IS 5312-1 (2004): Swing Check Type Reflux (Non-Return] Valves for Water Works Purposes, Part 1: Single-Door Pattern [CED 3: Sanitary Appliances and Water Fittings]

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(दूसरा पुनरीक्षण)

Indian Standard

SWING CHECK TYPE REFLUX (NON-RETURN) VALVES FOR WATER WORKS PURPOSES — SPECIFICATION

PART 1 SINGLE DOOR PATTERN

(Second Revision)

ICS 91.140.70

BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

November 2004

Price Group 3

FOREWORD

This Indian Standard (Part 1) (Second Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Sanitary Appliances and Water Fittings Sectional Committee had been approved by the Civil Engineering Division Council.

This standard was first published in 1984. In this revision, nominal pressures of the valves have been aligned with those specified in IS 14846 : 2000 'Sluice valves for water works purposes (50 to 1 200 mm size) — Specification'. Other changes keeping in view the current manufacturing practices in the country have been made.

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 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

SWING CHECK TYPE REFLUX (NON-RETURN) VALVES FOR WATER WORKS PURPOSES — SPECIFICATION

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(Second Revision)

1 SCOPE

1.1 This standard (Part 1) covers requirement for flanged reflux valves of single door, swing check type used for water works purposes of sizes 50 to 600 mm.

1.2 Double disc check and lift check valves are not covered under the scope of this standard.

2 REFERENCES

The standards given in Annex A contain provisions which, through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards given in Annex A.

3 NOMINAL PRESSURES

Reflux valves shall be designated by nominal pressure (PN) defined as maximum permissible gauge working pressure (MPa). The nominal pressure for the various sizes shall be as follows:

Size of Valve mm	*Nominal Pressure* MPa
50 to 600	1.0 and 1.6

4 NOMINAL SIZES

4.1 Reflux valves shall be of the following nominal sizes:

50, 65, 80, 100, 125, 150, 200, 250, 300, 350, 400, 450, 500 and 600 mm.

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

5 MATERIALS

The materials used for the manufacture of different component parts shall conform to the requirements given in Table 1. Where alternative materials are specified in Table 1 these may be used subject to their stipulation in the contract or order.

6 MANUFACTURE

6.1 Typical illustration of reflux valves are given in Fig. 1, 2 and 3.

6.2 The dimensions of the valves shall be as per Table 2, read with Fig. 1, 2 and 3.

6.3 All the parts of the valves shall be designed so as to withstand the specified test pressures.

6.4 The area for flow passage at any cross-section in the valve shall not be less than the area of the nominal bore of the valve.

6.5 The design of hinge, hinge pin, door and door suspension shall be such to ensure free swinging of the door. In closure, the door face shall have close face contact with the body ring by gravity only.

6.6 The design of valves used in vertical pipe lines shall be such that in the working position the valves positively close when the flow in the pipe comes to a stop.

6.7 The thickness of metal in all castings shall be maintained as uniform as possible throughout any section to avoid strains set up by sudden changes of cross-section.

6.8 Each reflux valve shall carry an arrow, very prominently to indicate the direction of flow. The arrow shall be cast integrally on the body.

6.8.1 The arrow shall be located on the left-hand side of the observer while he faces the direction of flow, unless otherwise specified by the purchaser.

6.9 Flanges

Unless otherwise specified in the contract or order, the flanges and their dimensions of drilling shall be in accordance with IS 1538. For valves of 50 and 65 mm nominal sizes the dimensions and drilling of flanges shall be in accordance with Table 3.

