

Table 1 Materials for Component Parts of Sluice Valve
(Clause 6)

Sl No.	Component	Preferred Material	Ref to IS No.	Grade or Designation	Alternative Material	Ref to IS No.	Grade or Designation
i)	Body, bonnet, dome, stool cover, wedge, stuffing box, gland, thrust plate and cap	Grey cast iron	210	FG 200 <i>Tensile 200 Hardness 160 to 220</i>	Spheroidal or Nodular iron Cast steel	1865 1030	260-300 / 12 or 500 / 2
ii)	Hand wheel	Grey cast iron	210	FG 200	Mild steel Cast steel Nodular iron	2062 1030 1865	F 410 WA 230 - 450W 400 / 12
iii)	Stem	Stainless steel	6603	12Cr 13 04Cr 18Ni 10 04Cr 17 Ni 12 MO 2	High Tensile Brass Stainless steel	320 or 6912 6603	HT 2 FHTB 2 20Cr13
iv)	Wedge nut, shoe, channel	Leaded tin bronze	318	LTB - 2	High Tensile Brass Phosphor bronze	320 6912 28	HTB 2 FHTB-2
v)	Body seat ring, wedge facing ring and bushes	Leaded tin bronze	318	LTB - 2	Alloy steel Stainless steel	3444 6603	Gr. 1 Gr. 4 Gr. 10 04Cr18Ni10
vi)	Bolts	Carbon steel	1363 (Part 1)	Class 4.6	Stainless steel	6603	
vii)	Nuts	Carbon steel	1363 (Part 3)	Class 4.0	Stainless steel	6603	
viii)	Gasket	Rubber	638	Type B	Neoprene Rubber		
ix)	Gland packing	Jute and hemp	5414		Rubber	638	Type B
x)	Gear	Spheroidal graphite iron	1865	Gr 500 / 7	Alloy steel Cast steel	1570 1030	40 Ni 2Cr1MO 28 Gr B
xi)	Gear housing	Grey cast iron	210	FG 200	Cast steel S.G. iron	1030 1865	230- 450 W 400 / 12
xii)	Pinion & pinion shaft	Wrought carbon steel	1570 (Part 3)	C55Mn75	Alloy steel Stainless steel	1570 (Part 4) 6603	40 Ni12Cr1 MO 28 04Cr18Ni10

