SLOVENSKI STANDARD
oSIST prEN 16767:2019

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Industrijski ventili - Kovinski protipovratni ventili

Industrial valves - Metallic check valves

Industriearmaturen - Rückflussverhinderer aus Gusseisen und Stahl

Robinetterie industrielle - Clapets de non-retour métalliques

Ta slovenski standard je istoveten z: **prEN 16767**

ICS:

23.060.50	Blokirni ventili	Check valves

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Industrial valves - Metallic check valves

Industriearmaturen - Rückflussverhinderer aus Gusseisen und Stahl

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 69.

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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 16767:2018) 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 16767:2016.

This document has been prepared under a standardization request given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For relationship with EU Directive, see informative Annex ZA, which is an integral part of this document.

The main changes are the following:

— inclusion of copper alloy check valves (in Clause 1, in a new 4.2.2.3 and in 4.2.3);

— inclusion of a reference to EN 1092-2 in 4.2.2.2;

— addition of informative Annex B giving the correspondence between DN and NPS;

— update of Annex ZA according to Directive 2014/68/EU.

1 Scope

This document specifies the general requirements for metallic check valves, which are forged, cast or fabricated in straight, angle or oblique pattern (see EN 736-2) with end connections flanged or wafer, butt welding, socket welding, or threaded.

This document applies to metallic check valves used for all industrial applications.

Additional requirements given in the relevant application standards may apply to check valves used for more specific applications (e.g. for the water industry, the chemical and petrochemical process industry, the gas distribution industry).

Sanitary check valves and back flow prevention anti-pollution check valves are excluded from the scope of this document.

The range of nominal sizes covered is:

— DN 8, DN 10; DN 12, DN 15; DN 20; DN 25; DN 32; DN 40; DN 50; DN 65; DN 80; DN 100; DN 125; DN 150; DN 200; DN 250; DN 300; DN 350; DN 400; DN 450; DN 500; DN 600; DN 700; DN 750; DN 800; DN 900; DN 1 000; DN 1 200.

DN 8 and DN 12 are not used for PN designated flanged end connections.

DN 8, DN 10 and DN 12 are not used for Class designated flanged end connections.

DN 750 is used for Class designated check valves only.

Socket welding end check valves and threaded end check valves are limited to the range DN 8 to DN 65.

The range of pressure designations covered is:

a) for flanged end and wafer type end cast iron bodies:

   — PN 2,5; PN 6; PN 10; PN 16; PN 25;

   — Class 125; Class 250;

b) for flanged end, wafer type and butt welding end bodies in steel or copper alloy materials:

   — PN 2,5; PN 6; PN 10; PN 16; PN 25; PN 40; PN 63; PN 100; PN 160; PN 250; PN 320; PN 400;

   — Class 150; Class 300; Class 600; Class 900 ; Class 1 500; Class 2 500;

c) for socket welding end and threaded end bodies in steel or copper alloy materials:

   — PN 40; PN 63; PN 100;

   — Class 600; Class 800.

NOTE Class 800 is a widely used Class designation for socket welding and threaded end check valves.

The correspondence between DN and NPS is given for information in Annex B.

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 19:2016, *Industrial valves — Marking of metallic valves*

EN 558:2017, *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 736-1:2018, *Valves — Terminology — Part 1: Definition of types of valves*

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 1092-1:2018, *Flanges and their joints — Circular flanges for pipes, valves, fittings and accessories, PN designated — Part 1: Steel flanges*

EN 1092-2:1997, *Flanges and their joints — Circular flanges for pipes, valves, fittings and accessories, PN designated — Part 2: Cast iron flanges*

EN 1092-3:2003, *Flanges and their joints - Circular flanges for pipes, valves, fittings and accessories, PN designated – Part 3: Copper alloy flanges*

EN 1759-1:2004, *Flanges and their joint — Circular flanges for pipes, valves, fittings and accessories, Class designated — Part 1: Steel flanges, NPS 1/2 to 24*

