SLOVENSKI STANDARD
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Ladjarska in pristaniška tehnologija - Specifikacija za oskrbovanje plovil na utekočinjeni zemeljski plin (ISO/DIS 20519:2020)

Ships and marine technology - Specification for bunkering of liquefied natural gas fuelled vessels (ISO/DIS 20519:2020)

Schiffe und Meerestechnik - Spezifikation für das Bunkern flüssigerdgasbetriebener Schiffe (ISO/DIS 20519:2020)

Navires et technologie maritime - Spécification pour le soutage des navires fonctionnant au gaz naturel liquéfié (ISO/DIS 20519:2020)

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Ships and marine technology — Specification for bunkering of liquefied natural gas fuelled vessels

Navires et technologie maritime — Spécification pour le soutage des navires fonctionnant au gaz naturel liquéfié

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ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

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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).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on 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 the following URL: www.iso.org/iso/foreword.html.

The committee responsible for this document is ISO/TC 8, *Ships and marine technology*.

Introduction

This document has been produced to meet an industry need identified by the International Maritime Organization (IMO). This document has been designed to support the IMO International Code of Safety for Ships using Gases or other Low-flashpoint Fuels (IGF Code).

Due to numerous economic and environmental factors, the use of liquefied natural gas (LNG) as a vessel's fuel has increased. While LNG fuelled ships and vessels have been in service since the early 2000's, most of these vessels have operated within small defined areas using LNG bunkering operations designed for that particular vessel service. The increase in LNG fuelled vessels corresponds with an increase in the number of the regions that these vessels will service. Therefore, there is a need to standardize LNG bunkering operations internationally to a reasonable degree so that vessel operators will have the tools to select vessel fuel providers that meet set safety and fuel quality standards and LNG bunkering operations will be conducted safely. This document can be used for both vessels involved in international and domestic service regardless of size.

This document does not replace existing laws or regulations. It is flexible so that it can be applied in many situations and under various regulatory regimes as long as the requirements of this document are met. If, however, local regulations preclude its use and do not provide the safety specified in this document, compliance with this document should not be claimed.

Ships and marine technology — Specification for bunkering of liquefied natural gas fuelled vessels

1 Scope

This document sets requirements for LNG bunkering transfer systems and equipment used to bunker LNG fuelled vessels, which are not covered by the IGC Code. This document includes the following five elements:

a) hardware: liquid and vapour transfer systems;

b) operational procedures;

c) requirement for the LNG provider to provide an LNG bunker delivery note;

d) training and qualifications of personnel involved;

e) requirements for LNG facilities to meet applicable ISO standards and local codes.

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 16904, *Petroleum and natural gas industries — Design and testing of LNG marine transfer arms for conventional onshore terminals*

ASME B16.5, *Pipe flanges and flanged fittings: NPS 1/2 through NPS 24 metric/inch standard*

BS 4089, *Specification for metallic hose assemblies for liquid petroleum gases and liquefied natural gases*

EN 1474-2, *Installation and equipment for liquefied natural gas — Design and testing of marine transfer systems — Design and testing of transfer hose*

EN 1474-3, *Installation and equipment for liquefied natural gas — Design and testing of marine transfer systems — Offshore transfer systems*

EN 12434, *Cryogenic vessels — Cryogenic flexible hoses*

IEC 60079-10-1, *Explosive atmospheres — Part 10-1: Classification of areas — Explosive gas atmospheres*

IMO International Code of Safety for Ships using Gases or other Low-flashpoint Fuels (IGF Code)

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

Oil Companies International Marine Forum *Design and Construction Specification for Marine Loading Arms*. Third edition, 1999. London, England: Oil Companies International Marine Forum

Society of International Gas Tanker and Terminal Operators, (SIGTTO). *ESD Arrangements & Linked Ship/Shore Systems for Liquefied Gas Carriers* [online]. First edition, 2009. Scotland, UK: Witherby Seamanship International Ltd

3 Terms and definitions

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

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

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

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

3.1
bunkering
operation of transferring LNG fuel to a *vessel* (3.22)

Note 1 to entry: For the purposes of this document, it refers to the delivery of LNG only. This document does not address the transfer of CNG, propane or fuels other than LNG that may be covered by the IGF Code (see 3.2).

