Indian Standard

SPECIFICATION FOR MILD STEEL TUBES, TUBULARS AND OTHER WROUGHT STEEL FITTINGS

PART 2 MILD STEEL SOCKETS TUBULAR AND OTHER WROUGHT STEEL PIPE FITTINGS

(Fourth Revision)

First Reprint JULY 1992

UDC 621·643·41-034·141·24

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

January 1992

Price Group 11

FOREWORD

This Indian Standard (Part 2) (Fourth Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Steel Tubes, Pipes and Fittings Sectional Committee had been approved by the Metallurgical Engineering Division Council.

This standard was first issued in 1969. After reviewing the standard, the committee responsible for preparation of the standard, had prepared a revision incorporating the following major changes:

a) The scope has been modified to cover the requirements of back nuts given in IS 3468 : 1975 'Specification for pipe nuts (*first revision*)'. In Table 3, requirements of back nuts have been deleted since these are covered in the relevant standard.

b) A new clause has been added to permit the manufacturer to make plain-end fittings without screwing.

c) Table 27 has been modified to cover both male taper thread size (external) and female parallel thread size (internal).

d) Expansion test and other requirements have been included for sockets on the basis of IS 1239 (Part 1) : 1990 'Mild steel tubes, tubulars and other wrought steel fittings — Specification : Part 1 Mild steel tubes (*fifth revision*)', to make the requirements for sockets complete.

e) Amendments No. 1 and 2 issued to the standard have been incorporated.

Malleable cast iron pipe fittings are covered by IS 1879 : 1987 'Specification for malleable cast iron pipe fittings (*second revision*)'.

The nominal bores specified in the standard and the corresponding nominal sizes of pipe threads according to IS 554 : 1985 'Dimensions for pipe threads where pressure tight joints are required on the threads (*third revision*)' are given in Annex B for information.

The standard keeps in view the manufacturing and trade practice followed in the country in this field. In preparing this standard assistance has been derived from the following publications:

BS 1387 : 1967 Specification for steel tubes and tubulars (suitable for screwing to B. S. 21 Pipe threads), issued by the British Standards Institution (BSI).

BS 1740 : 1965 Specification for wrought pipe fitting, iron and steel (screwed B. S. P. thread), issued by the British Standards Institution (BSI).

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 same as that of the specified value in this standard.

Indian Standard

SPECIFICATION FOR MILD STEEL TUBES, TUBULARS AND OTHER WROUGHT STEEL FITTINGS

PART 2 MILD STEEL SOCKETS TUBULAR AND OTHER WROUGHT STEEL PIPE FITTINGS

(Fourth Revision)

1 SCOPE

1.1 This standard (Part 2) covers the requirements for butt welded and seamless, plain ended, screwed and socketed mild steel tubulars and other welded and seamless wrought steel pipe fittings. The requirements of back nuts are covered in IS 3468 : 1975.

2 REFERENCES

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

3 TERMINOLOGY

3.0 For the purpose of this standard, the following definitions shall apply.

3.1 Fittings — Term used to denote fittings like elbows, tee, cross, etc.

3.2 Socket — The screwed coupling utilized in jointing the tubes together.

NOTE — The term 'socket' is synonymous with the term 'coupling'.

3.3 Tube (Pipe) — Along, hollow, open-ended object circular or other cross-section. The terms tube and pipe are often used synonymously.

3.4 Tubular — A term used to include pieces, long-screws, bends springs, return bends and barrel nipples.

4 DESIGNATION

4.1 Mild steel sockets and tubular covered by this standard shall be designated by their nominal bore.

4.2 Other wrought steel fittings shall be designated giving the following particulars in the sequence shown:

a) Type of fittings (*see* **4.2.1**), and
b) Size designation (*see* **4.2.2**)

4.2.1 *Type of Fittings*

The types of fittings are denoted as elbow, tee, cross, etc.

4.2.2 *Size Designation*

This is determined by the nominal bore in millimetres of the pipe at the outlets.

4.2.2.1 *Equal fittings*

Where all outlets in a given fitting are of the same size, the fitting shall be referred to by that one size, irrespective of the number of the outlets.

4.2.2.2 *Unequal fittings*

These are referred to by the size of each outlet.

5 SUPPLY OF MATERIAL

5.1 General requirements relating to the supply of mild steel tubulars and other fittings shall conform to IS 1387 : 1967.

6 MANUFACTURE

6.1 Tubulars conforming to this standard shall be made from tubes which comply with all the appropriate requirements of IS 1239 (Part 1) : 1990.

6.2 Sockets

Sockets shall be manufactured from mild steel by any of the following pocesses:

a) Hot-finished seamless (HFS),
b) Electric resistance welded (ERW),
c) High frequency induction welded (HFIW), and
d) Hot-finished welded (HFW).

NOTE — Hand welding of sockets may be permitted provided the test requirements for the sockets covered by this standard are complied with.

6.2.1 All sockets shall be either welded or seamless as agreed to between the purchaser and the manufacturer.

6.2.2 All elctric welded sockets (medium and heavy class) used for steam services shall be normalized.

6.3 Other Fittings

Other wrought steel pipe fittings shall be manufactured from mild steel by any approved process.

6.3.1 Unless otherwise specified by the purchaser, all fittings shall be manufactured with thread connections, complying with the requirements of IS 554 : 1985. At the request of the purchaser, the manufacturer is permitted to make plain end fittings without screwing as per the dimensions given in the relevant Tables.

6.4 The steel from which the fittings are made, when tested in accordance with IS 1894 : 1972 shall show on test a minimum tensile strength of 320 MPa. The percentage elongation on a gauge length of $5{\cdot}65\sqrt{S_o}$ (where S_o is the original cross section of the test specimen) shall not be less than 9 500 divided by the tensile strength of the specimen.

7 CHEMICAL COMPOSITION

7.1 The ladle analysis of steel shall not show sulphur and phosphorus in amounts exceeding 0·06 percent each.

7.1.1 The ladle analysis of steel shall be carried out either by the method specified in IS 228 or any other established instrumented/chemical method. In case of dispute the procedure given in IS 228 and its relevant parts shall be refuel method. However, the method is not given in IS 228 and its relevant parts, the refuel method shall be agreed to between the purchaser and the manufacturer.

7.1.2 *Product Analysis*

The maximum permissible variation of sulphur and phosphorus, in case of product analysis from the limits specified under **7.1** shall be 0·005 percent each.

NOTE — The product analysis is not applicable to rimming quality steel.

8 DIMENSIONS OF TUBULARS

8.1 Pieces

Pieces shall conform to the dimensions given in Table 1.

8.2 Nipples

Close taper and running nipples shall be made only from heavy tubes. Barrel nipples shall be made either from medium or heavy tubes. The dimensions of nipples shall be as given in Table 2.

8.3 Longscrews (Connectors)

8.3.1 Longscrews (connectors) shall be made only from heavy tube and shall be supplied single or double, as may be specified, and shall conform to the appropriate dimensions given in Table 3.

8.3.2 The sockets shall be suitably faced on the end which the back nut abuts. The face of the back but which abuts against the sockets shall be concave at an angle of approximately 15°.

8.3.3 The parallel threads on the longscrew and in the socket shall, in addition to complying with the appropriate requirement of IS 554 : 1985, be of such a size that the socket runs on the connector hand-tight without perceptible shake.

NOTE — When it is necessary to use longscrew for running joints, the threads of the longscrew which accommodates the running socket and back nut shall be parallel.

This type of joints is permissible for low pressures, but is not recommended for higher pressures or for work in which there are wide variations of temperature.

8.4 Bends and Springs

8.4.1 Bends and springs shall conform to the appropriate dimensions given in Table 4. A tolerance of ±1·5° on the specified angle shall be permitted.

8.4.2 Type 1A bends shall be made only from heavy tubes, and in addition to conforming to the appropriate dimensions given in Table 4, shall be fitted with sockets and back nuts conforming to the requirements given in **8.3.2**.

