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Smernice za varnost in oceno tveganja za skladiščenje utekočinjenega zemeljskega plina kot goriva (ISO/TS 18683:2021)

Guidelines for safety and risk assessment of LNG fuel bunkering operations (ISO/TS 18683:2021)

Leitlinien für die Sicherheits- und Risikobewertung beim Bunkern von LNG-Kraftstoff (ISO/TS 18683:2021)

Lignes directrices pour la sécurité et l'évaluation des risques des opérations de soutage de GNL (ISO/TS 18683:2021)

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Guidelines for safety and risk assessment of LNG fuel bunkering operations (ISO/TS 18683:2021)

Lignes directrices pour l'évaluation de la sécurité et des risques des opérations de soutage de GNL (ISO/TS 18683:2021)

Leitlinien für die Sicherheits- und Risikobewertung beim Bunkern von LNG-Kraftstoff (ISO/TS 18683:2021)

This Technical Specification (CEN/TS) was approved by CEN on 25 November 2024 for provisional application.

The period of validity of this CEN/TS is limited initially to three years. After two years the members of CEN will be requested to submit their comments, particularly on the question whether the CEN/TS can be converted into a European Standard.

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European foreword

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Endorsement notice

The text of ISO/TS 18683:2021 has been approved by CEN as CEN ISO/TS 18683:2026 without any modification.

TECHNICAL SPECIFICATION

ISO/TS 18683

Second edition
2021-11

Guidelines for safety and risk assessment of LNG fuel bunkering operations

Lignes directrices pour la sécurité et l'évaluation des risques des opérations de soutage de GNL

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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 (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 67, *Materials, equipment and offshore structures for petroleum, petrochemical and natural gas industries*, Subcommittee SC 9, *Liquefied natural gas installations and equipment*.

This second edition cancels and replaces the first edition (ISO/TS 18683:2015), which has been technically revised.

The main changes are as follows:

— title and scope restricted to Guidelines for safety and risk assessment of LNG fuel bunkering operations;

— list of bunkering supply scenarios updated with experience gained since 2015 in Clause 4;

— addition of concept of design stage risk assessment and operational risk assessment in 7.1;

— addition of Quantitative Consequence Assessment in 7.2;

— addition of roles and responsibilities of stakeholders in 7.3;

— design requirements removed from Clause 8 to avoid duplication with ISO 20519;

— individual Risk Criteria added in Annex A;

— three methods added to determine safety zone in Annex B;

— to avoid duplication with ISO 20519, the following clauses and annexes have been removed:

  — Clause 9 Requirements to components and systems;

  — Clause 11 Requirements for documentation;

  — Annex C Functional requirements;

— Annex D Sample Ship supplier checklist;

— Annex E Sample LNG delivery note;

— Annex F Arrangement and types of presenting connection;

— Annex G Dry disconnect coupling.

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

The properties, characteristics, and behaviour of LNG differ significantly from conventional marine fuels, such as heavy fuel oils and distillate fuels as marine diesel oil (MDO) or marine gas oil (MGO).

For these reasons, it is essential that all LNG bunkering operations are undertaken with diligence and due attention is paid to prevent leakage of LNG liquid or vapour and to control all sources of ignition. Therefore, it is important that throughout the LNG bunkering chain, each element is carefully designed and has dedicated safety and operational procedures executed by trained personnel.

It is important that the basic requirements laid down in this document are understood and applied to each operation in order to ensure the safe, secure, and efficient transfer of LNG as a fuel to the ship.

The objective of this document is to provide guidance for the risk assessment of LNG fuel bunkering operations and thereby ensuring that an LNG fuelled vessel and bunkering supply facilities are operating with a high level of safety, integrity, and reliability regardless of the type of bunkering supply scenario.

The LNG bunkering interface comprises the area of LNG transfer and includes manifold, valves, safety and security systems and other equipment, and the personnel involved in the LNG bunkering operations.

This document is based on the assumption that the receiving ships and LNG bunkering supply facilities are designed according to the relevant and applicable codes, regulations, and guidelines such as the International Maritime Organization (IMO), ISO, EN, and NFPA standards and the Society for Gas as a Marine Fuel (SGMF) and other recognized documents during LNG bunkering. Relevant publications by these and other organizations are listed in the Bibliography.

This document should be combined with the requirements set on ISO 20519.

