SLOVENSKI STANDARD
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Jekleni ventili s prirobnim zgornjim delom za splošno uporabo

Bolted bonnet steel globe valves for general-purpose applications

Robinets à soupapes en acier à chapeau boulonné pour applications générales

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INTERNATIONAL STANDARD

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Robinets à soupape en acier à chapeau boulonné pour applications générales

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 12149 was prepared by Technical Committee ISO/TC 153, *Valves*, Subcommittee SC 1, *Design, manufacture, marking and testing*.

Annex A of this International Standard is given for information only.

Introduction

The intent of this International Standard is the establishment of the basic requirements and recommendations for flanged, threaded, socket-welding or butt-welding end steel globe valves of bolted bonnet construction for general-purpose applications.

To maintain compatibility with ISO 7005-1, in which the American flanges previously designated by a class rating have been converted to nominal pressure (PN) ratings, this International Standard follows the same system. The equivalent ratings are as follows:

— Class 150: PN 20;

— Class 300: PN 50;

— Class 600: PN 110.

Bolted bonnet steel globe valves for general-purpose applications

1 Scope

This International Standard specifies the requirements for bolted bonnet steel globe valves for general-purpose applications and having the following features:

— bolted bonnets;

— flanged, threaded, socket-welding (DN 65 and smaller) or butt-welding ends;

— outside screw and yoke, inside screw and rising stem;

— with metallic or soft obturator (disc, piston) or seat seals.

It covers valves of the following nominal sizes, DN:

— 10; 15; 20; 25; 32; 40; 50; 65; 80; 100; 125; 150; 200; 250; 300; 350; 400;

and applies to valves of the following nominal pressures, PN:

— 10; 16; 20; 25; 40; 50; 110.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

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

ISO 7-2:1982, *Pipe threads where pressure-tight joints are made on the threads — Part 2: Verification by means of limit gauges.*

ISO 261:1998, *ISO general-purpose metric screw threads — General plan.*

ISO 263:1973, *ISO inch screw threads — General plan and selection for screws, bolts and nuts — Diameter range 0.06 to 6 in.*

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

ISO 5208, *Industrial valves — Pressure testing for valves.*

ISO 5209, *General purpose industrial valves — Marking.*

ISO 5210, *Industrial valves — Multi-turn valve actuator attachments.*

ISO 5752:1982, *Metal valves for use in flanged pipe systems — Face-to-face and centre-to-face dimensions.*

ISO 6708, *Pipework components — Definition and selection of DN (nominal size).*

ISO 7005-1, *Metallic flanges — Part 1: Steel flanges.*

ISO 7268, *Pipe components — Definition of nominal pressure.*

ANSI/ASME B1.20.1:1983 (R1992), *Pipe threads, General purpose (inch).*

ANSI/ASME B16.11:1991, *Forged fittings — Socket — Welding and threaded.*

ANSI/ASME B16.34:1996, *Valves — Flanged, threaded and welding end.*

3 Terms and definitions

For the purposes of this International Standard, the definitions of nominal size (DN) and nominal pressure (PN) given in ISO 6708 and ISO 7268, respectively, apply.

4 Pressure/temperature ratings

4.1 The pressure/temperature ratings applicable to valves specified in this International Standard shall be in accordance with those specified in ISO 7005-1 for steel flanges of the applicable PN and material specification. Restrictions on temperature or pressure, for example those imposed by soft seals and special trim materials, shall be indicated on the valve identification plate (see 8.4.2).

4.2 The temperature shown in a particular pressure/temperature rating is the maximum temperature of the pressure-containing shell of the valve. In general, this temperature is the same as that of the fluid contained. Use of a pressure rating corresponding to a temperature other than that of the fluid contained is the responsibility of the user.

4.3 For temperatures below the lowest temperature shown in the pressure/temperature rating tables in ISO 7005-1, the service pressure shall be no greater than the rating shown for that lowest temperature. The use of valves at lower temperatures is the responsibility of the user. Consideration should be given to the loss of ductility and impact strength of many materials at low temperature.

5 Design

5.1 Body wall thickness

5.1.1 A schematic diagram of a valve body is shown in Figure 1. The minimum wall thickness t_m at the time of manufacture shall be as given in Table 1 except as indicated in 5.1.2, 5.1.3, and 5.1.4.

Additional metal thickness needed for assembly stresses, closing stresses, stress concentrations and shapes other than circular shall be determined by individual manufacturers, since these factors vary widely.

5.1.2 The weld preparation in butt-welding end valves (see 5.2.2.2) shall not reduce the body wall thickness to less than the values required by 5.1.1 within a region closer to the outside surface of the body neck than t_m measured along the run direction. The transition to the weld preparation shall be gradual and the section shall be essentially circular through the entire length of the transition. Sharp discontinuities or abrupt changes in section in areas that infringe into the transition shall be avoided, except that test collars or bands, either welded or integral, are allowed. In no case shall the thickness be less that $0{,}77t_m$ at a distance of $1{,}33t_m$ from the weld end.

5.1.3 The valve body neck shall maintain the minimum wall thickness t_m as required by 5.1.1 within the distance of $1{,}1\sqrt{dt_m}$ measured from outside of the body run along the neck direction, where d is the nominal inside diameter as defined in 5.2.1.4.

Beyond the distance $1{,}1\sqrt{dt_m}$ from the outside of the body run, straight circular sections of body necks with inside diameter d' shall be provided with a local wall thickness at least equal to t' where t' is determined, by interpolation if necessary, as the value of t_m which would correspond to a value of d equal to $2d'/3$, using the applicable ISO PN (nominal pressure) rating.

