भारतीय मानक

(Reaffirmed 1996)

एसबैस्टॉस सीमेंट के भवन निर्माण पाइप तथा पाइप फिटिंग, गटर तथा गटर फिटिंग तथा छत निर्माण फिटिंग — विशिष्टि

भाग 1 पाइप तथा पाइप फिटिंग

(दूसरा पुनरीक्षण)

Indian Standard

ASBESTOS CEMENT BUILDING PIPES AND PIPE FITTINGS, GUTTERS AND GUTTER FITTINGS AND ROOFING FITTINGS — SPECIFICATION

PART 1 PIPES AND PIPE FITTINGS

(Second Revision)

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BUREAU OF INDIAN STANDARDS
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Price Group 8

FOREWORD

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

Asbestos cement building pipes are used extensively as rain-water pipes, soil and waste pipes and ventilating pipes. The lightness of asbestos cement pipes and their durability make them suitable for all normal building purposes.

This standard was first published in 1960 and subsequently revised in 1980. In the first revision, the standard was split into three parts based on the types of fitting for ease in the use of this standard Part 1 of this standard covers building pipes and pipe fittings. Part 2 covers gutters and gutter fittings and Part 3 covers roofing fittings.

The present revision has been taken up in the light of experience gained in its use and also with a view to bringing it in line with current practices in the manufacture of asbestos cement building pipes and pipe fittings. In this revision, acid resistance test has been deleted and hydraulic bursting test has been made optional. Further, the longitudinal bending test is made applicable to pipes having nominal length 2·44 m and above.

The composition of the committee responsible for the formulation of this standard is given in Annex B.

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

ASBESTOS CEMENT BUILDING PIPES AND PIPE FITTINGS, GUTTERS AND GUTTER FITTINGS AND ROOFING FITTINGS — SPECIFICATION

PART 1 PIPES AND PIPE FITTINGS

(Second Revision)

1 SCOPE

This standard (Part 1) covers the requirements of socketed asbestos cement building and sanitary pipes and pipe fittings of diameter 50 to 150 mm for use as rain water pipes, soil, waste and ventilating pipes.

2 REFERENCES

The Indian Standards listed in Annex A are necessary adjuncts to this standard.

3 COMPOSITION

The material used in the manufacture of the asbestos cement building and sanitary pipes and pipe fittings shall be composed of an inert aggregate consisting of clean asbestos fibre, including other suitable fibres cemented together by ordinary Portland cement, conforming to IS 269 : 1989 or IS 8112 : 1989 or IS 12269 : 1987 or Portland slag cement conforming to IS 455 : 1989 or Portland pozzolana cement conforming to IS 1489 (Part 1) : 1991 or IS 1489 (Part 2) : 1991 or rapid hardening Portland cement conforming to IS 8041 : 1990. Pozzolanic materials, pigments and fillers which are compatible with asbestos cement may be added.

NOTE — In case of Portland pozzolana cement and Portland slag cement, addition of pozzolanic materials shall not be permitted.

4 GENERAL QUALITY AND WORKMANSHIP

The material used in the manufacture of the pipes and pipe fittings shall be intimately mixed. The interior surface of the pipes and pipe fittings should be regular.

5 DIMENSIONAL AND PHYSICAL REQUIREMENTS

5.1 Dimensional Requirements

5.1.1 *Nominal Diameter*

The nominal diameter of the pipes and pipe fittings corresponds to the internal diameter (bore), tolerances not being taken into account. The series of the nominal diameters shall be 50, 60, 80, 100 and 150 mm.

NOTE — Nominal diameters other than mentioned in **5.1.1** may be manufactured by mutual agreement between the supplier and the purchaser, but in such cases, the nominal thickness shall correspond to the thickness of nearest nominal diameter given in **5.1.2**.

5.1.2 *Thickness*

The nominal thickness of pipes and pipe fittings shall not be less than the values given in Table 1 for different values of nominal diameters.

Table 1 Thickness of Pipes and Pipe Fittings and Tolerances on Thickness

(*Clauses* 5.1.2 *and* 5.1.5.2)

Sl No.	Nominal Dia of Pipe or Pipe Fitting	Thickness of Pipe or Pipe Fitting	Tolerance on Thickness
(1)	(2)	(3)	(4)
	mm	mm	mm
i)	50	6·5	± 1·0
ii)	60	6·5	± 1·0
iii)	80	8·0	± 1·0
iv)	100	8·0	± 1·0
v)	150	9·5	± 1·5

5.1.3 *Length*

5.1.3.1 *Nominal length*

The nominal lengths of pipes correspond to the useful lengths of the socketed pipes exclusive of internal depth of socket, not taking tolerance into account, and shall be 500, 1 000, 1 500, 1 830, 2 000, 2 440 and 3 000.

NOTE — Nominal lengths other than mentioned in **5.1.3.1** may be manufactured by mutual agreement between the supplier and the purchaser.

5.1.3.2 *Overall length*

The overall length is the sum of nominal length according to **5.1.3.1** and length of socket (*see* Dimension *G* in Table 3).

5.1.4 *Other Dimensions*

The other dimensions of pipes and pipe fittings shall be in accordance with figures and tables as detailed in Table 2.

5.1.5 *Tolerance and Dimensions*

5.1.5.1 *Internal diameter of plain ends and sockets*

The ratio of the actual diameter (maximum or minimum bore of pipes, pipe fittings or sockets measured over a given section) and the nominal diameter (bore of pipes, pipe fittings or sockets) should lie between 0·95 and 1·05 for all diameters of pipes and pipe fittings.

NOTE — The manufacturer shall ensure that the pipe fittings reasonably match with the pipes of respective sizes.