In cases where the distance to third parties is too close and the risk exceeds acceptance criteria, the bunkering location should not to be considered.

Guidelines for safety and risk assessment of LNG fuel bunkering operations

1 Scope

This document gives guidance on the risk-based approach to follow for the design and operation of the LNG bunker transfer system, including the interface between the LNG bunkering supply facilities and receiving LNG fuelled vessels.

This document provides requirements and recommendations for the development of a bunkering site and facility and the LNG bunker transfer system, providing the minimum functional requirements qualified by a structured risk assessment approach taking into consideration LNG properties and behaviour, simultaneous operations and all parties involved in the operation.

This document is applicable to bunkering of both seagoing and inland trading vessels. It covers LNG bunkering from shore or ship, mobile to ship and ship to ship LNG supply scenarios, as described in Clause 4.

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 73, *Risk management — Vocabulary*

ISO 31010, *Risk management — Guidelines on principles and implementation of risk management*

ISO 20519, *Ships and marine technology — Specification for bunkering of liquefied natural gas fuelled vessels*

IMO, IGF Code of Safety for Ships using Gases or other Low flashpoint fuels

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

IMO, International Convention on Standards of Training, Certification and Watchkeeping for Seafarers

3 Terms, definitions and abbreviated terms

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC Guide 73 and the following 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/

3.1.1
as low as reasonably practical
ALARP
reducing a risk to a level that represents the point, objectively assessed, at which the time, trouble, difficulty, and cost of further reduction measures become unreasonably disproportionate to the additional risk reduction obtained

3.1.2
boiling liquid expanding vapour explosion
BLEVE
sudden release of the content of a vessel containing a pressurized flammable liquid followed by a fireball

3.1.3
bunkering
process of transferring fuel to a ship

3.1.4
bunkering facility
system designed to be used to transfer/bunker liquefied gas as fuel to a gas-fuelled vessel

Note 1 to entry: It may consist of a floating, shore-based, fixed or mobile fuel-supply facility, such as a bunker vessel, terminal or road tanker.

3.1.5
bunkering site
location dedicated for bunkering comprising the bunkering installations, port and jetty, and other facilities and equipment that should be considered in the planning of bunkering

3.1.6
competent authority
organization or organizations that implement the requirements of legislation and regulate installations that must comply with the requirements of legislation

3.1.7
consequence
outcome of an event

3.1.8
drip tray
spill containment manufactured of material that can tolerate cryogenic temperatures

3.1.9
emergency shut-down
ESD
method that safely and effectively stops the bunker/transfer of natural gas and vapour between the supply facilities and receiving ship

3.1.10
gas-fuelled vessel
GFV
vessel using gas as marine fuel

3.1.11
hazard
potential source of harm

3.1.12
hazard identification
HAZID
brainstorming exercise using checklists where the potential hazards in a project are identified and gathered in a risk register for follow up in the project

3.1.13
impact assessment
assessment of how consequences (fires, explosions, etc.) affect people, structures the environment, etc.

3.1.14
individual risk
probability on an annual basis for an individual to be killed due to accidental events arising from the activity

3.1.15
mist
fog
cloud that will be generated by condensing humidity in air when in contact with cold surfaces during bunkering

Note 1 to entry: This mist will reduce visibility and can mask minor leaks.

3.1.16
monitoring and security area
area around the bunkering facility and ship where ship traffic and other activities are monitored (and controlled) to mitigate harmful effects

3.1.17
probability
extent to which an event is likely to occur

3.1.18
rapid phase transition
RPT
shock wave forces generated by instantaneous vaporization of LNG upon coming in contact with water

3.1.19
receiver
one or more organizations with ownership, operational and/or legal interests in a gas-fuelled vessel

Note 1 to entry: The receiver can be the vessel owner(s), the charterer or the operator.

[SOURCE: Reference [24]]

3.1.20
risk
combination of the probability of occurrence of harm and the severity of that harm

3.1.21
risk analysis
systematic use of information to identify sources and to estimate the risk

3.1.22
risk assessment
overall process of risk analysis and risk evaluation

3.1.23
risk contour
two-dimensional representation of risk (e.g. individual risk on a map)

3.1.24
risk evaluation
procedure based on the risk analysis to determine whether the tolerable risk has been achieved

3.1.25
safety
freedom from unacceptable risk