

Manual of Petroleum Measurement Standards Chapter 17.10.1

Refrigerated Light Hydrocarbon Fluids—Measurement of Cargoes on Board Marine LNG Carriers

ANSI/API *MPMS* CHAPTER 17.10.1
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ISO 10976:2015 (Modified), Refrigerated light hydrocarbon
fluids—Measurement of cargoes on board LNG carriers



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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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The committee responsible for this document is ISO/TC 28, *Petroleum products and lubricants*, Subcommittee SC 5, *Measurement of refrigerated hydrocarbon and non-petroleum based liquefied gaseous fuels*.

This second edition cancels and replaces the first edition (ISO 10976:2012), of which it constitutes a minor revision.

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Introduction

This International Standard provides accepted methods for measuring quantities on 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 International Standard is intended to establish uniform practices for the measurement of the quantity of cargo on board LNG carriers from which the energy is computed. It details the commonly used current 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. It is intended that the reader review, in detail, the latest editions of the publications, standards, and documents referenced in this International Standard in order to gain a better understanding of the methods described.

This International Standard is not intended to supersede any safety or operating practices recommended by the 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 Liquefied Natural Gas Importers (GIIGNL), and the Society of International Gas Tanker and Terminal Operators (SIGTTO), or individual operating companies. This International Standard is not intended to supersede any other safety or environmental considerations, local regulations, or the specific provisions of any contract.

The International System of Units (SI) is used throughout this International Standard as the primary units of measure because this system is commonly used in the industry for these types of cargoes. However, as some LNG carrier tanks are calibrated in the US customary units and some sales and purchase agreements are made in the 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 Marine LNG Carriers

1 Scope

This International Standard establishes all of the steps needed 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, vapor volume, temperature and pressure, and accounting for the total quantity of the cargo on board. This International Standard describes the use of common measurement systems used 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 International Standard provides general requirements for those involved in the LNG trade on ships and onshore.

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.

API *Manual of Petroleum Measurement Standards (MPMS) Chapter 8.6, Refrigerated Light Hydrocarbon Fluids—Sampling of Liquefied Natural Gas—Continuous and Intermittent Methods*

API MPMS Chapter 17.1, *Guidelines for Marine Inspection*

API MPMS Chapter 17.9, *Vessel Experience Factor (VEF)*

EN 1160 ¹, *Installations and equipment for liquefied natural gas—General characteristics of liquefied natural gas*

GPA 2166 ², *Obtaining Natural Gas Samples for Analysis by Gas Chromatography*

GPA 2261, *Analysis for Natural Gas and Similar Gaseous Mixtures by Gas Chromatography*

IACS Unified Requirements E10 ³, *Test Specification for Type Approval*

ICS ⁴, *Tanker Safety Guide (Liquefied Gas)*

IEC 60533 ⁵, *Electrical and electronic installations in ships—Electromagnetic compatibility (EMC)—Ships with a metallic hull*

ISO 6974 (all parts) ⁶, *Natural gas—Determination of composition and associated uncertainty by gas chromatography*

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

¹ European Committee for Standardization (CEN), Management Centre, Rue de la Science 23, B - 1040 Brussels, Belgium, <https://www.cen.eu>.

² GPA Midstream Association, 6060 American Plaza, Suite 700, Tulsa, Oklahoma 74135, <https://gpamidstream.org>.

³ International Association of Classification Societies, 4 Matthew Parker St, Westminster, London SW1H 9NP, United Kingdom, <https://www.iacs.org.uk>.

⁴ International Chamber of Shipping, 38 St. Mary Axe, London EC3A 8BH, United Kingdom, <https://www.ics-shipping.org>.

⁵ International Electrotechnical Commission, 3 rue de Varembé, CH-1211 Geneva 20, Switzerland, www.iec.ch.

⁶ International Organization for Standardization, ISO Central Secretariat, Chemin de Blandonnet 8, CP 401 – 1214 Vernier, Geneva, Switzerland, www.iso.org.