6.10 The inside diameter of the body ring shall not be less than the nominal bore of the valve.

6.10.1 The face of the body ring shall protrude clear of the surrounding cast iron by not less than 1.5 mm.

6.11 Doors and Hinges

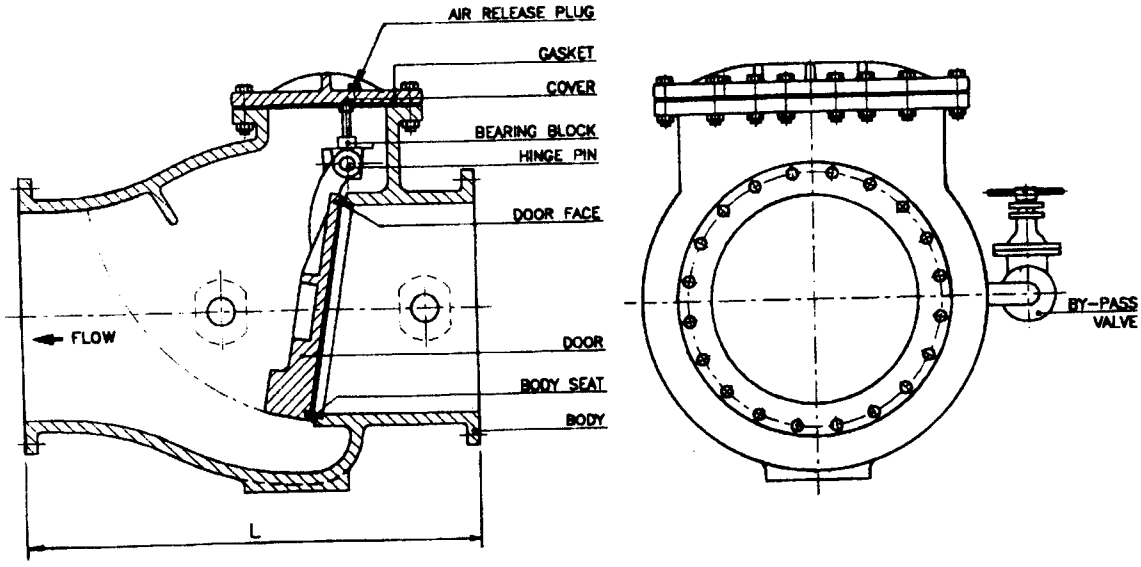
The design of the doors and hinges shall be suitable so as to withstand satisfactorily the repeated impacts likely to occur during service.

6.12 Door Faces

The minimum thickness of door face shall be 5 mm.

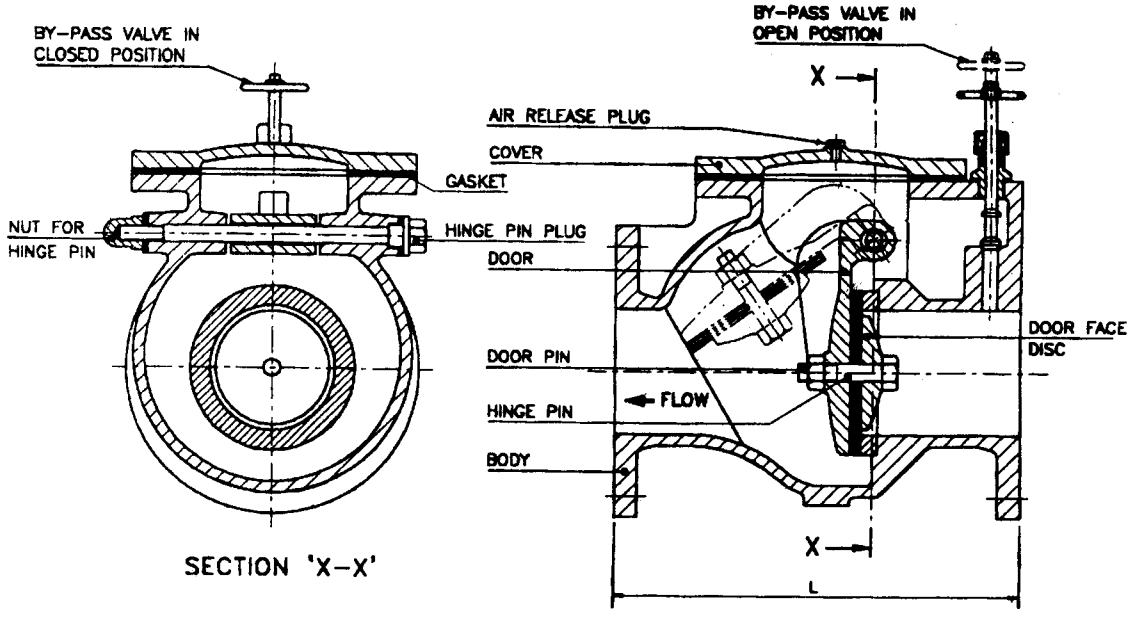
6.13 By-Pass Arrangements

The minimum size of by-pass arrangements, shall be as given in Table 4.



