भारतीय मानक

Indian Standard

IS 15905 : 2024

हबलेस अपकेन्द्री ढलवा (स्पन) लोहे के पाइप, फिटिंग्स तथा सहायक उपकरण — स्पिगट श्रेणी — विशिष्टि

(पहला पुनरीक्षण)

Hubless Centrifugally Cast (Spun) Iron Pipes, Fittings and Accessories — Spigot Series — Specification

(First Revision)

ICS 77.140.75; 91.140.80

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Pig Iron and Cast Iron Sectional Committee, MTD 06

FOREWORD

This Indian Standard (First Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Pig Iron and Cast Iron Sectional Committee had been approved by the Metallurgical Engineering Divisional Council.

This standard was first published in 2011. This revision has been brought out to bring the standard in the latest style and format of the Indian Standards. In addition, following significant modifications have been made:

a) The amendment issued has been incorporated;

b) Reference clause has been updated;

c) Scope of the standard has been modified;

d) Range of nominal sizes, DN, of 250, 300 and 400 has been included;

e) Clause **11** on coating has been modified;

f) Marking clause has been updated; and

g) Annex B on drawing and dimension for stainless steel shielding coupling has been modified.

Hubless centrifugally cast (spun) iron pipe, fittings and accessories are widely used in drainage piping system.

In the revision of this standard due consideration has been given to the manufacturing and trade practices followed in the country in this field and assistance has been derived from the following International Standards.

ISO 6594 : 2006 Cast iron drainage pipes and fittings — Spigot series

ISO 185 : 2020 Grey cast irons — Classifications

The composition of the Committee responsible for the formulation of this standard is given in Annex C.

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 : 2022 ‘Rules for rounding off numerical values (*second revision*)’. 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

HUBLESS CENTRIFUGALLY CAST (SPUN) IRON PIPES, FITTINGS AND ACCESSORIES — SPIGOT SERIES — SPECIFICATION

(First Revision)

1 SCOPE

1.1 This standard covers the requirement for hubless centrifugally cast (spun) iron soil, waste, ventilation and rain water pipes together with the details of the fittings and accessories including joints (coupling). The pipe and fittings are intended for non-pressure application, normally as gravity drainage systems, inside and outside discharge of building to a sewer, septic tank or to the point of disposal.

1.2 The fittings and accessories covered in this standard are normally manufactured by sand casting method.

1.3 Cast iron pipes, fittings and accessories including joints (coupling) manufactured to this standard are of hubless (spigot type), without sockets and spigot beads.

1.4 The range of nominal sizes DN, of pipes and fittings followed in this standard is as follows:

50 mm, 75 mm, 100 mm, 150 mm, 200 mm, 250 mm, 300 mm and 400 mm.

1.5 The corresponding joints (couplings) are normally fabricated or casted.

2 REFERENCES

The standards listed 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 edition of these standards.

3 SUPPLY OF MATERIAL

General requirements relating to supply of material shall be as laid down in IS 1387.

4 TERMINOLOGY

For the purpose of this standard, the following definitions apply:

4.1 Accessory — Any casting other than pipe or fitting used in a pipeline.

4.2 Cast Iron — Alloy of iron and carbon in which graphite can be present in different forms.

4.3 Clamp Assembly — That portion of the coupling excluding the gasket and shield.

4.4 Coupling — The complete assembly.

4.5 Drainage System for Buildings — System of pipes, fittings, accessories and joints used to collect and discharge soil, waste water and rainwater from a building; it comprises discharge pipes, stack ventilation and rain water pipes, installed in order to connect the discharge system of building to a sewer or a septic tank or to the point of disposal.

4.6 Fitting — Cast iron casting, other than a pipe, which allows a deviation, a change of direction or diameter, including flanged and access components.

4.7 Gasket — The EPDM or neoprene rubber portion of the coupling and for door portion in fittings.

4.8 Joint — Connection between the ends of pipes and/or fittings, including the coupling or clamping component, with sealing effected by EPDM or neoprene rubber gasket(s).

4.9 Length — Effective length of a pipe or fitting.

NOTE — For hubless pipes and fittings, the effective length is equal to the overall length.

4.10 Nominal Size (*DN*) — An alphanumeric designation of size for pipe, fitting and accessories, which is used for reference purposes. It comprises the letters *DN* followed by a dimensionless whole number which is indirectly related to the physical size, in millimeters, of the bore of the end connections.

4.11 Pipe — Casting of uniform bore, straight in axis normally having plain ends.

4.12 Sewer — System of pipes designed to collect soil and waste water from buildings and to convey them to the point of disposal or treatment.

4.13 Shield — An external corrugated metallic protective device designed to protect the sealing gasket.

5 MANUFACTURE

5.1 Cast iron used for the manufacture of pipes, fittings and accessories shall conform to FG 150 grade (min), as appropriate, specified in IS 210. Specific mass of cast iron shall be taken as 7.15 kg/dm^3 for the purpose of calculation.

5.2 The pipes, fittings and accessories shall be stripped with all precautions necessary to avoid warping or shrinking defects. The pipes, fittings and accessories shall be sound, free from defects, other than any unavoidable surface imperfections which result from the method of manufacture and which do not affect the use of the casting shall not be rejected. By agreement between the purchaser and the manufacturer minor defects may be rectified.

5.3 Special features for ease, strengthening or supporting requirements may be provided on outer surface of fitting castings, excluding free length (l) area, provided it does not impair the functionality of fittings. Its design shall be at the discretion of the manufacturer.

5.4 The pipes and fittings shall be capable of being cut with the tools normally used for installation, preferably with cutting machine, which cuts the pipe perpendicularly with straight edges or as suggested in manufacturer's catalogue. The hardness of the external unmachined surface of the pipe and fittings should not exceed 230 HBW, when tested as per IS 1500 (Part 1).

5.5 In case the hardness is more than 230 HBW, fracture test shall be carried out and if fracture is grey (without showing any chilling effect) such pipes and fittings shall be accepted.

6 JOINTS

6.1 The pipes, fittings and accessories may be assembled using various types of joints. The joints are intrinsic components of the drainage systems, whose characteristics and tolerances are specified in the manufacturers catalogues.

6.2 Taking into account the different applications of cast iron pipework systems, various joint designs are permitted provided that they satisfy the requirement of this standard. The joints shall incorporate one or more EPDM or neoprene rubber gasket(s) to ensure leak tightness and prevent direct contact between the ends of pipes, fittings and accessories. Rubber gasket(s) must satisfy the requirements given in Table 29, Table 30 and Table 31 of Annex B.

6.3 Heavy duty coupling, as given in Annex B, shall be used in areas, where more thrust pressure is anticipated, preferably in basement and rainwater lines.

6.4 In order to achieve satisfactory assembly, each end shall present a free length corresponding at least to the values of Table 1.

6.5 Materials for clamping components shall usually be made from:

a) Ductile iron of grade SG 500/7 as per IS 1865 or (ductile iron clamping components shall be coated as given in **11**; and

b) Austenitic stainless steels of 300 series, preferably of 304 or 316 grades.

NOTE — Some drawings along with dimensions of coupling are suggested in Annex B for guidance only.

6.6 All parts of the joints shall be free from defects likely to compromise their suitability for use. If required, the manufacturer shall furnish the certificate stating that the product has been tested and inspected as per the requirements of the specification and the requirements have been met.

7 VISUAL INSPECTION AND HAMMER TEST

All pipe, fitting, and accessories are visually inspected internally and externally using an appropriate light source (for example, against light) and tested for soundness by striking with a light hand hammer which should emit a clear ringing sound.

8 CRUSH TESTS ON PIPES RING

Perform crush tests on three rings at least 60 mm long, with parallel ends, and cut square to the axis from uncoated pipes.

8.1 Crush the rings between parallel platens (without V-support) of a length greater than that of the ring.

8.2 Calculation

$$\text{Crushing strength } (\sigma) = \frac{3F\,(d-e)}{\pi b e^2}$$

where

F = load applied, in N;

d = mean outside diameter or pipe ring before testing, in mm;

e = mean thickness measured at the rupture level, in mm; and

b = mean length, in mm.

The measured strength shall be at least 300 N/mm^2 for an average of three sets.

9 HYDROSTATIC TEST

9.1 Each pipe and fitting shall be tested at factory for hydrostatic pressure of 0.07 MPa (N/mm^2). These shall not show any sign of leakage, sweating or other defects of any kind.

9.2 The pressure shall be applied internally and shall be steadily maintained for a period of 15 s.

9.3 Test shall be carried out after the application of surface coating on pipes, fittings and accessories.

10 DIMENSIONS AND TOLERANCES

10.1 The dimension and tolerances are as given in **10.2** to **10.8**.

10.2 External Diameters and Tolerances

The external diameters of pipes and fittings and the tolerance applicable are given in Table 2.

10.3 Thickness and Tolerances

Table 3 gives the minimum and nominal thickness of pipes and fittings. Maximum thickness is not specified.

10.4 Length and Tolerances

The normal manufacturing length of pipes shall be 3 000 mm. However, other lengths of pipes are permitted and can be supplied by the agreement of manufacturer and purchaser.

Tolerances on length of the pipes and fittings are given in **10.8**.

10.5 Tolerances on Angles

Tolerance on the angles of the fittings are fixed at ± 2° throughout.

