

**Installation and equipment for liquefied natural gas
- Design and testing of marine transfer systems -
Part 1: Design and testing of transfer arms**

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

Käesolev Eesti standard EVS-EN 1474-1:2009 sisaldab Euroopa standardi EN 1474-1:2008 ingliskeelset teksti.

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English Version

Installation and equipment for liquefied natural gas - Design and testing of marine transfer systems - Part 1: Design and testing of transfer arms

Installations et équipements relatifs au gaz naturel liquéfié -
Conception et essais des systèmes de transfert marins -
Partie 1: Conception et essais des bras de
chargement/déchargement

Anlagen und Ausrüstung für Flüssigerdgas - Auslegung und
Prüfung von Schiffsübergabesystemen - Teil 1: Auslegung
und Prüfung von Verladearmen

This European Standard was approved by CEN on 1 November 2008.

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Foreword

This document (EN 1474-1:2008) 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of an identical text or by endorsement, at the latest by June 2009, and conflicting national standards shall be withdrawn at the latest by June 2009.

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

This document supersedes EN 1474:1997.

This European Standard consists of 3 parts:

- EN 1474-1, *Installation and equipment for liquefied natural gas — Design and testing of marine transfer systems — Part 1: Design and testing of transfer arms*
- 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 1474-3, *Installation and equipment for liquefied natural gas — Design and testing of marine transfer systems — Part 3: Offshore transfer systems*

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

1 Scope

This European Standard specifies the design, minimum safety requirements and inspection and testing procedures for liquefied natural gas (LNG) transfer arms intended for use on conventional onshore (LNG) terminals ¹⁾. It also covers the minimum requirements for safe LNG transfer between ship and shore.

Although the requirements for remote control power systems are covered, the standard does not include all the details for the design and fabrication of standard parts and fittings associated with transfer arms.

The content of this European Standard is supplementary to local or national standards and regulations and is additional to the requirements of EN 1532 and EN 1473.

2 Normative references

The following referenced documents are indispensable for the application 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 287-1, *Qualification test of welders — Fusion welding — Part 1: Steels*

EN 571-1, *Non destructive testing — Penetrant testing — Part 1: General principles*

EN 875, *Destructive tests on welds in metallic materials — Impact tests — Test specimen location, notch orientation and examination*

EN 910, *Destructive tests on welds in metallic materials — Bend tests*

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

EN 1092-4, *Flanges and their joints — Circular flanges for pipes, valves, fittings and accessories, PN designated — Part 4: Aluminium alloy flanges*

EN 1160, *Installations and equipment for liquefied natural gas — General characteristics of liquefied natural gas*

EN 1435, *Non-destructive examination of welds — Radiographic examination of welded joints*

EN 1473, *Installation and equipment for liquefied natural gas — Design of onshore installations*

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 1532, *Installation and equipment for liquefied natural gas — Ship to shore interface*

EN 1759-1, *Flanges and their joints — Circular flanges for pipes, valves, fittings and accessories, Class designated — Part 1: Steel flanges, NPS ½ to 24*

¹⁾ CONVENTIONAL ONSHORE (LNG) TERMINAL - Definition: A marine transfer facility for the loading or unloading of LNG Carriers that is located in a harbour or other sheltered coastal location. It shall consist of a fixed structure, or wharf, capable of withstanding the berthing loads of a fully laden LNG Carrier of a given specification and mooring the vessel safely alongside. The structure shall be connected to the shore by a trestle, tunnel or other means, facilitating the transfer and ancillary pipe work and providing safe access and egress for personnel performing maintenance or operational duties." See also definitions in EN 1474-2 and -3.

EN 1991-1-4, *Eurocode 1: Actions on structures — Part 1-4: General actions — Wind actions*

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

EN 12266-1, *Industrial valves — Testing of valves — Part 1: Pressure tests, test procedures and acceptance criteria — Mandatory requirements*

EN 12266-2, *Industrial valves — Testing of valves — Part 2: Tests, test procedures and acceptance criteria — Supplementary requirements*

EN 12308, *Installation and equipment for liquefied natural gas — Suitability testing of gaskets designed for flanged joints used on LNG piping*

EN 12560-1, *Flanges and their joints — Gaskets for Class-designated flanges — Part 1: Non-metallic flat gaskets with or without inserts*

EN 12560-2, *Flanges and their joints — Gaskets for Class-designated flanges — Part 2: Spiral wound gaskets for use with steel flanges*

