SLOVENSKI STANDARD
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Industrijski ventili - Ventili za kemično in petrokemično procesno industrijo - Zahteve in preskusi

Industrial valves - Valves for chemical and petrochemical process industry - Requirements and tests

Industriearmaturen - Armaturen für die chemische und petrochemische Verfahrensindustrie - Anforderungen und Prüfungen

Robinetterie industrielle - Appareils de robinetterie destinés aux procédés de l'industrie chimique et pétrochimique - Prescriptions et essais

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Industrial valves - Valves for chemical and petrochemical process industry - Requirements and tests

Robinetterie industrielle - Appareils de robinetterie destinés aux procédés de l'industrie chimique et pétrochimique - Prescriptions et essais

Industriearmaturen - Armaturen für die chemische und petrochemische Verfahrensindustrie - Anforderungen und Prüfungen

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

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European foreword

This document (prEN 12569:2019) has been prepared by Technical Committee CEN/TC 69 “Industrial valves”, the secretariat of which is held by AFNOR.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 12569:1999.[1]

This second edition will supersede EN 12569:1999, which has been technically revised with the following changes:

— a Clause 3 for terms, definitions and symbols has been added;

— Clause 5 on the applicable requirements has been completely re-written;

— a normative Annex A on supplementary possible steel grades for fasteners and a normative Annex B for threaded holes for pneumatic connections have been added;

— an informative Annex C giving basic configuration of the valve interface from actuator to the valve with a bracket has been added.

[1] The corrigendum EN 12569:1999/AC:2000 which impacted EN 12569:1999 will be closed as well.

Introduction

This document is based on the experience of the chemical and petrochemical industry and provides requirements additional to those given in EN 16668 and valve product standards.

It is assumed that the essential safety requirements of the European legislation for pressure equipment (satisfied by European product standards) and safety requirements from EN 16668 and other standards are satisfied.

1 Scope

This document applies to valves of DN 15 and larger, made of metallic materials for chemical and petrochemical plants. It contains additional requirements to those contained in the relevant European product standards (e.g. EN 593, EN 1349) and EN 16668.

The use of design codes or technical rules other than described by European product standards are subject to agreement with the purchaser.

Process control devices and safety accessories are not subject of this document.

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 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 593, *Industrial valves – Metallic butterfly valves for general purposes*

EN 736-2:2016, *Valves – Terminology – Part 2: Definition of components of valves*

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

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

EN 1267, *Industrial valves – Test of flow resistance using water as test fluid*

EN 1349, *Industrial process control valves*

EN 1515-4, *Flanges and their joints – Bolting – Part 4: Selection of bolting for equipment subject to the Pressure Equipment Directive 97/23/EC*

EN 1563, *Founding – Spheroidal graphite cast irons*

EN 1759 (all parts), *Flanges and their joint – Circular flanges for pipes, valves, fittings and accessories, Class designated*

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

EN 10269, *Steels and nickel alloys for fasteners with specified elevated and/or low temperature properties*

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

EN 12266-2:2012, *Industrial valves – Testing of metallic valves – Part 2: Tests, test procedures and acceptance criteria – Supplementary requirements*

EN 12351, *Industrial valves – Protective caps for valves with flanged connections*

EN 14917, *Metal bellows expansion joints for pressure applications*

EN 15081, *Industrial valves – Mounting kits for part-turn valve actuator attachment*

EN 16668:2016+A1:2018, *Industrial valves – Requirements and testing for metallic valves as pressure accessories*

EN 60534-4:2006, *Industrial-process control valves – Part 4: Inspection and routine testing (IEC 60534-4:2006)*

EN ISO 1179-1, *Connections for general use and fluid power – Ports and stud ends with ISO 228-1 threads with elastomeric or metal-to-metal sealing – Part 1: Threaded ports (ISO 1179-1)*

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

EN ISO 5211:2017, *Industrial valves – Part-turn actuator attachments (ISO 5211:2017)*

EN ISO 15848-1:2015, *Industrial valves – Measurement, test and qualification procedures for fugitive emissions – Part 1: Classification system and qualification procedures for type testing of valves (ISO 15848-1:2015)*