10.6 Straightness of Pipe

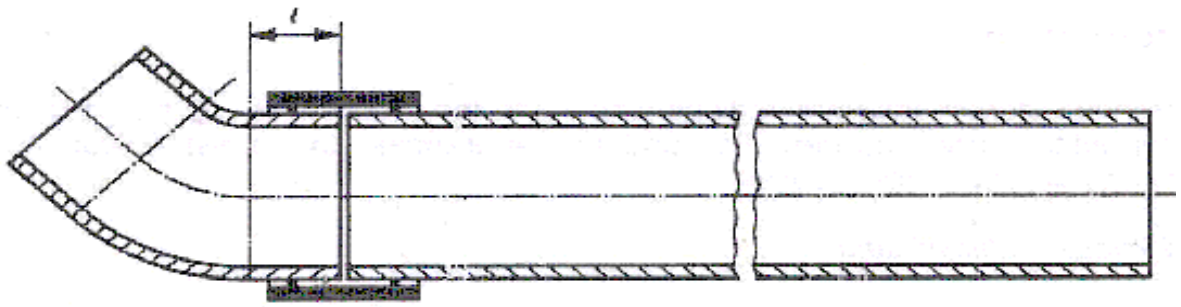
Pipe shall be straight to the extent of that for 3 000 mm length and deviation at point shall not exceed 0.15 percent of their length for all sizes.

10.7 End Faces

The end faces of pipes and fittings shall be free from fault, which may impair their fitness to use and their faces shall be perpendicular with the axis of the symmetry of the products. The maximum deviation from the right angle shall be upto 2° for all sizes.

Table 1 Minimum Free Lengths

(*Clause* 6.4)



Sl No.	Nominal Size *DN*	Minimum Free Length (*l*) (mm)
(1)	(2)	(3)
i)	50	25
ii)	75	30
iii)	100	35
iv)	150	45
v)	200	56
vi)	250	66
vii)	300	76
viii)	400	76

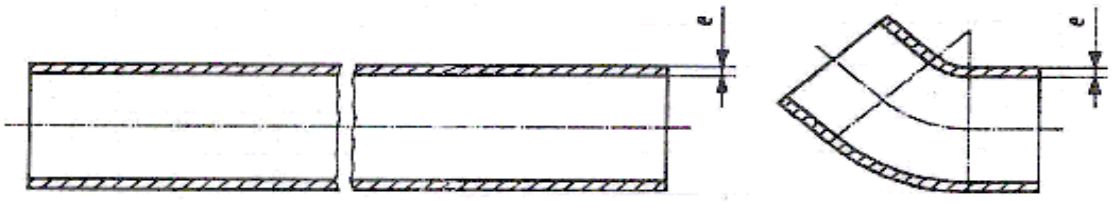
Table 2 External Diameters and Tolerances

(*Clause* 10.2)

Sl No.	Nominal Size	External Diameter	Tolerance on External Diameter
	DN, mm	*DE*, mm	*DE*, mm
(1)	(2)	(3)	(4)
i)	50	58	+ 2 - 1
ii)	75	83	+ 2 - 1
iii)	100	110	± 2
iv)	150	160	± 2
v)	200	210	± 2.5
vi)	250	274	± 2.5
vii)	300	326	± 2.5
viii)	400	429	+ 2 - 3

Table 3 Nominal and Minimum Thicknesses of Pipes and Fittings

(*Clause* 10.3)



Sl No.	DN	Thickness (*e*) mm			
		Pipe		Fittings	
		Nominal	*Minimum*	*Nominal*	*Minimum*
(1)	(2)	(3)	(4)	(5)	(6)
i)	50	3.5	3.0	4.2	3.0
ii)	75	3.5	3.0	4.2	3.0
iii)	100	3.5	3.0	4.2	3.0
iv)	150	4.0	3.5	5.3	3.5
v)	200	5.0	4.0	6.0	4.0
vi)	250	5.5	4.5	7.0	4.5
vii)	300	6.0	5.0	8.0	5.0
viii)	400	6.3	5.0	8.3	5.0

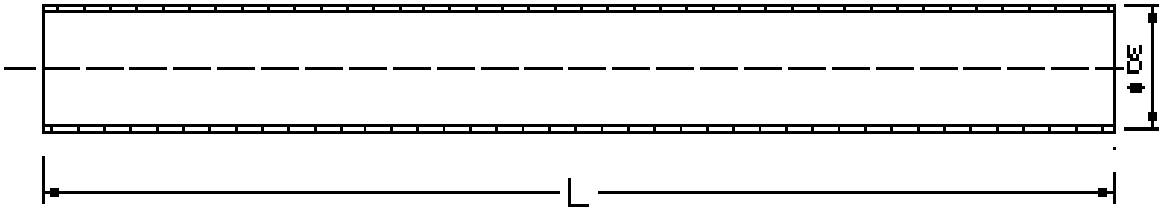


FIG. 1 PIPE LENGTH

10.8 Other Dimensions

10.8.1 *Pipe*

Tolerance on L of 3 000 mm is ± 20 mm, for all diameters (*see* Fig. 1).

10.8.2 *Fittings*

10.8.2.1 45° *Bend*

Tolerance on *a* is ± 5 mm, (*see* Table 4).

10.8.2.2 88° *Bend with or without access door*

Tolerance on *a* is ± 5 mm, (*see* Table 5).

10.8.2.3 88° *Long radius bend*

Tolerance on *a*, *r* is ± 5 mm, (*see* Table 6).

10.8.2.4 88° *Long tail bend*

Tolerance on *a*, *b*, *r* is ± 5 mm, (*see* Table 7).

10.8.2.5 *Horn plain bend*

Tolerance on *a*, *b*, *c*, *d*, *r* is ± 5 mm, (*see* Table 8).

10.8.2.6 *Double bend*

Tolerance on *a*, *b*, *c*, *r* is ± 5 mm, (*see* Table 9).

10.8.2.7 45° *Single branch*

Tolerance on *L*, *a*, *b* is ± 5 mm, (*see* Table 10).

10.8.2.8 88° *Single branch with or without access door*

Tolerance on *L*, *a*, *b* is ± 5 mm, (*see* Table 11).

10.8.2.9 88° *Double branch*

Tolerance on *L*, *a*, *b* is ± 5 mm, (*see* Table 12).

10.8.2.10 45° *Double branch*

Tolerance on *L*, *a*, *b* is ± 5 mm, (*see* Table 13).

10.8.2.11 *Diminishing pieces*

Tolerance on *L* is ± 5 mm, (*see* Table 14).

10.8.2.12 *Offset*

Tolerance on *L*, *a*, *b*, *r* is ± 5 mm, (*see* Table 15).

10.8.2.13 *Equal and unequal parallel branch*

Tolerance on *L*, *a*, *b*, *c*, *d*, *r* is ± 5 mm, (*see* Table 16).

10.8.2.14 *P trap*

Tolerance on *a*, *b*, *C*, *r*, *j*, *k*, *d* is ± 5 mm, (*see* Table 17).

10.8.2.15 *H ventilation pipe*

Tolerance on *L*, *a*, *b*, *c*, *d*, *e*, *f*, *g* is ± 5 mm, (*see* Table 18).

10.8.2.16 *Y ventilation pipe*

Tolerance on *L*, *a*, *b*, *c*, *d*, *r* is ± 5 mm, (*see* Table 19).

10.8.2.17 88° *T Y single branch*

Tolerance on *L*, *a*, *b*, *c*, *d*, *r* is ± 5 mm, (*see* Table 20).

10.8.2.18 *Vent cowel*

Tolerance on *L*, *a*, *b* is ± 5 mm, (*see* Table 21).

10.8.2.19 *Inspection pipe* (*clean-out pipe*)

Tolerance on *L*, *c*, *d* is ± 5 mm, (*see* Table 22).

10.8.2.20 *Unequal trap*

Tolerance on *a*, *b*, *C*, *R1*, *R2*, *j*, *s*, *d* is ± 5 mm, (*see* Table 23).

10.8.2.21 88° *Single branch with or without door* (*sweep type*)

Tolerance on *L*, *a*, *b*, *r* is ± 5 mm, (*see* Table 24).

10.8.2.22 88° *Single branch socketed with access door* (*sweep type*)

Tolerance on *L*, *a*, *b*, *r*, *DI is* ± 5 mm and *P* is ± 10 mm, (*see* Table 25).

10.8.2.23 *Multi inlet pipe*

Tolerance on *L*, *a*, *b*, *c*, *r* is ± 5 mm, (*see* Table 26)

10.8.2.24 *Floor trap* (*deep seal*)

Tolerance o*n L, a, b, c, d,* DI is ± 5 mm, S is ± 2 mm, P is ± 10 mm, (*see* Table 27).

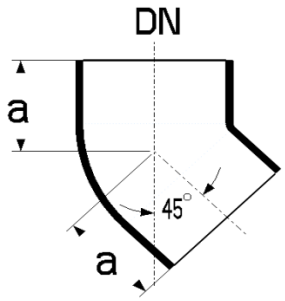
10.8.2.25 *Access door*

Tolerance one, *a*, *b*, *c*, *d*, *f* is ± 5 mm, (*see* Table 28).