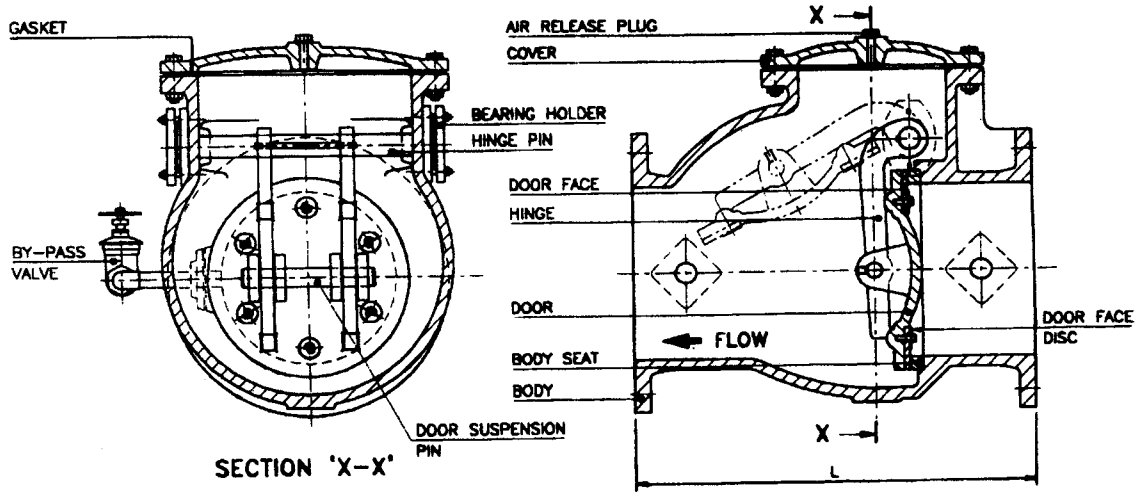
NOTE — The shapes of parts are only illustrative and the minimum requirements, where specified, are binding

FIG. 1 TYPICAL ILLUSTRATION OF REFLUX VALVE WITH INCLINED SEATING AND SIDE BY-PASS ARRANGEMENT



NOTE — The shapes of parts are only illustrative and the minimum requirements, where specified, are binding

FIG. 2 TYPICAL ILLUSTRATION OF REFLUX VALVE WITH VERTICAL SEATING AND INTEGRAL BY-PASS ARRANGEMENT



NOTE — The shapes of parts are only illustrative and the minimum requirements, where specified, are binding

FIG. 3 TYPICAL ILLUSTRATION OF REFLUX VALVE WITH VERTICAL SEATING AND SIDE BY-PASS ARRANGEMENT

Table 1 Material for Different Component Parts of Reflux Valves

(Clause 5)

Sl No.	Component	Preferred Material	Ref to IS No.	Grade or Designation	Alternate Material	Ref to IS No.	Grade or Designation
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
i)	Body, cover, door, bearing holder	Grey cast iron	210	FG 200	Grey cast iron spheroidal or nodular cast iron cast steel	210 1865 1030	FG 260 500/7 230-450 W
ii)	Hinge pin, door pin and door suspension pin	Stainless steel	6603	12Cr12	High tensile brass, stainless steel	320 6603	HT2 04Cr19Ni9/ 04Cr17Ni12Mo2
iii)	Body seat rings	Leaded tin bronze	318	LTB 2	Stainless steel	3444	Gr 1/Gr 4/Gr 10
iv)	Door face ring	Leaded tin bronze	318	LTB 2	Natural/synthetic rubber stainless steel	3444	Gr 1/Gr 4/Gr 10
v)	Bearing bushes/ Bearing block	Leaded tin bronze	318	LTB 2	P.T.F.E.	—	—
vi)	Plugs for hinge pin/ Air release plug	Leaded tin bronze	318	LTB 2	Stainless steel	6603	12Cr12/ 04Cr19Ni 09/ 04Cr17 Ni12Mo2
vii)	Bolts	Carbon steel	1363 (Part 1)	Class 4.6	—	—	—
viii)	Nuts	Carbon steel	1363 (Part 3)	Class 4.0	—	—	—
ix)	Gaskets	Rubber	638	Type B	CAF	2712	
x)	Hinges	Grey cast iron	210	FG 200	Malleable cast iron cast steel	14329 1030	230-450 W

Table 2 Dimensions of Reflux Valves

(*Clause* 6.2 and *Fig.* 1, 2 *and* 3)

All dimensions in millimetres.

