BS EN 15609:2021

BSI Standards Publication

LPG equipment and accessories — LPG propulsion systems for boats, yachts and other watercraft — Installation requirements

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National foreword

This British Standard is the UK implementation of EN 15609:2021. It supersedes BS EN 15609:2012, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee PVE/19, LPG containers and their associated fittings.

A list of organizations represented on this committee can be obtained on request to its committee manager.

This publication has been prepared under a mandate given to the European Standards Organizations by the European Commission and the European Free Trade Association. It is intended to support requirements of the EU legislation detailed in the European Foreword. A European Annex, usually Annex ZA or ZZ, describes how this publication relates to that EU legislation.

For the Great Britain market (England, Scotland and Wales), if UK Government has designated this publication for conformity with UKCA marking (or similar) legislation, it may contain an additional National Annex. Where such a National Annex exists, it shows the correlation between this publication and the relevant UK legislation. If there is no National Annex of this kind, the relevant Annex ZA or ZZ in the body of the European text will indicate the relationship to UK regulation applicable in Great Britain. References to EU legislation may need to be read in accordance with the UK designation and the applicable UK law. Further information on designated standards can be found at www.bsigroup.com/standardsandregulation.

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LPG equipment and accessories - LPG propulsion systems for boats, yachts and other watercraft - Installation requirements

Équipements pour gaz de pétrole liquéfié et leurs accessoires - Systèmes de propulsion GPL des bateaux, yachts et autres navires - Exigences d'installation

Flüssiggas-Geräte und Ausrüstungsteile - Flüssiggas(LPG)-Antriebsanlagen für Boote, Jachten und andere Wasserfahrzeuge - Einbauvorschriften

This European Standard was approved by CEN on 24 October 2021.

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European foreword

This document (EN 15609:2021) has been prepared by Technical Committee CEN/TC 286 "Liquefied petroleum gas equipment and accessories", the secretariat of which is held by NSAI.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by June 2022, and conflicting national standards shall be withdrawn at the latest by June 2022.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 15609:2012.

This document has been prepared under a Standardization Request given to CEN by the European Commission and the European Free Trade Association and supports essential requirements of EU Directive(s) / Regulation(s).

For relationship with EU Directive(s) / Regulation(s), see informative Annex ZA, which is an integral part of this document.

The main changes with respect to the previous edition include:

— Addition of fusible plug requirements;

— Addition of requirements for Outboard engines;

— Addition of LPG generator sets;

— Addition of Informative Annex G - Types of LPG propulsion systems;

— Addition of requirements for Fixed container - liquid phase for liquid LPG injection fuel system;

— Addition of new definitions;

— Updated text to paragraphs 4.2.3, 5.1, 5.2, 5.12.2;

— Update to Annex ZA, Relationship between this European Standard and the essential requirements of Directive 2013/53/EU [1] aimed to be covered;

— Removal of Environmental annex, references now made to CEN/TS 16765 [2].

Any feedback and questions on this document should be directed to the users' national standards body. A complete listing of these bodies can be found on the CEN website.

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

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Introduction

This document specifies requirements for the installation of equipment for the use of Liquefied Petroleum Gas (LPG) in the propulsion systems of small watercraft.

This document calls for the use of substances and procedures that can be injurious to health if adequate precautions are not taken.

Protection of the environment is a key political issue in Europe and elsewhere. For TC 286 this is covered in CEN/TS 16765 [2] LPG equipment and accessories - Environmental considerations for CEN/TC 286 standards, and this Technical Specification should be read in conjunction with this document. The Technical Specification provides guidance on the environmental aspects to be considered regarding equipment and accessories produced for the LPG industry and the following is addressed:

a) design;

b) manufacture;

c) packaging;

d) use and operation; and

e) disposal.

It has been assumed in the drafting of this document that the execution of its provisions is entrusted to appropriately qualified and experienced persons.

This document is based on EN 12979 [3].

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1 Scope

This document specifies the installation requirements for LPG propulsion systems on watercraft with hull lengths less than or equal to 24 m, as defined in EN ISO 8666 [11]. This document does not cover appliances with directly attached gas cylinders, such as portable self-contained camping stoves and portable gas lamps.

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.