8.4.3 Each bend and spring shall be supplied with one socket, if so specified by the purchaser.

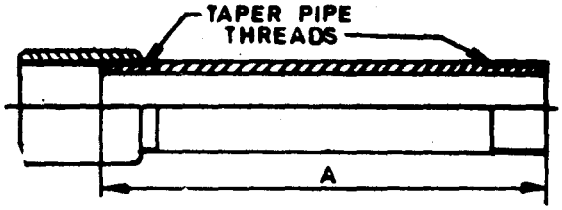
8.5 Return Bends

8.5.1 Return bends shall be made from heavy tube, supplied with socket at one end if so specified by the purchaser, and shall conform to the dimensions given in Table 5. The ends of the bends shall be parallel within ±1·5°.

Table 1 Dimensions of Pieces

(*Clause* 8.1)

All dimensions in millimetres.



Nominal Bore	Approximate Standard Length, *A*			
(1)	(2)	(3)	(4)	(5)
6	100	150	200	250
8	100	150	200	250
10	100	150	200	250
15	100	150	200	250
20	100	150	200	250
25	100	150	200	250
32	150	200	250	300
40	150	200	250	300
50	150	200	250	300
65	150	200	250	300
80	150	200	250	400
100	150	200	250	400
125	250	300	400	500
150	250	300	400	500

8.6 Sockets

Wherever tubulars are to be supplied with sockets, the dimensions of sockets shall be as given in Table 6. Tapping of sockets shall be done from one end only.

NOTES

1 The socket lengths shown in Table 6 meet the requirements of ISO/R 50, but the minimum length has been increased to allow for the chamfer at the ends of the socket and is based on:

$$B = 2L + 3{\cdot}5\,p$$

where

L = length of useful thread on pipe (*see* IS 554 : 1985), and

p = pitch of thread.

2 For minimum length of faced sockets (*see* Table 3).

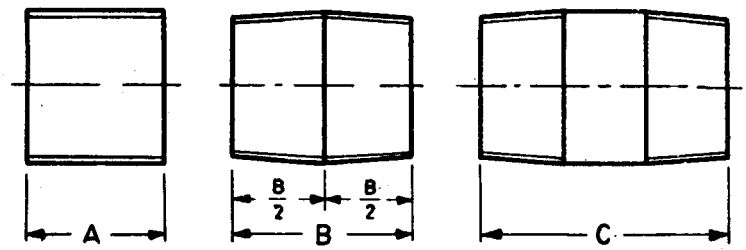
9 DIMENSIONS OF WROUGHT STEEL FITTINGS (OTHER THAN TUBULARS)

9.1 Sizes and dimensions of these fittings shall be as specified in Tables 7 to 28. All the dimensions given in these Tables enable the fittings to be assembled with tubes screwed in accordance with IS 554 : 1985.

Table 2 Dimensions of Running Nipples; Close Taper Nipples and Barrel Nipples

(*Clause* 8.2)

All dimensions in millimetres.



Running Nipple (Parallel threads)

Close Taper Nipple (Taper threads both ends)

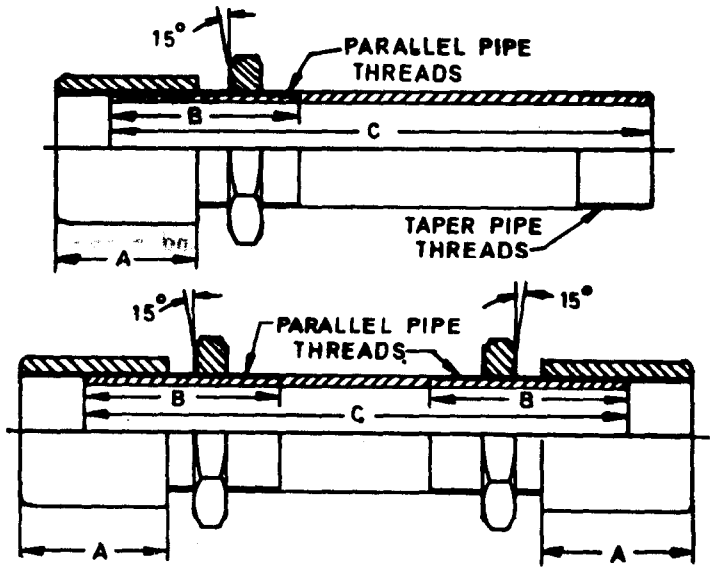
Barrel Nipple (Taper threads both ends)

Nominal Bore	Standard Length					
	Running Nipple		Close Taper Nipple		Barrel Nipple	
	Minimum	Tolerance	Minimum	Tolerance	Minimum	Tolerance
(1)	(2)	(3)	(4)	(5)	(6)	(7)
6	13	+1·5	19	+1·5	32	+3
8	19		27		38	
10	21		28		38	
15	27		37		51	+4·5
20	30		39		54	
25	33		46		60	
32)	38		51		70	+6
40	38		51		70	
50)	48		60		79	
65	51	+3	69	+3	89	+8
80	57		75		102	
100	70		87		114	
125	78		96		124	
150	78		96		127	

Table 3 Dimensions of Longscrews

(*Clause* 8.3.1)

All dimensions in millimetres.



NOTE — For particulars of back nuts, *see* IS 3468 : 1975.

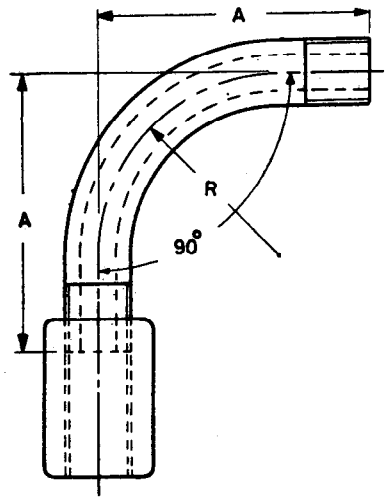
Nominal Bore	Faced Socket		Minimum Effective Length of Long Thread *B*	Approximate Standard Length, *C*			
	Length, *Min* *A*	Tolerance					
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
6	17	+ 1·5	29	100	150	200	250
8	25		37	100	150	200	250
10	25		40	100*	150	200	250
15	35	+ 3	52	100*	150	200	250
20	37		54	100*	150	200	250
25	43		62	100*	150	200	250
32	48	+ 4·5	70	150*	200	250	300
40	48		71	150*	200	250	300
50	57		82	150*	200*	250	300
65	65	+ 6	97	150*	200*	250*	300
80	71		106	200*	250*	300	400
100	84		121	200*	250*	300	400
125	92		130	250*	300*	400	500
150	92		132	250*	300*	400	500

* Double longscrew are not supplied in these lengths.

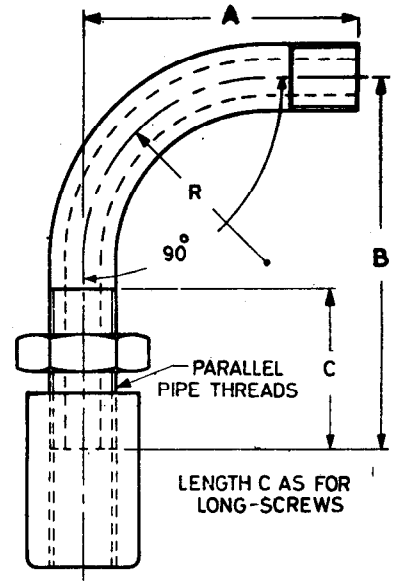
Table 4 Dimensions of Bends and Springs

(*Clause* 8.4.1)

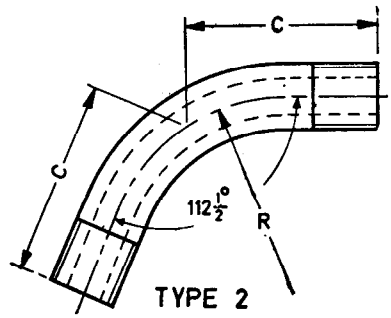
All dimensions in millimetres.