Size	50	65	80	100	125	150	200	250	300	350	400	450	500	600
Length (*L*)	203	216	241	292	330	356	495	622	698	787	914	978	978	1 295
Alternate Length (*L*)	200	240	260	300	350	400	500	600	700	800	900	1 000	1 100	1 300
Hinge Pin Diameter, *Min*	10	10	10	12	12	16	20	22	25	25	32	32	38	38

Tolerance on length, mm :

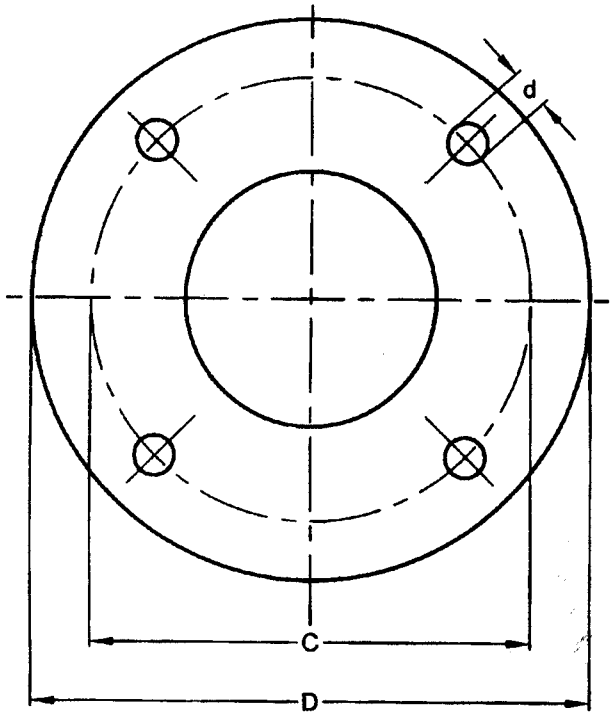
Range	*Tolerance*
0 to 250	± 2
251 to 500	± 3
501 to 800	± 4
801 to 1 000	± 5
1 001 to 1 300	± 6

NOTE — Alternate lengths as given above will be withdrawn after 3 years from the date of publication of this standard.

Table 3 Dimensions and Drilling of Flanges

(*Clause* 6.9)

All dimensions in millimetres.



Sl No.	Particulars	Dimensions for Nominal Size	
		50	65
(1)	(2)	(3)	(4)
i)	Outside diameter, *D*	$165^{+1.5}_{-1.0}$	$185^{+1.5}_{-1.0}$
ii)	Thickness of flange	$16^{+2.0}_{-0}$	$16^{+2.0}_{-0}$
iii)	Diameter of bolt circle, *C*	125 ± 1.0	145 ± 1.0
iv)	Number of holes (Equally spaced off centre)	4	4
v)	Diameter of bolt holes, *d*	19	19
vi)	Diameter of bolts	16	16

Table 4 Sizes of By-Pass Arrangements
(*Clause* 6.13)
All dimensions in millimetres.

Size of Valves	50	65	80	100	125	150	200	250	300	350	400	450	500	600
Size of By-Pass Arrangements, *Min*	10	10	10	10	15	15	25	25	40	40	40	50	50	65

6.13.1 The by-pass arrangement shall be located either at the top only in case of integral type arrangement (*see* Fig. 2) or on the right-hand side of the observer when facing in the direction of flow (*see* Fig. 1 and Fig. 3) unless otherwise specified in the contract or order.

6.13.2 *By-Pass Valves*

By-pass valves (external) up to and including 40 mm size shall be of gunmetal (*see* IS 778) Class 1 for PN 1.0 and Class 2 for PN 1.6 rating valves. The by-pass valve of 50 mm size shall be of same rating as the main valve.

7 COATING

7.1 All coatings shall be carried out after satisfactory testing of the valves prior to despatch. All the unmachined ferrous surfaces of the valve (both inside and outside) shall be thoroughly clean, dry and shall be free from rust and grease before painting. All exposed machined ferrous surfaces shall be painted with one coat of aluminium red oxide primer.

7.2 Two coats of black Japan conforming to Type B of IS 341 or paint conforming to IS 9862 or IS 2932 shall be applied by brush or spray for exterior application in colour as approved by the purchaser.

NOTE — A valve may be assembled without coating if a purchaser specifically desires to inspect the assembled valve without coating.

8 TESTING

8.1 Each valve shall be subjected to the hydrostatic tests specified in **8.2** and **8.3**. The test duration shall be as specified in Table 5.

8.2 Hydrostatic Body Test

All valves shall be subjected to hydrostatic body test at appropriate test pressure given in Table 5 and shall show no leakage or permanent distortion under this pressure when both ends are blanked and the pressure is applied at the inlet end.

8.3 Hydrostatic Seat Test

Pressure as per Table 5 to be applied at the outlet side of the valve with the other side open to atmosphere. There shall not be any visible leakage during the test.

