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Ships and marine technology — Ship design — CNG and LNG propulsion system

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Contents

Page

Foreword ..... **v**
Introduction ..... **vi**
1 Scope **1**
2 Normative references **1**
3 Terms and Definitions **2**
4 Components **6**
4.1 General provisions 6
4.2 CNG cylinders and LNG containers 7
4.2.1 General provisions 7
4.2.2 Cylinders 7
4.2.3 Fixed container 7
4.2.4 Components fitted to the cylinder or fixed container 7
4.3 Fuel system components 8
4.3.1 Vaporizer 8
4.3.2 Other components 8
5 Installation requirements **9**
5.1 General requirements 9
5.2 Installer of the CNG or LNG system 10
5.3 Additional CNG or LNG systems not connected to the propulsion system 10
5.4 Modifications to the structure of the ship or craft 10
5.5 Container or cylinder installation 11
5.5.1 General 11
5.5.2 Fixed containers/cylinders 11
5.5.3 Cylinders and Containers 12
5.5.4 Cylinders and containers lockers 12
5.6 Components fitted to the fixed container/cylinder 13
5.6.1 General requirement 13
5.6.2 Remote-controlled service valve and excess flow valve on the container 13
5.6.3 Pressure relief valve 13
5.6.4 Filler valve 13
5.6.5 Level indicator 13
5.6.6 Fittings 13
5.6.7 Pressure relief device 13
5.7 Gas pipes and hoses 14
5.8 Other components 15
5.8.1 Gas connections between components of the CNG or LNG system 15
5.8.2 Remote-controlled shut-off valve 16
5.8.3 Filling unit 16
5.9 Electrical installation 16
5.10 Fuel selection system 17
5.11 Gas detection 17
5.11.1 General 17
5.11.2 Alarm position 18
5.11.3 Sensors position 18
5.12 Forced ventilation 18
5.12.1 General 18
5.12.2 Purging of engine space 18
5.12.3 Position of venting 18
6 Fire-extinguishing equipment **18**
7 Owner's manual **18**
8 Commissioning **19**
8.1 Tightness test 19

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8.2 Leakage test 19
8.3 Initial filling of the container and cylinder and the system with LNG/CNG 19
8.4 Fuel System test 19
8.5 Water trial 20
Annex A (normative) **Owner's manual** **21**
Annex B (informative) **Example of installation certificate** **24**
Annex C (informative) **Example CNG or LNG identification label** **25**
Bibliography **27**

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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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This document was prepared by Technical Committee ISO/TC 8, *Ships and marine technology,* Subcommittee SC 8, *Ship design*.

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

This document specifies requirements for the installation of equipment for the use of compressed natural gas (CNG) and liquefied natural gas (LNG) in the propulsion systems of ships and crafts.

This document includes procedures which the use substances and procedures that can be injurious to health if adequate precautions are not taken. This document refers only to technical suitability.

Natural gas, either in gaseous (CNG) or liquid phase (LNG), is a very efficient and ready-to-use solution which can facilitate compliance with the more stringent environmental regulations as well as the compliance with the principles of the circular economy. Regulations can concern the impact of a product on the environment during its entire life cycle, including the expenditure of energy and during all phases such as use, scrapping and recycling of materials. Some parts of this document also address environmental aspects.

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Ships and marine technology — Ship design — CNG and LNG propulsion system

1 Scope

This document specifies the requirements for the installation of compressed natural gas (CNG) and liquefied natural gas (LNG) propulsion systems and components on ships and crafts.

This document does not apply to large sea-going ships covered by SOLAS Chapter II-1 vessels.

This document does not cover appliances with directly attached gas cylinders, such as portable container.

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 9094, *Small craft — Fire protection*

ISO 10240, *Small craft — Owner's manual*

ISO 11105, *Small craft — Ventilation of petrol engine and/or petrol tank compartments*

ISO 11439, *Gas cylinders — High pressure cylinders for the on-board storage of natural gas as a fuel for automotive vehicles*

ISO 11591, *Small craft — Field of vision from the steering position*

ISO 12217-1, *Small craft — Stability and buoyancy assessment and categorization — Part 1: Non-sailing boats of hull length greater than or equal to 6 m*

ISO 12217-2, *Small craft — Stability and buoyancy assessment and categorization — Part 2: Sailing boats of hull length greater than or equal to 6 m*

ISO 12217-3, *Small craft — Stability and buoyancy assessment and categorization — Part 3: Boats of hull length less than 6 m*

ISO 12614 (all parts), *Road vehicles — Liquefied natural gas (LNG) fuel system components*

ISO 12617, *Road vehicles — Liquefied natural gas (LNG) refuelling connector — 3,1 MPa connector*

ISO 12991, *Liquefied natural gas (LNG) — Tanks for on-board storage as a fuel for automotive vehicles*

ISO 13297:2020, *Small craft — Electrical systems*

ISO 14469, *Road vehicles — Compressed natural gas (CNG) refuelling connector*

ISO 15500 (all parts), *Road vehicles — Compressed natural gas (CNG) fuel system components*

ISO 23684, *Road vehicles — Technical personnel dealing with natural gas vehicles (NGVs) — Training and qualification*

ISO 24671, *Road vehicles — Qualification and certification of technical personnel dealing with natural gas vehicles (NGVs)*

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IEC 60529, *Degrees of protection provided by enclosures (IP Code)*

EN 3-7:2004+A1:2007, *Portable fire extinguishers — Part 7: Characteristics, performance requirements and test methods*

EN 14291, *Foam producing solutions for leak detection on gas installations*

EN 28846, *Seagoing vessels — Aluminum alloy castings for machinery and general engineering use - Chemical composition and mechanical properties*

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
accessible
capable of being reached for inspection, removal or maintenance without removal of permanent ship/craft structures

Note 1 to entry: Hatches are not regarded as permanent ship/craft structures in this sense, even if tools such as wrenches or screwdrivers are needed to open them.

3.2
appliance
device designed for heating, cooking, lighting, refrigeration, hot water production or electricity production (fuel cell or generator), using natural gas as its energy source

3.3
automatic valve
valve which is not operated manually

3.4
bi-fuel engine
engine that has two independent fuel systems (one of them for natural gas) and can run alternatively on either fuel, but only on one fuel at a time

3.5
check valve
automatic valve (3.3) which allows gas to flow in only one direction

3.6
cockpit
volume open to the air intended for the accommodation of people

Note 1 to entry: For the purpose of this document, the term "cockpit" is used either for a proper cockpit or for any recess as clarified in Note 2.

Note 2 to entry: Bulwarks can create a large cockpit, open crafts can effectively comprise a cockpit which includes nearly all the craft, cockpit(s) can be situated anywhere in the craft, and a cockpit can open aft to the sea.

Note 3 to entry: Cockpits can retain water, however briefly, due to rain, waves, ship heeling, etc.

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