

New Procedure for the Evaluation of Moisture and Leakage Currents in GRP Composites

L. Kumosa, D. Armentrout and M. Kumosa

Center for Advanced Materials and Structures,
Department of Engineering, University of Denver
2390 S. York St.
Denver, CO 80208

ABSTRACT

In this work two unidirectional glass/polymer composites were investigated, namely ECR (low seed)-glass/epoxy and ECR (high seed)-glass/modified polyester, for their moisture absorption and leakage currents. These two significantly different composite systems had been previously classified in our research as one of the best and one of the worst systems for high voltage insulator applications regarding their resistance to moisture absorption and the development of leakage currents. The composites were tested using a newly designed test method based on hollow core cylindrical glass/polymer composite specimens subjected to moisture and high voltage. It was found that the hollow core thin walled cylinders made out of the two composites responded differently when subjected to high voltage under controlled moisture diffusion conditions. It was also shown in this research that the newly developed test technique could be applied to successful screening and ranking of polymer matrix composites, which are used in composite (non-ceramic) insulators both for their moisture absorption and leakage currents under Fickian and anomalous diffusion conditions.

This manuscript was been submitted for publication in *IEEE Transactions on Dielectrics and Electrical Insulation* in 2005.