Approved American National Standard

ANSI

ANSI/NETA MTS-2015

MTS

STANDARD FOR

MAINTENANCE TESTING SPECIFICATIONS

FOR ELECTRICAL POWER EQUIPMENT & SYSTEMS

2015 NETA® STANDARDS

ANSI/NETA MTS-2015

AMERICAN NATIONAL STANDARD

STANDARD FOR MAINTENANCE TESTING SPECIFICATIONS

for Electrical Power Equipment and Systems

Secretariat
NETA (InterNational Electrical Testing Association)

Approved by
American National Standards Institute

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American National Standard

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FOREWORD

(This Foreword is not part of American National Standard ANSI/NETA MTS-2015)

The InterNational Electrical Testing Association (NETA) was formed in 1972 to establish uniform testing procedures for electrical equipment and apparatus. NETA has been an Accredited Standards Developer for the American National Standards Institute since 1996. NETA's scope of standards activity is different from that of 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 standards takes into account both national and international standards. NETA's standards may be used internationally as well as in the United States. NETA firmly endorses a global standardization. IEC standards as well as American consensus standards are taken into consideration by NETA's ballot pools and reviewing committees.

The first NETA *Maintenance Testing Specifications for Electrical Power Equipment and Systems* was published in 1975. Since 1989, revised editions of the *Maintenance Testing Specifications* have been published in 1993, 1997, and 2001.

In 2005, this document was approved for the first time as an American National Standard. It was published as a revised American National Standard in 2011. The 2015 *Standard for Maintenance Testing Specifications for Electrical Power Equipment and Systems* is the most current revision of this document, and was approved as a revised American National Standard on December 3, 2014.

The ANSI/NETA *Standard for Maintenance Testing Specifications for Electrical Power Equipment and Systems* 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.

PREFACE

(This Preface is not part of American National Standard ANSI/NETA MTS-2015)

It is recognized by the Association that the needs for maintenance testing of commercial, industrial, governmental, and other electrical power systems vary widely. Many criteria are used in determining what equipment is to be tested and to what extent.

To help the user better understand and navigate more efficiently through this document, we offer the following information:

Notation of Changes
Material included in this edition of the document but not part of the previous edition is marked with a black vertical line to the left of the insertion of text, deletion of text, or alteration of text.

Document Structure
The document is divided into thirteen separate and defined sections:

Section	Description
Section 1	General Scope
Section 2	Applicable References
Section 3	Qualifications of Testing Organization and Personnel
Section 4	Division of Responsibility
Section 5	General
Section 6	Power System Studies
Section 7	Inspection and Test Procedures
Section 8	System Function Test
Section 9	Thermographic Survey
Section 10	Electromagnetic Field Survey
Section 11	Corona Studies - RESERVED
Tables	Reference Tables
Appendices	Various Informational Documents

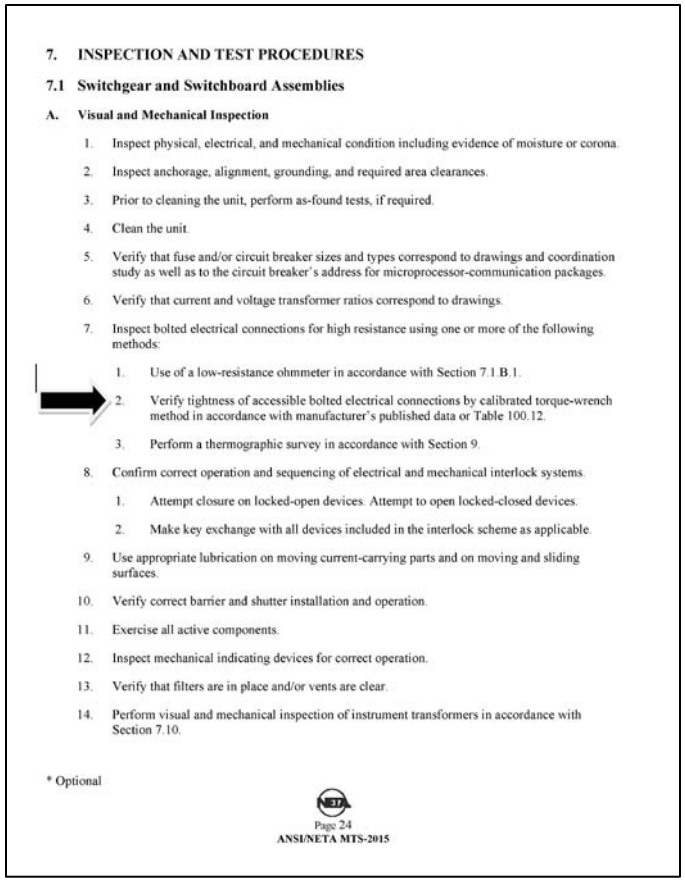
Section 7 Structure
Section 7 is the main body of the document with specific information on what to do relative to the inspection and maintenance testing of electrical power equipment and systems. It is not intended that this document explain how to test specific pieces of equipment or systems.

