Protective Sleevings

INTRODUCTION

Sleeving and Shielding Solutions

Complete range of SLEEVE, WRAP-AROUND, COLD APPLIED & EDGE PROTECTION.

Performance products for demanding environments.

A range of protective sleevings are available from world leading manufacturers, providing protection for electrical harnesses, hoses and pipes against heat, abrasion, chemicals fluids and electrical noise. Applications range from commercial products through to high performance products that can be used in the most demanding environments.

Protective sleevings come in a wide variety of constructions, sizes and colours including wrap-around, push-on, heat-shrinkable, spiral binding, metal braids and protective edging.

Temperature capabilities from -70°C to +1100°C

Features & Benefits
- Mechanical protection
- Chemical resistance
- Electrical insulation
- Fluid and solvent resistance
- Moisture protection
- Strain relief, flexibility
- Aesthetic enhancement
- Fast and efficient installation

Typical Applications
Customers in a variety of aerospace, defence, energy, industrial and transport markets utilise our products in a host of applications including:

Aerospace
- Wire harnesses protection from abrasion in fuselage applications and in the wings.
- Electrical barrier against arc generated from a short circuit.
- EMI and lightning protection inside fuselage and on the wings, VTP & HTP sections.

Defence
- EMI protection on radar systems
- High temperature mechanical protection.
- NBC protection of wire harnesses.

Electronics
- Protection of wire harnesses in electrical cabinets and enclosures.
- Dielectric protection of sensitive wire harnesses.
- Protection of wiring from high temperatures.

Marine
- Thermal and mechanical protection.
- Fire protection of tubing, wiring and hoses.

Transport
- Mechanical protection of wire harnesses located in panels and inside HVAC systems.
- Protection against UV and stone impingement above and underneath the car body.
- EMI shielding to reduce emissions.
SELECTION GUIDE

ABRASION / MECHANICAL PROTECTION

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<th>Description</th>
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<td>HFT5000</td>
<td>Heatshrinkable fabric tubing</td>
<td>96</td>
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<tr>
<td>EXPANDO® PT</td>
<td>Expandable protective braid</td>
<td>98</td>
</tr>
<tr>
<td>EXPANDO® TCP</td>
<td>Expandable protective braid, low fire hazard</td>
<td>100</td>
</tr>
<tr>
<td>EXPANDO® HR</td>
<td>Expandable protective braid, high ratio</td>
<td>102</td>
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<tr>
<td>EXPANDO® PPS</td>
<td>Expandable protective braid, low smoke</td>
<td>104</td>
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<tr>
<td>EXPANDO® HTNS</td>
<td>Expandable protective braid, high temp, 1:2 ratio</td>
<td>106</td>
</tr>
<tr>
<td>EXPANDO® HTNS LA</td>
<td>Expandable protective braid, high temp, 1:3 ratio</td>
<td>108</td>
</tr>
<tr>
<td>ROUNDIT® 2000</td>
<td>Self-wrapping protective braid</td>
<td>110</td>
</tr>
<tr>
<td>ROUNDIT® 2000 FR</td>
<td>Self-wrapping protective braid, flame retardant</td>
<td>112</td>
</tr>
<tr>
<td>ROUNDIT® 2000 V0</td>
<td>Self-wrapping protective braid, low fire hazard</td>
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<tr>
<td>ROUNDIT® 2000 NX</td>
<td>Self-wrapping protective braid, high temp'</td>
<td>116</td>
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<td>ROUNDIT® 2000 NX HT</td>
<td>Self-wrapping protective braid, enhanced high temp</td>
<td>118</td>
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THERMAL MANAGEMENT

<table>
<thead>
<tr>
<th>Product Code</th>
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<tr>
<td>TEXTALU® 1202</td>
<td>Insulative high temperature sleeve</td>
<td>120</td>
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<tr>
<td>THERMOTUBIX® Industrial</td>
<td>Silicone coated high temperature sleeve</td>
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<td>Silicone coated high temperature sleeve</td>
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ELECTROMAGNETIC SHIELDING

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<tr>
<td>ROUNDIT® 2000 NX Cu/Ni</td>
<td>Self-wrapping screening and protective braid</td>
<td>124</td>
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<tr>
<td>RAYBRAID® 90 and 101/103</td>
<td>Tubular braiding for electrical screening</td>
<td>126</td>
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MISCELLANEOUS

<table>
<thead>
<tr>
<th>Product Code</th>
<th>Description</th>
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<tbody>
<tr>
<td>GTB</td>
<td>Spiral Binding</td>
<td>128</td>
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<tr>
<td>PTFE spiral binding</td>
<td></td>
<td></td>
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</tbody>
</table>

PROTECTIVE EDGING

<table>
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<tr>
<th>Product Code</th>
<th>Description</th>
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</tr>
</thead>
<tbody>
<tr>
<td>RAYRIM® and TPEM</td>
<td>Performance heatshrinkable edge protection</td>
<td>129</td>
</tr>
<tr>
<td>Spring-Fast® M22529/2</td>
<td>High performance edge protection</td>
<td>130</td>
</tr>
</tbody>
</table>
# Protective Sleeving

## Selection Guide

<table>
<thead>
<tr>
<th>Product</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Abrasion / Mechanical Protection</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HFT5000</td>
<td>Heat-shrink</td>
<td>Heat-shrinkable (2:1) fabric tubing, provides outstanding abrasion, chafing &amp; cutting protection, even at high temperatures.</td>
</tr>
<tr>
<td>Expando® PT Plus</td>
<td>Push-on</td>
<td>Highly expandable braid (1:3) with strong mechanical protection; treated to prevent end-fray; available in a variety of colours.</td>
</tr>
<tr>
<td>Expando® TCP V0</td>
<td>Push-on</td>
<td>Expandable braid (1:2) with strong mechanical protection; with low toxicity and smoke emission</td>
</tr>
<tr>
<td>Expando® HR &amp; HR Plus</td>
<td>Push-on</td>
<td>Highly expandable braid (1:3) with good mechanical protection and outstanding chemical resistance, treated to prevent end fray.</td>
</tr>
<tr>
<td>Expando® PPS</td>
<td>Push-on</td>
<td>Expandable light weight braid (1:2) with strong mechanical protection; with low toxicity and smoke emission</td>
</tr>
<tr>
<td>Expando® HTNS-L/HO</td>
<td>Push-on</td>
<td>Expandable braid (1:2) with strong mechanical protection; oil water repellent treated sleeve plus soft to the cable structure.</td>
</tr>
<tr>
<td>Expando® HTNS-LA/HO</td>
<td>Push-on</td>
<td>Expandable braid (1:3) with strong mechanical protection; oil water repellent treated sleeve plus soft to the cable structure.</td>
</tr>
<tr>
<td>Roundit® 2000</td>
<td>Wrap-around</td>
<td>Self-wrapping sleeve with strong mechanical protection; quick and easy installation on cables.</td>
</tr>
<tr>
<td>Roundit® 2000 FR</td>
<td>Wrap-around</td>
<td>Self-wrapping sleeve with strong mechanical protection; soft to the cable structure.</td>
</tr>
<tr>
<td>Roundit® 2000 V0</td>
<td>Wrap-around</td>
<td>Self-wrapping with high mechanical protection; ideal flame resistance with low toxicity and smoke emission.</td>
</tr>
<tr>
<td>Roundit® 2000 NX</td>
<td>Wrap-around</td>
<td>Self-wrapping sleeve with high mechanical protection, ideal for high temperature mechanical performance.</td>
</tr>
<tr>
<td>Roundit® 2000 NX HT</td>
<td>Wrap-around</td>
<td>Self-wrapping sleeve with high mechanical protection, ideal for high temperature mechanical performance; High Temperature</td>
</tr>
<tr>
<td><strong>Thermal Management</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Textalu® 1202</td>
<td>Push-on</td>
<td>An insulative fibreglass sleeve, with a heavy aluminium coating designed to protect components in high temperature areas.</td>
</tr>
<tr>
<td>Thermotubix® - Industrial</td>
<td>Push-on</td>
<td>Silicone coated sleeve with good resistance to high temperature, fire and molten splashes.</td>
</tr>
<tr>
<td>Thermotubix® - Aerospace</td>
<td>Push-on</td>
<td>Silicone coated sleeve with enhanced fire protection; provides excellent protection against high temperatures and fire.</td>
</tr>
<tr>
<td><strong>Electromagnetic Shielding / Screening</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Roundit® 2000 NX Cu/Ni EMI</td>
<td>Wrap-around</td>
<td>Tough self-wrapping solution; flexible and easy to install offering a combination of EMI shielding &amp; abrasion resistance long term.</td>
</tr>
<tr>
<td>Raybraid® 90 &amp; 101/103</td>
<td>Push-on</td>
<td>Tubular braiding for electrical screening of wire bundles, with minimum 90% optical coverage, greater for 101 and 103.</td>
</tr>
<tr>
<td><strong>Miscellaneous</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GTB Spiral binding</td>
<td>Wrap-around</td>
<td>PTFE spiral binding can be used in industrial and commercial environments, ideal for control panels.</td>
</tr>
<tr>
<td>Rayrim® / TPEM</td>
<td>Edge Protection</td>
<td>Commercial protective adhesive lined edging. Application on internal and external radii as well as straight edges.</td>
</tr>
<tr>
<td>Spring-Fast® Mil-Specª</td>
<td>Edge Protection</td>
<td>The fastest, safest, most reliable way to protect wires, cables and tubing from abrasion. Very flexible for sharp radii corners.</td>
</tr>
</tbody>
</table>

*Spring-Fast® other options and variations are available, please contact us for more information.*
### Protective Sleeving

#### Selection Guide

<table>
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<tr>
<th>Temp. Range</th>
<th>Specification</th>
<th>Construction</th>
<th>Sizes</th>
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</thead>
<tbody>
<tr>
<td><strong>Abrasion / Mechanical Protection</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-40°C to +150°C</td>
<td>E199379 Rated 135°C</td>
<td>Polyolefin/polyester, with 2:1 shrink ratio</td>
<td>6 to 35mm recovered</td>
</tr>
<tr>
<td>-70°C to +125°C</td>
<td>UL recognised component • MIL-DTL-235053E -70°C • ASTM D-3418 +250°C</td>
<td>Material : Polyester Colours: Black, Natural and others</td>
<td>3 to 64mm</td>
</tr>
<tr>
<td>-50°C to +150°C</td>
<td>NF 16101 • NF 16102 • ASTM E662 • ASTM E162:</td>
<td>Material : UL 94 VO Rated Polyester Colour: Black with grey tracer</td>
<td>3 to 50 mm</td>
</tr>
<tr>
<td>-70°C to +150°C</td>
<td>UL 1441 VW-1 Flammability • FAR Part 25</td>
<td>Material: Halar® (E-CTFE) Fluoropolymer Colour: Black with white tracer / inverse</td>
<td>3 to 64 mm</td>
</tr>
<tr>
<td>-70°C to +200°C</td>
<td>UL 1441 VW-1 Flammability • FAR Part 25 • ASTM E662 Smoke</td>
<td>Material: Polyphenylene sulfide Colour: Black or Natural</td>
<td>3 to 45 mm</td>
</tr>
<tr>
<td>-60°C to +240°C</td>
<td>EN 6049-003 • PAN 6480P • FAR Part 25 • UL 224 • UL 94</td>
<td>Material: Nomex® Colour: Olive Green</td>
<td>2 to 40 mm</td>
</tr>
<tr>
<td>-60°C to +240°C</td>
<td>EN6049-004 • FAR Part 25 • UL 224 • UL 94</td>
<td>Material: Nomex® Colour: Olive Green</td>
<td>3 to 50 mm</td>
</tr>
<tr>
<td>-70°C to +125°C</td>
<td>FMVSS-302 Test Method D45 1333 Self-extinguishing Type B</td>
<td>Material : Polyester Colour: Black</td>
<td>5 to 45 mm</td>
</tr>
<tr>
<td>-50°C to +150°C</td>
<td>NF 16101 - 16102: I2 F2 • ASTM E662 • ASTM E162</td>
<td>Material : Flame-retardant Polyester Colour: Black</td>
<td>5 to 50 mm</td>
</tr>
<tr>
<td>-50°C to +150°C</td>
<td>NF 16101 • NF 16102 • ASTM E662 • ASTM E162:</td>
<td>Material: UL 94 VO Rated Polyester Colour: Black</td>
<td>5 to 50 mm</td>
</tr>
<tr>
<td>-60°C to +200°C</td>
<td>FAR Part 25</td>
<td>Material: Nomex® and PPS Colour: Olive Green</td>
<td>5 to 40 mm</td>
</tr>
<tr>
<td>-60°C to +260°C</td>
<td>FAR Part 25</td>
<td>Material: Nomex® and PEEK Colour: Olive Green with twin ivory tracer</td>
<td>5 to 40 mm</td>
</tr>
<tr>
<td><strong>Thermal Management</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-50°C to +550°C</td>
<td>FMVSS 302 test D45 1333 Type A • ISO 6722</td>
<td>Material: Fibreglass, Aluminium Colour: Aluminium grey</td>
<td>5 to 24 mm</td>
</tr>
<tr>
<td>-54°C to +260°C</td>
<td>Flame resistant</td>
<td>Material: Fibreglass and silicone Colour: Reddish-brown</td>
<td>8 to 101 mm</td>
</tr>
<tr>
<td>-54°C to +260°C</td>
<td>Flame resistant • 15 min withstand @ 1100°C</td>
<td>Material: Fibreglass and silicone Colour: Reddish-brown</td>
<td>8 to 101 mm</td>
</tr>
<tr>
<td><strong>Electromagnetic Shielding / Screening</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-60°C to +200°C</td>
<td>EN 6049-008 • FAR Part 25</td>
<td>Material: Nickel-plated copper &amp; polyester Colour: Olive Green</td>
<td>5 to 38 mm</td>
</tr>
<tr>
<td>up to +150°C</td>
<td></td>
<td>Material: Series 90 &amp; 101 Tinned Copper; Series 103 Nickel Copper</td>
<td>3 to 30 mm*</td>
</tr>
<tr>
<td><strong>Miscellaneous</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-70°C to +260°C</td>
<td>PAN 6480 • AS4 1088</td>
<td>Material: PTFE Colour: Black</td>
<td>3 to 25 mm</td>
</tr>
<tr>
<td>-55°C to +80°C</td>
<td></td>
<td>Material: Polyolefin Colour: Black</td>
<td>0.6 to 4.2 mm</td>
</tr>
<tr>
<td>-40°C to +185°C</td>
<td>FAR Part 25 • MIL-STD-202F • AS9000 Compliant • FAA/CAA Recognised</td>
<td>Material: Polymer coated, stainless steel. Plus polymer cushion</td>
<td>0.6 to 6.6 mm</td>
</tr>
</tbody>
</table>

