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मानक

IS 9338 (1984): cast iron screw-down stop valves and stop and check valves for water works purposes [CED 3: Sanitary Appliances and Water Fittings]



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Indian Standard

SPECIFICATION FOR CAST IRON SCREW-DOWN STOP VALVES AND STOP AND CHECK VALVES FOR WATER WORKS PURPOSES

(First Revision)

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Indian Standard

SPECIFICATION FOR CAST IRON SCREW-DOWN STOP VALVES AND STOP AND CHECK VALVES FOR WATER WORKS PURPOSES

(First Revision)

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AMENDMENT NO. 1 MAY 2002 TO IS 9338 : 1984 SPECIFICATION FOR CAST IRON SCREW-DOWN STOP VALVES AND STOP AND CHECK VALVES FOR WATER WORKS PURPOSES

(First Revision)

(Page 5, Table 1, Sl No. (iii), (iv), (v) and (viii)] — Insert the following after the existing in column (3), (4) and (5):

Sl. No.	MATERIAL	Ref to IS	GRADES OR DESIGNATION
iii)	c) Stainless steel	IS 1570 (Part 5) : 1985	12Cr12
iv)	c) Stainless steel	IS 6603:1973	04Cr18 Ni10 ar 04Cr17Ni12 Mo2
V)	c) Stainless steel	IS 6603:1973	04 Cr18Ni10 er 04 Cr17Ni 12 Mo2
vii)	Or Nitrile Rubber		

(*Page* 10, *clause* 6.8) — Insert the following in the beginning of the clause: 'Each valve shall be provided with back seating arrangement.'

(CED3)

Reprography Unit, BIS, New Delhi, India

Indian Standard

SPECIFICATION FOR CAST IRON SCREW-DOWN STOP VALVES AND STOP AND CHECK VALVES FOR WATER WORKS PURPOSES

(First Revision)

0. FOREWORD

0.1 This Indian Standard (First Revision) was adopted by the Indian Standards Institution on 31 October 1984, after the draft finalized by the Sanitary Appliances and Water Fittings Sectional Committee had been approved by the Civil Engineering Division Council.

0.2 The design and manufacture of cast iron screw-down stop and check valves has made rapid strides in the country. However, the sizes, overall dimensions and pressure ratings of valves as made by various manufacturers require to be co-ordinated. With the aim of rationalizing the sizes and pressure ratings and specifying dimensions to effect interchangeability of valves, this standard was first published in 1979. The first revision of this standard has been taken up to incorporate further changes necessary in the light of the comments received from the users and the manufacturers. In this revision modifications relating to materials for various components, coatings, etc, has been incorporated. Two classes of valves with pressure ratings 1.6 MPa and 1.0 MPa have now been specified for different nominal sizes instead of one class with pressure rating 1.6 MPa specified earlier.

0.3 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS: 2-1960^{*}. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard covers requirements for flanged cast iron screw-down

^{*}Rules for rounding off numerical values (revised).

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stop valves from 15 to 300 mm nominal sizes of the following types used for water supply up to 45°C:

- a) Globe stop valve,
- b) Angle stop valve,
- c) Oblique stop valve,
- d) Globe stop and check valve, and
- e) Angle stop and check valve.

2. TERMINOLOGY

2.1 For the purpose of this standard the definitions covered in IS : 4854 (Part 1)-1969* shall apply.

3. NOMINAL PRESSURE

3.1 Valves shall be designated by nominal pressure (PN) defined as the maximum permissible gauge working pressure in MPa for the sizes indicated as follows:

Nominal Pressure (PN)	Nominal Sizes
MPa	mm
1.0	200 to 300
1.6	Up to and including 150

4. NOMINAL SIZES

4.1 Stop valves and stop and check valves shall be of the following nominal sizes:

15, 20, 25, 32, 40, 50, 65, 80, 100, 125, 150, 200, 250 and 300 mm.

4.1.1 The nominal size shall refer to the nominal bore of the waterway. The actual bore at any point shall not be less than the nominal size given in 4.1.