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

EN 1442:2017, *LPG equipment and accessories - Transportable refillable welded steel cylinders for LPG - Design and construction*

EN 10025-2:2019, *Hot rolled products of structural steels - Part 2: Technical delivery conditions for non-alloy structural steels*

EN 12805:2002, *Automotive LPG components - Containers*

EN 12806:2003, *Automotive liquefied petroleum gas components - Other than containers*

EN 13110:2012+A1:2017, *LPG equipment and accessories - Transportable refillable welded aluminium cylinders for liquefied petroleum gas (LPG) - Design and construction*

EN 14140:2014,[1] *LPG equipment and accessories - Transportable refillable welded steel cylinders for LPG - Alternative design and construction*

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

EN 14427:2014, *LPG equipment and accessories - Transportable refillable fully wrapped composite cylinders for LPG - Design and construction*

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*

EN 60529:1991,[2] *Degrees of protection provided by enclosures (IP Code) (IEC 60529:1989)*

EN ISO 898-1:2013, *Mechanical properties of fasteners made of carbon steel and alloy steel - Part 1: Bolts, screws and studs with specified property classes - Coarse thread and fine pitch thread (ISO 898-1:2013)*

EN ISO 8846:2017, *Small craft - Electrical devices - Protection against ignition of surrounding flammable gases (ISO 8846:1990)*

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[1] As impacted by EN 14140:2014/AC:2015.

[2] As impacted by EN 60529:1991/A1:2000.

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EN ISO 9094:2017, *Small craft - Fire protection (ISO 9094:2015)*

EN ISO 10133:2017, *Small craft - Electrical systems - Extra-low-voltage d.c. installations (ISO 10133:2012)*

EN ISO 10239:2017, *Small craft - Liquefied petroleum gas (LPG) systems (ISO 10239:2014)*

EN ISO 11105:2020, *Small craft - Ventilation of petrol engine and/or petrol tank compartments (ISO 11105:2020)*

EN ISO 12217-1:2017, *Small craft - Stability and buoyancy assessment and categorization - Part 1: Non-sailing boats of hull length greater than or equal to 6 m (ISO 12217-1:2015)*

EN ISO 12217-2:2017, *Small craft - Stability and buoyancy assessment and categorization - Part 2: Sailing boats of hull length greater than or equal to 6 m (ISO 12217-2:2015)*

EN ISO 12217-3:2017, *Small craft - Stability and buoyancy assessment and categorization - Part 3: Boats of hull length less than 6 m (ISO 12217-3:2015)*

EN ISO 13297:2018, *Small craft - Electrical systems - Alternating current installations (ISO 13297:2014)*

ISO 20826:2006, *Automotive LPG components — Containers*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 12806 and the following apply.

ISO and IEC maintain terminological 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/

NOTE The definition for watercraft can be found in Directive 2013/53/EU.

3.1
liquefied petroleum gas
LPG
low pressure liquefied gas composed of one or more light hydrocarbons which are assigned to either UN 1011, UN 1075, UN 1965, UN 1969 or UN 1978 only, and which consist mainly of propane, propene, butane, butane isomers and butene with traces of other hydrocarbon gases

Note 1 to entry: For automotive LPG specification, see EN 589 [4].

3.2
LPG system
assembly of components enabling a watercraft to use LPG in its propulsion system

3.3
interconnected LPG system
ICS
engine that is hydraulically interconnected with a petrol or diesel fuelling system

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3.4
outboard engine
engine used for propulsion of the watercraft that is mounted so that the engine is outside the hull of the watercraft

EXAMPLE long tail engines or other engines designed to be removable

3.5
competent person
person who by combination of appropriate qualification, training, experience, and resources, is able to make objective judgments on the subject

3.6
pressure vessel
assembly of the pressure envelope (including the openings and their closures) and non-pressure-retaining parts attached directly to it

3.7
cylinder
transportable pressure receptacle with a water capacity not exceeding 150 l

3.8
contents gauge
device to indicate the liquid level or contents in a pressure vessel

3.9
pressure relief valve
PRV
self-closing valve which automatically, without the assistance of any energy other than that of the vapour concerned, discharges vapour at a predetermined pressure, and operates with a pop action

3.10
overfill protection device
device designed to automatically reduce the filling rate to a minimal flow when the fill level reaches a predetermined amount

Note 1 to entry: In marine applications, the predetermined amount is 80 % of the water capacity.

3.11
filler valve
valve system for liquid fill service

3.12
fusible plug
component protecting the pressure vessel from bursting by venting the LPG content at a pre-set temperature

3.13
excess flow valve
valve designed to close automatically, with a small residual flow, when the fluid flow passing through it exceeds a predetermined value, and to re-open when the pressure differential across the valve has been restored below a certain value

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3.14
non-return valve
valve designed to close automatically to restrict reverse flow

3.15
fuel system
installation required to supply LPG to the engine

3.16
pressure regulator
vaporizer
device that vaporizes LPG, reduces and/or regulates the outlet pressure to a pre-set value independent of variations of the inlet pressure and/or the flow rate

Note 1 to entry: The shut-off valve can be integrated in the vaporizer/regulator.