NOTE — Intolerance dimension given in the standard are for guidance only.

Table 4 45° Bend

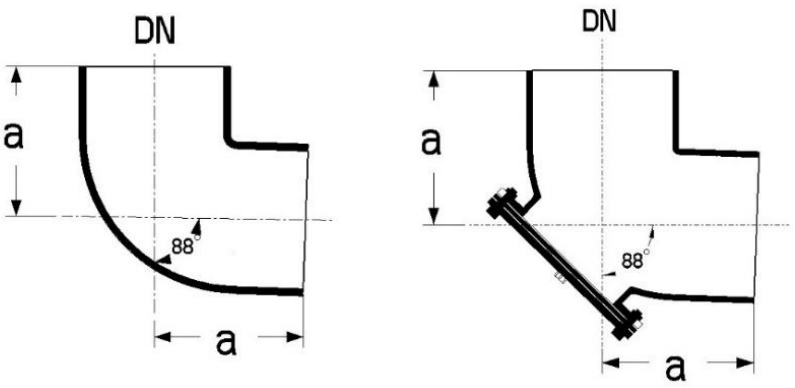
(*Clause* 10.8.2.1)



Sl No.	Nominal Size	*a*
	DN	(mm)
(1)	(2)	(3)
i)	50	50
ii)	75	60
iii)	100	70
iv)	150	90
v)	200	110
vi)	250	130
vii)	300	155
viii)	400	247

Table 5 88° Bend with or without Access Door

(*Clause* 10.8.2.2)

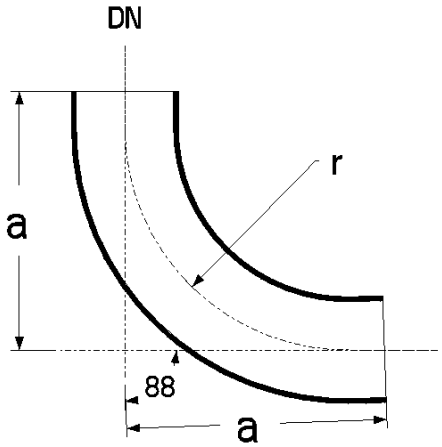


Sl No.	Nominal Size *DN*	Without Access Door *a* (mm)	With Access Door *a* (mm)
(1)	(2)	(3)	(4)
i)	50	75	75
ii)	75	95	95
iii)	100	110	110
iv)	150	145	145
v)	200	180	180
vi)	250	220	–
vii)	300	260	–

NOTE — For details of access door, *see* Table 28.

Table 6 88° Long Radius Bend

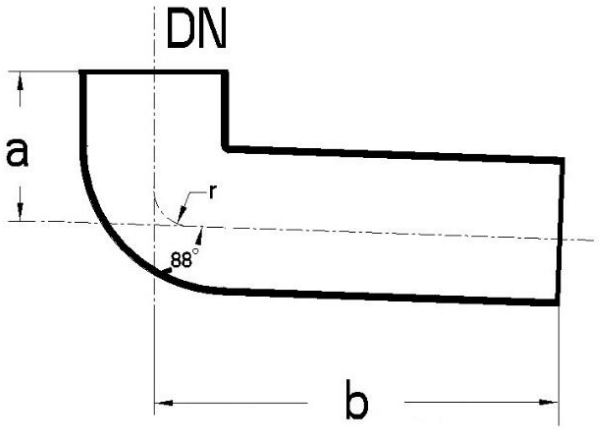
(*Clause* 10.8.2.3)



Sl No.	Nominal Size *DN*	***a*** (mm)	***r*** (mm)
(1)	(2)	(3)	(4)
i)	50	241	203
ii)	75	254	216
iii)	100	267	229
iv)	150	305	254

Table 7 88° Long Tail Bend

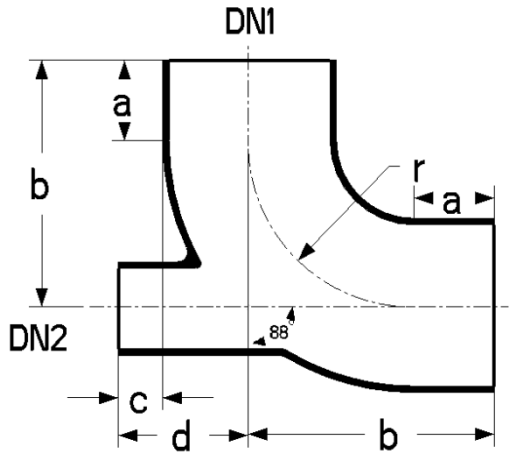
(*Clause* 10.8.2.4)



Sl No.	Nominal Size *DN*	***a*** (mm)	***b*** (mm)	***r*** (mm)
(1)	(2)	(3)	(4)	(5)
i)	50	75	300	29
ii)	75	95	300	41.5
iii)	100	110	300	55
iv)	150	145	300	80
v)	200	180	300	106

Table 8 Horn Plain Bend

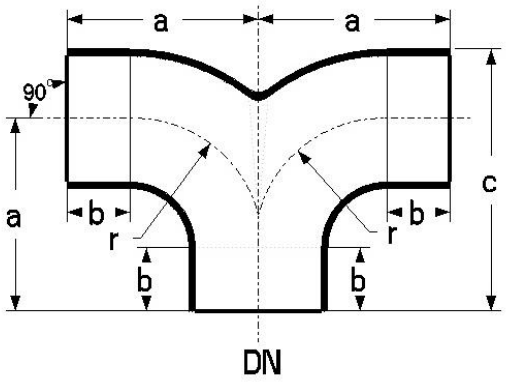
(*Clause* 10.8.2.5)



Sl No.	Nominal Size		***a*** (mm)	***r*** (mm)	***b*** (mm)	***c*** (mm)	***d*** (mm)
	*DN*1	*DN*2					
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
i)	75	50	45	89	134	40	81.5
ii)	100	50	50	102	152	40	95

Table 9 Double Bend

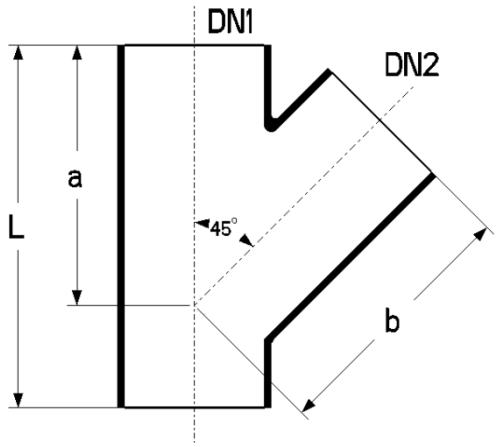
(*Clause* 10.8.2.6)



Sl No.	Nominal Size *DN*	***a*** (mm)	***b*** (mm)	***c*** (mm)	***r*** (mm)
(1)	(2)	(3)	(4)	(5)	(6)
i)	75	134	45	175.5	89
ii)	100	152	50	207	102

Table 10 45° Single Branch

(*Clause* 10.8.2.7)



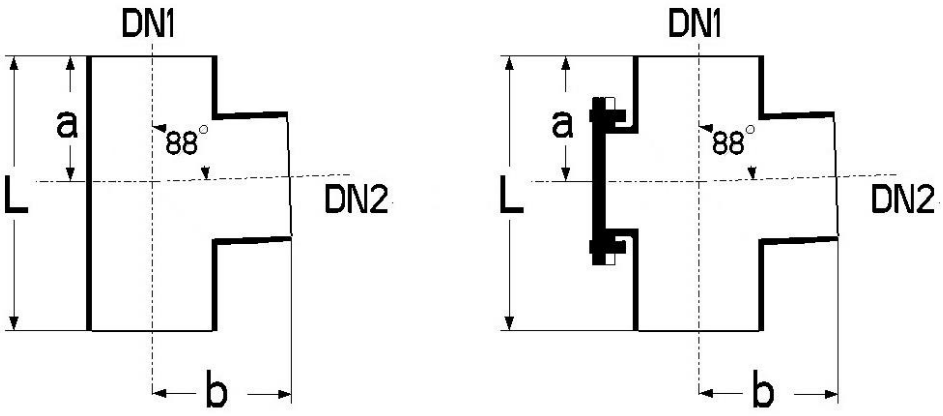
Sl No.	Nominal Size		***L***	***a***	***b***
	*DN*1 (mm)	*DN*2 (mm)	(mm)	(mm)	(mm)
(1)	(2)	(3)	(4)	(5)	(6)
i)	50	50	160	115	115
ii)	75	50	180	135	135
iii)	75	75	215	155	155
iv)	100	50	185	150	150
v)	100	75	220	170	170

Table 10 (*Concluded*)

Sl No.	Nominal Size		*L*	*a*	*b*
	*DN*1 (mm)	*DN*2 (mm)	(mm)	(mm)	(mm)
(1)	(2)	(3)	(4)	(5)	(6)
vi)	100	100	260	190	190
vii)	150	75	225	215	215
viii)	150	100	280	225	225
ix)	150	150	355	265	265
x)	200	100	300	260	260
xi)	200	150	375	300	300
xii)	200	200	455	340	340
xiii)	250	100	320	305	305
xiv)	250	150	405	350	350
xv)	250	200	470	380	380
xvi)	250	250	560	430	430
xvii)	300	100	350	345	345
xviii)	300	150	415	380	380
xix)	300	200	485	415	440
xx)	300	250	580	465	465
xxi)	300	300	660	505	505
xxii)	400	300	660	555	565

