Designation: F 2044 – 00

An American National Standard

Standard Specification for Liquid Level Indicating Equipment, Electrical[1]

This standard is issued under the fixed designation F 2044; 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 (ϵ) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This specification covers the requirements for electrical liquid level indicating equipment for shipboard low pressure and high pressure tanks containing freshwater, feed water, potable water, seawater, wastewater, diesel fuel, lubricating oil, contaminated oil, refrigerants, JP fuels, and various other fluids. Application includes compensating tanks in which the equipment must locate the interface.

1.2 Each liquid level indicating equipment typically consists of the following components:

(a) One or more sensing devices;
(b) Flexible interconnections, if needed;
(c) Primary indicator panel assembly;
(d) Auxiliary indicator panel assembly, when required; and
(e) Portable indicator panel assembly, when required.

1.3 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only. Where information is to be specified, it shall be stated in SI units.

1.4 *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.*

1.5 Special requirements for naval shipboard applications are included in the Supplement to this standard.

2. Referenced Documents

2.1 *ASTM Standards:*

D 3951 Practice for Commercial Packaging[2]

2.2 *ISO Standards:*

9001 Quality System Model for Quality Assurance in Design/Development, Production, Installation, and Servicing[3]

3. Terminology

3.1 *Definitions:*

3.1.1 *hysteresis*—maximum difference in output, at any measurand value within the specified range, when the value is approached first with increasing and then with decreasing measurand.

3.1.2 *insulation resistance*—the resistance measured between insulated portions of a liquid level indicating equipment and between insulated portions of a liquid level indicating equipment and ground when a specified dc voltage is applied under specified conditions.

3.1.3 *output*—electrical or numerical quantity, produced by a liquid level indicating sensor or measurement system, that is a function of the applied measurand.

3.1.4 *pressure cycling*—the specified minimum number of specified periodic pressure changes over which a liquid level indicating sensor will operate and meet the specified performance.

3.1.5 *process medium*—the measured fluid (measurand) that comes in contact with the sensing element.

3.1.6 *repeatability*—ability of a liquid level indicating equipment to reproduce output readings when the same measurand value is applied to it consecutively, under the same conditions, and in the same direction.

3.1.7 *response*—the measured output of a liquid level indicating sensor to a specified change in measurand.

3.1.8 *signal conditioner*—an electronic device that makes the output signal from a sensor element compatible with a readout system.

3.1.9 *wetted parts*—liquid level indicating equipment components with at least one surface in direct contact with the process medium.

4. Designation

4.1 *Designation*—Most liquid level indicating equipment manufacturers use designations or systematic numbering or identifying codes.

4.2 *Design*—Liquid level indicating equipment typically consist of a sensing device that may or may not be in contact with the process medium, a transduction element that modifies the signal from the sensing device to produce an electrical output, and an indicator panel assembly to show the level of the medium being measured. Some parts of the sensing device may be hermetically sealed if those parts are sensitive to and may be exposed to moisture. The output cable must be securely fastened to the body of the sensing device. A variety of sensing

[1] This specification is under the jurisdiction of ASTM Committee F-25 on Ships and Marine Technology and is the direct responsibility of Subcommittee F25.10 on Electrical and Electronics.

Current edition approved July 10, 2000. Published September 2000.

[2] Available from the *Annual Book of ASTM Standards*, Vol 15.09.

[3] Available from American National Standards Institute, 11 W. 42nd St., 13th Floor, New York, NY 10036.

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