

SLOVENSKI STANDARD

SIST EN 12567:2001

01-december-2001

Industrijske ventili - Izolirajoči ventili za LNG - Specifikacija za ustreznost in ustrezne
preizkušnje

Industrial valves - Isolating valves for LNG - Specification for suitability and appropriate
verification tests

Industriearmaturen - Absperrarmaturen für Flüssigerdgas - Anforderungen an die
Gebrauchstauglichkeit und deren Prüfungen

Robinetterie industrielle - Robinets de sectionnement pour GNL - Prescriptions d'aptitude
à l'emploi et vérifications s'y rapportant

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Ta slovenski standard je istoveten z: **EN 12567:2000**

ICS:

| | | |
|-----------|--------------------|-------------------|
| 23.060.01 | Ventili na splošno | Valves in general |
|-----------|--------------------|-------------------|

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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 12567

July 2000

ICS 23.060.01

English version

Industrial valves - Isolating valves for LNG - Specification for
suitability and appropriate verification tests

Robinetterie industrielle - Robinets de sectionnement pour
GNL - Prescriptions d'aptitude à l'emploi et vérifications s'y
rapportant

Industriearmaturen - Absperrarmaturen für Flüssigerdgas -
Anforderungen an die Gebrauchstauglichkeit und deren
Prüfungen

This European Standard was approved by CEN on 25 June 2000.

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 Central Secretariat 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 Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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

Central Secretariat: rue de Stassart, 36 B-1050 Brussels

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Foreword

This European Standard has been prepared by Technical Committee CEN/TC 69 "Industrial valves", 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 January 2001, and conflicting national standards shall be withdrawn at the latest by January 2001.

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

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1 Scope

This European Standard specifies the general performance requirements of isolating valves (gate valves, globe road or sea) of Liquefied Natural Gas (LNG). LNG filling valves for vehicle refuelling systems are excluded from the scope of this standard.

DN range from DN 8 to DN 1000.

PN range from PN 16 to PN 100.

Class range from Class 150 to Class 900.

Temperature range from – 196 °C to + 60 °C.

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 (including amendments).

EN 19, *Industrial Valves – Marking*.

EN 736-1, *Valves - Terminology - Part 1 : Definition of types of valves*.

EN 736-2, *Valves - Terminology - Part 2 : Definition of components of valves*.

EN 736-3, *Valves - Terminology - Part 3 : Definition of terms*.

EN 764, *Pressure equipment - Terminology and symbols - Pressure, temperature and volume*.

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

EN 10045-1, *Metallic materials - Charpy impact tests - Part 1 : Test method*.

EN 12308, *Installations and equipment for LNG - Suitability testing of gaskets designed for flanged joints used on LNG piping*.

EN ISO 5210, *Industrial valves – Multi-turn actuator attachments (ISO 5210:1991)*.

prEN ISO 5211:2000, *Industrial valves - Part-turn valve actuator attachments (ISO/FDIS 5211:2000)*.

prEN 12266-1:1999, *Industrial valves – Testing of valves - Part 1 : Tests, test procedures and acceptance criteria to be fulfilled by every valve*.

prEN 12516-1:2000, *Industrial Valves – Shell Design Strength – Part 1: Tabulation Method for Steel Valves*.

prEN 12516-2:2000, *Industrial Valves – Shell Design Strength – Part 2: Calculation Method for Steel Valves*.

prEN 12516-3:1999, *Valves - Shell design strength - Part 3 : Experimental method*.

EN 12570, *Industrial valves - Method for sizing the operating element*.

ISO 10497, *Testing of valves - Fire type-testing requirements*.

ASTM A 380, *Standard practice to cleaning, descaling and passivation of stainless steel parts, equipment and systems*.

3 Terms and definitions

For the purposes of this European Standard, the terms and definitions of EN 736-1, EN 736-2, EN 736-3 and EN 764 apply together with the following terms and definitions :

3.1

LNG (liquefied natural gas)

see EN 1160

3.2

allowable pressure p_s

see EN 764

3.3

minimum allowable temperature

minimum temperature which a valve can permanently withstand at pressures equal to or less than the allowable pressure p_s (see EN 764)

3.4

operating cycle

full motion from closed position to open position and back to closed position

3.5

type test

see EN 736-3

3.6

production test

see EN 736-3

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4 Tests and design requirements

4.1 Tests

The requirements for production and type tests shall be as given in Tables 1 to 23.

The range of valves approved on the basis of a type test shall be as given in annexes C and D.

4.2 Consideration of thermal conditions in steady state

The stress and the strength calculations shall be in accordance with the requirements of prEN 12516-1:2000, prEN 12516-2:2000 and prEN 12516-3:1999.