Expected Test Results
Section 7 consists of sections specific to each particular type of equipment. Within those sections there are, typically, four main bodies of information:

A. Visual and Mechanical Inspection
B. Electrical Tests
C. Test Values – Visual and Mechanical
D. Test Values – Electrical

Results of Visual and Mechanical Inspections

Some, but not all, visual and mechanical inspections have an associated test value or result. Those items with an expected result are referenced under Section C. Test Values – Visual and Mechanical. For example, Section 7.1 Switchgear and Switchboard Assemblies, item 7.1.A.7.2 calls for verifying tightness of connections using a calibrated torque wrench method. Under the Test Values – Visual and Mechanical Section 7.1.C.2, the expected results for that particular task are listed within Section C, with reference back to the original task description on item 7.1.A.7.2.



7. **INSPECTION AND TEST PROCEDURES**

7.1 Switchgear and Switchboard Assemblies

A. Visual and Mechanical Inspection

1. Inspect physical, electrical, and mechanical condition including evidence of moisture or corona.
2. Inspect anchorage, alignment, grounding, and required area clearances.
3. Prior to cleaning the unit, perform as-found tests, if required.
4. Clean the unit.
5. Verify that fuse and/or circuit breaker sizes and types correspond to drawings and coordination study as well as to the circuit breaker's address for microprocessor-communication packages.
6. Verify that current and voltage transformer ratios correspond to drawings.
7. Inspect bolted electrical connections for high resistance using one or more of the following methods:
   1. Use of a low-resistance ohmmeter in accordance with Section 7.1.B.1.
   2. Verify tightness of accessible bolted electrical connections by calibrated torque-wrench method in accordance with manufacturer's published data or Table 100.12.
   3. Perform a thermographic survey in accordance with Section 9.
8. Confirm correct operation and sequencing of electrical and mechanical interlock systems.
   1. Attempt closure on locked-open devices. Attempt to open locked-closed devices.
   2. Make key exchange with all devices included in the interlock scheme as applicable.
9. Use appropriate lubrication on moving current-carrying parts and on moving and sliding surfaces.
10. Verify correct barrier and shutter installation and operation.
11. Exercise all active components.
12. Inspect mechanical indicating devices for correct operation.
13. Verify that filters are in place and/or vents are clear.
14. Perform visual and mechanical inspection of instrument transformers in accordance with Section 7.10.

* Optional

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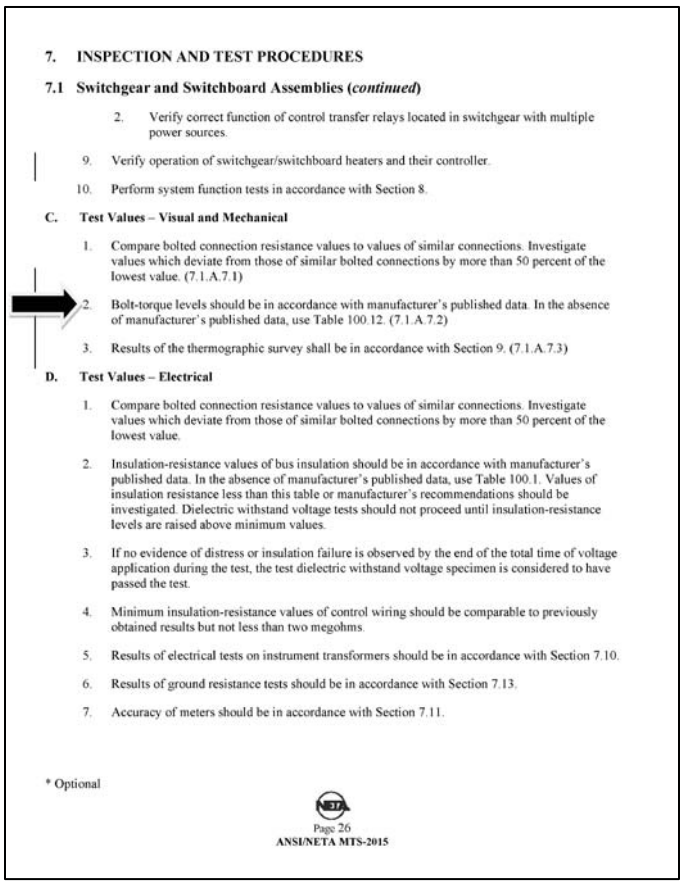