5. MATERIAL

5.1 Materials used for the manufacture of different components of stop valves and stop and check valves shall conform to the requirements given in Table 1.

^{*}Glossary of terms for valves and their parts: Part 1 Screw-down stop, check and gate valves and their parts.

TABLE 1 MATERIALS FOR COMPONENTS OF STOP VALVES AND STOP AND CHECK VALVES

		(Ciause 5.1)		
SL No.	COMPONENT	MATERIAL	REF TO IS :	GRADES OR DESIGNATION
(1)	(2)	(3)	(4)	(5)
i)	Body, bonnet, handwheel, gland (one piece) and back seat integral	Cast iron	IS: 210-1978 ¹	FG 200
ii)	a) Fasteners/bolting	Carbon steel	IS: 1367-1967*	Class 4:6
	b) Nut	do	do	Class 4
iii)	Stem	a) High tensile	IS: 320-1980 ^a	HT 2
		brass	IS:6912-19734	FHTB 2
		b) Stainless steel	IS : 6603-1973*	04Cr18Ni10 or 04Cr17Ni12 Mo 2
iv)	Body seat ring/disc facing ring	a) Leaded tin bronze	IS : 318-1981*	LTB 2
	-	b) Stainless steel	IS : 1570 (Part 5)-1972'	20Cr13 or 30Cr13
V)	Solid disc with integral face	a) Leaded tin bronze	IS : 318-1981*	LTB 2
		b) Stainless steel	IS:1570 (Part 5)-19727	20Cr13 or 30Cr13
vi)	Disc with separate facing rings	Cast iron	IS: 210-1978	FG 200
vii)	Gland packing	a) Jute and hemp	IS:5414-1969*	
		b) Asbestos	IS:4687-1980 ⁹	—
viii)	Bonnet gasket	Compressed as- bestos fibre	IS : 2712-197110	Grade C
ix)	Disc stem nut, back seat bushing (where separate),	a) Leaded tin bronze	IS: 318-1981*	LTB 2
	gland (two piece design)	b) Stainless steel	IS : 6603-1973*	04Cr18Ni10 or 04Cr17Ni12 Mo 2
x)	Yoke bush	a) Leaded tin bronze	IS : 318-1981*	LTB 2
		b) High tensile	IS: 320-1980*	HT 2
	15.5	brass	IS: 6912-1973	FHTB 2
	····,	c) SG iron	15:1865-19741	400/12 or 500/7

¹Specification for grey iron castings (third revision).

*Specification for technical supply conditions for threaded fasteners (first revision).

*Specification for high tensile brass rods and sections (other than forging stock) (second revision),

⁴Specification for copper and copper alloys forgings (first revision).

*Specification for stainless steel bars and flats.

*Specification for leaded tin bronze ingots and castings (second revision).

⁷Schedules for wrought steels for general engineering purposes: Part 5 Stainless and heat resisting steels (first revision).

*Specification for gland packing, jute and hemp.

*Specification for gland packing, asbestos (first revision).

¹⁰Specification for compressed asbestos fibre jointings (second revision).

¹¹Specification for iron castings with spheroidal or nodular graphite (second revision).

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6. MANUFACTURE

6.1 Bodies — The area of the body end parts shall not be less than the area of a circle of diameter equivalent to the nominal size of the valve, except that this area may be reduced by not more than 15 percent through the seats to permit the use of disc guides from below. A typical sketch of stop valve is shown in Fig. 1.

6.2 Bonnets — Bonnets of all sizes of stop valves shall be cast as one piece. For sizes 50 mm and above, a separate bush shall be used to make threads for stems.

6.3 Body Ends — The dimensions and drilling of flanges shall conform to IS: 1538 (Part 4)-1976* and IS: 1538 (Part 6)-1976† for sizes 80 mm and above. For sizes below 80 mm the dimensions shall be in accordance with Table 2 and Fig. 2. Flanges shall be machined flat, that is, without a raised joint face unless otherwise specified.