3.17
hydrostatic relief valve
self-closing valve which automatically, without the assistance of any energy other than that of the fluid concerned, discharges fluid at a predetermined pressure

3.18
ventilation system
assembly of ducts and an electrical ventilator that is capable of extracting hydrocarbons from the inside of the watercraft and allowing the entrance of fresh air

3.19
container housing
ventilated enclosure intended solely for storage of one or more LPG containers, pressure regulators and safety devices, and located on the exterior of the boat where any leakage would flow overboard

3.20
container locker
gas-tight (to the craft) enclosure with an overboard drain, where any leakage would flow overboard, intended solely for storage of one or more LPG containers in a cockpit or recess in the watercraft

3.21
permanently installed
securely fastened so that tools have to be used for removal

3.22
accessible
capable of being reached for inspection, removal or maintenance without the removal of permanent watercraft structures

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

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3.23
readily accessible
capable of being reached for operation, inspection or maintenance without the removal of any watercraft structure, the use of any tools or the removal of any item of portable equipment stowed in places intended for storage of portable equipment such as lockers, drawers or shelves

Note 1 to entry: Hatches are not regarded as permanent watercraft structures in this sense.

3.24
installer
person or organisation who, due to qualifications, training, experience and resources, can assume technical responsibility for the installation of the LPG propulsion system

3.25
appliance
appliance that is designed for heating, cooking, lighting, refrigeration, hot water production or electricity production (fuel cell or generator), using LPG as its energy source

3.26
cockpit
area within the watercraft that can retain water, however briefly, due to rain, waves, boat heeling, etc

Note 1 to entry: Cockpits are normally designed for the accommodation of people but, for the purpose of this document, the term "cockpit" is used either for a proper cockpit or for any other type of recess. This means that bulwarks can create a large cockpit, cockpit(s) can be situated anywhere in the boat and a cockpit can open aft to the sea. Open boats can effectively comprise the whole watercraft is a deck.

3.27
venting tube
duct that connects the gas-tight housing to the atmosphere

3.28
shut-off valve
valve that provides a leak-tight seal which is operated either manually, remotely or is self-closing

3.29
gas detection
revealing of the presence of LPG due to exposure outside the LPG containment system

3.30
bi-fuel system
engine designed to operate two separate fuel systems and to run either on LPG or an alternative fuel

Note 1 to entry: For the purpose of this document, the fuels are LPG and petrol.

3.31
dual-fuel system
engine with two independent fuel systems that can run on one fuel alone or both fuels simultaneously

Note 1 to entry: For the purpose of this document, the fuels are LPG and diesel.

Note 2 to entry: Both fuels are metered separately.

Note 3 to entry: The consumed amount of one fuel relative to the other can vary depending on the operation.

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3.32
electronic control unit
ECU
device that controls the LPG supply to the engine

3.33
inspection body
independent inspection and testing body approved by the competent authority

3.34
liquid LPG injection system
fuel system that feeds the engine by injecting liquid LPG directly into the intake manifold or directly in the combustion chamber, where it vaporises, and not use a reducer/vaporizer device

3.35
quick-connector
coupling used to provide a fast, make-or-break connection of fluid

Note 1 to entry: In the case of LPG, pressurized-transfer lines.

4 Components

4.1 Overview

The LPG system shall be designed by a competent person.

Individual components of the system, and the system as a whole, shall be designed to withstand the combined conditions of pressure, vibration, shocks, corrosion and movement encountered under normal operation.

All materials used in LPG systems shall be compatible with LPG and with other liquids or compounds with which it might come into contact under normal operating conditions, e.g. grease, lubricating oil, bilge solvents, fresh water and sea water.

Efforts should be made to prevent grease, lubricating oil, bilge solvents and other chemicals from contaminating the marine environment.

4.2 LPG containers/cylinders

4.2.1 General

The LPG container(s) shall be protected from corrosion in the marine environment by an adequate surface treatment system, or be constructed from materials suited to the marine environment.

For the purpose of this document, two types of LPG pressure vessels are identified:

— cylinders; and

— fixed containers.

4.2.2 Cylinders

LPG cylinders can be used in the liquid or gas/vapour phase to fuel the engine of a watercraft depending on the choice of technology and the required power.

The cylinders used on watercraft shall comply with one of the following:

a) EN 1442:2017;

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