7. **INSPECTION AND TEST PROCEDURES**

7.1 Switchgear and Switchboard Assemblies (*continued*)

2. Verify correct function of control transfer relays located in switchgear with multiple power sources.
9. Verify operation of switchgear/switchboard heaters and their controller.
10. Perform system function tests in accordance with Section 8.

C. Test Values – Visual and Mechanical

1. Compare bolted connection resistance values to values of similar connections. Investigate values which deviate from those of similar bolted connections by more than 50 percent of the lowest value. (7.1.A.7.1)
2. Bolt-torque levels should be in accordance with manufacturer's published data. In the absence of manufacturer's published data, use Table 100.12. (7.1.A.7.2)
3. Results of the thermographic survey shall be in accordance with Section 9. (7.1.A.7.3)

D. Test Values – Electrical

1. Compare bolted connection resistance values to values of similar connections. Investigate values which deviate from those of similar bolted connections by more than 50 percent of the lowest value.
2. Insulation-resistance values of bus insulation should be in accordance with manufacturer's published data. In the absence of manufacturer's published data, use Table 100.1. Values of insulation resistance less than this table or manufacturer's recommendations should be investigated. Dielectric withstand voltage tests should not proceed until insulation-resistance levels are raised above minimum values.
3. If no evidence of distress or insulation failure is observed by the end of the total time of voltage application during the test, the test dielectric withstand voltage specimen is considered to have passed the test.
4. Minimum insulation-resistance values of control wiring should be comparable to previously obtained results but not less than two megohms.
5. Results of electrical tests on instrument transformers should be in accordance with Section 7.10.
6. Results of ground resistance tests should be in accordance with Section 7.13.
7. Accuracy of meters should be in accordance with Section 7.11.

* Optional

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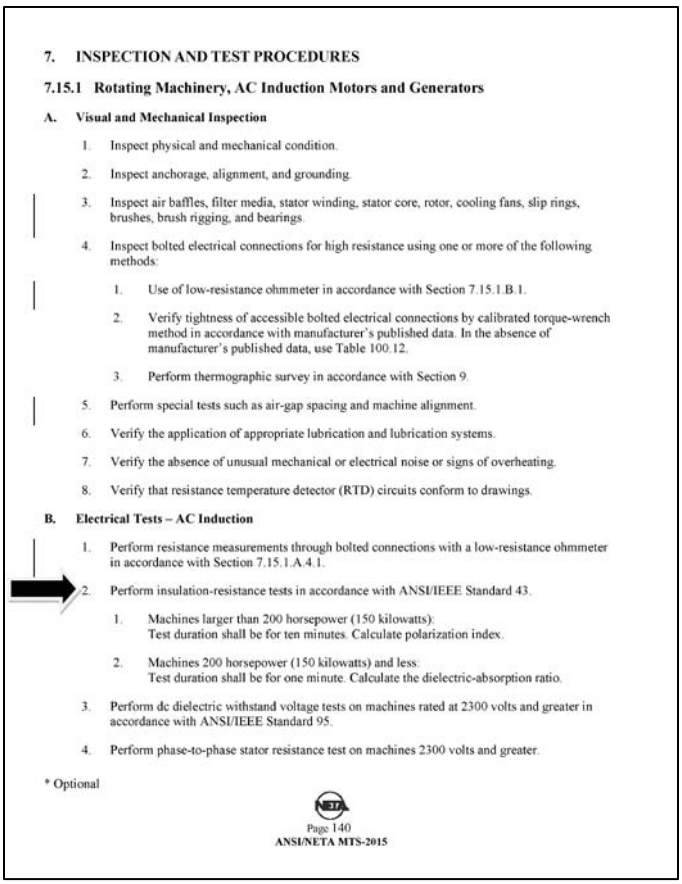
Results of Electrical Tests

