

<b>STN</b>	<b>Zariadenie a príslušenstvo na skvapalnený zemný plyn</b> <b>Navrhovanie a skúšanie námorných prenosných systémov</b> <b>Časť 2: Navrhovanie a skúšanie prenosných hadíc</b>	<b>STN</b> <b>EN 1474-2</b>  38 6615
------------	--	---

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

Táto norma obsahuje anglickú verziu európskej normy.  
This standard includes the English version of the European Standard.

Táto norma bola oznámená vo Vestníku ÚNMS SR č. 02/21

Obsahuje: EN 1474-2:2020

Oznámením tejto normy sa ruší  
STN EN 1474-2 (38 6615) z júna 2009

**132106**



EUROPEAN STANDARD

EN 1474-2

NORME EUROPÉENNE

EUROPÄISCHE NORM

September 2020

ICS 75.200

Supersedes EN 1474-2:2008

English Version

## Installation and equipment for liquefied natural gas - Design and testing of marine transfer systems - Part 2: Design and testing of transfer hoses

Installations et équipements de gaz naturel liquéfié -  
Conception et essais des systèmes de transfert marins -  
Partie 2 : Conception et essais des flexibles de transfert

Anlagen und Ausrüstung für Flüssigerdgas - Auslegung  
und Prüfung von Schiffsübergabesystemen - Teil 2:  
Auslegung und Prüfung von Übergabeschläuchen

This European Standard was approved by CEN on 19 July 2020.

This European Standard was corrected and reissued by the CEN-CENELEC Management Centre on 21 October 2020.

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**

## Contents

Page

European foreword.....	4
1 Scope.....	5
2 Normative references.....	5
3 Terms, definitions and abbreviations .....	5
3.1 Terms and Definitions.....	5
3.2 Abbreviations.....	10
4 Applications and Qualification Categories.....	10
4.1 Applications .....	10
4.2 Qualification Categories .....	10
5 Description of typical LNG transfer hose assembly designs and accessories .....	11
5.1 General.....	11
5.2 Mandatory components.....	11
5.3 Optional components.....	12
5.4 Typical construction of LNG transfer hose assemblies .....	12
5.4.1 Main hose categories .....	12
5.4.2 Corrugated metal hose assemblies.....	13
5.4.3 Thermoplastic multi-layer (non-vulcanized) hose assemblies (Composite hose assemblies).....	15
5.4.4 Hose-in-hose with annular space .....	16
6 Design features of the LNG transfer hoses assemblies.....	17
6.1 General.....	17
6.2 Transfer Hose Assembly technology design parameters .....	17
6.3 Project Specific Design Parameters.....	18
6.3.1 Selection of hose assembly length.....	18
6.3.2 Service life.....	18
6.3.3 Selection of buoyancy and submersion.....	18
6.3.4 Selection of insulation .....	18
6.3.5 Selection of external protection .....	19
6.3.6 Selection of leak detection.....	19
6.4 Component details – End fitting.....	19
6.4.1 General.....	19
6.4.2 Termination .....	20
6.4.3 Connector.....	20
6.4.4 Bending stiffener/restrictor (optional).....	20
6.5 Hose assembly handling / lifting device.....	20
6.6 Safety systems .....	20
6.6.1 Leak detection (optional).....	20
6.6.2 Fire safety requirements.....	21
6.6.3 Electrical safety requirements.....	21
6.7 Connection to the ship.....	21
6.8 Hydraulic and electric control systems.....	21
7 Qualification Requirements .....	21
7.1 Foreword.....	21
7.2 Qualification process .....	22
7.2.1 General Principle .....	22

7.2.2	Qualification Levels Specific Requirements.....	22
7.2.3	Certification range definition from a tested hose assembly .....	24
7.2.4	Certification extension and update.....	25
7.3	Hose Assembly tests .....	25
7.3.1	General .....	25
7.3.2	Hose assembly property characterization tests.....	26
7.3.3	Qualification tests with acceptance criteria .....	34
8	Quality assurance and control .....	44
8.1	General .....	44
8.2	Material selection .....	44
8.3	Manufacturing.....	45
8.3.1	Manufacturing basics .....	45
8.3.2	Traceability.....	45
8.3.3	Marking.....	45
8.3.4	Packing and Preservation.....	46
8.4	Factory acceptance tests .....	46
8.4.1	General .....	46
8.4.2	Tests to be performed on every hose assembly .....	46
9	Documentation .....	46
9.1	Purchasing Guidelines .....	46
9.2	Design, Qualification and Manufacturing Documentation .....	46
9.3	As-built documentation/Manufacturing Data Book .....	47
9.4	Operation manual.....	47
	Annex A (informative) Purchasing guidelines table .....	49
	Annex B (informative) Guidelines for additional testing program .....	52
	Annex C (Informative) Guidelines for Hose Qualification Categories (HQC) Selection .....	59
	Annex D (informative) Surge pressure considerations for LNG hose assemblies.....	61
	Annex E (Informative) Pressure Leak Tests - justification about maximum allowed permeability rate and leak detection value .....	62
	Bibliography .....	64

**EN 1474-2:2020 (E)****European foreword**

This document (EN 1474-2:2020) 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 March 2021, and conflicting national standards shall be withdrawn at the latest by March 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 1474-2:2008.

In comparison with the previous edition, the following technical modifications have been made:

- Update of the scope
- Review of Application and introduction of Hose Qualification Categories
- Revision of hose assembly categories
- Review of design features
- Review of qualification requirements
- Review of Quality assurance and control
- Review of documentation
- Review of annexes

This series 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*

(This standard has been superseded by EN ISO 16904 - Petroleum and natural gas industries - Design and testing of LNG marine transfer arms for conventional onshore terminals)

- 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 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.

## 1 Scope

This document gives general guidelines for the design, material selection, qualification, certification, and testing details of hose assemblies for Liquefied Natural Gas (LNG) marine transfer applications.

The transfer hose assemblies are part of transfer systems (it means that they may be fitted with ERS, QCDC, handling systems, hydraulic and electric components etc.) To avoid unnecessary repetition, cross-references to EN ISO 16904 and EN 1474-3 are made for all compatible items, and for references, definitions and abbreviations. Where additional references, definitions and abbreviations are required specifically for LNG hose assemblies, they are listed in this European Standard.

## 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 1474-1:2008, *Installation and equipment for liquefied natural gas — Design and testing of marine transfer systems — Part 1: Design and testing of transfer arms*

EN 1474-3:2008, *Installation and equipment for liquefied natural gas - Design and testing of marine transfer systems - Part 3: Offshore transfer systems*

EN ISO 7369:2004, *Pipework - Metal hoses and hose assemblies - Vocabulary (ISO 7369:2004)*

EN ISO 8330:2014, *Rubber and plastics hoses and hose assemblies - Vocabulary (ISO 8330:2014)*

EN ISO 10012:2003, *Measurement management systems - Requirements for measurement processes and measuring equipment (ISO 10012:2003)*

EN ISO 10619-1:2018, *Rubber and plastics hoses and tubing - Measurement of flexibility and stiffness - Part 1: Bending tests at ambient temperature (ISO 10619-1:2017)*

EN ISO 16904:2016, *Petroleum and natural gas industries - Design and testing of LNG marine transfer arms for conventional onshore terminals (ISO 16904:2016)*

**koniec náhľadu – text ďalej pokračuje v platenej verzii STN**