



HEAT SHRINKABLE TUBING (ZCSM)

LOW VOLTAGE INSULATION AND OUTER SEALING TUBINGS

KEY FEATURES

- Flame retardant according to IEC 60332-1
- High performance electrical and mechanical characteristics
- Approved for and used in applications in power plants, public accessible buildings and transportation network
- Approved for and used in applications with safety class cables, requiring insulation or circuit integrity
- Compliant to RoHS and REACH regulations
- Stabilized against UV Irradiation

TE Connectivity's (TE) Raychem ZCSM heat-shrinkable heavy-wall flame retardant tubing is designed for insulation purposes on low voltage cable accessories and applications, including mechanical protection on medium voltage accessories.

ZCSM tubing is an uncoated, zero-halogen, thick wall type, low fire hazard tubing. They are used for splicing cables and also for general purpose protection tubing in low fire hazard environments such as the offshore, mining, construction industry. Other applications include transportation network and equipment and many others.

The optical smoke density produced by TE's Raychem ZCSM tubing in fire conditions has been measured in accordance with typical methods such as the 3 m³ Cube Test (IEC 60134), and has proven its applicability.

The range of thick-wall ZCSM tubing can be used as the jackets to MV and LV cable accessories, providing protection to the same fire standards as modern low smoke, low fire hazard cable specifications.

Customers can count on consistent, high quality products, driven by TE's proven innovation and backed by our extraordinary customer support.

Heat Shrinkable Tubing ZCSM



TESTING

| Physical Characteristic | Test Method | Material Requirements |
|------------------------------------------------|---------------------|-------------------------------------------------------------------|
| Tensile Strength | ISO 37 | 8 MPa min. |
| Ultimate Elongation | ISO 37 | 200 % min. |
| Density | ISO/R 1138 Method A | 1,5 g/cm ³ |
| Hardness | ISO 868 | ≥ 40 shore D |
| Accelerated ageing 168 hrs at 150 °C ± 2 °C | | |
| Tensile Strength | ISO 188 | 8 MPa min |
| Ultimate Elongation | ISO 37 | 100% min |
| Low Temperature Flexibility | ASTM D 2671 | No cracking at 4 hours at -40 °C ± 3 °C |
| Dielectric Strength | IEC 60243 | 10 kV/mm min. |
| Volume Resistivity | IEC 60093 | 1x10 ¹⁰ Ω cm min. |
| Water Absorption | ISO 62 proc. A | max. 0.3% after 24 h at 23 °C max. 0.7% after 14 days at 23 °C |

Flame-retardant Characteristics, Fire Safety

| | | |
|----------------------|---------------------|-----------------------------------|
| Flammability | IEC 60332-1 | pass |
| Flame propagation | IEC 60332-1 | pass |
| Limited oxygen index | ISO 4589 | 29 min. |
| Temperature index | NES 715, type B | 250°C min |
| Smoke density | IEC 60134 | on request |
| Smoke index | NES 711 | 20 max. |
| Acid gas generation | BR TDE 76-P-16 | 1,5% max. |
| Toxicity index | NES 713 | 3 max. |
| Corrosion | ASTM D 2671 Proc. A | No corrosion after 16 h at 150 °C |

Application Characteristics

| | |
|---------------------------------------|------------------------|
| Operating temperature range | - 40 °C up to + 120 °C |
| Installation/ shrinking temperature | > 125 °C |
| Low temperature flexibility | ≥ - 40 °C |
| Shrink ratio | ≥ 2,5 : 1 |
| Longitudinal shrinkage free recovered | ≤ - 15 % |

Characteristics at a glance

- Cross-linked polyolefin, thick wall
- Color black, shrinkage ratio 2,5 : 1
- Stabilized against UV rays
- Halogen-free, non-corrosive, free of lead and aluminium
- High tensile strength and mechanical robustness
- Suitable for heat-shrink applications approved for mining, power plants, railway and rolling stock applications
- Suitable for and approved for heat-shrink applications for safety cable networks, as in high-rise buildings, public buildings, subways, road or railway tunnels

Applications in

- Low voltage insulation
- Protection against moisture and pressure
- Mechanical protection
- Corrosion protection (with approved sealing materials only)

PRODUCT SELECTION INFORMATION

| Description | Application Range (mm) | | Diameter (mm) | | Wall Thickness (mm) | |
|-------------|------------------------|------|---------------|---------------|---------------------|---------------|
| | from | to | expanded min | recovered max | expanded nom | recovered min |
| ZCSM 8/3 | 3,5 | 7 | 8 | 3 | 0,6 | 2 |
| ZCSM 16/5 | 5,5 | 14,5 | 16 | 5 | 0,7 | 2,4 |
| ZCSM 24/8 | 9 | 21,5 | 24 | 8 | 0,9 | 2,9 |
| ZCSM 32/12 | 13 | 29 | 32 | 12 | 1 | 4 |
| ZCSM 45/16 | 17,5 | 40,5 | 45 | 16 | 1 | 4 |
| ZCSM 60/22 | 24 | 54 | 60 | 22 | 1 | 4 |
| ZCSM 70/25 | 27,5 | 63 | 70 | 25 | 1 | 4 |
| ZCSM 85/36 | 39,5 | 76,5 | 85 | 36 | 1 | 4 |
| ZCSM 120/50 | 55 | 108 | 120 | 50 | 1 | 4,2 |
| ZCSM 180/75 | 82,5 | 162 | 180 | 75 | 1 | 4,2 |

Ordering information

ZCSM tubing - uncoated /U

ZCSM-8/3-1000/U
ZCSM-16/5-1000/U
ZCSM-24/8-1000/U
ZCSM-32/12-1000/U
ZCSM-45/16-1000/U
ZCSM-60/22-1000/U
ZCSM-70/25-1000/U
ZCSM-85/36-1000/U
ZCSM-120/50-1000/U
ZCSM-180/75-1000/U

* all sizes uncoated only

Other lengths and delivery on spool available on request. Please contact your local TE sales representative.

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