



IEEE Guide for Functional Evaluation of Insulation Systems for AC Electric Machines Rated 2300 V and Above

IEEE Power Engineering Society

Sponsored by the
Electric Machinery Committee

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Abstract: A procedure that may be used to evaluate and compare insulation systems used, or proposed for use, in large ac electric machines is described in this guide.

Keywords: ac, accelerated aging, armature winding, electric machine, electrical insulation, electromechanical, functional evaluation, stator winding, thermal endurance, thermal expansion, thermomechanical, voltage endurance

The Institute of Electrical and Electronics Engineers, Inc.
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Introduction

This introduction is not part of IEEE Std 434-2006, IEEE Guide for Functional Evaluation of Insulation Systems for AC Electric Machines Rated 2300 V and Above.

During operation, the electrical insulation of large ac machines is continuously subjected to electrical, thermal, mechanical, and environmental stresses. These stresses initiate aging mechanisms that cause irreversible changes in the electrical and physical properties of the insulation, eventually leading to degradation and failure. To perform satisfactorily, an insulation system must retain an adequate level of electrical and physical strength throughout its expected service life.

Manufacturers of large machines continually strive to develop and employ better materials, designs, and manufacturing processes to improve the performance and reduce the cost of their insulation systems. When changes are made to a service-proven insulation system, it is necessary to evaluate the effects of these changes. Functional tests provide a means of evaluating an insulation system by exposing it to factors of influence that simulate or are characteristic of actual service conditions. This guide establishes the basis for evaluating the aging of the electrical insulation system as a result of these influences. It is recognized that this guide does not describe all of the functional tests currently in use by manufacturers of large ac machines, and that additional tests may be required to achieve a complete evaluation and classification of a new insulation system. The functional tests described in this guide are, however, in widespread use.

This revision of the guide updates the previous edition mainly to clarify the intent and performance of the different functional tests. Future revisions are contemplated to include additional functional tests, and details of test procedures and analysis of results.

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Participants

This guide was originally developed by a working group of the Insulation Subcommittee of the IEEE Rotating Machinery Committee. The working group had the following membership:

E. A. Boulter, *Chair*
V. S. McFarlin, *Secretary*

J. C. Botts
J. M. Brown
A. W. W. Cameron
E. M. Fort

M. M. Fromm
J. L. Kuehlthau
P. Lonseth
C. V. Maughan

J. A. Oliver
P. Richardson
C. C. Sargeant
E. S. Yates

At the time this guide was completed, the 434 Working Group had the following membership:

Lori Rux, *Chair*
Stefano Bomben, *Vice Chair*

Sabir Azizi-Ghannad
Ray Bartnikas
Kevin Becker
Sudhakar Cherukupalli
Douglas Conley
Shawn Filliben
George Gao
Jim Grant
Vince Green
Bal Gupta

Guy Halldorson†
Gary Heuston
Claude Hudon
Thomas Kluk†
Thomas Laird
Jim Lau
Lou Little
Bill McDermid
Hal Miller

Glenn Mottershead
Beant Nindra
Howard Sedding
Greg Stone
Meredith Stranges
Jim Timperley
Joe Williams
Chuck Wilson
Karim Younsi
Hugh Zhu

†Deceased

The following members of the individual balloting committee voted on this guide. Balloters may have voted for approval, disapproval, or abstention.

Michael W. Adams
Paul A. Anderson
Saber Azizi-Ghannad
Martin Baur,
Thomas H. Bishop
Thomas H. Blair
Steven R. Brockschink
Andrew J. Brown
Carl L. Bush
Antonio Cardoso
Jorge E. Fernandez Daher
Ronald L. Daubert
Matthew T. Davis
Gary L. Donner
Donald G. Dunn
James H. Dymond

Gary R. Engmann
Marcel Fortin
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N. K. Ghai
Randall C. Groves
James H. Gurney
David A. Horvath
Dennis Horwitz
David W. Jackson
Innocent Kamwa
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Maurice Linker
William E. Lockley
William Lumpkins
G. L. Luri

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William M. McDermid
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Gary L. Michel
Jerry R. Murphy
Krsti Najdenkoski
Robert J. Nelson
Arthur S. Neubauer
Michael S. Newman
Lorraine K. Padden
Ralph E. Patterson
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Gregory C. Stone
S. Thamilarasan
James W. Wilson, Jr.

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