Each electrical test has a corresponding expected result, and the test and the result have identical numbers. If the electrical test is item four, the expected result under the Test Values section is also item four. For example, under Section 7.15.1 Rotating Machinery, AC Induction Motors and Generators, item 7.15.1.B.2 (item 2 within the Electrical Tests section) calls for performing an insulation-resistance test in accordance with IEEE Standard 43. Under the Test Values – Electrical section, the expected results for that particular task are listed in the Test Values section under item 2.



7. INSPECTION AND TEST PROCEDURES

7.15.1 Rotating Machinery, AC Induction Motors and Generators

A. Visual and Mechanical Inspection

1. Inspect physical and mechanical condition.
2. Inspect anchorage, alignment, and grounding.
3. Inspect air baffles, filter media, stator winding, stator core, rotor, cooling fans, slip rings, brushes, brush rigging, and bearings.
4. Inspect bolted electrical connections for high resistance using one or more of the following methods:
   1. Use of low-resistance ohmmeter in accordance with Section 7.15.1.B.1.
   2. Verify tightness of accessible bolted electrical connections by calibrated torque-wrench method in accordance with manufacturer's published data. In the absence of manufacturer's published data, use Table 100.12.
   3. Perform thermographic survey in accordance with Section 9.
5. Perform special tests such as air-gap spacing and machine alignment.
6. Verify the application of appropriate lubrication and lubrication systems.
7. Verify the absence of unusual mechanical or electrical noise or signs of overheating.
8. Verify that resistance temperature detector (RTD) circuits conform to drawings.

B. Electrical Tests – AC Induction

1. Perform resistance measurements through bolted connections with a low-resistance ohmmeter in accordance with Section 7.15.1.A.4.1.
2. Perform insulation-resistance tests in accordance with ANSI/IEEE Standard 43.
   1. Machines larger than 200 horsepower (150 kilowatts):
      Test duration shall be for ten minutes. Calculate polarization index.
   2. Machines 200 horsepower (150 kilowatts) and less:
      Test duration shall be for one minute. Calculate the dielectric-absorption ratio.
3. Perform dc dielectric withstand voltage tests on machines rated at 2300 volts and greater in accordance with ANSI/IEEE Standard 95.
4. Perform phase-to-phase stator resistance test on machines 2300 volts and greater.

* Optional

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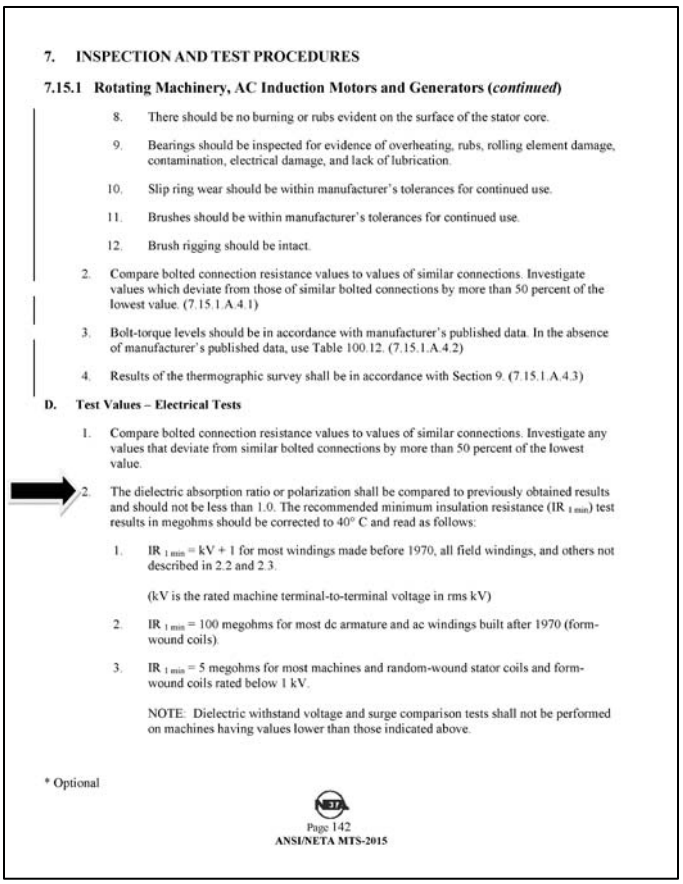