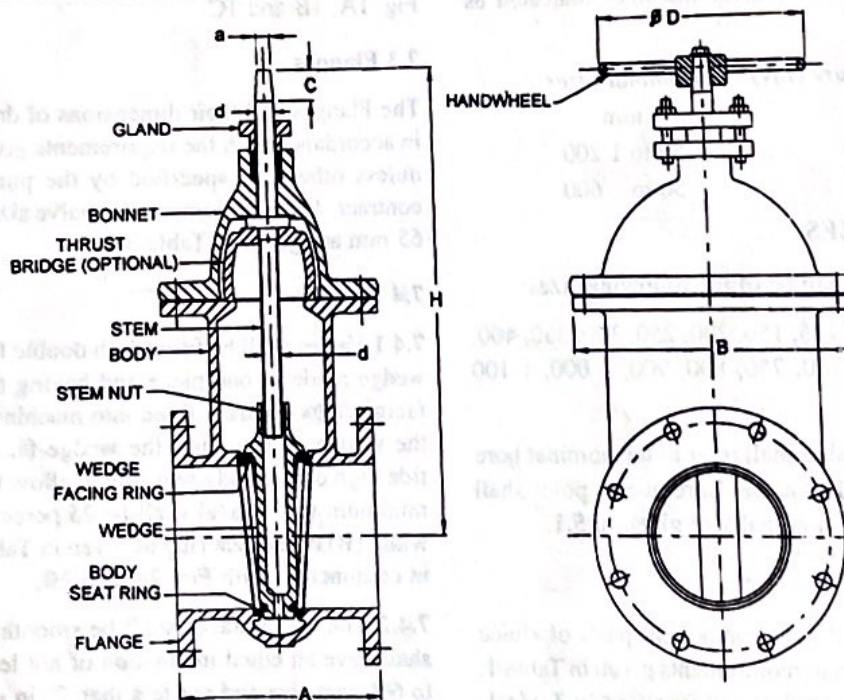


FIG. 1A TYPICAL SKETCH OF A SLUICE VALVE FOR SIZE 150 mm ϕ WITH THRUST PLATE

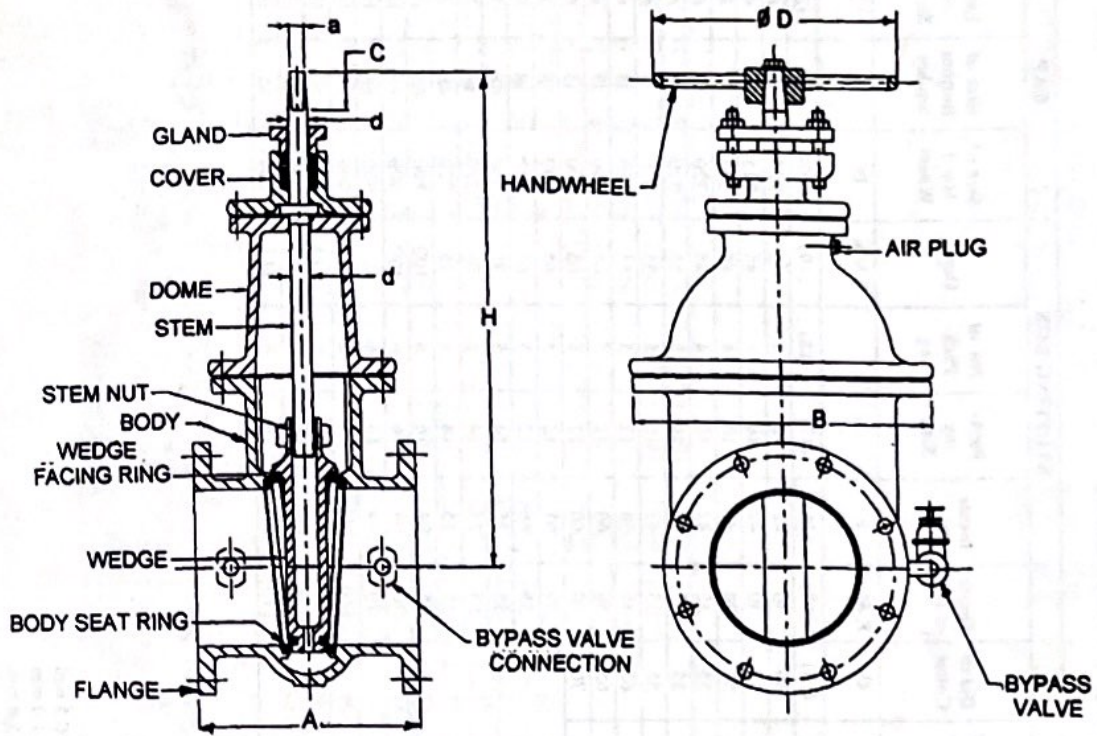


FIG. 1B TYPICAL SKETCH OF A SLUICE VALVE FOR SIZE 200 mm ϕ AND ABOVE

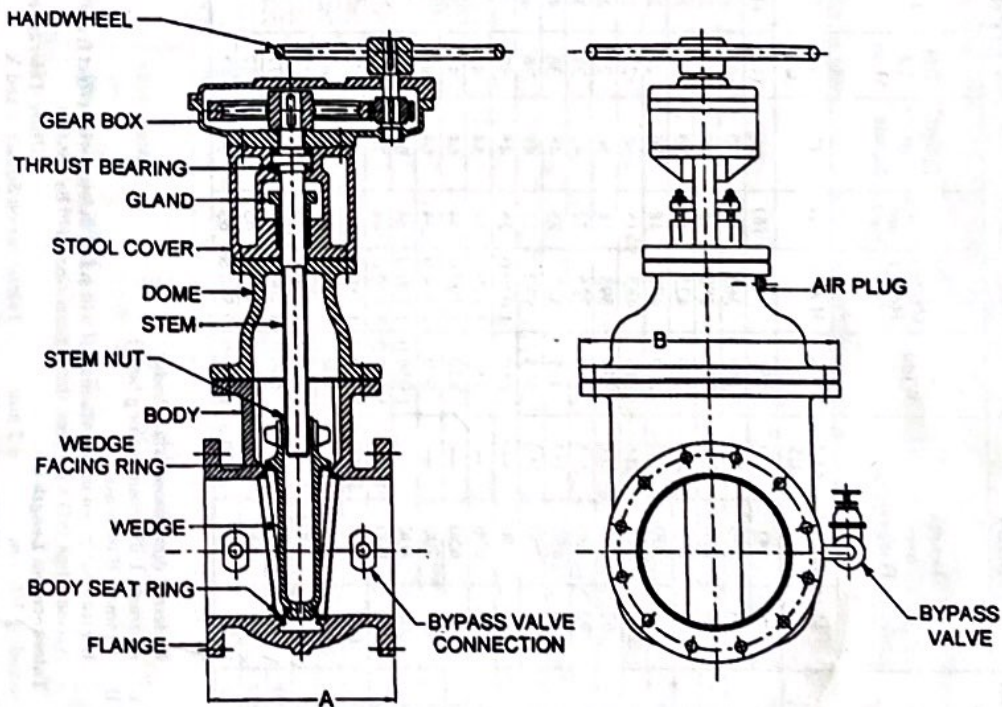


FIG. 1C TYPICAL SKETCH OF A SLUICE VALVE WITH BALL THRUST BEARING AND SPUR GEAR ARRANGEMENT

Table 2 Dimensions of Sluice Valves for Nominal Pressure PN 1.0
(Clauses 7.2.4, 7.7.1, 7.9, 7.11, 7.12, 7.13 and Fig. 1A, 1B, 4 and 5)
All dimensions in millimetres.