Table 11 88° Single Branch with or without Access Door

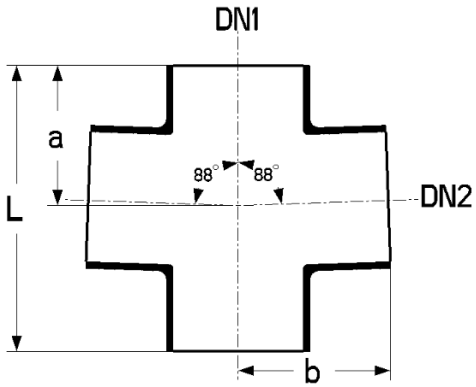
(*Clause* 10.8.2.8)



Sl No.	Nominal Size		Without Access Door			With Access Door		
	*DN*1	*DN*2	*L* (mm)	*a* (mm)	*b* (mm)	*L* (mm)	*a* (mm)	*b* (mm)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
i)	50	50	145	65	75	152	72	75
ii)	75	50	170	70	80	172	72	80
iii)	75	75	180	85	95	182	87	95
iv)	100	50	170	76	105	170	76	105
v)	100	75	190	88	110	190	88	110
vi)	100	100	220	105	115	227	112	115
vii)	150	100	245	115	145	245	115	145
viii)	150	150	300	145	155	300	145	155
ix)	200	75	250	120	170	250	120	170
x)	200	100	270	125	175	270	125	175
xi)	200	150	325	150	185	325	150	185
xii)	200	200	365	180	180	365	180	180
xiii)	250	250	455	225	225	–	–	–
xiv)	300	300	530	265	265	–	–	–

Table 12 88° Double Branch

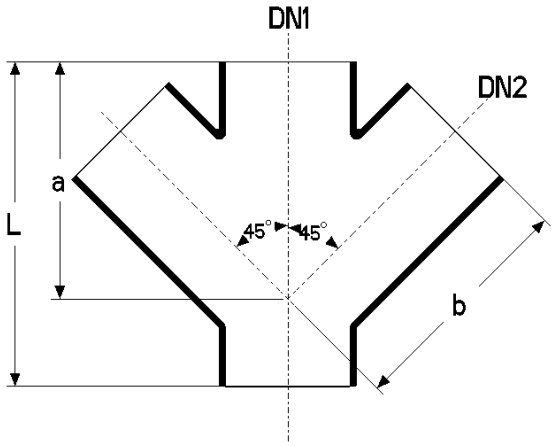
(*Clause* 10.8.2.9)



Sl No.	Nominal Size		*L*	*a*	*b*
	*DN*1	*DN*2	(mm)	(mm)	(mm)
(1)	(2)	(3)	(4)	(5)	(6)
i)	50	50	145	65	75
ii)	75	50	170	70	80
iii)	75	75	180	85	95
iv)	100	50	170	76	105
v)	100	75	190	88	110
vi)	100	100	220	105	115
vii)	150	100	245	115	145
viii)	150	150	300	145	155
ix)	200	75	250	120	170
x)	200	100	270	125	175
(xi)	200	150	325	150	185
xii)	200	200	365	180	195

Table 13 45° Double Branch

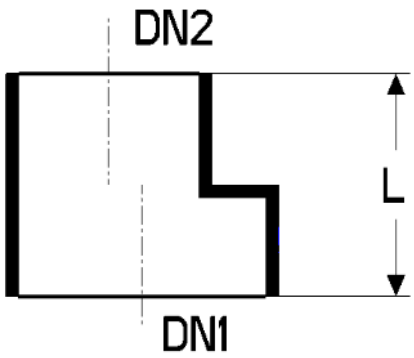
(*Clause* 10.8.2.10)



Sl No.	Nominal Size		*L*	*a*	*b*
	*DN*1	*DN*2	(mm)	(mm)	(mm)
(1)	(2)	(3)	(4)	(5)	(6)
i)	50	50	160	115	115
ii)	75	50	180	135	135
iii)	75	75	215	155	155
iv)	100	50	185	150	150
v)	100	75	220	170	170
vi)	100	100	260	190	190
vii)	150	75	240	205	205
viii)	150	100	280	225	225
ix)	150	150	355	265	265
x)	200	75	250	240	240
xi)	200	100	335	290	290
xii)	200	150	375	300	300
xiii)	200	200	455	340	340

Table 14 Diminishing Pieces (Reducer)

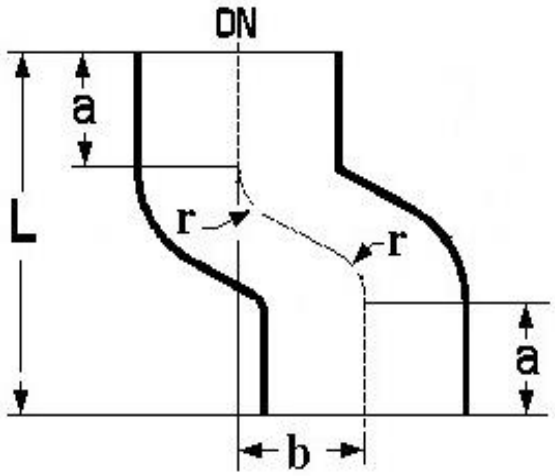
(*Clause* 10.8.2.11)



Sl No.	Nominal Size		*L*
	*DN*1	*DN*2	(mm)
(1)	(2)	(3)	(4)
i)	75	50	80
ii)	100	50	80
iii)	100	75	90
iv)	150	75	100
v)	150	100	105
vi)	200	100	115
vii)	200	150	125
viii)	250	75	125
ix)	250	100	125
x)	250	150	135
xi)	250	200	145
xii)	300	75	140
xiii)	300	100	140
xiv)	300	150	150
xv)	300	200	160
xvi)	300	250	170
xvii)	400	300	200

Table 15 Offset

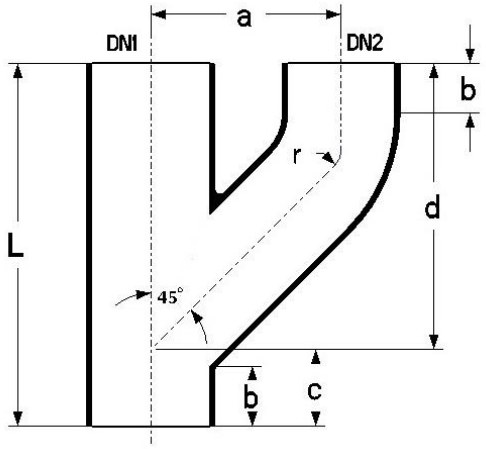
(*Clause* 10.8.2.12)



Sl No.	Offset	Nominal Size *DN*	*L* (mm)	*a* (mm)	*b* (mm)	*r* (mm)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
i)	65 mm	50	165	50	65	14.5
		75	185	60	65	20.75
		100	205	70	65	27.5
		150	245	90	65	40
ii)	130 mm	50	230	50	130	14.5
		75	250	60	130	20.75
		100	270	70	130	27.5
		150	310	90	130	40
		200	350	110	130	53
iii)	200 mm	50	300	50	200	14.5
		75	320	60	200	20.75
		100	340	70	200	27.5
		150	380	90	200	40

Table 16 Equal and Unequal Parallel Branch

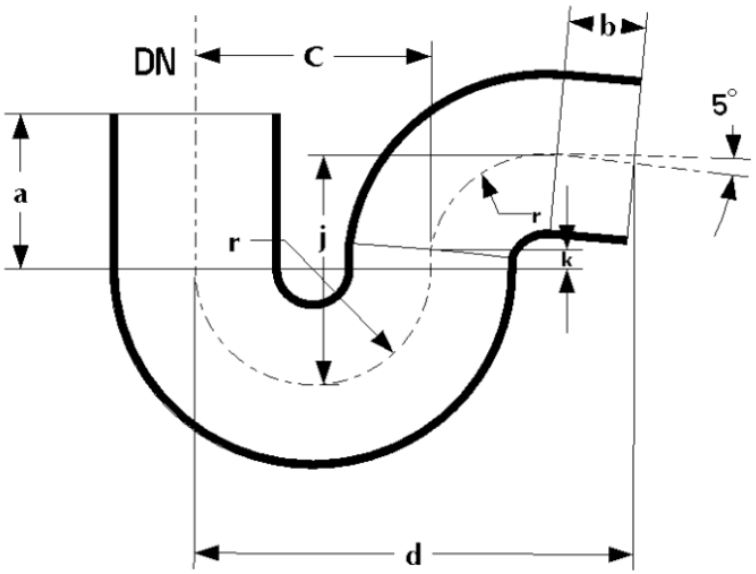
(*Clause* 10.8.2.13)



Sl No.	Nominal Size		*L*	*a*	*b*	*c*	*d*	*r*
	*DN*1	*DN*2	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
i)	75	50	325	178	45	64	261	29
ii)	75	75	325	178	45	64	261	41.5
iii)	100	50	311	178	45	50	261	29
iv)	100	75	311	178	50	50	261	41.5
v)	100	100	339	178	50	72	267	55