7. INSPECTION AND TEST PROCEDURES

7.15.1 Rotating Machinery, AC Induction Motors and Generators (*continued*)

8. There should be no burning or rubs evident on the surface of the stator core.
9. Bearings should be inspected for evidence of overheating, rubs, rolling element damage, contamination, electrical damage, and lack of lubrication.
10. Slip ring wear should be within manufacturer's tolerances for continued use.
11. Brushes should be within manufacturer's tolerances for continued use.
12. Brush rigging should be intact.

2. Compare bolted connection resistance values to values of similar connections. Investigate values which deviate from those of similar bolted connections by more than 50 percent of the lowest value. (7.15.1.A.4.1)
3. Bolt-torque levels should be in accordance with manufacturer's published data. In the absence of manufacturer's published data, use Table 100.12. (7.15.1.A.4.2)
4. Results of the thermographic survey shall be in accordance with Section 9. (7.15.1.A.4.3)

D. Test Values – Electrical Tests

1. Compare bolted connection resistance values to values of similar connections. Investigate any values that deviate from similar bolted connections by more than 50 percent of the lowest value.
2. The dielectric absorption ratio or polarization shall be compared to previously obtained results and should not be less than 1.0. The recommended minimum insulation resistance ($IR_{1\,min}$) test results in megohms should be corrected to 40° C and read as follows:
   1. $IR_{1\,min}$ = kV + 1 for most windings made before 1970, all field windings, and others not described in 2.2 and 2.3.

      (kV is the rated machine terminal-to-terminal voltage in rms kV)
   2. $IR_{1\,min}$ = 100 megohms for most dc armature and ac windings built after 1970 (form-wound coils).
   3. $IR_{1\,min}$ = 5 megohms for most machines and random-wound stator coils and form-wound coils rated below 1 kV.

      NOTE: Dielectric withstand voltage and surge comparison tests shall not be performed on machines having values lower than those indicated above.

* Optional

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Optional Tests

The purpose of these specifications is to assure that all tested electrical equipment and systems supplied by either contractor or owner are operational and within applicable standards and manufacturer's published tolerances and that equipment and systems are installed in accordance with design specifications.

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?

If/When Applicable

The phrases "if applicable", "when applicable", and any variation thereof do not occur in this standard. This standard assumes that if devices or pieces of equipment are not present, they will not be subject to testing or verification.

Manufacturer's Instruction Manuals

It is important to follow the recommendations contained in the manufacturer's published data. Many of the details of a complete and effective testing procedure can be obtained from this source.

Summary

The guidance of an experienced testing professional should be sought when making decisions concerning the extent of testing. It is necessary to make an informed judgment for each particular system regarding how extensive a procedure is justified. The approach taken in these specifications is to present a comprehensive series of tests applicable to most industrial and larger commercial systems. In smaller systems, some of the tests can be deleted. In other cases, a number of the tests indicated as optional should be performed.

Likewise, guidance of an experienced testing professional should also be sought when making decisions concerning the results of test data and their significance to the overall analysis of the device or system under test. Careful consideration of all aspects of test data, including manufacturer's published data and recommendations, must be included in the overall assessment of the device or system under test.

The Association encourages comment from users of this document. Please contact the NETA office or your local NETA Accredited Company.

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CONTENTS (*continued*)

TABLES

CONTENTS (*continued*)

TABLES (*Continued*)

APPENDICES

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1. GENERAL SCOPE

1.1 Maintenance Testing Specifications

1. These specifications cover the suggested field tests and inspections that are available to assess the suitability for continued service and reliability of electrical power distribution equipment and systems.

2. The purpose of these specifications is to assure that tested electrical equipment and systems are operational, are within applicable standards and manufacturer's tolerances, and are suitable for continued service.

3. The work specified in these specifications may involve hazardous voltages, materials, operations, and equipment. These specifications do not purport to address all of the safety problems associated with their use. It is the responsibility of the user to review all applicable regulatory limitations prior to the use of these specifications.

