December 2021

DIN EN 1473

ICS 75.200

Supersedes
DIN EN 1473:2016-10

Installation and equipment for liquefied natural gas – Design of onshore installations; English version EN 1473:2021, English translation of DIN EN 1473:2021-12

Anlagen und Ausrüstung für Flüssigerdgas –
Auslegung von landseitigen Anlagen;
Englische Fassung EN 1473:2021,
Englische Übersetzung von DIN EN 1473:2021-12

Installation et équipements de gaz naturel liquéfié –
Conception des installation terrestres;
Version anglaise EN 1473:2021,
Traduction anglaise de DIN EN 1473:2021-12

This standard has been included in the body of DVGW Technical Rules.

Document comprises 143 pages

Translation by DIN-Sprachendienst.

In case of doubt, the German-language original shall be considered authoritative.

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A comma is used as the decimal marker.

National foreword

This standard includes safety requirements.

This document (EN 1473:2021) has been prepared by Technical Committee CEN/TC 282 “Installation and equipment for LNG” (Secretariat: AFNOR, France).

The responsible German body involved in its preparation was *DIN-Normenausschuss Gastechnik* (DIN Standards Committee Gas Technology), Working Committee NA 032-02-10 AA “Installation and equipment for LNG”.

This standard provides functional guidelines for the design, construction and operation of onshore LNG facilities with a storage capacity of more than 200 tonnes of LNG for the liquefaction of natural gas as well as for the storage, vaporization, transfer and handling of LNG and natural gas. As an innovation compared to the previous edition, the new EN 1473:2021 also covers storage under pressure: It was therefore necessary to define requirements for safety and performance. To achieve the integration of pressure vessel tanks, the standard had to be completely restructured to focus on topics relevant to both pressure vessels and low-pressure tanks.

In addition, the risk management requirements have been comprehensively updated, first during project development and later during plant operation.

As far as the interests of occupational health and safety are concerned in this standard, it should be noted that the relevant German national regulations take priority over the requirements of this standard. Where more stringent local or national requirements exist, these supersede the minimum requirements specified in this standard.

The European Standards referred to in this document, with the exception of EN IEC 31010 and EN ISO 14726, have been published as DIN EN or DIN EN ISO Standards with the same number.

The DIN documents corresponding to the documents referred to in this document are as follows:

HD 60364-5-54	DIN VDE 0100-540 (VDE 0100-540)
IEC 61511(all parts)	DIN EN 61511 (all parts)
EN ISO 14726	DIN ISO 14726

This standard has been developed with the consensus of the *DVGW Deutscher Verein des Gas- und Wasserfaches e.V.* (German Technical and Scientific Association for Gas and Water).

This document has been included in the body of technical rules and standards for gas issued by the *DVGW*.

For current information on this document, please go to DIN’s website (www.din.de) and search for the document number in question.

Amendments

This standard differs from DIN EN 1473:2016-10 as follows:

a) due to the incorporation of pressurized storage the standard has been re-structured and revised;

b) duplications have been detected and deleted;

c) terms and definitions have been adjusted;

d) normative references have been updated;

e) the subject has been changed in Annex H;

f) risk assessment requirements have been improved;

g) the storage tanks classification has been improved.

Previous editions

DIN EN 1473: 1997-11, 2007-06, 2016-10

National Annex NA
(informative)

Bibliography

DIN EN 61511, *Functional safety — Safety instrumented systems for the process industry sector*

DIN ISO 14726, *Shipbuilding and marine technology — Identification colours for the content of piping systems*

DIN VDE 0100-540 (VDE 0100-540), *Low voltage electrical installations — Part 5-54: Selection and erection of electrical equipment — Earthing arrangements and protective conductors*

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 1473

May 2021

ICS 75.200

Supersedes EN 1473:2016

English Version

Installation and equipment for liquefied natural gas - Design of onshore installations

Installation et équipements de gaz naturel liquéfié - Conception des installation terrestres

Anlagen und Ausrüstung für Flüssigerdgas - Auslegung von landseitigen Anlagen

This European Standard was approved by CEN on 15 February 2021.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of 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 United Kingdom.

EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

Ref. No. EN 1473:2021 E

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European foreword

This document (EN 1473:2021) has been prepared by Technical Committee CEN/TC 282 “Installation and equipment for LNG”, the secretariat of which is held by AFNOR.

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 November 2021, and conflicting national standards shall be withdrawn at the latest by November 2021.

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 1473:2016.

Due to the incorporation of pressurized storage the standard has been re-structured and revised. In comparison with EN 1473:2016, the following changes have been made:

— duplications detected and deleted;

— terms and definitions adjusted;

— normative references updated;

— changed subject in Annex H;

— risk assessment requirements improved;

— storage tanks classification improved.

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.

Introduction

The objective of this document is to give functional guidelines for on-shore LNG installations. It recommends procedures and practices that will result in safe and environmentally acceptable design, construction and operation of LNG plants.

Given the wide range of facilities from small to large, with high and low risk profile, etc., the acceptability criteria could vary depending on the project and are subject to conclusions by the normative risk assessment.

Seveso, PED, and ATEX Directives are expected to be followed. Where national and/or local regulations exist in which some of the requirements are equal or more stringent than in this document, it is up to agreement with national and/or local regulators to determine which of the requirements apply.

