ROHS, Halogen Free, SAE, MIL, Flame Retardant, VW1, REACH

**Application** PTFE is designed to provide insulation and mechanical protection in severe chemical and thermal environments. Used widely in the medical, aviation, aerospace, and scientific instrumentation industries.

**Shrink Ratio and Operating Temperature** PTFE is available as a 1.7:1 material, shrinking to one half (45%) of its supplied size. The tubing's wall thickness also changes proportionally to the degree of recovery.

PTFE high temperature heat shrink has a continuous operating temperature range of -55 degrees C (-67 degrees F) to 260 degrees C (500 degrees F)

**Standard Sizes and Dimension**

Size (mm)	Size (inch)	Inside Dia. (mm)		Wall thickness (mm)
		As supplied (D)	After recovery (d)	After recovery (t)
0.5	1/64"	0.7±0.2	≤0.4	0.23
0.8	1/32"	0.8±0.2	≤0.45	0.23
1.0	3/64"	1.0±0.2	≤0.5	0.23
1.5	1/16"	1.5±0.2	≤0.9	0.25
2.0	5/64"	2.0±0.2	≤1.3	0.25
2.5	7/64"	2.5±0.2	≤1.5	0.30
3.0	1/8"	3.0±0.2	≤1.8	0.30
3.5	9/64"	3.5±0.2	≤2.0	0.30
4.0	5/32"	4.0±0.3	≤2.5	0.30
4.5	3/16"	4.5±0.3	≤2.8	0.30
5.0	13/64"	5.0±0.3	≤3.0	0.30
6.0	1/4"	6.0±0.3	≤3.8	0.38
7.0	9/32"	7.0±0.3	≤4.0	0.38

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**Order Fax** (800) 421-3538 **E-mail** sales@thermosleeve-usa.com **Website** <http://www.thermosleeve-usa.com>

8.0	5/16"	8.0±0.3	≤4.8	0.38
9.0	3/8"	9.0±0.3	≤5.0	0.38
10.0	13/32"	10.0±0.3	≤6.0	0.38
12.0	1/2"	12.0±0.3	≤7.0	0.38

**Typical Properties**

Item	Test Method	Unit	Specifications
Shrink Temperature	—	°C	327
Temperature Range	UL224	°C	200
Operating temperature		°C	-55°C to +260°C
Tensile strength	ASTM D638	M Pa	24.5
Elongation at break	ASTM D638	%	350
Bending Modulus	ASTM D790	M Pa	490
Impact Strength	ASTM D256+23°C-54°C J/m		107
Hardness (shore)	ASTM D2240	Shore D	55
Coefficient of Dynamic Friction			0.1
Flammability	UL-224		VW-1
Dielectric Constant 10 <sup>3</sup> -10 <sup>6</sup> Hz	ASTM D150		2.1
Dielectric Dissipation Factor @ 10 <sup>6</sup> Hz	ASMT D150		0.0002
Arc Resistance (Stainless Steel Electrodes)	ASMT D495	S	>300
Volume Resistivity	ASTM D257	Ω /cm	>10 <sup>18</sup>
Weather Resistance	"Weather-o-meter" (2000h)		No crack
Fluid resistance	ASTM D543		Excellent
Chemical resistance	ASTM D543		Excellent

**Availability** Four-foot lengths, master reels and cut pieces

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**Part Number** DR**Header** DR Diesel Resistant Elastomer Heat Shrink Tubing

**Description** Thermosleeve-USA DR is a flexible cross-linked Elastomer heat shrink tubing that provides long-term resistance against diesel, hydraulic fluids and chemicals. Manufactured from a cross-linked elastomeric material, DR heat shrink has been specially formulated to offer both cut and abrasion resistant properties. Ten sizes cover the diameter range from 1/8" (3.2mm) to 3" (76.2mm) and DR has a minimum shrink temperature rating of 175 degrees C (347 degrees F).

**Agency Approval & Compliance** ROHS, SAE, MIL, Flame Retardant, REACH, VW1

**Application** DR heat shrink tubing is well suited for protecting wire harnesses and cables where resistance to oil, diesel, hydraulic fluids and chemicals is essential. Common utilization includes transportation and military applications.

**Shrink Ratio and Operating Temperature** DR has a 2:1 shrink ratio. When fully recovered, the 2:1 material will shrink to fifty percent (50%) of its original supplied diameter.