* Raybraid® 101/103 is available in sizes 3 to 20mm only

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HFT5000
Polyolefin/polyester construction
Heat-shrinkable fabric tubing

AbrasIon and Mechanical Protection
HFT5000 is made from a very flexible heat-shrinkable fabric and at temperatures above +110°C shrinks to fit securely around a range of shapes and sizes. Designed to provide mechanical abrasion protection, noise and rattle suppression, for components such as rubber hoses, plastic pipes, and harness wiring bundles.

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

Features & Benefits
• 2:1 shrink ratio for easy installation
• Highly flexible woven construction
• Outstanding abrasion resistance over a wide temperature range
• Resistance to harsh environments
• Easily cut with standard industrial cutting equipment
• Low shrink temperature for safe installation onto heat sensitive substrates
• Halogen free

Operating Temperature
• From -40°C to +125°C (3000 hours)
• From -40°C to +150°C (1000 hours)

Installation
• Minimum shrink temperature +110°C
• Minimum full recovery +140°C to +190°C
• Maximum storage temperature +60°C

Materials Description
Warp material: Polyester
Weft material: Irradiated, modified polyolefin
Coating: Modified polyolefin

Specifications & Approvals
• UL E199379 135°C
• RW2060

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**Protective Sleeving**

**HFT5000**

*Polyolefin/polyester construction*

*Heat-shrinkable fabric tubing*

---

**Properties**

<table>
<thead>
<tr>
<th>Test</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>+23°C</td>
<td>No wear to underlying rubber hose</td>
</tr>
<tr>
<td>+80°C</td>
<td>No wear to underlying rubber hose</td>
</tr>
<tr>
<td>+135°C</td>
<td>No wear to underlying rubber hose</td>
</tr>
</tbody>
</table>

**Thermal aging**

<table>
<thead>
<tr>
<th>Test</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>3000 hrs at +125°C</td>
<td>No deterioration at +80°C</td>
</tr>
<tr>
<td>1000 hrs at +150°C</td>
<td>No deterioration +80°C</td>
</tr>
</tbody>
</table>

**Flammability**

<table>
<thead>
<tr>
<th>Test</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>MVSS302</td>
<td>Pass</td>
</tr>
</tbody>
</table>

**Low temperature flexibility**

<table>
<thead>
<tr>
<th>Test</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 hrs at -40°C &amp; +125°C</td>
<td>No cracking</td>
</tr>
</tbody>
</table>

**Cold impact**

<table>
<thead>
<tr>
<th>Test</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>200g weight from 100mm at -40°C</td>
<td>No cracking</td>
</tr>
</tbody>
</table>

**Thermal shock**

<table>
<thead>
<tr>
<th>Test</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 cycles between -40°C and +125°C</td>
<td>No deterioration at +80°C</td>
</tr>
</tbody>
</table>

**Fluid resistance:**

- Antifreeze (50% ethylene glycol)
- Engine oil (SAE 10w/30)
- Mineral hydraulic fluid
- Detergent (1% Teepol)
- Brake fluid (DOT 4)
- Unleaded gasoline
- Diesel fuel
- Battery acid (1.25 SG H₂SO₄).

<table>
<thead>
<tr>
<th>Test</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>24hrs immersion at +23°C</td>
<td>No deterioration in abrasion resistance at +80°C</td>
</tr>
</tbody>
</table>

---

**Inside Diameter**

<table>
<thead>
<tr>
<th>Inside Diameter</th>
<th>Std Pack Size</th>
<th>Part Number</th>
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</thead>
<tbody>
<tr>
<td>Supplied (mm)</td>
<td>Recovered (mm)</td>
<td>Spools (SP)</td>
</tr>
<tr>
<td>4</td>
<td>2</td>
<td>500m</td>
</tr>
<tr>
<td>6</td>
<td>3</td>
<td>500m</td>
</tr>
<tr>
<td>12</td>
<td>6</td>
<td>500m</td>
</tr>
<tr>
<td>20</td>
<td>10</td>
<td>400m</td>
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<td>30</td>
<td>15</td>
<td>400m</td>
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<td>40</td>
<td>20</td>
<td>300m</td>
</tr>
<tr>
<td>50</td>
<td>25</td>
<td>200m</td>
</tr>
<tr>
<td>60</td>
<td>30</td>
<td>200m</td>
</tr>
<tr>
<td>70</td>
<td>35</td>
<td>150m</td>
</tr>
</tbody>
</table>

**Note:** The fully recovered wall thickness will be approximately 1mm and longitudinal shrinkage on full recovery is between 10% and 20%.

**Part Number Example:** HFT5000-60/30-0-SP  
60mm inside diameter, black tubing, supplied on a spool.

**Ordering Information**

- **Standard colour:** 0 = Black
- **Size selection:** The largest size that will fit snugly over the component(s)
- **Standard packaging:** Spools (SP), for MOQ please contact us.
- **Ordering description:** Specify product name, size and colour: HFT5000-20/10-0-SP

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Protective Sleeving

EXPANDO® PT and PT Plus
Polyester (PET)
Expandable braided sleeving

Abrasion and Mechanical Protection
Tough, lightweight over sleeves used to protect cable assemblies, hose and wire harnesses from chafing, cutting and abrading. The open-braid construction of Expando products enables each size to expand to fit several application shapes and diameters. This open-textile construction also makes them highly flexible and resistant to trapping water, heat and humidity.

Expando PT and Expando PT Plus are braided polyester (PET) sleeves designed for applications up to 125°C. General purpose industrial/commercial products, Expando PT and PT Plus balance the properties of mechanical and thermal stability with economy.

The patented ‘Plus’ treatment makes end termination neater and easier, by creating a webbing between the filaments of the sleeving to reduce end fray during installation and through the life of the product, allowing it to be cut with ordinary scissors.

Expando PT and Expando PT Plus over sleeves have many applications in the marine, electronic and general manufacturing industries. Retains flexibility at low temperatures making both versions ideal for exposed applications in weather stations, navigation beacons and radar antennas.

Features & Benefits
• Abrasion resistant
• Halogen free
• 1:3 expansion ratio
• Does not trap heat or humidity
• Rot free
• Self extinguishing when used to encase typical non-flammable wires or cables.
• ‘Plus’ version eliminates the need for hot-knife cutting
• Available in 6 colours

Operating Temperature
• From -70°C to +125°C

Specifications & Approvals
• UL Recognised component

Notes
Longitudinal shrinkage should be taken into account when utilising the full expansion properties of the sleeve. Available in spool lengths as standard, or as cut to length to requirements to special order.

For further information on this or other products in our range, or for assistance with your specific requirements, please contact us.

All numeric data shows average or typical values.
### Protective Sleeving

**EXPANDO® PT and PT Plus**

Polyester (PET)

Expandable braided sleeving

<table>
<thead>
<tr>
<th>Properties</th>
<th>Test</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Melt Temperature</td>
<td>ASTM D-2117</td>
<td>+250°C</td>
</tr>
<tr>
<td>Low Temperature flexibility</td>
<td>MIL-DTL-23053E</td>
<td>-70°C</td>
</tr>
<tr>
<td>Copper Corrosivity</td>
<td>MIL-I-23053</td>
<td>No Effect</td>
</tr>
</tbody>
</table>

**Smoke Density**

- ASTM E-1354
- D<sub>mc</sub> = 2.12

**Hard Vacuum**

- TML (Mass)
- CVCM (Condensation)
- WVR (Steam)

- MIL-E-595
- 0.30%
- 0.03%
- 0.16%

Expando sleeving products made with the ‘Plus’ treatment should not be used in hard vacuum environments nor immersed in solvents, or liquids where ‘Plus’ particles could contaminate the system environment. Consult us for info.

**Fluid resistance**

- Hydraulic Fluid (MIL-H-5606)
- Lube Oil (MIL-I-7808)
- De-icing Fluid (MIL-A-8243)
- Salt Water (OS-1926)

- MIL-I-23053
- Tensile Retention
  - 100%
  - 99%
  - 100%
  - 99%
  - 100%

### Recommended Application Range

<table>
<thead>
<tr>
<th>Minimum Ø (mm)</th>
<th>Maximum Ø (mm)</th>
<th>Nom g/m</th>
<th>Pack Size</th>
<th>Part Number</th>
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<tbody>
<tr>
<td>2</td>
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<td>2.62</td>
<td>600m</td>
<td>Expando PT 3-Colour</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2.62</td>
<td></td>
<td>Expando PT Plus 3-Colour</td>
</tr>
<tr>
<td>3</td>
<td>11</td>
<td>4.32</td>
<td>300m</td>
<td>Expando PT 6-Colour</td>
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<td></td>
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<td>3.93</td>
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<td>Expando PT 10-Colour</td>
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<td>9.49</td>
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<td>Expando PT Plus 10-Colour</td>
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<tr>
<td>6</td>
<td>19</td>
<td>12.60</td>
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<td>Expando PT 13-Colour</td>
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<td>11.61</td>
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</tr>
<tr>
<td>13</td>
<td>32</td>
<td>19.64</td>
<td>150m</td>
<td>Expando PT 19-Colour</td>
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<td>18.01</td>
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<td>Expando PT Plus 19-Colour</td>
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<tr>
<td>19</td>
<td>45</td>
<td>26.19</td>
<td>75m</td>
<td>Expando PT 32-Colour</td>
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<td></td>
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<td>24.85</td>
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<td>Expando PT Plus 32-Colour</td>
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<tr>
<td>32</td>
<td>70</td>
<td>44.20</td>
<td>75m</td>
<td>Expando PT 45-Colour</td>
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<td>42.56</td>
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<td>Expando PT Plus 45-Colour</td>
</tr>
<tr>
<td>38</td>
<td>89</td>
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<td>Expando PT 51-Colour</td>
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<td>53.34</td>
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<td>Expando PT Plus 51-Colour</td>
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<td>45</td>
<td>114</td>
<td>58.17</td>
<td>75m</td>
<td>Expando PT 64-Colour</td>
</tr>
<tr>
<td></td>
<td></td>
<td>63.40</td>
<td></td>
<td>Expando PT Plus 64-Colour</td>
</tr>
</tbody>
</table>

**Part Number Example; Expando PT 13-0**

- 13mm inside diameter, black tubing, supplied in 150m spools.

**Ordering Information**

- Preferred colour: 0 = Black
- Non preferred colours: 3 = Orange, 4 = Yellow, 6 = Blue, 8 = Grey, 9 = Natural/White
- Standard packaging: Spools only, for MOQ please contact us

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EXPANDO® TCP V0
UL94 V0 rated Polyester
Expandable braided sleeving

Abrasions and Mechanical Protection
Expando® TCP V0 is an expandable braided sleeve manufactured from modified polyester monofilaments classified UL 94 V0 which offers excellent flame-retardant properties. It is designed for the protection of tubing and maintenance of wire and cable bundles and commonly used on Rail and Military ground vehicles.