It does not need to be applied retrospectively, but application is recommended when major modifications of existing installations are being considered.

This document is also recommended for debottlenecking, revamping and plant life extension in the limits that will be defined by the local authority. The appliance of the European Directives to the existing facilities is part of the limits to be defined together with the local authority.

In case of plant expansion, this document is applicable for the new facilities. The application of these recommendations for the tie-ins and connections to the existing facilities will be defined by the local authority. The limits of such application should consider the practicality of such appliance. In the same way, the limits of the European Directives appliance will be accurately defined with the local authority.

1 Scope

This document gives guidelines for the design, construction and operation of all onshore liquefied natural gas (LNG) installations for the liquefaction, storage, vaporization, transfer and handling of LNG and natural gas (NG).

This document is applicable for plants with an LNG storage capacity above 200 t.

The designated boundary limits are LNG inlet/outlet by the ship's manifold including vapour return connection, the truck loading/unloading connection including vapour return, the rail car loading/unloading connection including vapour return and the natural gas in and outlet boundary by piping systems.

Terminals or plant types have one or more boundary limits as described in this scope (see Figure 1).

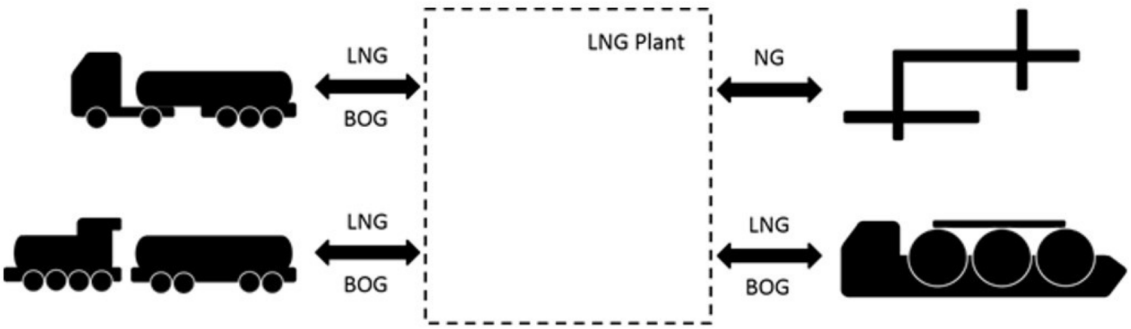

Figure 1 — Boundary limits of onshore liquefied natural gas (LNG) installations

A short description of each of these installations is given in Annex G.

Feed gas for LNG liquefaction installations (plant) can be from gas field, associated gas from oil field, piped gas from transportation grid or from renewables.

Floating solutions (for example FPSO, FSRU, SRV), whether off-shore or near-shore, are not covered by this document even if some concepts, principles or recommendations could be applied. However, in case of berthed FSRU with LNG transfer across the jetty, the following recommendations apply for the jetty and topside facilities.

In case of solutions using floating storage unit (FSU) and land-based re-gasification solution, the on-shore part is covered by these standard recommendations.

Plants with a storage inventory from 5 t up to 200 t are covered by [5].

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 809, *Pumps and pump units for liquids - Common safety requirements*

EN 1092-1, *Flanges and their joints - Circular flanges for pipes, valves, fittings and accessories, PN designated - Part 1: Steel flanges*

EN 1127-1, *Explosive atmospheres - Explosion prevention and protection - Part 1: Basic concepts and methodology*

EN 1474-2, *Installation and equipment for liquefied natural gas - Design and testing of marine transfer systems - Part 2: Design and testing of transfer hoses*

EN 1514-1, *Flanges and their joints - Dimensions of gaskets for PN-designated flanges - Part 1: Non-metallic flat gaskets with or without inserts*

EN 1591 (all parts), *Flanges and their joints - Design rules for gasketed circular flange connections*

EN 1776, *Gas infrastructure - Gas measuring systems - Functional requirements*

EN 1990, *Eurocode - Basis of structural design*

EN 1991 (all parts), *Eurocode 1: Actions on structures*

EN 1992 (all parts), *Eurocode 2: Design of concrete structures*

EN 1993 (all parts), *Eurocode 3: Design of steel structures*

EN 1994-1-1, *Eurocode 4: Design of composite steel and concrete structures - Part 1-1: General rules and rules for buildings*

EN 1994-1-2, *Eurocode 4 - Design of composite steel and concrete structures - Part 1-2: General rules - Structural fire design*

EN 1997-1:2004,[1] *Eurocode 7: Geotechnical design - Part 1: General rules*

EN 1997 (all parts), *Eurocode 7 - Geotechnical design*

EN 1998 (all parts), *Eurocode 8: Design of structures for earthquake resistance*

EN 10204, *Metallic products - Types of inspection documents*

EN 12065, *Installations and equipment for liquefied natural gas - Testing of foam concentrates designed for generation of medium and high expansion foam and of extinguishing powders used on liquefied natural gas fires*

EN 12162, *Liquid pumps - Safety requirements - Procedure for hydrostatic testing*

[1] As impacted by EN 1997-1:2004/AC:2009.