DR has a continuous operating temperature rating of -75 degrees C (-103 degrees F) and 150 degrees C (302 degrees F)

**Standard Sizes and Dimension****Sizes**

Size (Inch)	As Supplied	After Recovery		Standard Packing
	Min ID mm (D)	Max ID mm (d)	Wall-thickness mm (t)	
1/8	3.20	1.60	0.75±0.15	50m
3/16	4.80	2.4	0.82±0.15	50m
1/4	6.40	3.2	0.90±0.15	50m
3/8	9.50	4.75	1.02±0.20	50m
1/2	12.7	6.35	1.22±0.20	30m
3/4	19.1	9.55	1.45±0.28	30m
1	25.4	12.7	1.78±0.28	30m
1-1/2	38.1	19.0	2.41±0.41	30m
2	50.8	25.1	2.79±0.41	1m
3	76.20	38.10	3.18±0.41	1m

**Specifications**

Item		Specifications
Shrink Temperature (°C)		175
Operating Temperature Range (°C)		—65~150
Tensile Strength (Mpa)		≥11.7
Elongation at Break (%)		≥250
Longitudinal Change		<10
Aging in Circulation-air oven		150°C, 168hrs
After Aging	Tensile Strength (Mpa)	≥10.3
	Elongation at Break (%)	≥200
Volume Resistance (Ω.cm)		1.0x10 <sup>11</sup>
Dielectric strength		≥11.9
Water Absorption		≤ 2
Elongation after Fluid Resistance		≥175
After Aging	Tensile Strength (Mpa)	≥10.4
	Elongation at Break (%)	≥200
	Dielectric strength	≥7.9

**Availability** Four-foot lengths, master reels and cut pieces

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**Part Number** DS406

**Header** DS 406 4X Heat Shrink Butt Connectors

**Description** Thermosleeve-USA DS 406 butt connectors are heat-shrinkable, polyolefin-insulated splices that provide one-step sealing for wire-to-wire splicing applications with an adhesive seal.

**Characteristics** With adhesive lining, DS406s protect splices from water condensation, salt, and corrosion • Provide strain relief • Protect against vibration in rugged environments • Completely insulate and protect electrical connections • More reliable than conventional splices

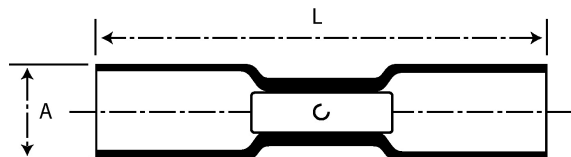
**Agency Approval & Compliance** ROHS, Halogen Free, REACH

**Application** For automotive/truck wiring repair and maintenance • Automotive accessories installation • Marine electronics and fleet maintenance • Commercial wiring in outdoor applications (pumps/pools/spas) • Appliances

**Shrink Ratio and Operating Temperature** DS 406 is available as a 2:1 material, shrinking to one half (50%) of its original supplied. The tubing's wall thickness will also change proportionally to the degree of recovery.

DS 406 heat shrink material has a continuous operating temperature range of -55 degrees C (-67 degrees F) to 125 degrees C (257 degrees F)

#### Standard Sizes and Dimension



Part No.	Butt Splice Dimensions		Color	AWG	mm <sup>2</sup>	Wire Dimensions	
	A Min.	L Nom.				Insulation O.D. (Min.)	Insulation O.D. (Min.)
DS406-001	3.68	31.75	Red	22-18	0.5-1.5	3.56	1.40
DS406-002	4.57	31.75	Blue	16-14	1.5-2.5	4.45	2.03
DS406-003	6.35	38.10	Yellow	12-10	3-6	6.22	2.79

#### Typical Properties

Item	Specification
Shrink Ratio	4:1
Operating Temperature Range (°C)	-55°C ~125°C
Cut-through Resistance	31 Kg

Flammability	Non-Flame Retardant
Wire Pullout After Crimping & Recovery	Red: 11.3Kg; Blue 22.7Kg; Yellow: 27.2 kg
Solvent Resistance	Isopropyl alcohol, trichloroethylene, gasoline, battery acid, diesel fuel, motor oil, antifreeze, brake fluid, 5% salt water
Dielectric Strength	2500VAC
Insulation Resistance	1000 megaohm at 100VDC

**Selector Gude**

Wire Size AWG	mm <sup>2</sup>	Part No.	Color
22-18	0.8-0.95	DS406-001	Red
16-14	1.2-2.5	DS406-002	Blue
12-10	3-6	DS406-003	Yellow

