SLOVENSKI STANDARD
SIST EN 1074-1:2001

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Ventili za oskrbo z vodo - Zahteve za ustreznost in ustrezni preskusi - 1. del: Splošne zahteve

Valves for water supply - Fitness for purpose requirements and appropriate verification tests - Part 1: General requirements

Armaturen für die Wasserversorgung - Anforderung an die Gebrauchlichkeit und deren Prüfung - Teil 1: Allgemeine Anforderungen

Robinetterie pour alimentation en eau - Prescriptions d'aptitude a l'emploi et vérifications s'y rapportant - Partie 1: Prescriptions générales

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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.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
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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of an identical text or by endorsement, at the latest by October 2000, and conflicting national standards shall be withdrawn at the latest by October 2000.

It consists of six parts:

Part 1: General requirements

Part 2: Isolating valves

Part 3 Check valves

Part 4: Air valves

Part 5: Control valves

Part 6: Hydrants

Part 1, in conjunction with the subsequent parts, lays down the general requirements and test procedures to be carried out in production and during the assessment of conformity of these valves (type tests). The detailed requirements, which depend on the types of valves, are defined in parts 2 to 6 of this standard.

The annexes A, B, C, D and E of this European standard are normative.

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.

Introduction

In respect of potential adverse effects on the quality of water intended for human consumption caused by the product covered by this standard:

1) this standard provides no information as to whether the product may be used without restriction in any of the Member States of the EU or EFTA;

2) it should be noted that, while awaiting the adoption of verifiable European criteria, existing national regulations concerning the use and/or the characteristics of this product remain in force.

1 Scope

This European Standard defines the minimum fitness for purpose requirements for valves to be used in, or connected to, water supply pipe systems, above or below ground (see EN 805), carrying water intended for human consumption.

This standard specifies the general design requirements, the performance requirements and the conformity assessment method for valves, whatever their type and materials.

This standard deals with the requirements that are common to several types of valves; it is applicable only when quoted as reference in one of the other parts of this standard.

2 Normative references

This European Standard incorporates, by dated or undated references, 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 558-1, *Industrial valves -– Face-to-face and centre-to-face dimensions of metal valves for use in flanged pipe systems - Part 1: PN - designated valves.*

EN 681-1, *Elastomeric seals - Material requirements for pipe joint seals used in water and drainage applications - Part 1: Vulcanised rubber.*

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

EN 1092-2, *Flanges and their joints - Circular flanges for pipes, valves, fittings and accessories, PN designated - Part 2: Cast iron flanges.*

EN 1333, *Pipework components - Definition and selection of PN.*

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

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

EN 45012, *General requirements for bodies operating assessment and certification/registration of quality systems (ISO/IEC Guide 62:1996).*

EN 60529, *Degrees of protection afforded by the shells (IP code).*

prEN 19:1999, *Industrial valves – Marking.*

EN 805, *Water supply - Requirements for systems and components outside buildings.*

prEN 1092-1:1997, *Flanges and their joints - Circular flanges for pipes, valves, fittings and accessorie - PN designated - Part 1: Steel flanges.*

prEN 1092-3:1994, *Flanges and their joints - Circular flanges for pipes, valves, fittings and accessories - Part 3: Copper alloy and composite flanges, PN designated.*

prEN 1092-4:1995, *Flanges and their joints - Circular flanges for pipes, valves, fittings and accessories, PN designated - Part 4: Aluminium alloy flanges.*

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

EN ISO 6708, *Pipework components - Definition and selection of DN (nominal size) (ISO 6708:1995).*

EN ISO 9002, *Quality systems - Model for quality assurance in production, installation and servicing (ISO 9002:1994).*

ISO TR 9080, *Thermoplastics pipes for the transport of fluids - Methods of extrapolation of hydrostatic stress rupture data to determine the long-term hydrostatic strength of thermoplastics pipe materials.*

3 Definitions

For the purpose of this standard, the following definitions apply:

3.1 maximum operating torque (MOT): Higher limit fixed for the torque which, when applied at the entrance point of the mechanical energy, will operate the valve and ensure compliance with the required leakage rate.

3.2 minimum strength torque (mST): Lower limit fixed for the torque which, when applied at the entrance point of the mechanical energy, with the obturator either totally open or totally closed, causes no alteration to the functional capability of the valve.

3.3 entrance point of the mechanical energy: Point where the load (torque) is applied in order to open or close the valve obturator in its delivery condition; it may be the end of the stem, or the input shaft of the reducer when the reducer is an integral part of the valve.

3.4 type test: Test to prove that the design meets the corresponding performance requirements.

3.5 operating mechanism: Mechanism which translates the motion of the operating device to the motion of the obturator (EN 736-2).

3.6 operating device: Manual or power operated device used to operate the bare valve (EN 736-2).

3.7 operating element: Component of the operating device by which the mechanical power is introduced (EN 736-2).

