

ANSI/NETA MTS 7.2.2-2001

AMERICAN NATIONAL STANDARD

STANDARD FOR

**ELECTRICAL MAINTENANCE TESTING OF
LIQUID-FILLED TRANSFORMERS**

Secretariat
**InterNational Electrical Testing
Association**



Approved by
American National Standards Institute



American National Standard

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**Standard for Electrical Maintenance Testing
Liquid-Filled Transformers**

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These lists represent the membership at the time the text of this document was balloted. Since that time, changes in the membership may have occurred.

**Standard for Electrical Maintenance Testing
Liquid-Filled Transformers**

FOREWORD

(THIS FOREWORD IS NOT PART OF AMERICAN NATIONAL STANDARD ANSI/NETA
MTS7.2.2 - 2001)

The InterNational Electrical Testing Association (NETA) was formed in 1972 to establish uniform testing procedures for electrical equipment and apparatus. NETA developed specifications for the acceptance of new electrical apparatus prior to energization and for the maintenance of existing apparatus to determine its suitability to remain in service. The first NETA *Acceptance Testing Specifications for Electrical Power Equipment and Systems* was produced in 1972. Upon completion of this project, the NETA Technical Committee began work on a maintenance document, and *Maintenance Testing Specifications for Electrical Power Equipment and Systems* was published in 1975.

Since 1975, several revisions of the *Maintenance Specifications* have been published; in 1989 the NETA Technical Committee, with approval of the Board of Directors, set a four-year review and revision schedule. Unless it involves a significant safety or urgent technical issue, each comment and suggestion for change is held until the appropriate review period. Each edition includes new and completely revised sections. The document uses the standard numbering system of ANSI and IEEE. Since 1989, revised editions of the *Maintenance Testing Specifications* have been published in 1993, 1997, and 2001.

The *NETA Maintenance Testing Specifications* was developed for use by those responsible for the continued operation of existing electrical systems and equipment to guide them in specifying and performing the necessary tests to ensure that these systems and apparatus perform satisfactorily, minimizing downtime and maximizing life expectancy. This document aids in ensuring safe, reliable operation of existing electrical power systems and equipment. Maintenance testing can identify potential problem areas before they become major problems requiring expensive and time-consuming solutions.

In the early 1990's, NETA's Board of Directors approved the concept of issuing a maintenance testing standard for each of the major components identified in Section 7 of the *Maintenance Testing Specifications* with the goal of each one becoming an ANSI Standard.

NETA applied for accreditation as a Standards Developer for the American National Standards Institute and was approved as an organizational member in 1996. NETA's scope of standards activity is different from that of the IEEE, NECA, NEMA, and UL. In matters of testing electrical equipment and systems NETA continues to reference other standards developers' documents where applicable.

NETA's review and updating of presently published specifications takes into account both national and international standards. The use of our document is not restricted to the United States but is also used internationally. NETA firmly endorses a global standardization. IEC standards as well as American consensus standards are taken into consideration by NETA's Section Panels and reviewing committees.

Suggestions for improvement of this standard are welcome. They should be sent to the InterNational Electrical Testing Association, PO Box 687, Morrison, Colorado 80465-0687.

**Standard for Electrical Maintenance Testing
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CONTENTS

	Page
Preface	1
Scope	2
Qualifications of Testing Personnel	2
Division of Responsibility.....	3
General	4
Inspection and Test Procedures	6
System Function Tests.....	16
Thermographic Survey	16
Applicable References.....	19

TABLES

Table 5A US Standard Bolt Torque Values for Electrical Connections	10
Table 5B Liquid-Filled Transformer Insulation-Resistance, Maintenance Test Values	12
Table 5C Insulation Resistance Conversion Factors, Liquid-Filled Transformer.....	13
Table 5D Recommended Dissipation/Power Factor at 20° C, Liquid-Filled Transformers, Maintenance Test Values	14
Table 5E Suggested Limits for Service-Aged Insulating Fluids.....	15
Table 7A Thermographic Survey – Suggested Actions Based on Temperature Rise	18

**Standard for Electrical Maintenance Testing
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PREFACE

It is recognized by the Association that the needs of commercial, industrial, municipal, governmental, and other electrical power systems vary widely. Many criteria are used in determining what equipment is to be tested, at what intervals, and to what extent. Ambient conditions, availability of down time, and maintenance budgets are but a few of the considerations that go into the planning of a maintenance schedule. The owner must make many decisions each time maintenance is considered.

It is the intent of this document to list a majority of the field tests available for assessing the suitability for continued service and reliability of liquid-filled transformers. Certain tests are assigned an "optional" classification. The following considerations are used in determining the use of the "optional" classification:

1. Does another listed test provide similar information?
2. How does the cost of the test compare to the cost of other tests providing similar information?
3. How commonplace is the test procedure? Is it new technology?
4. Does the outage time required for the particular test greatly increase the total outage time required for all maintenance?

While acknowledging the above, it is still necessary to make an informed judgment for each particular system regarding how extensive a procedure is justified. The approach taken in this standard is to present a comprehensive series of tests that is applicable to liquid-filled transformers. The guidance of an experienced testing professional should be sought when making decisions such as how extensive testing should be. In smaller systems, some of the tests can be deleted. In other cases, a number of the tests indicated as optional should be performed.

As a further note, it is important to follow the recommendations contained in the manufacturer's instruction manuals. Many of the details of a complete and effective maintenance testing procedure can only be obtained from that source.

Alan D. Peterson, Chair
Standards Review Council

InterNational Electrical Testing Association



**Standard for Electrical Maintenance Testing
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1. SCOPE

- 1.1 The purpose of this standard is to assure that all tested electrical equipment and systems are operational and within the applicable standards and manufacturer's tolerances.
- 1.2 This standard covers field tests and inspections that are available to assess the suitability for continued service and reliability of liquid-filled transformers.
- 1.3 The work specified in this standard may involve hazardous voltages, materials, operations, and equipment. This standard does not purport to address all the safety problems associated with its use. It is the responsibility of the user of this standard to review all applicable regulatory and safety limitations prior to use of this standard.

2. QUALIFICATIONS OF TESTING PERSONNEL

- 2.1 The subjective assessment required by this NETA maintenance standard is unique compared to other American National Standards in that it deals with the evaluation of service-aged equipment. While technicians performing tests and inspections on new equipment deal with finite test values, those working with service-aged equipment must form recommendations based on judgement.
- 2.2 Technicians performing these electrical tests and inspections shall be trained and experienced concerning the apparatus and systems being evaluated. These individuals shall be capable of conducting the tests in a safe manner and with complete knowledge of the hazards involved. They must be able to evaluate the test data and make a judgment on the continued serviceability or nonserviceability of the specific equipment.
- 2.3 Test technicians shall have knowledge of and experience with the specific liquid-filled transformer. Additional personnel qualifications are as follows:
 1. Outside testing organizations: Owners of liquid-filled transformers utilizing outside testing companies shall require that each on-site crew leader shall hold a current certification, Level III or higher, in electrical testing. This certification shall be in accordance with ANSI/NETA ETT-2000, Standard for Certification of Electrical Testing Personnel.
 2. Manufacturers Service Personnel: Field service personnel of the manufacturer of the specific liquid-filled transformers being evaluated shall be certified by the manufacturer to perform these electrical tests and inspections. The manufacturer shall provide sufficient documentation to satisfy the owner that its service personnel are trained and qualified to perform these electrical tests and inspections.

*Optional