Table 5 Test Duration and Pressure
(*Clauses* 8.1, 8.2 *and* 8.3)

Sl No.	PN Rating	Test for	Test Pressure (Gauge) MPa	Test Duration min
(1)	(2)	(3)	(4)	(5)
i)	PN 1.0	Body	1.5	5
		Seat	1.0	2
ii)	PN 1.6	Body	2.4	5
		Seat	1.6	2

9 INSPECTION

The purchaser or his authorized representative shall have free access to the works of the manufacturer at all reasonable times to inspect the valve at any stage of manufacture and to reject any material which does not conform to the specified requirements.

10 INFORMATION TO BE SUPPLIED WITH ENQUIRY OR ORDER

The following information is supplied by the purchaser with enquiry or order:

a) Size of valve;
b) Maximum cold non-shock working pressure;
c) Material of body, door and cover;
d) Operating position of valve horizontal, vertical or inclined;
e) Whether by-pass arrangement required or not;
f) Flow velocity or volumetric flow rate;
g) Whether the water is corrosive and if so, details to be given; and
h) Flange details if other than mentioned in this standard.

11 MARKING

11.1 Following information shall be cast on each valve body in raised letter:

a) Manufacturer's name or trade-mark;
b) Nominal pressure of valve (PN 1.0 or PN 1.6);
c) Size of valve, mm;
d) Direction of flow; and
e) Heat No. of cast.

11.2 BIS Certification Marking

Each valve may also be marked with the Standard Mark.

11.2.1 The use of Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act,*

1986 and the Rules and Regulations made thereunder. Details of conditions under which a license for the use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

12 PACKING AND STORAGE

12.1 Valve shall be complete in all respects when shipped.

12.2 Valve shall be drained and the door adequately blocked in the closed position. The manufacturer shall use care in preparing valves for shipment, so that no damage will occur during handling or in transit.

12.3 Valve shall be stored in roofed store, away from dirt.

ANNEX A

(*Clause* 2)

LIST OF REFERRED INDIAN STANDARDS

IS No.	*Title*
210 : 1993	Grey iron castings — Specification (*fourth revision*)
318 : 1981	Specification for leaded tin bronze ingots and castings (*second revision*)
320 : 1980	Specification for high tensile brass rods and sections (other than forging stock) (*second revision*)
341 : 1973	Black Japan types A, B and C (*first revision*)
638 : 1979	Specification for sheet rubber jointing and rubber insertion jointing (*second revision*)
778 : 1984	Specification for copper alloy gate, globe and check valves for water works purposes (*fourth revision*)
1030 : 1998	Carbon steel castings for general engineering purposes (*fifth revision*)
1363	Hexagon head bolts, screws and nuts of product grade C
(Part 1) : 2002	Hexagon head bolts (size range M 5 to M 64) (*fourth revision*)
(Part 3) : 1992	Hexagon nuts (size range M 5 to M 64) (*third revision*)
1538 : 1993	Cast iron pipe fittings for pressure pipes for water, gas and sewage (*third revision*)
1865 : 1991	Iron castings with spheroidal or nodular graphite (*third revision*)
2712 : 1998	Gaskets and packings — Compressed asbestos fibre jointing (*third revision*)
2932 : 1993	Enamel, synthetic, exterior (a) undercoating (b) finishing — Specification (*second revision*)
3444 : 1999	Corrosion resistant alloy steel and nickel base castings for general applications — Specification (*third revision*)
6603 : 2001	Stainless steel bars and flats — Specification (*first revision*)
9862 : 1981	Ready mixed paint, brushing, bituminous, black lead free, acid alkali, water and chlorine resisting
14329 : 1995	Malleable iron castings

Bureau of Indian Standards

BIS is a statutory institution established under the *Bureau of Indian Standards Act,* 1986 to promote harmonious development of the activities of standardization, marking and quality certification of goods and attending to connected matters in the country.

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Review of Indian Standards

Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the latest issue of 'BIS Catalogue' and 'Standards: Monthly Additions'.

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Amendments Issued Since Publication

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TO
IS 5312 (PART 1) : 2004 SWING CHECK TYPE REFLUX (NON-RETURN) VALVES FOR WATER WORKS PURPOSES — SPECIFICATION

PART 1 SINGLE DOOR PATTERN

(Second Revision)

(*Page* 5, *clause* **6.13.2**, *line* 4) — Insert 'and 65 mm' after '50 mm'.

(CED 3)

Reprography Unit, BIS, New Delhi, India