3.2
bunkering terminal
fixed operation on or near shore that is not regulated as a *vessel* (3.22) that can be used to provide LNG bunkers to a receiving vessel

3.3
Classed
classification
process in which the design and condition of a *vessel* (3.22) is evaluated to determine its compliance with rules and standards developed by the *Classification Society* (3.5) issuing the classification

3.4
controlled zones
areas extending from the bunkering manifolds on the LNG receiving vessel and the LNG supply source during LNG bunkering operations that have restrictions in place

Note 1 to entry: These restrictions include limitation on personnel access, sources of ignition and unauthorized activities. The controlled zones are subdivided into hazardous zones, safety zones and the monitoring and security areas as defined in Annex B.

3.5
Classification Society
non-governmental organization that establishes and maintains technical standards for the construction and operation of ships and offshore structures

Note 1 to entry: They also validate that construction is according to these standards and carry out regular surveys in service to verify compliance with the standards.

3.6
dry-connection or disconnection
method that reduces *LNG* (3.10) or natural gas releases into the atmosphere under normal operation to a negligible amount consistent with safety, either by equipment design or procedural practice

3.7
dry-disconnect/connect coupling (DD/CC)
mechanical device used to connect the hose bunkering system to LNG fuel manifold without employing bolts

3.8
emergency release (break-away) coupling
ERC
coupling installed on *LNG* (3.10) and vapour lines, as a component of ERS, to ensure the quick physical disconnection of the transfer system from the unit to which it is connected, designed to prevent damage to loading/unloading equipment in the event that the transfer system's operational envelope and/or parameters are exceeded beyond a predetermined point

3.9
emergency release system
ERS
system that provides a safe shut down, transfer system isolation and quick release of hoses or *transfer arms* (3.19) between the facility or *vessel* (3.22) providing the *LNG* (3.10), and the vessel receiving the LNG, preventing product release at disconnection time

Note 1 to entry: The ERS consists of an emergency release coupling (ERC) and interlocked isolating valves which automatically close on both sides, thereby containing the LNG or vapour in the lines (dry disconnect), and, if applicable, associated control system.

3.10
emergency shutdown system
ESD
system that safely and effectively stops the transfer of *LNG* (3.10) and vapour between the facility or *vessel* (3.22) providing the LNG and the vessel receiving the LNG or vice versa

Note 1 to entry: The operation of this system can be referred to as an "ESD I". Vessel ESD systems should not be confused with other emergency shutdown systems within the terminal or on board vessels.

Note 2 to entry: An informative illustration of an ESD I and ESD II is provided in Figure C.2.

3.11
liquefied natural gas
LNG
natural gas that has been cooled and condensed into liquid form

Note 1 to entry: It is characterized as a cryogenic liquid having a temperature typically around −161 °C under normal atmospheric pressure.

3.12
lower flammable limit
LFL
concentration of flammable gas or vapour in air below which there is insufficient amount of substance to support and propagate combustion

3.13
management system
set of procedures an organization needs to follow in order to meet its objectives

3.14
member state authority
legal authority within a member state that has jurisdiction over maritime or port activities within that state

3.15
mobile facility
mobile facilities are trucks, rail car or other mobile device (including portable tanks) used to transfer *LNG* (3.10) to a *vessel* (3.22)

3.16
monitoring and security area
area around the bunkering facility and *vessel* (3.22) where vessel traffic and other activities are monitored to mitigate harmful effects

3.17
nozzle
half part of the coupling, which typically is mounted on the hose bunkering system of the bunker facility which permits quick connection and disconnection of LNG bunkering system to the receptacle of the receiving vessel in a safe manner

3.18
receptacle
half part of the coupling, which is typically mounted to the manifold flange of the receiving vessel and which permits quick connection and disconnection in a safe manner

3.19
recognized organization
competent organization with delegated authority on behalf of an Administration to assist in the uniform and effective implementation of IMO Codes and Conventions

Note 1 to entry: Adapted from IMO A.739 (18).

