

An American National Standard

IEEE Standard Test Procedure for Thermal Evaluation of Oil-Immersed Distribution Transformers

Sponsor
**Transformers Committee
of the
IEEE Power Engineering Society**

Sectetariat

**Institute of Electrical and Electronics Engineers
National Electrical Manufacturers Association**

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Secretary, IEEE Standards Board
P.O. Box 1331
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USA

Foreword

(This Foreword is not a part of ANSI/IEEE C57.100-1986, IEEE Standard Test Procedure for Thermal Evaluation of Oil-Immersed Distribution Transformers.)

For many years, temperature limits for electrical apparatus have been founded upon classification of insulating materials by broad general definitions based upon chemical composition. This method no longer meets the complete needs of the industry, and a new approach is needed based upon functional tests.

The latest revision of IEEE Std 1-1969 [5],¹ IEEE General Principles for Temperature Limits in the Rating of Electric Equipment, recognizes this need by the following statement:

“Experience has shown that the thermal life characteristics of composite insulation systems cannot be reliably inferred solely from information concerning component materials. To assure satisfactory service life, insulation specifications need to be supported by service experience or life tests. Accelerated life tests are being used increasingly to evaluate systems using the many new synthetic insulating materials that are available, thus shortening the period of service experience required before they can be used with confidence. Tests on complete insulation systems, representative of each type of equipment, are necessary to confirm the performance of materials for their specific functions in the equipment.

“The electrical insulation of equipment is made up of many different components selected to withstand the widely different electric, mechanical, and thermal stresses occurring in different parts of the structure. How long an insulation system will be serviceable depends on the effectiveness of the physical support for the insulation and the severity of the forces acting on it as well as on the materials themselves and the service environment. Therefore, the length of useful life of the insulation system depends on the way that its individual components are arranged, their interactions upon each other, the contribution of each component to the electrical and mechanical integrity of the system, and the way the equipment is manufactured.”

Accordingly, this standard is intended to establish test procedures for evaluating the insulation systems of oil-immersed distribution transformers.

During the preparation of this standard, members of the working group built and tested more than fifty complete transformers. In the interval since the last revision of this standard an additional sampling of more than fifty transformers received impulse tests after various degrees of aging and increasing load current. The results of these tests indicate that the methods of this standard are workable.

The IEEE will maintain this document current with the state of the technology. Comments are invited on this document as are suggestions for additional material. These should be addressed to:

Secretary
IEEE Standards Board
Institute of Electrical and Electronics Engineers, Inc
345 East 47 Street
New York, NY 10017

¹Numbers in brackets correspond to those of the references in Section 3 of this standard.

At the time it approved this standard, the C57 Committee had the following membership:

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Western Area Power Administration	D. R. Torgerson

The major work of establishing the test procedures and conducting the tests was done by the Working Group on Thermal Evaluation of Oil-Immersed Power and Distribution Transformers. The working group had the following membership:

A.M. Lockie, Chair

M. F. Beavers †
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W. L. Carey
H. V. Dornbush

W. C. Farneth
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A. F. Konar
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†Deceased