BPTM Raychem heat-shrinkable busbar insulation tubing
Voltage class 25 kV, Application Ø 6.5-220 mm

Product description
BPTM is a medium wall, heat-shrinkable tubing which provides insulation enhancement and protection against flashover and accidentally induced discharge. Particularly useful in confined spaces BPTM tubing can be used on both circular and rectangular copper or aluminium busbars. On application of heat the tubing shrinks snugly over the busbar profile ensuring that the required minimum wall thickness is obtained. BPTM tubing can be installed easily during large scale production using an oven or in the field using a gas torch or hot air. BPTM tubing is manufactured from a non-halogen based polymer which has excellent performance in high voltage environments and greatly reduces the noxious and corrosive effects in fire situations.

Applications
The use of BPTM tubing allows equipment designers the freedom to reduce air spacing between busbars, such as in the manufacture of switchgear cabinets where space is at a premium. BPTM provides flashover protection up to 25 kV.

Features/benefits
• Compatible with all other products in the Raychem MV insulation enhancement system
• Excellent flexibility, can be installed on a wide range of curved or bent busbars without cracking or creasing
• High shrink ratio reduces inventory and simplifies product selection
• Exceptional insulation and long term reliability even at high continuous operating temperatures
• Extremely durable, resists damage from solvents, ultraviolet light, weathering, mechanical impact and general wear and tear
• Suitable for indoor and outdoor use
• Excellent anti-tracking properties
• Good thermal emissivity and contact with busbars means no derating is required
• Flame retardant and non-halogen based material reduces flammability and the toxic and corrosive effects in fire situations
• Can be stored indefinitely at temperatures up to 50°C without loss of performance
• Over 20 years of successful operating experience
BPTM

Clearance reduction
The table indicates the clearance reductions which are possible using BPTM tubing. These are derived from BIL, AC withstand, DC withstand and discharge extinction tests. These clearances should not be adopted without testing by the user. Sharp electrodes and unusual geometries may require wider clearances.

<table>
<thead>
<tr>
<th>Rated voltage (kV)</th>
<th>Phase–phase (mm)</th>
<th>Phase–ground (mm)</th>
<th>IEC 71-2 air clearance (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Round busbars</td>
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<td></td>
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</tr>
<tr>
<td>12</td>
<td>55</td>
<td>65</td>
<td>120</td>
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<tr>
<td>17.5</td>
<td>70</td>
<td>85</td>
<td>160</td>
</tr>
<tr>
<td>24</td>
<td>95</td>
<td>125</td>
<td>220</td>
</tr>
<tr>
<td>36</td>
<td>150</td>
<td>205</td>
<td>320</td>
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<tr>
<td>Rectangular busbars</td>
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<tr>
<td>12</td>
<td>65</td>
<td>75</td>
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<td>17.5</td>
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<td>24</td>
<td>115</td>
<td>150</td>
<td>220</td>
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<tr>
<td>36</td>
<td>200</td>
<td>285</td>
<td>320</td>
</tr>
</tbody>
</table>

Key product specifications
- Thermal endurance: IEC 216, 105°C min.
- Accelerated ageing:
  - Tensile strength: ISO 188, ASTM D2671, 168 hrs @ 120°C, 10 MPa min., 300% min.
  - Ultimate elongation: IEC 112, VDE 0303/1, KA 3c
- Comparative tracking index: IEC 243
- Dielectric strength: ASTM D149, IEC 243, 180 kV/cm min. @ 2 mm, 150 kV/cm min. @ 2.5 mm, 120 kV/cm min. @ 3 mm
- Low temperature flexibility: ASTM D2671 Procedure C, No cracking after 4 hrs @ -40°C
- Smoke index: NES 711, Less than 120
- Acid gas generation: Raychem PPS 3010, Less than 1% by weight

Note: For further product specification information see Raychem PPS 3010/04.

Technical reports
- UVR 8019 – (Rev 1) Qualification report of BPTM tubing
- UVR 8016 – Testing of BPTM dust pick-up and comparison of BPTM cleaning techniques
- UVR 8091 – Production-scale installation of BBIT/BPTM tubing
- UVR 8122 – Resistance of BBIT/BPTM to hydrofluoric acid
- UVR 8194 – Long term weathering and thermal ageing of BBIT and BPTM tubing

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