4.3 Consideration of thermal conditions in transient state**Table 1**

| Requirement | Production test | Type test |
|--|----------------------|--|
| <p>The valve shall be designed to take into account the thermal stresses in transient state occurring during the cool down operation.</p> <p>NOTE Thermal stresses in transient state present the following characteristics :</p> <ul style="list-style-type: none"> — they are often much larger than static pressure stresses ; — they increase with an increase in thickness of the valve body. <p>The general requirements of EN 1160 shall be observed when necessary.</p> <p>The valve design with respect to thermal stresses in transient state shall be accepted provided that the valve passes the thermal shock test.</p> | No test is required. | Thermal shock test defined in annex A (normative). |

4.4 Protection against thermal expansion of LNG

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Table 2

| Requirement | Production test | Type test |
|---|--------------------------|--------------------------|
| <p>The valve shall be designed in such a way that LNG cannot be trapped in any cavity, regardless of the position of the obturator, or an internal safety device shall be fitted to prevent the pressure from rising above the p_s.</p> <p>Under no circumstances shall LNG be allowed to be released to the atmosphere.</p> | Examination of drawings. | Examination of drawings. |

4.5 Cryogenic neck extension**Table 3**

| Requirement | Production test | Type test |
|--|----------------------|--|
| <p>The valve shall be designed so that the sealing device on the stem or the shaft, and the operating device shall remain above a minimum temperature ensuring proper operation of the valve.</p> <p>Any icing shall not hinder operation of the valve nor impair the sealing device of the stem or the shaft.</p> | No test is required. | Examination carried out during the endurance strength test defined in annex B (normative). |

4.6 Sealing devices for stem or shaft

Table 4

| Requirement | Production test | Type test |
|--|---|--|
| The sealing device shall be sufficiently distant from the body to prevent any risk of icing. | Verification that the materials and design of the valve are in conformity with those of the valve submitted to the type test. | Examination carried out during the endurance strength test defined in annex B (normative). |

4.7 Assembly of valve (with the exception of the connection to the pipework)

Table 5

| Requirement | Production test | Type test |
|---|---|---|
| <p>External sealing of the valve shall ensure leak tightness in any operating position, at both ambient temperature and minimum allowable temperature, as well as during cooling and warming operations.</p> <p>The bolting load shall be determined to take into account the relaxation of bolts occurring during the cooling down.</p> <p>Flange gaskets shall be in accordance with EN 12308.</p> <p>NOTE The relaxation is due to :</p> <ul style="list-style-type: none"> — the delay between cooling of the body and cooling of bolting ; — the difference in contraction coefficients between the metal of the body and the metal of the bolts ; — the gasket. <p>The flanges shall be designed to withstand :</p> <ul style="list-style-type: none"> — pressure stresses ; — bolting loads necessary to ensure leak tightness of the joint at both ambient and low temperatures. | Verifications that the materials and design of the valve is in conformity with those of the valve submitted to the type test. | The external leak tightness shall be confirmed during the endurance strength test defined in annex B (normative). |

4.8 Connections to the pipework

Table 6

| Requirement | Production test | Type test |
|--|--------------------------|--------------------------|
| Flanges and welding ends shall be in accordance with European Standards. | Examination of drawings. | Examination of drawings. |

4.9 External protection

Table 7

| Requirement | Production test | Type test |
|--|------------------------|----------------------|
| Passivation shall be performed after the machining, before assembly. However, the necessity of the passivation should be agreed between purchaser and supplier. The passivation is not necessary, if there exists a procedure for storage, machining and handling of austenitic stainless steel valve parts. | ASTM A380 shall apply. | No test is required. |

4.10 Pressure retaining metal parts

Table 8

| Requirement | Production test | Type test |
|---|--|--|
| <p>Materials shall be selected from the following :</p> <ul style="list-style-type: none"> — austenitic stainless steels ; — nickel steels ; — aluminium alloys ^a. <p>Metals and alloys commonly used for LNG applications shall be as listed in EN 1160.</p> <p>Other metals are permissible provided that they are capable of withstanding an operating temperature of – 196 °C.</p> <p>The impact energy K_V, measured at –196 °C in accordance with EN 10045-1, shall be greater than 60 J. For aluminium alloys, impact test is not required.</p> | Examination of the chemical analysis and mechanical test certificates. | Examination of the chemical analysis and mechanical test certificates. |
| ^a Due to the low melting temperature of aluminium alloys, if required fire safe protection system shall be provided for the valve. | | |

4.11 Electro-chemical effects

Table 9

| Requirement | Production test | Type test |
|--|--|--|
| The materials shall be carefully selected so as to prevent any formation of electrolytic coupling greater than 250 mV. | Examination of the technical data sheet. | Examination of the technical data sheet. |

5 Functional requirements and tests

5.1 General

The requirements of prEN 12266-1:1999 shall apply. In case of contradictions between prEN 12266-1:1999 and this standard, this standard prevails.

5.2 Electrical continuity

Table 10

| Requirement | Production test | Type test |
|--|----------------------|---------------------------------------|
| It is recommended that the electrical resistance between body and shaft or stem be equal to or less than 10 ohms. NOTE Permanent electrical continuity may be required between the body, the shaft or stem and the obturator. | No test is required. | Measurement of electrical resistance. |

5.3 Mechanical strength of the shell

Table 11

| Requirement | Production test | Type test |
|---|---|---|
| The shell shall withstand a minimum internal pressure of $1,5 \times p_s$ value at ambient temperature. | This test shall be carried out with liquid in accordance with the test P 10 of prEN 12266-1:1999. | This test shall be carried out with liquid in accordance with test P 10 of prEN 12266-1:1999. |

5.4 Endurance

Table 12

| Requirement | Production test | Type test |
|--|----------------------|---|
| Each new design of valve shall be subjected to an endurance test carried out with LNG or with liquid nitrogen. | No test is required. | The endurance test shall be carried out in accordance with annex B (normative). |

5.5 Fire resistance

Table 13

| Requirement | Production test | Type test |
|--|----------------------|--|
| At the request of the purchaser, a fire test shall be carried out. | No test is required. | The fire test shall be carried out in accordance with ISO 10497. |