NOTE — Valves may be supplied with other flange dimensions by agreement between the purchaser and the manufacturer.

6.4 Body Bonnet Connection — The attachment of the bonnet to the body shall be bolted with minimum of 4 studs or bolts.

6.5 Glands — Glands may be of one-piece or two piece, self-aligning type and bolted to the bonnet by one of the following methods:

- a) Hinged type bolt, and
- b) 'T' headed bolts.

6.6 Body Seats

6.6.1 The body seat rings shall be renewable type. The seat rings shall be either screwed or press fitted and shall be either shoulder seated or bottom seated. Threaded rings shall be so designed to facilitate removal. Body seat rings shall be so fitted as to avoid their becoming loose in service.

6.6.2 The dimensions of the body seat rings assuming an 'L' shape cross section press fitted shall be as given in Table 3 and Fig. 3.

NOTE — For other types of seat rings the values given in Table 3 shall not be applicable.

^{*}Specification for cast iron fittings for pressure pipes for water, gas and sewage: Part 4 Specific requirements for flanges of pipes and fittings (second revision).

^{*}Specification for cast iron fittings for pressure pipes for water, gas and sewage: Part 6 Specific requirements for standard flange drilling of flanged pipes and fittings (second revision).





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TABLE 2 DIMENSIONS OF FLANGES FOR STOP VALVES

(Clause 6.3; and Fig. 2)

All dimensions in millimetres.

SL	PARTICULARS		DIMENSIO	NS FOR]	NOMINAL S	SIZE OF V	ALVES	
140.		15	20	25	32	40	50	65
(1)	(2)	(\$)	(4)	(5)	(6)	(7)	(8)	(9)
i)	Inside dia	15	20	25	32	40	50	65
ii)	Outside dia, D	95+1·5 -1·0	105+1·5 -1·0	115+1·5 -1·0	140+1·5 -1·0	150 + 1.5 - 1.0	165+1·5 -1·0	185+1·5 -1·0
iii)	Thickness of flange	14+2·0 -0	16+2 ^{.0} -0	16 +2.0 -0	18+2°0 -0	18+2·0 -0	20+2·0 -0	20+2·0 −0
i v)	Dia of bolt circle, C	65±1.0	7 5 ±1·0	85±1.0	100±1·0	110±1•0	125±1·0	145±1·0
v)	No. of hole	4	4	4	4	4	4	4
vi)	Dia of bolt hole, 'd'	14	14	14	19	19	19	19
vii)	Bolt dia	12	12	12	16	16	16	16



FIG. 2 DRILLING OF FLANGE OF SLUICE VALVE



TABLE 3 DIMENSIONS OF BODY SEAT RINGS ASSUMING 'L' SHAPED CROSS SECTION

(Clause 6.6.2; and Fig. 3)

All dimensions in millimetres.

Sl No.	Signe of Valves	A, Min	B, Min	C, Min	D, Min
(1)	(2)	(3)	(4)	(5)	(6)
i)	15	8	5	2	S .
ii)	20	8	6	2	3
iii)	25	8	6	2	3
iv)	32	10	8	2.2	3
V)	40	10	8	3	4
vi)	50	12	10	3	4
vii)	65	12	10	3	5
viii)	80	12	12	3	5
ix)	100	14	13	3.2	6
x)	125	14	14	4	6
xi)	150	14	14	4	6
xii)	200	16	15	4·5	7
πi ii)	2 50	17	16	5	8
xiv)	300	19	16	5	8



FIG. 3 DIMENSIONS OF L-SHAPED CROSS SECTION OF BODY SEAT RING

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6.7 Disc

6.7.1 Disc assemblies which are detachable, or of two-piece construction, shall be such that they cannot become detached in service.

6.7.2 Disc faces shall be flat, mitre, ball/cone, plug type (see Fig. 4).

6.7.3 Disc of stop and check valves shall be guided. When the stem is taken to its top most position the disc shall not come out of its guide.