This product has a highly expandable structure which allows for easy installation over long lengths, even after fitting of end connectors. Expando TCP V0 has an expansion ratio of 1:2 which enables a large number of diameters to be covered with a limited range of sizes.

The properties of the monofilament ensure excellent performance of this sleeve in the most diverse and hostile environments. The product is used in a wide range of industries including railway and electrical/electronic devices.

Features & Benefits
• 1:2 expansion ratio
• UL 94 V0 raw material
• Zero halogen
• Self extinguishing
• Excellent abrasion resistance
• Easy installation over long lengths

Operating Temperature
• From -50°C to +150°C

Specifications & Approvals
• UL94 V0 Rated (raw material)
• EN 45545-2

Notes
Longitudinal shrinkage should be taken into account when utilising the full expansion properties of the sleeve. Available in spool lengths as standard, or as cut to length to requirements to special order.

For further information on this or other products in our range, or for assistance with your specific requirements, please contact us.

All numeric data shows average or typical values.
## Protective Sleeving

**EXPANDO® TCP V0**

UL94 V0 rated Polyester

Expandable braided sleeving

### Properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Test</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abrasion resistance</td>
<td>NF F 63-808</td>
<td>Pass</td>
</tr>
<tr>
<td><strong>Fire / Smoke / Toxicity</strong></td>
<td>UL 94, NF 16101 / 16102, DIN 5510 § 2 &amp; 54837, CEI 20-38, ASTM E 662 - ASTM E 162, EN 45545-2</td>
<td>Raw material classified V0, I2 - F1 Zero halogen, S4, SR2, ST2, T=1.3, Pass, R22, HL3, R23, HL3</td>
</tr>
<tr>
<td>Fluid resistance</td>
<td>EN 6059-303, Immersion 24hrs @ 70°C</td>
<td>No visible degradation or alteration after being exposed.</td>
</tr>
</tbody>
</table>

### Fluid resistance

- Hydraulic fluids: NATO.0.156

### Recommended Range

<table>
<thead>
<tr>
<th>Minimum Ø (mm)</th>
<th>Maximum Ø (mm)</th>
<th>Std Pack Size</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>5</td>
<td>200m</td>
<td>TCP-V0-3mm-Colour</td>
</tr>
<tr>
<td>4</td>
<td>8</td>
<td>200m</td>
<td>TCP-V0-5mm-Colour</td>
</tr>
<tr>
<td>5</td>
<td>9</td>
<td>200m</td>
<td>TCP-V0-6mm-Colour</td>
</tr>
<tr>
<td>6</td>
<td>12</td>
<td>200m</td>
<td>TCP-V0-8mm-Colour</td>
</tr>
<tr>
<td>7</td>
<td>15</td>
<td>100m</td>
<td>TCP-V0-10mm-Colour</td>
</tr>
<tr>
<td>10</td>
<td>18</td>
<td>100m</td>
<td>TCP-V0-12mm-Colour</td>
</tr>
<tr>
<td>12</td>
<td>23</td>
<td>50m</td>
<td>TCP-V0-15mm-Colour</td>
</tr>
<tr>
<td>16</td>
<td>28</td>
<td>50m</td>
<td>TCP-V0-20mm-Colour</td>
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<tr>
<td>21</td>
<td>35</td>
<td>50m</td>
<td>TCP-V0-25mm-Colour</td>
</tr>
<tr>
<td>26</td>
<td>45</td>
<td>50m</td>
<td>TCP-V0-30mm-Colour</td>
</tr>
<tr>
<td>36</td>
<td>60</td>
<td>50m</td>
<td>TCP-V0-40mm-Colour</td>
</tr>
<tr>
<td>45</td>
<td>75</td>
<td>50m</td>
<td>TCP-V0-50mm-Colour</td>
</tr>
</tbody>
</table>

**Part Number Example; Expando TCP-V0-15-Black**

12mm to 23mm inside diameter, black sleeving, supplied in 50m spools as standard.

**Ordering Information**

- Standard Colour: 0 = Black, with grey tracer; or 8 = Grey with black tracer
- Standard packaging: Spools only, for MOQ please contact us

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Protective Sleeving

EXPANDO® HR and HR Plus
Halar® (E-CTFE) Fluoropolymer
Tough, lightweight expandable sleeving

Abrasione and Mechanical Protection
Expando® HR is an expandable sleeve constructed of Halar® (E-CTFE) fluoropolymer that is designed for applications up to 150°C. Inherently flame-retardant, it is a UL Recognised Component which meets VW-1 requirements and will not melt and drip on direct exposure to flame. Expando HR is a special purpose, highly reliable solution for military and aerospace applications. It offers good mechanical properties, performs well in both high and low temperature environments and has outstanding chemical resistance.

The patented ‘Plus’ treatment makes end termination neater and easier, by creating a webbing between the filaments of the sleeving to reduce end fray during installation, allowing it to be cut with ordinary scissors. This reduces assembly time and eliminates the need for proper ventilation equipment required for hot-knife cutting.

Expando HR protective oversleeve has many uses in the aerospace, marine, electronic, military, nuclear and general manufacturing industries.

Expando products are tough, lightweight over sleeves used to protect cable assemblies, hoses and wire harnesses from chafing, cutting and abrading. The open-weave construction of Expando products enables each size to expand to fit several application shapes and sizes. This open-weave construction also makes them highly flexible and resistant to trapping water, heat and humidity.

* Halar is a registered trademark of Solvay Solexis

Specifications & Approvals
- UL Recognised component

Notes
Longitudinal shrinkage should be taken into account when utilising the full expansion properties of the sleeve. Available in spool lengths as standard, or as cut to length to requirements to special order.

For further information on this or other products in our range, or for assistance with your specific requirements, please contact us.

All numeric data shows average or typical values.

Features & Benefits
- Excellent abrasion resistance
- 1:3 expansion ratio
- Flame resistant
- UL recognised component
- Low vacuum outgassing

Operating Temperature
- From -70°C to +150°C
## Properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Test</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Melt Temperature</td>
<td>ASTM D-2117</td>
<td>+240°C</td>
</tr>
<tr>
<td>Low Temperature flexibility</td>
<td>MIL-DTL-23053E</td>
<td>-70°C</td>
</tr>
<tr>
<td>Copper Corrosivity</td>
<td>MIL-I-23053</td>
<td>No Effect</td>
</tr>
</tbody>
</table>

### Expando HR vs HR Plus

<table>
<thead>
<tr>
<th>Property</th>
<th>Expando HR</th>
<th>HR Plus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flammability</td>
<td>VW-1</td>
<td>VW-1 classified</td>
</tr>
<tr>
<td>Smoke Density</td>
<td>$D_{mc}=0.30$</td>
<td>$D_{mc}=0.30$</td>
</tr>
<tr>
<td>Hard Vacuum</td>
<td></td>
<td>Expando sleeving products made with the ‘Plus’ treatment should not be used in hard vacuum environments nor immersed in solvents, or liquids where ‘Plus’ particulates could contaminate the system environment. Consult us for info.</td>
</tr>
<tr>
<td>Fluid resistance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>JP4 Jet Fuel (MIL-T-5624)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hydraulic Fluid (MIL-H-5606)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lube Oil (MIL-I-7808)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>De-icing Fluid (MIL-A-8243)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Salt Water (O-S-1926)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Recommended Application Range

<table>
<thead>
<tr>
<th>Minimum Ø (mm)</th>
<th>Maximum Ø (mm)</th>
<th>Nom g/m</th>
<th>Spools</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>6</td>
<td>4.02</td>
<td>600m</td>
<td>HR-3mm-Colour</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>HR-Plus-3mm-Colour</td>
</tr>
<tr>
<td>3</td>
<td>11</td>
<td>5.96</td>
<td>300m</td>
<td>HR-6mm-Colour</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>HR-Plus-6mm-Colour</td>
</tr>
<tr>
<td>6</td>
<td>19</td>
<td>17.9</td>
<td>150m</td>
<td>HR-13mm-Colour</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>HR-Plus-13mm-Colour</td>
</tr>
<tr>
<td>12</td>
<td>32</td>
<td>26.85</td>
<td>150m</td>
<td>HR-19mm-Colour</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>H-Plus-19mm-Colour</td>
</tr>
<tr>
<td>19</td>
<td>45</td>
<td>34.31</td>
<td>150m</td>
<td>HR-32mm-Colour</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>HR-Plus-32mm-Colour</td>
</tr>
<tr>
<td>32</td>
<td>70</td>
<td>56.69</td>
<td>75m</td>
<td>HR-45mm-Colour</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>HR-Plus-45mm-Colour</td>
</tr>
</tbody>
</table>

### Part Number Example; Expando HR-32-Black

19mm to 45mm inside diameter, black tubing, supplied in 150m spools.

### Ordering Information

- **Preferred colours:** Black with white tracer, or White with black tracer
- **Standard packaging:** Spools only, for MOQ please contact us

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EXPANDO® PPS
Polyphenylene Sulfide
Expandable braided sleeving

Abrasion and Mechanical Protection
Expando® PPS (Polyphenylene Sulfide) is an expandable sleeve designed for mechanical protection in high temperatures. Rated to +200°C, and meets VW-1 flame test requirements.

The inherent properties of PPS gives low levels of flammability, toxicity, smoke generation and hard vacuum off gassing. Because of its high use temperature, Expando PPS resists damage from high temperature air guns used with heat-shrinkable elements such as strain reliefs, terminations and identification sleeves.

Expando PPS is used in the aerospace industry for its outstanding properties in extreme environments. This product should be considered for aircraft, space, military, marine and hostile environment applications.

Expando products are tough, lightweight over sleeves used to protect cable assemblies, hoses and wire harnesses from chafing, cutting and abrading. The open-weave construction of Expando products enables each size to expand to fit several application shapes and sizes. This open-weave construction also makes them highly flexible and resistant to trapping water, heat and humidity.

Features & Benefits
- 1:3 expansion ratio
- High temperature capability
- Meets VW-1 requirements
- BMS 13-52 Type III
- Low toxicity, smoke generation and out gassing

Operating Temperature
- From -70°C to +200°C

Notes
Longitudinal shrinkage should be taken into account when utilising the full expansion properties of the sleeve. Available in spool lengths as standard, or as cut to length to requirements to special order.

For further information on this or other products in our range, or for assistance with your specific requirements, please contact us.

All numeric data shows average or typical values.

Specifications & Approvals
- BMS 13-52 Type III

RoHS Compliant

1:3 expansion ratio
### Protective Sleeving

**EXPANDO® PPS**  
Polyphenylene Sulfide  
Expandable braided sleeving

<table>
<thead>
<tr>
<th>Properties</th>
<th>Test</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Melt temperature</td>
<td>ASTM D-3418</td>
<td>285°C</td>
</tr>
<tr>
<td>Low temperature flexibility</td>
<td>MIL-DTL-23053E</td>
<td>-70°C</td>
</tr>
<tr>
<td>Flammability</td>
<td>UL 1441</td>
<td>VW-1</td>
</tr>
<tr>
<td></td>
<td>FAR Part 25</td>
<td>Pass</td>
</tr>
<tr>
<td>Smoke Density</td>
<td>ASTM E662</td>
<td>Dmax &lt;50</td>
</tr>
<tr>
<td>Copper Corrosivity</td>
<td>MIL-I-23053</td>
<td>No effect</td>
</tr>
<tr>
<td>Hard Vacuum</td>
<td>ASTM E-595</td>
<td>Meets industry limits</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1.0% max</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.1% max</td>
</tr>
<tr>
<td>Fluid resistance</td>
<td>MIL-DTL-23053</td>
<td>No visible degradation or alteration after being exposed. Retains &gt;97% of its initial breaking strength</td>
</tr>
</tbody>
</table>

- **Test Results**  
  - **Melt temperature**: 285°C  
  - **Low temperature flexibility**: -70°C  
  - **Flammability**: VW-1  
  - **Smoke Density**: Dmax <50  
  - **Copper Corrosivity**: No effect  
  - **Hard Vacuum**: Meets industry limits  
  - **Fluid resistance**: No visible degradation or alteration after being exposed. Retains >97% of its initial breaking strength

### Recommended Application Range

<table>
<thead>
<tr>
<th>Minimum Ø (mm)</th>
<th>Maximum Ø (mm)</th>
<th>Nom g/m</th>
<th>Pack Size</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
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<td>3.44</td>
<td>610m</td>
<td>Expando-PPS-3mm-Colour</td>
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<tr>
<td>3</td>
<td>13</td>
<td>5.89</td>
<td>305m</td>
<td>Expando-PPS-6mm-Colour</td>
</tr>
<tr>
<td>6</td>
<td>19</td>
<td>12.11</td>
<td>152m</td>
<td>Expando-PPS-13mm-Colour</td>
</tr>
<tr>
<td>13</td>
<td>32</td>
<td>14.24</td>
<td>152m</td>
<td>Expando-PPS-19mm-Colour</td>
</tr>
<tr>
<td>25</td>
<td>45</td>
<td>26.34</td>
<td>76m</td>
<td>Expando-PPS-32mm-Colour</td>
</tr>
<tr>
<td>32</td>
<td>64</td>
<td>28.72</td>
<td>76m</td>
<td>Expando-PPS-45mm-Colour</td>
</tr>
</tbody>
</table>

### Ordering Information

- **Part Number Example; Expando-PPS-6mm-Black**  
  3mm to 13mm inside diameter, black sleeving, supplied in 305m spools as standard.

