

Shenzhen Wahchangwei Industrial Co.,Ltd

# Wahchangwei Product Catalog

Insulation sleeving, protective tubing and wire harness protection

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WCW Flex · English

Values are based on Catalog 15 and typical product references. Final specifications can be confirmed by samples, drawings and customer standards.

# About Wahchangwei

Founded in 2002, Shenzhen Wahchangwei Industrial Co.,Ltd provides high-performance composite material solutions for electrical insulation, high and low temperature protection, mechanical abrasion protection and wire/cable protection.

# Products and Technical Parameters

# 1. High-Temperature Special Fiberglass Sleeving

Flexible high-temperature shielding for wires, cables and irregular parts up to 600 C.

### Material

Texturized fiberglass with high-temperature coating

### Temperature

-10 C to 600 C

### Voltage / Insulation

300-700 V breakdown voltage range

### Size

ID 0.5-30.0 mm

### Structure

Special high-temperature resistant fiberglass sleeving

### Key Features

- Withstands normal assembly handling without loss of insulation capability
- Excellent low-temperature flexibility
- Suitable for high-temperature shielding up to 600 C

### Typical Applications

- Steam tracing pipelines in oil refineries
- Thermal and electrical insulation for wires and cables
- Glass manufacturing, metal refining, foundries and steel mills

ID range	Wall thickness	Breakdown voltage	Temperature resistance	Flame resistance
0.5-3.0 mm	0.18±0.05 mm	300-700 V	-10 C to +600 C	VW-1
4.0-6.0 mm	0.30±0.05 mm	300-700 V	-10 C to +600 C	VW-1
7.0-12.0 mm	0.35±0.05 mm	300-700 V	-10 C to +600 C	VW-1
14.0-30.0 mm	0.43±0.05 mm	300-700 V	-10 C to +600 C	VW-1

Catalog notes	Value
Typical applications	Oil refinery steam tracing, wire/cable thermal and electrical insulation, glass manufacturing and metal refining
Features	Normal assembly handling, low-temperature flexibility, high-temperature shielding up to 600 C

## 2. PVC Insulating Tubing

Flame-retardant non-shrink tubing for terminals, small electrical parts, motors, automotive harnesses and transformers.

### Material

Flexible flame-retardant PVC

### Temperature

General insulating tubing application range

### Voltage / Insulation

300 V / 600 V wall options

### Size

Inside diameter 0.79-15.9 mm

### Structure

Non-shrink general purpose insulating tubing

### Key Features

- Non-flammable insulating protection
- 300 V and 600 V wall thickness options
- Coil packing from 50 m to 500 m by size

### Typical Applications

- Terminal lugs and wire joints
- Small electrical parts
- Toy motors and transformer lead wires

No.	Inside diameter	Wall 300 V	Wall 600 V	Packing
5/8	15.9±0.80 mm	0.70±0.18	0.70±0.18	50 m
1/2	12.7±0.80 mm	0.57±0.15	0.57±0.15	100 m
3/8	9.53±0.50 mm	0.57±0.15	0.57±0.15	200 m
0#	8.38±0.50 mm	0.45±0.15	0.57±0.15	300 m
8#	3.38±0.20 mm	0.45±0.15	0.57±0.15	500 m
16#	1.34±0.15 mm	0.35±0.10	0.45±0.15	500 m
21#	0.79±0.15 mm	0.25±0.05	0.45±0.15	500 m

Application	Catalog description
Use	General purpose non-shrink insulating tubing for terminal lugs, small electrical parts, toy motor leads and transformers

### 3. 150 C Heat Shrink Tubing

Halogen-free, flame-retardant high-temperature tubing for electronics, communications, vehicles, ships and aircraft manufacturing.

<p><b>Material</b></p> <p>Radiation-crosslinked halogen-free polyolefin</p>	<p><b>Temperature</b></p> <p>-55 C to 150 C</p>
<p><b>Voltage / Insulation</b></p> <p>600 V class, 2500 V / 1 min withstand</p>	<p><b>Size</b></p> <p>Heat shrink sizes from 0.6/0.35 to 150/70 mm</p>
<p><b>Structure</b></p> <p>Single-wall high-temperature heat shrink tubing</p>	
<p><b>Key Features</b></p> <ul style="list-style-type: none"> <li>• UL224 / CAN/CSA C22.2 No.198.1-99 / AMS-DTL-23053/5 Class 1</li> <li>• 2:1 shrink ratio, initiating shrink <math>\geq 84</math> C, full shrink <math>\geq 135</math> C</li> <li>• Low smoke, flexible, flame retardant, RoHS compliant</li> </ul>	<p><b>Typical Applications</b></p> <ul style="list-style-type: none"> <li>• High-temperature connector insulation</li> <li>• Solder joint rust and corrosion prevention</li> <li>• Electronics, communications, automotive, ships and aircraft</li> </ul>

