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Industrial valves - Steel plug valves

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Industriearmaturen - Kegelhähne aus Stahl

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

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Foreword

This document (prEN 12304:2004) 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 has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive.

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

1 Scope

This European Standard specifies requirements for the valve seat and body pressure/temperature ratings and the design, including materials, dimensions, operation, performance, testing and marking of lubricated, soft seated and lined plug valves having a steel shell.

It also specifies anti-static requirements, an optional fire tested design and the option of a steel or cast iron plug.

This European Standard is applicable to short, regular or venturi pattern valves. The range of valves covered by this European Standard are given in Table 1.

Pressure/temperature ratings of the linings of lined valves and flange attachment methods are outside the scope of this European Standard.

2 Normative references

This European Standard incorporates by dated or undated reference, 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 (including amendments).

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

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

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 558-2, *Industrial valves — Face-to-face and centre-to-face dimensions of metal valves for use in flanged pipe systems — Part 2: Class-designated valves*

EN 736-1, *Valves — Terminology — Part 1: Definitions of types of valves*

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

EN 736-3, *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 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 1561:1997, *Founding — Grey cast irons*

prEN 1759-1:2000[1)], *Flanges and their joints — Circular flanges for pipes, valves, fittings and accessories, Class designated — Part 1: Steel flanges, NPS ½ to 24*

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

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

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

EN 12627, *Industrial valves — Isolating valves for LNG — Specification for suitability and appropriate verification tests*

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

ISO 262, *ISO general purpose metric screw threads — Selected sizes for screws, bolts and nuts*

ISO 263, *ISO inch screw threads — General plan and selection for screws, bolts and nuts — Diameter range 0,06 to 6 in*

ISO 10497, *Testing of valves — Fire type-testing requirements*

3 Terms and definitions

For the purposes of this European Standard, the terms and definitions given in EN 736-1, EN 736-2 and EN 736-3 and the following apply.

3.1
lubricated plug valve
valve having the mating surfaces of the plug and body separated from each other by a pressurised, renewable film of lubricant/sealant

3.2
soft seated plug valve
non-lubricated valve having soft seats of a low frictional material fitted between body and plug

3.3
lined plug valve
valve having a fully moulded, bonded or keyed non-removable lining on all internal wetted surfaces that may be lubricated or non-lubricated

3.4
short plug valve
valve having face-to-face dimensions corresponding with wedge gate valves

3.5
regular plug valve
valve generally having plug ports of greater area than short or venturi plug valves

3.6
venturi plug valve
valve having reduced plug port area and a body throat approximating to a venturi

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1) Under preparation.

3.7
pressure balanced plug valve
taper plug valve which has a system allowing line pressure to act on both ends of the plug, thus balancing the plug to avoid out off balance pressure taper locking the plug to the body

3.8
threaded size
TS
fractional designation of size independent of any unitary system that is used to identify threaded connections in valves

4 Technical specification

4.1 Nominal sizes

Valves shall be of nominal sizes (DN) or threaded sizes (TS) according to type of end fitting as given in Table 1.

4.2 PN or Class designation

Designations of valves shall be as given in Table 1.

4.3 Pressure/temperature ratings

NOTE The pressure/temperature ratings of the linings of lined valves are outside the scope of this European Standard.

4.3.1 Metal seated valves

Pressure/temperature ratings for the valve shell shall be as specified for the appropriate material in the flange standards EN 1092-1 or prEN 1759-1.

NOTE The maximum or minimum operating temperature may be limited by the grade of lubricant/sealant used in the valve, see 4.8.9.

4.3.2 Soft seated valves

Minimum pressure/temperature seat ratings of soft seated valves shall be as given in Table 2. With the exception of the soft seats and primary seals all valve components shall be capable of withstanding the pressure/temperature ratings as specified in the flange standard EN 1092-1 or prEN 1759-1 as appropriate to the material of the valves shell.

Table 1 — Relationship between nominal size, thread size, PN or Class designation and body end connections

DN	TS	PN 10 PN16 Class 150	PN 25 PN 40 Class 300	PN 63	PN 100	Class 600	Class 900	Class 1 500	Class 2 500
8	¼	C	C			C	-	-	-
10	3/8	C	C			C	-	-	-
15	½	BCD	BCD			BCD	-	BCD	BCD
20	¾	BCD	BCD			BCD	-	BCD	BCD
25	1	BCD	BCD			ACD	-	ACD	ACD
32	1¼	BCD	BCD			BCD	-	ACD	ACD
40	1½	BCD	BCD			ACD	-	ACD	ACD
50	2	ACD	ACD			ACD	-	ACD	-
65	-	A	A			A	-	A	A
80	-	A	A			A	A	A	A
100	-	A	A			A	A	A	A
150	-	A	A			A	A	A	A
200	-	A	A			A	A	A	A
250	-	A	A			A	A	A	A
300	-	A	A			A	A	A	A
350	-	A	A			A	-	A	-
400	-	A	A			A	-	A	-
450	-	A	A			A	-	-	-
500	-	A	A			A	-	-	-
600	-	A	A			A	-	-	-

NOTE A = flanged and butt-weld ends, B = flanged ends only, C = threaded ends, D = socket-weld ends.

Table 2 — Minimum pressure/temperature ratings for soft seated valves

Pressure in bar

DN	Minimum non-shock pressure rating at service temperature							
	40 °C	50 °C	75 °C	100 °C	125 °C	150 °C	175 °C	200 °C
8 to 150	48	47	43	39	36	32	29	25
200 to 300	35	34	31	28	25	23	20	17

NOTE Pressure/temperature ratings given are for steady state conditions. Where pressure and/or temperature cycling occurs the manufacturer should be consulted. The minimum pressure/temperature ratings are based on seats made from polyytetrasfluoroethylene (PTFE) without fillers, of virgin material completely free of reclaimed processed materials (see 4.8.4).