Sl No.	Nominal Size	BODY				STEM							STUFFING BOX					CAP			
		Length over Flanges		Width	Overall Height	Squ are	Length of Square	Dia of Stem	Length from Collar		Collar Thickness	Dia of Collar	Depth of Nut	Inside Dia	Pack- ing Size	No. of Pack- ing	Depth	Size of Hand Wheel	Size of Bottom Square	Length of Square	
		PD	ALT-I						ALT- IIS	B Max											L1
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
i)	50	178	250	215	160	365	15	30	22	225	180	8	50	30	42	10	4	45	225	35	60
ii)	65	190	270	230	215	380	15	30	22	225	180	8	50	30	42	10	4	45	225	35	60
iii)	80	203	280	230	220	425	15	30	22	240	190	8	50	30	42	10	4	45	225	35	60
iv)	100	229	300	255	250	470	18	36	27	240	190	8	55	35	47	10	4	45	320	35	60
v)	125	254	325	266	310	485	18	36	27	250	200	10	55	35	47	10	5	55	320	35	60
vi)	150	267	350	280	330	525	18	36	27	250	200	10	55	35	47	10	5	55	320	35	60
vii)	200	292	400	318	460	725	22	42	32	340	280	10	65	45	56	12	5	65	360	35	60
viii)	250	330	450	355	495	835	25	48	36	450	270	15	65	50	60	12	5	65	400	35	60
ix)	300	356	500	380	585	910	25	48	36	465	240	15	70	50	60	12	5	65	400	35	60
x)	350	381	550	—	650	1 020 0	25	45	37	—	—	—	—	50	61	12	5	65	500	48	75
xi)	400	406	600	—	750	1 110 0	31	54	42	—	—	—	—	55	66	12	5	65	640	48	75
xii)	450	432	650	—	830	1 200 0	34	64	47	—	—	—	—	55	75	14	5	75	720	48	75
xiii)	500	457	700	—	900	1 300 0	34	64	47	—	—	—	—	55	75	14	5	75	720	48	75
xiv)	600	508	800	—	1 050 0	1 500 0	34	64	47	—	—	—	—	55	75	14	5	75	720	48	75
xv)	700	610	900	1 130 0	1 150 0	1 670 0	44	78	62	—	—	—	—	65	94	16	6	100	800	65	100
xvi)	750	610	950	1 200 0	1 200 0	1 780 0	48	86	67	—	—	—	—	70	99	16	6	100	900	65	100
xvii)	800	660	1 000 0	1 250 0	1 300 0	1 930 0	48	86	67	—	—	—	—	70	99	16	6	100	900	65	100
xviii)	900	711	1 100 0	1 380 0	1 400 0	2 080 0	53	88	77	—	—	—	—	70	99	16	6	100	900	65	100
xix)	1 000 0	811	1 200 0	1 500 0	1 500 0	2 200 0	53	88	77	—	—	—	—	110	113	18	6	113	900	65	100
xx)	1 000 0	\$ \$	\$ \$	1 650 0	1 650 0	2 450 0	63	99	87	—	—	—	—	110	113	18	6	113	900	65	100
xxi)	1 200 0	\$ \$	\$ \$	1 800 0	1 800 0	2 580 0	63	99	87	—	—	—	—	115	123	18	6	113	1 000 0	65	100

As per manufacturer's design

NOTES

- 1 - PD Preferred dimensions (short body).
- 2 - ALT I Alternate I dimensions (long body).
- 3 - ALT II Alternate II dimensions.
- 4 - \$ Dimensions given under Alternate II will stand deleted with effect from 01 April 2005.
- 5 - (\$\$) As and when ISO stipulates, these dimensions will be notified.

Tolerances on Length L
Up to and including 300 mm ± 2 mm
Above 300 and including 600 mm ± 3 mm

Other Tolerances
Tolerances on Square, a and X ± 0.5 mm
Tolerances on Length of Square, C ± 1.0 mm

Table 3 Dimensions of Sluice Valves for Nominal Pressure PN 1.6
(Clause 7.2.4, 7.7.1, 7.9, 7.11, 7.12, 7.13 and Fig. 1A, 1B, 4 and 5)

All dimensions in millimetres.

