

## VOLTAGE STRESS CONTROL IN TERMINATIONS:

### Electric Fields in screened cables

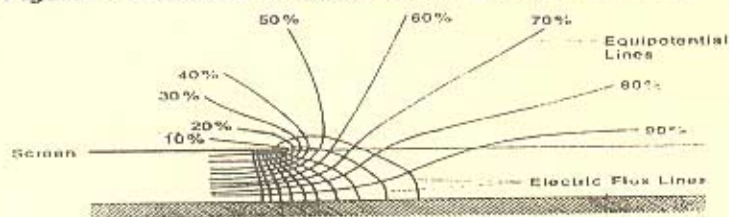
In Screened cables, voltage stresses are carefully controlled. The combination of the conductor screen and the insulation screen ensures a radial electric field through the insulation. The insulation screen which generally consists of a combination of a semicon layer and copper tape or drain wires, also acts to contain the electric field and the resultant voltage stresses within the insulation.

### Stress Concentration at the Screen Cut back.

When a screened cable is to be "terminated" or connected to some equipment, the screen has to be removed at some distance from the conductor connection. This is known as the "screen Cut-back". Electric field lines from the unscreened portion converge to the edge of the screen. This results in voltage stress concentration in the region immediately beyond the screen.

The problem is further compounded by the absence of the screen. The electric field extends out of the cable insulation into the surrounding air. Since the dielectric strength of air is almost ten times lower than that of XLPE insulation, it ionises at voltage stress levels that are not harmful within the cable insulation. The ionisation, detectable as "partial discharge", damages the adjoining cable insulation, progressively leading to insulation failure.

**Figure 1 Cable Termination Without Stress Control**



***Cable's are meant to be insulated for the rated system voltage through-out the length. If the cable insulation is adequate to with-stand voltage stresses through-out the length, why is there a "voltage stress control" problem at the end termination.***

### Controlling Voltage Stresses.

Screen end voltage stresses are controlled by several principles in cable jointing

- (a) Geometric
- (b) Resistive (i) Linear  
(ii) Non Linear

Each of these principles takes different physical forms in practice. These are discussed in separate Technotes.

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