5.1.5.2 *Thickness*

The tolerances on thickness of pipes and pipe fittings shall be in accordance with Table 1. Thickness shall be measured at the unmachined end of the pipe.

5.1.5.3 *The nominal length*

The tolerances on nominal length of pipes and pipe fittings shall be ±10 mm and ±5 mm respectively.

5.1.5.4 *The overall length*

The tolerances on the overall lengths of pipes shall be ± 10 mm.

5.1.5.5 *The depth of sockets*

The tolerances on the depth of the sockets of pipe fittings shall be ±5 mm.

5.2 Physical Requirements

5.2.1 The deviation in straightness of pipes determined in accordance with **12.2.1** of IS 5913 : 1989 shall not exceed the following:

Nominal Diameter	*Deviation*
mm	mm
50 to 60	5·5 *l*
80 to 150	4·5 *l*

NOTE — *l* is the nominal length of the pipe in metres.

5.2.2 *Hydraulic Pressure Test*

The hydraulic pressure test shall be carried out on pipes and pipe fittings given in Table 2 except on items at Sl No. (xi) and (xii) and pipe fittings provided with access doors.

5.2.2.1 The apparatus used for this test and the procedure for this test shall be generally in accordance with IS 5913 : 1989 suitably modified to meet the requirements of the particular product under test. The internal hydraulic pressure should be raised generally to 0·1 MN/m² and maintained for 30 seconds to check that there is no fissure or visible sweating on the outside surface of the pipes or pipe fittings.

5.2.3 *Hydraulic Bursting Test (Optional Test)*

When subjected to hydraulic bursting test in accordance with IS 5913 : 1989, the pipe shall indicate a minimum bursting stress of 5 MN/m².

5.2.4 *Longitudinal Bending Test*

When subjected to the longitudinal bending test in accordance with IS 5913 : 1989, the unit longitudinal bending stress shall not be less than 12·5 MN/m².

Table 2 Details of Figures and Tables for Various Asbestos Cement Pipes and Pipe Fittings
(*Clause* 5.1.4)

Sl No.	Description of the Item	Figure No.	Table No.
i)	Single socketed pipe	1	3
ii)	Loose socket	2	4
iii)	Plain bend	3	5
iv)	Swan neck	4A 4B	6 7
v)	Sanitary bend	5	8
vi)	Single and double equal junctions	6	9
vii)	Single and double unequal junctions	7	10
viii)	Single and double equal inverted junctions with spigot branch	8	11
ix)	Hexagonal rain water head	9	12
x)	Shoe	10	13
xi)	Cone cap cowl	11	14
xii)	Slotted vent cowl	12	15
xiii)	W C connectors	13	16

NOTE — This test is required for pipes of nominal length of 2·44 m and above only.

5.2.5 *Transverse Crushing Test*

When subjected to the transverse crushing test in accordance with IS 5913 : 1989, the unit transverse crushing stress of pipes at failure shall not be less than 14 MN/m^2.

5.2.6 *Water Absorption Test*

When subjected to water absorption test as per IS 5913 : 1989, the mean water absorption of specimen shall not be more than 28 percent of the dry mass of the material.

5.3 All the tests indicated in **5.1** and **5.2** are to be carried out on samples selected in accordance with **6.**

6 SAMPLING

The sampling, inspection and acceptance of pipes and pipe fittings shall be in accordance with IS 7639 : 1975.

7 MANUFACTURER'S CERTIFICATE

The manufacturer shall satisfy himself that his asbestos cement building pipes and pipe fittings conform to the requirements of this standard, and if required shall furnish a certificate to this effect to the purchaser or his representative.

8 MARKING

8.1 Pipes and pipe fittings shall be clearly and indelibly marked suitably with the following:

a) Indication of the source of manufacture,

b) Size of the pipe or pipe fittings,

c) Date of manufacture, and

d) Pictorial warning signs as given in IS 12081 (Part 2) : 1987.

8.2 BIS Certification Marking

Each pipe or pipe fitting may also be marked with the Standard Mark.

8.2.1 The use of the Standard Mark is governed by the provisions of 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.

9 SAFETY RULES SHEET

9.1 All delivery of asbestos cement pipes and pipe fittings shall be accompanied by a safety rules sheet as given in IS 11769 (Part 1) : 1987.

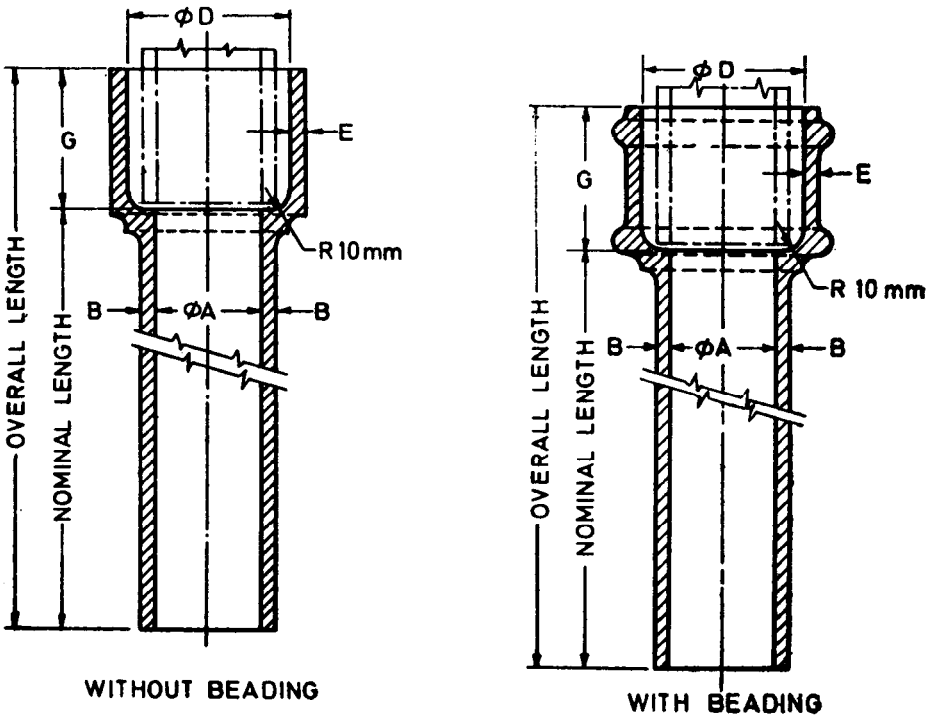


FIG. 1 SINGLE SOCKETED PIPE

Table 3 Dimensions of Single Socketed Pipes and Details of Socket for Accessories