6.7.4 The disc may have integral faces or may be fitted with separate facing rings firmly secured to the disc. These rings shall be screwed on or pressed fitted.

6.7.5 Provision shall be made for releasing entrapped air between disc and stem (see Fig. 4D).

6.8 Back Seat — When specified, values shall have an integral back seating surface in the bonnet to contact a corresponding seat on the stem or disc assembly when the value is fully open. When a separate back seat bushing is provided it shall comply with the trim specification.

6.9 Stems — The stems shall be outside screw type having the actuating thread exterior to the bonnet.

6.9.1 The dimensions of the stems shall be in accordance with Table 4 and Fig. 5.

6.10 Threads — The stems shall have trapezoidal threads, and shall conform to IS : 7008 (Part 3)-1973*.

6.11 Hand Wheel — Hand wheel may be of cast finish and shall have on the upper side of the rim the words 'OPEN' and 'SHUT' with appropriate direction arrows. The letters and arrows shall be cast in recesses so that their surfaces shall be in level with the surface of the hand wheel rim. Up to and including 40 mm nominal size, the shut and open direction arrows may be put on a name plate under the handwheel nut. The handwheel shall be secured by a mild steel nut and washer. The sizes of the retaining nuts shall be as given in Table 4.

NOTE — If the handwheel is to be polished, plated or given some other special finish, full particulars shall be given by the purchaser at the time of the enquiry or order (see Appendix A).

6.12 Stuffing Box — The depth of stuffing box shall be as given in Table 4, to accommodate at least five turns of packing.

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^{*}ISO metric trapezoidal screw threads: Part 3 Basic dimensions for design profiles.



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FIG. 5 DIMENSIONS OF STEM

6.13 Height of Valves — The overall heights of the valves shall not exceed the values specified in Table 5.

6.14 Interchangeability — All value parts shall be interchangeable between units of the same size and type from any one manufacturer.

6.15 Face-to-Face and Centre-to-Face Dimensions — The face-toface dimensions of flanged globe valves and flanged globe stop and check valves and centre-to-face dimensions of flanged angle stop valves and flanged angle stop and check valves shall be as given in Table 5.

7. COATING

7.1 Immediately after casting and before machining, all cast iron parts shall be thoroughly cleaned, and before rusting commences, shall be coated by dipping in a bath containing a composition having a tar base and maintained at a temperature between 143 and 166°C. The proportions of the ingredients of the composition shall be so regulated as to produce a coating having the properties specified in 7.3.

NOTE 1 — The sluice valves may be assembled without coating if the purchasing organization specially desires to inspect the assembled valves without any coating.

				TATE		DATENSE	IO SNO	STEM	S AND	STUPPI	NG BO	54			
						(Claure	r 6.9.1, 6.	.11, 6.12;	and Fig.	.5)					
						All e	limensio	lim ni se	limetres.						
	PARTI-				Din	ENDIONS	FOR NO.	NINAL S	10 ESI	VALVE		I		į	
		1	R .	ន	22	Ş	S	65	8	8	125	150	200	250	8
3	(2)	3	•	(2)	(9)	ε	(8)	(6)	(01)	(11)	(12)	(13)	(†1)	(15)	(16)
(î	Square on top of sten G	9±0-5 n,	<u>5</u> .076	9±0-5	11±0.5	12±0-5	12±0-5	14±0 ^{.5}	14±0-5	17±0.5	17 ±0 -5	19 <u>+</u> 0-5	24±0-5	24±0 -5	24土0:5
≅ 13	Diameter of spindle, <i>S</i> , <i>M</i> ia	1	ł	41	*	16	16	18	20	ន	24	26	32	8	8
(111	Pitch of thread	4	4	4	4	4	4	4	4	Cu.	ŝ	2	9	9	9
(vi	Diameter of stuffing box, $E_{\rm s}$	8	8	33	8	31	31	33	2	37	Ş	\$	8	3	3
•	Depth of stuffing box, Mis	. ?	8	35	35	38	38	8	S.	8	4	4 3	45	45	45
7	Size of mut for secur- ing hand- wheel	M8	M8	M8	M8	W 10	W 10	M 12	M 12	M16	M16	M16	M20	M 20	M20

