Examination Standard for Electrical Equipment for Measurement, Control and Laboratory Use

Class Number 3810

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Foreword

This standard is intended to verify that the products and services described will meet stated conditions of performance, safety and quality useful to the ends of property conservation. The purpose of this standard is to present the criteria for examination of various types of products and services.

Examination in accordance with this standard shall demonstrate compliance and verify that quality control in manufacturing shall ensure a consistent and reliable product.

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1. INTRODUCTION

1.1 Purpose

1.1.1. This standard states testing and certification requirements for electrical equipment for measurement, control and laboratory use (herein called equipment).

1.1.2. Testing and certification criteria may include, but are not limited to, performance requirements, marking requirements, examination of manufacturing facility(is), audit of quality assurance procedures, and a follow-up program.

1.2 Scope

1.2.1 This standard applies to electrical, electronic, or electro-mechanical equipment designed:

- to measure or observe, and indicate quantities of electrical or electronic phenomena, or
- to supply electrical or electronic quantities for measuring or indicating purposes, or
- to measure or control, directly or indirectly, an industrial process, or
- to measure or indicate electrical analogs of non-electrical phenomena, or
- to measure, indicate, monitor, analyze substances or prepare materials, i.e., laboratory equipment.

1.3 Basis for Requirements

1.3.1 The requirements of this standard are based on experience, research, testing, and the standards of other national and international organizations. The advice of manufacturers, users, trade associations, and loss control specialists was also considered.

1.3.2 The requirements of this standard reflect tests and practices used to examine characteristics of electrical equipment for the purpose of obtaining certification. Electrical equipment having characteristics not anticipated by this standard may be certified if performance equal, or superior, to that required by this standard is demonstrated.

1.4 Basis for Certification

Certification is based upon satisfactory evaluation of the product and the manufacturer in the following major areas:

1.4.1 Examination and tests on production samples shall be performed to evaluate:

- the suitability of the product;
- the performance of the product as specified by the manufacturer and required for certification; and
- as far as practical, the durability and reliability of the product.

1.4.2 An examination of the manufacturing facilities and audit of quality control procedures is made to evaluate the manufacturer's ability to consistently produce the product which is examined and tested, and the marking procedures used to identify the product. Subsequent surveillance may be required by the certification agency in accordance with the certification scheme to ensure ongoing compliance.

1.5 Basis for Continued Certification

The basis for continual certification may include, but is not limited to, the following based upon the certification scheme and requirements of the certification agency
:

- production or availability of the product as currently certified;
- the continued use of acceptable quality assurance procedures;
- satisfactory field experience;
- compliance with the terms stipulated by the certification;
- satisfactory re-examination of production samples for continued conformity to requirements; and
- satisfactory surveillance audits conducted as part of the certification agency's product surveillance program.

1.6 Effective Date

The effective date of this certification standard mandates that all products tested for certification after the effective date shall satisfy the requirements of this standard.

The effective date of this standard is eighteen (18) months after the publication date of the standard for compliance with all requirements.

1.7 System of Units

Units of measurement used in this Standard are United States (U.S.) customary units. These are followed by their arithmetic equivalents in International System (SI) units, enclosed in parentheses. The first value stated shall be regarded as the requirement. The converted equivalent value may be approximate. Conversion of U.S. customary units is in accordance with ANSI/IEEE/ASTM SI-10.

1.8 Normative References

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies.

ANSI/IEEE/ASTM SI-10, *American National Standard for Metric Practice*

ANSI/UL 61010-1, *Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use – Part 1: General Requirements*

1.9 Terms and Definitions

For the purposes of this standard, unless stated otherwise, the definitions are given in ANSI/UL 61010-1.

2. GENERAL INFORMATION

2.1 Product Information

For the purposes of this standard, unless stated otherwise, the product information is given in ANSI/UL 61010-1.

2.2 Certification Application Requirements

The manufacturer shall provide the following preliminary information with any request for Approval consideration:

- a complete list of all models, types, sizes, and options for the products or services being submitted for Approval consideration;
- marketing/ordering literature showing general specifications and functions of the equipment. These are generally very useful in determining project costs and may also be used as attachments to the final report for equipment Approval projects;
- instruction manual(s) providing installation, operation, and maintenance instructions;
- production drawings as follows:
  - electrical schematic(s)
  - final assembly drawing and parts lists
  - sub-assembly drawings or piece-part drawings/assembly drawings sufficient to detail primary circuit components, operator controls, enclosure design, and safety interlocks.
  - product label drawing(s) showing all required marking information. The label drawing should show proposed artwork indicating the manufacturer's name, address, model and serial numbers, equipment ratings, warning markings, and the Approval mark.
  - protective grounding detail drawing(s) showing the method of protective grounding provided, including location, size, and marking.
  - the number and location of manufacturing facilities;
  - any documents from other National Recognized Testing Laboratories (NRTL) or National Certification Bodies (NCB) needed to support the Approval process; i.e., component recognitions, Listing reports, Certification reports, IEC/CB Scheme reports, etc.

All documents shall identify the manufacturer's name, document number or other form of reference, title, date of last revision, and revision level. All documents shall be provided with English translation.