- **Standard Colour:** Black or Natural  
- **Standard packaging:** Spools only, for MOQ please contact us

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EXPANDO® HTNS L/HO
Meta Aramid NOMEX®
Expandable braided sleeving

Abrasıon and Mechanical Protection
Expando® HTNS-L/HO is a thin wall braided sleeve manufactured from Meta-Aramid Nomex®. Its highly expandable structure allows easy installation over long lengths after fitting of end connectors with a limited range of product sizes.

Expando HTNS-L/HO’s flexible, expandable and non-flammable properties ensure excellent performance in the most diverse and aggressive environments. The product is designed for protection of wire and cable bundles against flame, high temperatures and mechanical abrasion.

The properties of Expando HTNS-L/HO ensure excellent resistance to gamma and x-rays.

Expando HTNS-L/HO has an oil and water repellent treatment (HO) to reduce humidity absorption and to improve impermeability to fluids.

Expando products are tough, lightweight over sleeves used to protect cable assemblies, hoses and wire harnesses from chafing, cutting and abrading. The open-weave construction of Expando products enables each size to expand to fit several application shapes and sizes. This open-weave construction also makes them highly flexible and resistant to trapping water, heat and humidity.

Ideal for military, marine and aerospace applications.

* Nomex is a registered trademark of E.I. DuPont de Nemours.

Features & Benefits
- 1:2 expansion ratio
- Thin wall
- Lightweight
- Self-extinguishing
- Excellent abrasion protection
- Resistant to gamma and x-rays
- Oil/water repellent

Operating Temperature
- From -60°C to +240°C (continuous) and up to +310°C (short term).

Specifications & Approvals
- EN 6049-003
- PAN 6480P

Notes
Longitudinal shrinkage should be taken into account when utilising the full expansion properties of the sleeve. Available in spool lengths as standard, or as cut to length to requirements to special order.

For further information on this or other products in our range, or for assistance with your specific requirements, please contact us.

All numeric data shows average or typical values.
EXPANDO® HTNS L/HO
Meta Aramid NOMEX®
Expandable braided sleeving

Properties | Test | Results
---|---|---
Carbonisation | Above +370°C | Does not melt
Abrasion resistance | EN 6059 Part 403 | Pass
Bending strength | 50,000 bending cycles at +180°C | Excellent
Flame resistance (self-extinguishing properties) | UL 224, UL 94, FAR 25 AMDT.25-72§ 853(b) | VW-1, Base material classified VO, Pass
Humidity resistance | 1000hrs at +150°C in air saturated with water vapour | Retains 70% of its original tensile strength
Water/oil repellent treatment | EN 6059 Part 305 | Pass
Fluid resistance | • JP4 Jet Fuel, NATO F44
• Hydraulic fluids: Skydrol 500B4 & L D4
• Mineral oil, MIL-L-7870A
• Synthetic oil, MIL-L-23699
• Cleaning fluids: Forane 141B & MIL-L-87936
• De-icing fluid, MIL-A-8243 | EN 6059 Part 303 (24hrs with various temperatures) | Pass

Recommended Application Range

<table>
<thead>
<tr>
<th>Minimum Ø (mm)</th>
<th>Maximum Ø (mm)</th>
<th>Nom g/m</th>
<th>Pack Size</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>2.70</td>
<td>100m</td>
<td>HTNS-L/HO-2mm-Green</td>
</tr>
<tr>
<td>2</td>
<td>4</td>
<td>4.00</td>
<td>100m</td>
<td>HTNS-L/HO-4mm-Green</td>
</tr>
<tr>
<td>4</td>
<td>8</td>
<td>8.00</td>
<td>100m</td>
<td>HTNS-L/HO-6mm-Green</td>
</tr>
<tr>
<td>6</td>
<td>12</td>
<td>12.00</td>
<td>50m</td>
<td>HTNS-L/HO-8mm-Green</td>
</tr>
<tr>
<td>8</td>
<td>16</td>
<td>14.00</td>
<td>50m</td>
<td>HTNS-L/HO-10mm-Green</td>
</tr>
<tr>
<td>10</td>
<td>20</td>
<td>17.00</td>
<td>50m</td>
<td>HTNS-L/HO-15mm-Green</td>
</tr>
<tr>
<td>12</td>
<td>24</td>
<td>22.00</td>
<td>50m</td>
<td>HTNS-L/HO-20mm-Green</td>
</tr>
<tr>
<td>15</td>
<td>30</td>
<td>32.50</td>
<td>50m</td>
<td>HTNS-L/HO-25mm-Green</td>
</tr>
<tr>
<td>20</td>
<td>40</td>
<td>38.00</td>
<td>50m</td>
<td>HTNS-L/HO-30mm-Green</td>
</tr>
</tbody>
</table>

Part Number Example; Expando HTNS-L/HO-10mm-Green
8mm to 16mm inside diameter, Olive-Green sleeving, supplied in 50m spools as standard.

Ordering Information
Standard Colour: Green (Olive Green)
Standard packaging: Spools only, for MOQ please contact us

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**EXPANDO® HTNS LA/HO**

**Meta Aramid NOMEX®**

Expandable braided sleeving

### Abrasion and Mechanical Protection

Expando® HTNS-LA/HO is a thin wall braided sleeve manufactured from Meta-Aramid Nomex®. Its highly expandable structure of 1:3 allows easy installation over long lengths after fitting of end connectors with a limited range of product sizes.

Expando HTNS-LA/HO’s flexible, expandable and non-flammable properties ensure excellent performance in the most diverse and aggressive environments. The product is designed for protection of wire and cable bundles against flame, high temperatures and mechanical abrasion.

The properties of Expando HTNS-LA/HO ensure excellent resistance to gamma and x-rays.

Expando HTNS-LA/HO has an oil and water repellent treatment (HO) to reduce humidity absorption and to improve impermeability to fluids.

Expando products are tough, lightweight over sleeves used to protect cable assemblies, hoses and wire harnesses from chafing, cutting and abrading. The open-weave construction of Expando products enables each size to expand to fit several application shapes and sizes. This open-weave construction also makes them highly flexible and resistant to trapping water, heat and humidity.

Ideal for military, marine and aerospace applications.

* Nomex is a registered trademark of E.I. DuPont de Nemours.

### Features & Benefits

- 1:3 expansion ratio
- Thin wall
- Lightweight
- Self-extinguishing
- Excellent abrasion protection
- Resistant to gamma and x-rays
- Oil/water repellent

### Operating Temperature

- From -60°C to +240°C (continuous) and up to +310°C (short term).

### Specifications & Approvals

- EN 6049-003
- PAN 6480P

### Notes

Longitudinal shrinkage should be taken into account when utilising the full expansion properties of the sleeve. Available in spool lengths as standard, or as cut to length to requirements to special order.

For further information on this or other products in our range, or for assistance with your specific requirements, please contact us.

All numeric data shows average or typical values.
Protective Sleeving

EXPANDO® HTNS LA/HO
Meta Aramid NOMEX®
Expandable braided sleeving

<table>
<thead>
<tr>
<th>Properties</th>
<th>Test</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbonisation</td>
<td>Above +370°C</td>
<td>Does not melt</td>
</tr>
<tr>
<td>Abrasion resistance</td>
<td>EN 6059 Part 403</td>
<td>Pass</td>
</tr>
<tr>
<td>Bending strength</td>
<td>50,000 bending cycles at +180°C</td>
<td>Excellent</td>
</tr>
<tr>
<td>Flame resistance (self-extinguishing properties)</td>
<td>UL 224, UL 94, FAR 25 AMDT.25-72§ 853(b)</td>
<td>VW-1, Base material classified VO, Pass</td>
</tr>
<tr>
<td>Humidity resistance</td>
<td>1000hrs at +150°C in air saturated with water vapour</td>
<td>Retains 70% of its original tensile strength</td>
</tr>
<tr>
<td>Water/oil repellent treatment</td>
<td>EN 6059 Part 305</td>
<td>Pass</td>
</tr>
<tr>
<td>Fluid resistance</td>
<td>EN 6059 Part 303 (24hrs with various temperatures)</td>
<td>Pass</td>
</tr>
<tr>
<td>• JP4 Jet Fuel, NATO F44</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Hydraulic fluids:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Skydrol 500B4 &amp; L D4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Mineral oil, MIL-L-7870A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Synthetic oil, MIL-L-23699</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Cleaning fluids:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Forane 141B &amp; MIL-L-87936</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• De-icing fluid, MIL-A-8243</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Recommended Application Range

<table>
<thead>
<tr>
<th>Minimum Ø (mm)</th>
<th>Maximum Ø (mm)</th>
<th>Nom g/m</th>
<th>Pack Size</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>6</td>
<td>5.50</td>
<td>100m</td>
<td>HTNS-LA/HO-5mm-Green</td>
</tr>
<tr>
<td>5</td>
<td>15</td>
<td>11.00</td>
<td>100m</td>
<td>HTNS-LA/HO-10mm-Green</td>
</tr>
<tr>
<td>8</td>
<td>24</td>
<td>18.00</td>
<td>100m</td>
<td>HTNS-LA/HO-15mm-Green</td>
</tr>
<tr>
<td>12</td>
<td>36</td>
<td>22.00</td>
<td>50m</td>
<td>HTNS-LA/HO-25mm-Green</td>
</tr>
<tr>
<td>22</td>
<td>60</td>
<td>31.00</td>
<td>50m</td>
<td>HTNS-LA/HO-40mm-Green</td>
</tr>
</tbody>
</table>

### Part Number Example; HTNS-L/HO-10mm-Green
8mm to 16mm inside diameter, Olive-Green sleeving, supplied in 50m spools as standard.

### Ordering Information
- **Standard Colour:** Green (Olive Green)
- **Standard packaging:** Spools only, for MOQ please contact us

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ROUNDIT® 2000
Polyester
Self Wrap-around sleeving

Abrasion and Mechanical Protection
Roundit® 2000 is a wrap-around sleeving manufactured from modified monofilament and textured polyester yarn, designed for mechanical protection and maintenance of wire and cable bundles. Its construction with 100% covering ratio provides excellent cut-through and abrasion resistance.

The self-wrapping feature of Roundit® 2000 allows for quick and easy installation and removal of the product for assembly and maintenance applications. Roundit® 2000 may be applied or removed without any manipulation of connectors or fittings and offers an innovative solution in areas where breakouts are required.

Its wrapable construction allows stocking of a limited range of sizes to cover a wide range of diameters. The ‘Roundit®-Tool’, a special assembly tool, is also available to ease installation.

Roundit® 2000 has many applications in the aerospace, motorsport, marine, defence, railway, electronics and manufacturing industries.

For installation it is recommended to maintain a minimum of 25% overlap at all times.

Features & Benefits
• Excellent cut-through and abrasion resistance
• Self wrapping design
• Easy to apply and remove
• Ideal for retro-fit and maintenance without having to disconnect components
• Lightweight construction
• Aesthetic solution

Operating Temperature
• From -70°C to +125°C

Specifications & Approvals
• UL Recognised component, versions also available.

Notes
Maximum application size is determined by wrapping product around a mandrel of a given size to obtain 90° of overlap (average value).

Application Tool
A professional aluminium assembly tool ‘ROUNDIT-TOOL’ is available for sizes 5, 8, 13 and 19mm, see table. Please note that a basic red plastic tool used for demonstration is also available free of charge on request.

