

# TechTalk

## Introduction Electrical Discharges in Medium Voltage Terminations

Compiled by John Sherriff | January 2019 | Rev 1

### The scope

Partial electrical breakdown occurs in an insulation system between electrodes energised by the system supply voltage. The breakdown does not bridge the electrodes. i.e. Voids, cracks, contamination ext.

Partial electrical current flow in the form of an intermittent arc between two conductive components in the same conductor circuit. This can be in the active load circuit or cable shield and earth circuit. There is no sustained plasma. i.e. High resistant connections or current flow through earth system of the terminations.



Partial Discharge in Tri core terminations.



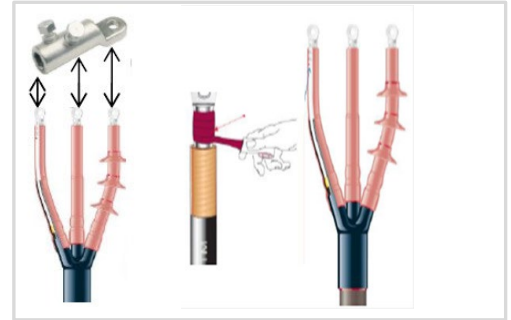
Partial Arcing in Single core terminations.

Breakdown process caused by electrical discharges within MV terminations

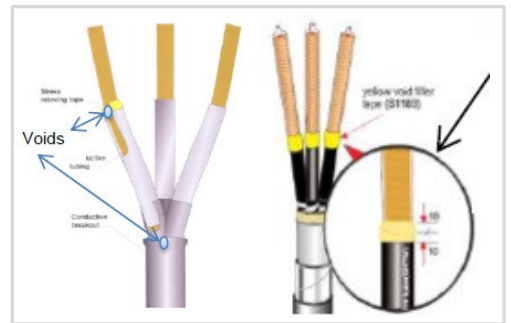
Component	Defect type	Progression	End result
Termination lug	High resistance connections	Overheating	Fusing/welding or full arc flash
Incorrect or no sealing tape applied (Lug)	Water ingress	Tracking (PD)	Flashover with full arc flash
Insulation	Delamination and voids	Internal partial discharge	Dielectric breakdown with full arc flash
Stress control tape	Voids due to incorrect application of stress control tape		
Electrical interface	Increased moisture ingress due to incorrect installation		
Anti-tracking tube	Leakage current flow	Tracking	Flashover with full arc flash
Incorrect clearance between phases	External and internal partial discharge	Tracking, air gap discharge	Flashover with full arc flash

### Defects leading to failure

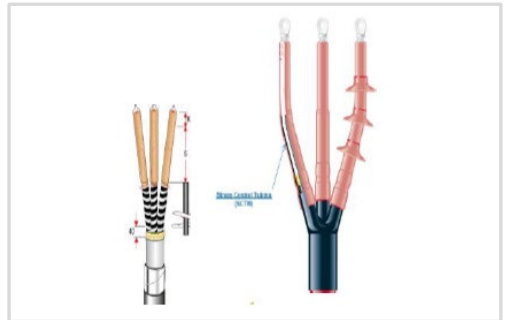
Incorrect lugs and sealing



Incorrect void fillers



Incorrect stress control



Incorrect creepage distance