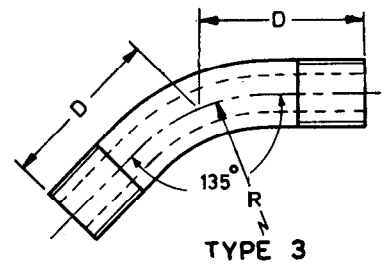
TYPE 1



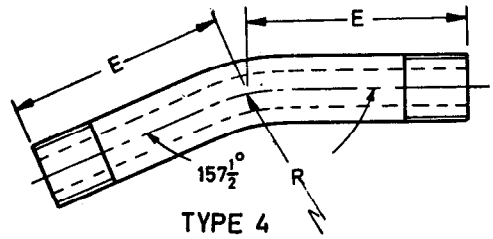
TYPE 1A



TYPE 2



TYPE 3



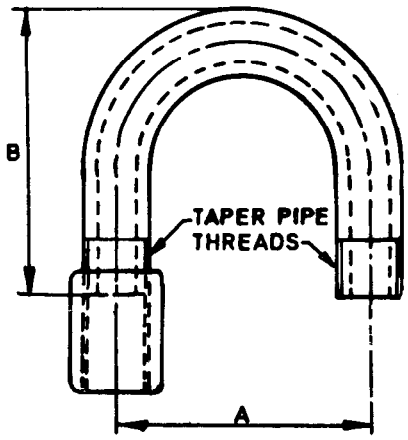
TYPE 4

Nominal Bore	Bends 90°, Approximate Centre to Face		Approximate Radius	Approximate Centre to Face for Springs		
				112·5°	135°	157·5°
	A	*B*	*R*	*C*	*D*	*E*
(1)	(2)	(3)	(4)	(5)	(6)	(7)
6	51	73	32	48	44	44
8	64	92	41	60	57	54
10	73	105	48	67	64	60
15	86	127	57	79	76	73
20	102	143	73	92	89	86
25	121	168	89	108	105	102
32	146	197	108	133	127	124
40	165	219	127	149	143	140
50	203	264	159	181	175	168
65	248	321	197	222	213	206
80	292	371	232	260	248	241
100	381	467	308	340	324	318
125	540	632	—	476	457	444
150	622	718	—	572	540	527

Table 5 Dimensions of Return Bends

(*Clause* 8.5.1)

All dimensions in millimetres.

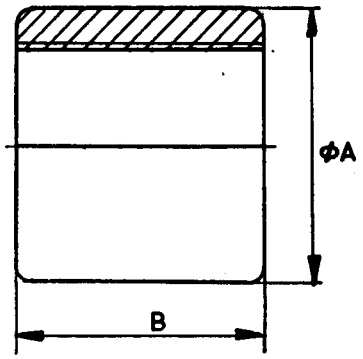


Nominal Bore	Approximate Centres *A*	Approximate Back to Face *B*
(1)	(2)	(3)
6	44	51
8	51	64
10	64	70
15	89	102
20	102	121
25	114	140
32	127	152
40	165	178
50	190	210
65	305	292
80	356	330
100	457	400
125	762	578
150	914	692

Table 6 Dimensions of Mild Steel Sockets

(*Clause* 8.6)

All dimensions in millimetres.

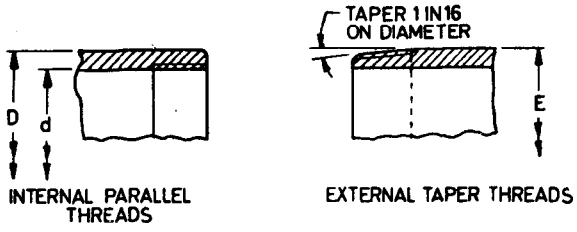


Nominal Bore	Minimum Outside Diameter *A*	Minimum Length *B*
(1)	(2)	(3)
6	15	19
8	18·5	27
10	22	28
15	27	37
20	32·5	39
25	39·5	46
32	49	51
40	56	51
50	68	60
65	84	69
80	98	75
100	124	87
125	151	96
150	178	96

Table 7 Dimensions of Screwed Ends of Fittings

(*Clause* 9.1)

All dimensions in millimetres.



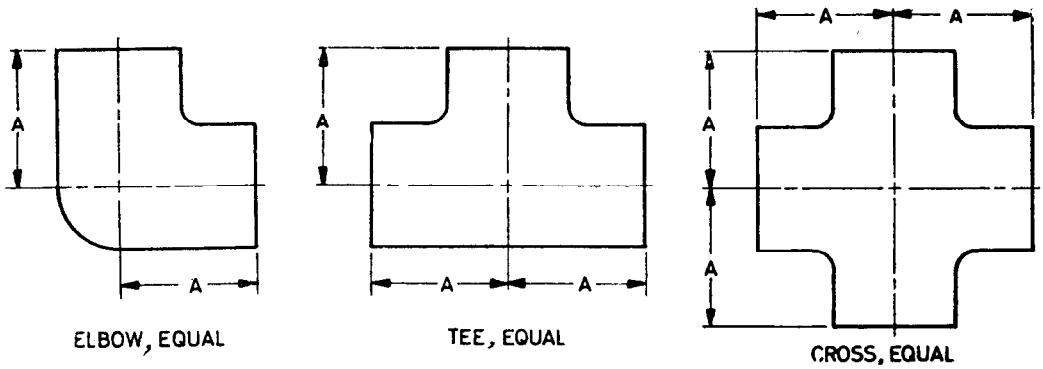
Nominal Size of Outlet	Minimum Outside Diameter	Minimum Outside Diameter of Body Behind External Thread	Maximum Inside Diameter of Body Behind Internal Thread
	D	*E*	*d*
(1)	(2)	(3)	(4)
6	15	9·8	8·6
8	18·5	13·3	11·4
10	22	16·8	15·0
15	27	21·1	18·6
20	32·5	26·6	24·1
25	39·5	33·4	30·3
32	49	42·1	39·0
40	56	48·0	44·8
50	68	59·8	56·7
65	84	75·4	72·2
80	98	88·1	84·9
100	24	113·3	110·1
125	51	138·7	135·5
150	78	164·1	160·9

NOTE — For particular of threads, *see* IS 554 : 1985.

Table 8 Dimensions of Elbows, Tees and Crosses, Equal

(*Clause* 9.1)

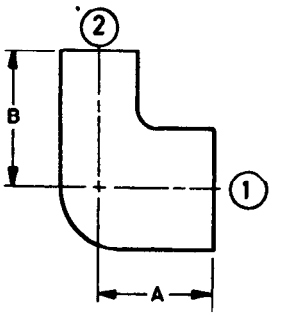
All dimensions in millimetres.



Nominal Size of Outlet	Minimum Length, Centre to Face
(1)	(2)
6	16
8	22
10	24
15	32
20	35
25	43
32	51
40	52
50	64
65	76
80	89
100	115
125	140
150	160

Table 9 Dimensions of Elbows, Reducing

(*Clause* 9.1)

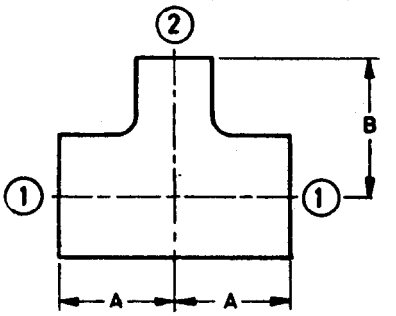


ELBOW, REDUCING

Nominal Size of Outlet	Minimum Length, Centre to Face	Minimum Length, Centre to Face
	A	*B*
(1)	(2)	(3)
(1) × (2)		
mm × mm	mm	mm
8 × 6	21	22
10 × 6	21	24
10 × 8	22	24
15 × 8	25	32
15 × 10	27	32
20 × 8	27	35
20 × 10	29	35
20 × 15	32	35
25 × 10	32	43
25 × 15	35	43
25 × 20	38	43
32 × 15	38	51
32 × 20	41	51
32 × 25	44	51
40 × 15	38	52
40 × 20	41	52
40 × 25	44	52
40 × 32	48	52
50 × 15	41	64
50 × 20	44	64
50 × 25	48	64
50 × 32	52	64
50 × 40	56	64
65 × 40	60	76
65 × 50	67	76
80 × 25	60	89
80 × 50	73	89
100 × 50	83	115
100 × 80	95	115

Table 10 Dimensions of Tees, Reducing (on the Branch)

(*Clause* 9.1)