(*Table* 2 and *Fig.* 1)

All dimensions in millimetres.

Nominal Size	A	B	D	E	G
(1)	(2)	(3)	(4)	(5)	(6)
50	50	6·5	76	8·0	70
60	60	6·5	86	8·0	70
70	80	8·0	109	8·0	70
100	100	8·0	129	9·5	75
150	150	9·5	185	9·5	75

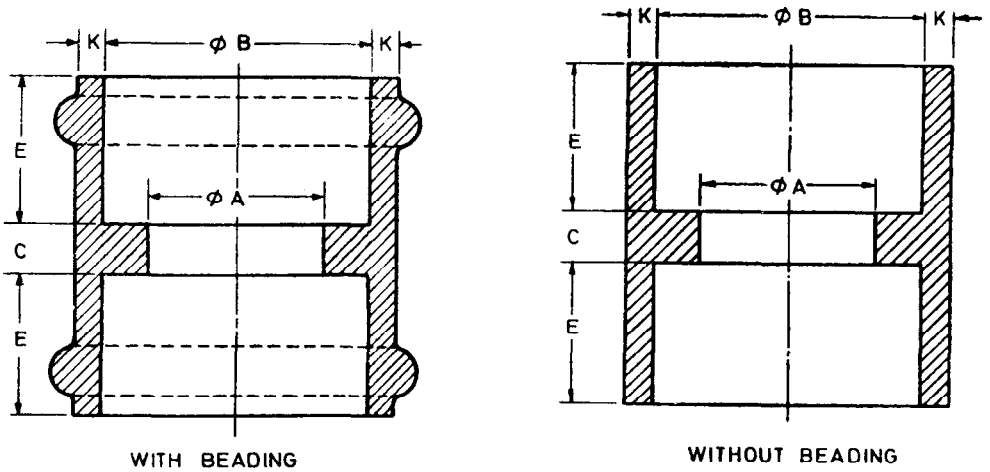


FIG. 2 LOOSE SOCKET

Table 4 Dimensions of Loose Socket

(*Table* 2 and *Fig.* 2)

All dimensions in millimetres.

Nominal Size	A	B	C	E	K
(1)	(2)	(3)	(4)	(5)	(6)
50	50	75	13	30	6·5
60	60	85	13	30	6·5
80	80	108	13	30	8·0
100	100	128	13	35	8·0
150	150	182	13	35	9·5

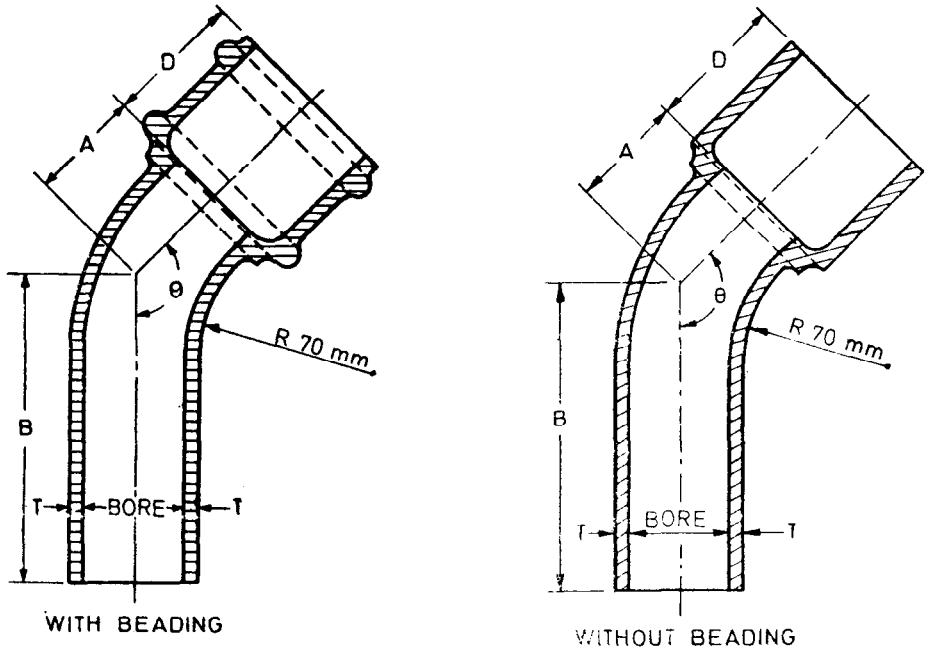


FIG. 3 PLAIN BEND

Table 5 Dimensions of Plain Bend

(*Table* 2 and *Fig.* 3)

All dimensions in millimetres.

Nominal Size or Bore Dia	T	A			B			D
		92½°	112½°	135°	92½°	112½°	135°	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
50	6·5	110	81	55	190	161	135	70
60	6·5	115	84	56	195	164	139	70
80	8·0	126	92	62	206	172	142	70
100	8·0	136	99	66	216	179	146	75
150	9·5	161	117	77	241	197	157	75

NOTES

1 Supplied in plain or with access door.

2 Bends with included angle θ other than those specified in the table may be supplied as agreed to between the manufacturer and the purchaser.