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www.isgroup-international.com
## Properties

<table>
<thead>
<tr>
<th>Test</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Melt Temperature</td>
<td>+256ºC</td>
</tr>
<tr>
<td>Low Temperature flexibility</td>
<td>-70ºC</td>
</tr>
<tr>
<td>Copper Corrosivity</td>
<td>No effect</td>
</tr>
<tr>
<td>Fire Resistance</td>
<td>Self-extinguishing, type B</td>
</tr>
<tr>
<td>Smoke Density</td>
<td>Please ask for info</td>
</tr>
</tbody>
</table>

### Hard Vacuum
- TML (Mass)
- CVCM (Condensation)
- WVR (Steam)

<table>
<thead>
<tr>
<th>Test</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASTM E-595</td>
<td>0.63%</td>
</tr>
<tr>
<td></td>
<td>0.16%</td>
</tr>
<tr>
<td></td>
<td>0.06%</td>
</tr>
</tbody>
</table>

### Fluid resistance
- Hydraulic Fluid (MIL-H-5606)
- Lube Oil (MIL-I-7808)
- De-icing Fluid (MIL-A-8243)
- Salt Water (O-S-1926)

<table>
<thead>
<tr>
<th>Test</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>MIL-I-23053</td>
<td>Tensile Retention</td>
</tr>
<tr>
<td></td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td>100%</td>
</tr>
</tbody>
</table>

### Application Range

<table>
<thead>
<tr>
<th>Min Ø mm</th>
<th>Max Ø mm</th>
<th>Weight g/m</th>
<th>Pack Size Spools (m)</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5</td>
<td>11</td>
<td>150</td>
<td>Roundit-2000-5mm-Black</td>
</tr>
<tr>
<td>5</td>
<td>8</td>
<td>14</td>
<td>100</td>
<td>Roundit-2000-8mm-Black</td>
</tr>
<tr>
<td>10</td>
<td>13</td>
<td>21</td>
<td>50</td>
<td>Roundit-2000-13mm-Black</td>
</tr>
<tr>
<td>16</td>
<td>19</td>
<td>28</td>
<td>25</td>
<td>Roundit-2000-19mm-Black</td>
</tr>
<tr>
<td>19</td>
<td>25</td>
<td>39</td>
<td>25</td>
<td>Roundit-2000-25mm-Black</td>
</tr>
<tr>
<td>25</td>
<td>29</td>
<td>41</td>
<td>25</td>
<td>Roundit-2000-29mm-Black</td>
</tr>
<tr>
<td>29</td>
<td>32</td>
<td>45</td>
<td>25</td>
<td>Roundit-2000-32mm-Black</td>
</tr>
<tr>
<td>32</td>
<td>38</td>
<td>54</td>
<td>25</td>
<td>Roundit-2000-38mm-Black</td>
</tr>
</tbody>
</table>

### Application Tool

- 5 Single end
- 8 Single end
- 13 Single end
- 5, 8 and 13, 19 Double end

**Part Number Example; Roundit-2000-13mm-Black**
13mm inside diameter, black sleeving, supplied in 50m spools as standard.

**Ordering Information**
- Standard Colour: 0 = Black
- Standard packaging: Spools only, for MOQ please contact us

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ROUNDIT® 2000 FR
Flame Retardant Polyester
Self Wrap-around sleeving

Abrasion and Mechanical Protection
Roundit® 2000FR is a wrap-around sleeving manufactured from flame-retardant polyester monofilaments and multifilaments, designed for mechanical protection and maintenance of wire and cable bundles. Its construction with 100% covering ratio provides excellent cut-through and abrasion resistance.

The self-wrapping feature of Roundit® 2000FR allows for quick and easy installation and removal of the product for assembly and maintenance applications. Roundit® 2000FR may be applied or removed without any manipulation of connectors or fittings and offers an innovative solution in areas where breakouts are required.

Its wrappable construction allows stocking of a limited range of sizes to cover a wide range of diameters. The ‘Roundit®-Tool’, a special assembly tool, is also available to ease installation.

Roundit® 2000FR has many applications in the aerospace, motorsport, marine, defence, railway, electronics and manufacturing industries.

For installation it is recommended to maintain a minimum of 25% overlap at all times

Features & Benefits
• Excellent abrasion resistance
• Flame retardant
• Zero halogen
• Self wrapping design
• Easy to apply and remove
• Ideal for retro-fit and maintenance without having to disconnect components
• Lightweight construction
• Aesthetic solution

Operating Temperature
• From -50°C to +150°C

Specifications & Approvals
• NF16101/16102
• EN 45545-2

Notes
Maximum application size is determined by wrapping product around a mandrel of a given size to obtain 90° of overlap (average value).

For further information on this or other products in our range, or for assistance with your specific requirements, please contact us.

All numeric data shows average or typical values.

Application Tool
A professional aluminium assembly tool ‘ROUNDIT-TOOL’ is available for sizes 5, 8, 13 and 19mm, see table. Please note that a basic red plastic tool used for demonstration is also available free of charge on request.
ROUNDIT® 2000 FR
Flame Retardant Polyester
Self Wrap-around sleeving

Properties | Test | Results
---|---|---
Filament Melt Temperature | NF EN ISO 4589-2 | +250°C
Oxygen Index | NF F 63-808 | IO 31.75%
Dynamic Cut Through | BS G212 | Pass
Abrasion Resistance | | Pass
Fluid resistance | EN 6059-303 | No visible degradation or alteration after being exposed
• Hydraulic fluids: NATO.0.156 | NF 16 101 & NF 16 102 | I2 - F2
DB DIN 5510 § 2 & 54 837 | S4, SR2, ST2
UNI CEI 20-38 | T = 1.7
ASTM E 662 - ASTM E 162 | Pass
EN 45545-2 | R22, HL3, R23, HL3

Fire / Smoke / Toxicity
NF 16 101 & NF 16 102
DB DIN 5510 § 2 & 54 837
UNI CEI 20-38
ASTM E 662 - ASTM E 162
EN 45545-2

Application Range | Weight | Pack Size | Part Number
---|---|---|---
Min Ø mm | Max Ø mm | g/m | Spools (m)
1 | 5 | 9 | 150m | Roundit-2000FR-5mm-Black
5 | 8 | 12 | 100m | Roundit-2000FR-8mm-Black
8 | 13 | 18 | 50m | Roundit-2000FR-13mm-Black
13 | 19 | 25 | 25m | Roundit-2000FR-19mm-Black
19 | 25 | 36 | 25m | Roundit-2000FR-25mm-Black
25 | 29 | 37 | 25m | Roundit-2000FR-29mm-Black
29 | 32 | 43 | 25m | Roundit-2000FR-32mm-Black
32 | 38 | 54 | 25m | Roundit-2000FR-38mm-Black
38 | 50 | 75 | 25m | Roundit-2000FR-50mm-Black**

** Size 50 is made of two sizes 25 sewn together.

Application Tool

<table>
<thead>
<tr>
<th>Application Tool</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 Single end</td>
</tr>
<tr>
<td>Roundit-Tool-5</td>
</tr>
<tr>
<td>8 Single end</td>
</tr>
<tr>
<td>Roundit-Tool-8</td>
</tr>
<tr>
<td>13 Single end</td>
</tr>
<tr>
<td>Roundit-Tool-13</td>
</tr>
<tr>
<td>5, 8 and 13, 19 Double ended</td>
</tr>
<tr>
<td>Roundit-Two-Head</td>
</tr>
</tbody>
</table>

Part Number Example; Roundit-2000FR-13mm-Black
13mm inside diameter, black sleeving, supplied in 50m spools as standard.

Ordering Information
Standard Colour: 0 = Black
Standard packaging: Spools only, for MOQ please contact us

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Protective Sleeving

ROUNDIT® 2000 V0
UL94 V0 Rated Polyester
LFH Wrap-around sleeving

Abras ion and Mechanical Protection
Roundit® 2000V0 is a wrap-around sleeving manufactured from UL 94 V0 rated flame-retardant polyester monofilaments and multifilaments, designed for mechanical protection and maintenance of wire and cable bundles and has excellent cut-through and abrasion resistance.

The self-wrapping feature of Roundit® 2000V0 allows for quick and easy installation and removal of the product for assembly and maintenance applications. Roundit® 2000V0 may be applied or removed without any manipulation of connectors or fittings and offers an innovative solution in areas where breakouts are required.

 Its wrapable construction allows stocking of a limited range of sizes to cover a wide range of diameters. The ‘Roundit®-Tool’, a special assembly tool, is also available to ease installation.

Roundit® 2000V0 has many applications in the aerospace, motorsport, marine, defence, railway, electronics and manufacturing industries.

For installation it is recommended to maintain a minimum of 25% overlap at all times

Features & Benefits

• Excellent abrasion resistance
• Self extinguishing
• Halogen free
• Self wrapping design
• Easy to apply and remove
• Ideal for retro-fit and maintenance without having to disconnect components
• Lightweight construction
• Aesthetic solution

Operating Temperature

• From -50°C to +150°C

Specifications & Approvals

• UL94 V0 Rated (raw material)
• EN 45545-2

Notes

Maximum application size is determined by wrapping product around a mandrel of a given size to obtain 90° of overlap (average value).

For further information on this or other products in our range, or for assistance with your specific requirements, please contact us.

All numeric data shows average or typical values.

Application Tool

A professional aluminium assembly tool ‘ROUNDIT-TOOL’ is available for sizes 5, 8, 13 and 19mm, see table. Please note that a basic red plastic tool used for demonstration is also available free of charge on request.
### Properties

<table>
<thead>
<tr>
<th>Test</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Filament Melt Temperature</td>
<td>+240°C</td>
</tr>
<tr>
<td>Oxygen Index</td>
<td>IO 37%</td>
</tr>
<tr>
<td>Fluid resistance:</td>
<td></td>
</tr>
<tr>
<td>- Hydraulic fluids: NATO.0.156</td>
<td></td>
</tr>
<tr>
<td>EN 6059-303</td>
<td>No visible degradation or alteration after being exposed</td>
</tr>
<tr>
<td>Abrasion Resistance</td>
<td>ISO 6722</td>
</tr>
<tr>
<td></td>
<td>1464 cycles (size 19)</td>
</tr>
</tbody>
</table>

### Fire / Smoke / Toxicity

- Filament Melt Temperature: +240°C
- Oxygen Index: IO 37%
- Fluid resistance:
  - Hydraulic fluids: NATO.0.156
  - EN 6059-303
  - Immersion for 24hrs at +70°C
- Abrasion Resistance: ISO 6722
- 1464 cycles (size 19)
- Raw material classified V0
- I2 - F2 Halogen free
- S4, SR2, ST2
- T=1.4
- R = 1.3, A0 = 0.193, OI = 34.9%
- Pass
- R22, HL3, R23, HL3

### Application Range

<table>
<thead>
<tr>
<th>Min Ø mm</th>
<th>Max Ø mm</th>
<th>g/m</th>
<th>Pack Size</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5</td>
<td>7</td>
<td>150m</td>
<td>Roundit-2000-V0-5mm-Black</td>
</tr>
<tr>
<td>5</td>
<td>8</td>
<td>9</td>
<td>100m</td>
<td>Roundit-2000-V0-8mm-Black</td>
</tr>
<tr>
<td>8</td>
<td>13</td>
<td>14</td>
<td>50m</td>
<td>Roundit-2000-V0-13mm-Black</td>
</tr>
<tr>
<td>13</td>
<td>19</td>
<td>18</td>
<td>25m</td>
<td>Roundit-2000-V0-19mm-Black</td>
</tr>
<tr>
<td>19</td>
<td>25</td>
<td>24</td>
<td>25m</td>
<td>Roundit-2000-V0-25mm-Black</td>
</tr>
<tr>
<td>25</td>
<td>29</td>
<td>28</td>
<td>25m</td>
<td>Roundit-2000-V0-29mm-Black</td>
</tr>
<tr>
<td>29</td>
<td>32</td>
<td>31</td>
<td>25m</td>
<td>Roundit-2000-V0-32mm-Black</td>
</tr>
<tr>
<td>32</td>
<td>38</td>
<td>35</td>
<td>25m</td>
<td>Roundit-2000-V0-38mm-Black</td>
</tr>
<tr>
<td>38</td>
<td>50</td>
<td>58</td>
<td>25m</td>
<td>Roundit-2000-V0-50mm-Black</td>
</tr>
</tbody>
</table>

### Application Tool

- 5 Single end: Roundit-Tool-5
- 8 Single end: Roundit-Tool-8
- 13 Single end: Roundit-Tool-13
- 5, 8 and 13, 19 Double ended: Roundit-Two-Head

### Part Number Example: Roundit-2000V0-13mm-Black

13mm inside diameter, black sleeving, supplied in 50m spools as standard.

### Ordering Information

- Standard Colour: 0 = Black, with white tracer
- Standard packaging: Spools only, for MOQ please contact us

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ROUNDIT® 2000 NX
Polyphenylene Sulfide and NOMEX®
High temperature wrap-around sleeving

Abrasion and Mechanical Protection
Roundit® 2000 NX is a woven combination of Nomex® and PPS (polyphenylene sulfide). The Nomex®/PPS blend in flat weave construction gives Roundit 2000 NX a rugged yet smooth texture and appearance for high temperature bundling and abrasion resistance. This product is rated to +200°C and is non-halogenated.

