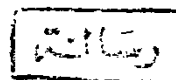


AIN SHAMS UNIVERSITY
FACULTY OF ENGINEERING
ELECTRICAL POWER AND MACHINES DEPT.

**STUDY OF POLYMER INSULATING MATERIALS UNDER
SALT-FOG CONDITIONS**

A Thesis

Submitted in Partial Fulfillment for
the Requirement of the Degree of Master
of Science in Electrical Engineering



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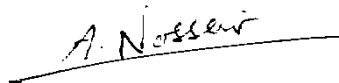
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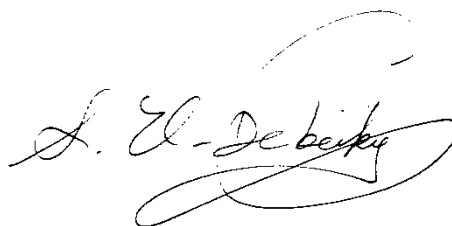
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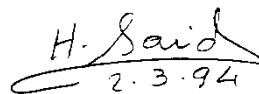
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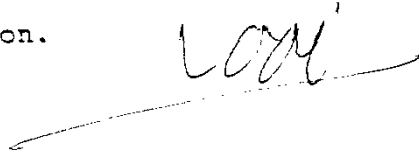
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STATEMENT

This dissertation is submitted to Ain Shams University for the degree of Master in Electrical Engineering.

The work included in this thesis was carried out by the author. No part of this thesis has been submitted for a degree or a qualification.

A handwritten signature in black ink, appearing to be 'LOM', with a long horizontal stroke extending to the left.

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ABSTRACT

Organic materials such as polyethylene, rubbers, epoxies and polyesters are widely used as insulating materials for many reasons such as; economy, strength and ease fabrication to good tolerance. As a result of the development which have taken place recently, these materials can be produced with various electrical, thermal and mechanical properties according to their intended purpose.

Polymeric insulators are subjected to a variety of surface stresses such as heat, sunlight, moisture and contamination which can cause degradation of their characteristics. Therefore, for satisfactory operation of the insulation, it is important to assess the effects of the various environmental degradation factors on the tracking and erosion performance of the material in use.

Therefore, the aim of this work is to study the electrical performance of polymer materials under different testing conditions. Cylindrical samples prepared from polyester with styrene monomer have been examined experimentally in atmospheric air conditions. The ac (50 Hz) and dc flashover voltages have been measured for different sets of samples under different testing conditions. In addition the ac (50 Hz) surface aging of the polyester samples has been investigated under salt fog conditions. Inorganic fillers are incorporated into the polyester/styrene to enhance the physical and electrical properties in addition to minimize the effects of tracking and / or erosion.

The effects of adding inorganic fillers such as; Kaolin (K), Felspar (F) and Quartz (Q) with different quantities on the electrical performance of polyester / styrene have been studied.

Finally the main salient points of this work have been summarized and presented, indicating the importance of this study as polymers are presently being used worldwide in highly competitive and advance power industry.

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LIST OF ABBREVIATIONS

H.V:	High Voltage.
MEK:	Methyl-Ethyl Ketone.
Co-naph:	Cobalt naphthenate.
RTV:	Room Temperature Vulcanized.
HTV:	High Temperature Vulcanized.
P ₁ :	Sample Chemically prepared at curing temperature equal 20°C.
P ₂ :	Sample Chemically prepared at curing temperature equal 40°C.
P ₃ :	Sample Chemically prepared at curing temperature equal 60°C.
P ₄ :	Sample Chemically prepared at curing temperature equal 80°C.
K:	Kaolin.
F:	Felspar.
Q:	Quartz.
K ₁ :	Sample with 4% percentage of Kaolin.
K ₁₁ :	Sample with 16% percentage of Kaolin.
K ₁₁₁ :	Sample with 28% percentage of Kaolin.
K ₁₁₁₁ :	Sample with 44% percentage of Kaolin.
F ₁ :	Sample with 4% percentage of Felspar.
F ₁₁ :	Sample with 16% percentage of Felspar.

F_{iii}: Sample with 28% percentage of Felspar.
F_{iv}: Sample with 44% percentage of Felspar.
Q_i: Sample with 4% percentage of Quartz.
Q_{ii}: Sample with 16% percentage of Quartz.
Q_{iii}: Sample with 28% percentage of Quartz.
Q_{iv}: Sample with 44% percentage of Quartz.
NaCl: Sodium Chloride.

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