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Ships and marine technology — General requirements for inclinometers used for the determination of trim and list of LNG carriers

Navires et technologie maritime — Exigences générales relatives aux inclinomètres utilisés pour la détermination de l'assiette et liste des méthaniers

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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. 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. 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 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 8, *Ship design*.

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

Inclinometers are used to determine the trim and list of various types of ships floating on the water. In the case of liquefied natural gas carriers (LNG carriers), on which a large quantity of LNG is traded, based on the results of static measurement, determination of trim and list, along with other elements, is particularly important because the measurement of the liquid level of a cargo tank is inevitably affected by the ship's inclination.

This document provides general requirements for the accuracy, installation, calibration and verification of inclinometers used for the determination of trim and list of LNG carriers, but is not intended to preclude the use or development of any other technologies or methods or the revision of the methods presented. Users of this document are encouraged to review, in detail, the latest editions of the publications, standards and documents referenced in this document in order to gain a better understanding of the methods described.

Users of this document should consider the applicable safety or operating practices recommended by organizations, such as the International Maritime Organization (IMO), the International Chamber of Shipping (ICS), the Oil Companies International Marine Forum (OCIMF), the International Group of LNG Importers (GIIGNL) and the Society of International Gas Tanker and Terminal Operators (SIGTTO), or individual operating companies, as well as any other safety or environmental considerations, local regulations or the specific provisions of any contract.

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Ships and marine technology — General requirements for inclinometers used for the determination of trim and list of LNG carriers

1 Scope

This document provides general requirements for the accuracy, installation, calibration and verification of trim and list inclinometers used for the determination of trim and list of LNG carriers for the purpose of measuring on-board cargo level.

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.

IEC 60079-0, *Explosive atmospheres —Part 0: Equipment — General requirements*

3 Terms and definitions

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

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

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

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

3.1
custody transfer measurement system
CTMS
system that processes inputs from an ATG (automatic tank gauge) system, thermometers, pressure gauges, etc., and provides custody transfer measurement information on board, generating documents with regard to custody transfer of LNG

Note 1 to entry: CTMS components include:

a) automatic level gauge system (radar, microwave, capacitance and float types),

b) automatic temperature gauge,

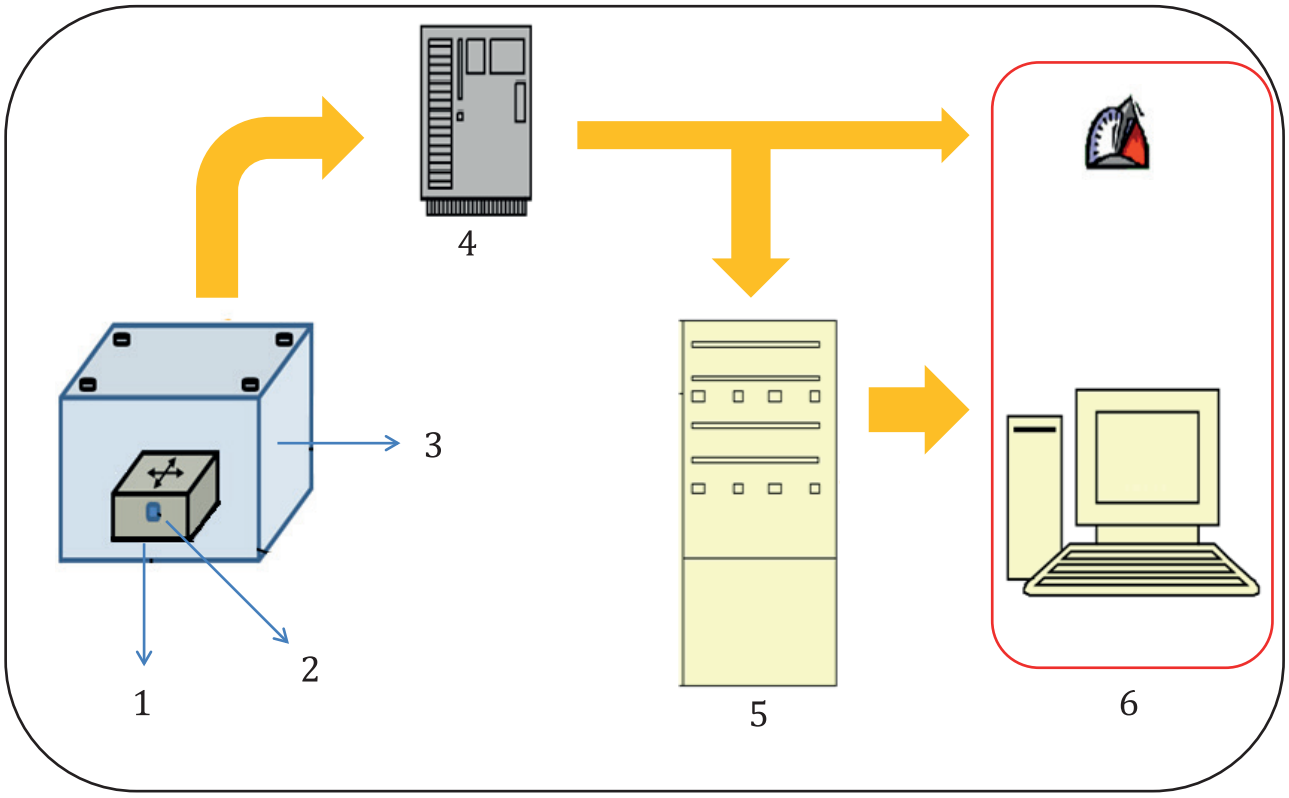
c) automatic pressure gauge,

d) trim and list indication system

Note 2 to entry: A trim and List inclinometer system can be typically incorporated as part of a CTMS.

Note 3 to entry: See Figure 1.

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Key

1	trim and list inclinometer	4	connection/control box
2	sensor	5	custody transfer system (cts) unit
3	protection box	6	trim and list indicator

Figure 1 — Outline of trim and list inclinometer system

3.2
trim and list inclinometer
inclinometer used to determine the trim and list of LNG carriers

3.3
inherent error
error of a trim and list inclinometer when it is tested and verified against a reference standard under controlled conditions as specified by the manufacturer

4 Safety precautions

4.1 Existing safety regulations, standards and classification societies rules

It is the responsibility of the user of this document to consider the applicable safety or operating practices recommended by regulatory agencies and organizations, to establish appropriate health and safety practices and to determine the applicability of regulatory limitations prior to use.

4.2 Equipment precautions

All electric components for the ship's trim and list inclinometer installed in hazardous areas shall meet the requirements of IEC 60079-0 applicable for the specific zone within the hazardous area. They shall conform to the applicable sections of the national and/or international electrical safety standards

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