Roundit 2000 NX is ideal for commercial and defence aircraft applications due to its excellent abrasion resistance and halogen-free qualities.

Roundit® products are tough, lightweight over sleeves used to bundle and protect cable assemblies, hoses and wire harnesses from chafing, cutting and abrading. The self-wrapping feature of Roundit products allows quick and easy application and removal of the product for assembly and maintenance.

The product may also be applied or removed without disturbing connectors or fittings.

* Nomex is a registered trademark of E.I. DuPont de Nemours.

Features & Benefits
• Excellent cut-through and abrasion resistance
• Halogen free
• Tough fabric texture
• Oil and water repellent
• Self-wrapping design

Operating Temperature
• From -60°C to +200°C (continuous) and up to +220°C (short term).

Specifications & Approvals
• EN 6049-006
• BMS 13-81 Type 1
• DMS2379 Class 4, type 4
• JN1149

Notes
Maximum application size is determined by wrapping product around a mandrel of a given size to obtain 90° of overlap (average value).

For further information on this or other products in our range, or for assistance with your specific requirements, please contact us.

All numeric data shows average or typical values.

Application Tool
A professional aluminium assembly tool ‘ROUNDIT-TOOL’ is available for sizes 5, 8, 13 and 19mm, see table. Please note that a basic red plastic tool used for demonstration is also available free of charge on request.
### Protective Sleeving

**ROUNDIT® 2000 NX**

Polyphenylene Sulfide and NOMEX®

High temperature wrap-around sleeving

<table>
<thead>
<tr>
<th>Properties</th>
<th>Test</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Classification flammability</td>
<td>ABD 031 &amp; FAR 25§ 853</td>
<td>Conforms - no halogen content</td>
</tr>
<tr>
<td>Smoke density/toxicity</td>
<td>NF F 16-101</td>
<td>F3, I4</td>
</tr>
<tr>
<td>Water repellent</td>
<td>EN 6059 Part 305</td>
<td>Pass</td>
</tr>
<tr>
<td>Abrasion resistant</td>
<td>EN 6059 Part 403</td>
<td>Pass</td>
</tr>
<tr>
<td>Dynamic cut-through</td>
<td>EN 6059 Part 405</td>
<td>Pass</td>
</tr>
<tr>
<td>Vibrations</td>
<td>DO 160B</td>
<td>No cable abrasion</td>
</tr>
<tr>
<td>Mould growth</td>
<td>EN 6059 Part 306</td>
<td>Pass</td>
</tr>
</tbody>
</table>

#### Fluid resistance

- JP4 Jet Fuel (NATO F44)
- Hydraulic Fluid, Skydrol 500B4
- Mineral oil, MIL-L-7870A
- Synthetic oil, MIL-L-23699
- Cleaning fluids MIL-L-87936
- De-icing fluid, MIL-A-8243

<table>
<thead>
<tr>
<th>Test</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>EN 6059-303</td>
<td>Good resistance</td>
</tr>
</tbody>
</table>

#### Application Range

<table>
<thead>
<tr>
<th>Min Ø mm</th>
<th>Max Ø mm</th>
<th>Weight g/m</th>
<th>Pack Size Spools (m)</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5</td>
<td>13</td>
<td>150m</td>
<td>Roundit-2000-NX-5mm-Colour</td>
</tr>
<tr>
<td>5</td>
<td>8</td>
<td>18</td>
<td>100m</td>
<td>Roundit-2000-NX-8mm-Colour</td>
</tr>
<tr>
<td>8</td>
<td>13</td>
<td>26</td>
<td>50m</td>
<td>Roundit-2000-NX-13mm-Colour</td>
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<tr>
<td>16</td>
<td>19</td>
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<td>25m</td>
<td>Roundit-2000-NX-19mm-Colour</td>
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<tr>
<td>19</td>
<td>25</td>
<td>47</td>
<td>25m</td>
<td>Roundit-2000-NX-25mm-Colour</td>
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<td>25</td>
<td>32</td>
<td>65</td>
<td>25m</td>
<td>Roundit-2000-NX-32mm-Colour</td>
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<tr>
<td>32</td>
<td>40</td>
<td>90</td>
<td>25m</td>
<td>Roundit-2000-NX-40mm-Colour</td>
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</tbody>
</table>

#### Application Tool

- 5 Single end: Roundit-Tool-5
- 8 Single end: Roundit-Tool-8
- 13 Single end: Roundit-Tool-13
- 5, 8 and 13, 19 Double ended: Roundit-Two-Head

### Part Number Example; Roundit-2000-NX-13mm-Green

13mm inside diameter, black sleeving, supplied in 50m spools as standard.

### Ordering Information

- Standard Colour: Green (Olive Green)
- Other colours: Red, Orange
- Standard packaging: Spools only, for MOQ please contact us

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**Protective Sleeving**

**ROUNDIT® 2000 NX HT**

**PEEK Monofilaments and NOMEX®**

High temperature wrap-around sleeving

Abrasional and Mechanical Protection

Roundit® 2000 NX HT is a woven combination of PEEK monofilaments and Nomex® multifilaments. It includes an oil and water repellent treatment in order to prevent the absorption of condensation build-up caused by the extreme changes aircraft are subjected to. Designed for mechanical protection and maintenance of wire and cable bundles, its 100% covering ratio provides excellent cut through and abrasion resistance.

Roundit® products are tough, lightweight over sleeves used to bundle and protect cable assemblies, hoses and wire harnesses from chafing, cutting and abrading. The self-wrapping feature of Roundit products allows quick and easy application and removal of the product for assembly and maintenance. The product may also be applied or removed without disturbing connectors or fittings.

This high temperature version is differentiated from the standard Roundit 2000 NX by a wide ivory tracer on the outer side.

*Nomex is a registered trademark of E.I. DuPont de Nemours.

**Features & Benefits**

- Excellent cut-through and abrasion resistance
- Halogen free
- Tough fabric texture
- Oil and water repellent
- Self-wrapping design

**Operating Temperature**

- From -70°C to +260°C

**Specifications & Approvals**

- EN 6049-007

**Notes**

Maximum application size is determined by wrapping product around a mandrel of a given size to obtain 90° of overlap (average value).

For further information on this or other products in our range, or for assistance with your specific requirements, please contact us.

All numeric data shows average or typical values.

**Application Tool**

A professional aluminium assembly tool ‘ROUNDIT-TOOL’ is available for sizes 5, 8, 13 and 19mm, see table. Please note that a basic red plastic tool used for demonstration is also available free of charge on request.
ROUNDIT® 2000 NX HT
PEEK Monofilaments and NOMEX®
High temperature wrap-around sleeving

**Properties**

<table>
<thead>
<tr>
<th>Test</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flammability &amp; Smoke</td>
<td>ABD 031 &amp; FAR 25§ 853 Conforms - no halogen content</td>
</tr>
<tr>
<td>Water repellent</td>
<td>EN 6059 Part 305 Pass</td>
</tr>
<tr>
<td>Abrasion resistant</td>
<td>EN 6059 Part 403 Pass</td>
</tr>
<tr>
<td>Dynamic cut-through</td>
<td>EN 6059 Part 405 Pass</td>
</tr>
<tr>
<td>Mould growth</td>
<td>DO 160B No cable abrasion</td>
</tr>
<tr>
<td></td>
<td>EN 6059 Part 306 Pass</td>
</tr>
</tbody>
</table>

**Fluid resistance**
- JP4 Jet Fuel (OTAN F44)
- Hydraulic Fluid, Skydrol 500B4
- Mineral oil, MIL-L-7870A
- Synthetic oil, MIL-L-23699
- Cleaning fluids MIL-L-87936
- De-icing fluid, MIL-A-8243
- EN 6059-303 Good resistance

<table>
<thead>
<tr>
<th>Application Range</th>
<th>Weight</th>
<th>Pack Size</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Min Ø mm</td>
<td>Max Ø mm</td>
<td>g/m</td>
<td>Spools (m)</td>
</tr>
<tr>
<td>1</td>
<td>5</td>
<td>20</td>
<td>150m</td>
</tr>
<tr>
<td>5</td>
<td>8</td>
<td>27</td>
<td>100m</td>
</tr>
<tr>
<td>8</td>
<td>13</td>
<td>39</td>
<td>50m</td>
</tr>
<tr>
<td>13</td>
<td>19</td>
<td>60</td>
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<td>19</td>
<td>25</td>
<td>73</td>
<td>25m</td>
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<td>32</td>
<td>93</td>
<td>25m</td>
</tr>
<tr>
<td>32</td>
<td>40</td>
<td>116</td>
<td>25m</td>
</tr>
</tbody>
</table>

**Application Tool**
- 5 Single end: Roundit-Tool-5
- 8 Single end: Roundit-Tool-8
- 13 Single end: Roundit-Tool-13
- 5, 8 and 13, 19 Double ended: Roundit-Two-Head

**Part Number Example; Roundit-2000-NX-HT-13mm-Green**
13mm inside diameter, black sleeving, supplied in 50m spools as standard.

**Ordering Information**
- Standard Colour: Green (Olive Green)
- Standard packaging: Spools only, for MOQ please contact us

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Protective Sleeving

**TEXTALU® 1202**
Glass fibre, Aluminium coating
Thermal Sleeving

**Thermal Management**

Textalu® 1202 is an insulative fibreglass sleeving with a heavy aluminium coating designed to protect components in high temperature areas. It produces superior insulation to components that must maintain stable temperature to assure performance efficiency. The infra-red emissivity rating of Textalu 1202 heavy aluminium coating, combined with its fibreglass braid, ensures temperature stability inside the sleeving despite external fluctuations due to radiant heat.

**Features & Benefits**

- Fibreglass liner withstand up to +550ºC
- Excellent thermal protection
- High flexibility

**Operating Temperature**

- From -40ºC to +200ºC

**Specifications & Approvals**

- ISO 6722 Heat ageing
- FMVSS 302 flame resistance

**Properties**

<table>
<thead>
<tr>
<th>Test</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heat ageing</td>
<td>ISO 6722 240h at 225ºC</td>
</tr>
<tr>
<td>Flame resistance</td>
<td>FMVSS 302, test method D45 1333</td>
</tr>
<tr>
<td>Fluid resistance</td>
<td>D47 1924</td>
</tr>
<tr>
<td>Motor, oil, protection oil, mineral hydraulic, automatic transmission fluid &amp; zinc chloride.</td>
<td></td>
</tr>
<tr>
<td>Engine coolant</td>
<td>D47 1924</td>
</tr>
<tr>
<td>Unleaded petrol &amp; diesel.</td>
<td>Immersion for 15s @ 22ºC followed by drying period of 24h @ 175ºC.</td>
</tr>
<tr>
<td></td>
<td>Immersion for 24h @ 118ºC</td>
</tr>
<tr>
<td></td>
<td>Immersion for 24h @ 40ºC</td>
</tr>
</tbody>
</table>

**Inside Diameter**

<table>
<thead>
<tr>
<th>Inside Diameter (mm)</th>
<th>Wall Thickness (mm)</th>
<th>Pack Size</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>0.55</td>
<td>200m</td>
<td>TEXTALU-1202-5mm</td>
</tr>
<tr>
<td>8</td>
<td>0.65</td>
<td>150m</td>
<td>TEXTALU-1202-8mm</td>
</tr>
<tr>
<td>10</td>
<td>0.75</td>
<td>150m</td>
<td>TEXTALU-1202-10mm</td>
</tr>
<tr>
<td>12</td>
<td>0.75</td>
<td>150m</td>
<td>TEXTALU-1202-12mm</td>
</tr>
<tr>
<td>15</td>
<td>0.75</td>
<td>150m</td>
<td>TEXTALU-1202-15mm</td>
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<tr>
<td>18</td>
<td>1.00</td>
<td>100m</td>
<td>TEXTALU-1202-18mm</td>
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<tr>
<td>20</td>
<td>1.50</td>
<td>50m</td>
<td>TEXTALU-1202-20mm</td>
</tr>
<tr>
<td>22</td>
<td>1.50</td>
<td>50m</td>
<td>TEXTALU-1202-22mm</td>
</tr>
</tbody>
</table>

**Part Number Example; TEXTALU-1202-5mm**

5mm inside diameter, supplied in 200m spools as standard.

**Ordering Information**

- Standard Colour: Aluminium grey
- Standard packaging: Spools only

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Thermal Management
Thermotubix® industrial is a thick wall sleeving with knitted fibreglass inner lining with an external coating of flame retardant silicone rubber. Providing an effective protection against sustained high temperatures, flames and molten splashes that can seriously damage electrical cables and hydraulic, gas and lubricant supply lines. Typically used in Rail, Steel and Petrochemical industries to protect against hazards including high temperature exposure.