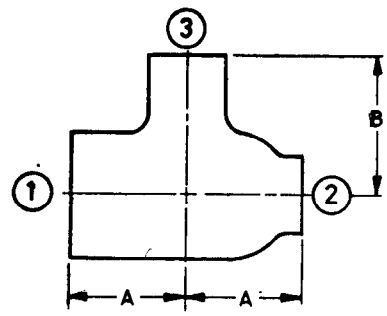


TEE, REDUCING (on the branch)

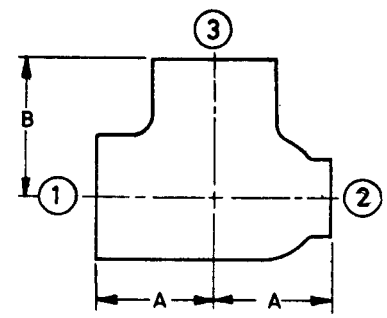
Nominal Size of Outlet	Minimum Length, Centre to Face	Minimum Length, Centre to Face	Nominal Size of Outlet	Minimum Length, Centre to Face	Minimum Length, Centre to Face
	A	*B*		*A*	*B*
(1)	(2)	(3)	(1)	(2)	(3)
(1) × (2)			(1) × (2)		
mm × mm	mm	mm	mm × mm	mm	mm
8 × 6	21	22	50 × 40	56	64
10 × 6	21	24	65 × 25	54	76
10 × 8	22	24	65 × 32	57	76
15 × 8	25	32	65 × 40	60	76
15 × 10	27	32	65 × 50	67	76
20 × 8	27	35	80 × 25	60	89
20 × 10	29	35	80 × 32	64	89
20 × 15	32	35	80 × 40	67	89
25 × 10	30	43	80 × 50	73	89
25 × 8	32	43	80 × 65	79	89
25 × 15	35	43	100 × 25	70	115
25 × 20	38	43	100 × 40	76	115
32 × 10	35	51	100 × 50	83	115
32 × 15	38	51	100 × 80	95	115
32 × 20	41	51	105 × 80	115	140
32 × 25	44	51	125 × 100	130	140
40 × 10	37	52	150 × 80	120	160
40 × 15	38	52	150 × 100	135	160
40 × 20	41	52			
40 × 25	48	52			
40 × 32	49	52			
50 × 15	41	64			
50 × 20	44	64			
50 × 25	48	64			
50 × 32	52	64			

Table 11 Dimensions of Tees, Reducing (on the Run and Branch, or on the Run Only)

(*Clause* 9.1)



TEE, REDUCING ON THE RUN AND BRANCH

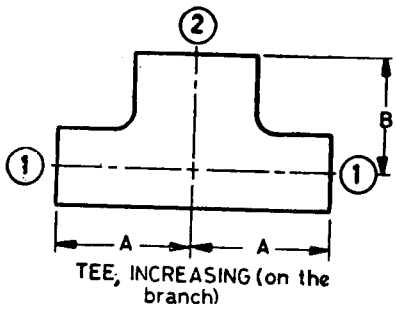


TEE, REDUCING ON THE RUN ONLY

Nominal Size of Outlet	Minimum Length, Centre to Face *A*	Minimum Length, Centre to Face *B*
(1)	(2)	(3)
(1) × (2) × (3)		
mm × mm × mm	mm	mm
20 × 15 × 15	32	35
20 × 15 × 20	35	35
25 × 20 × 15	35	43
25 × 20 × 20	38	43
25 × 20 × 25	43	43
32 × 25 × 20	41	51
32 × 25 × 25	44	51
32 × 25 × 32	51	51
32 × 25 × 40	52	52
40 × 32 × 25	44	52
40 × 32 × 32	49	52
40 × 32 × 40	52	52
40 × 32 × 50	64	64
50 × 32 × 50	64	64
50 × 40 × 25	48	64
50 × 40 × 40	56	64
50 × 40 × 50	64	64
50 × 50 × 50	67	76
50 × 50 × 65	76	76
80 × 50 × 50	73	89
80 × 50 × 80	89	89
100 × 80 × 80	95	115

Table 12 Dimensions of Tees (Increasing on the Branch)

(*Clause* 9.1)

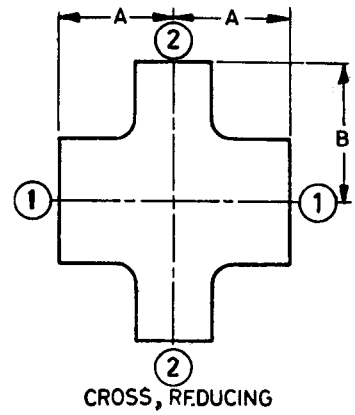


TEE, INCREASING (on the branch)

Nominal Size of Outlet	Minimum Length, Centre to Face	Minimum Length, Centre to Face
	A	*B*
(1)	(2)	(3)
(1) × (2) mm × mm	mm	mm
6 × 8	22	21
8 × 10	24	22
10 × 15	32	27
15 × 20	35	32
15 × 25	43	35
20 × 25	43	38
25 × 32	51	44
25 × 40	52	44
32 × 40	52	49
40 × 50	64	56
50 × 65	76	67
50 × 80	89	73
65 × 80	89	79
80 × 100	115	95

Table 13 Dimensions of Crosses, Reducing

(*Clause* 9.1)



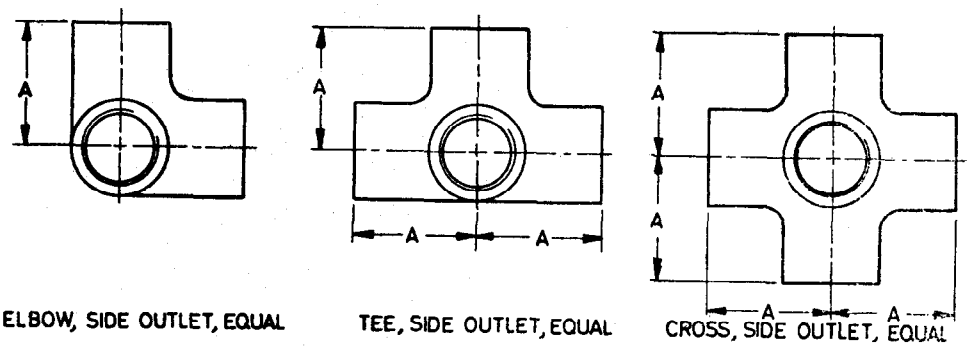
CROSS, REDUCING

Nominal Size of Outlet	Minimum Length, Centre to Face	Minimum Length, Centre to Face
	A	*B*
(1) (1) × (2) mm × mm	(2) mm	(3) mm
8×6	21	22
10×8	22	24
15×10	27	32
20×15	32	35
25×15	35	43
25×20	38	43
32×15	38	51
32×25	44	51
40×15	38	52
40×25	44	52
50×25	48	64
50×40	56	64
65×50	67	76
80×40	67	89
80×50	73	89
100×50	83	115
100×80	95	115
125×100	115	140
125×100	130	140
150×80	120	160
150×100	135	160

Table 14 Elbows, Tees and Crosses, Side Outlet, Equal

(*Clause* 9.1)

All dimensions in millimetres.



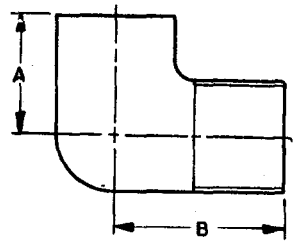
ELBOW, SIDE OUTLET, EQUAL — TEE, SIDE OUTLET, EQUAL — CROSS, SIDE OUTLET, EQUAL

Nominal Size of Outlet	Minimum Length, Centre to Face for All Outlets
	A
(1)	(2)
15	32
20	35
25	43
32	51
40	52
50	64

Table 15 Dimensions of Elbows, Round, Male and Female, Equal

(*Clause* 9.1)

All dimensions in millimetres.