Table 17 P Trap

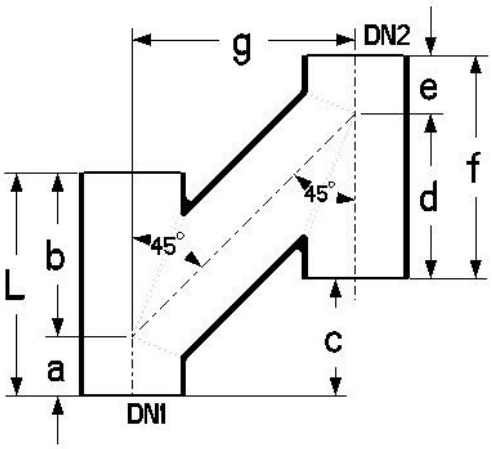
(*Clause* 10.8.2.14)



Sl No.	Nominal Size	*a*	*b*	*C*	*r*	*j*	*k*	*d*
	DN	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
i)	50	51	40	102	51	102	-	193
ii)	75	83	45	127	64	140	13	236
iii)	100	102	50	152	76	165	13	278
iv)	150	152	60	203	102	216	13	365

Table 18 H Ventilation Pipe

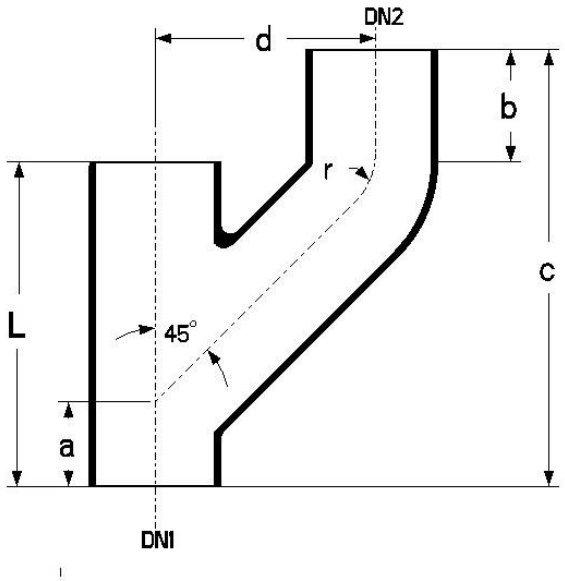
(*Clause* 10.8.2.15)



Sl No.	Nominal Size		*L*	*a*	*b*	*c*	*d*	*e*	*f*	*g*
	*DN*1	*DN*2	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
i)	75	75	190	55	135	63	138	52	190	150
ii)	100	75	225	60	165	45	165	60	225	150
iii)	100	100	230	61	169	121	170	60	230	230
iv)	150	100	280	50	230	81	210	70	280	241

Table 19 Y Ventilation Pipe

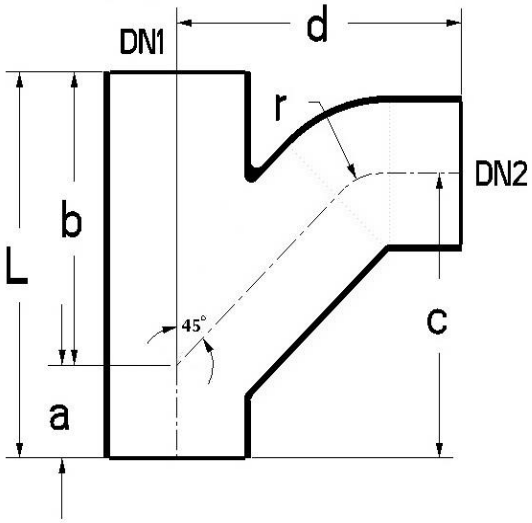
(*Clause* 10.8.2.16)



Sl No.	Nominal Size		*L*	*a*	*b*	*c*	*d*	*r*
	*DN*1	*DN*2	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
i)	75	75	200	55	53	260	150	41.5
ii)	100	75	220	50	50	270	150	41.5
iii)	100	100	245	60	85	330	200	55
iv)	150	100	286	50	100	390	241	55

Table 20 88° T Y Single Branch

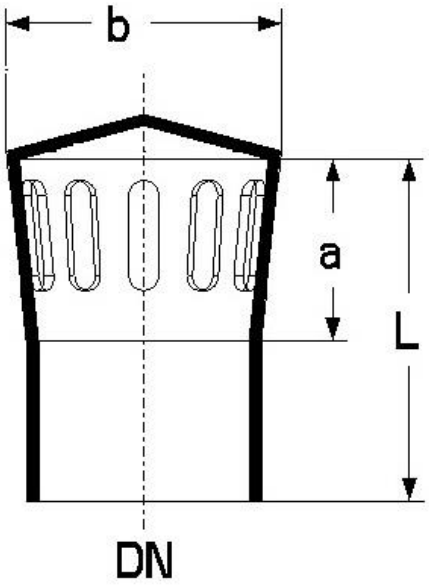
(*Clause* 10.8.2.17)



Sl No.	Nominal Size		*L*	*a*	*b*	*c*	*d*	*r*
	*DN*1	*DN*2	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
i)	50	50	150	45	105	119	126	29
ii)	75	50	165	45	120	125	138	29
iii)	75	75	195	50	145	157	164	41.5
iv)	100	50	165	35	130	122	154	29
v)	100	75	195	45	150	165	180	41.5
vi)	100	100	270	65	205	199	210	55
vii)	150	75	235	42	193	176	208	41.5
viii)	150	100	257	42	215	187	210	55
ix)	150	150	320	75	245	268	270	80
x)	200	75	255	35	220	190	237	41.5
xi)	200	100	290	45	245	219	252	55
xii)	200	150	340	65	275	277	300	80
xiii)	200	200	410	98	312	340	349	106
xiv)	250	150	395	55	340	315	348	80
xv)	250	200	465	90	375	360	381	106
xvi)	250	250	560	135	425	423	435	132.5

Table 21 Vent Cowel

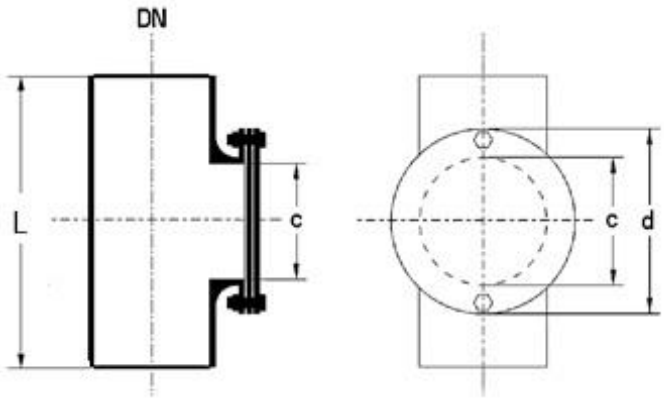
(*Clause* 10.8.2.18)



Sl No.	Nominal Size *DN*	***L*** (mm)	***a*** (mm)	***b*** (mm)
(1)	(2)	(3)	(4)	(5)
i)	50	130	70	78
ii)	75	140	80	91
iii)	100	160	85	118
iv)	150	185	100	168
v)	200	215	125	220

Table 22 Inspection Pipe (Clean Out Pipe)

(*Clause* 10.8.2.19)

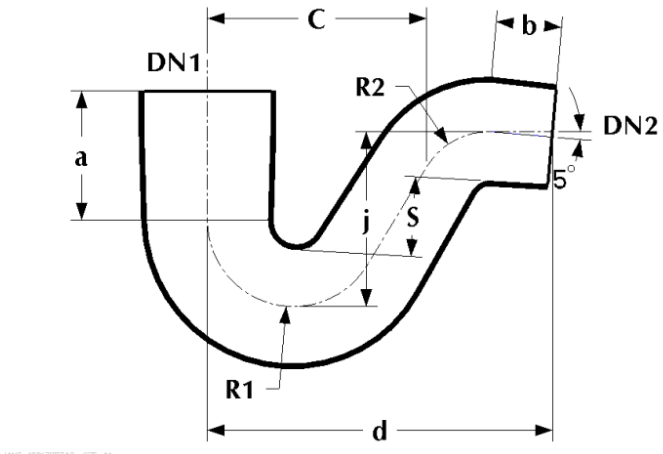


Sl No.	Nominal Size *DN*	*L* (mm)	*c* (mm)	*d* (mm)
(1)	(2)	(3)	(4)	(5)
i)	50	175	53	105
ii)	75	205	75	125
iii)	100	250	104	159
iv)	150	330	155	215
v)	200	400	205	262
vi)	250	420	205	262
vii)	300	450	205	262
viii)	400	475	205	262

NOTE — Screws shall be of galvanized steel and rubber gasket (EPDM or Neoprene) of 3 mm (min.) thickness shall be provided for packing along with access door. The design of rubber gasket shall be at the sole discretion of the manufacturer.

