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Nadomešča:
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Mala plovila - Sistemi za utekočinjeni naftni plin (LPG) (ISO/DIS 10239:2023)

Small craft - Liquefied petroleum gas (LPG) systems (ISO/DIS 10239:2023)

Kleine Wasserfahrzeuge - Flüssiggas-Anlagen (LPG) (ISO/DIS 10239:2023)

Petits navires - Installations alimentées en gaz de pétrole liquéfiés (GPL) (ISO/DIS 10239:2023)

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Small craft — Liquefied petroleum gas (LPG) systems

Petits navires — Installations alimentées en gaz de pétrole liquéfiés (GPL)

ICS: 47.080

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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 188, *Small craft*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 464, *Small craft*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This fourth edition cancels and replaces the third edition (ISO 10239:2014), which has been technically revised. The major technical changes include:

The main changes are as follows:

- scope has been clarified;
- new definitions for room sealed appliance and open flued appliance have been added;
- the location of pressure regulation devices has been clarified.

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.

Small craft — Liquefied petroleum gas (LPG) systems

1 Scope

This document addresses the installation of permanently installed liquefied petroleum gas (LPG) systems and LPG-burning appliances on small craft.

This document does not apply to LPG-fuelled propulsion engines or LPG-driven generators.

This document addresses cooking appliances with internal LPG cartridges, with a capacity of 225 g or less (See [Annex D](#)).

This document addresses storage of all LPG cylinders but is not intended to regulate the technical requirements for such cylinders that are subject to national regulations.

It does not contain procedures for commissioning new LPG installations or system maintenance or upgrades. Competent persons responsible for commissioning LPG installations should use relevant national codes and procedures appropriate to the country concerned.

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.

ISO 7-1:1994, *Pipe threads where pressure-tight joints are made on the threads — Part 1: Dimensions, tolerances and designation*

ISO 8434-1:2018, *Metallic tube connections for fluid power and general use — Part 1: 24° cone connectors*

ISO 8666:2020, *Small craft — Principal data*

ISO 8846:1990, *Small craft — Electrical devices — Protection against ignition of surrounding flammable gases*

ISO 9094:2015, *Small craft — Fire protection*

ISO 10240:2019, *Small craft — Owner's manual*

ISO 11812:2020, *Small craft — Watertight or quick-draining recesses and cockpits*

EN 751-2:1996, *Sealing materials for metallic threaded joints in contact with 1st, 2nd and 3rd family gases and hot water — Part 2: Non-hardening jointing compounds*

EN 751-3:1996, *Sealing materials for metallic threaded joints in contact with 1st, 2nd and 3rd family gases and hot water — Part 3: Unsintered PTFE tapes*

EN 1254-2:2021, *Copper and copper alloys - Plumbing fittings - Part 2: Compression fittings for use with copper tubes*

EN 1949:2021, *Specification for the installation of LPG systems for habitation purposes in leisure accommodation vehicles and accommodation purposes in other vehicles*

EN 14291:2004, *Foam producing solutions for leak detection on gas installations*

EN 15266:2007, *Stainless steel pliable corrugated tubing kits in buildings for gas with an operating pressure up to 0,5 bar*

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EN 16129:2013, *Pressure regulators, automatic change-over devices, having a maximum regulated pressure of 4 bar, with a maximum capacity of 150 kg/h, associated safety devices and adaptors for butane, propane, and their mixtures*

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 craft small craft

recreational boat, and other watercraft using similar equipment, of up to 24 m length of hull (Lh)

Note 1 to entry: The measurement methodology for the length of hull (Lh) is defined in ISO 8666.

[SOURCE: ISO 8666:2020, 3.15, modified – Note 1 to entry has been added.]

3.2 liquefied petroleum gas LPG

mixture of light hydrocarbons, gaseous under conditions of normal temperature and pressure, and maintained in the liquid state by increase of pressure or lowering of temperature

Note 1 to entry: The principal components are propane, propene, butanes or butenes.

Note 2 to entry: LPG can be obtained as commercial butane, commercial propane or a mixture of the two.

[SOURCE: EN 624:2011, 3.1.7 — modified with addition of Note 2 to entry]

3.3 permanently installed

securely fastened so that tools need to be used for removal

[SOURCE: ISO 10088:2013, definition 3.3]

3.4 cylinder housing

ventilated enclosure intended solely for storage of one or more LPG cylinders, pressure regulation device and safety devices, and located so that leakage flows to the outside

3.5 cylinder locker

enclosure which is vapour tight to the interior of the craft with a drain to the outside intended solely for storage of one or more LPG cylinders in a cockpit or recessed into the craft

3.6 LPG system

system consisting of an arrangement of cylinder(s), safety device(s), pressure regulation device(s), connection(s), valve(s), piping, tubing, hose, fitting(s) and devices intended to store, supply, monitor or control the flow of LPG up to and including the appliance

Note 1 to entry: The cylinders are replacement items and might or might not be supplied with the LPG system in the craft.

3.7**habitable space**

space surrounded by permanent structure in which there is provision for any of the following activities: sleeping, cooking, eating, washing/toilet, navigation, steering

Note 1 to entry: Spaces intended exclusively for storage, open cockpits with or without canvas enclosures and *engine compartments* (3.21), are not included.

