



SLOVENSKI STANDARD

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Nadomešča:
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Armature za transport zemeljskega plina po cevovodih - Zahteve glede uporabnosti in preskušanje

Valves for natural gas transportation in pipelines - Performance requirements and tests

Armaturen für den Transport von Erdgas in Fernleitungen - Anforderungen an die Gebrauchstauglichkeit und deren Prüfung

Robinetterie pour le transport de gaz naturel par des pipelines - Exigences de performance et essais

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EUROPEAN STANDARD
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Valves for natural gas transportation in pipelines - Performance requirements and tests

Robinetterie pour le transport de gaz naturel par des pipelines - Exigences de performance et essais

Armaturen für den Transport von Erdgas in Fernleitungen - Anforderungen an die Gebrauchstauglichkeit und deren Prüfung

This European Standard was approved by CEN on 18 April 2013.

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Foreword

This document (EN 14141:2013) 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of an identical text or by endorsement, at the latest by December 2013, and conflicting national standards shall be withdrawn at the latest by December 2013.

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 14141:2003.

The main changes compared to the previous edition are listed below:

- the scope was adjusted and revised;
- Clause 5 was specified and revised;
- Clause 10 was added;
- Annexes B, F and G were added;
- entire document was editorially revised and adjusted.

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, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

EN 14141:2013 (E)**Introduction**

CEN/TC 69/WG 9 has been responsible for the development of a European performance standard of valves for use in pipelines for transportation of natural gas in accordance with EN 1594.

The significant properties of valves designed for a special application are defined by performance requirements accompanied by the description of tests to be carried out:

- by the manufacturer on the product during the manufacture; and
- by an independent accepted body on test samples for certification purposes;

to give proof that the valve meets the performance requirements of this European Standard.

A type test is included in this European Standard to satisfy the requirements of EN 1594.

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1 Scope

This European Standard applies to all valves (plug, ball, gate and check valves) used in onshore transmission pipelines for transport of natural gas in accordance with EN 1594, but with a differing temperature range according to the following three classes in accordance with EN 682:

- 1) - 10 °C to 60 °C;
- 2) - 20 °C to 60 °C;
- 3) the range stated by the purchaser for special design.

This European Standard comprises all valves which are components of the pipeline.

This European Standard specifies valves for pipelines with a maximum operating pressure (MOP) over 16 bar.

Control valves and safety valves are excluded from the scope of this European Standard.

This European Standard specifies requirements and appropriate verification tests carried out during production and for certification purposes to verify that the valves conform to the requirements. A summary of the product and type tests is given in Annex G.

This European Standard makes reference to EN 13942. All the requirements of EN 13942 should be met unless otherwise stated. Paragraphs marked with a dot [•] indicate requirements which are identical to EN 13942.

Additional national requirements and tests in accordance with individual national legal regulations not yet harmonised may be necessary and are to be advised in the purchase order.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 19, *Industrial valves - Marking of metallic valves*

EN 549, *Rubber materials for seals and diaphragms for gas appliances and gas equipment*

EN 558, *Industrial valves — Face-to-face and centre-to-face dimensions of metal valves for use in flanged pipe systems — PN and Class designated valves*

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

EN 682, *Elastomeric Seals - Materials requirements for seals used in pipes and fittings carrying gas and hydrocarbon fluids*

EN 736-1:1995, *Valves - Terminology - Part 1: Definition of types of valves*

EN 736-2:1997, *Valves - Terminology - Part 2: Definition of components of valves*

EN 736-3:2008, *Valves - Terminology - Part 3: Definition of terms*

EN 1369:2012, *Founding - Magnetic particle testing*

EN 1371-1:2011, *Founding - Liquid penetrant testing- Part 1: Sand, gravity die and low pressure die castings*

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EN 1435:1997, *Non-destructive examination of welds — Radiographic examination of welded joints*

EN 1503-1, *Valves - Materials for bodies, bonnets and covers - Part 1: Steels specified in European Standards*