3.20
LNG transfer system
consists of all equipment contained between the bunkering manifold flange on the facility or *vessel* (3.22) providing LNG fuel and the bunkering manifold flange on the receiving LNG fuelled vessel including but not limited to; vessel to vessel transfer arms, LNG transfer arms (articulated rigid piping) or hoses, *emergency release system (ERS)* (3.8), insulation flanges; dry connect/disconnect couplings (DD/CC), and in addition the ESD ship/shore or ship/ship link used to connect the supplying and receiving ESD systems

Note 1 to entry: An illustration of a typical LNG transfer system is provided in Figure C.1.

3.21
technical standards
standards that prescribe requirements for one or more of the following: operations, equipment design/ fabrications or testing methodology

Note 1 to entry: Auditors cannot issue a certification or approval to a company that claims compliance with a Technical Standard unless that standard is incorporated into a recognized management system as a management objective.

3.22
transfer arm
articulated metal transfer system used for transferring *LNG* (3.10) to the *vessel* (3.22) being bunkered

Note 1 to entry: It can be referred to as a “loading arm” or “unloading arm”.

3.23
safety zone
area around the bunkering station where only dedicated and essential personnel and activities are allowed during *bunkering* (3.1)

3.24
security zone
area established by the national or local authorities around a bunkering facility or area through which *vessel* (3.22) and personnel movement is subject to regulatory restrictions

3.25
vessel
includes ships, barges (self-propelled or no propulsion) or boats of any size in domestic or international service

Note 1 to entry: A bunkering vessel is a vessel used to transport LNG to a vessel using LNG as a fuel.

Note 2 to entry: A receiving vessel is a vessel that uses LNG as a fuel and does not transport LNG as a cargo.

4 Abbreviated terms

Term	Description	Explanation
IGC Code	International Maritime Organization's International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk	The IGC Code applies to ships involved in the carriage of bulk liquefied gases and prescribes the design and construction standards of ships involved in such carriage and the equipment they should carry.
IGF Code	International Maritime Organization's International Code of Safety for Ships using Gases or other Low-flashpoint Fuels, 2017	The IGF Code applies to ships fuelled by gases or other low-flashpoint fuels. The Code contains mandatory provisions for the arrangement, installation, control and monitoring of machinery, equipment and systems using low-flashpoint fuels.
IACS	International Association of Classification Societies	An organization that establishes, reviews, promotes and develops minimum technical requirements in relation to the design, construction, maintenance and survey of ships and other marine related facilities; and assists international regulatory bodies and standards organizations to develop, implement and interpret statutory regulations and industry standards in ship design, construction and maintenance, with a view to improving safety at sea and the prevention of marine pollution.
IMO	International Maritime Organization	A specialized agency of the United Nations whose purpose is "to provide machinery for cooperation among governments in the field of governmental regulation and practices relating to technical matters of all kinds affecting shipping engaged in international trade; to encourage and facilitate the general adoption of the highest practicable standards in matters concerning efficiency of navigation, and prevention and control of marine pollution from ships."
ISM	International Safety Management Code	An IMO code that provides an international standard for the safe management and operation of ships and for pollution prevention.
STCW	International Convention on Standards of Training, Certification and Watchkeeping for Seafarers	This convention promotes the safety of life and property at sea and the protection of the marine environment by establishing in common agreement international standards of training, certification and watchkeeping for seafarer.
SGMF	Society for Gas as a Marine Fuel	A non-governmental organization established to promote safety and industry best practice in the use of gas as a marine fuel.

5 Transfer system design requirements

5.1 Vessel requirements

5.1.1 In order to be compliant with this document, vessels involved shall meet the following requirements (this applies to vessels of all sizes, in domestic or international service):

5.1.2 Bunkering vessels shall conform with this document and be approved by its Flag State, Recognized Organization or Classification Society that complies with the applicable uniform interpretations and requirements posted by IACS, indicating that it meets, at a minimum, the applicable requirements of the IGC Code, this document and applicable Flag State requirements.

5.1.3 Receiving vessels shall conform with this document and be approved by its Flag State, Recognized Organization or Classification Society that complies with the applicable uniform interpretations and requirements posted by IACS, indicating that it meets, at a minimum, the applicable requirements of the IGF Code, this document and applicable Flag State requirements.