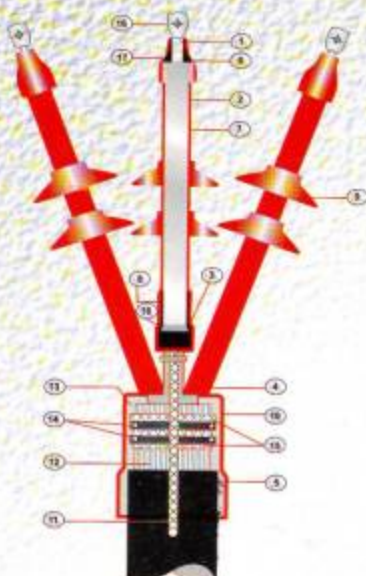


HEAT SHRINKABLE

**Termination
Suitable for
Single &
Three Core
XLPE Cables**



General Layout Of Cable Termination



1. CONDUCTOR
2. INSULATION
3. SEMI CONDUCTING SCREEN
4. METAL SHIELD
5. OUTER SHEATH
6. TERMINAL SLEEVE
7. NON-TRACKING WEATHER RESISTANT TUBING
8. STRESS CONTROL TUBING
9. RAIN SHED

10. NON-TRACKING CABLE BREAK OUT
11. TINNED COPPER EARTH BRAID
12. ARMOUR
13. INNER SHEATH
14. WORM DRIVE CLIPS
15. MASTIC SEALING TAPE
16. TERMINAL LUG
17. LUG SEALING TAPE
18. STRESS CONTROL PAINT/S.C. MASTIC

Heat Shrinkable Terminology shall apply to extruded and molded polymeric materials, which have the shape "Memory" effect. This effect makes the material to shrink back to its original shape and profile on application of heat more than its crystalline temperature.

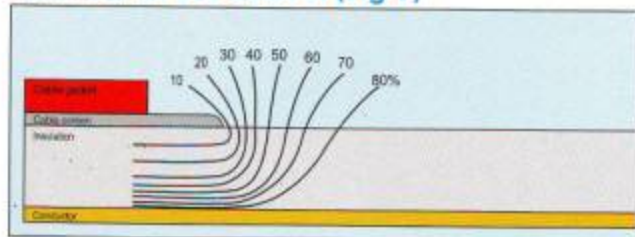
The technology backed material selection have been extensively optimized with respect to product design and functions for expected service conditions. ENERGIA Heat Shrinkable terminations have been developed for indoor applications and outdoor installations where they are exposed to weather and solar conditions. The design have been focused to provide the basic important functions covered under various national and international standards laid down for the medium voltage cable terminations. The design criteria covers the following:

- Electrical Stress Control Mechanism at the insulation screen cut end.
- Appropriate creepage distance between the conductor and the earth point.
- Sealing of the cable end against ingress of moisture.
- Protection of the cable insulation from ultraviolet rays and other environmental fatigues.
- Cable crutch sealing.
- Appropriate armour and screen earthing arrangement.

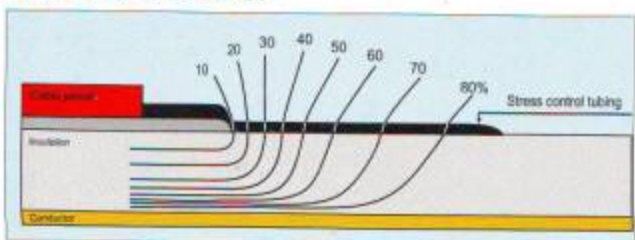


Designed for quick and easy installation "ENERGIA" Heat Shrinkable Terminations covers for the following design concept:

Without Stress Control (Fig-1)



With stress control

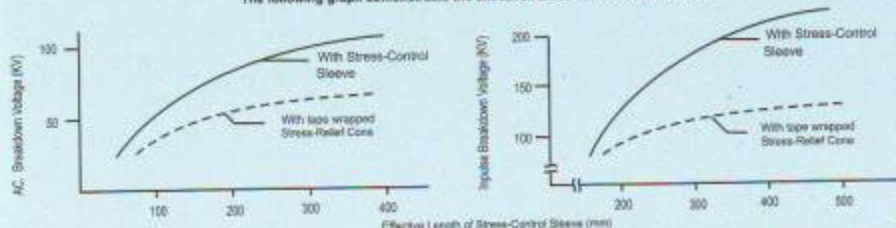


Electrical Stress control Mechanism :