See Table 1 for equivalent TS.

1 bar = 100 kN/m^2 = 100 kPa.

4.4 Dimensions

4.4.1 Flanged-end valves

4.4.1.1 Flanged dimensions shall comply with EN 1092-1.

NOTE Where the body design does not permit through clearance bolt holes, threaded holes may be provided.

4.4.1.2 Face-to-face dimensions shall be in accordance with EN 558-1 or EN 558-2 as appropriate.

4.4.2 Butt welding end valves

End-to-end dimensions shall be in accordance with EN 12627 (see Table A.1).

NOTE It is the responsibility of the purchaser to specify :

— the diameter and wall thickness or the schedule number to the connecting pipe ; or

— if some other welding end preparation is required.

4.4.3 Socket welding end valves

Socket dimensions shall be given according to Table A.2. The minimum metal thickness at the socket welding end shall be as given in 4.5.2.

4.4.4 Soft seated extended welding end valves

The overall length of welding end soft seated valves when fitted with extended ends shall be 400 mm ± 1 mm. Valves of sizes DN 15 to DN 40 intended for butt welding shall have ends square or bevelled for welding and valves intended for socket welding shall have the ends prepared in accordance with 4.4.3.

NOTE It is the responsibility of the purchaser to specify a particular welding end preparation, if required.

4.4.5 Threaded end valves

The minimum wall thickness at the threaded end shall not be less than that given in 4.5.2.

Valves ends shall have internal taper or parallel threads in accordance with ISO 7-1 or EN ISO 228-1.

Valves having parallel threads shall have flat end sealing faces with minimum outside diameter as given in Table A.3.

NOTE Other threads may be provided by agreement between manufacturer and purchaser.

4.4.6 Bolting

Bolting threads shall be in accordance with ISO 262 or ISO 263.

When used, valve body/cover bolting shall be of minimum size M10 or 3/8.

4.5 Design

4.5.1 General

Valves shall be of the tapered or parallel plug type, of short, regular or venturi pattern (see 3.4, 3.5, 3.6 and Figures B.1 to B.4).

4.5.2 Shell wall thickness

The minimum wall thickness of the pressure-containing shell, including covers or other shell closure members but excluding glands, shall be in accordance with EN 12627 or Table 3 (for existing designs).

Drilling of or pinning to, or spot welding the wall of a pressure-containing part e.g. for nameplate fixing, shall not be used where it would reduce the effective thickness below the value established.

4.5.3 Body tappings

If body tappings are required, the design of valves DN 50 and larger shall be such that tappings of the size given in Table 4 can be provided in the locations shown by arrows in Figure 1. Where the tapped hole needs reinforcement a boss shall be provided.

Tappings shall have taper or parallel threads in accordance with ISO 7-1 or EN ISO 228-1. Other threads may be provided by agreement between purchaser and supplier. Valves having parallel threads shall have flat sealing faces with minimum outside diameter as given in Table A.3.

NOTE A requirement for a body tapping should be specified in the enquiry and/or order (see annex C).

Table 3 — Minimum shell wall thickness

Dimensions in millimetres

DN	Minimum shell wall thickness											
	PN 10	PN 16	Class 150	PN 25	PN 40	Class 300	PN 63	PN 100	Class 600	Class 900	Class 1 500	Class 2 500
8	2,7	2,7	2,7	2,7	2,7	2,7	N	N	2,7		-	-
10	3,0	3,0	3,0	3,0	3,0	3,0	0	0	3,0	-	-	-
15	3,0	3,0	3,0	3,0	3,1	3,1	N	N	3,4	-	4,8	6,4
20	3,0	3,0	3,1	3,3	3,5	3,8			4,1	-	5,8	7,4
25	4,0	4,0	4,1	4,2	4,6	4,8			4,8	-	6,6	8,9
32	4,5	4,5	4,8	4,8	4,8	4,8	A	A	4,8	-	7,9	11,2
40	4,5	4,5	4,8	4,8	4,8	4,8	P	P	5,6	-	9,7	12,7
50	5,0	5,5	5,6	5,7	6,1	6,4	P	P	6,4	-	11,2	15,8
65	5,0	5,5	5,6	5,8	6,4	6,4	L	L	7,1	-	12,7	19,1
80	5,0	5,5	5,6	5,8	6,6	7,1	I	I	7,9	10,4	15,8	22,4
100	6,0	6,0	6,4	6,6	7,3	7,8	C	C	9,6	12,7	19,1	27,7
150	6,5	7,0	7,1	7,5	8,8	9,6	A	A	12,7	18,3	27,7	40,4
200	7,0	8,0	8,1	8,6	10,2	11,2	B	B	15,8	22,4	35,8	52,3
250	7,5	8,5	8,6	9,3	11,4	12,7	L	L	19,0	26,9	43,7	65,8
300	8,5	9,5	9,6	10,4	12,7	14,2	E	E	23,1	31,8	50,8	76,9
350	9,0	10,0	10,4	11,3	14,0	15,8			24,6	-	55,6	-
400	9,6	11,0	11,2	12,7	15,5	17,5			27,7	-	63,5	-
450	10,0	11,5	11,9	13,0	-	-			-	-	-	-
500	10,5	12,5	12,7	14,5	-	-			-	-	-	-
600	11,0	14,0	14,48	18,0	-	-			-	-	-	-

NOTE See Table 1 for equivalent thread size designation.