3 Terms, definitions and symbols

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 736-2, EN 736-3, EN 1267, EN 16668 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— IEC Electropedia: available at http://www.electropedia.org/

— ISO Online browsing platform: available at http://www.iso.org/obp

3.1.1
shell tapping
threaded hole in the wall of the shell

[SOURCE: EN 736-2:2016, 3.1.1.23]

3.1.2
fugitive emission
chemical or mixture of chemicals, in any physical form, which represents an unanticipated or spurious leak from equipment on an industrial site

[SOURCE: EN ISO 15848-1:2015, 3.5]

3.1.3
sound engineering practice
SEP
design taking into account all relevant factors influencing safety

3.1.4
anti-blow out design
valve design which ensures that, when the valve is under pressure, the shaft or stem cannot be fully blown out of the shell by disassembly of any external part or by failure of the connection between obturator and shaft or stem even when external parts (which are not included in the bare shaft valve, e.g. bracket, lever, actuator) are removed

[SOURCE: EN 736-3:2008, 3.3.7, modified]

3.2 Symbols

Symbols and units are given in Table 1.

Table 1 — Symbols and units

Symbol	Denomination	Unit
ρ	Liner density	g/cm^3

4 Category of valves

Classification of valves shall be carried out as stated in EN 16668. Unless otherwise agreed, valves shall always be classified for gaseous fluids of Fluid Group 1 (to ensure universal use of the components).

Valves like condensate traps and pressure controllers that are used exclusively for steam and steam condensate service shall be classified in Fluid Group 2.

If the result of the categorization is not I, II or III, SEP applies.

5 Requirements

5.1 Design

5.1.1 General

5.1.1.1 For threaded holes for pneumatic connections, all threads shall be G-threads, see Annex B.

5.1.1.2 The individual parts of the components shall be manufactured in such a way as to ensure their interchangeability for components of the same make, same type, same design status and the same nominal size.

5.1.1.3 In the absence of requirements, the performance of the bellows shall be qualified by a type test. This type test shall be in accordance with EN ISO 15848-1 with its numbers of mechanical cycles for a defined level of the valve (to which the bellow is fitted). Furthermore, each bellow shall pass a proof test as per EN 14917, where the substitution of batch-related tests on the basis of statistical test results is not permitted.

The fatigue life depending on the maximum stress range to which a bellow is exposed during the entire service life shall be specified in the bellow documentation being considered as integrated part of the valve manufacturer documentation.

Flooded bellows in manually operated valves up to PN 40 for process application shall be designed for 20 000 full strokes at least. As an option, at least 5 000 full strokes are subject to agreement.

Flooded bellows in manually operated valves higher than PN 40 for process application shall be designed for 2 500 full strokes at least.

5.1.1.4 Spindle seals (e.g. bellows and diaphragms) which are designed for increased tightness requirements (e.g. to avoid fugitive emissions into the atmosphere) and are considered as primary seals shall, unless otherwise agreed, be provided with a secondary seal in the event of unforeseen damage to the primary seal.

5.1.1.5 Concerning the sizing of the operating mechanism, EN 593 shall apply in the absence of requirements.

If stated by the purchaser, it is allowed to size an actuator based on a reduced differential pressure taking into account the effect of the hydraulic torque.

5.1.1.6 Concerning flow characteristics, EN 593 shall apply in the absence of requirements. The face-to-face lengths of valves shall conform to EN 558, unless agreed otherwise.

5.1.1.7 On all components where an electrically conductive connection to the piping line cannot be ensured for installation-specific reasons (e.g. wafer-style valves), suitable engineering measures (e.g. a pocket hole with internal threading in the shell) shall be provided to ensure proper discharge of any developing electrostatic charges to the piping line.

Durable protection against electrostatic charging shall be ensured.

The discharge resistance between any part of the component (including attachments) and the piping line shall be affirmed < 10 Ohm for metallic components and < 10^6 Ohm for plastic-lined metallic components.