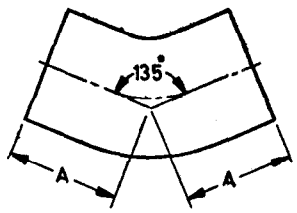
ELBOW, MALE & FEMALE, EQUAL

Nominal Size of Outlet	Minimum Length, Centre to Face	Minimum Length, Centre to Face	Minimum Bore of Male End	Maximum Bore of Male End
	A	*B*		
(1)	(2)	(3)	(4)	(5)
8	19	27	6·5	8
10	21	29	8·5	10·5
15	25	35	11·5	13
20	30	40	18	21
25	37	46	24	26
32	43	54	30	32
40	49	57	37	39
50	59	70	48	51
65	68	83	62	66
80	81	94	75	79
100	100	115	97	104

Table 16 Dimensions of Elbows, Equal, 135°

(*Clause* 9.1)

All dimensions in millimetres.



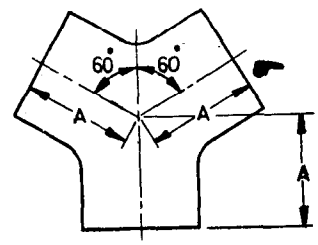
ELBOW-135, EQUAL

Nominal Size of Outlet	Minimum Length, Centre to Face *A*
(1)	(2)
6	16
8	17
10	19
15	22
20	27
25	33
32	38
40	44
50	51
65	60
80	73
100	105

Table 17 Dimensions of Y-Pieces, Female, Equal

(*Clause* 9.1)

All dimensions in millimetres.

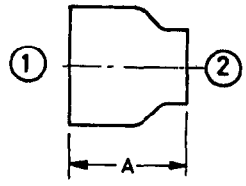


Y-PIECE, EQUAL

Nominal Size of Outlet	Minimum Length, Centre to Face *A*
(1)	(2)
15	27
20	35
25	36
32	44
40	49
50	57
65	71
80	79
100	100

Table 18 Dimensions of Socket, Reducing

(*Clause* 9.1)



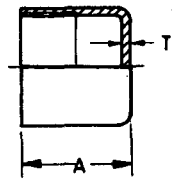
SOCKET, REDUCING

Nominal Size of Outlet	Minimum Length	Nominal Size of Outlet	Minimum Length
	A		*A*
(1)	(2)	(1)	(2)
(1) × (2)		(1) × (2)	
mm × mm	mm	mm × mm	mm
8 × 6	25	50 × 15	70
10 × 6	30	50 × 20	68
10 × 8	29	50 × 25	67
15 × 6	41	50 × 32	65
15 × 8	40	50 × 40	64
15 × 10	38	65 × 25	76
20 × 8	44	65 × 32	75
20 × 10	43	65 × 40	73
20 × 15	41	65 × 50	71
25 × 8	54	80 × 25	86
25 × 10	52	80 × 32	84
25 × 15	51	80 × 40	83
25 × 20	49	80 × 50	81
32 × 10	60	80 × 65	79
32 × 15	59	100 × 40	105
32 × 20	57	100 × 50	100
32 × 25	56	100 × 65	100
40 × 15	65	100 × 80	98
40 × 20	64	125 × 80	115
40 × 25	62	125 × 100	115
40 × 32	60	150 × 80	140
		150 × 100	140

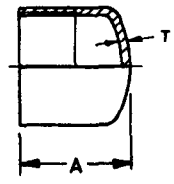
Table 19 Dimensions of Caps

(*Clauses* 9.1)

All dimensions in millimetres.



CAP, FLAT



CAP, DOME

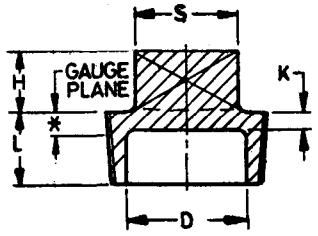
Nominal Size	Minimum Length *A*	Minimum Thickness *T*
(1)	(2)	(3)
6	19	3·5
8	24	3·5
10	27	3·5
15	37	4·0
20	38	4·0
25	44	4·5
32	51	5·0
40	54	5·5
50	60	6·0
65	67	6·0
80	73	7.0
100	86	7·0
125	98	7·0
150	98	7·0

NOTE — Flat or dome pattern caps may be supplied at the option of the manufacturer.

Table 20 Dimensions of Plug

(*Clause* 9.1)

All dimensions in millimetres.



PLUG

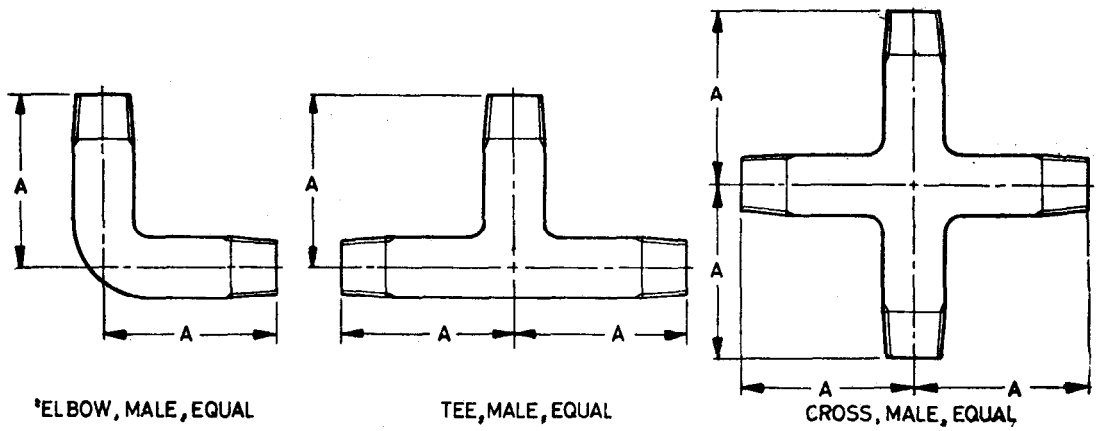
Nominal Size	Minimum Length of Thread for Basic Gauge	Approx Size of Square	Approx Height of Square	Maximum Internal Diameter	Minimum Thickness of Metal	Fitting Allowance in Accordance with IS 554 : 1985
	L	*S*	*H*	*D*	*K*	
(1)	(2)	(3)	(4)	(5)	(6)	(7)
6	6·5	6	6	...	...	$2\frac{3}{4}$
8	9·7	9	6	...	...	$2\frac{3}{4}$
10	10·1	11	10	...	...	$2\frac{3}{4}$
15	13·2	13	10	...	...	$2\frac{3}{4}$
20	14·5	14	12	...	...	$2\frac{3}{4}$
25	16·8	17	12	22	4	$2\frac{3}{4}$
32	19·1	22	16	31	5	$2\frac{3}{4}$
40	19·1	27	16	33	5	$2\frac{3}{4}$
50	23·4	32	19	48	5	$3\frac{1}{4}$
65	26·7	37	19	62	6	4
80	29·8	37	22	73	8	4
100	35·8	46	25	97	10	$4\frac{1}{2}$
125	40·1	51	29	120	12	5
150	40·1	60	32	145	12	5

NOTE — Plugs of Nominal sizes 25 to 150 mm may be either solid or hollow, and the attention of the purchaser is drawn to the necessary of stating in his enquiry and order which pattern is required.

Table 21 Dimensions of Elbows, Tees and Crosses, Male, Equal

(*Clause* 9.1)

All dimensions in millimetres.



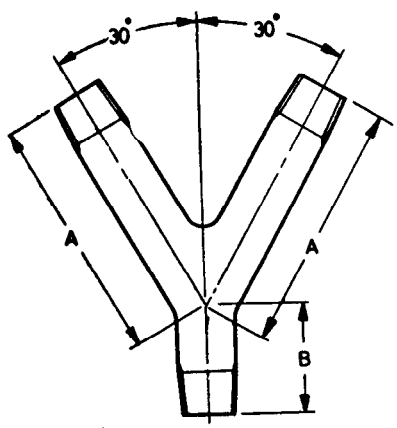
Nominal Size of Outlet	Minimum Length, Centre to Face
	A
(1)	(2)
15	90
20	95
25	100
32	110
40	115
50	125
65	140
80	150
100	180
125	200
150	230

NOTE — Made from heavy tube conforming to IS 1239 (Part 1) : 1990.