3.8 DN: Alphanumeric designation of the size of pipework components used for reference purposes. It comprises the letters DN followed by a dimensionless round number which is loosely related to the effective dimensions, in millimetres, of the bore or external diameter of the end connections (EN ISO 6708).

3.9 PN: Alphanumeric designation used for reference purposes and related to a combination of mechanical and dimensional characteristics of a component of a pipe system. It comprises the letters PN followed by a dimensionless number (EN 1333).

3.10 PFA, allowable operating pressure: Maximum hydrostatic pressure that a component is capable of withstanding continuously in service (EN 805).

3.11 PMA, maximum allowable pressure: Maximum pressure occurring from time to time, including surge, that a component is capable of withstanding in service (EN 805).

3.12 PEA, allowable site test pressure: Maximum hydrostatic pressure that a newly installed component is capable of withstanding for a relatively short duration, in order to ensure integrity and tightness of the pipeline (EN 805).

4 Design requirements

4.1 Materials

4.1.1 Components and coating materials

Components and coating materials shall be selected from those conforming to the relevant standards, if any; they shall also conform to 4.9, 4.10 and 4.11, alone or in combination with coating materials.

4.1.2 Elastomers

Elastomers shall comply with EN 681-1 and also, with the requirements of clause 4.9.

4.2 DN

DN's shall be selected from those given in EN 805, with an upper limit of DN 2000. The manufacturer shall indicate whether the DN's are from the DN/ID series or from the DN/OD series.

4.3 Pressures

Valves intended for water systems come under the PN designation and shall be designed in such a way that their characteristic pressures PFA, PMA and PEA, conform to table 1 for the corresponding PN (see also 4.4).

Table 1 - Pressures

PN	PFA [a] bar	PMA [a] bar	PEA [b] bar
6	6	8	12
10	10	12	17
16	16	20	25
25	25	30	35

[a] PFA and PMA apply to valves in all positions from fully closed to fully open.
[b] PEA only applies to valves not in the closed position.

Table 1 gives minimum values of PMA and PEA. The manufacturer's catalogues can indicate higher values on the condition that the requirements of this standard have been verified with these higher values. In this case, PEA shall be not less than either 1,5 PMA or (PMA + 5) bar whichever is the minimum.

4.4 Temperatures

Valves shall be designed for service temperatures from 0°C (excluding frost) to 40°C and for storage temperatures between -20°C and 70°C. For valves made from materials with temperature-dependent mechanical behaviour, the pressures PFA, PMA and PEA shall be established at 20°C and, if applicable, a derating factor (temperature/pressure table) for higher temperatures shall be given by the product standards and/or the manufacturer.

4.5 Design of the shell and obturator

Valves shall be designed so as to ensure a safety factor against short term and long term shell and obturator rupture, taking account of PFA, PMA and PEA given in 4.3. This requirement shall not preclude any of the performance requirements under clause 5.

The design shall be carried out:

- either by a calculation method, using the tensile strength of the material (as defined in the relevant material standards) divided by a safety factor; for materials with time-dependent mechanical behaviour (such as plastic materials), the tensile strength shall be the 20°C fifty year extrapolated minimum strength obtained from pressure tests on injection moulded or extruded pipes subjected to constant hydrostatic pressure at various temperatures and for different lengths of time in accordance with ISO TR 9080;

- or by an experimental method, by means of pressure tests on valve shells subjected to a constant hydrostatic pressure equal to PMA times a safety factor; for materials with time-dependent mechanical behaviour (such as plastic materials), the test pressure shall be further multiplied by a coefficient specific to each material in order to take account of its fifty year extrapolated minimum strength and of the slope of its strength regression line.

4.6 End types and interchangeability

Valves can be designed with various types of end connections adapted to specific pipe systems; the connections shall fulfil the standardized requirements of the relevant pipe systems.

In order to ensure interchangeability of flanged valves, their face-to-face or centre-to-face dimensions shall be in accordance with EN 558-1 and their flanges with prEN 1092-1:1997, EN 1092-2, prEN 1092-3:1994 or prEN 1092-4:1995 (depending on the flange material). In the case of steel valves with welding ends, the end-to-end and centre-to-end dimensions shall be in accordance with EN 12982 and the welding ends dimensions to EN 12627.

4.7 Operating direction

For valves with an operating mechanism, the preferred direction of closure is clockwise.

Valves, other than service connection valves with DN smaller than DN 50, designed for anti-clockwise closure, shall be marked to indicate the closing direction.

4.8 Maximum water velocity

Valves shall be designed for water flow velocities which can reach the values given in table 2 in steady flow conditions.

Table 2 - Maximum water velocity

PFA bar	Flow velocity m/s
6	2,5
10	3
16	4
25	5

4.9 All materials, including lubricants, in contact with water intended for human consumption

Under the usage conditions defined in this standard, all materials including lubricants in contact with water intended for human consumption shall not affect its organoleptic, physico-chemical and microbiological characteristics as defined in the National Regulations in force in the country of use.

