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Refrigerated light hydrocarbon fluids — Measurement of cargoes on board LNG carriers

Hydrocarbures légers réfrigérés — Mesurage des cargaisons à bord des navires 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 document 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 28, *Petroleum and related products, fuels and lubricants from natural or synthetic sources*, Subcommittee SC 5, *Measurement of refrigerated hydrocarbon and non-petroleum based liquefied gaseous fuels.*

This third edition cancels and replaces the second edition (ISO 10976:2015), which has been technically revised.

The main changes are as follows:

— Table 1 has been modified,

— in 5.7 and 6.4, new international standards have been cited,

— in Annex D, the example has been updated according to ISO 6578:2017.

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.

Introduction

This document provides accepted methods for measuring quantities on board liquefied natural gas (LNG) carriers, for those involved in the LNG trade on ships and onshore. It includes recommended methods for measuring, reporting and documenting quantities on board these vessels.

This document is intended to establish uniform practices for measuring the quantity of cargo on board LNG carriers from which the energy is computed. It details the current, commonly used methods of cargo measurement, but is not intended to preclude the use or development of any other technologies or methods, or the revision of the methods presented.

Safety or operating practices can apply, including those 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.

The International System of units (SI) is used throughout this document as the primary units of measure since this system is commonly used in the industry for these types of cargoes. However, as some LNG carrier tanks are calibrated in US customary units and some sales and purchase agreements (SPA) are made in US customary units, both SI and US customary equivalents are shown. Proper unit conversion is intended to be applied, documented and agreed upon among all parties involved in the LNG custody transfer.

Refrigerated light hydrocarbon fluids — Measurement of cargoes on board LNG carriers

1 Scope

This document establishes all necessary steps to properly measure and account for the quantities of cargoes on liquefied natural gas (LNG) carriers. This includes, but is not limited to, the measurement of liquid volume, vapour volume, temperature and pressure, and accounting for the total quantity of the cargo on board. This document describes the use of common measurement systems on board LNG carriers, the aim of which is to improve the general knowledge and processes in the measurement of LNG for all parties concerned. This document provides general requirements for those involved in the LNG trade on ships and onshore.

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.

ISO 6578:2017, *Refrigerated hydrocarbon liquids — Static measurement — Calculation procedure*

ISO 8310, *Refrigerated hydrocarbon and non-petroleum based liquefied gaseous fuels — General requirements for automatic tank thermometers on board marine carriers and floating storage*

ISO 8943:2007, *Refrigerated light hydrocarbon fluids — Sampling of liquefied natural gas — Continuous and intermittent methods*

ISO 18132-1, *Refrigerated hydrocarbon and non-petroleum based liquefied gaseous fuels — General requirements for automatic tank gauges — Part 1: Automatic tank gauges for liquefied natural gas on board marine carriers and floating storage*

ISO 19970, *Refrigerated hydrocarbon and non-petroleum based liquefied gaseous fuels — Metering of gas as fuel on LNG carriers during cargo transfer operations*

ISO 21903, *Refrigerated hydrocarbon fluids — Dynamic measurement — Requirements and guidelines for the calibration and installation of flowmeters used for liquefied natural gas (LNG) and other refrigerated hydrocarbon fluids*

IEC 60533, *Electrical and electronic installations in ships — Electromagnetic compatibility (EMC) — Ships with a metallic hull*

ISO 16903, *Petroleum and natural gas industries — Characteristics of LNG, influencing the design, and material selection*

IACS, Unified Requirements E10

3 Terms, definitions and abbreviated terms

3.1 Terms and definitions

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