EN 1503-2, *Valves - Materials for bodies, bonnets and covers - Part 2: Steels other than those specified in European Standards*

EN 1515-1, *Flanges and their joints - Bolting - Part 1: Selection of bolting*

EN 1515-2, *Flanges and their joints - Bolting - Part 2: Classification of bolt materials for steel flanges, PN designated*

EN 1594, *Gas supply systems - Pipelines for maximum operating pressure over 16 bar - Functional requirements*

EN 10204:2004, *Metallic products - Types of inspection documents*

EN 10228-1:1999, *Non-destructive testing of steel forgings - Part 1: Magnetic particle inspection*

EN 10228-2:1998, *Non-destructive testing of steel forgings - Part 2: Penetrant testing*

EN 10228-3:1998, *Non-destructive testing of steel forgings - Part 3: Ultrasonic testing of ferritic or martensitic steel forgings*

EN 10228-4, *Non-destructive testing of steel forgings - Part 4: Ultrasonic testing of austenitic and austenitic-ferritic stainless steel forgings*

EN 12266-1:2012, *Industrial valves - Testing of metallic valves - Part 1: Pressure tests, test procedures and acceptance criteria - Mandatory requirements*

EN 12516-1, *Industrial valves - Shell design strength - Part 1: Tabulation method for steel valve shells*

EN 12516-2, *Industrial valves - Shell design strength - Part 2: Calculation method for steel valve shells*

EN 12516-3, *Valves - Shell design strength - Part 3: Experimental method*

EN 12517-1:2006, *Non-destructive testing of welds - Part 1: Evaluation of welded joints in steel, nickel, titanium and their alloys by radiography - Acceptance levels*

EN 12627:1999, *Industrial valves - Butt welding ends for steel valves*

EN 12681, *Founding - Radiographic examination*

EN 12982, *Industrial valves - End-to-end and centre-to-end dimensions for butt welding end valves*

EN 13942:2009, *Petroleum and natural gas industries - Pipeline transportation systems - Pipeline valves (ISO 14313:2007 modified)*

EN ISO 148-1, *Metallic materials - Charpy pendulum impact test - Part 1: Test method (ISO 148-1)*

EN ISO 5210, *Industrial valves - Multi-turn valve actuator attachments (ISO 5210)*

EN ISO 5211, *Industrial valves - Part-turn actuator attachments (ISO 5211)*

EN ISO 9712:2012, *Non-destructive testing - Qualification and certification of NDT personnel (ISO 9712:2012)*

EN ISO 10497, *Testing of valves - Fire type-testing requirements (ISO 10497)*

EN ISO 11666:2010, *Non-destructive testing of welds - Ultrasonic testing - Acceptance levels (ISO 11666:2010)*

EN ISO 17637, *Non-destructive testing of welds - Visual testing of fusion-welded joints (ISO 17637)*

EN ISO 17638, *Non-destructive testing of welds - Magnetic particle testing (ISO 17638)*

EN ISO 17640:2010, *Non-destructive testing of welds - Ultrasonic testing - Techniques, testing levels, and assessment (ISO 17640:2010)*

EN ISO 23277:2009, *Non-destructive testing of welds - Penetrant testing of welds - Acceptance levels (ISO 23277:2006)*

EN ISO 23278:2009, *Non-destructive testing of welds — Magnetic particle testing of welds — Acceptance levels (ISO 23278:2006)*

MSS-SP-55-2006¹⁾, *Quality standard for steel castings for valves, flanges and fittings and other piping components (visual method for evaluation of surface irregularities)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 736-1:1995, EN 736-2:1997, EN 736-3:2008 and EN 13942:2009 and the following apply.