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		TABLE 5 DIA	JENSIO	IO SNO	F SCRI	EW DO	S NM	TOP	VALV	ES AN		GLE	VALV	51		
					(Clai	ues 6.13	6.15; 2	und Fig	.1)							
					All di	mention	a ii n	illimet	12							
	Ŀ,	PARTIOULARS				DINGEN	SNOIS.	FOR N	VNINO	l Size	V TO	ALVES				
	ž	•	15	2	52	32	Ş	ß	ន	8	8	125	150	ŝ	250	ŝ
	Ξ	(2)	(3)	•	(2)	(9)	(2)	(8)	(6)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
	i)	Face to face dimensions for straight pattern stop valve, A	130	150	160	180	200	230	290	310	350	1 00	480	00 9	730	850
14	(i	Centre to face dimen- sions of angle pattern stop valve, A ₁	8	6 2	100	105	115	125	145	155	175	20 0	225	275	325	375
:3	(i	Gentre of waterway to top of handwheel, Mar	200	200	2 00	210	240	250	305	315	360	420	465	575	200	8 00
4	E	Dia of h an dwheel, Min	100	10	120	120	140	140	160	180	200	250	320	9	00 1	8
			Tolera	nce on	dimens	ions A s	und A1:			,						
			Tin to	ini hue	-hudino	200 mr	-			+						
			Above	200 m	m up to	and in	cluding cluding	100 m	8	1 + 1 - 1						
			Above	800 m 1		and in and in	cluding cluding	800		+ + + +						

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Note 2 — From every bath one piece of smallest size and one piece of largest size should be tested for coating. Alternatively, for tar based paints the representative test piece $150 \times 100 \times 10$ mm each bath of casting shall be subjected to coating test from each bath.

7.2 The casting shall be reheated before dipping, either by immersion in hot water or by heating in an oven, or shall be held in the dipping bath sufficiently long to reach an equivalent temperature, the method used being at the maker's option. Care shall be taken to see that the castings are perfectly dry immediately before dipping. On removal from the bath the castings shall be sufficiently drained.

7.3 The coating shall be such that it shall not impart any taste or smell to water. The coating shall be smooth, glossy and sufficiently tenacious so as not to flow when exposed to a temperature of $77^{\circ}C$ and not become so brittle at a temperature of $15^{\circ}C$ so as to chip off when scratched lightly with the point of a penknife.

7.4 Alternatively, two coats of Black Japan conforming to Type 8 of IS: 341-1971* or paint conforming to IS: 9862-1981† shall be applied.

8. TESTING

8.1 Each valve shall be subjected to hydrostatic tests as described in Appendix B to the test pressure for a duration as per Table 6 and the valve shall show no sign of leakage under these tests.

TABLE	6 TEST PRESSURE (DURATION OF	(GAUGE) AND T Valves	EST
PN RATING of Valve	TEST	Test Pressure (Gauge), Min	Test Duration, <i>Min</i>
(1)	(2)	(3)	(4)
MPa		MPa	min
1.6	Body test Seat test	2·4 1·6	5 2
	Back seat test (where specified)	2.4	5
1-0	Body test Seat test Back seat test (where specified)	1·5 1·0 1·5	5 2 5

*Specification for Black Japan (first revision).

[†]Specification for ready mixed paint, brushing, bituminous black lead-free, acid alkali, water and heat resisting.

9. INFORMATION TO BE SUPPLIED WITH ENQUIRY OR ORDER

9.1 The purchaser shall supply the information given at Appendix A along with his enquiry or order.

10. MARKING

10.1 The following information shall be cast on each valve body in raised letters:

- a) The manufacturer's name or trade-mark,
- b) Nominal pressure rating (PN),
- c) The size of valve, and
- d) Arrow head indicating the direction of flow.