EN 1759-3:2003, *Flanges and their joints — Circular flanges for pipes, valves, fittings and accessories, Class designated — Part 3: Copper alloy flanges*

EN 10269:2013, *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 12351:2010, *Industrial valves — Protective caps for valves with flanged connections*

EN 12516-1:2014+A1:2018, *Industrial valves — Shell design strength — Part 1: Tabulation method for steel valve shells*

EN 12516-2:2014, *Industrial valves — Shell design strength — Part 2: Calculation method for steel valve shells*

EN 12516-4:2014+A1:2018, *Industrial valves — Shell design strength — Part 4: Calculation method for valve shells manufactured in metallic materials other than steel*

EN 12627:2017, *Industrial valves — Butt welding ends for steel valves*

EN 12760:2016, *Industrial valves — Socket welding ends for steel valves*

EN 12982:2009, *Industrial valves — End-to-end and centre-to-end dimensions for butt welding end valves*

EN 16722:2015, *Industrial valves — End-to-end and centre-to-end dimensions for valves with threaded ends*

EN ISO 228-1:2003, *Pipe threads where pressure-tight joints are not made on the threads — Part 1: Dimensions, tolerances and designation (ISO 228-1:2000)*

EN ISO 9606-1:2017, *Qualification testing of welders — Fusion welding — Part 1: Steels (ISO 9606-1:2012 including Cor 1:2012 and Cor 2:2013)*

EN ISO 14732:2013, *Welding personnel — Qualification testing of welding operators and weld setters for mechanized and automatic welding of metallic materials (ISO 14732:2013)*

EN ISO 15607:2003, *Specification and qualification of welding procedures for metallic materials — General rules (ISO 15607:2003)*

ISO 7-1:1994, *Pipe threads where pressure-tight joints are made on the threads — Part 1: Dimensions, tolerances and designation*

ISO 4200:1991, *Plain end steel tubes, welded and seamless — General tables of dimensions and masses per unit length*

ASME B36.10M-2015, *Welded and Seamless Wrought Steel Pipe*

ANSI/ASME B1.20.1-2013, *Pipe Threads, General Purpose, Inch*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 736-1, EN 736-2 and EN 736-3 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

NOTE EN 736-1 illustrates four basic types of check valves:

— the axial and lift types are based on the globe valve;

— the swing type is based on the butterfly valve and

— the diaphragm type is based on the diaphragm valve.

Other types of check valves are possible and are considered to be within the scope of this document.

4 Requirements

4.1 General

For information to be supplied by the purchaser, see Annex A.

4.2 Design

4.2.1 Materials

4.2.1.1 The body and cover (if any) materials shall be selected from EN 12516-1:2014+A1:2018 and/or EN 12516-4:2014+A1:2018. Bolting (if any) materials shall be selected from EN 10269:2013. A selection of bolts and nuts for flange connections, which may be used for the body and cover connection, is indicated in EN 1515-4.

4.2.1.2 All the internal parts in contact with the fluid shall be made of a material or coated with a material whose corrosion resistance to the fluid being carried is at least equal to the body and bonnet material. The manufacturer shall declare the materials of construction and any coatings of components in contact with the line fluid from which the suitability of the check valve for the application can be determined.

4.2.2 Pressure/temperature ratings

4.2.2.1 Steel body

The pressure/temperature ratings shall be as specified in EN 12516-1:2014+A1:2018 for the particular body/bonnet material group.

The pressure/temperature ratings applicable to Class 800 socket welding and threaded end check valves shall be the Class 600 rating for the applicable material group multiplied by the ratio of 800/600.

4.2.2.2 Cast iron body

The pressure/temperature ratings shall be as specified in EN 1092-2:1997.

4.2.2.3 Copper alloy body

The pressure/temperature ratings shall be as specified in EN 1092-3:2003 for PN-designated check valves and as specified in EN 1759-3:2003 for Class designated check valves.

4.2.2.4 Other parts

Other parts of the check valve (cover, bolts etc.) shall have such dimensions, so that they fulfil the body rating.