2. APPLICABLE REFERENCES

2.1 Codes, Standards, and Specifications

All inspections and field tests shall be in accordance with the latest edition of the following codes, standards, and specifications except as provided otherwise herein.

1. American National Standards Institute – ANSI

2. ASTM International – ASTM

ASTM D 92	*Standard Test Method for Flash and Fire Points by Cleveland Open Cup Tester*
ASTM D 445	*Standard Test Method for Kinematic Viscosity of Transparent and Opaque Liquids (the Calculation of Dynamic Viscosity)*
ASTM D 664	*Standard Test Method for Acid Number of Petroleum Products by Potentiometric Titration*
ASTM D 877	*Standard Test Method for Dielectric Breakdown Voltage of Insulating Liquids using Disk Electrodes*
ASTM D 923	*Standard Practices for Sampling Electrical Insulating Liquids*
ASTM D 924	*Standard Test Method for Dissipation Factor (or Power Factor) and Relative Permittivity (Dielectric Constant) of Electrical Insulating Liquids*
ASTM D 971	*Standard Test Method for Interfacial Tension of Oil against Water by the Ring Method*
ASTM D 974	*Standard Test Method for Acid and Base Number by Color-Indicator Titration*
ASTM D 1298	*Standard Test Method for Density, Relative Density (Specific Gravity), or API Gravity of Crude Petroleum and Liquid Petroleum Products by Hydrometer Method*
ASTM D 1500	*Standard Test Method for ASTM Color of Petroleum Products (ASTM Color Scale)*
ASTM D 1524	*Standard Test Method for Visual Examination of Used Electrical Insulating Oils of Petroleum Origin in the Field*

2. APPLICABLE REFERENCES

2.1 Codes, Standards, and Specifications (*continued*)

ASTM D 1533	*Standard Test Methods for Water in Insulating Liquids by Coulometric Karl Fischer Titration*
ASTM D 1816	*Standard Test Method for Dielectric Breakdown Voltage of Insulating Oils of Petroleum Origin Using VDE Electrodes*
ASTM D 2029	*Standard Test Methods for Water Vapor Content of Electrical Insulating Gases by Measurement of Dew Point*
ASTM D 2129	*Standard Test Method for Color of Clear Electrical Insulating Liquids (Platinum-Cobalt Scale)*
ASTM D 2284	*Standard Test Method of Acidity of Sulfur Hexafluoride*
ASTM D 2285	*Standard Test Method for Interfacial Tension of Electrical Insulating Oils of Petroleum Origin against Water by the Drop-Weight Method*
ASTM D 2477	*Standard Test Method for Dielectric Breakdown Voltage and Dielectric Strength of Insulating Gases at Commercial Power Frequencies*
ASTM D 2685	*Standard Test Method for Air and Carbon Tetrafluoride in Sulfur Hexafluoride by Gas Chromatography*
ASTM D 2759	*Standard Practice for Sampling Gas from a Transformer under Positive Pressure*
ASTM D 3284	*Standard Test Method for Combustible Gases in the Gas Space of Electrical Apparatus Using Portable Meters*
ASTM D 3612	*Standard Test Method for Analysis of Gases Dissolved in Electrical Insulating Oil by Gas Chromatography*
ASTM D 3613	*Standard Practice for Sampling Electrical Insulating Oils for Gas Analysis and Determination of Water Content*

3. Association of Edison Illuminating Companies – AEIC

4. Canadian Standards Association – CSA

2. APPLICABLE REFERENCES

2.1 Codes, Standards, and Specifications (*continued*)

5. Electrical Apparatus Service Association – EASA

ANSI/EASA AR100 *Recommended Practice for the Repair of Rotating Electrical Apparatus*