In oil and grease-free design, special cleanliness requirements shall be a separate subject to agreement.

5.1.1.8 For valves classified in SEP, the relevant requirements of this document shall be considered in addition.

5.1.1.9 All screwed connections, e.g. body/cover connections or screwed in parts of valves, shall be properly secured (e.g. by mechanical / contact friction or locking) against accidental loosening.

Screwed body/cover connections that rely on the thread to seal are not acceptable.

5.1.1.10 The valve shall be designed so that the risk of media induced crevice corrosion is avoided.

5.1.1.11 Gaskets of the shell shall be radially retained against the pressure. In case of body bonnet joints up to and including PN 25 (or Class 150) valves it is not mandatory.

Spiral wound gaskets sealing the body/cover connection shall be fully retained or provided with outer and inner guide rings.

The sealing face of spiral wound gaskets and metallic ring-joint gaskets shall not be interrupted by bolts, rings, etc.

5.1.1.12 Flange bolting shall not be used to compensate pipe stresses.

5.1.1.13 The design of the valve shall allow, with or without an intermediate part, mounting of a pneumatic, hydraulic or electric actuator complying with EN ISO 5210 (multi-turn valve actuators) or EN ISO 5211 (part-turn actuators).

5.1.1.14 Manually operated valves shall normally be closed by turning the handwheel or lever in a clockwise direction when facing the handwheel or lever.

If anti-clockwise closing is ordered, this shall be specified and marked on the operating element.

5.1.2 Shell design strength

The requirements in accordance with EN 16668 and existing product standards shall be fulfilled.

Shutoff valves and control valves shall have no shell tapping, unless otherwise specified.

5.1.3 Protection against exceeding the allowable limits

The requirements in accordance with EN 16668:2016+A1:2018, 5.1.3 and existing product standards shall be fulfilled.

5.1.4 Connection to the drive

Where a connecting flange is specified for actuators as per EN ISO 5210 or EN ISO 5211, the design and type of execution shall be agreed between the manufacturer and the purchaser.

The connection between the valve body and the gearbox or actuator shall be vented such that any product leakage from the stem or shaft cannot penetrate into the gearbox or actuator housing.

Mounting of pneumatic part-turn actuators on valves shall be done in accordance with EN 15081. The preferred design is mentioned in Annex C.

5.1.5 Additional requirements for butterfly valves, ball and plug valves

5.1.5.1 Ease of recognition of valve position

On butterfly valves, ball and plug valves, the position of the hand lever or indicating means shall unequivocally indicate the valve open and closed positions. The design of the indicating means shall be such that its components cannot be assembled to falsely indicate the valve open or closed position. When the valve is open, the lever shall point in the direction of the piping line; when the valve is closed, it shall point in the direction normal to the piping line. Any other arrangement of the manual lever or indicating means shall be reliably ruled out.

The position of the valve in the installed condition shall also be clearly recognizable when the manual lever or mechanical actuator (manual gearbox, pneumatic or electrical actuator) has been removed. The same shall apply to the position indication of multi-way valves and their stem extensions.

On shutoff valves, the removal of the hand lever or the external actuator is prohibited under pressurized service conditions. A corresponding caution note shall be included in the operating manual.

The shaft and actuator shall indicate the same position of the sealing element, regardless of the accessories used (e.g. stem extension).

After assembly, the position of actuators and gearboxes relative to the valve shall be physically marked in order to avoid incorrect re-assembly during maintenance.

5.1.5.2 Dead space venting in ball and plug valves

Where dead space venting is specified, the type of execution shall be agreed between the manufacturer and the purchaser.

5.1.6 Strength of valve stem and shaft

The weakest point of the valve stem or shaft shall always be located outside the pressure-bearing valve body.

The following data, expressed in Nm, shall be indicated by the valve manufacturer for actuator sizing:

a) breakaway torque (for opening and closing);

b) maximum allowable torque of shaft or stem load.

The following criteria shall be observed:

— for shutoff valves, the differential pressure shall be taken as the nominal pressure;

— dry (unlubricated);