SI No.	No- minal Size	BODY			STEM						STUFFING BOX				CAP						
		Length Over Flanges	Width	Overall Height	Square	Length of Square	Dia of Stem	L1	L2	Collar Thick- ness	Dia of Collar	Depth of Nut	Inside Dia	Packing Size	No. of Pack- ing	Depth	Size of Hand Wheel	Size of Bottom Square	Length of Square		
(1)	(2)	PD (3)	(4)	ALT-I (5)	ALT-II (6)	H Max (7)	a (8)	C (9)	d Min (10)	(11)	(12)	i (13)	G (14)	K Min (15)	E (16)	(17)	(18)	(19)	D (20)	X (21)	Y (22)
i)	050	178	250	215	160	365	15	30	22	225	180	08	50	30	42	10	4	45	280	35	60
ii)	065	190	270	230	215	380	15	30	22	225	180	08	50	30	42	10	4	45	280	35	60
iii)	080	203	280	230	220	425	15	30	22	240	190	08	50	30	42	10	4	45	280	35	60
iv)	100	229	300	255	250	470	18	36	27	240	190	08	55	35	47	10	4	45	360	35	60
v)	125	254	325	266	310	485	18	36	27	250	200	10	55	35	47	10	5	55	360	35	60
vi)	150	267	350	280	330	595	18	36	27	250	200	10	55	35	47	10	5	55	360	35	60
vii)	200	292	400	318	460	725	22	42	32	340	280	10	65	45	56	12	5	65	450	35	60
viii)	250	330	450	355	495	835	25	48	36	450	280	10	65	50	60	12	5	65	640	35	60
ix)	300	356	500	380	585	910	25	48	36	465	240	15	70	50	60	12	5	65	640	35	60
x)	350	381	550	690	730	1030	30	55	42					55	66	12	6	77	640	48	75
xi)	400	406	600	750	800	1110	35	60	47					55	75	14	6	90	730	48	75
xii)	450	432	650	820	850	1210	37	65	52					60	80	14	6	90	800	48	75
xiii)	500	457	700	880	930	1340	37	65	52					60	80	14	6	90	800	48	75
xiv)	600	508	800	1000	1050	1500	42	70	57					60	89	16	6	102	800	48	75

As per manufacturer's design

NOTES

- 1 - PD Preferred dimensions (short body).
- 2 - ALT I Alternate I dimensions (long body).
- 3 - ALT II Alternate II dimensions.
- 4 - \$ Dimensions given under Alternate II will stand deleted with effect from 01 April 2005.

Tolerances on Length L

- Up to and including 300 mm ± 2 mm
- Above 300 and including 600 mm ± 3 mm

Other Tolerances

- Tolerances on Square, a and X ± 0.5 mm
- Tolerances on Length of Square, C ± 1.0 mm
- Tolerances on Size of Hand wheel, D ± 5.0 mm
- Tolerances on Length between Square ± 0.5 mm