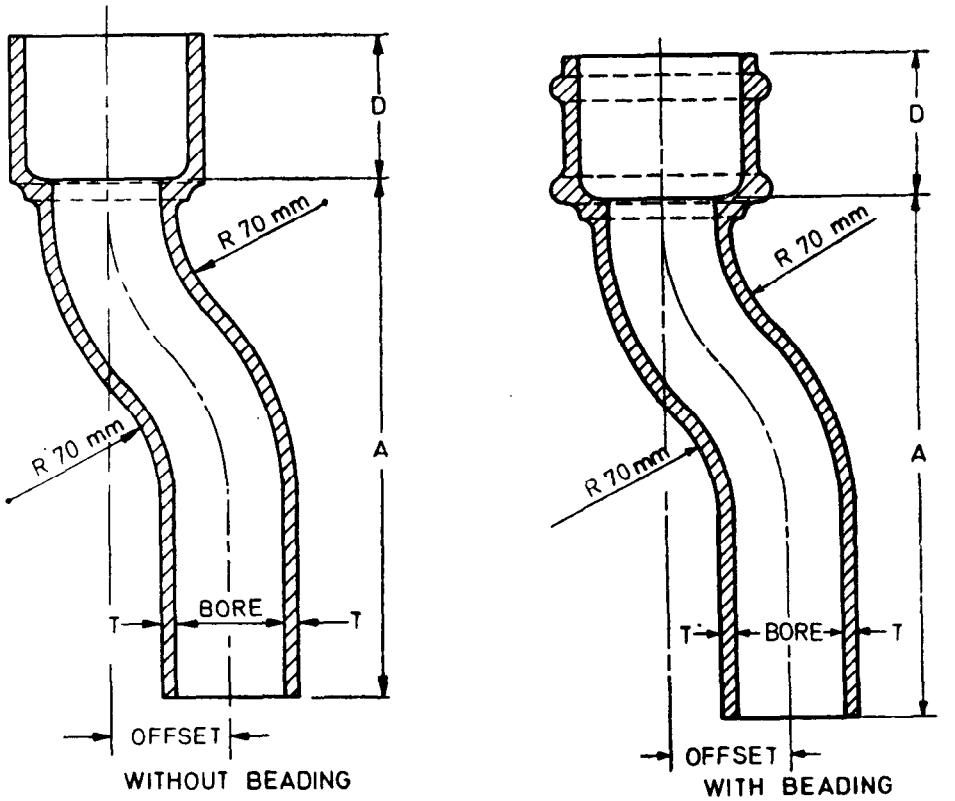


FIG. 4A SWAN NECK

Table 6 Dimensions of Swan Neck

(*Table* 2 and *Fig.* 4A)

All dimensions in millimetres.

Nominal Size or Bore Dia	T	A				D
		60 mm Offset	75 mm Offset	100 mm Offset	150 mm Offset	
(1)	(2)	(3)	(4)	(5)	(6)	(7)
50	6·5	248	262	280	301	70
60	6·5	252	267	286	308	70
80	8·0	257	277	298	325	70
100	8·0	273	286	317	338	75
150	9·5	291	307	333	370	75

NOTE — Tolerance on offset shall not be more than ±5 mm.