Table 23 Unequal Trap

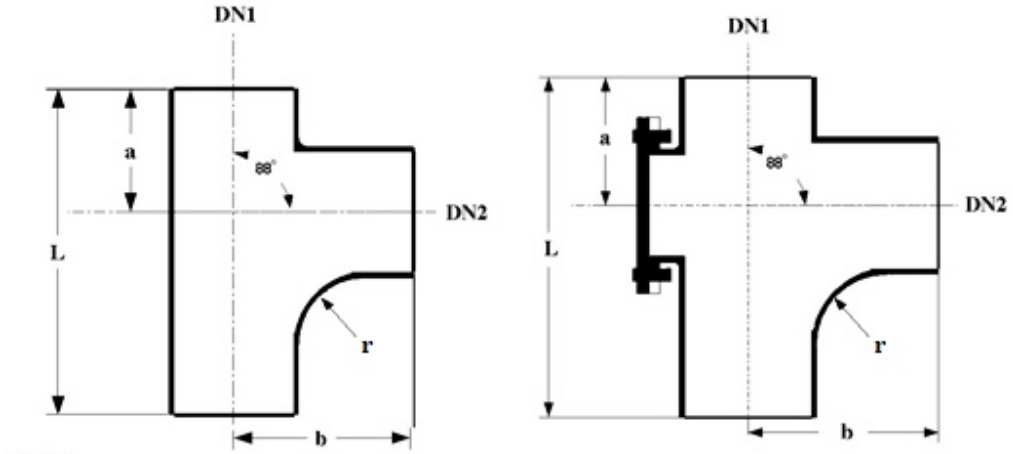
(*Clause* 10.8.2.20)



Sl No.	Nominal Size		*a*	*b*	*C*	*R*1	*R*2	*j*	*S*	*d*
	DN	*DN*1	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
i)	100	75	102	55	175	68	55	140	50	280

Table 24 88° Single Branch With or Without Access Door (Sweep Type)

(*Clause* 10.8.2.21)

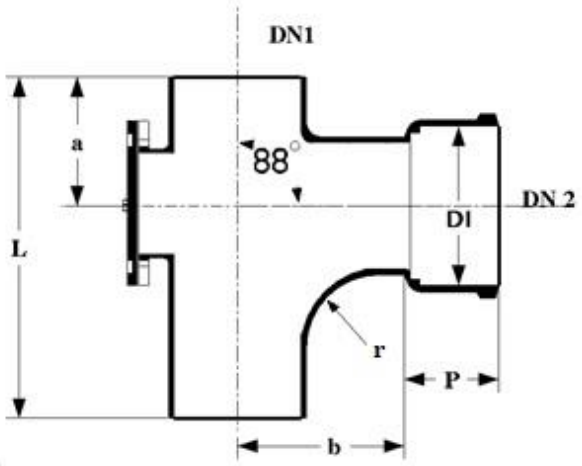


Sl No.	Nominal Size		Without Door				With Door			
	*DN*1	*DN*2	*L* (mm)	*a* (mm)	*b* (mm)	*r* (mm)	*L* (mm)	*a* (mm)	*b* (mm)	*r* (mm)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
i)	75	75	224	98	122	40	224	98	122	40
ii)	100	75	244	100	138	40	244	100	138	40
iii)	100	100	270	102	152	55	270	102	152	55
iv)	150	100	300	117	202	45	300	117	202	45
v)	150	150	400	140	260	75	400	140	260	75
vi)	200	150	428	157	283	75	–	–	–	–
vii)	200	200	478	182	293	85	–	–	–	–

NOTE — For details of access door, *see* Table 28.

Table 25 88° Single Branch Socketed with Access Door (Sweep Type)

(*Clause* 10.8.2.22)

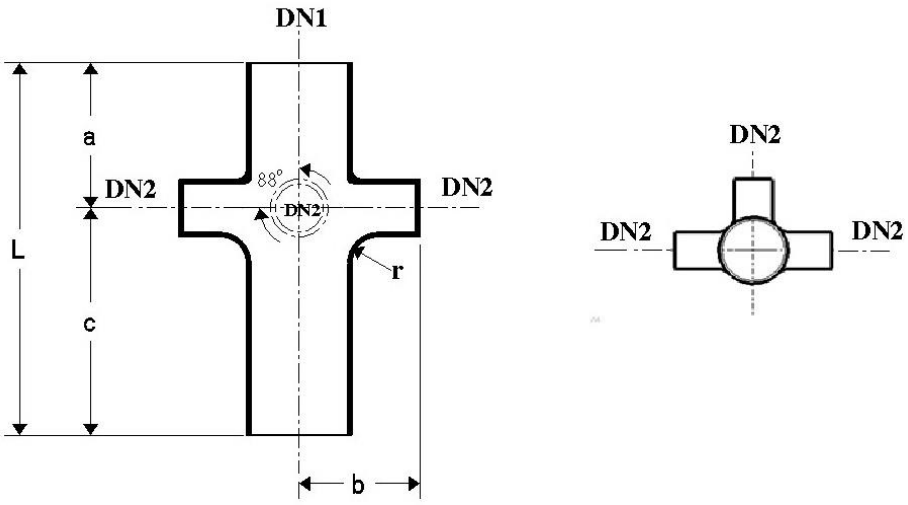


Sl No.	Nominal Size		*L*	*a*	*b*	*P*	*DI*	*r*
	*DN*1	*DN*2	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
i)	75	75	224	98	122	65	99	40
ii)	100	75	244	100	138	65	99	40
iii)	100	100	270	102	152	70	126	55

NOTE — For details of access door, *see* Table 28.

Table 26 Multi Inlet Pipe

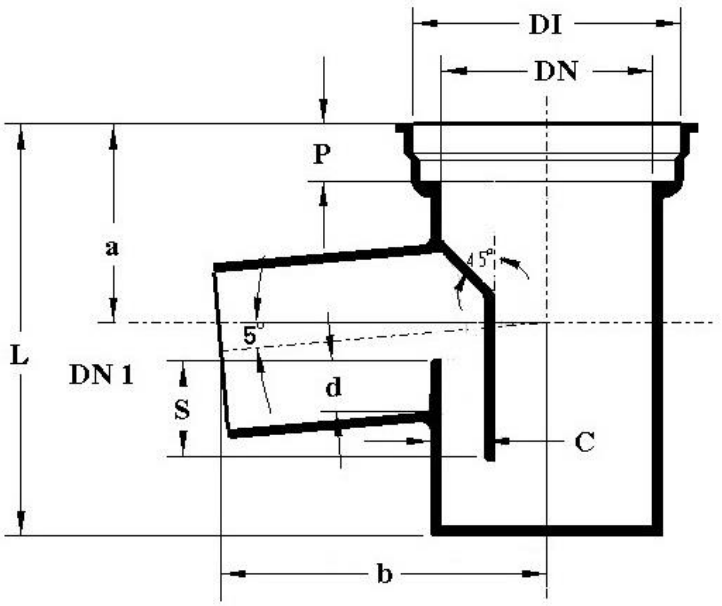
(*Clause* 10.8.2.23)



Sl No.	Nominal Size		*L*	*a*	*b*	*c*	*r*
	*DN*1	*DN*2	(mm)	(mm)	(mm)	(mm)	(mm)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
i)	100	50	384	157	142	227	40

Table 27 Floor Trap (Deep Seal)

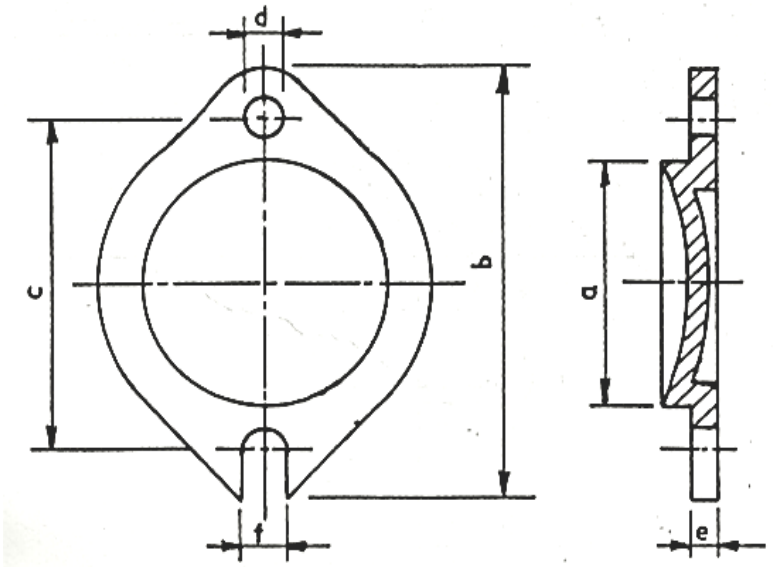
(*Clause* 10.8.2.24)



Sl No.	Nominal Size		*L*	*a*	*b*	*c*	*d*	*P*	*DI*	*S*
	DN	*DN*1	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
i)	75	50	170	85	142	20	15	35	99	50
ii)	100	50	170	90	144	25	20	35	126	50
iii)	100	75	195	94	155	25	20	35	126	50
iv)	100	100	215	110	165	25	30	35	126	50

Table 28 Access Door

(*Clause* 10.8.2.25 *and Note of Table* 5, 24 *and* 25)



Sl No.	Nominal Size *DN*	Dimensions					
		e (mm)	*a* (mm)	*b* (mm)	*c* (mm)	*d* (mm)	*f* (mm)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
i)	50	6	35	73	55	8	8
ii)	75	6	55	93	75	8	8
iii)	100	6	75	133	105	12	12
iv)	150	6	95	153	125	12	12
v)	200	8	119	173	150	12	12

NOTE — Screws shall be of galvanized steel and rubber gasket (EPDM or Neoprene) of 3 mm (min.) thickness shall be provided for packing along with access door. The design of rubber gasket shall be at the sole discretion of manufacturer.