4.2.2.5 Low temperature applications

4.2.2.5.1 Steel check valves

For temperatures below the lowest temperature given in the pressure/temperature rating tables of EN 12516-1:2014+A1:2018, the maximum allowable pressure shall be not greater than the pressure corresponding to the lowest temperature in the rating tables. The use of check valves at lower temperatures than shown in the rating tables is permitted providing the bending rupture energy of the body and cover material, measured on three 10 mm × 10 mm specimens (in accordance with EN ISO 148-1), shall be not less than an average of 27 J at a temperature no higher than the lowest scheduled operating temperature.

4.2.2.5.2 Cast iron check valves

Temperatures lower than those given in the pressure/temperature ratings tables of EN 12516-4:2014+A1:2018 can be used only if the shells and bonnets are manufactured in spheroidal graphite cast iron of grades EN-GJS-350-22-LT or EN-GJS-400-18-LT (see Table 1).

Table 1 — Allowable material grades for low temperature (LT) design conditions

Symbol	Number	Temperature limits
EN-GJS-350–22-LT	5.3100	–40 °C to 350 °C
EN-GJS-400–18-LT	5.3103	–20 °C to 350 °C

4.2.2.6 Restrictions

Any restrictions of temperature or pressure below those specified in 4.2.2.1 to 4.2.2.5, for example, those imposed by soft seals, special trims, shall be indicated on the check valve [see 8.1 a)].

4.2.3 Dimensions

4.2.3.1 Face-to-face (FTF), centre-to-face (CTF), end-to-end (ETE) and centre-to-end (CTE) dimensions

Face-to-face (FTF) and centre-to-face (CTF) dimensions for PN or Class designated flanged end and wafer type check valves shall be in accordance with EN 558.

The end-to-end (ETE) and centre-to-end (CTE) dimensions of butt welding end check valves shall be selected from EN 12982.

The end-to-end (ETE) and centre-to-end (CTE) dimensions of threaded end check valves shall be selected from EN 16722.

The end-to-end and centre-to-end dimensions of socket welding end check valves are at the choice of the manufacturer.

4.2.3.2 Body ends

4.2.3.2.1 Flanged ends of PN designated check valves shall comply with the requirements of EN 1092-1 for steel body, or EN 1092-2 for cast iron body or EN 1092-3 for copper alloy body.

Flanged ends of Class designated check valves shall comply with the requirements of EN 1759-1 for steel body or EN 1759-3 for copper alloy body.

Flanged ends of ISO PN designated check valves may comply with the requirements of ISO 7005-2 for cast iron body or ISO 7005-3 for copper alloy body.

Steel flanged ends shall be cast or forged integral with the body except that steel flanges at steel bodies may be attached by welding in accordance with 4.2.6.

4.2.3.2.2 Wafer bodies, flangeless, lugged or single flanged bodies shall be such that they can be clamped between flanges in accordance with:

a) EN 1092-1, EN 1092-2 or EN 1092-3 for PN designated check valves;

b) EN 1759-1 or EN 1759-3 for Class designated check valves.

4.2.3.2.3 Butt welding end profiles prepared for steel tubes according to ISO 4200 shall be in accordance with EN 12627. The bevel form may be selected from EN ISO 9692-1.

Butt welding end profiles and the bevel form prepared for steel pipes according to ASME B36.10M-2015 may be in accordance with ASME B16.25.

4.2.3.2.4 Socket welding end dimensions shall be in accordance with EN 12760. The minimum thickness of the pressure retaining material shall be in accordance with EN 12516-1 or EN 12516-2.

4.2.3.2.5 Threaded ends shall be of the internal form in accordance with Type R_c and R_p to ISO 7-1 or Type G to EN ISO 228-1 or Type NPT to ASME B1.20.1. The minimum thickness of the pressure retaining material shall be in accordance with EN 12516-1 or EN 12516-2.

4.2.4 Operation

A check valve automatically opens by fluid flow in a defined direction and automatically closes to prevent fluid flow in the reverse direction. The manufacturer's recommendations given in 4.3.2 shall be considered.

The seat bore may either be full bore or reduced bore.