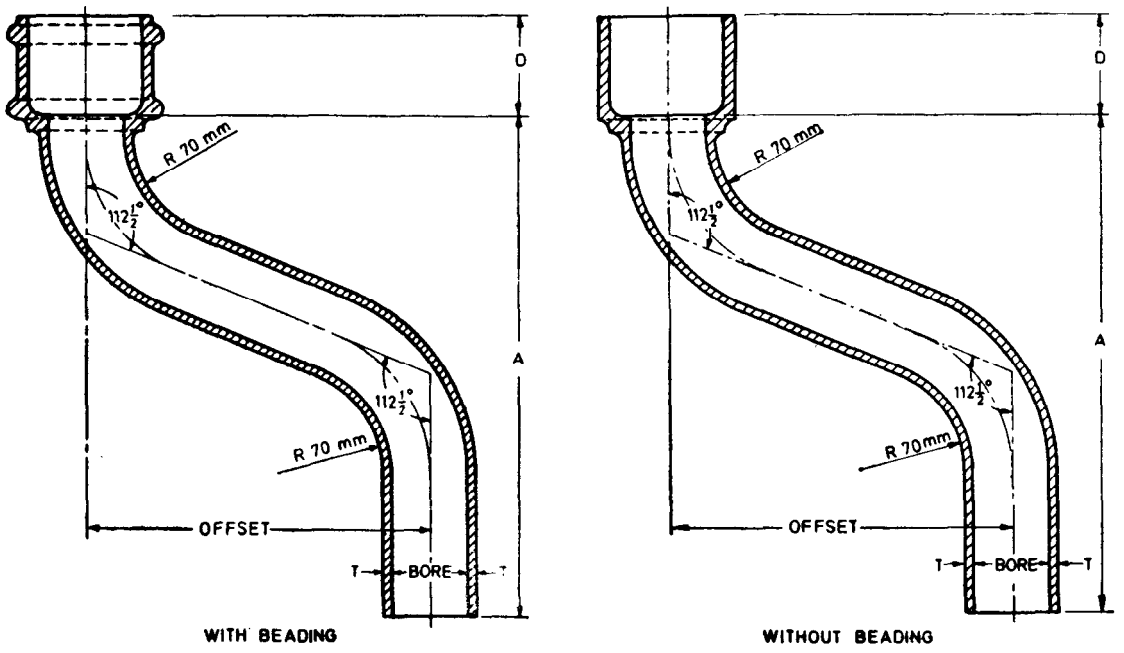


FIG. 4B SWAN NECK

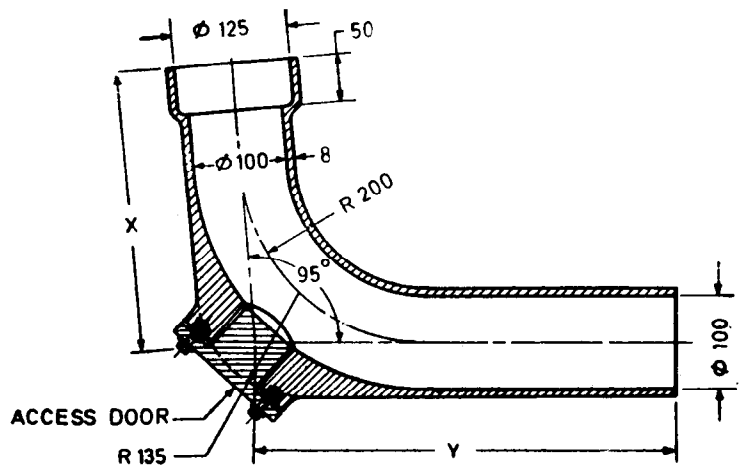
Table 7 Dimensions of Swan Neck

(*Table* 2 and *Fig.* 4B)

All dimensions in millimetres.

Nominal Size or Bore Dia	T	A		D
		225 mm Offset	300 mm Offset	
(1)	(2)	(3)	(4)	(5)
50	6·5	337	368	70
60	6·5	344	375	70
80	8·0	350	390	70
100	8·0	373	404	75
150	9·5	409	440	75

NOTE — Tolerance on offsets shall not be more than ± 5 mm.



All dimensions in millimetres.

FIG. 5 SANITARY BEND

Table 8 Dimensions of Sanitary Bend

(*Table* 2 and *Fig.* 5)

All dimensions in millimetres.

Nominal Size or Bore Dia	X	Y
(1)	(2)	(3)
100	300	1 000
100	375	1 000
100	450	1 000
100	525	1 000
100	300	500
100	375	500
100	450	500
100	525	500

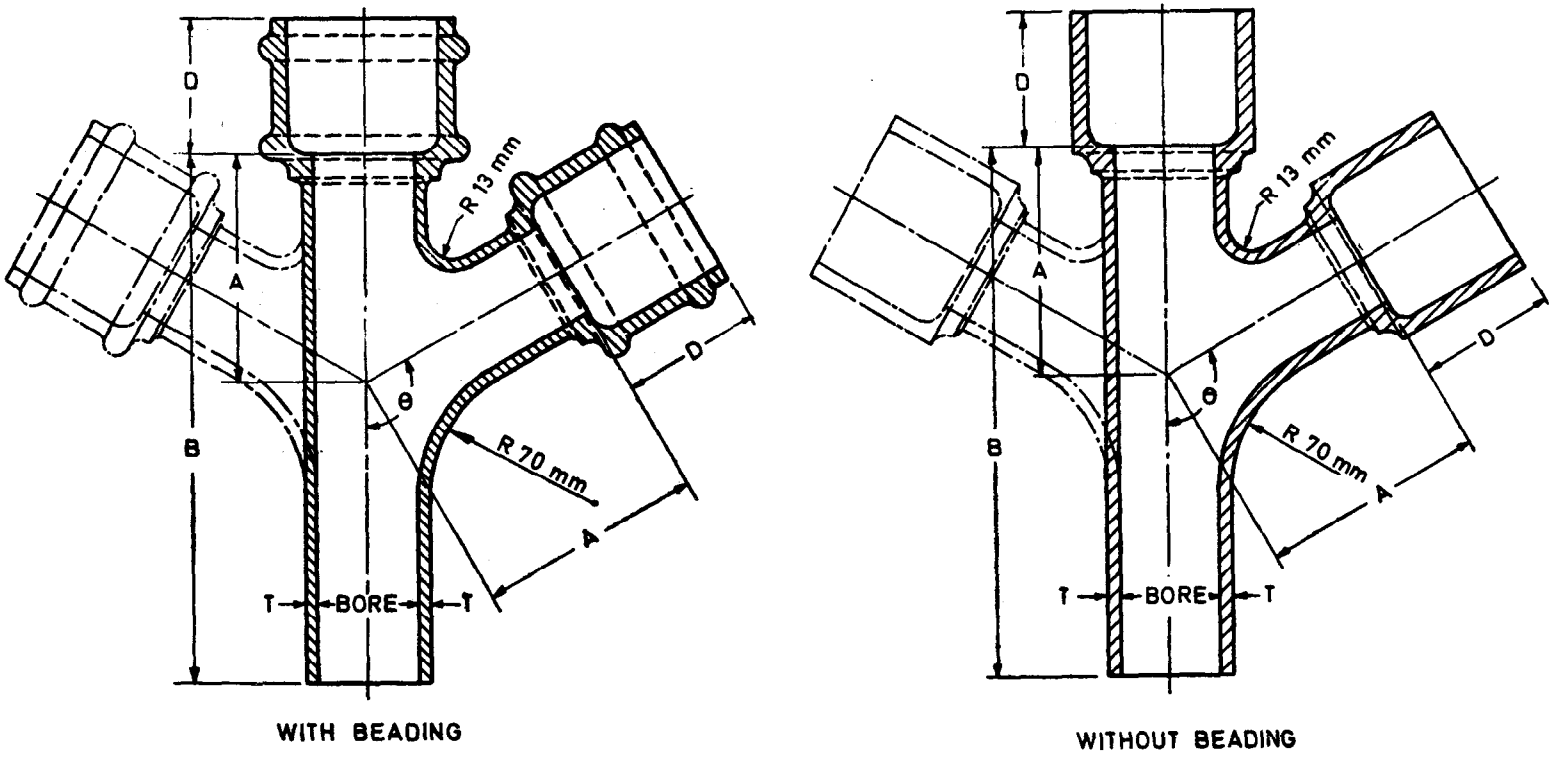


FIG. 6 SINGLE AND DOUBLE EQUAL JUNCTIONS

Table 9 Dimensions of Single and Double Equal Junctions

(*Table* 2 and *Fig.* 6)

All dimensions in millimetres.