Features & Benefits
- Excellent thermal protection
- High flexibility
- Commercial grade

Operating Temperature
- From -54°C to +260°C

<table>
<thead>
<tr>
<th>Inside Diameter</th>
<th>Wall Thickness</th>
<th>Std Pack Size</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal (mm)</td>
<td>mm</td>
<td>Spools</td>
<td></td>
</tr>
<tr>
<td>8.0</td>
<td>3.0</td>
<td>15m</td>
<td>THERMOTUBIX-IND-8</td>
</tr>
<tr>
<td>9.5</td>
<td>3.0</td>
<td>15m</td>
<td>THERMOTUBIX-IND-9.5</td>
</tr>
<tr>
<td>12.7</td>
<td>3.0</td>
<td>15m</td>
<td>THERMOTUBIX-IND-12.7</td>
</tr>
<tr>
<td>16.0</td>
<td>3.0</td>
<td>15m</td>
<td>THERMOTUBIX-IND-16</td>
</tr>
<tr>
<td>19.0</td>
<td>3.0</td>
<td>15m</td>
<td>THERMOTUBIX-IND-19</td>
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<tr>
<td>22.0</td>
<td>3.0</td>
<td>15m</td>
<td>THERMOTUBIX-IND-22</td>
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<tr>
<td>25.0</td>
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<td>THERMOTUBIX-IND-45</td>
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<td>51.0</td>
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<td>15m</td>
<td>THERMOTUBIX-IND-51</td>
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<tr>
<td>57.0</td>
<td>3.0</td>
<td>15m</td>
<td>THERMOTUBIX-IND-57</td>
</tr>
<tr>
<td>64.0</td>
<td>3.0</td>
<td>15m</td>
<td>THERMOTUBIX-IND-64</td>
</tr>
<tr>
<td>76.0</td>
<td>3.0</td>
<td>15m</td>
<td>THERMOTUBIX-IND-76</td>
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<tr>
<td>89.0</td>
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<td>15m</td>
<td>THERMOTUBIX-IND-89</td>
</tr>
<tr>
<td>101.0</td>
<td>3.0</td>
<td>15m</td>
<td>THERMOTUBIX-IND-101</td>
</tr>
</tbody>
</table>

Part Number Example; THERMOTUBIX-IND-25 25mm inside Ø, supplied in 15m spools as standard.

Ordering Information
Standard Colour: Red iron oxide
Standard packaging: Spools only, for MOQ please contact us

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THERMOTUBIX® Aerospace
Glass fibre, Silicone
Thermal Sleeving

Thermal Management
Thermotubix® Aerospace sleeving is a thickwall braided fibreglass inner lining, coated with a specially compounded, flame retardant silicone rubber. This product can be easily installed on cables and hoses and expands to pass over fittings and couplings.

The aerospace grade offers an effective protection against sustained high temperatures, flames and molten metal splashes that can seriously damage electrical cables and hydraulic, gas and lubricant supply lines.

The construction of Thermotubix Aerospace ensures an excellent fire protection for tubing up to +1100°C peak temperature according to SAE-ASTM specifications.

This product provides thermal protection against internal and external hazards in a variety of industries, including aerospace, marine, iron and steel, plus automotive.

Features & Benefits
• Fire protection up to +1100°C (15 min) and +800°C (30 min).
• Flexibility to -54°C
• Resistant to hydraulic fluids and lubricating oils.

Operating Temperature
• From -54°C to +260°C

Specifications & Approvals
• SAE Aerospace AS 1072 Type 2
• Tested in accordance with UL 73 and conform to UL 181 standards.
• EN 45545-2

Notes
Also available with an indelible ink marking, for more information please contact us.

For further information on this or other products in our range, or for assistance with your specific requirements, please contact us.

All numeric data shows average or typical values.

Thermobande®
There is also a coated fibreglass tape, called Thermobande® available. This is often used for fire protection of tubing after the fitting of end terminations.

Available in six different sizes ranging from 25mm to 152mm wide, to accommodate most situations.

Please contact us for more information.
THERMOTUBIX® Aerospace
Glass fibre, Silicone
Thermal Sleeving

<table>
<thead>
<tr>
<th>Properties</th>
<th>Test</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low temperature flexibility</td>
<td>ASTM D-746</td>
<td>-54°C</td>
</tr>
<tr>
<td>Peak temperature</td>
<td></td>
<td>15 min. at +1100°C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>30 min. at +800°C</td>
</tr>
<tr>
<td>Flammability</td>
<td>ASTM D-350, Method B</td>
<td>Not flammable</td>
</tr>
<tr>
<td>Fire / Smoke / Toxicity</td>
<td>NF 16101 &amp; NF 16102</td>
<td>I2 F0</td>
</tr>
<tr>
<td></td>
<td>DIN 5510 §2 &amp; 54837</td>
<td>S4, SR2, ST2</td>
</tr>
<tr>
<td></td>
<td>DIN EN ISO 5659-2</td>
<td>CIT 8 min: 0.036 / FED 30 min: 0.031</td>
</tr>
<tr>
<td></td>
<td>EN 45545-2</td>
<td>R22, HL3, R23, HL3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&gt; 64mm R9 HL3</td>
</tr>
<tr>
<td>Fluid resistance</td>
<td>1 Hour soak in: Gasoline,</td>
<td>No cracking or degradation resulted from</td>
</tr>
<tr>
<td></td>
<td>Engine oil, Power steering fluid, Transmission fluid, Coolant, Battery acid.</td>
<td>soak in any of the tested fluids.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Inside Diameter</th>
<th>Wall Thickness</th>
<th>Std Pack Size</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal (mm)</td>
<td>mm</td>
<td>Spools</td>
<td></td>
</tr>
<tr>
<td>8.0</td>
<td>4.0</td>
<td>30m</td>
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<tr>
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<td>12.7</td>
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<td>30m</td>
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<td>16.0</td>
<td>4.0</td>
<td>30m</td>
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<td>4.0</td>
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<td>THERMOTUBIX-89</td>
</tr>
<tr>
<td>101.0</td>
<td>4.0</td>
<td>6m</td>
<td>THERMOTUBIX-101</td>
</tr>
</tbody>
</table>

6m and 9m standard packaging spools are supplied in one continuous length 15m and 30m with variable cut lengths with a minimum of 4.5m length.

Part Number Example; THERMOTUBIX-51 51mm inside Ø, supplied in 9m spools as standard.

Ordering Information
Standard Colour: Red iron oxide
Standard packaging: Spools only, for MOQ please contact us

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Protective Sleeving

ROUNDIT® 2000NX EMI Cu/Ni
Polyphenylene Sulfide and NOMEX®
Self-wrapping electromagnetic shielding

Electromagnetic Shielding and Screening
Roundit® 2000NX EMI Cu/Ni is a self-wrapping sleeve designed for mechanical protection and EMI shielding of wire and cable bundles. The outer layer, which supplies the abrasion resistance, is manufactured from PPS monofilaments and Nomex® with an oil and water repellent treatment. The inner layer is composed of nickel-plated copper (Cu/Ni), which provides the EMI insulation. The outer layer construction with a 100% covering ratio provides excellent cut-through and abrasion resistance.

Roundit 2000 NX EMI is also available with an internal layer of PTFE tape; allowing wire harnesses to be protected from the internal metal layer. The self-wrapping feature allows for quick and easy installation and removal of the product for assembly and maintenance.

Roundit 2000 NX EMI has many applications in the aerospace and defence industries from aircraft seating looms to RN Vessels

* Nomex is a registered trademark of E.I. DuPont de Nemours.

Features & Benefits
- High performance EMI shielding
- Halogen free
- Oil and water repellent
- Salt spray resistant (500 hours)

Operating Temperature
- From -60°C to +200°C

Specifications & Approvals
- ASD EN 6049-008

Notes
Nominal size is determined by wrapping product around a mandrel of a given size to obtain 90° of overlap (average value).

For further information on this or other products in our range, or for assistance with your specific requirements, please contact us.

All numeric data shows average or typical values.

Application Tool
A professional aluminium assembly tool ‘ROUNDIT-TOOL’ is available for sizes 5, 8, 13 and 19mm, see table. Please note that a basic red plastic tool used for demonstration is also available free of charge on request.

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### Properties

<table>
<thead>
<tr>
<th>Properties</th>
<th>Test</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rapid change of temperature</td>
<td>EN2591-305</td>
<td>Pass</td>
</tr>
<tr>
<td>Fire / Smoke / Toxicity</td>
<td>ABD 013 &amp; FAR 25 § 853</td>
<td>Pass</td>
</tr>
<tr>
<td>Water repellency</td>
<td>EN 6059 Part 305</td>
<td>Pass</td>
</tr>
<tr>
<td>Abrasion resistance</td>
<td>EN 6059 Part 403</td>
<td>Pass</td>
</tr>
<tr>
<td>Dynamic cut-through</td>
<td>EN 6059 Part 405</td>
<td>Pass</td>
</tr>
</tbody>
</table>

### Chemical

**Fluid resistance**
- Jet fuel: JP4 (Otan F44)
- Hydraulic fluid: Skydro 500 B4
- Mineral oil: MIL-L-7870A
- Synthetic oil: MIL-L-23699
- Cleaning fluids: MIL-L-87936
- De-icing fluid: MIL-A-8243

<table>
<thead>
<tr>
<th>Test</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>EN 6059-303</td>
<td>Good resistance</td>
</tr>
</tbody>
</table>

**Salt spray resistance**

<table>
<thead>
<tr>
<th>Test</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>EN 2591-307 for 500 hours</td>
<td>Pass</td>
</tr>
<tr>
<td>ASTM B355</td>
<td>Class 27 Nickel plated copper</td>
</tr>
</tbody>
</table>

**Mould growth**

<table>
<thead>
<tr>
<th>Test</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>EN 6059 Part 306</td>
<td>Pass</td>
</tr>
</tbody>
</table>

### EMI Performances

**Transfer Impedance**

| IEC 60512-23-3 Triaxial method | Size 11: Ro = 3.45 mΩ/m |

### Inside Diameter

<table>
<thead>
<tr>
<th>Inside Diameter</th>
<th>Max Weight</th>
<th>Pack Size</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal (mm)</td>
<td>Max (mm)</td>
<td>Nom g/m</td>
<td>Spools</td>
</tr>
<tr>
<td>6</td>
<td>10.0</td>
<td>83</td>
<td>50m ROUNDIT-2000-NX-EMI-*^6mm-Green</td>
</tr>
<tr>
<td>11</td>
<td>14.8</td>
<td>131</td>
<td>50m ROUNDIT-2000-NX-EMI-*^11mm-Green</td>
</tr>
<tr>
<td>17</td>
<td>23.0</td>
<td>192</td>
<td>25m ROUNDIT-2000-NX-EMI-*^17mm-Green</td>
</tr>
<tr>
<td>23</td>
<td>30.4</td>
<td>247</td>
<td>25m ROUNDIT-2000-NX-EMI-*^23mm-Green</td>
</tr>
<tr>
<td>30</td>
<td>39.3</td>
<td>322</td>
<td>25m ROUNDIT-2000-NX-EMI-*^30mm-Green</td>
</tr>
<tr>
<td>38</td>
<td>49.0</td>
<td>409</td>
<td>25m ROUNDIT-2000-NX-EMI-*^38mm-Green</td>
</tr>
</tbody>
</table>

*When * = A the sleeving comes without internal PTFE layer*

*When * = B the sleeving comes with internal PTFE layer*

**Part Number Example; ROUNDIT-2000-NX-EMI-B-17mm-Green**

17mm nominal inside Ø, supplied in 25m spools as standard.

**Ordering Information**

- Standard Colour: Green (Olive Green)
- Standard packaging: Spools only, for MOQ please contact us

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Protective Sleeving

RAYBRAID®
Tinned Copper or Nickel tubular braid
Electromagnetic Shielding

Electromagnetic Shielding and Screening
Raybraid® 90 has a minimum of 90% optical coverage and is available in a wide range of sizes to cover 2mm to 36mm diameters.

Raybraid® 101 and 103 have a minimum of 93% and maximum 100% optical coverage and is available in a wide range of sizes to cover 2.5mm to 38mm diameters.

Standard Raybraid 90 and 101 are tinned copper and Raybraid 103 is nickel plated copper for high temperature applications. Raybraid 101 and 103 are also fully compatible with Tinel-Lock® adaptors for termination of the braid to connectors and backshells.

Raybraid is supplied on a round tube former which facilitates assembly and is more robust than braid supplied in flattened form.