**Availability** Bulk and 25-piece bags

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**Part Number** OFS**Header** OFS Heat Shrinkable Optical Fiber Protector

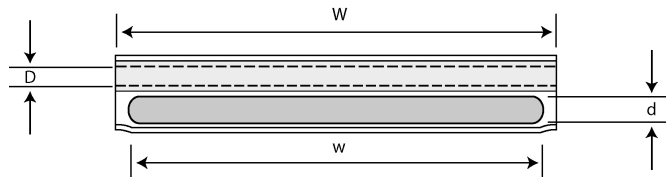
**Description** Thermosleeve-USA OFS is made from specially designed cross-linked polyolefin with an adhesive liner. OFS heat shrinkable optical fiber splice connectors provide excellent strength and protection to optical fiber splices. RoHS compliant.

**Agency Approval & Compliance** ROHS, Halogen Free, REACH

**Application** Used for fiber optic mechanical splicing in Telecommunications and LAN networking applications.

**Operating Temperature** OFS has a 2:1 heat shrinkable sleeve that shrinks to one half (50%) of its original size. The tubing's wall thickness will also change proportionally to the degree of recovery.

OFS optical fiber splices have a continuous operating temperature range of -55 degrees C (-67 degrees F) to 105 degrees C (221 degrees F)

**Standard Sizes and Dimension**

Type	Length (W) (mm)	Hot Melt Tube (mm)		Stainless Steel (mm)		Packaging
		ID (D)	Length (W)	OD (d)	Length (w)	
Large Size						
OFS-60B	60±1.0	1.4±0.05	60±1.0	1.5±0.05	55±1.0	100pcs/bag
OFS-45B	45±1.0	1.4±0.05	45±1.0	1.5±0.05	40±1.0	100pcs/bag
OFS-40B	40±1.0	1.4±0.05	40±1.0	1.5±0.05	36±1.0	100pcs/bag
OFS-23B	23±1.0	1.4±0.05	23±1.0	1.5±0.05	18±1.0	100pcs/bag
Mid Size						
OFS-61M	61±1.0	1.3±0.05	61±1.0	1.2±0.05	55±1.0	100pcs/bag
OFS-60M	60±1.0	1.3±0.05	60±1.0	1.2±0.05	56±1.0	100pcs/bag
OFS-45M	45±1.0	1.3±0.05	45±1.0	1.2±0.05	40±1.0	100pcs/bag
OFS-40M	40±1.0	1.3±0.05	40±1.0	1.2±0.05	36±1.0	100pcs/bag
OFS-30M	30±1.0	1.3±0.05	30±1.0	1.2±0.05	26±1.0	100pcs/bag
OFS-25M	25±1.0	1.3±0.05	25±1.0	1.2±0.05	21±1.0	100pcs/bag

**Small Size**

OFS-60S	60±1.0	0.5±0.05	60±1.0	1.0±0.05	56±1.0	100pcs/bag
OFS-40S	40±1.0	0.5±0.05	40±1.0	1.0±0.05	36±1.0	100pcs/bag
OFS-60SA	60±1.0	1.3±0.05	60±1.0	1.0±0.05	56±1.0	100pcs/bag
OFS-40SA	40±1.0	1.3±0.05	40±1.0	1.0±0.05	36±1.0	100pcs/bag

**Micro Size**

OFS-40T	40±1.0	0.5±0.05	40±1.0	0.5±0.05	40±1.0	100pcs/bag
OFS-25T	25±0.5	0.5±0.05	25±0.5	0.5±0.05	25±0.5	100pcs/bag
OFS-18T	18±0.5	0.5±0.05	18±0.5	0.5±0.05	18±0.5	100pcs/bag
OFS-15T	15±0.5	0.5±0.05	15±0.5	0.5±0.05	15±0.5	100pcs/bag
OFS-10T	10±0.5	0.5±0.05	10±0.5	0.5±0.05	10±0.5	100pcs/bag

**Typical Properties**

Item	Test Method	Specifications
Shrink Temperature (°C)	—	≥90
Operating Temperature Range (°C)	—	—55~110
Tensile Strength (Mpa)	ASTMD2671	≥18
Ultimate Elongation (%)	ASTMD2671	700
Dielectric Strength (kV/mm)	IEC 243	20
Coefficient of electrical breakdown	IEC 243	2.5max
Longitudinal Shrink Ratio	ASTMD2671	≤+5

**Availability** Bulk and 100-piece bags

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