Nominal Size or Bore Dia	T	A			B			D
		92½°	112½°	135°	92½°	112½°	135°	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
50	6·5	84	105	145	274	265	279	70
60	6·5	91	114	160	284	276	295	70
80	8·0	99	124	179	302	294	319	70
100	8·0	113	145	210	335	329	355	75
150	9·5	141	186	275	389	388	432	75

NOTE — Supplied in plain or with access door.

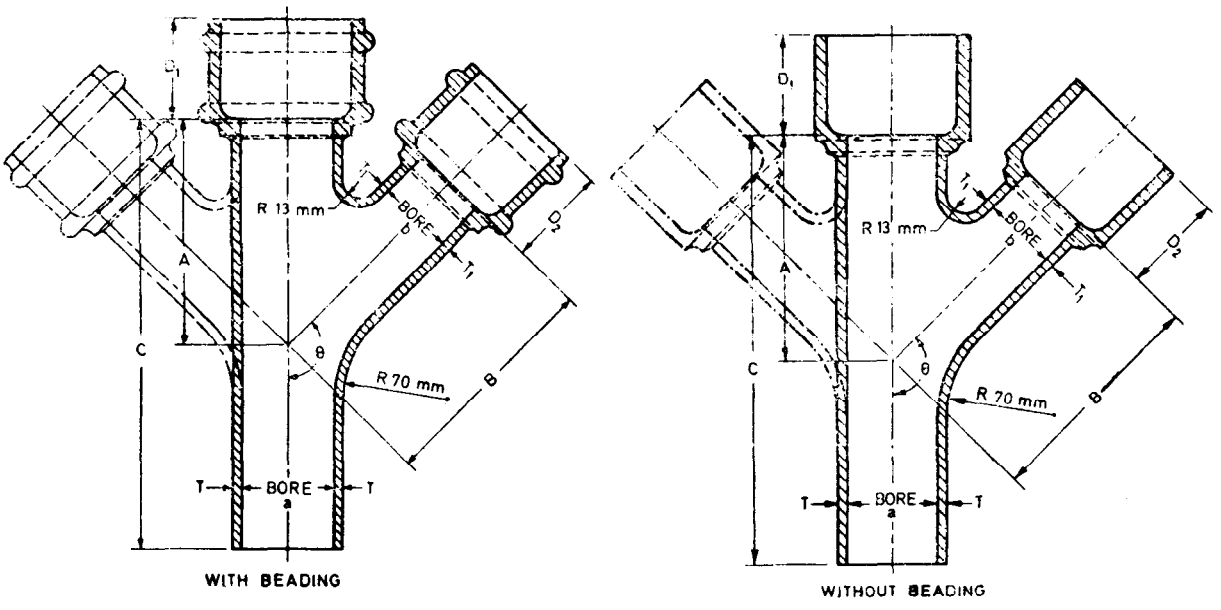


FIG. 7 SINGLE AND DOUBLE UNEQUAL JUNCTIONS

Table 10 Dimensions of Single and Double Unequal Junctions

(*Table* 2 and *Fig.* 7)

All dimensions in millimetres.

Nominal Size or Bore Dia		T	T_1	A			B			C			D_1	D_2
Bore *a*	Bore *b*			92½°	112½°	135°	92½°	112½°	135°	92½°	112½°	135°		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
60	50	6·5	6·5	98	107	152	117	112	154	289	251	289	70	70
80	50	8·0	6·5	100	111	160	124	121	166	287	270	302	70	70
100	50	8·0	6·5	103	116	172	137	134	183	207	279	330	75	70
80	60	8·0	6·5	106	119	169	121	123	171	297	276	314	70	70
100	60	8·0	6·5	110	123	182	132	137	190	306	289	349	75	70
100	80	8·0	8·0	110	132	205	135	140	198	310	314	371	75	70
150	80	9·5	8·0	115	143	227	164	169	236	324	330	394	75	70
150	100	9·5	8·0	123	163	237	162	186	270	346	356	422	75	75

NOTE — Supplied in plain or with access door.

