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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).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 8, *Ships and marine technology*, Subcommittee SC 6, *Navigation and ship operations*.

Annex A is for information only and Annex B forms detailed test methods.

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Introduction

An electronic inclinometer is an electronic device that provides information about roll period, roll amplitude, and heel angle of the ship. Electronic inclinometers are intended to support decision-making processes on board in order to avoid dangerous situations as well as assist in maritime casualty investigation. The requirements in this Publicly Available Specification take into account human factors, ergonomic principles, and advances in technology.

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Ships and marine technology — Navigation and ship operations — Electronic inclinometers

1 Scope

This Publicly Available Specification specifies the performance requirements, methods of testing, and test results of electronic inclinometers required by the performance standard, IMO resolution MSC.363 (92) in addition to the general requirements contained in resolution A.694 (17) and is associated with IEC 60945.

The electronic inclinometers provide information about actual heel angle, roll amplitude, roll period to support decision-making process on board in order to avoid dangerous situations as well as to assist in maritime casualty investigation. The electronic inclinometers are mainly composed of a set of sensors, a signal processor, a display, an input device, and an interface to other systems.

It does not apply to the electronic inclinometers installed for purposes, which are outside the scope of this Publicly Available Specification, e.g. monitoring of cargo status.

Where a requirement in this Publicly Available Specification is different from IEC 60945, the requirement in this Publicly Available Specification takes precedence.

NOTE All requirements that are extracted from the recommendations of IMO Resolution MSC.363 (92), performance standards for electronic inclinometers, are printed in italics and the resolution and paragraph numbers are indicated in brackets.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60945, *Maritime navigation and radiocommunication equipment and systems — General requirements — Methods of testing and required test results*

IEC 61162-1, *Maritime navigation and radiocommunication equipment and systems — Digital interfaces — Part 1: Single talker and multiple listeners*

IEC 61162-2, *Maritime navigation and radiocommunication equipment and systems — Digital interfaces — Part 2: Single talker and multiple listeners, high-speed transmission*

IEC 61162-3, *Maritime navigation and radiocommunication equipment and systems — Digital interfaces — Part 3: Serial data instrument network*

IEC 61162-450, *Maritime navigation and radiocommunication equipment and systems — Digital interfaces — Part 450: Multiple talkers and multiple listeners — Ethernet interconnection*

3 Terms and definitions

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

3.1
actual heel angle
momentary angle of roll referenced to a levelled ship to port or starboard side

[SOURCE: IMO MSC.363 (92) Paragraph 3.1]

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3.2
analogue type display
display that shows actual heel angle, roll amplitudes, and roll peak hold values in a continuous way, such as by means of an arrow pointer and graduated scale

3.3
digital type display
display that shows actual heel angle, roll amplitudes, and roll peak hold values in the form of numbers

3.4
display
means by which the roll behaviour of the ship and the state of the electronic inclinometer system is presented to an observer

3.5
inspection equipment
equipment for testing the performance of the electronic inclinometer

3.6
reset function for roll peak hold value
function for resetting roll peak hold values to zero and for recording reset date [month, day, and year] and time

3.7
roll amplitude
maximum values of heel angle to port or starboard side

[SOURCE: IMO MSC.363 (92) Paragraph 3.1]

3.8
roll period
time between two successive maximum values of heel angle on the same side of the ship

[SOURCE: IMO MSC.363 (92) Paragraph 3.1]

3.9
roll peak hold value
maximum values of roll amplitude to port or starboard side from the last reset

3.10
rolling
motion around the longitudinal axis of the ship

Note 1 to entry: Positive roll is starboard down.

[SOURCE: IMO MSC.363 (92) Paragraph 3.1]

3.11
zero crossing method
zero crossing method is the way for measuring wave period by using a zero crossing which is a point where the sign of a measured value (roll angle) changes (e.g. from positive to negative)

4 Requirements

4.1 General

Users of this Publicly Available Specification shall note that while attempting to implement the requirements, they shall ensure compliance with such statutory requirements, rules, and regulations so as to be applicable to the individual ship concerned.

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