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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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Published in Switzerland

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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.

ISO 10976 was prepared by Technical Committee ISO/TC 28, *Petroleum products and lubricants*, Subcommittee SC 5, *Measurement of refrigerated hydrocarbon and non-petroleum based liquefied gaseous fuels*.

This first edition of ISO 10976 cancels and replaces ISO 13398:1997, which has been technically revised.

## 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 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. 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 standard 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's 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 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, vapour 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 referenced documents are indispensable for the application 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 8310, *Refrigerated light hydrocarbon fluids — Measurement of temperature in tanks containing liquefied gases — Resistance thermometers and thermocouples*

ISO 8943, *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*

IEC 60533, *Electrical and electronic installations in ships — Electromagnetic compatibility*

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

API Standard 2217A, *Guidelines for Work in Inert Confined Spaces in the Petroleum and Petrochemical Industries*

IACS Unified Requirements E10

ICS Tanker Safety Guide — Liquefied Gas

ICS/OCIMF/IAPH International Safety Guide for Oil Tankers and Terminals (ISGOTT)

IMO International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk (IGC Code)

NOTE Earlier versions of the gas codes can apply to older ships (see the note to 3.1.13).

SIGTTO Liquefied Gas Handling Principles on Ships and in Terminals

SIGTTO Liquefied Gas Fire Hazard Management

## 3 Terms, definitions and abbreviated terms

### 3.1 Terms and definitions

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