Property	Test method	Requirement
Tensile strength	ASTM D2671	$\geq 10.4$ MPa
Elongation at break	ASTM D2671	$\geq 200\%$
Tensile strength after aging	180 C x 168 h	$\geq 7.3$ MPa
Elongation after aging	180 C x 168 h	$\geq 100\%$
Longitudinal change	ASTM D2671	-5% to +5%
Flame retardancy	ASTM D2671 C	VW-1
Voltage withstand	UL224	2500 V, 1 min no breakdown
Heat shock	UL224, 250 C x 4 h	No cracking, no dripping
Dielectric strength	ASTM D149	$\geq 15$ kV/mm
Volume resistivity	IEC60093	$\geq 10^{14}$ ohm-cm

Feature	Catalog value
Standard	UL224, CAN/CSA C22.2 No.198.1-99, AMS-DTL-23053/5 Class 1
Shrink ratio	2:1
Initiating shrink temperature	$\geq 84$ C
Full shrink temperature	$\geq 135$ C
Operating temperature	-55 C to +150 C
Environmental compliance	RoHS

## 4. 3:1 and 4:1 Eco-Friendly Dual-Wall Tubing

High-ratio adhesive lined tubing for waterproofing, corrosion protection, insulation and sealing of harnesses, marine cables and metal pipes.

### Material

Flame-retardant polyolefin outer layer with hot-melt adhesive inner layer

### Temperature

-45 C to 125 C

### Voltage / Insulation

Electrical insulation protection, dielectric strength  $\geq 15$  kV/mm

### Size

3:1 and 4:1 high shrink ratio series

### Structure

Eco-friendly dual-wall adhesive-lined heat shrink tubing

### Key Features

- UL224, RoHS compliant
- Shrink ratio 3:1 / 4:1, onset shrink  $\geq 70$  C, full recovery  $\geq 125$  C
- High shrink ratio, flame-retardant outer layer, UV resistance

### Typical Applications

- Wire harness sealing and insulation
- Marine wires and cables
- Metal pipes requiring waterproof, moisture-proof and anti-corrosion protection

Property	Test method	Requirement
Tensile strength	ASTM D2671	$\geq 10.4$ MPa
Elongation at break	ASTM D2671	$\geq 200\%$
Aged tensile strength	158 C x 168 h	$\geq 7.3$ MPa
Aged elongation	158 C x 168 h	$\geq 100\%$
Longitudinal dimensional change	ASTM D2671	-8% to +8%
Flame retardancy	ASTM D2671B	Pass
Dielectric strength	IEC60243	$\geq 15$ kV/mm
Volume resistivity	IEC60093	$\geq 10^{14}$ ohm-cm
Softening point	ASTM E28	95 $\pm$ 5 C
Water absorption	ASTM D570	<0.2%
Peel strength PE	ASTM D1000	$\geq 120$ N/25 mm
Peel strength Al	ASTM D1000	$\geq 80$ N/25 mm

4:1 series	As supplied ID	Recovered ID	Wall after recovery	Adhesive wall	Packing
2/13	4.0 mm	1.0 mm	1.05 $\pm$ 0.30	0.50 $\pm$ 0.30	200 m
1/4	6.0 mm	1.5 mm	1.15 $\pm$ 0.30	0.50 $\pm$ 0.30	100 m
1/2	12.0 mm	3.0 mm	1.75 $\pm$ 0.30	0.60 $\pm$ 0.30	1.22 m

4:1 series	As supplied ID	Recovered ID	Wall after recovery	Adhesive wall	Packing
1	24.0 mm	6.0 mm	2.60±0.40	0.75±0.30	1.22 m
2	52.0 mm	13.0 mm	3.35±0.50	0.95±0.30	1.22 m

3:1 series	As supplied ID	Recovered ID	Wall after recovery	Adhesive wall	Packing
3/32	2.4 mm	0.8 mm	0.80±0.30	0.40±0.20	200 m
1/4	6.4 mm	2.2 mm	1.25±0.30	0.45±0.20	100 m
1/2	12.7 mm	4.2 mm	1.65±0.30	0.50±0.20	1.22 m
1	25.4 mm	8.5 mm	2.00±0.40	0.60±0.30	1.22 m
2	50.0 mm	17.0 mm	2.75±0.40	0.80±0.30	1.22 m
5	125.0 mm	42.0 mm	3.10±0.50	1.10±0.40	1.22 m

# 5. Silicone Fiberglass Sleeving

High-temperature electrical insulation for motors, transformers, harnesses and power systems.

