

“Discharge Resistant” Cable

In designing ethylene propylene rubber (EPR) based medium voltage cable there are two basic options. Either the cable can be designed to be inherently resistant to voltage discharge (properties determined primarily by formulation), or it can be designed to be discharge free (properties determined mainly by the quality of the manufacturing processes and materials used).

The pertinent industry standards (ANSI/ICEA S-94-649 and AEIC CS8) allow for either of these two approaches. Only Kerite offers the discharge resistant option.

Through applied engineering, Kerite designed and has consistently produced highly discharge resistant medium voltage cable. Our first residential underground distribution (URD) installations were in 1926. This long-term experience with URD cables has proven the link between our discharge-resistant design and cable longevity.

There are two primary causes of cable failure that can be significantly mitigated with discharge resistant insulation: 1) Cable damage that occurred during handling or installation. If the damage penetrated the insulation shield, it will result in partial discharge erosion at the damage site leading to eventual failure. 2) Water treeing that leads to electrical treeing. After a cable has aged for many years, it would be expected to have a certain degree of water treeing. The voltage stress can become so high at these sites that it initiates an electrical tree, which is a carbonized channel in the insulation. Partial discharges would be expected to continue the growth of these electrical trees leading to eventual cable failure. Kerite discharge resistant insulation provides additional protection against both physical cable damage and treeing associated with long term aging.

Since the early 1980's, the industry has introduced many cable design and processing refinements designed to slow the aging process - ideally to a point where the circuit would be retired for some other reason long before failure rate becomes a problem.

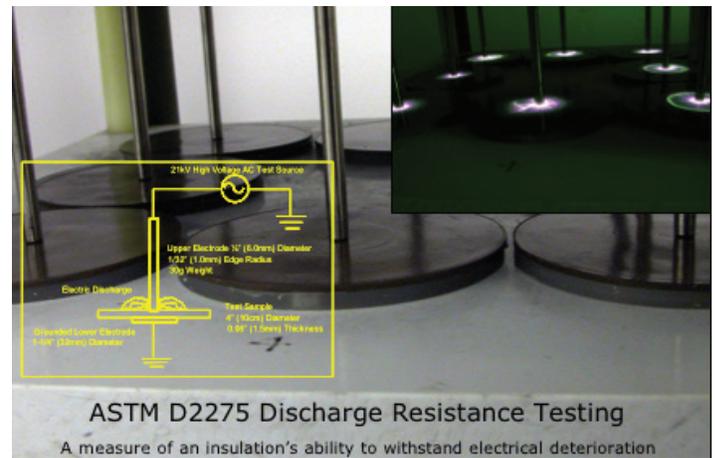
However, only Kerite has a track record of compounding experience and URD cable design consistency that allows us to warrant URD cable for the expected life of the circuit.

Kerite has the performance history to justify this warranty position.

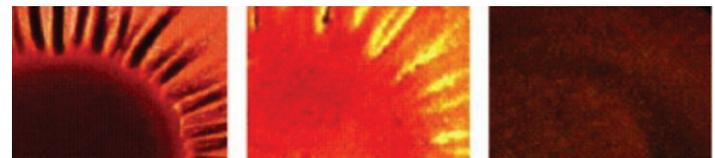
Testing for Discharge Resistance

If discharge in the cable results in deterioration, which results in eventual failure – having a test to show the relative discharge resistance of different insulations is pertinent and meaningful.

There is such a test. ASTM D 2275, Standard Test Method for Voltage Endurance of Solid Electrical Insulating Materials Subjected to Partial Discharge (Corona) on the Surface. This is the test required to establish “discharge resistance” in ICEA S-94-649 and AEIC CS8. The set-up for the test is shown below:



Actual test results on different insulations (ICEA Standards requires the sample to pass 250 hours with no evidence of erosion. The hours noted on the competitors' samples are typical times to dielectric puncture of the sample, not to the start of erosion. The views show an enlarged segment of the contact area of the 1/4" diameter electrode.):



EPR1 - Averages 120 hours to failure

EPR2 - Averages 200 hours to failure

Kerite - Over 250 hours with no start of erosion