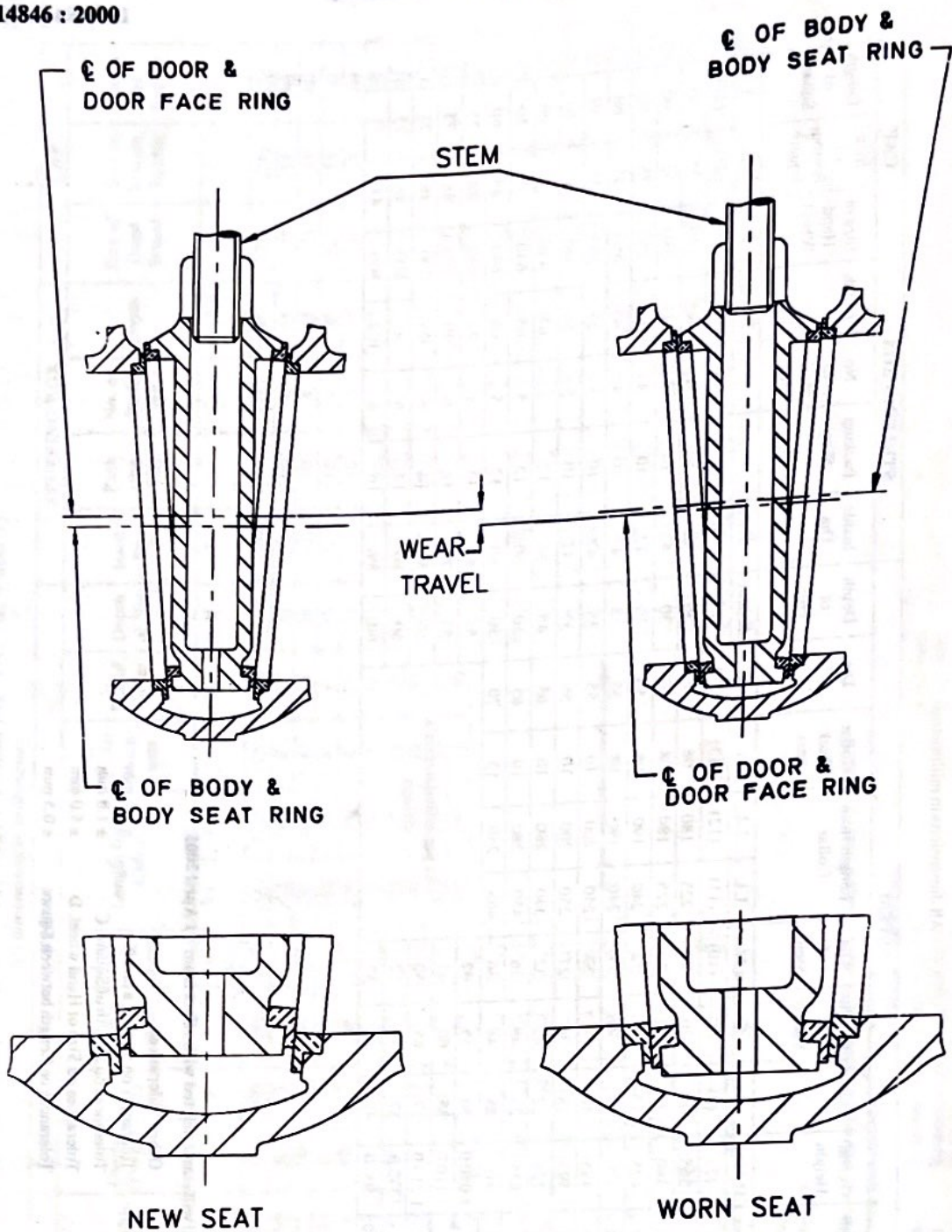


FIG. 2A TYPICAL SKETCH OF WEAR TRAVEL OF WEDGE

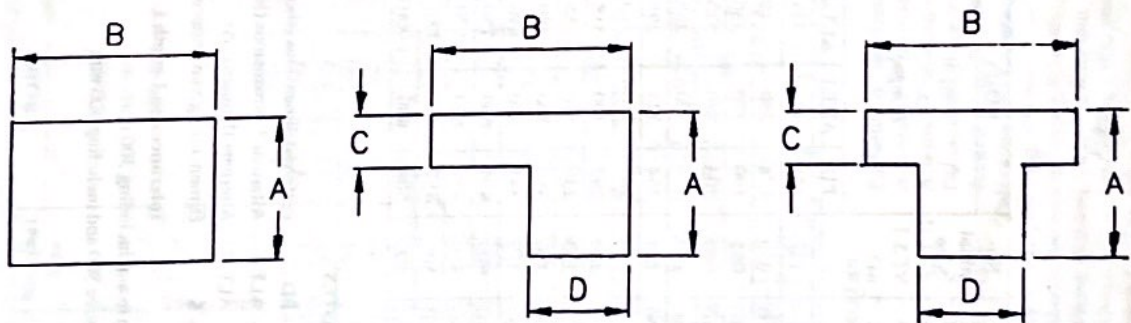
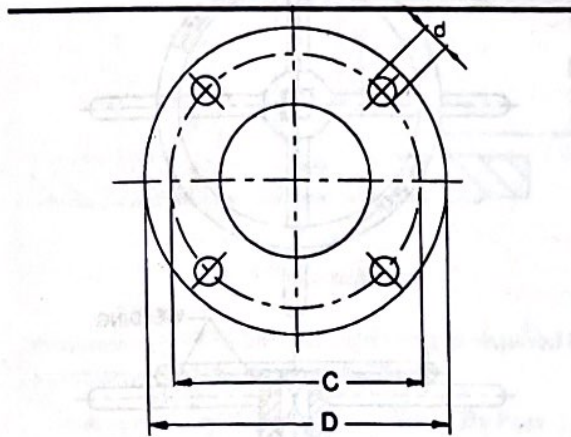


FIG. 2B DIMENSIONS BODY SEAT AND WEDGE FACING RINGS

Table 3A Flanges of Sluice Valves
(Clause 7.3)

All dimensions in millimetres.



Sl No.	Particulars	Dimensions for Nominal Size			
		50		65	
1.	Outside diameter (D)	165	+1.5 -1.0	185	+1.5 -1.0
2.	Thickness of flange	165	+2.0 -0.0	16	+2.0 -0.0
3.	Diameter of bolt circle (C)	125±1.0		145±1.0	
4.	Number of bolts (Equally spaced off centre)	4		4	
5.	Diameter of bolt holes (d)	19		19	
6.	Diameter of bolts	16		16	

Table 4 Dimensions of Body, Seat and Wedge Facing Rings

(Clause 7.4)

All dimensions in millimetres.

Valve Size	A	B	C	D
50	7	10	3	5
65	8	11	3	6
80	8	12	3	6
100	9	13	3	7
125	9	14	4	7
150	9	14	4	7
200	11	16	4	8
250	11	17	4	9
300	13	19	5	10
350	13	19	5	10
400	13	19	5	10
450	13	19	5	10
500	15	22	6	11
600	16	24	6	12
700	19	28	7	14
750	19	28	7	14
800	22	32	8	16
900	24	36	9	18
1 000	27	40	10	20
1 100	30	44	11	22
1 200	30	44	11	22

7.5 Guides and Lugs

The guides and the lugs shall be provided to guide the wedge through its full travel. It shall be optional for the manufacturer to provide guides on the wedge and lugs on the body or vice-versa. Where sluice valves are intended to be used in a horizontal position and where so desired by the purchaser the lugs and guides shall be provided with channel and shoe arrangement as per material specification in Table 1. Wherever the channel and shoe arrangement is provided on guides and lugs, the same shall be secured by non-protruding rigid rivets of non-ferrous metals. The thickness of the channel and shoe liner shall be minimum 5 mm for sizes of valves 450 mm and above. The maximum clearance between the guides and lugs with or without channel and shoe arrangement shall be as given in 7.5.1.

7.5.1 The clearance between lugs and guides for different sizes of sluice valves shall be as given below:

Valve Size (mm)	Maximum Total Clearance (mm)
50 to 300	3
350 to 450	4
500 to 600	5
700 to 1 200	6

7.6 Facing or Seat Rings

The dimensions of the wedge facing rings and body seat rings shall be as specified in Table 4 read in conjunction with Fig. 2B.