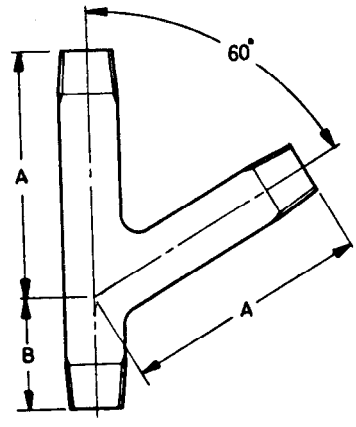
Table 22 Dimensions of Y-Pieces and Angle Tees, Male, Equal

(*Clause* 9.1)

All dimensions in millimetres.



Y PIECE, MALE, EQUAL



ANGLE TEE, MALE, EQUAL

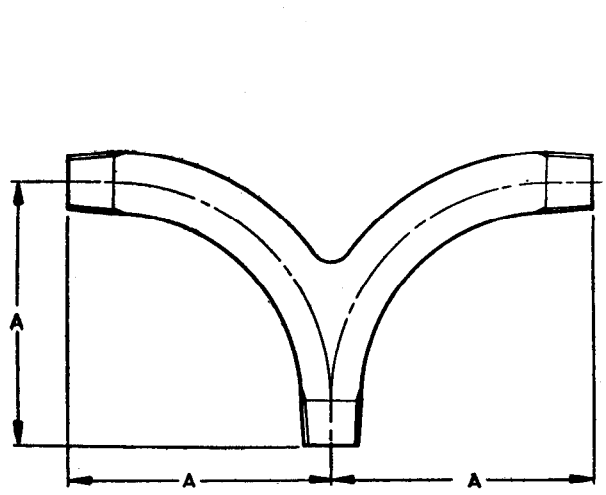
Nominal Size of Outlet	Minimum Length, Centre to Face *A*	Minimum Length, Centre of Face *B*
(1)	(2)	(3)
15	120	57
20	130	64
25	150	70
32	160	73
40	170	76
50	190	83
65	200	90
80	220	100
100	260	110
125	300	115
150	340	125

NOTE — Made from heavy tube conforming to IS 1239 (Part 1) : 1990.

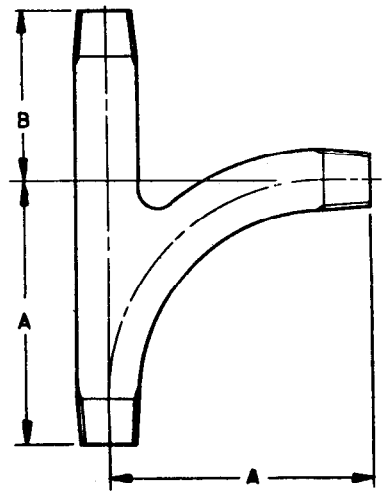
Table 23 Dimensions of Twin Elbows and Sweep Tees, Male, Equal

(*Clause* 9.1)

All dimensions in millimetres.



TWIN ELBOW, MALE, EQUAL



SWEEP TEE, MALE, EQUAL

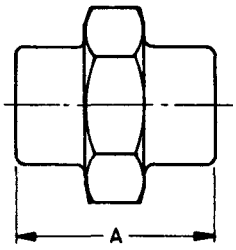
Nominal Size of Outlet	Minimum Length, Centre to Face *A*	Minimum Length, Centre to Face *B*
(1)	(2)	(3)
15	80	85
20	90	90
25	120	100
32	150	105
40	170	110
50	200	125
65	250	135
80	290	145
100	380	170
125	530	195
150	620	220

NOTE — Made from heavy tube conforming to IS 1239 (Part 1) : 1990.

Table 24 Dimensions of Socket Unions

(*Clause* 9.1)

All dimensions in millimetres.



SOCKET UNION

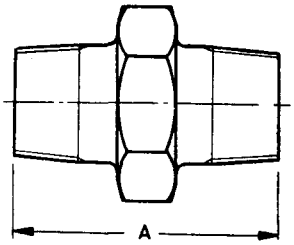
Nominal Size of Outlet	Minimum Length
	A
(1)	(2)
6	38
8	44
10	51
15	57
20	67
25	76
32	85
40	100
50	110
65	120
80	135
100	160
125	185
150	210

NOTE — Unions are normally supplied with flat seats and fitted with a washer. Other types of seating are obtainable, if required.

Table 25 Dimensions of Pipe Unions

(*Clause* 9.1)

All dimensions in millimetres.



PIPE UNION

Nominal Size of Outlet	Minimum Length *A*
(1)	(2)
6	95
8	100
10	110
15	115
20	120
25	125
32	135
40	140
50	150
65	165
80	180
100	205
125	215
150	230

NOTES

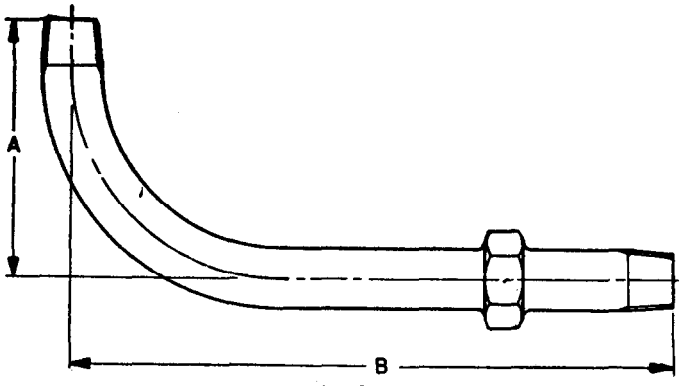
1 Bodies made from heavy tube conforming to IS 1239 (Part 1) : 1990.

2 Unions are normally supplied with flat seats and fitted with a washer. Other types of seating are obtainable, if required.

Table 26 Dimensions of Unions Bends

(*Clause* 9.1)

All dimensions in millimetres.



UNION BEND

Nominal Size of Outlet	Minimum Length, Centre to Face *A*	Minimum Length, Centre to Face *B*
(1)	(2)	(3)
6	54	100
8	64	115
10	73	125
15	83	140
20	100	160
25	120	185
32	150	220
40	170	240
50	205	280
65	245	330
80	290	380

NOTES

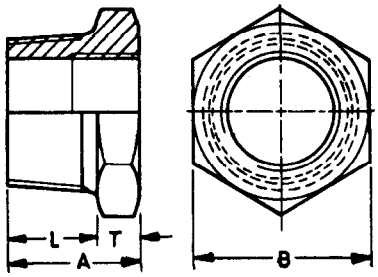
1 Bodies made from heavy tube conforming to IS 1239 (Part 1) : 1990.

2 Unions are normally supplied with flat seats and fitted with a washer. Other types of seating are obtainable, if required.

Table 27 Dimensions of Hexagon Bushes

(*Clause* 9.1)

All dimensions in millimetres.



BUSH

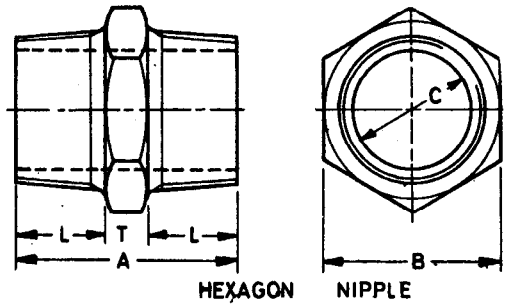
Nominal Size		Length of Useful Threads for Basic Gauge Lengths Plus Clearance *L* (*Min*)	Thickness of Hexagon *T* (*Max*)	Minimum Overall Lengths *A* (*Min*)	Width Across Flats of Hexagon *B*
External Threads	Internal Threads				
(1)	(2)	(3)	(4)	(5)	(6)
8	6	12·5	6	18·5	15·5
10	8	12·5	7	20·5	17·9
15	8	17·5	8	25·5	23·0
	10	17·5	7	25·5	23·0
	10	19	10	29	27·8
20	15	19	10	29	27·8
25	15	21	10	31	35·3
	20	21	10	31	35·3
32	15	24	11	35	47·2
	20	24	11	35	47·2
	25	24	11	35	47·2
40	20	24	13	37	52·0
	25	24	13	37	52·0
	32	24	13	37	52·0
50	25	27	14	41	61·1
	32	27	14	41	61·1
	40	27	14	41	61·1
65	32	32	16	48	79
	40	32	16	48	79
	50	32	16	48	79
80	40	35	19	54	92
	50	35	19	54	92
	65	35	19	54	92
100	50	40	22	62	117
	65	40	22	60	117
	80	40	22	62	117
125	80	45	25	70	143
	100	45	25	70	143
150	80	45	25	70	168
	100	45	25	70	168

NOTE — External and internal threads shall be made as per IS 554 : 1985.