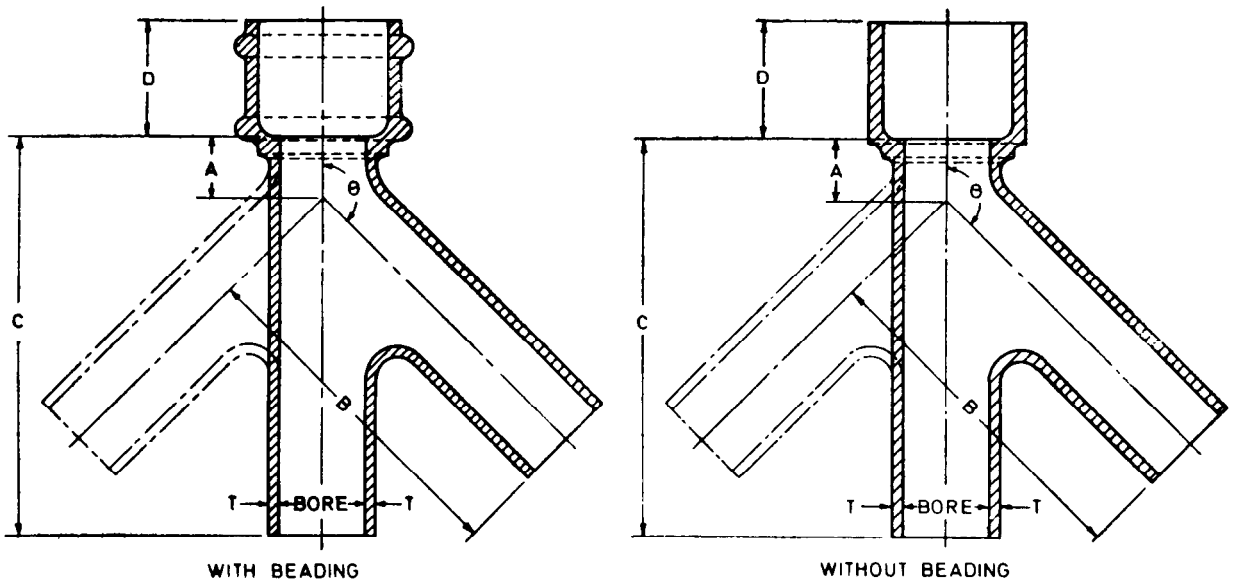


FIG. 8 SINGLE AND DOUBLE EQUAL INVERTED JUNCTIONS WITH SPIGOT BRANCH

Table 11 Dimensions of Single and Double Equal Inverted Junctions with Spigot Branch

(*Table* 2 and *Fig.* 8)

All dimensions in millimetres.

Nominal Size or Bore Dia	T	A			B			C			D
		92½°	112½°	135°	92½°	112½°	135°	92½°	112½°	135°	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
50	6·5	67	51	37	147	159	200	206	211	237	70
60	6·5	75	55	39	154	168	216	219	223	255	70
80	8·0	81	60	42	160	180	235	235	241	277	70
100	8·0	93	69	48	179	206	272	267	275	320	75
150	9·5	119	87	59	205	246	338	321	333	397	75

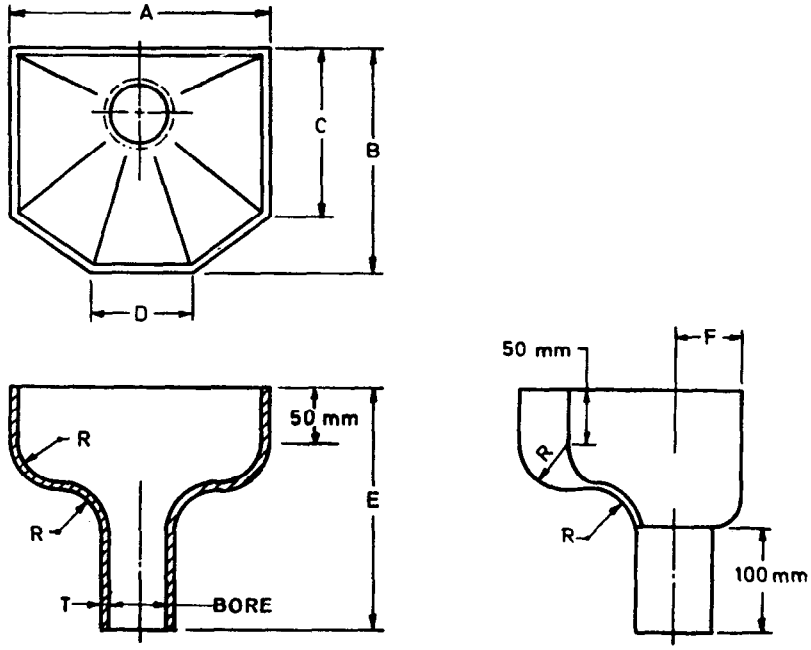


FIG. 9 HEXAGONAL RAIN WATER HEAD

Table 12 Dimensions of Hexagonal Rain Water Head

(*Table* 2 and *Fig.* 9)

All dimensions in millimetres.

Nominal Size	*A*	*B*	*C*	*D*	*E*	*R*
(1)	(2)	(3)	(4)	(5)	(6)	(7)
400 × 300	400	300	200	150	330	75
300 × 250	300	250	140	135	280	75
200 × 200	250	200	165	90	225	50

Nominal Size or Bore Dia	*T*	*F*
(1)	(2)	(3)
50	6·5	60
60	6·5	65
80	8·0	75
100	8·0	85
150	9·5	115

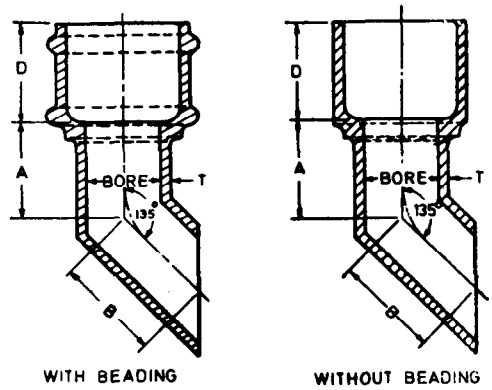


FIG. 10 SHOE

Table 13 Dimensions of Shoe

(*Table* 2 and *Fig.* 10)

Nominal Bore	T	A	B	C
(1)	(2)	(3)	(4)	(5)
50	6·5	64	70	70
60	6·5	67	77	70
80	8·0	70	94	70
100	8·0	73	107	75
150	9·5	85	145	75

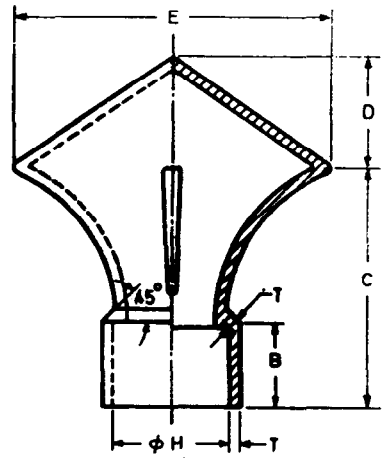


FIG. 11 CONE CAP COWL

Table 14 Dimensions of Cone Cap Cowl

(*Table* 2 and *Fig.* 11)

All dimensions in millimetres.