<p><b>Material</b></p> <p>Fiberglass braid with silicone composite coating</p>	<p><b>Temperature</b></p> <p>-60 C to 200 C</p>
<p><b>Voltage / Insulation</b></p> <p>UL E233804 / E233803, 200 C 600 V; Grade A/B/C wall options</p>	<p><b>Size</b></p> <p>ID 0.5-35.0 mm</p>
<p><b>Structure</b></p> <p>Silicone coated fiberglass sleeving</p>	
<p><b>Key Features</b></p> <ul style="list-style-type: none"> <li>• Superior moisture, heat and radiation resistance</li> <li>• Flexible product for sharp bends</li> <li>• Available in coils, spools or cut lengths; standard white, custom colors</li> </ul>	<p><b>Typical Applications</b></p> <ul style="list-style-type: none"> <li>• Electric motors and equipment leads</li> <li>• Relay leads and heating cable</li> <li>• Aerospace and atomic energy applications</li> </ul>

Inside diameter range	Tolerance	Grade A wall	Grade B wall	Grade C wall
0.5-2.0 mm	+0.20 / -0.00	0.45±0.05	0.40±0.05	0.35±0.05
2.5-3.0 mm	+0.25 / -0.00	0.50±0.05	0.40±0.05	0.35±0.05
3.5-5.0 mm	+0.35 / -0.00	0.55±0.05	0.50±0.05	0.42±0.05
6.0-9.0 mm	+0.50 / -0.00	0.60±0.05	0.55±0.05	0.45±0.05
10.0-12.0 mm	+0.70 / -0.00	0.65±0.05	0.60±0.05	0.53±0.05
13.0-20.0 mm	+0.80 / -0.00	0.70±0.05	0.65±0.05	0.56±0.05
22.0-35.0 mm	+0.90 / -0.00	1.05±0.05	1.00±0.05	0.70±0.05

Catalog notes	Value
UL file	E233804 / E233803
Rating	200 C, 600 V
Color	Standard white; other colors made to order
Supply	Coils, spools or lengths at manufacturer option

# 6. Silicone Rubber Fiberglass Sleeving

Flexible high-temperature sleeving with strong insulation and mechanical protection.

### Material

Braided fiberglass coated with high-performance silicone rubber

### Temperature

-60 C to 200 C

### Voltage / Insulation

UL E233804 / E233803, 200 C 600 V

### Size

ID 0.5-35.0 mm

### Structure

Silicone rubber coated fiberglass sleeving

### Key Features

- Extremely flexible, tough and abrasion resistant
- Suitable for low-temperature and high-temperature extremes
- Coils, spools or cut lengths; standard white, custom colors

### Typical Applications

- Appliances, motors and generators
- Automotive, marine and aircraft electrical components
- Transformers, coils and relays

Inside diameter range	Tolerance	Grade A wall	Grade B wall
0.5-2.0 mm	+0.20 / -0.00	0.45±0.05	0.40±0.05
2.5-3.0 mm	+0.25 / -0.00	0.50±0.05	0.40±0.05
3.5-5.0 mm	+0.35 / -0.00	0.55±0.05	0.50±0.05
6.0-9.0 mm	+0.50 / -0.00	0.60±0.05	0.55±0.05
10.0-12.0 mm	+0.70 / -0.00	0.65±0.05	0.60±0.05
13.0-20.0 mm	+0.80 / -0.00	0.70±0.05	0.65±0.05
22.0-35.0 mm	+0.90 / -0.00	1.05±0.05	1.00±0.05

Catalog notes	Value
UL file	E233804 / E233803
Rating	200 C, 600 V
Applications	Appliances, motors, generators, automotive, marine and aircraft components

# 7. Inner Rubber Outer Fiber Silicone Sleeving

Composite sleeving for applications needing a soft silicone inner layer plus abrasion-resistant fiberglass outside.