6. Institute of Electrical and Electronic Engineers – IEEE

ANSI/IEEE C2	*National Electrical Safety Code*
ANSI/IEEE C37 Compilation	*Guides and Standards for Circuit Breakers, Switchgear, Relays, Substations, and Fuses*
ANSI/IEEE C57 Compilation	*Distribution, Power, and Regulating Transformers*
ANSI/IEEE C62 Compilation	*Surge Protection*
ANSI/IEEE 43	*IEEE Recommended Practice for Testing Insulation Resistance of Rotating Machinery*
ANSI/IEEE 48	*IEEE Standard Test Procedures and Requirements for Alternating-Current Cable Terminations 2.5 kV through 765 kV*
IEEE 81	*IEEE Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Ground System Part I: Normal Measurements*
ANSI/IEEE 81.2	*IEEE Guide for Measurement of Impedance and Safety Characteristics of Large, Extended or Interconnected Grounding Systems*
ANSI/IEEE 95	*IEEE Recommended Practice for Insulation Testing of Large AC Rotating Machinery with High Direct Voltage*
IEEE 100	*The Authoritative Dictionary of IEEE Standards Terms*
IEEE 141	*IEEE Recommended Practice for Electrical Power Distribution for Industrial Plants (Red Book)*
ANSI/IEEE 142	*IEEE Recommended Practice for Grounding of Industrial and Commercial Power Systems (Green Book)*
ANSI/IEEE 241	*IEEE Recommended Practice for Electric Power Systems in Commercial Buildings (Gray Book)*
ANSI/IEEE 242	*IEEE Recommended Practice for Protection and Coordination of Industrial and Commercial Power Systems (Buff Book)*

2. APPLICABLE REFERENCES

2.1 Codes, Standards, and Specifications (*continued*)

IEEE 386	*IEEE Standard for Separable Insulated Connectors System for Power Distribution Systems above 600 V*
ANSI/IEEE 399	*IEEE Recommended Practice for Power Systems Analysis (Brown Book)*
IEEE 400	*IEEE Guide for Field Testing and Evaluation of the Insulation of Shielded Power Cable Systems*
ANSI/IEEE 421.3	*IEEE Standard for High-Potential-Test Requirements for Excitation Systems for Synchronous Machines*
ANSI/IEEE 446	*IEEE Recommended Practice for Emergency and Standby Power Systems for Industrial and Commercial Applications (Orange Book)*
ANSI/IEEE 450	*IEEE Recommended Practice for Maintenance, Testing, and Replacement of Vented Lead-Acid Batteries for Stationary Applications*
ANSI/IEEE 493	*IEEE Recommended Practice for the Design of Reliable Industrial and Commercial Power Systems (Gold Book)*
ANSI/IEEE 519	*IEEE Recommended Practices and Requirements for Harmonic Control in Electrical Power Systems*
ANSI/IEEE 602	*IEEE Recommended Practice for Electric Systems in Health Care Facilities (White Book)*
ANSI/IEEE 637	*IEEE Guide for the Reclamation of Insulating Oil and Criteria for Its Use*
IEEE 644	*Procedures for Measurement of Power Frequency Electric and Magnetic Fields from AC Power Lines*
ANSI/IEEE 739	*IEEE Recommended Practice for Energy Management in Commercial and Industrial Facilities (Bronze Book)*
ANSI/IEEE 902	*IEEE Guide for Maintenance, Operation and Safety of Industrial and Commercial Power Systems (Yellow Book)*
IEEE 1015	*IEEE Recommended Practice for Applying Low-Voltage Circuit Breakers Used in Industrial and Commercial Power Systems (Blue Book)*
IEEE 1100	*IEEE Recommended Practice for Powering and Grounding Sensitive Electronic Equipment (Emerald Book)*
ANSI/IEEE 1106	*IEEE Recommended Practice for Maintenance, Testing, and Replacement of Nickel-Cadmium Batteries for Stationary Applications*

2. APPLICABLE REFERENCES

2.1 Codes, Standards, and Specifications (*continued*)

ANSI/IEEE 1159	*IEEE Recommended Practice on Monitoring Electrical Power Quality*
ANSI/IEEE 1188	*IEEE Recommended Practice for Maintenance, Testing, and Replacement of Valve-Regulated Lead-Acid (VRLA) Batteries for Stationary Applications*
IEEE 1584	*IEEE Guide for Performing Arc-Flash Hazard Calculations*
IEEE 1584a	*IEEE Guide for Performing Arc-Flash Hazard Calculations – Amendment 1*

7. Insulated Cable Engineers Association – ICEA

ANSI/ICEA S-93-639/NEMA WC 74	*5-46 kV Shielded Power Cable for Use in the Transmission and Distribution of Electric Energy*
ANSI/ICEA S-94-649	*Standard for Concentric Neutral Cables Rated 5,000 – 46,000 Volts*
ANSI/ICEA S-97-682	*Standard for Utility Shielded Power Cables Rated 5,000 – 46,000 Volts*