Table 28 Dimensions of Nipples, Hexagon, Equal

(*Clause* 9.1)

All dimensions in millimetres,



Nominal Size	Minimum Length of Thread for Basic Gauge Length Plus Dia Clearance *L*	Thickness of Hexagon *T*	Minimum Overall Length *A*	Maximum Diameter of Bore *C*	Width Across Flats of Hexagon *B*
(1)	(2)	(3)	(4)	(5)	(6)
6	9·5	6	25	5·5	13·1
8	12·5	6	31	6·5	15·5
10	12·5	8	33	9·5	17·9
15	17·5	8	43	12·5	23·0
20	19	10	48	19	27·8
25	21	20	52	25	35·3
32	24	11	59	32	47·2
40	24	13	61	38	52·0
50	27	14	68	51	61·1
65	32	16	80	64	79
80	35	19	89	76	92
100	40	22	102	100	117
125	45	25	115	125	143
150	45	25	115	150	168

9.2 Tolerances

9.2.1 Where maximum and minimum dimensions are not specified, the tolerance for centre to face and centre to centre dimensions shall be as specified in Table 29.

9.2.2 *Tolerance for the Alignment of Threads*

The axes of the threads shall be coincident with the theoretical axes of the fitting within a tolerance of ±0·5° on the run and on the branches.

9.2.3 Thread tolerances shall be in accordance with those specified in IS 554 : 1985.

10 JOINTS

10.1 Tubulars and fittings shall be screwed with taper or parallel threads or both as detailed in tables. Unless otherwise specified, sockets for tubulars shall have parallel threads. All threads shall be in accordance with IS 554 : 1985.

11 TESTS ON FITTINGS AND SOCKETS

11.1 The fittings and sockets before they leave the works, shall be subjected to either of the following pressure tests, as mutually agreed between the purchaser and the manufacturer:

a) The application of an internal hydraulic pressure of not less than 5 MPa, or

b) The application of an internal air pressure of 0·7 MPa whilst the fittings is completely immersed in water or light oil.

Table 29 Tolerance

(*Clause* 9.2.1)

Dimensions mm		Tolerance mm
Above	Up to and Including	
(1)	(2)	(3)
—	30	± 1·5
30	50	± 2·0
50	75	± 2·5
75	100	± 3·0
100	175	± 3·5

NOTES

1 Centre to face dimensions apply to elbows, bends, tees, crosses, etc.

2 Face to face dimensions apply to sockets, nipples, etc.

3 Centre to centre dimensions apply to return bends.

11.1.1 The ends of fittings and sockets when subjected to the required pressure, after having been made up wrench tight with the prior application of lubricant, or sealant, or by any other appropriate method shall not show any leakage. The test shall be carried out after the fittings and sockets have been screwed and before any protecting coating other than galvanizing has been applied.

11.1.2 The sample size and the acceptance criteria for the pressure test shall be given in Table 30 below.

11.2 Expansion Test on Sockets

At the option of the manufacturer any one of the tests described in **11.2.1** shall be carried out.

11.2.1 *Drift Expanding Test*

It shall be carried out on sockets, tubes, blanks or sockets in accordanae with IS 2335 : 1963. On a conical mandrel having an included taper on diameter 1 in 16 and the minimum increase in outside diameter after expansion shall be as follows:

Nominal Bore mm	*Percentage of Expansion, Min*
Up to and including 25	2·0
32 to 40	1·5
50 to 80	1·0
100 to 150	0·5

Table 30 Scale of Sampling and Acceptance Criteria for Pressure Test

(*Clause* 11.1.2)

Lot Size	Stage	Sample Size	Cumulative Sample Size	Acceptance Number	Rejection Number
(1)	(2)	(3)	(4)	(5)	(6)
Up to 1 000	First	13	13	0	2
	Second	13	26	1	2
1 001 to 3 000	First	20	20	0	2
	Second	20	40	1	2
3 001 to 5 000	First	32	32	0	3
	Second	32	64	3	4
5 001 to 10 000	First	50	50	1	4
	Second	50	100	4	5
10 001 and above	First	80	80	2	5
	Second	80	160	6	7

11.2.2 *Taper Screw Plug Test*

Sockets shall be capable of withstanding the expansion test as described below without showing any sign of fracture or failure.

11.2.2.1 The test shall consist of screwing the selected socket on a taper screw plug.

11.2.2.2 The threads of socket shall be thoroughly clean and free from foreign matter. Should the threads show sign of burr, this shall be removed by means of a pipe thread tap. The threads of the socket and the end of the test plug shall be lubricated with oil, and the socket shall then be screwed on to the test plug between the jaws of a vice, or other suitable fixtures, and by rotating the socket with both hands. The socket shall then be further rotated five complete turns beyond hand tightness, either by means of a pipe wrench of an adequate length to operate the test with gradual turning or by a power machine giving an appropriate leverage. The wrench shall not be hammered (*see* Fig. 1).

11.2.2.3 The plugs shall be manufactured from steel and shall be hardened to give a vickers hardness between 700 and 800 HV when determined by applying a load of 30 kgf in accordanae with IS 1501 (Part 1) : 1984.

11.2.2.4 The dimensions of plug shall conform with those given in Table 31. The threads shall be ground after the plugs are case hardened, and the thread form and angle of taper shall be in accordance with the appropriate dimensions and tolerances specified in IS 554 : 1985.

11.2.2.5 For routine testing, use may be made, if so desired, of unhardened steel plugs in accordance with the dimensions given in Table 31 and having machined threads, the thread form and angle of taper being in accordance with the appropriate dimensions and tolerance specified in IS 554 : 1985.

11.2.2.6 In case of dispute, however in the test shall be carried out with the hardened plugs specified in **11.2.2.3** and **11.2.2.4.**

12 SAMPLING OF TUBULARS, SOCKETS AND FITTINGS

12.1 The procedure for sampling of tubulars, sockets and fittings for various tests shall be given in IS 4711 : 1974.

12.2 Re-test

Should any one of the test pieces first selected fail to pass any of the tests specified, two further samples shall be selected for testing in respect of each failure. Should the test pieces from both these additional samples pass, the material shall be deemed to comply with the requirements of the particular test. Should the test pieces from either of these additional samples fail, the material represented by the test samples shall be deemed as not complying with the standard.

13 GALVANIZING

13.1 Where tubulars, sockets and fitting are required to be galvanized, the zinc coating shall be in accordance with IS 4736 : 1986.