<p><b>Material</b></p> <p>Silicone rubber inner tube with braided fiberglass outer layer</p>	<p><b>Temperature</b></p> <p>200 C rating</p>
<p><b>Voltage / Insulation</b></p> <p>UL E233803, 200 C 600 V</p>	<p><b>Size</b></p> <p>ID 1.0-25.0 mm</p>
<p><b>Structure</b></p> <p>Inner rubber and outer fiber composite sleeving</p>	
<p><b>Key Features</b></p> <ul style="list-style-type: none"> <li>• Excellent insulating protection and temperature resistance</li> <li>• Soft silicone inner layer with outer fiberglass protection</li> <li>• Grade A wall thickness 0.60-1.50 mm by ID range</li> </ul>	<p><b>Typical Applications</b></p> <ul style="list-style-type: none"> <li>• H/N grade automobile insulation protection</li> <li>• Shipbuilding and electrical machinery</li> <li>• Home appliances, electric heating equipment and special lamps</li> </ul>

Inside diameter range	Tolerance	Grade A wall thickness
1.0-2.5 mm	+0.20 / -0.00	0.60±0.05
3.0-5.0 mm	+0.30 / -0.00	0.70±0.05
6.0-7.0 mm	+0.35 / -0.00	0.75±0.05
8.0-9.0 mm	+0.40 / -0.00	0.80±0.05
10.0-12.0 mm	+0.50 / -0.00	0.90±0.05
13.0-25.0 mm	+0.65 / -0.00	1.50±0.05

Catalog notes	Value
UL file	E233803
Rating	200 C, 600 V
Structure	Silicone rubber tube + braided fiberglass + high-temperature silicone coating

# 8. Acrylic Resin Fiberglass Sleeving

Electrical insulation sleeving for coils, appliances, motors and power components.

**Material**

Non-alkali fiberglass braid with acrylic resin coating

**Temperature**

155 C rating

**Voltage / Insulation**

UL E233803, 155 C 600 V

**Size**

ID 0.5-25.0 mm

**Structure**

Acrylic coated fiberglass sleeving

**Key Features**

- Highly craze resistant
- Withstands severe bending with no loss of dielectric properties
- Resistant to most acids and organic solvents

**Typical Applications**

- Fractional and integral horsepower motor leads and crossovers
- Dry and oil-filled transformers
- Relays, radio/television circuits and welding apparatuses

Inside diameter range	Tolerance	Grade A wall	Grade B/C wall
0.5-2.5 mm	+0.25 / -0.00	0.38 mm	0.20 mm
3.0-4.5 mm	+0.30 / -0.00	0.45 mm	0.23 mm
5.0-6.0 mm	+0.40 / -0.00	0.45 mm	0.28 mm
7.0-9.0 mm	+0.55 / -0.00	0.50 mm	0.32 mm
10.0-14.0 mm	+0.77 / -0.00	0.60 mm	0.40 mm
15.0-25.0 mm	+0.85 / -0.00	0.64 mm	0.43 mm

Catalog notes	Value
UL file	E233803
Rating	155 C, 600 V
Properties	Highly craze resistant, withstands severe bending, resistant to most acids and organic solvents

# 9. Pure Silicone Rubber Tube

Flexible tubing for fluid transfer, soft connection and protective routing.

### Material

Pure silicone rubber, raw materials from Japan / USA / Germany

### Temperature

Sterilizable; custom hardness available

### Voltage / Insulation

Breakdown voltage 4000-10000 V

### Size

PSR series, custom ID / wall thickness / length

### Structure

Extruded flexible silicone rubber tubing

### Key Features

- Excellent flexibility and flex-crack resistance
- Excellent transparency with no odor and taste
- FDA and LFGB compliant grade available

### Typical Applications

- Electrical equipment and illumination
- Medical equipment
- Food-contact and baby-product applications requiring compliant material

Type	Description	Breakdown voltage	Hardness	Elongation
PSR-T	Half-transparent, wall 0.5-0.7 mm	4000-10000 V	50-80 HA	>=250%
PSR-Ta	Half-transparent, wall thickening	4000-10000 V	50-80 HA	>=250%
PSR-HT	Highly-transparent, wall 0.5-0.7 mm	4000-10000 V	50-80 HA	>=250%
PSR-HTa	Highly-transparent, wall thickening	4000-10000 V	50-80 HA	>=250%
PSR-M	Milky white, wall 0.5-0.7 mm	4000-10000 V	50-80 HA	>=250%
PSR-MSa	Milky white flame-resistant wall thickening	4000-10000 V	50-80 HA	>=250%

Catalog notes	Value
Compliance	FDA and LFGB compliant grade available
Sterilization	Autoclave, ethylene oxide, gamma radiation
Options	Custom dimension, length and hardness

# 10. PTFE Tubing

Chemical and heat resistant tubing for demanding electrical and fluid applications.