Nominal Size	B	C	D	E	H	T	No. of Slots
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
50	50	143	70	190	70	6·5	6
60	60	165	75	216	83	6·5	6
80	75	190	80	235	104	8·0	7
100	100	244	100	292	124	9·5	7
150	100	286	100	356	178	9·5	12

NOTE — Slots to be equally spaced.

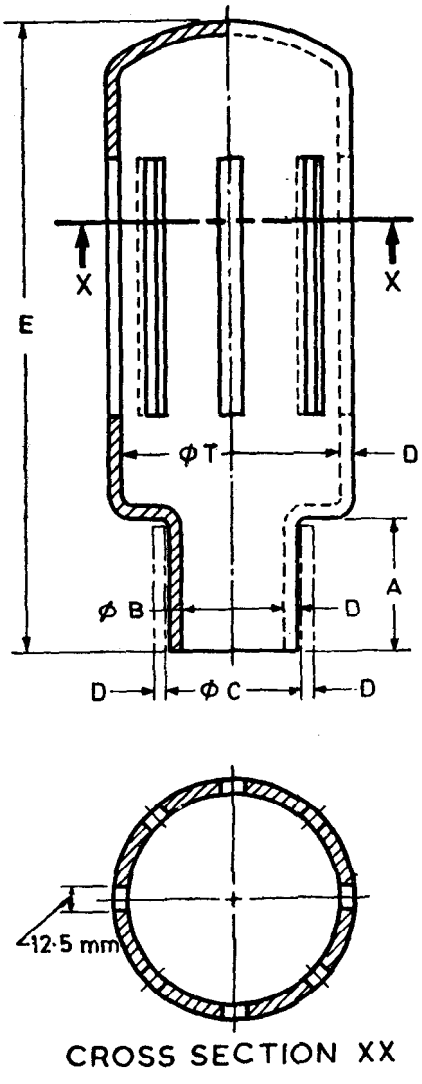


FIG. 12 SLOTTED VENT COWL

Table 15 Dimensions of Slotted Vent Cowl

(*Table* 2 and *Fig.* 12)

All dimensions in millimetres.

Nominal Size	A	B	C	D	E	T	No. of Slots
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
50	50	35	50	6·5	300	90	6
60	60	45	60	6·5	300	100	8
80	75	62	80	8·0	330	138	8
100	100	82	100	8·0	360	140	12
150	100	128	150	9·5	400	200	14

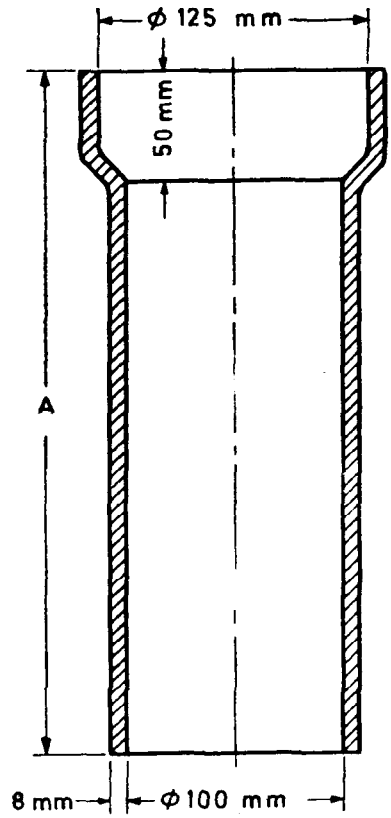


FIG. 13 W C CONNECTORS

Table 16 Dimensions of W C Connectors

(*Table* 2 and *Fig.* 13)

All dimensions in millimetres.								
A	225	300	375	450	525	600	675	750

ANNEX A

(*Clause* 2)

LIST OF REFERRED INDIAN STANDARDS

IS No.	*Title*	*IS No.*	*Title*
269 : 1989	33 Grade ordinary Portland cement (*fourth revision*)	8041 : 1990	Rapid hardening Portland cement (*second revision*)
455 : 1989	Portland slag cement (*fourth revision*)	8112 : 1989	43 Grade ordinary Portland cement (*first revision*)
1489 (Part 1) : 1991	Portland pozzolana cement: Part 1 Flyash based (*third revision*)	11769 (Part 1) : 1987	Guidelines for safe use of products containing asbestos: Part 1 Asbestos cement products
1489 (Part 2) : 1991	Portland pozzolana cement: Part 2 Calcined clay based (*third revision*)	12081 (Part 2) : 1987	Recommendations for pictorial warning signs and precautionary notices for asbestos and products containing asbestos: Part 2 Asbestos and its products
5913 : 1989	Method of tests for asbestos cement products (*first revision*)		
7639 : 1975	Methods of sampling of asbestos cement product	12269 : 1987	53 Grade ordinary Portland cement

ANNEX B
(*Foreword*)

COMMITTEE COMPOSITION

Cement and Concrete Sectional Committee, CED 2

Chairman	*Representing*
DR H. C. VISVESVARAYA	In personal capacity (*University of Roorkee, Roorkee 247667*)
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