11 COATING

11.1 General

11.1.1 Coating shall not be applied to any pipe, fitting and accessories, unless its surface is clean, dry and free from rust or foreign matter. All tests or measurements shall be made on finished products, after drying and/or polymerization.

11.1.2 Unless otherwise agreed to between the purchaser and the manufacturer, all pipes, fittings and accessories shall be uniformly coated externally and internally with epoxy paint coating. The method of coating can be by dipping or brushing or spraying or roller. The mean thickness of coating shall not be less than 70 µm and the local minimum thickness shall not be less than 50 µm.

11.1.3 The coating material shall set rapidly with good adherence and shall not scale off. In all cases the coating material shall be smooth, tenacious and hard enough not to flow when exposed to a temperature of 65 °C, but not so brittle at a temperature of 0 °C as to chip off when scribbled lightly with a penknife.

11.1.4 In the case of pipes, fittings and accessories, which are imperfectly coated or where coating does not set or conform to the qualities specified in **11.1.1** to **11.1.3** the coating shall be removed and the pipes, fittings, and accessories recoated.

11.2 Resistance to Salt Spray

11.2.1 The salt spray test shall be carried out for a period of at least 350 h in accordance with ISO 9227. After the test period, the samples shall be rinsed with demineralized water to remove salt residues.

11.2.2 The coating shall then be examined immediately for blistering and rusting, the degrees of which shall not exceeds the following levels:

a) Degree of blistering : Dimension 3, Class 3 according to ISO 4628-2; and

b) Degree of rusting : Ri 2 according to ISO 4628-3.

12 MARKING

12.1 Each pipe, fitting and accessories shall have cast or stamped or indelibly painted on it the following:

a) Manufacturer's name, initials or identification mark;

b) Nominal diameter

c) Last two digits of the year of manufacture; and

d) Any other mark required by the purchaser.

12.2 BIS Certification Marking

The pipes, fittings and accessories may be marked with the Standard Mark.

12.2.1 The product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the *Bureau of Indian Standards Act*, 2016 and the Rules and Regulations framed thereunder, and the products may be marked with the Standard Mark.

ANNEX A

(*Clause* 2)

LIST OF REFERRED STANDARDS

IS No./Other Standards	*Title*
IS 210 : 2009	Grey iron castings — Specification (*fifth revision*)
IS 1387 : 1993	General requirements for the supply of metallurgical materials (*second revision*)
IS 1500 (Part 1) : 2019/ISO 6506-3 : 2014	Metallic materials — Brinell hardness test: Part 1 Test method (*fifth revision*)
IS 1570 (Part 5) : 1985	Schedules for wrought steels: Part 5 Stainless and heat-resisting steels (*second revision*)
IS 1865 : 1991	Iron castings with spheroidal or nodular graphite — Specification (*third revision*)
IS 3400 (Part 6) : 2018/ISO 1817 : 2015	Methods of test for vulcanized rubbers: Part 6 Determination of the effect of liquids (*fourth revision*)
IS 5382 : 2018/ ISO 4633 : 2015	Rubber seals — Joint rings for water supply, drainage and sewerage pipelines — Specification for materials (*second revision*)
IS 5519 : 1979	Deviations for untoleranced dimensions and mass of grey iron castings (*first revision*)
ISO 4628-2 : 2016	Paints and varnishes — Evaluation of degradation of coatings — Designation of quantity and size of defects, and of intensity of uniform changes in appearance — Part 2: Assessment of degree of blistering
ISO 4628-3 : 2016	Paints and varnishes — Evaluation of degradation of coatings — Designation of quantity and size of defects, and of intensity of uniform changes in appearance — Part 3: Assessment of degree of rusting
ISO 9227 : 2022	Corrosion test in artificial atmospheres — Salt spray test

ANNEX B

(*Foreword* and *Clause* 6)

DRAWING AND DIMENSIONS FOR STAINLESS STEEL SHIELDED COUPLING

B-1 Profile of EPDM or neoprene rubber gasket as given in Table 29 and Table 30.

B-1.1 Physical requirements of gasket as given in Table 31.

B-2 Design of stainless steel shield and clamp as given in Table 32.

B-3 TYPICAL HUBLESS COUPLING JOINT-INSTALLATION (*see* Fig. 2)

B-3.1 Place the gasket on one end of pipe or fitting and the stainless steel clamp and shield assembly on the other end of pipe or fitting.

B-3.2 Firmly seat the pipe or fitting ends against the integrally moulded center stop inside the EPDM or neoprene rubber gasket.

B-3.3 Slide the stainless steel shield and clamp assembly over the EPDM or neoprene rubber gasket and tighten the clamps. For larger diameters couplings which have four clamps, the inner clamps should be tightened first and then the outer clamps.

B-3.4 In all the cases, when tightening clamps, they should be tightened alternately to ensure that the coupling shield is drawn up uniformly.

NOTE — Other types of joints can also be used at the discretion of the customer. The details given in Annex B is for guidance only.

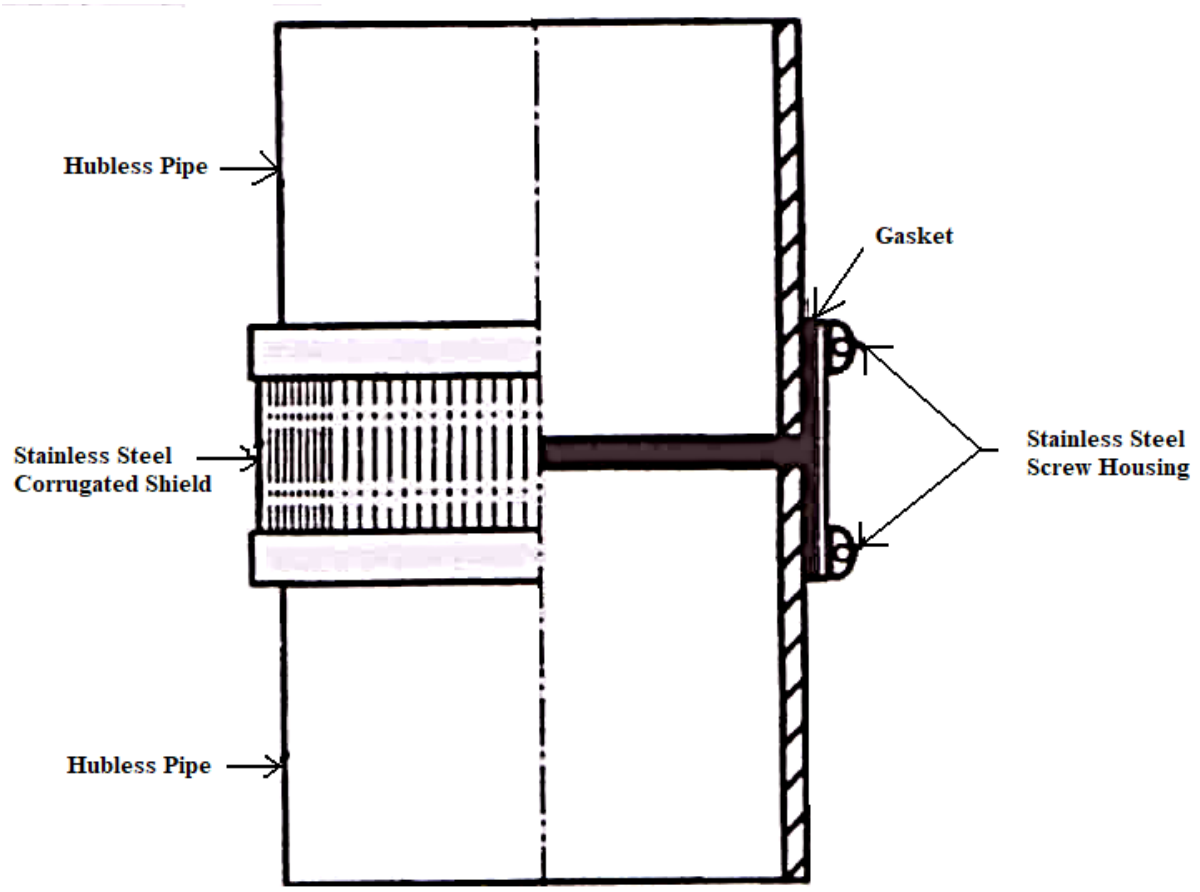
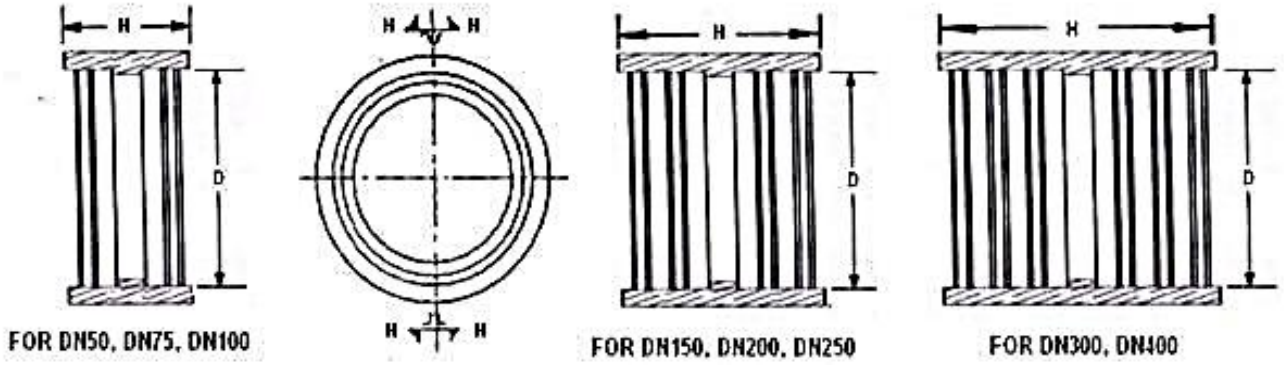


