SLOVENSKI STANDARD
SIST EN 1532:1999

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Napeljave in oprema za utekoļ injeni zemeljski plin ï Povezava med ladjo in kopnim

Installation and equipment for liquefied natural gas - Ship to shore interface

Anlagen und Ausrüstung für Flüssigerdgas - Schnittstelle zwischen Schiff und Land

Installations et équipements relatifs au gaz naturel liquéfié - Interface terre navire

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75.200	Oprema za skladiģļenje nafte, naftnih proizvodov in zemeljskega plina	Petroleum products and natural gas handling equipment

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English version

Installation and equipment for liquefied natural gas - Ship to shore interface

Installations et équipements relatifs au gaz naturel liquéfié - Interface terre navire

Anlagen und Ausrüstung für Flüssigerdgas - Schnittstelle zwischen Schiff und Land

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CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

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Contents

Foreword

This European Standard 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of an identical text or by endorsement, at the latest by September 1997, and conflicting national standards shall be withdrawn at the latest by September 1997.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

0 Introduction

Each LNG port facility and terminal should have its own specific safety systems determined by Hazard Analysis and LNG carriers using the facility should be compatible with these systems. In general, for all vessels, particular care should be taken to ensure that the basic requirements laid down in this standard are understood and applied at each cargo transfer.

In order to define the arrangement which will ensure the best possible conditions for ship to shore transfer, in particular regarding safety, it is necessary to set up this standard which, as far as possible, will lead to the harmonisation of the differing requirements of the ship and the terminal.

This standard governs the ship/shore interface taking into account the publications of the Society of International Gas Tankers and Terminal Operators (SIGTTO), Oil Companies International Marine Forum (OCIMF) and the International Maritime Organization (IMO). In particular, this applies in matters pertaining to safety.

1 Scope

This European Standard gives recommendations and requirements for the terminal and on board the ship to ensure the safe transfer of LNG at receiving and exporting terminals.

It is applicable to the ship/shore LNG transfer systems including :

- ship to shore connections ;
- all safety aspects of transfer operations ;
- any other operations that occur while the ship is moored on the jetty.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN 1160	Installation and equipment for liquefied natural gas - General characteristics of liquefied natural gas
EN 50014	Electrical apparatus for potentially explosive atmospheres - General requirements
EN 50015	Electrical apparatus for potentially explosive atmospheres - Oil immersion "o"
EN 50016	Electrical apparatus for potentially explosive atmospheres - Pressurized apparatus "p"

EN 50017	Electrical apparatus for potentially explosive atmospheres - Powder filling "q"
EN 50018	Electrical apparatus for potentially explosive atmospheres - Flameproof enclosure "d"
EN 50019	Electrical apparatus for potentially explosive atmospheres - Increased safety "e"
EN 50020	Electrical apparatus for potentially explosive atmospheres - Intrinsic safety "i"
EN 50028	Electrical apparatus for potentially explosive atmospheres - Encapsulation "m"
EN 50039	Electrical apparatus for potentially explosive atmospheres - Intrinsically safe electrical systems "i"
EN 50054	Electrical apparatus for the detection and measurement of combustible gases - General requirements and test methods
EN 50056	Electrical apparatus for the detection and measurement of combustible gases - Performance requirements for Group 1 apparatus indicating up to 100 % (v/v) methane
EN 50057	Electrical apparatus for the detection and measurement of combustible gases - Performance requirements for Group II apparatus indicating up to 100 % lower explosive limit
EN 50058	Electrical apparatus for the detection and measurement of combustible gases - Performance requirement for Group II apparatus indicating up to 100 % (v/v) gas
prEN 1127-1	Safety of machinery - Fire and explosions - Part 1: Explosion Prevention and Protection
prEN 1473	Installation and equipment for liquefied natural gas - Design of onshore installation
prEN 1474	Installation and equipment for liquefied natural gas - Design and testing of loading/unloading arms
prEN 50145	Electrical apparatus for potentially explosive gas atmospheres - Classification of hazardous areas
ISO 10497	Testing of valves - Fire type-setting requirements

3 Definitions and abbreviations

For the purposes of this European Standard the definitions of prEN 1474 and the following definitions apply :

3.1 Definitions

3.1.1 ship/shore transfer facilities : A jetty including all the ship/shore interface equipment for receiving or exporting LNG.

3.1.2 communication : All methods of transmitting written or oral information. It also includes information covered by data links.

3.1.3 interface : All the operations of the ship and shore relating to LNG cargo transfer, ship's access or ship's supplies.

3.1.4 main control room : A control room situated in the terminal from which central control is directed.

3.1.5 jetty control centre : A control centre situated on or adjacent to the jetty primarily to control the loading/unloading arms.

3.1.6 ship cargo control room : A control room situated on board the ship from which the control of the ship's transfer operation is directed.

3.1.7 emergency shut down (ESD) : A method that safely and effectively stops the transfer of LNG between ship and shore or vice versa.