Example:

```
XYZ & Co
PN 1.6
300 mm
→
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10.1.1 Each valve may also be marked with Standard mark.

10.1.2 The use of the Standard Mark is govered by the provisions of the Bureau of Indian Standards Act, 1986 and the Rules and Regulations made thereunder. The details of conditions under which the licence for the use of Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

11. PACKING AND STORAGE

11.1 Packing and storage shall be done as given below:

- a) Packing All valves shall be supplied with their discs closed. Bright parts shall be protected against rust. Valves with smooth finished flanged joint faces shall be suitably protected against damage. Parts liable to injury in transit shall be wrapped with wood wool or similar material as a protection.
- b) Storage --- Valves shall be stored in roofed stores away from dirt.

12. OPERATION

12.1 Means — Unless otherwise specified, valves shall be designed to be directly operated by a handweel.

12.2 Direction — Unless otherwise specified, manually operated valves shall be closed by turning the shaft in a clockwise direction when facing the end of the operating shaft.

12.3 Indicators — When specified by the purchaser an indicator shall be provided. The marking shall show both 'OPEN' and 'SHUT' positions.

12.4 Chainwheel Operation — If chainwheel operation is required, the type of chainwheel shall be specified in the order which shall also specify any chain to be supplied.

12.5 Gear Operation — It gear operation is required, the type of gearing and its arrangement shall be specified in the enquiry or order.

12.6 Actuator Operation — If actuator operation is required, the details of the actuator and its power supply together with the design maximum pressure differential across the valve shall be specified in the enquiry or order.

APPENDIX A

(Clauses 6.11 and 9.1)

INFORMATION TO BE SUPPLIED WITH THE ENQUIRY OR ORDER

A-1. The following information shall be supplied by the purchaser along with the enquiry or order:

- a) Nominal size of valve required:
- b) Type of valve required:
 - 1) Stop or stop and check;
 - 2) Straight, angle or oblique:
- c) Trim material required that is stainless steel or bronze;

- d) Type of disc required, that is, flat, mitre, ball/cone or plug type;
- e) Whether the flanges are required to be drilled or undrilled;
- f) Whether back seat is required;
- g) Whether an indicator showing 'open' and 'shut' is required;
- h) Whether chainwheel operation is required? Also indicate the type of chainwheel and whether chain is required to be supplied;
- j) Type of gearing and its arrangement, if required;
- k) Type of power operation required, if any; and
- m) Test certificate, inspection or witnessing of test or certificate of conformity.

APPENDIX B

(*Clause* 8.1)

TESTING OF VALVES

B-1. BODY TEST

B-1.1 All completely assembled valves shall be subjected to body test as described in **B-1.1.1** to **B-1.1.3**.

B-1.1.1 The body ends shall be blanked so that the valve is subjected to the full stresses in all directions induced by the test pressure ensuring that there is no air trap inside the body.

B-1.1.2 The value shall be tested in the fully open or partly open position.

B-1.1.3 Values with Back Seats — To test the back seat, where fitted, the value shall be fully open and the gland shall be slackened.

B-2. SEAT TEST

B-2.1 All completely assembled valves shall be subjected to seat test as described in **B-2.1.1** to **B-2.1.3**.

B-2.1.1 The seating surfaces of the valve shall be cleaned unless the use of a temporary surface treatment has been agreed to between the manufacturer and the purchaser to avoid the possibility of damage under the conditions of the test.

B-2.1.2 The valve shall be tested after closing in the normal manner.

B-2.1.3 With the end of the valve not subjected to the test pressure left open to atmosphere, the test pressure shall be applied as follows:

- a) Globe valve-under the disc;
- b) Globe stop and check valve:
 - 1) under the disc,
 - 2) to the 'outlet' end of the body with the stem raised (the pressure is then applied to the top of the disc); and
- c) Check valves to the outlet end of the body.

(Continued from page 2)

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