8. InterNational Electrical Testing Association – NETA

ANSI/NETA ETT	*Standard for Certification of Electrical Testing Technicians*
ANSI/NETA ATS	*Standard for Acceptance Testing Specifications for Electrical Power Equipment and Systems*

2. APPLICABLE REFERENCES

2.1 Codes, Standards, and Specifications (*continued*)

9. National Electrical Manufacturers Association – NEMA

NEMA AB4	*Guidelines for Inspection and Preventive Maintenance of Molded-Case Circuit Breakers Used in Commercial and Industrial Applications*
ANSI/NEMA C84.1	*Electrical Power Systems and Equipment Voltage Ratings (60 Hz)*
NEMA MG1	*Motors and Generators*

10. National Fire Protection Association – NFPA

ANSI/NFPA 70	*National Electrical Code*
ANSI/NFPA 70B	*Recommended Practice for Electrical Equipment Maintenance*
ANSI/NFPA 70E	*Standard for Electrical Safety in the Workplace*
ANSI/NFPA 99	*Standard for Healthcare Facilities*
ANSI/NFPA 101	*Life Safety Code*
ANSI/NFPA 110	*Emergency and Standby Power Systems*
ANSI/NFPA 780	*Installation of Lightning Protection Systems*

11. Occupational Safety and Health Administration – OSHA

12. State and local codes and ordinances

13. Underwriters Laboratories, Inc. – UL

2. APPLICABLE REFERENCES

2.2 Other Publications

Manufacturer's instruction manuals for the equipment to be tested.

A Stitch in Time…The Complete Guide to Electrical Insulation Testing, Megger.

Electrical Power Equipment Maintenance and Testing, Paul Gill, New York: Taylor & Francis Books.

Electrical Safety Handbook, John C. Cadick, New York: McGraw Hill.

The Electrical Safety Program Book, Kenneth G. Mastrullo, Ray A. Jones, Jane G. Jones, National Fire Protection Association.

Instruction Book PC – 2000 for Wecosol™ Fluid-Filled Primary and Secondary Unit Substation Transformer, ABB Power T&D.

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Institute of Electrical and Electronic Engineers – IEEE
PO Box 1331
Piscataway, NJ 08855
(732) 981-0060
www.ieee.org

Insulated Cable Engineers Association – ICEA
c/o Global Document Engineers
15 Inverness Way East
Englewood, CO 80112
(303) 397-7956
www.icea.net

International Electrotechnical Commission – IEC
Contact through American National Standards Institute

InterNational Electrical Testing Association – NETA
3050 Old Centre Ave. Suite 102
Portage, MI 49024
(269) 488-6382 or (888) 300-NETA (6382)
www.netaworld.org

The McGraw-Hill Companies
P.O. Box 182604
Columbus, OH 43272
(877) 833-5524
www.mcgraw-hill.com

Megger
4271 Bronze Way
Dallas, TX 75237
(214) 723-2861
www.megger.com

National Electrical Manufacturers Association– NEMA
1300 N. 17th St. Suite 1847
Rosslyn, VA 22209
(703) 841-3200
www.nema.org

2. APPLICABLE REFERENCES

2.3 Contact Information (*continued*)

National Institute of Standards and Technology
100 Bureau Drive
Gaithersburg, SD 20899
(301) 975-6478
www.nist.gov

National Fire Prevention Association – NFPA
1 Battery March Park
PO Box 901
Quincy, MA 02269-9101
(617) 984-7247
www.nfpa.org

Occupational Safety and Health Administration – OSHA
U.S. Department of Labor
Occupational Safety and Health Administration
Office of Public Affairs – Room N3647
200 Constitution Avenue
Washington, D.C. 20210
(202) 693-1999
www.osha.gov

Square D Company, Anderson Product Division
P.O. Box 455
Leeds, AL 35094
(205) 699-2411
www.schneider-electric.com

Taylor and Francis Books, Inc. – CRC Press
2000 NW Corporate Blvd.
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www.crcpress.com

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333 Pfingsten Road
Northbrook, IL 60062
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www.ul.com