### Material

Imported high-quality PTFE resin with eco-friendly color pigments

### Temperature

High-temperature resistant PTFE range

### Voltage / Insulation

High voltage and pressure resistance

### Size

Model 30 to 0, ID 0.30-8.38 mm with S/T/L wall options

### Structure

Extruded and sintered PTFE tubing

### Key Features

- Excellent high-temperature resistance
- Corrosion resistance and superior self-lubricating property
- Packaging 305 m, 200 m, 153 m, 100 m, 50 m or 1.0 m rods by size

### Typical Applications

- Machinery, electronic appliances and transformers
- Automobiles and aerospace
- Chemical industry and communication

Model	ID	OD S	OD T	OD L	Packing
30	0.30±0.10	0.80±0.10	0.70±0.10	0.60±0.10	305 m
24	0.56±0.10	1.16±0.10	1.06±0.10	0.86±0.10	305 m
20	0.86±0.10	1.66±0.10	1.46±0.10	1.16±0.10	305 m
16	1.34±0.20	2.14±0.20	1.94±0.20	1.64±0.20	153 m
12	2.16±0.25	2.96±0.25	2.76±0.25	2.56±0.25	100 m
8	3.38±0.25	4.38±0.25	4.18±0.25	3.78±0.25	100 m
4	5.28±0.30	6.28±0.30	6.08±0.30	5.88±0.30	50 m / 1.0 m rod
0	8.38±0.30	9.38±0.30	9.18±0.30	8.98±0.30	1.0 m rod

Catalog notes	Value
Material	Imported high-quality polytetrafluoroethylene resin
Properties	High temperature, high voltage/pressure, corrosion resistance, self-lubricating
Applications	Coffee machines, oxygen generators, ventilators, transformers

# 11. PA / PU Tubing

Flexible tubing options for routing, pneumatic, fluid and assembly scenarios.

## Material

PA / PU engineering plastic

## Temperature

-40 C to 100 C typical

## Voltage / Insulation

Not primary insulation unless specified

## Size

Metric and custom tubing

## Structure

Flexible extruded tube

## Key Features

- Flexible routing
- Wear resistance
- Pneumatic and fluid compatibility

## Typical Applications

- Pneumatic lines
- Fluid routing
- Automation equipment

Item	Typical value
Material	PA / PU
Working temperature	-40 C to 100 C typical
Use	Pneumatic, fluid and routing applications
Options	Metric and custom tubing by project requirement

# 12. Flexible Corrugated Tubing

Flexible routed protection for wire harnesses in vehicles, equipment cabinets and moving assemblies.

<p><b>Material</b></p> <p>PP / PE / PA</p>	<p><b>Temperature</b></p> <p>Application dependent</p>
<p><b>Voltage / Insulation</b></p> <p>Mechanical protection</p>	<p><b>Size</b></p> <p>AD9.0-AD80; ID 6.0-66.5 mm, OD 9.0-80.0 mm</p>
<p><b>Structure</b></p> <p>Flexible corrugated tubing, split or non-split</p>	
<p><b>Key Features</b></p> <ul style="list-style-type: none"> <li>• UL94 flame resistance option</li> <li>• Highly abrasion resistant, acid resistant, solvent and fuel resistant</li> <li>• UV resistant, lightweight, easy to install and remove</li> </ul>	<p><b>Typical Applications</b></p> <ul style="list-style-type: none"> <li>• Cable and wire management</li> <li>• Vehicle harness routing</li> <li>• Equipment cabinets and moving assemblies</li> </ul>

Series	ID	OD	Wall thickness
WCW-P(A/P/E)-AD9.0	6.0±0.3	9.0±0.3	0.27±0.05
WCW-P(A/P/E)-AD17	13±0.3	17±0.3	0.35±0.08
WCW-P(A/P/E)-AD22	18.1±0.5	21.8±0.5	0.40±0.08
WCW-P(A/P/E)-AD34.5	29±0.6	34.5±0.6	0.45±0.10
WCW-P(A/P/E)-AD48	48±0.8	54.5±0.8	0.50±0.12
WCW-P(A/P/E)-AD80	66.5±1.0	80±1.0	0.65±0.15

Feature	Catalog value
Materials	PP / PE / PA
Flame resistance	UL94
Options	Split style and non-split style

# 13. Heat Shrink Tubing

Insulation, sealing, strain relief and terminal protection.