EN 12560-3, *Flanges and their joints — Gaskets for Class-designated flanges — Part 3: on-metallic PTFE envelope gaskets*

EN 12560-4, *Flanges and their joints — Gaskets for Class-designated flanges — Part 4: Corrugated, flat or grooved metallic and filled metallic gaskets for use with steel flanges*

EN 12560-5, *Flanges and their joints — Gaskets for Class-designated flanges — Part 5: Metallic ring joint gaskets for use with steel flanges*

EN 12560-6, *Flanges and their joints — Gaskets for Class-designated flanges — Part 6: Covered serrated metal gaskets for use with steel flanges*

EN 12567, *Industrial valves — Isolating valves for LNG — Specification for suitability and appropriate verification tests*

EN 13463-1, *Non-electrical equipment for use in potential explosive atmospheres — Part 1: Basic method and requirements*

EN 13463-2, *Non-electrical equipment for use in potential explosive atmospheres — Part 2: Protection by flow restricting enclosure 'fr'*

EN 13463-5, *Non-electrical equipment for use in potential explosive atmospheres — Part 5: Protection by constructional safety "c"*

EN 13463-8, *Non-electrical equipment for use in potential explosive atmospheres — Part 8: Protection by liquid immersion 'k'*

EN 60034-5, *Rotating electrical machines — Part 5: Degrees of protection provided by the integral design of rotating electrical machines (IP code) — Classification (IEC 60034-5:2000)*

EN 60079-0, *Electrical apparatus for explosive gas atmospheres — Part 0: General requirements (IEC 60079-0:2004, modified)*

EN 60079-1, *Explosive atmospheres — Part 1: Equipment protection by flameproof enclosures "d" (IEC 60079-1:2007)*

EN 60079-2, *Explosive atmospheres — Part 2: Equipment protection by pressurized enclosure "p" (IEC 60079-2:2007)*

EN 60079-5, *Explosive atmospheres — Part 5: Equipment protection by powder filling "q" (IEC 60079-5:2007)*

- EN 60079-6, *Explosive atmospheres — Part 6: Equipment protection by oil immersion "o"* (IEC 60079-6:2007)
- EN 60079-7, *Explosive atmospheres — Part 7: Equipment protection by increased safety "e"* (IEC 60079-7:2006)
- EN 60079-10, *Electrical apparatus for explosive gas atmospheres — Part 10: Classification of hazardous areas* (IEC 60079-10:2002)
- EN 60079-11, *Explosive atmospheres — Part 11: Equipment protection by intrinsic safety "i"* (IEC 60079-11:2006)
- EN 60079-18, *Electrical apparatus for explosive gas atmospheres — Part 18: Construction, test and marking of type of protection encapsulation "m" electrical apparatus* (IEC 60079-18:2004)
- EN 60079-25, *Electrical apparatus for explosive gas atmospheres — Part 25: Intrinsically safe systems* (IEC 60079-25:2003)
- EN 60529, *Degrees of protection provided by enclosures (IP Code)* (IEC 60529:1989)
- EN 61508 (all parts), *Functional safety of electrical/electronic/programmable electronic safety-related systems*
- EN 61511 (all parts), *Functional safety — Safety instrumented systems for the process industry sector*
- EN 62305-3, *Protection of structures against lightning — Part 3: Physical damage to structures and life hazard* (IEC 62305-3:2006, modified)
- EN ISO 1460, *Metallic coatings — Hot dip galvanised coatings on ferrous materials — Gravimetric determination of the mass per unit area* (ISO 1460:1992)
- EN ISO 1461, *Hot dip galvanised coatings on fabricated iron and steel articles — Specification and test methods* (ISO 1461:1999)
- EN ISO 9000, *Quality management systems — Fundamentals and vocabulary* (ISO 9000:2005)
- EN ISO 9001, *Quality management systems — Requirements* (ISO 9001:2000)
- EN ISO 10497, *Testing of valves — Fire type-testing requirements* (ISO 10497:2004)
- EN ISO 12944 (all parts), *Paints and varnishes — Corrosion protection of steel structures by protective paint systems*

3 Terms, definitions and abbreviations

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

3.1

adapters

see "spool (piece)" in 3.68

3.2

apex swivel

articulated, fluid-carrying joint located between the <inboard> and <outboard arms>

NOTE It provides <luffing> of the <outboard arm> relative to the <inboard arm>.