3.1

full opening valve [•]

valve with an unobstructed opening capable of allowing a sphere or other internal devices of the same nominal size as the valve to pass

3.2

maximum pressure differential [•] (MPD)

maximum difference between the upstream and downstream pressure across the obturator at which the obturator may be operated

3.3

reduced-opening valve [•]

valve with the opening through the obturator smaller than at the end connection(s)

3.4

seating surfaces [•]

contact surfaces of the obturator and seat which ensure valve sealing

3.5

stem [•]

part that connects the obturator to the operator and which may consist of one or more components

Note 1 to entry: This definition applies also for shafts.

3.6

test report

¹⁾ Developed and approved by the Manufacturers Standardization Society of the Valve and Fittings Industry, Inc. 127 Park Street, NE, Vienna, Virginia 22180.

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written statement comprising the results of the particular tests for the evaluation of the conformity of a range of valves to this European Standard

3.7**type test**

test carried out on one or more valves representative of the design and the manufacturing process to confirm conformance of the manufactured valves with specified requirements

Note 1 to entry: A range may include valves of the same design, the same material group and the same manufacturing method but with different size designations and different allowable pressures.

3.8**type test certification**

granting of a certificate by an independent accepted body to prove the conformity of a range of valves with a standard

3.9**piggability [•]**

capability of a valve to permit the unrestricted passage of a pig

4 Functional requirements**4.1 Travel stops**

[•] Travel stops shall be provided on the valve and/or operator and they shall locate the position of the obturator in the open and closed position. The travel stops shall not affect the sealing capability of the valve.

They shall not shift unintentionally. In case of lever operated valves, the travel stop shall be independent from the lever.

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4.2 Position of the obturator

[•] Except for check valves, the position of the obturator shall not be altered by the dynamic forces of the passing flow or in the case of screw operated gate valves by forces generated from internal pressure.

4.3 Protection of exposed stems and shafts

[•] Extended and exposed stems and shafts of valves shall be protected against dust by a stem extension casing.

4.4 Piggability

Valves for transmission pipelines shall be piggable unless otherwise agreed and shall conform to the definition of the full opening valve (3.1). The dimensions for the smallest full opening valve diameter are given in EN 13942:2009, Table 1.

4.5 Lifting lugs

[•] Valves of size DN 200 (NPS 8) and larger shall be provided with lifting points, unless otherwise agreed. The manufacturer shall verify suitability of the lifting points. If the valve manufacturer is responsible for the supply of the valve and operator assembly, the valve manufacturer shall verify the suitability of the lifting points for the complete valve and operator assembly.

If the purchaser is responsible for the supply of the operator assembly, the purchaser shall provide adequate information to enable the manufacturer to verify the suitability of the lifting points for the complete assembly.

NOTE Regulatory requirements can specify special design, manufacturing and certification of lifting points.

4.6 Additional requirements

The purchaser may require additional requirements for special conditions, see Annex F.

5 Requirements and tests

5.1 Design

5.1.1 Shell

Requirement	Verification on product	Type test
<p>The design and dimensions of the valves shall be such as to withstand safely all stresses occurring under operating conditions. The shell design shall meet the requirements of EN 12516-1 or EN 12516-2 or EN 12516-3. Alternatively the requirements of other internationally recognised design codes or standards as per EN 13942 shall be met.</p> <p>NOTE The tabulation method according to EN 12516-1 is similar in approach to ASME B16.34 in that the designer can look up the required minimum wall thickness dimension of the valve body from a table.</p>	<p>The manufacturer shall document the design validation of the valve and shall make it available for evaluation and approval on request.</p>	<p>Design approval in accordance with A.4.3, respectively Annex E.</p>

5.1.2 End-to-end dimensions

Requirement	Test on product	Type test
<p>End-to-end dimensions of flanged and butt welding valves shall conform to EN 13942 or EN 558 or EN 12982. In case of EN 558 or EN 12982 the purchaser shall indicate the series to be supplied.</p>	<p>Dimensional check.</p>	<p>Test in accordance with A.4.3.</p>