**Material**

Heat shrink material by application

**Temperature**

By selected heat shrink series

**Voltage / Insulation**

Electrical insulation and mechanical protection

**Size**

Shrink ratio 2:1 / 3:1 / 4:1

**Structure**

Heat shrink tubing supplied as spools, lengths or cut pieces

**Key Features**

- Electrical insulation, mechanical protection, environmental sealing and strain relief
- High expansion ratio can repair cable jackets without removing connectors
- Clear types allow inspection of covered components

**Typical Applications**

- Back-end connector sealing
- Breakouts and connector-to-cable transitions
- Cable repair and terminal protection

Size	As supplied ID	After recovery ID	Spool length	Application range
0.5	0.80±0.20	<=0.35	400 m	0.3-0.6
1.0	1.50±0.20	<=0.65	400 m	0.75-0.9
5.0	5.50±0.20	<=2.50	200 m	2.6-4.5
8.0	8.50±0.30	<=4.00	100 m	4.2-7.2
16	16.50±0.40	<=8.00	100 m	8.3-15
30	31.50±1.00	<=15.00	50 m	16-29
100	>=100	<=50.00	25 m	55-85
150	>=150	<=75.00	25 m	80-120

Catalog notes	Value
Shrink ratio	2:1 / 3:1 / 4:1
Features	Oil and chemical resistance, halogen-free low smoke RoHS compliance, insulation and heat/voltage resistance

# 14. Standard Heat Shrink Tubing

General-purpose heat shrink for insulation, marking, bundling and terminal protection.

### Material

Radiation-crosslinked halogen-free, red-phosphorus-free polyolefin

### Temperature

-55 C to 125 C

### Voltage / Insulation

UL224 2500 V / 1 min no breakdown; dielectric strength >=15 kV/mm

### Size

2:1 shrink ratio; standard colors black, red, yellow, blue, white

### Structure

Standard halogen-free heat shrink tubing

### Key Features

- UL224 standard, shrink ratio 2:1
- Initiating shrink >=80 C, full shrink >=125 C
- RoHS, IPC/JEDEC-J-STD-709, H-class material

### Typical Applications

- High fire-safety wire insulation
- Solder joint rust prevention
- Subway, high-speed rail, aircraft and IT digital products

Feature	Catalog value
Standard	UL224
Shrink ratio	2:1
Initiating shrink temperature	>=80 C
Full shrink temperature	>=125 C
Operating temperature	-55 C to +125 C
Environmental standard	RoHS, IPC/JEDEC-J-STD-709, H-class material
Standard colors	Black, red, yellow, blue, white; other colors custom

Environmental parameter	Requirement	Method
Cd / Cr / Hg / Pb	Qualified by limits in catalog	GB/Z21274-2007 / GB/Z21275-2007
Br	<=900 ppm	Pr EN14582 B
Cl	<=900 ppm	Pr EN14582 B
PBBs / PBDEs	N/A	GB/Z21276-2007
Red phosphorus	<=1000 ppm	PY-GC/MS

# 15. Dual-wall Adhesive Heat Shrink

Waterproof sealing and fixation for connectors, terminals and wire exits.

<p><b>Material</b></p> <p>Polyolefin with hot-melt adhesive</p>	<p><b>Temperature</b></p> <p>-45 C to 125 C</p>
<p><b>Voltage / Insulation</b></p> <p>Dielectric strength <math>\geq 15</math> kV/mm, volume resistivity <math>\geq 10^{14}</math> ohm-cm</p>	<p><b>Size</b></p> <p>2:1 / 3:1 common ratios</p>
<p><b>Structure</b></p> <p>Dual-wall adhesive-lined heat shrink tube</p>	
<p><b>Key Features</b></p> <ul style="list-style-type: none"> <li>Waterproof sealing, corrosion protection and air leakage prevention</li> <li>Hot-melt adhesive buffers mechanical strain</li> <li>Outer layer flexible and flame retardant</li> </ul>	<p><b>Typical Applications</b></p> <ul style="list-style-type: none"> <li>Connector sealing and wire exits</li> <li>Automotive and appliance harnesses</li> <li>Cable branch points, metal pipes and submersible pump wiring</li> </ul>

Property	Test method	Requirement
Tensile strength	ASTM D2671	$\geq 10.4$ MPa
Elongation at break	ASTM D2671	$\geq 200\%$
Aged tensile strength	158 C x 168 h	$\geq 7.3$ MPa
Aged elongation	158 C x 168 h	$\geq 100\%$
Longitudinal dimensional change	ASTM D2671	-8% to +8%
Flame retardancy	ASTM D2671B	Pass
Dielectric strength	IEC60243	$\geq 15$ kV/mm
Volume resistivity	IEC60093	$\geq 10^{14}$ ohm-cm
Softening point	ASTM E28	95 $\pm$ 5 C
Water absorption	ASTM D570	<0.2%
Peel strength PE	ASTM D1000	$\geq 120$ N/25 mm
Peel strength Al	ASTM D1000	$\geq 80$ N/25 mm

Use	Catalog description
Application	Connector sealing, wire exits, cable branch points, metal pipes, cable repair and submersible pump wiring

# 16. 2:1 Eco-Friendly Dual-Wall Tubing

Adhesive-lined tubing for waterproof insulation and sealing where a standard 2:1 shrink ratio is preferred.