2.3 Requirements for Samples for Examination

2.3.1 Following authorization of a certification examination, the manufacturer shall submit samples for examination and testing based on the following:

- Sample requirements to be determined by the certification agency

2.3.2 Requirements for samples may vary depending on design features, results of prior or similar testing, and results of any foregoing tests.

2.3.3 The manufacturer shall submit samples representative of production. Any decision to use data generated using prototypes is at the discretion of the certification agency.

2.3.4 It is the manufacturer's responsibility to provide any necessary test fixtures.

3. GENERAL REQUIREMENTS

3.1 Review of Documentation

3.1.1 During the initial investigation and prior to physical testing, the manufacturer's specifications and details shall be reviewed to assess the ease and practicality of installation and use. The certification examination results may further define the limits of the final certification.

3.2 Markings

In addition to the requirements of the standards referenced in Paragraph 4, the following additional requirements apply:

3.2.1 Marking on the product or, if not possible due to size, on its packaging or label accompanying the product, shall include the following information:

- name and address of the manufacturer or marking traceable to the manufacturer;
- date of manufacture or code traceable to date of manufacture or lot identification

3.2.2 The model or type identification shall correspond with the manufacturer's catalog designation and shall uniquely identify the certification agency's mark of conformity

3.2.3 The certification agency's mark of conformity shall be displayed visibly and permanently on the product and/or packaging as appropriate and in accordance with the requirements of the certification agency. The manufacturer shall exercise control of this mark as specified by the certification agency and the certification scheme.

3.2.4 All markings shall be legible and durable.

3.3 Manufacturer's Installation and Operation Instructions

3.3.1 The manufacturer shall

- prepare instructions for the installation, maintenance, and operation of the product;
- provide facilities for repair of the product and supply replacement parts; and
- provide services to ensure proper installation, inspection, or maintenance for products of such nature that it would not be reasonable to expect the average user to be able to provide such installation, inspection, or maintenance.

3.4 Calibration

3.4.1 Each piece of equipment used to verify the test parameters shall be calibrated within an interval determined on the basis of stability, purpose, and usage. A copy of the calibration certificate for each piece of test equipment is required. The certificate shall indicate that the calibration was performed against working standards whose calibration is certified and traceable to an acceptable reference standard and certified by an ISO/IEC 17025 accredited calibration laboratory. The test equipment shall be clearly identified by label or sticker showing the last date of the calibration and the next due date. A copy of the service provider's accreditation certificate as an ISO/IEC 17025 accredited calibration laboratory should be available.

3.4.3 When the inspection equipment and/or environment is not suitable for labels or stickers, other methods such as etching of control numbers on the measuring device are allowed, provided documentation is maintained on the calibration status of thus equipment.

4. PERFORMANCE AND CONSTRUCTION REQUIREMENTS

Products certified within the scope of this standard shall comply with the applicable requirements of ANSI/UL61010-1.

5. OPERATIONS REQUIREMENTS

5.1 Demonstrated Quality Control Program

5.1.1 A quality assurance program is required to assure that subsequent products produced by the manufacturer shall present the same quality and reliability as the specific equipment examined. Design quality, conformance to design, and performance are the areas of primary concern.

- Design quality is determined during the examination and tests, and is documented in the certification report
- Continued conformance to this standard is verified by the certifier's surveillance audit.
- Quality of performance is determined by field performance and by periodic re-examination and testing.

5.1.2 The manufacturer shall demonstrate a quality assurance program which specifies controls for at least the following areas:

- existence of corporate quality assurance guidelines;
- incoming quality assurance, including testing;
- in-process quality assurance, including testing;
- final inspection and tests;
- equipment calibration;
- drawing and change control;
- packaging and shipping; and
- handling and disposition of non-conforming materials.

5.1.3 Documentation/Manual

There should be an authoritative collection of procedures/policies. It should provide an accurate description of the quality management system while serving as a permanent reference for implementation and maintenance of that system. The system shall require that sufficient records are maintained to demonstrate achievement of the required quality and verify operation of the quality system.

5.1.4 Records

To assure adequate traceability of materials and products, the manufacturer shall maintain a record of all quality assurance tests performed, for a minimum period of two years from the date of manufacture.

5.1.5 Drawing and Change Control

- The manufacturer shall establish a system of product configuration control that shall allow no unauthorized changes to the product. Changes to critical documents, identified in the certification report, must be reported to, and authorized by the certification agency prior to implementation for production.
- Records of all revisions to all certified products shall be maintained.

5.2 Surveillance Audit

5.2.1 An audit of the manufacturing facility may be part of the certification agency's surveillance requirements to verify implementation of the quality assurance program. Its purpose is to determine

that the manufacturer's equipment, procedures, and quality program are maintained to ensure a uniform product consistent with that which was tested and certified.

5.2.2 Certified products or services shall be produced or provided at, or provided from, location(s) disclosed as part of the certification examination. Manufacture of products bearing a certification mark is not permitted at any other location prior to disclosure to the certification agency.

5.3 Manufacturer's Responsibilities

The manufacturer shall notify the certification agency of changes in product construction, components, raw materials, physical characteristics, coatings, component formulation or quality assurance procedures prior to implementation.

6. BIBLIOGRAPHY

ISO/IEC 17025, *General Requirements for the Competence of Testing and Calibration Laboratories*.