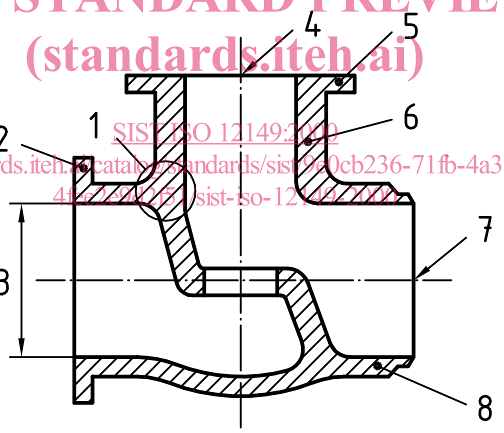
It will be noted that, for any case where $d > 1{,}5d$, the newly determined minimum wall thickness for the body neck will be greater than the basic value t_m. In such cases, this greater wall thickness shall be provided for all of the body neck having a diameter greater than $1{,}5d$.

5.1.4 Local areas having less than the minimum wall thickness will be acceptable, provided that all of the following limitations are satisfied:

a) the area of sub-minimum thickness can be enclosed by a circle whose diameter is no greater than $0{,}35\sqrt{dt_m}$, where d is the nominal inside diameter as given in Table 2 and t_m is the minimum body wall thickness as shown in Table 1;

b) the measured thickness is no less than $0{,}75t_m$;

c) enclosure circles are separated from each other by an edge-to-edge distance of no less than $1{,}75\sqrt{dt_m}$.



Key

1 Junction of body run and body neck
2 Body end flange
3 Body end port inside diameter
4 Axis of body neck
5 Bonnet flange
6 Body neck
7 Axis of body run
8 Body run

Figure 1 — Identification of terms

Table 1 — Body wall thickness

Nominal size DN [a]	Nominal pressure PN						
	10	16	20	25	40	50	110
	Minimum body wall thickness, t_m mm						
10	3	3	3	3	3	3	3,3
15	3	3	3	3	3,1	3,1	3,4
20	3	3	3,1	3,3	3,5	3,8	4,1
25	4	4	4,1	4,2	4,6	4,8	4,8
32	4,5	4,5	4,8	4,8	4,8	4,8	4,8
40	4,5	4,5	4,8	4,8	4,8	4,8	5,6
50	5	5,5	5,6	5,7	6,1	6,4	6,4
65	5	5,5	5,6	5,8	6,6	6,4	7,1
80	5	5,5	5,6	5,8	6,6	7,1	7,9
100	6	6	6,4	6,6	7,3	7,8	9,6
125	6,3	6,5	7,1	7,2	8,1	9,6	11,2
150	6,5	7	7,1	7,5	8,8	9,6	12,7
200	7	8	8,1	8,6	10,2	11,2	15,8
250	7,5	8,5	8,6	9,3	11,4	12,7	19
300	8,5	9,5	9,6	10,4	12,7	14,2	23,1
350	9	10	10,4	11,3	14	15,8	24,6
400	9,6	11	11,2	12,7	15,4	17,5	27,7

[a] For the corresponding body end port nominal inside diameter, see Table 2.

5.2 Body dimensions

5.2.1 Flanges

5.2.1.1 Face-to-face dimensions for flanged end valves shall be in accordance with Table 8 of ISO 5752:1982 for straight pattern and Table 9 for angle pattern.

5.2.1.2 Body end flanges shall comply with the requirements of ISO 7005-1.

5.2.1.3 End flanges shall be cast or forged integral with the body except that flanges may be attached by welding by a qualified welding operator using a qualified welding procedure, provided that all such flanges on valves DN 50 and larger shall be butt-welded. Any heat treatment necessary to ensure that the material is suitable for the full range of service temperatures shall be performed.

5.2.1.4 For unlined flanged valves, the nominal inside diameter d of the body end port shall be as specified in Table 2 as applicable.

Table 2 — Body end port nominal inside diameter, *d*

DN	PN		
	10; 16; 20; 25	40; 50	110
	d mm		
10	10	10	10
15	13	13	13
20	19	19	19
25	25	25	25
32	32	32	32
40	38	38	38
50	50	50	50
65	64	64	64
80	76	76	76
100	100	100	100
125	125	125	125
150	150	150	150
200	200	200	200
250	250	250	250
300	300	300	300
350	335	335	325
400	385	385	375

5.2.2 Butt-welding ends

5.2.2.1 End-to-end dimensions for butt-welding end valves shall be in accordance with Table 8 of ISO 5752:1982 for straight pattern and Table 9 for angle pattern.

5.2.2.2 Butt-welding ends shall be in accordance with the details shown in Figure 2, unless otherwise specified in the purchase order.

5.2.3 Threaded and socket-welding ends

5.2.3.1 End-to-end dimensions for threaded and socket-welding end valves shall be the manufacturer's standard.

5.2.3.2 Valve body threads shall be taper or parallel threads in accordance with ISO 7-1 or taper threads in accordance with ANSI/ASME B1.20.1 as appropriate.

5.2.3.3 Threads shall be gauged in accordance with ISO 7-2 or taper threads in accordance with ANSI/ASME B1.20.1, as appropriate.

5.2.3.4 Socket-welding end dimensions shall be in accordance with Table 3.