**Material**

Flexible flame-retardant polyolefin with hot-melt adhesive

**Temperature**

-45 C to 125 C

**Voltage / Insulation**

Dielectric strength  $\geq 15$  kV/mm

**Size**

2:1 series from 1.6 mm to 31.8 mm typical table values

**Structure**

2:1 eco-friendly dual-wall tubing

**Key Features**

- Shrink ratio 2:1, initiating shrink  $\geq 70$  C, full shrink  $\geq 125$  C
- Soft, flame-retardant outer layer
- RoHS compliant; standard black, custom colors available

**Typical Applications**

- Wire connections in electronic devices
- Automotive and home appliance wire harnesses
- Cable repair, cable branch points and metal pipelines

Size	As supplied ID	Recovered ID	Wall after recovery	Packing	Application range
0.60/0.35	$\geq 0.90$	$\leq 0.35$	0.33	200 m	0.5-0.7
1.00/0.65	$\geq 1.60$	$\leq 0.65$	0.33	200 m	0.8-1.2
3.00/1.50	$\geq 3.50$	$\leq 1.50$	0.44	200 m	1.7-2.2
6.00/3.00	$\geq 6.40$	$\leq 3.00$	0.56	100 m	3.2-6.1
12.00/6.00	$\geq 12.3$	$\leq 6.00$	0.56	100 m	6.3-12.1
25/12.50	$\geq 25.6$	$\leq 12.5$	0.77	50 m	13.0-25.0
50/25.00	$\geq 51.5$	$\leq 25.0$	0.97	25 m	30.0-45.0
150/70.00	$\geq 150.0$	$\leq 70.0$	1.17	25 m	80.0-120.0

Feature	Catalog value
Shrink ratio	2:1
Initiating shrink temperature	$\geq 70$ C
Full shrink temperature	$\geq 125$ C
Operating temperature	-45 C to +125 C
Color	Black standard; custom colors available

# 17. PET Woven Network Tube

Lightweight abrasion protection and bundling for wire harness assemblies.

**Material**

PET monofilament

**Temperature**

Wide operating temperature range

**Voltage / Insulation**

Mechanical protection

**Size**

Nominal 1/8 in to 2-1/2 in; expanded ID 1-105 mm

**Structure**

PET expandable open-weave braided sleeving

**Key Features**

- Expands to two to three times original ID
- Will not trap heat or moisture
- Abrasion resistant, lightweight, easy to install, flame resistance option

**Typical Applications**

- Wires, cables and harnesses
- Hydraulic lines, tubes and hoses
- Military, industrial, marine, aerospace, transportation and electronics

Nominal size	Metric	Part No.	Min ID	Max ID	Standard spool
1/8 in	3 mm	WCW-PET-003	1	6	1000 m
1/4 in	6 mm	WCW-PET-006	3	9	500 m
5/16 in	8 mm	WCW-PET-008	5	16	350 m
3/8 in	10 mm	WCW-PET-010	7	19	350 m
1/2 in	12 mm	WCW-PET-012	8	24	300 m
5/8 in	16 mm	WCW-PET-016	10	27	250 m
1 in	25 mm	WCW-PET-025	18	35	200 m
2 in	50 mm	WCW-PET-050	40	80	100 m
2-1/2 in	64 mm	WCW-PET-064	45	105	100 m

Feature	Catalog value
Protection	Mechanical protection for wires, cables, harnesses, hydraulic lines, tubes and hoses
Performance	Abrasion resistant, removable for repair, lightweight, flexible, flame resistance option

# 18. Self-wrap Sleeving

Openable protection for retrofit, repair and complex branch harnesses.