- (The insulation screen which needs to be terminated at an appropriate distance from the conductor under the basic requirement for terminating any screened medium voltage cables.) The cable insulation at this point in the absence of a suitable and effective stress control measures shall be under very high electrical stress which is due to the concentration of electrostatic and equipotential lines of forces in this small region. The magnitude of these stresses shall be much higher than the design stress limits of the cable insulation. This shall result in the degradation of the insulation at this point leading to premature breakdown of the insulation. The quantitative graphical representation of the electrical stress distribution is explained in fig-1.
- Occurrence of these high electrical stress concentration have been controlled by using heat Shrinkable tubing with controlled volume resistivity and permittivity, thus providing

AC, Impulse breakdown Voltage

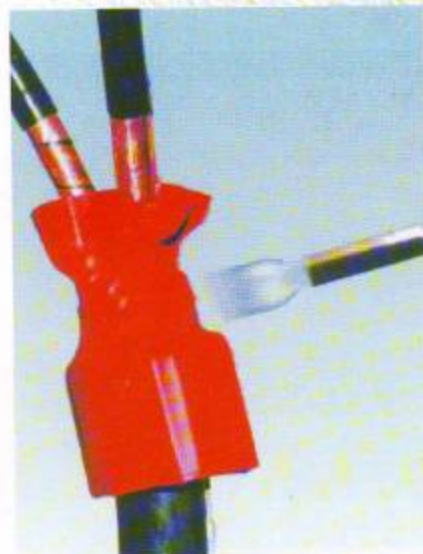
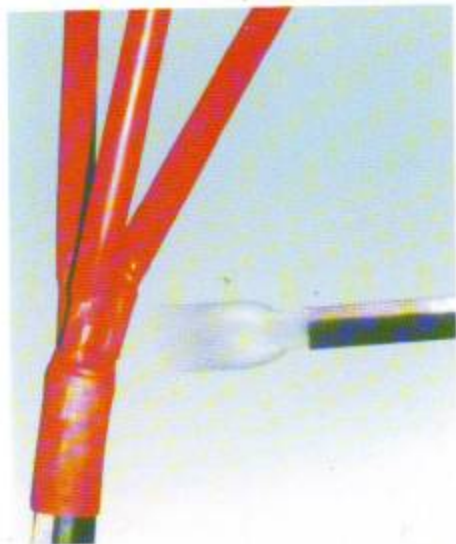
The following graph demonstrates the effectiveness of stress-control sleeve.



an adequate stress control function at the cut end of the insulation screen. The installed heat shrinkable tubing suppresses electrical discharge to prevent insulation damage while terminations in actual service conditions at different voltages.

Heat Shrinkable Anti-Tracking Breakout :

High voltage Non Tracking anti-Tracking Breakouts are providing excellent environmental seal to the cable crutch. They are supplied with internal surfaces coated with anti-track red mastic which ensures for perfect sealing to avoid ingress of water.



High Voltage Non-Tracking weather resistant protective tubing's:

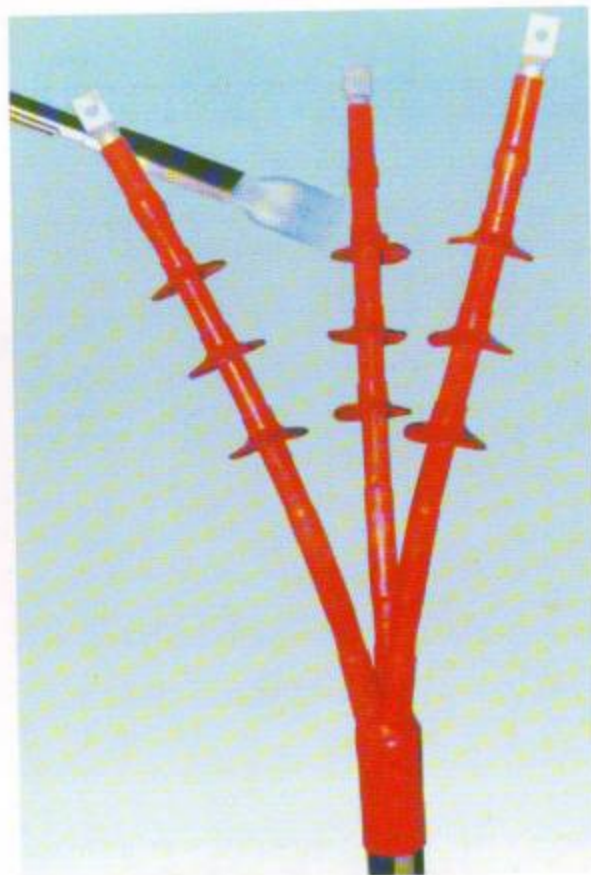
Red colour Heat Shrinkable Polyolefin tubing's with excellent electrical insulation characteristics and high anti-tracking ability ensures withstanding long term outdoor exposure. These tubing's are suitable for areas with salt, sand, salt fog pollution and environment of high temperature and humidity. The tubing's are suitable for operating temperature from Minus 40 to 110 degree centigrade continuously.