4.10 Internal corrosion and ageing resistance

Under the usage conditions defined in this standard, all internal surfaces which are in continuous contact with the water in the pipeline shall be resistant to corrosion and ageing by the selection of materials or shall be protected by appropriate means.

4.11 External corrosion and ageing resistance

Under the usage conditions defined in this standard, all external surfaces of the valve (including bolts) which are in continuous contact with the surrounding soil, water or atmosphere shall be resistant to corrosion and ageing by the selection of materials, or shall be protected by appropriate means.

5 Performance requirements

5.1 Mechanical strength

5.1.1 Resistance to internal pressure of the shell and of all pressure containing components

The valves shall withstand without damage, an internal pressure equal to the higher of the two values: PEA or 1,5 x PFA.

When, in order to verify this requirement, a valve in its delivery state is tested in accordance with the test method given in annex A, there shall be no visually detectable external leakage and no other sign of defect.

5.1.2 Resistance of the obturator to differential pressure

The valves in the closed position shall withstand without damage a differential pressure applied to the obturator equal to the lower of the two values: 1,5 x PFA or PFA + 5. If the PMA indicated for the valves is higher than this value, the differential pressure applied shall be equal to PMA.

When, in order to verify this requirement, a valve in its delivery state is tested according to the test method given in annex B, it shall pass the seat tightness test given in 5.2.2 and the operating test given in 5.2.3.

5.1.3 Resistance of the valves to bending

Valves which are designed to be rigidly connected at both ends to adjacent pipes, excluding wafer type valves, shall withstand the stresses transmitted to them without sustaining any deformation likely to alter their functional capabilities beyond the limits specified in other parts of this standard.

When, in order to verify this requirement, a valve in its delivery state is tested according to the test method given in annex C with a bending moment *M*, given in the relevant part of this standard at a differential pressure across the obturator equal to PFA, it shall, under the bending test load:

- show no visually detectable external leakage;
- exhibit a leakage rate at the obturator (see 5.2.2) not higher than that immediately above the seat leakage rate specified for new valves (e.g., rate B if the specified rate is rate A).

5.1.4 Resistance of valves to operating loads

Valves having a mechanically operated obturator shall withstand, in the fully open and in the fully closed positions, the minimum strength torque (mST) without any damage likely to impair their functional capabilities beyond the limits specified in other parts of this standard.

The test method, the torques (mST) to be applied and the acceptance criteria shall be those given in the other parts of this standard.

5.2 Leak-tightness

5.2.1 Leak-tightness of the shell and of all pressure containing components

5.2.1.1 Leak-tightness to internal pressure

The valves shall be leak-tight under an internal water pressure equal to the higher of the two values: PEA or 1,5 x PFA.

When, in order to verify this requirement, a valve in its delivery state is subjected to a water pressure test in accordance with 5.1.1, or to an air pressure test at 6 bar according to prEN 12266-1:1999, there shall be no visually detectable leakage.

NOTE: Air testing is applicable only when pressure vessel regulations permit.

5.2.1.2 Leak-tightness to external pressure

Valves shall be leak-tight to ingress of air, water or any foreign matter.

When, in order to verify this requirement, a valve in its delivery state is tested in accordance with the test method given in annex D, any variation of pressure during the test shall not exceed 0,02 bar.

5.2.2 Seat tightness

5.2.2.1 Seat tightness at high differential pressure

The seat of valves in the fully closed position shall be leak-tight within a defined leakage rate, selected from rates A to F of prEN 12266-1:1999 in accordance with the other parts of this standard; the required leakage rate shall be given in the manufacturer's technical data.

When, in order to verify this requirement, a valve in its delivery state is subjected to a test in accordance with A.4 of prEN 12266-1:1999 under a differential pressure equal to 1,1 x PFA for water, or 6 bar for air, the measured leakage rate shall not exceed the defined leakage rate.

5.2.2.2 Seat tightness at low differential pressure

Requirement shall be in accordance with 5.2.2.1; test according to 5.2.2.1 but under a differential water pressure of 0,5 bar.

5.2.3 Maximum operating torque (MOT) for operation and leak-tightness

Valves having a mechanically operated obturator shall be capable of being opened or closed and made leaktight by application of torques which are compatible with the operating element (lever, handwheel) with which they are equipped or with operating keys generally used for buried valves.

The maximum operating torques (MOT) and the test method to verify conformance with this requirement shall be those given in other parts of this standard.

5.2.4 Leak-tightness of gearboxes to external pressure

Mechanical gearboxes likely to be immersed, shall be designed to avoid any water ingress. They shall be in accordance with EN 60529, class IP 68, with immersion under 3m head of water for 3h.

5.3 Hydraulic or airflow characteristics

The hydraulic or airflow characteristics of the valves shall be given in the manufacturer's catalogues and shall be in accordance with the other parts of this standard.