3.1.8 emergency release system (ERS) : A system that provides a positive means of quick release of loading/unloading arms and safe isolation between ship and shore.

3.1.9 emergency release procedure (ERP) : A procedure that is intended to provide a positive means of quick release and safe isolation between ship and shore.

3.1.10 ship's cargo manifold : The flanged pipe assembly, mounted on board ship to which the outboard flange of the loading/unloading arms are connected.

3.1.11 terminal : An LNG plant with loading/unloading facilities.

3.1.12 transfer : Loading or unloading operation.

3.2 Abbreviations

For the purpose of this European Standard, the following abbreviations apply :

- LNG : liquefied natural gas ;
- NG : natural gas ;
- MOV : motor operated valve.

4 List of items that make up the ship to shore interface

The items to be especially considered for LNG transfer are :

- the ship's safe mooring at the jetty ;
- gangway access from jetty to ship ;
- all the communications between ship and shore ;
- all instrument and electrical connections used across the interface ;
- loading/unloading ;
- bunkering from the terminal or by supply barge ;
- liquid nitrogen connection ;
- ship's storing.

5 Description of LNG and associated hazards

5.1 Description of LNG

The characteristics of LNG are described in EN 1160.

5.2 Hazards associated with LNG

The main hazards are defined in EN 1160 and those most important in the transfer of LNG are :

- the cryogenic effects resulting from the very low temperatures. These low temperatures can cause injury to people (frostbite), and also cause damage to non-cryogenic materials, which lose their mechanical properties, become brittle and fracture ;
- the potential hazards of fire or explosion from leaks or spillage of LNG ;
- the overpressure caused by rapid phase transition (RPT), due to the interaction between LNG and water ;
- overpressure due to thermal expansion of trapped LNG.

5.3 Hazards associated with LNG transfer

The main hazards are associated with :

- cooldown, warmup, purging and draining of loading/unloading arms ;
- overflows of storage tanks (ship and shore) ;
- overpressure of storage tanks (ship and shore).

5.4 Potential external factors

The external hazards that should be considered in the transfer operations are :

1) natural environment :
   - atmospheric conditions (wind, lightning, etc) ;
   - sea conditions ;
   - seismic conditions ;
   - rise and fall of the tide ;

2) other hazards :
   - jetty contact ;
   - collision with another ship or the jetty ;
   - mooring lines breaking ;
   - fire at the terminal or its surroundings ;
   - LNG ship movement generated by the suction effects from ships passing nearby.

6 Hazardous areas

When the ship is moored at the jetty, the ship's gas dangerous space or zone is added to the jetty's hazardous area.

(For definition of the ship's gas dangerous space or zone, reference should be made to the IMO code : Annex B : Reference 7).

The hazardous area on the terminal and jetty is classified in two types :

a) zone 1 : for areas where the risk of an explosive atmosphere exists during normal operation ;

b) zone 2 : for areas where an explosive atmosphere could occur in the event of deviation from normal operation.

For definition of these hazardous areas, reference shall be made to prEN 1127-1 and prEN 50145.

Within the jetty area, the electrical equipment shall be set out in accordance with EN 50014 to EN 50020, EN 50028, EN 50039, EN 50054, EN 50056 to EN 50058 taking into account the zone where it is used and for non electrical equipment in accordance with prEN 1127-1. The electrical equipment on the ship should be in accordance with the relevant Gas Code as published by IMO.

7 Safety precautions

7.1 General

Safety precautions may differ from location to location due to local conditions, therefore a hazard analysis shall be carried out in each case to establish the minimum safety precautions. The hazard analysis shall be performed according to prEN 1473. The basic precautions as outlined in this European Standard are considered to be the minimum safety precautions required. The additional precautions, resulting from the hazard analysis for each terminal shall be considered as extra to the basic precaution. The terminal and the ship shall always ensure that this minimum safety level is maintained by the use of the Ship/Shore Safety Check List. (In this regard, reference should be made to the SIGTTO guidelines: Annex B: reference 6).

7.2 Basic precautions

7.2.1 Restricted harbour areas

In order to guard against unexpected collisions to the LNG carrier when alongside, restricted areas around the berth for other maritime traffic should be defined by the appropriate authorities and the terminal.

7.2.2 Restricted area on the jetty

Areas in which the access of non authorized personnel is limited should be regulated by the safety rules of the terminal. These areas correspond, at least in part, to the area affected by LNG transfer and should be clearly indicated.

7.2.3 Restricted area on the ship

Areas in which access of non authorized personnel is limited should be regulated by the safety rules of the ship. These areas correspond, at least in part, to the area affected by LNG transfer.

7.2.4 Ship/shore safety check list

The Ship/Shore Safety Check List should be officially completed by ship and shore personnel before the start of LNG transfer. (In this regard, reference should be made to the SIGTTO guidelines: Annex B: Reference 6).