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Ships and marine technology — Marine environment protection — Continuous on-board pH monitoring method

Navires et technologie maritime — Protection de l'environnement marin — Méthode de surveillance continue du pH à bord

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 8, *Ships and marine technology*, Subcommittee SC 2, *Marine environment protection*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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Introduction

The pH of water is an important indicator of water quality. Continuous pH monitoring of water served in marine equipment/systems installed on-board ships for various applications, such as exhaust gas cleaning systems (scrubbers) and boilers, is essential. “Continuous” describes a monitoring situation. The pH meter for continuous monitoring is situated in a fixed position on-board to monitor a stream, as opposed to batched-based deployment in a laboratory. This situation imparts some challenges that should be addressed. For installation of systems such as scrubbers to remove sulfur oxide from the exhaust gas by using seawater or freshwater, pH monitoring of the processed water is important not only for the process control of the systems but also for ensuring compliance with regulations when discharging the processed water [see IMO Resolution MEPC. 340(77)]. It is expected that reliable pH meters are robust over time, and suitable for processed water that can contain sea salts and/or oily substances or can exhibit a wide range of pH.

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Ships and marine technology — Marine environment protection — Continuous on-board pH monitoring method

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1 Scope

This document specifies the performance requirements and the test procedures for a pH meter used for continuous on-board monitoring using combination electrodes. The pH meter applies to measuring the pH of the following water for on-board consumption and research purposes:

a) natural seawater and freshwater,

b) freshwater produced from freshwater generators,

c) the used process water for running machinery on-board ships.

This document also specifies the method for evaluating performance, calibration, and maintenance of a pH meter used for continuous on-board monitoring.

2 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. For undated references, the latest edition of the referenced document (including any amendments) applies.

ASTM D6569-14, *Standard Test Method for On-Line Measurement of pH*

IEC 60746-2:2003, *Expression of Performance of Electrochemical Analyzers — Part 2 — pH value*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1
pH value
value derived from the potential difference between the *glass electrode* (3.5) and the *reference electrode* (3.6) and compensated using temperature measured with the *temperature sensor* (3.7)

Note 1 to entry: This is based on a measure of the relative hydrogen ion activity in an aqueous solution given in IEC 60746-2:2003, 3.1

3.2
continuous monitoring
measurement using fixed equipment that continually and automatically takes a reading at a predetermined interval and then returns a result

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