7.7 Stems and Wedge Nuts

7.7.1 The major dimensions of stems and wedge nuts shall be in accordance with Tables 2, 3 and 4 and read in conjunction with Fig.1A, 1B, 1C, 2A, 2B, 3A, 3B, 4, 5 and 6.

7.7.2 Stems shall have machine-cut single start square or trapezoidal threads of such lengths that the wedges can be raised to a position so as to ensure full flow passage through the valve.

7.7.3 The clearance between the wedge net housing lugs on the wedge and the inside surface of the valve body shall be adequate to insert the wedge net into the wedge lug recess either in the direction of water flow or in perpendicular direction when the wedge is in closed position.

7.7.4 The stem of all valves shall be so screwed as to close the valve when the cap, hand wheel or crank handle is rotated in clockwise direction (However, counter clockwise rotation of stem for valve closure is permitted subject to agreement between the purchaser and the manufacturer). Stems required for hand wheel mounting shall be tapped on top to suit setscrew.

7.8 Bolts and Nuts

Bolts and nuts shall conform to IS 1363 and IS 4218 (Part 5). Tee headed bolts may also be used where necessary.

7.9 Height of Valve

The heights of valves shall conform to those given in Tables 2 and 3 read in conjunction with Fig 1A, 1B and 1C.

7.10 Gears

Gears if provided, shall be of suitable design (see IS 2535) and workmanship, so as to ensure satisfactory working of sluice valve. Gear ratio shall be worked out keeping in view the maximum stem torque, hand wheel diameter and hand wheel effort as specified in 7.11. The material for different components of gear shall conform to the requirements given in Table 1.

7.11 Hand Wheel

Hand wheel material shall be as per Table 1 and shall have on the upper side of the rim the words OPEN and SHUT with direction arrows as shown in Fig. 3A and 3B. The hand wheel shall be secured by a setscrew. A steel washer to cover the square hole in the boss shall be fixed between the head of the setscrew and the boss of the hand wheel. The rim of the hand wheel may be smooth or serrated and the spokes may be curved or straight. The size of hand wheel for each size of valve shall be as specified in Tables 2 and 3. The total hand wheel effort shall not exceed 80 N at the periphery of the hand wheel on opening/closing of valve.

7.12 Valve Caps

The stem of sluice valve operated by a removable key shall be provided with caps of dimensions as given in



FIG. 3A CAST HANDWHEEL

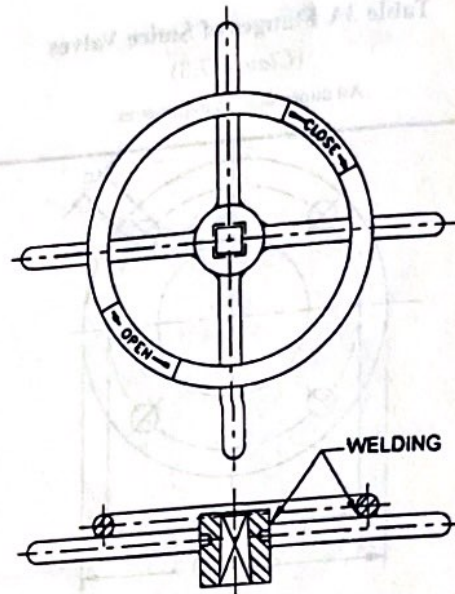


FIG. 3B FABRICATED HANDWHEEL

Tables 2 and 3 (see Fig. 4) and shall be secured by setscrew.

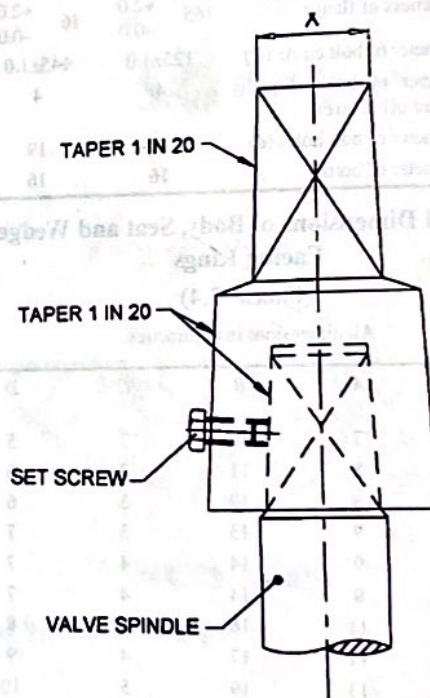


FIG. 4 VALVE CAP

7.13 Stuffing Box

The minimum inside dimensions of stuffing box shall be in accordance with Tables 2 and 3 read in conjunction with Fig. 5.