Rain Sheds (Creepage Extenders):

Non tracking red colour rain sheds with unique design having a large skirt shape provides a better creepage distance to the cores of the cable termination. It also improves resistance to action of weathering & pollution. Application of anti-track red mastic on inner surface of the collar provides perfect sealing over the cores after installation by application of heat during shrinking operations.

Optional Items :

- Right angle and straight boots for MV cubicles and motor terminals with short spacing Available on demand.
- Special solder less earth connection Kits to quickly and simply ground the armour and metal screen of the cable termination Available on demand.



Innovation In Action.

Performance Particulars of Energia Heat Shrinkable Terminations for XLPE Insulator Cables Upto 36KV

| | Test Sequence | Test Voltage Highest Voltage for cable Um (kv) | | | | Result |
|------------------------------|---|---|-----|-----|------|--|
| | | 7.2 | 12 | 24 | 36 | |
| A.C. Voltage withstand | 1 min | 20 | 28 | 50 | 70 | No breakdown and no flashover |
| Partial Discharge | --- | 7.2 | 12 | 24 | 36 | ≤ 20pC |
| Impulse Voltage withstand | 10 positive and 10 negative, 1.2/50 μ S, between each conductor and the grounded screen | 20 | 75 | 125 | 170 | No breakdown and no flashover |
| Load Cycling | 3 cycles 5h heating, 3h cooling Conductor temperature: 5 + operating temperature | 9 | 15 | 30 | 45 | No breakdown and no flashover |
| Partial Discharge | --- | 7.2 | 12 | 24 | 36 | ≤ 20pC |
| Load Cycling | 60 cycles 5h heating, 3h cooling Conductor temperature: 5 + operating temperature | 9 | 15 | 30 | 45 | No breakdown and no flashover |
| Thermal Short Circuit | 1 sec symmetrical fault with conductor temperature as for cable specification 1 sec earth fault with screen or armour temperature as for cable specification | - | - | - | - | No visible signs of damage |
| Load cycling | 63 cycles 5h heating, 3h cooling Conductor temperature: 5 + operating temperature | 9 | 15 | 30 | 45 | No breakdown and no flashover |
| Partial Discharge | | 7.2 | 12 | 24 | 36 | ≤ 20pC |
| Impulse voltage withstand | 10 positive and 10 negative, 1.2/50mS, between each conductor and the grounded screen | 20 | 75 | 125 | 170 | No breakdown and no flashover |
| D.C. Voltage withstand | 30 min | 28 | 48 | 96 | 144 | No breakdown and no flashover |
| Humidity indoor terminations | Conductivity 70±10 mS/m, 300 hour spray rate: 0.4 litre/m ³ /h | 4.5 | 7.5 | 15 | 22.5 | No breakdown and no flash-over, no visible tracking and no erosion |
| Dynamic Short Circuit | 63kA | - | - | - | - | No visible signs of damage |
| Salt-fog outdoor termination | Conductivity 1600±200mS/m, 1000 hour | 4.5 | 7.5 | 15 | 22.5 | No flashover |

Notes : Um is the highest phase to phase voltage. All other voltage are stated as phase to ground values.

Right to change any specification is reserved due to product upgradation.