3.8**readily accessible**

capable of being reached quickly and safely for effective use under emergency conditions without the use of tools

[SOURCE: ISO 9094:2015]

3.9**unattended appliance**

device intended to function without the constant attention of an operator and which can cycle on and off automatically

3.10**high pressure side**

part of an installation between the cylinder valve and the inlet of a pressure regulation device in a LPG system

Note 1 to entry: Vapour pressure at 20 °C for propane = 700 kPa and for butane = 175 kPa¹⁾.

3.11**low pressure side**

part of an installation exposed to the regulated pressure of the LPG pressure regulation device in a LPG system

3.12**pressure regulation device**

device to reduce in a controlled manner, the high pressure of the LPG system to the required *operating pressure* (3.16) of the appliances

3.13**appliance shut-off valve**

device to isolate an appliance from the gas supply

3.14**main shut-off valve**

device to isolate the entire LPG system from the *high pressure side* (3.10) of the supply

3.15**flame supervision device**

device that has a sensing element, that causes the inlet of the LPG supply to a burner to be open in the presence of a flame and closed in the absence of a flame

3.16**operating pressure**

inlet pressure of the LPG appliances

3.17**ventilator**

device that allows air to pass into and out of an interior space

1) 100 kPa = 1 bar.

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3.18

room-sealed appliance

appliance having a combustion system in which incoming combustion air and outgoing products of combustion pass through ductwork sealed to *habitable spaces* (3.7) and connected to an enclosed combustion chamber

3.19

open flued appliance

appliance where combustion air is drawn from the space containing the appliance and the outgoing products of combustion pass through a flue incorporating a draught diverter

3.20

hose assembly

length of hose with a coupling attached on both ends

[SOURCE: EN 16436-2]

3.21

engine compartment

compartment of the craft, containing spark or compression ignition internal combustion engine(s)

4 General provisions

4.1 An LPG system and all its components shall be capable of withstanding storage at -30 °C to $+60\text{ °C}$.

4.2 LPG systems shall be of the vapour withdrawal type, i.e., LPG released only under gas phase conditions.

4.3 All LPG appliances installed on a single LPG system shall be designed for use at the same operating pressure and the same LPG type, e.g., propane, butane, or a mixture of the two. The operating pressure shall be clearly labelled in the vicinity of the cylinder shut-off valve.

The cylinder(s) selected and other supply equipment shall be of sufficient capacity to ensure safe and satisfactory operation of all appliances simultaneously. The cylinder locker or cylinder housing shall be capable of accommodating the capacity of cylinders needed.

4.4 Where an additional LPG system is installed:

- there shall be no connection between each of the LPG supplies;
- the cylinder(s) for each gas supply may be installed in the same cylinder locker or cylinder housing.

If an additional cylinder locker or cylinder housing is used, there shall be a warning sign inside each cylinder locker or cylinder housing which indicates that there is an additional LPG supply.

Inside the cylinder locker or cylinder housing it shall be clearly indicated which appliances are supplied by each LPG supply. This shall also be stated in the owner's manual.

4.5 Each LPG system shall be fitted with simple means to test the LPG system for leakage before use of any appliances (e.g., a pressure gauge, bubble leak detector).

Where a bubble leak detector is fitted in the LPG system, it shall be securely mounted in the low pressure side of the LPG system and in the cylinder housing or cylinder locker.

If pressure gauges are used, they shall read the cylinder pressure side of the pressure regulation device. The gauge scale shall have a pressure range from 0 kPa to a maximum of between 1 000 kPa and 1 600 kPa to be able to show pressure drops during the LPG system check (see C.3).

5 Pressure regulation device

5.1 Each LPG system shall be equipped with, or have provision for the installation of, a pressure regulation device (see 3.12). This device shall be designed to provide a defined operating pressure suitable for the consuming appliances, but not more than 5 kPa. A label indicating the operating pressure of the LPG appliances installed shall be affixed in the vicinity of the LPG cylinder locker or cylinder housing.

5.2 The LPG pressure regulation device shall have an overpressure unit to prevent uncontrolled pressure increase in the low pressure side to a value above 15 kPa. Any LPG discharge of the unit shall be inside the cylinder locker or housing, or shall be separately vented outside the craft. The unit may be a pressure relief governor, a pressure relief valve or an automatic safety shut off valve.

5.3 The operating pressure shall be marked on the pressure regulation device.

5.4 Pressure regulation devices shall not have an external manual output pressure adjustment.

5.5 The pressure regulation device shall be located within the cylinder locker or housing.

5.6 If not rigidly connected to, and supported by, the cylinder connection, the pressure regulation device shall be separately secured within the cylinder locker or cylinder housing to protect it from damage and exposure to dirt and water.

5.7 Pressure regulation devices shall be located such that the inlet to them is at or above the level of the cylinder outlet connection.

5.8 Pressure regulation devices shall be made of corrosion-resistant metallic material or have an effective coating against external corrosion. Fasteners used shall be of corrosion-resistant material or have a corrosion-resistant plating or coating.

NOTE Pressure regulation devices in accordance with EN 16129:2013, Annex M, meet these requirements and are marked with 'Marine.'

6 LPG Supply line

6.1 General

The LPG supply line from the cylinder locker or cylinder housing to the appliance(s) shall be:

- piping in accordance with 6.2, or
- a continuous single hose assembly from the cylinder locker or cylinder housing to each appliance in accordance with 6.3.

The layout of each supply line shall be such that the length of piping and/or hose assemblies are as short as practicable.

6.1.1 Hose assemblies shall be used to connect:

- gimballed appliances to any LPG supply line piping;
- cylinders to pressure regulation devices (high pressure side of the system) where the pressure regulation device is not connected directly to the cylinder;