7.14 By Pass Arrangements

Sluice valves may be provided with by pass arrangements, if required by the purchaser. The

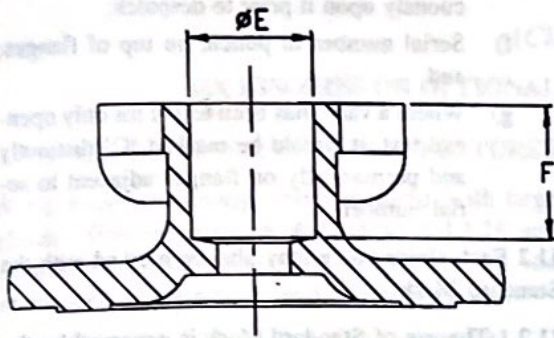


FIG. 5 STUFFING BOX

minimum size of by pass arrangements as required by a purchaser shall be as given below:

Nominal size of Sluice Valve (mm)	Size of By Pass Arrangement (mm)
250	25
300	25
350	40
400	40
450	50
500	50
600	65
700	80
750	80
800	80
900	100
1 000	100
1 100	125
1 200	125

8 ACCESSORIES OR OPTIONAL FEATURES

Some of the accessories or optional features used with large sluice valves are given in Annex A for information.

9 COATING

9.1 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 conforming to IS 5660.

9.2 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 any coating.

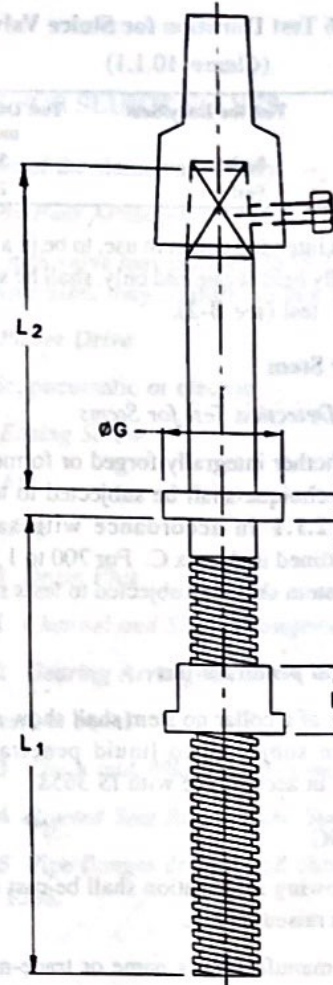


FIG. 6 STEM WITH CAP

10 TESTING

10.1 Hydrostatic Test

10.1.1 Each valve shall be subjected to hydrostatic tests as described in Annex B to the test pressures and test duration specified in Table 5 and Table 6 respectively. The valves during the test shall not show any sign of leakage.

Table 5 Test Pressure for Sluice Valves

PN Rating	Test for Body/Seat	Test Pressure MPa (Gauge)
PN 1.0 50 to 200	Body	1.5
	Seat	1.0
PN 1.6 50 to 600	Body	2.4
	Seat	1.6

10.1.2 Valves intended, when in use, to be rigidly held at both ends in a pipeline either above or below ground, shall be subjected to 'closed-end' test (see B-1).

Mogapascal to Kg/cm^2
 1 MPa = 10.1972 Kg/cm^2

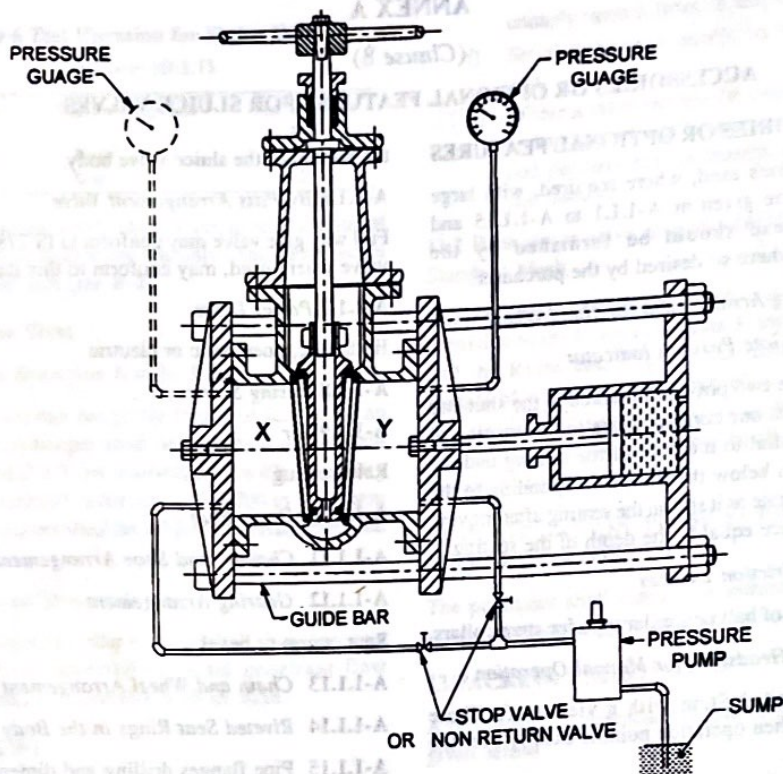


FIG. 7 TYPICAL VALVE TESTING ARRANGEMENT FOR CLOSED-END TEST

B-2 OPEN-END TEST

B-2.1 Each valve held in vertical position shall be subjected to three separate hydrostatic tests. The first test shall be made when the wedge is open and the pressure applied to whole body of the valve after releasing air through the gland and for this test only use of the testing machine for closed end testing shall be permissible. The second and third tests shall be made to determine the water-tightness of the faces with the wedge closed and the valve fixed at one end only. After the test, the wedge shall be closed so that the bonnet remains filled with water. The second test shall be conducted with the pressure (see 10.1.1) applied to the one face and the third test with the pressure applied to the other face of the wedge. Under this condition, the valve seating on the down-stream side shall be watertight for a period of 2 minutes. During the period

of above test, the pressure gauge reading shall not fall below the test pressure.