FIG. 2 TYPICAL HUBLESS COUPLING JOINT-INSTALLATION

Table 29 EPDM or Neoprene Rubber Gasket

(*Clause* 6.2 *and* B-1)

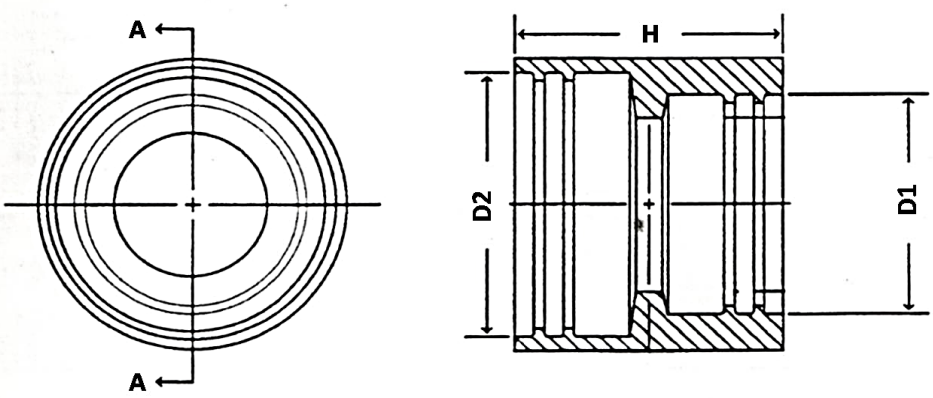


Sl No.	Nominal Size *DN*	Outer Diametre (*D*) (mm)	Standard Gasket Height (*H*) (mm)	Heavy Duty Gasket Height (*H*) (mm)
(1)	(2)	(3)	(4)	(5)
i)	50	59.8	54	76
ii)	75	84.8	54	76
iii)	100	111	54	76
iv)	150	162	76	101
v)	200	211	101	101
vi)	250	272	101	101
vii)	300	324	141	141
viii)	400	426	141	141

Tolerance on *D* and *H* is ± 2 mm.

Table 30 EPDM or Neoprene Rubber Gasket for Reducing Coupling

(*Clause* 6.2 *and* B-1)



Sl No.	Nominal Size		*D*1	*D*2	*H*
	*DN*1	*DN*2	(mm)	(mm)	(mm)
(1)	(2)	(3)	(4)	(5)	(6)
i)	40	50	49.20	59.80	54
ii)	50	75	59.80	85.8	54

Tolerance on *D*1, *D*2 and *H* is ± 2 mm.

Table 31 Physical Requirements of EPDM or Neoprene Rubber Gasket

(*Clauses* 6.2 *and* B-1.1)

Sl No.	Test	Physical Tests Min or Max Requirements
(1)	(2)	(3)
i)	Tensile Strength	10 MPa (*Min*)
ii)	Elongation	250 percent (min)
iii)	Durometer (Shore A)	70 ± 5 at 25 ± 5 °C
iv)	Accelerated Aging	15 percent max tensile and 20 percent max elongation deterioration, 10 points max; increase in hardness, all determinations after oven aging for 96 h at 70 °C
v)	Compression Set	25 percent max after 22 h at 70 °C
vi)	Oil Immersion	80 percent max volume change after immersion in Oil No. 3 (IRM 903) as per IS 3400 (Part 6) for 70 h at 100 °C
vii)	Ozone Cracking	No visible cracking at 2 times magnification of the gasket after 100 h. Exposure in 1.0 ppm ozone concentration at 38 °C. Testing and inspection to be on gasket which is loop mounted to give approximately 20 percent elongation of outer surface
viii)	Tear Resistance	Die C; 28.6 N/mm of thickness
ix)	Water Absorption	20 percent max by weight after 7 days at 70 °C
x)	Ozone Resistance	No cracks NOTE — Ozone resistance on 70 hardness hubless pipe gaskets shall be tested at 1/10,00,000 (1 PPM).

Table 32 Shield and Clamp Assembly

(*Clause* B-2)

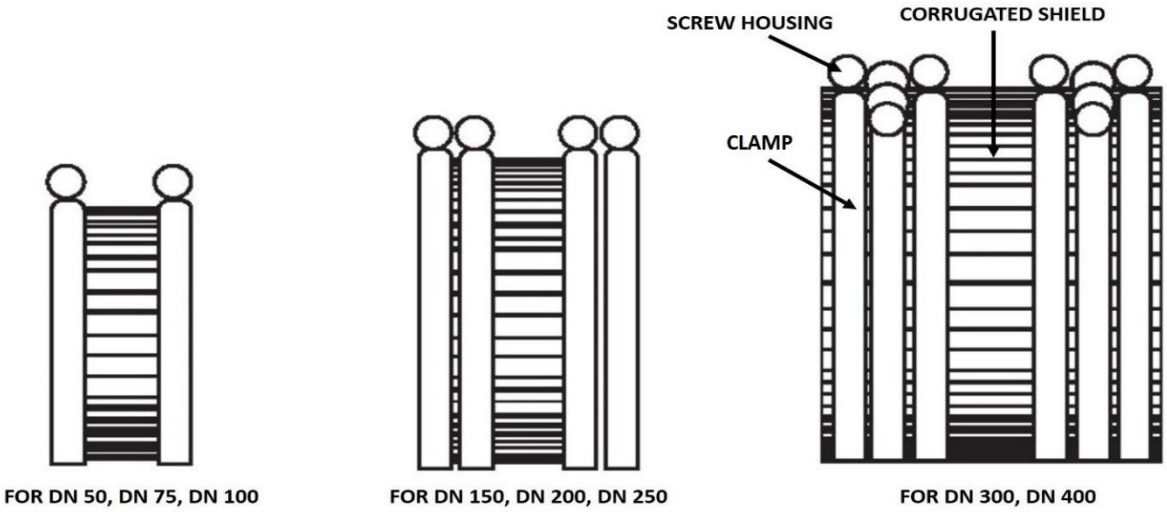


FIG. 3 SHIELD AND CLAMP ASSEMBLY (STANDARD)

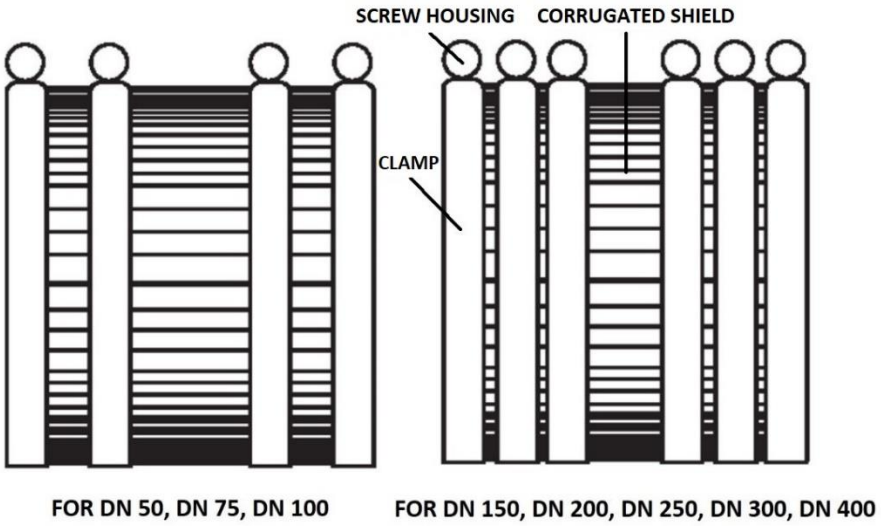


FIG. 4 SHIELD AND CLAMP ASSEMBLY (HEAVY DUTY)

Sl No.	Nominal Size *DN*	Standard Shield Height (*H*) (mm)	Heavy Duty Shield Height (*H*) (mm)
(1)	(2)	(3)	(4)
(i)	50	54	76
(ii)	75	54	76
(iii)	100	54	76
(iv)	150	76	101
(v)	200	101	101
(vi)	250	101	101
(vii)	300	141	141
(viii)	400	141	141

Tolerance on *H* is ± 2 mm.

ANNEX C

(*Foreword*)

COMMITTEE COMPOSITION

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Organization	*Representative(s)*
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