International Standard

ISO 19970

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

Hydrocarbures réfrigérés et combustibles gazeux liquéfiés à base non pétrolière — Mesurage du gaz comme carburant sur les transporteurs de GNL pendant les opérations de transfert de cargaison

Second edition
2025-07

Reference number
ISO 19970:2025(en)

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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.

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 second edition cancels and replaces the first edition (ISO 19970:2017), which has been technically revised.

The main changes are as follows:

— boil-off gas (BOG) measurement system has been defined;

— uncertainty calculation examples have been added to Annex C.

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

Concerns over the emission of pollutants from ship exhausts prompted IMO to enact MARPOL Annex VI[14] to the IMO Protocol of 1997, which sets limits on sulfur oxide (SOx) and nitrogen oxide (NOx) emissions. MARPOL Annex VI also specifies a global cap which limits the permitted sulfur content of fuel oil to a mass fraction of 3,5 % and special SOx emission control areas (SECAs) where the sulfur contents must not exceed a mass fraction of 1,0 %. In order to comply with these requirements, ships generally require special facilities to be installed to limit SOx emissions, unless they use low sulfur fuel oil.

Liquefied natural gas (LNG) carriers are capable of utilizing boil-off gas (BOG) in ships and shore tanks. They return gas during the cargo transfer operation as fuel for their own power generation, if commercial value of such energy consumed on board is accountable as an element of custody transfer measurement. This document provides the procedures for metering gas and assessing its calorific value, and the requirements for metering devices.

Aspects of safety are not dealt with in this document. It is the responsibility of the user to ensure that the system meets applicable safety regulations.

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

1 Scope

This document specifies the minimum requirements to quantify boil-off gas (BOG) consumed on liquefied natural gas (LNG) carriers for their own functions, in particular for power generation and during cargo transfer operations.

This document provides requirements for the metering of BOG and the subsequent calorific value calculations, which can be taken into account when the energy transferred during cargo transfer is determined. This document also gives performance requirements and calibration of the elements included in the BOG measurement system.

This document, with some modifications, can also be applied to the measurement of BOG consumed by LNG carriers at sea.

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/IEC Guide 98-3, *Uncertainty of measurement — Part 3: Guide to the expression of uncertainty in measurement*

3 Terms and definitions

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

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

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

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

3.1
boil off
process of evaporation of a liquid resulting from heat ingress or a drop in pressure

[SOURCE: ISO 10976:2023, 3.1.6]

3.2
boil-off gas
BOG
vapour (3.11) produced by *boil off* (3.1)

Note 1 to entry: BOG in this document refers to the low molecular gas returned from shore tanks to ship tanks and the gas produced in ship cargo tanks during cargo transfer operation.

[SOURCE: ISO 10976:2023, 3.1.7 — Note 1 to entry has been added.]

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