B-2.2 A typical arrangement for open-end of sluice valve is shown in Fig. 8. The first test is conducted when the gate is open as in the case of closed-end test, the second test is conducted by applying the pressure from the side Y, the third is performed by reversing valve and applying pressure from the side X.

NOTE — Any valve that has been tested only by the closed-end tests and which, during the testing of a main or part of main after laying, occupies a terminal position on the main, should have its exposed end blanked off and its wedge in the open position. Any valve that has been tested by the open-end tests should be similarly treated if the test pressure applied to the main exceeds the maximum working pressure. In either case any precaution necessary to resist hydraulic thrust on the valves by strutting or otherwise should be taken.

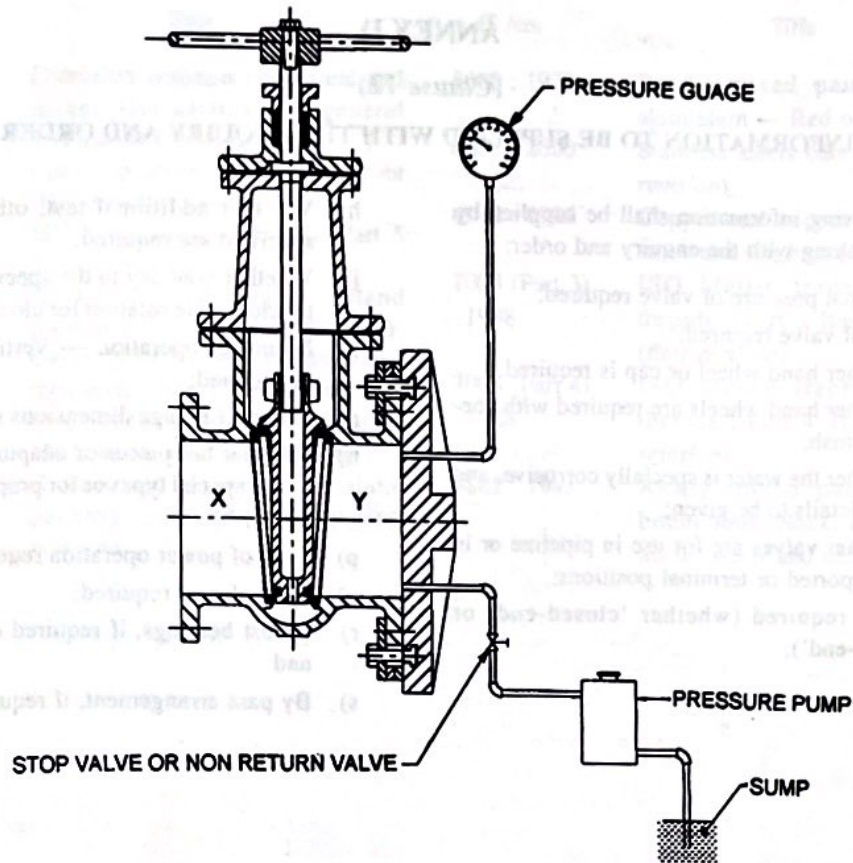


FIG. 8 TYPICAL VALVE TESTING ARRANGEMENT FOR OPEN-END TEST

ANNEX C

(Clause 10.2.1)

SAMPLING OF FORGED STEMS FOR FLAW DETECTION TEST

C-1 LOT

C-1.1 All the forged stems of same size from the same manufacturer, produced from the same batch of brass or stainless steel, shall be grouped together to constitute a lot.

C-1.2 Each lot as defined in C-1.1, shall be taken separately for sampling and testing before it is accepted for utilization in producing of valves. For this purpose, the number of samples depending on the size of the lot shall be drawn from the lot strictly at random. The number of samples from a lot shall be as given in C-2. For ensuring the randomness of sampling, guidance may be taken from IS 4905.

C-2 SCALE OF SAMPLING

The number of sample stems to be selected from a lot shall be as given below:

No. of Stems in the Lot	No. of Stems in the Sample
Up to 8	All
9 to 25	8
26 to 50	13
51 to 100	20
101 to 300	32
301 and over	50

C-3 CRITERIA FOR CONFORMITY

C-3.1 All the sample stems selected from the lot in accordance with C-1.2, shall be subjected to the flaw detection test. The lot shall be accepted only when all the sample stems are found to pass in the flaw detection test.

C-3.2 In case, if any one or more of the sample stems failing in the flaw detection test, all the stems in the lot shall be subjected to flaw detection test before acceptance and only those which are found to be satisfactory, shall be used in the production of valves.