

Heat-shrinkable joints for screened plastic and rubber insulated cables up to 36 kV

For jointing plastic insulated cables for up to 36 kV we offer a system based on head-shrinkable materials which is fast and simple to install, eliminates shelf-life limitations even in severe climates and permits immediate back-filling of the trench and switching on of power.

Reliability in installation

The insulating, screening and electrical field control layers of the joint are made of cross-linked polymeric materials with precisely defined electrical characteristics.

The cross-linking process results in an „elastic memory“; activated simply by heating. The memory then causes the components to shrink to a pre-determined diameter; the correct insulation thickness is thus achieved in one step automatically.

A simple fast jointing technique

The joint components are supplied as a pre-engineered set of heat-shrinkable tubings, which means the cable fitter does not have to check the thickness or length of the system. Our system thus ensures accurate installation work while enabling the joint to be installed in significantly less time than many alternative techniques.

Proven technology

The long-term performance of Raychem heat-shrinkable materials has been demonstrated by well-proven Raychem termination system. Millions of cable accessory installations for up to 36 kV in some of the severest service conditions have confirmed their reliability under high electrical, thermal and environmental stress.



A universal system

Cable preparation and installation techniques for Raychem medium voltage joints are identical to those for Raychem head-shrinkable terminations. The same basic design is also shared by Raychem joints for MIND paper insulated cables for up to 36 kV. In this respect, again, the heat-shrinkable system sets new standards of efficiency and simplicity for the cable fitter's work.

Rational stock-keeping

The performance and ease of installation of Raychem high voltage heat-shrinkable materials are not sensitive to storage time or normal

storage conditions. A few kits cover the standard size range of cables, including single core cables for 36 kV up to 630 mm², allow the use of various types of connectors and shrink to fit either round or sector-shaped cores and different constructions.

Mechanical strength

For steel wire or tape armoured cables Raychem joints incorporate a light-weight impact-resistant galvanized steel joint case which is quick to install and provides earth fault current capacity. Heat-shrinkable sleeves provide outer sealing and corrosion protection of the joint.

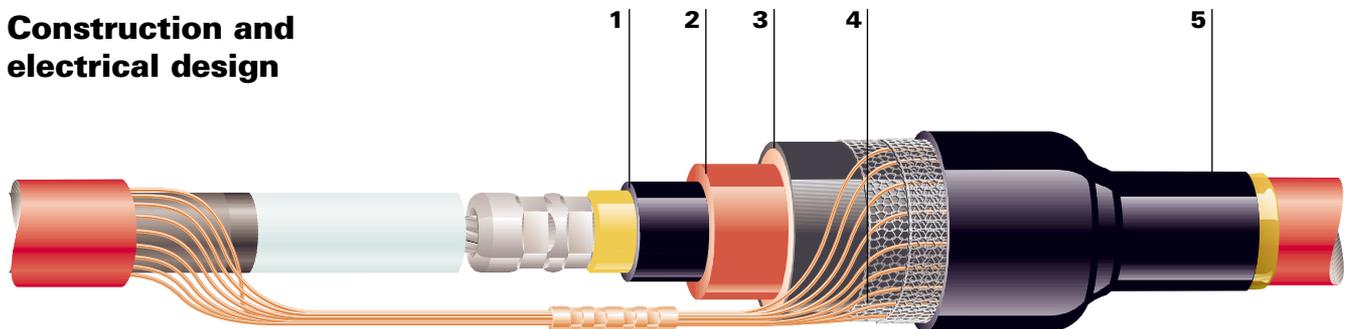
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Installation procedure

Pre-packed in the correct nested sequence, the joint components are slid over the prepared cable end. After jointing the conductors, each tubing is positioned over the connector and shrunk into place. In three core cable joints one heat-shrinkable sleeve (unarmoured cable) or joint case (armoured cable) over all three cores replaces the outer sealing sleeve shown in the single core cable joint below. All kits are complete with illustrated installation instructions.



Construction and electrical design



1 Electrical field control

Head-shrinkable tubing with a precisely defined impedance characteristic smooths the electrical field over the connector and screen ends. The shrinking action during installation causes the special low viscosity void filler to flow into position around the connector area at the same time. Pencilling of the conductor insulation at the connector is not necessary.

2 Insulation

High voltage insulating tubings and the inner wall of the screened tubing restore the conductor insulation. The elastic memory of the heat-shrinkable components ensures the correct wall thickness is obtained.

3 Insulation screen

A single dual-wall tubing enables the final insulating layer (red) to be installed complete with a conductive polymeric screen (black). This technique saves time and ensures a flawless bond between insulation and screen.

4 Metallic shielding

Copper mesh continues the correct shield cross-section across the connection area and makes electrical contact with the outer screen of the joint.

5 Outer sealing

Joints for both armoured and unarmoured cables are sealed with heavy-wall heat-shrinkable sleeves, internally pre-coated with adhesive. The heat used to shrink the tubing causes the specially developed adhesive to melt and flow, resulting in a lasting moisture and corrosion barrier on the cable oversheath.

Minimum performance for Raychem joints for screened plastic and rubber insulated cables up to 36 kV

Test Sequence		Test Voltage					Result
		Highest Voltage for Cable U_m [kV]					
		7.2	12	17.5	24	36	
Impact	4 kg wedge dropped 6 times from 2 m armoured cables only						no functional damage
A.C. Voltage Withstand	1min	27	35	45	55	75	no breakdown and no flashover
Partial Discharge		4.5	7.5	10.9	15	22.5	≤ 3 pC
		7.2	12	17.5	24	36	≤ 20 pC
Impulse Voltage Withstand	10 positive and 10 negative, 1.2/50 μ s, between conductor and grounded screen	70	95	110	150	200	no breakdown and no flashover
Load Cycling	63 cycles 5h heating, 3h cooling Conductor temperature: PE, PVC cables: 75°C XPE cables: 95°C	9	15	22	30	45	no breakdown and no flashover
Partial Discharge		4.5	7.5	10.9	15	22.5	≤ 3 pC
		7.2	12	17.5	24	36	≤ 20 pC
Thermal Short Circuit	1 s symmetrical fault with conductor temperature as for cable specification 1 s earth fault with armour temperature as for cable specification						no visible signs of damage
Load Cycling	as above with cable in 1 m water, oversheath removed	9	15	22	30	45	no breakdown and no flashover
Partial Discharge		4.5	7.5	10.9	15	22.5	≤ 3 pC
		7.2	12	17.5	24	36	≤ 20 pC
A.C. Voltage Withstand	4h	14	24	36	48	72	no breakdown and no flashover
Impulse Voltage Withstand	repeat	70	95	110	150	200	no breakdown and no flashover
D.C. Voltage Withstand	30 min	28	48	72	96	144	no breakdown and no flashover
Notes:	1. U_m is the highest phase to phase voltage. All other voltages are stated as phase to ground values. 2. Further details are given in Raychem specification PPS 3013.						

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