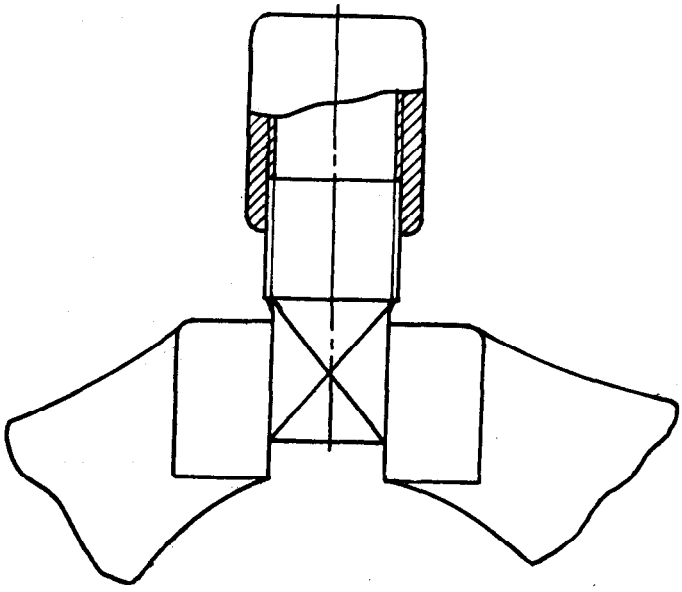
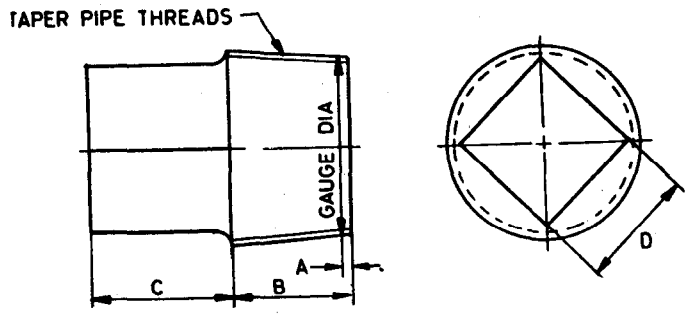


FIG. 1 MECHANICAL EXPANSION TEST ON SOCKETS

Table 31 Dimensions of Taper Screw Plugs for Expansion Test

(*Clauses* 11.2.2.4 *and* 11.2.2.5)



Nominal Bore	Gauge Diameter	Threads Per 25·4 mm	Tolerance on Total Number of Threads	*A*	*B*	*C*	*D*
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
6	9·728	28	2	1·8	13	11	7
8	13·157	19	2	2·8	19	13	10
10	16·662	19	2	2·8	19	16	13
10	20·955	14	2	3·6	25	19	14
20	26·441	14	2	3·6	25	29	17
25	33·249	11	2	4·6	32	29	21
32	41.910	11	2	4·6	32	32	27
40	47·803	11	2	4·6	32	38	32
50	59·614	11	2	4·6	32	38	37
65	75·184	11	2	4·6	32	51	48
80	87·884	11	2	4·6	32	57	54
100	113·030	11	2	4·6	32	64	70
125	138·430	11	2	4·6	32	67	76
150	163·830	11	2	4·6	32	70	89

13.1.1 Tubulars, sockets and fittings shall be galvanzined before screwing.

14 WORKMANSHIP

14.1 Tubulars, sockets and fitting shall be clearly finished and reasonably free from scale, surface flaws, laminations and other defects. The screw threads of tubulars, sockets and fittings shall be clean and well cut. The ends shall be cut clearly and square unless otherwise specified.

15 MARKING

15.1 Tubulars, sockets and fittings shall be suitably packed and threads protected from damage and marked with the following details:

a) Manufacturer's name or trademark, and

b) Size designation

15.1.1 Tubulars, sockets and fittings may also be marked with the Standard Mark.

ANNEX A

(*Clause* 2.1)

LIST OF REFERRED INDIAN STANDARDS

IS No.	*Title*
228	Methods of chemical analysis of steels
554 : 1985	Dimensions for pipe threads where pressure tight jonts are required on the threads (*third revision*)
1239 (Part 1) : 1990	Mild steel tubes, tubulars and other wrought steel fittings — Specification : Part 1 Mild steel tubes (*fifth revision*)
1387 : 1967	General requirements for the supply of Metallurgical materials (*first revision*)
1501 (Part 1) : 1984	Method for Vickers hardness test for metallic materials : Part 1 HV5 to HV 100 (*second revision*)
1879 : 1987	Malleable cast iron pipe fittings (*second revision*)
1894 : 1972	Method for tensile testing of steel tubes (*first revision*)
2335 : 1985	Method of drift expanding test on metallic tubes.
3468 : 1975	Pipe nuts (*first revision*)
4711 : 1974	Methods for sampling of steel pipes, tubes and fittings.
4736 : 1986	Hot dip zinc coatings on mild steel tubes (*first revision*)

ANNEX B

(*Clause* 0.3)

NOMINAL SIZE OF PIPE THREADS AND CORRESPONDING NOMINAL BORES OF PIPES

Nominal Size of Pipe Threads (*As per IS* 554 : 1985)	*Corresponding Nominal Bore* (*As per IS* 1239 (*Part 1*) : 1990 *mm*
1/16	—
1/8	6
1/4	8
3/8	10
1/2	15
3/4	20
1	25
1¼	32
1½	40
2	50
2½	65
3	80
3½	—
4	100
5	125
6	150

Standard Mark

The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act, 1986* and the Rules and Regulations made thereunder. The Standard Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well defined system of inspection, testing and quality control which is devised and supervised by BIS and operated by the producer. Standard marked products are also continuously checked by BIS for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

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.

Copyright

Revision of Indian Standards

Indian Standards are reviewed periodically and revised, when necessary and amendments, if any, are issued from time to time. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition. Comments on this Indian Standard may be sent to BIS giving the following reference:

Doc : No. MTD 19 (3859)

Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

BUREAU OF INDIAN STANDARDS

Headquarters :

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110002
Telephones : 331 01 31, 331 13 75

Telegrams : Manaksanstha
(Common to all Offices)

Regional Offices :	Telephone
Central : Manak Bhavan, 9 Bahadur Shah Zafar Marg NEW DELHI 110002	{311 01 31 {331 13 75
Eastern : 1/14 C. I. T. Scheme VII M, V. I. P. Road, Maniktola CALCUTTA 700054	37 86 62
Northern : SCO 445-446, Sector 35-C, CHANDIGARH 160036	53 38 43
Southern : C. I. T. Campus, IV Cross Road, MADRAS 600113	235 02 16
Western : Manakalaya, E9 MIDC, Marol, Andheri (East) BOMBAY 400093	6 32 92 95

Branches : AHMADABAD, BANGALORE, BHOPAL, BHUBANESHWAR, COIMBATORE, FARIDABAD, GHAZIABAD, GUWAHATI, HYDERABAD, JAIPUR, KANPUR, PATNA, SRINAGAR, THIRUVANANTHAPURAM.

Printed at Dee Kay Printers, New Delhi, India

AMENDMENT NO. 1 AUGUST 1993
TO
IS 1239 (Part 2) : 1992 SPECIFICATION FOR MILD STEEL TUBES, TUBULARS AND OTHER WROUGHT STEEL FITTINGS

PART 2 MILD STEEL SOCKETS TUBULAR AND OTHER WROUGHT STEEL PIPE FITTINGS

(Fourth Revision)

(*Page* 26, *clause* **11.1.1**) — Delete.

(*Page* 26, *clause* **11.1.2**) — Renumber this clause as **11.1.1**.

(MTD 19)

Reprography Unit, BIS, New Delhi, India

AMENDMENT NO. 2 MARCH 1999
TO
IS 1239 (PART 2) : 1992 SPECIFICATION FOR MILD STEEL TUBES, TUBULARS AND OTHER WROUGHT STEEL FITTINGS

PART 2 MILD STEEL SOCKETS TUBULAR AND OTHER WROUGHT STEEL PIPE FITTINGS

(Fourth Revision)

(*Page* 26, *clause* **10.1**) — Insert the following at the end of para:

'Gauging in accordance with IS 8999 shall be considered as an adequate test for conformity of threads.'

(*Page* 26, *clause* **11.2**, *line* 2) — Insert '**and 11.2.2**' after '**11.2.1**'.

(*Page* 29, *Annex* A) — Insert the following at the end of Annex:

IS No.	*Title*
'8999 : 1979	Gauging practice for pipe threads where pressure tight joints are required on the threads'

(MTD 19)

Reprography Unit, BIS, New Delhi, India

AMENDMENT NO. 3 MARCH 2000
TO
IS 1239 (PART 2) : 1992 SPECIFICATION FOR MILD STEEL TUBES, TUBULARS AND OTHER WROUGHT STEEL FITTINGS

PART 2 MILD STEEL SOCKETS TUBULAR AND OTHER WROUGHT STEEL PIPE FITTINGS

(Fourth Revision)

[*Page* 2, *clause* **8.4.1** (*second line*), *and clause* **8.4.2** (*third line*)] — Substitute the word 'approximate' *for* 'appropriate'.

(MTD 19)

Reprography Unit, BIS, New Delhi, India