5.1.3 Butt welding ends

Requirement	Test on product	Type test
<p>Weld end details and thickness shall be in accordance with EN 12627:1999, Figures 2, 3, 4 and 5.</p> <p>The length of the butt end shall be sufficient to allow welding without damage of the internal parts of the valve. The valve supplier shall specify the maximum acceptable welding temperature. Where this cannot be achieved, use extension of pipe section (minimum length 50 mm + 4 × s).</p>	<p>Dimensional check on drawing and product.</p>	<p>Drawing examination in accordance with A.4.3.</p>

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5.1.4 Anti-blow-out feature

Requirement	Test on product	Type test
[•] Valves shall be designed with a stem anti-blow out device to prevent stem ejection by internal pressure when the stem packing and/or retainer has been removed.	Drawing examination.	Drawing examination in accordance with A.4.3.

5.1.5 Sealant injection systems

Requirement	Test on product	Type test
<p>The sealing injection system shall be provided for seats and/or stem if specified by the purchaser.</p> <p>If a sealant injection system is provided, it shall be equipped with:</p> <ul style="list-style-type: none"> — a check valve located on the body at each injection point; — a universal giant button head fitting \varnothing 22 mm to connect sealant injection gun. 	Drawing examination.	Drawing examination.
<p>The seat sealant injection system shall be capable of distributing sealant uniformly around the seats.</p>	<p>SIST EN 14141:2013 https://standards.iteh.ai/catalog/standards/sist/4fa523d2-4404-4a91-b013-75d32c7cbc53/sist-en-14141-2013</p>	<p>Type test is applicable only to ball valves. A trial sealant injection is performed and the valve inspected to confirm adequate delivery and even distribution of sealant.</p> <p>The test is conducted on a closed valve with 50 % maximum differential pressure applied using a sealant recommended by the manufacturer. The valve should be inspected to determine distribution. The sealant should form a continuous ring on the surface of the obturator.</p>

5.1.6 Extended drain, vent and sealant lines

Requirement	Type test	Test on product
[•] Drain, vent and sealant lines shall be provided if specified and shall be extended by means of rigid pipework, if necessary. The lines shall be fastened to the valve and/or extensions and terminate close to the stem extension top works, by agreement.	Drawing examination.	<p>Drawing examination.</p> <p>Hydraulic pressure test at 1,5 times the rated pressure of the valve. The test may be conducted as a part of valve shell test or as a test of the preassembled pipework</p> <p>The welded connection to the valve body shall be inspected according to 5.5.2.</p>
[•] Drain and vent lines shall:		
1) have a design pressure not		

Requirement	Type test	Test on product
<p>less than the rated pressure of the valve on which they are installed;</p> <p>2) be capable of withstanding the hydrostatic shell test pressure of the valve;</p> <p>3) be designed in accordance with a recognised design code;</p> <p>4) be suitable for blow-down operation, where applicable.</p> <p>Sealant lines shall have a design pressure not less than the greater of the pipeline valve rated pressure and the injection pressure.</p> <p>The purchaser should specify the injection pressure or the pipe for use. If not specified by the purchaser, the manufacturer shall advise the maximum injection pressure for the system. The size of the sealant lines shall be by agreement. Prior to assembly, the internal bores of sealant lines shall be clean and free from rust and any foreign particles.</p> <p>Drain and vent connections on valves:</p> <p>1) They shall be fitted with at least one isolating valve;</p> <p>2) Connection to the valve body shall be welded;</p> <p>3) Connection to the first valve shall be welded;</p> <p>4) Minimum pipe size shall be as follows:</p> <ul style="list-style-type: none"> — DN ≤ 100 – DN 15 (½") drain; — DN 150 + 200 – DN 20 (¾") drain; — DN ≥ 250 – DN 25 (1") drain. <p>Each sealant injection line</p> <ul style="list-style-type: none"> — shall be welded to the valve body; — shall incorporate a check valve at the point of connection to the valve body; — shall incorporate an isolating valve; — shall terminate in a giant button head fitting 		