

General

Elliott experience with cycloaliphatic epoxy dates back to 1975 when cycloaliphatic epoxy bushing wells and insulators were utilized in 35 kV elbow terminated pad-mounted switchgear. Successful field operating experience soon led to greatly expanded use of cycloaliphatic epoxy components.

Elliott insulators are manufactured with a liquid resin cycloaliphatic epoxy compound which includes silane treated silica. This compound is pressure injected into a preheated controlled temperature precision shaped mold. Low viscosity and pressure injection allow the manufacture of insulators with multiple square-edge skirts and greater leakage distance for superior performance in contaminated environments.

Cast-in-place threaded and knurled brass inserts eliminate the need for metal end caps and provide greater strike distance when compared to insulators with cemented steel end caps.

Elliott ELRIM cycloaliphatic epoxy insulators are homogeneous so if one is chipped by rough handling or vandalism, the exposed surface will provide the same performance characteristics of the unchipped surface.

Electrical Characteristics

Non-tracking, self-scouring and nonweathering performance is characteristic of Elliott ELRIM cycloaliphatic epoxy insulators. Pyrolysis of cycloaliphatic epoxy insulators produces gaseous by-products such as water vapor and carbon dioxide that leave a virtually residue free non-tracking surface. A high temperature arc decomposes minute amounts of cycloaliphatic epoxy liberating water as steam that scours the surface of the insulator in the path of the arc. The insulators are resistant to ultraviolet radiation and do not react with water or contaminants due to the nonweathering qualities.

Test and Field Experience

Elliott ELRIM cycloaliphatic epoxy insulators have been tested to confirm impulse withstand ratings, low frequency withstand dry and low frequency withstand wet. Mechanical testing confirms cantilever strength, tensile strength, torsion strength and compression strength. Thermal withstand cycling tests from +200 degrees F to -200 degrees F assure trouble free field service in the most severe climatic conditions. In addition to the in-house testing, various utilities have tested apparatus insulators and line post insulators in their most severe outdoor test facilities to substantiate superior performance of ELRIM cycloaliphatic epoxy. Various utilities have selected ELRIM cycloaliphatic epoxy insulators for severe-duty applications where porcelain or another material has not been satisfactory and the cycloaliphatic epoxy has provided superior performance.

Conclusion

As the characteristics, design advantages and superior field performance of cycloaliphatic epoxy become known to users worldwide, we see more specifications written to permit or require insulators which are cycloaliphatic epoxy. As equipment manufacturers learn of these advantages, their engineers are selecting insulators and bushings that are cycloaliphatic epoxy to improve their designs and enhance quality. At Elliott Industries, Inc. we will continue to develop new insulators to expand our product line and provide special components to electrical utilities and other manufacturers.

Typical Switchgear Construction - Insulators

The switch and/or fuse mounting insulators shall be molded of a cycloaliphatic epoxy resin system with the following characteristics:

- 1) A minimum of ten years field operating experience.
- 2) Increased leakage distance established by in-house testing and field operating experience.
- 3) Adequate cantilever, tension, torsion and compression strength established by test.
- 4) Adequate thermal cycle withstand to assure trouble free field service in the most severe climatic conditions established by in-house testing and field operating experience.
- 5) Cycloaliphatic epoxy resin homogeneity throughout every insulator shall provide maximum resistance to power arcs. Ablation caused by high temperature power arcs shall continuously expose material of the same composition and properties so that only a minor change in electrical or mechanical characteristics occurs due to arc induced ablation.
- 6) Surface damage to insulators shall expose material of the same composition and characteristics so insulators with minor surface damage will not require replacement.
- 7) Meet or exceed applicable ANSI Standards.