* Raybraid & Tinel-Lock brands are registered trademarks of Tyco Electronics

Features & Benefits
• Screening military harnesses
• Minimum 90% optical coverage
• 101 and 103 Super flexible
• Good expansion ratio
• Supplied on plastic former to maintain round profile and is more robust than braid supplied in flattened form

Operating Temperature
• Raybraid 90 & 101 up to 150°C
• Raybraid 103 above 150°C

Raybraid 90 (Tinned Copper Braid)
• Minimum 90% optical coverage.
• Available in a wide range of sizes to cover 2.0mm to 36.0mm diameters.

Raybraid 101 (Tinned Copper Braid)
• Minimum 93% maximum optical coverage, with very usable expansion ratio.
• Available in a wide range of sizes to cover 2.5mm to 38mm diameters.
• Fully compatible with Tinel-Lock adapters for termination of the braid to associated connectors.

Raybraid 103 (Nickel Copper Braid)
• Minimum 93% maximum optical coverage, with very usable expansion ratio.
• Available in a wide range of sizes to cover 2.5mm to 38mm diameters.
• Fully compatible with Tinel-Lock adapters for termination of the braid to associated connectors.

Notes
For applications that require a limited wire shielding tape which can be wound around a cable for installation and repair, we offer 000W280. Supplied in 4.5m rolls, width 20mm, material tinned copper. For further information on this or other products in our range, or for assistance with your specific requirements, please contact us.

All numeric data shows average or typical values.

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### Raybraid 90

<table>
<thead>
<tr>
<th>Diameter of former</th>
<th>No. of Carriers</th>
<th>Ends per Carrier</th>
<th>Strand Size</th>
<th>Cable Bundle</th>
<th>Pack Size</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>mm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.0 (±0.13)</td>
<td>16</td>
<td>5</td>
<td>36/0.13</td>
<td>2.0</td>
<td>3.5</td>
<td>100</td>
</tr>
<tr>
<td>4.0 (±0.25)</td>
<td>16</td>
<td>7</td>
<td>36/0.13</td>
<td>3.0</td>
<td>5.0</td>
<td>100</td>
</tr>
<tr>
<td>5.0 (±0.25)</td>
<td>24</td>
<td>6</td>
<td>36/0.13</td>
<td>4.0</td>
<td>6.0</td>
<td>100</td>
</tr>
<tr>
<td>6.0 (±0.25)</td>
<td>24</td>
<td>7</td>
<td>36/0.13</td>
<td>5.0</td>
<td>7.0</td>
<td>100</td>
</tr>
<tr>
<td>10.0 (±0.25)</td>
<td>24</td>
<td>9</td>
<td>34/0.16</td>
<td>7.0</td>
<td>12.0</td>
<td>100</td>
</tr>
<tr>
<td>12.5 (±0.25)</td>
<td>24</td>
<td>10</td>
<td>34/0.16</td>
<td>11.0</td>
<td>13.0</td>
<td>100</td>
</tr>
<tr>
<td>15.0 (±0.38)</td>
<td>24</td>
<td>11</td>
<td>32/0.20</td>
<td>13.0</td>
<td>18.0</td>
<td>50</td>
</tr>
<tr>
<td>20.0 (±0.38)</td>
<td>36</td>
<td>7</td>
<td>32/0.20</td>
<td>17.0</td>
<td>23.0</td>
<td>50</td>
</tr>
<tr>
<td>25.0 (±0.38)</td>
<td>36</td>
<td>9</td>
<td>30/0.25</td>
<td>22.0</td>
<td>28.0</td>
<td>50</td>
</tr>
<tr>
<td>30.0 (±0.38)</td>
<td>36</td>
<td>9</td>
<td>28/0.32</td>
<td>27.0</td>
<td>36.0</td>
<td>50</td>
</tr>
</tbody>
</table>

### Raybraid 101 and 103

<table>
<thead>
<tr>
<th>Diameter of former</th>
<th>No. of Carriers</th>
<th>Ends per Carrier</th>
<th>Strand Size</th>
<th>Cable Bundle</th>
<th>Pack Size</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>mm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.0 (±0.13)</td>
<td>16</td>
<td>10</td>
<td>38/0.10</td>
<td>2.5</td>
<td>5.0</td>
<td>100</td>
</tr>
<tr>
<td>4.0 (±0.25)</td>
<td>24</td>
<td>7</td>
<td>36/0.13</td>
<td>3.5</td>
<td>7.5</td>
<td>100</td>
</tr>
<tr>
<td>6.0 (±0.25)</td>
<td>24</td>
<td>9</td>
<td>36/0.13</td>
<td>4.5</td>
<td>9.5</td>
<td>100</td>
</tr>
<tr>
<td>7.5 (±0.25)</td>
<td>24</td>
<td>14</td>
<td>36/0.13</td>
<td>7.0</td>
<td>14.0</td>
<td>100</td>
</tr>
<tr>
<td>10.0 (±0.25)</td>
<td>36</td>
<td>12</td>
<td>36/0.13</td>
<td>8.0</td>
<td>22.0</td>
<td>100</td>
</tr>
<tr>
<td>12.5 (±0.25)</td>
<td>36</td>
<td>15</td>
<td>36/0.13</td>
<td>11.0</td>
<td>24.0</td>
<td>100</td>
</tr>
<tr>
<td>20.0 (±0.38)</td>
<td>48</td>
<td>16</td>
<td>36/0.13</td>
<td>16.0</td>
<td>38.0</td>
<td>50</td>
</tr>
</tbody>
</table>

When X = Should be replaced with type of braid required i.e. RAY-101 or RAY-103

### Part Number Example; RAY-103-7.5

Nickel plated copper braid supplied 7.5mm nominal inside Ø, supplied in 100m spools as standard.

**Ordering Information**

- **Standard Material:** Tinned or Nickel copper braid
- **Standard packaging:** Spools only, for MOQ please contact us

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Spiral Binding

PTFE Spiral binding can be used in industrial and office environments for the following applications:
- Organising wires for communication, computer equipment and control panels
- OEM applications for protecting tubes and harnesses
- Abrasion protection for control panel wiring
- Eliminate lacing cord and tie-offs

Features & Benefits
- Re-usable
- Flexible and fast installation
- Allows breakouts and re-routing
- Harness multiple cables into a single manageable bundle

Operating Temperature
- -70°C to 260°C

Specifications & Approvals
- PAN 6480
- AS4 1088

<table>
<thead>
<tr>
<th>ID</th>
<th>Width (W)</th>
<th>Thickness</th>
<th>Edge Ø (ED)</th>
<th>Weight</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal (mm)</td>
<td>Max (mm)</td>
<td>Nom g/m</td>
<td>(mm)</td>
<td>(g/m)</td>
<td></td>
</tr>
<tr>
<td>3.0 (±0.25)</td>
<td>5.0 (±0.25)</td>
<td>0.75 (±0.08)</td>
<td>1.125</td>
<td>22.0</td>
<td>GTB-30-Couler</td>
</tr>
<tr>
<td>5.0 (±0.40)</td>
<td>5.0 (±0.25)</td>
<td>0.75 (±0.08)</td>
<td>1.125</td>
<td>33.0</td>
<td>GTB-50-Couler</td>
</tr>
<tr>
<td>7.5 (±0.50)</td>
<td>8.0 (±0.40)</td>
<td>0.75 (±0.08)</td>
<td>1.125</td>
<td>47.6</td>
<td>GTB-75-Couler</td>
</tr>
<tr>
<td>12.5 (±0.65)</td>
<td>10.0 (±0.50)</td>
<td>0.75 (±0.08)</td>
<td>1.125</td>
<td>76.9</td>
<td>GTB-125-Couler</td>
</tr>
<tr>
<td>25.5 (±0.80)</td>
<td>12.5 (±0.65)</td>
<td>1.25 (±0.10)</td>
<td>1.660</td>
<td>250.0</td>
<td>GTB-255-Couler</td>
</tr>
</tbody>
</table>

Part Number Example; GTB-75-Black
7.5mm Internal diameter spiral binding, in black.

Ordering Information
- Standard Colour: Black
- Non Standard colours: Natural, Red and Yellow
- Standard packaging: Spools only, please ask for details

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Rayrim® and TPEM are extruded strips internally coated with heat activated adhesive, so that on heating the profile changes from a ‘V’ to form a ‘U’ and the adhesive bonds to the substrate profile. Typically electrical cabinets and enclosures. Manufactured from cross-linked Polyolefin, offering 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.

**Features & Benefits**
- Flexible
- Adhesive lined
- Adhesion strength: RAYRIM 25N/25mm minimum and TPEM 35N/25mm minimum

**Operating Temperature**
- -55°C to +80°C

### Application Range Guide

<table>
<thead>
<tr>
<th>Plate Gauge</th>
<th>Thickness (mm)</th>
<th>Bending Radius Min. (mm)</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>SWG 30 - 24</td>
<td>0.31 - 0.56</td>
<td>10</td>
<td>RAYRIM-NR-6-0-* TPEM-NR-6-0-*</td>
</tr>
<tr>
<td>SWG 23 - 16</td>
<td>0.61 - 1.63</td>
<td>15</td>
<td>RAYRIM-NR-7-0-* TPEM-NR-7-0-*</td>
</tr>
<tr>
<td>SWG 15 - 10</td>
<td>1.83 - 3.25</td>
<td>20</td>
<td>RAYRIM-NR-8-0-* TPEM-NR-8-0-*</td>
</tr>
<tr>
<td>SWG 9 - 5</td>
<td>3.66 - 5.38</td>
<td>25</td>
<td>RAYRIM-NR-9-0-* TPEM-NR-9-0-*</td>
</tr>
</tbody>
</table>

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SPRING-FAST®

Protective grommet edging

Spring-Fast® is a revolutionary composite grommet edging, which is fast becoming a market leader in the field of wire and cable protection. Spring-Fast® provides the fastest, safest and most effective method of abrasion protection available.

The Spring-Fast® grommet edging is currently used throughout the Aerospace market to protect cables.

Spring-Fast® applications also include:
- Satellites & missiles
- Shipboard & airborne equipment
- Refrigeration & air conditioning equipment
- Uninterruptable power supplies
- Instrumentation & control panels
- Lighting systems

Features & Benefits
- MIL Spec qualified
- Flexible construction to fit a wide range of applications
- No adhesive/curing time required to apply the grommet - snap on fit
- Saves considerable installation time
- No hazardous adhesives and solvents required during application
- Vibration proof
- Abrasion resistant
- Chemical resistant
- Long life expectancy
- Excellent performance under extreme temperatures and humidities
- Expansion co-efficient that closely matches the host material

Spring-Fast® was developed to provide increased performance and safety characteristics over the older nylon type protective edging. Spring-Fast® edging is safer and more reliable because it is constructed from a composite of polymer-encapsulated stainless steel, which is further enhanced by an additional polymer cushion.

Spring-Fast® mechanically locks on to any two axis contour with finger pressure in seconds, smoothing over any sharp edges that can come into contact with wire and cable harnesses, eliminating the problem of damage through vibration and subsequent abrasion.

Specifications & Approvals
- FAA/CAA Recognised
- UL94 V0 Compliant
- NASM22529 qualified
- RoHS Compliant
Properties | Test
---|---
**Operating temp'** | -40ºC to +85ºC
**Voltage breakdown** | 1500 Volts @ 60Hz
**Flammability** | FAR 25.601, FAR 25853, MIL-STD-202F (111A)
**Salt spray** | 2000 Hours (minimum), MIL-STD-202F (101D)

Sheet Thickness | Spool Size | Cushion Width | Part Number
---|---|---|---
(mm) | (feet) | (mm) | |
0.6 - 0.9 | 25 or 100 | 5.1 | M22529/2-1R-spool size
0.9 - 1.6 | 25 or 100 | 5.1 | M22529/2-2R-spool size
1.5 - 1.9 | 25 or 100 | 5.1 | M22529/2-3R-spool size
1.8 - 2.4 | 25 or 100 | 6.1 | M22529/2-4R-spool size
2.3 - 2.8 | 25 or 100 | 6.1 | M22529/2-5R-spool size
2.7 - 3.4 | 25 or 100 | 6.1 | M22529/2-6R-spool size
4.5 - 5.0 | 25 or 100 | 8.1 | M22529/2-7R-spool size
6.1 - 6.6 | 25 or 100 | 9.7 | M22529/2-8R-spool size

**Fitting**
A full range of tools are also available to assist with fitting, please ask for details; • Full bypass shears - Cutting tool • Roll-Fast® - Installation tool • Castle Removal Tool

**Note**
Due to sheet thickness tolerances and finishes, end user should determine product sizes by trial. When sheet thickness is at maximum for the grommet chosen, end user may use a rubber mallet to set, or try the next size larger grommet.

**Part Number Example; M22529/2-8R-100**
A 100 foot length of protective edging, to suit thickness 6.1mm to 6.6mm.

**Ordering Information**
Standard Colour: Green, with grey polymer
Standard packaging: 25ft or 100ft Spools

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