### Material

Semi-rigid braided monofilament sleeving

### Temperature

-40 C to 125 C

### Voltage / Insulation

Mechanical protection

### Size

WCW-SW-003 to WCW-SW-050, width 22-255 mm

### Structure

Lateral split self-wrap braided sleeving with 25% edge overlap

### Key Features

- Easy installation without extra fasteners
- Lightweight, quiet and flexible; bends to tight radius
- UV, abrasion and chemical resistance; high vibration resistance and noise suppression

### Typical Applications

- Large or bundled cables and wires
- Inline plugs, connectors and splices
- Retrofit repair and branch harness protection

Type	Width	Min usable ID	Max usable ID	Packing
WCW-SW-003	22±2 mm	3 mm	4 mm	200 m
WCW-SW-008	40±2 mm	8 mm	9 mm	100 m
WCW-SW-010	47±2 mm	10 mm	11 mm	100 m
WCW-SW-019	98±2 mm	19 mm	20 mm	50 m
WCW-SW-025	128±2 mm	25 mm	27 mm	50 m
WCW-SW-038	188±3 mm	38 mm	40 mm	25 m
WCW-SW-050	255±3 mm	50 mm	52 mm	25 m

Feature	Catalog value
Operating temperature	-40 C to +125 C
Overlap	25% edge overlap
Properties	Halogen-free, UV resistance, abrasion and chemical resistance, high vibration resistance

# 19. Corrugated Tubing

Mechanical impact and abrasion protection for harness routing.

<p><b>Material</b> PP / PE / PA</p>	<p><b>Temperature</b> Application dependent</p>
<p><b>Voltage / Insulation</b> Mechanical protection</p>	<p><b>Size</b> AD9.0-AD80 corrugated tube series</p>
<p><b>Structure</b> Corrugated protective tube, split or non-split style</p>	
<p><b>Key Features</b></p> <ul style="list-style-type: none"> <li>• Mechanical damage protection</li> <li>• UV, weathering and chemical protection</li> <li>• Flexible body for corners and elbows</li> </ul>	<p><b>Typical Applications</b></p> <ul style="list-style-type: none"> <li>• Automotive harnesses</li> <li>• Industrial wiring</li> <li>• Appliance and equipment wiring</li> </ul>

Series	ID	OD	Wall thickness
WCW-P(A/P/E)-AD9.0	6.0±0.3	9.0±0.3	0.27±0.05
WCW-P(A/P/E)-AD17	13±0.3	17±0.3	0.35±0.08
WCW-P(A/P/E)-AD22	18.1±0.5	21.8±0.5	0.40±0.08
WCW-P(A/P/E)-AD34.5	29±0.6	34.5±0.6	0.45±0.10
WCW-P(A/P/E)-AD42.5	36±0.6	42.5±0.6	0.50±0.12
WCW-P(A/P/E)-AD56	56±1	67±1	0.60±0.15
WCW-P(A/P/E)-AD80	66.5±1.0	80±1.0	0.65±0.15

Feature	Catalog value
Materials	PP / PE / PA
Options	Split and non-split style
Properties	Mechanical protection, UV/weathering/chemical protection, flexible routing

# 20. Cable Ties and Binding Rope

Bundling and assembly accessories for consistent production.

### Material

Nylon / polyester by requirement

### Temperature

-40 C to 85 C typical

### Voltage / Insulation

Assembly accessory

### Size

Multiple lengths, widths and colors

### Structure

Cable tie / binding rope / assembly accessory

### Key Features

- Fast bundling and stable assembly
- Color and size options
- Line-side packing support

### Typical Applications

- Harness bundling
- Panel wiring
- Production line assembly

Item	Catalog value
Material	Nylon / polyester by request
Options	Multiple lengths, widths and colors
Use	Bundling and line-side assembly
Customization	Cut length, color and packing by project

# 21. Custom Cut Protective Parts

Cut-to-length sleeving, tubing and packed parts for line-side assembly.

<p><b>Material</b></p> <p>Selected sleeving, tubing or molded protection by project</p>	<p><b>Temperature</b></p> <p>According to selected base material</p>
<p><b>Voltage / Insulation</b></p> <p>According to selected base material</p>	<p><b>Size</b></p> <p>Cut-to-length, kitting and private packing</p>
<p><b>Structure</b></p> <p>Custom processed protective part</p>	
<p><b>Key Features</b></p> <ul style="list-style-type: none"> <li>• Ready for assembly</li> <li>• Reduced line labor</li> <li>• Private packing and kitting</li> </ul>	<p><b>Typical Applications</b></p> <ul style="list-style-type: none"> <li>• OEM line-side supply</li> <li>• Automotive and appliance assembly</li> <li>• Project-specific protective parts</li> </ul>

Item	Catalog value
Process	Cut-to-length / kitting / private packing
Material	Selected according to application
Use	Ready-to-assemble OEM supply
Customization	Drawing, sample, size, color and packing by customer requirement

# Contact

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