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# Standard Specification for Insulation Resistance Monitor for Shipboard Electrical Motors and Generators<sup>1</sup>

This standard is issued under the fixed designation F 1134; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

## 1. Scope

1.1 This specification covers monitoring devices (monitors) for the automatic detection and signaling of low insulation resistance values in idle electrical motors or generators, or both.

1.2 Monitors are intended for permanent installation in both existing or new panels and controller enclosures designed for marine application.

1.3 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

1.4 The following safety hazards caveat pertains only to the test method described in this specification: *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

## 2. Referenced Documents

### 2.1 UL Standard:

UL94 Test for Flammability of Plastic Materials for Parts in Devices and Appliances<sup>2</sup>

### 2.2 IEEE Standards:

IEEE 45 Recommended Practice for Electrical Installations on Shipboard<sup>3</sup>

IEEE 100 Standard Dictionary of Electrical and Electronics Terms<sup>3</sup>

### 2.3 Government Standard:

Title 46 Code of Federal Regulations Shipping<sup>4</sup>

## 3. Terminology

3.1 *Definitions*—In general definitions shall be in accordance with IEEE 100 (see Section 2).

### 3.2 *Descriptions of Terms Specific to This Standard:*

3.2.1 *idle machine*—rotary machine, when not rotating, owing to the absence of energy.

3.2.2 *monitor*—device, generally located in a motor starter, control panel, or main switchboard, that senses the

leakage resistance of electrical machine windings to ground, while the monitored machine stands idle.

## 4. Monitor Classification

4.1 *Type*—The insulation resistance monitors covered by this specification shall be of the following types:

4.1.1 *Type I*—Alternating current motor monitors.

4.1.2 *Type II*—Alternating current generator monitors.

4.1.3 *Type III*—Direct current motor monitors.

4.1.4 *Type IV*—Direct current generator monitors.

4.2 *Duty Rating*—All monitors shall be capable of continuous duty operations as defined in accordance with IEEE 100.

## 5. Ordering Information

5.1 Monitoring devices shall be ordered by including the following information:

5.1.1 *Purpose or Use of Monitor(s)*—Application as motor or generator monitor.

5.1.2 Line voltage and frequency.

5.1.3 Control voltage and frequency.

5.1.4 Type of starter (if motor monitor).

5.1.5 Winding configuration (if motor monitor).

5.1.6 Location of monitor.

5.1.7 *Sensitivity*—Set for 1 megohm (optional setting, if requested, from 0.1 to 5 M $\Omega$ ).

5.1.8 Remote monitoring devices.

5.1.9 Special options requested (that is, test buttons, elevated ambient temperature usage, etc.).

## 6. Materials and Manufacture

6.1 *General*—Materials used in the construction of insulation resistance monitors are to be manufactured and tested in accordance with IEEE 45. Materials conforming to other recognized standards will be subject to approval by the procuring agency, provided they are not less effective.

6.2 *Flame-Retardant Materials*—Enclosure materials used in the construction of the monitors are to be flame-retardant in accordance with UL94, and have a minimum flame rating of 94V-1 for monitors being installed within a motor controller enclosure, or switchgear-type enclosure, or a minimum rating of 94-5V for monitors not installed within such an enclosure.

6.3 *Electrical Insulation*—Electrical insulation materials used and application thereof shall be in accordance with the requirements of IEEE 45.

6.4 *Current Carrying Terminals*—All monitor current carrying terminals shall be made of corrosion resistant material in accordance with CFR 46, Subchapter J.

6.5 *Electrical Isolation*—Monitors shall isolate their mea-

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<sup>2</sup> Available from Underwriters Laboratories, Inc., 333 Pfingsten Rd., Northbrook, IL 60062.

<sup>3</sup> Available from Institute of Electrical and Electronic Engineers, IEEE Service Center, 445 Hoes Ln., Piscataway, NJ 08554.

<sup>4</sup> Available from Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.