भारतीय मानक ब्यूरो
BUREAU OF INDIAN STANDARDS

MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG, NEW DELHI 110002

व्यापक परिचालन मसौदा

हमारा संदर्भ : सीईडी 50/टी - 96 **17 फ़रवरी 2025**

तकनीकी समिति : प्लास्टिक पाइपिंग पद्धति विषय समिति, सीईडी 50

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भारतीय मानक ब्यूरो
BUREAU OF INDIAN STANDARDS

MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG, NEW DELHI 110002

DRAFT IN WIDE CIRCULATION

DOCUMENT DESPATCH ADVICE

Reference	Date
CED 50/T-96	17 February 2025

TECHNICAL COMMITTEE:

PLASTIC PIPING SYSTEMS SECTIONAL COMMITTEE, CED 50

ADDRESSED TO:

1. All Members of Civil Engineering Division Council, CEDC
2. All Members of Plastic Piping Systems Sectional Committee, CED 50
3. All Members of Subcommittees and Panels under CED 50
4. All other interested

Dear Madam/Sir,

Please find enclosed the following draft:

Doc. No.	Title
CED 50 (27507)WC	**Draft Indian Standard for Injection Moulded PVC Socket Fittings with Solvent Cement Joints for Water Supplies – Specification (*Second Revision*)** **(ICS 23.040.45)**

Kindly examine the draft and forward your views stating any difficulties which you are likely to experience in your business or profession, if this is finally adopted as National Standard.

Last Date for comments: 19 March 2025

Comments if any, may please be made in the attached format and mailed to the undersigned at the above address or preferably through e-mail to ced50@bis.gov.in. The comments may preferably be shared in the prescribed template through the Manak Online portal at www.manakonline.in. Alternatively, the comments may be sent through the attached format for consideration by the BIS' Sectional Committee for necessary action.

In case no comments are received or comments received are of editorial nature, you will kindly permit us to presume your approval for the above document as finalized. However, in case comments, technical in nature are received, then it may be finalized either in consultation with the Chairman, Sectional Committee or referred to the Sectional Committee for further necessary action if so desired by the Chairman, Sectional Committee.

The document is also hosted on BIS website **www.bis.gov.in** .

Thanking you,

Yours Faithfully,

Sd/-

(Dwaipayan Bhadra)

Sc. 'E'/Director and Head (Civil Engg.)

Encl: As above

FORMAT FOR SENDING COMMENTS ON BIS DOCUMENTS

(Please use A4 size sheet of paper only and type within fields indicated. Comments on each clause/subclause/table/fig etc. be started on a fresh box. Information in column 5 should include reasons for the comments, and those in column 4 should include suggestions for modified wording of the clauses when the existing text is found not acceptable. Adherence to this format facilitates Secretariat's work) {Please e-mail your comments to ced50@bis.gov.in}

DOC. NO.	**Doc: CED 50 (27507) WC**
TITLE	**Draft Indian Specification for Injection Moulded PVC Socket fittings With solvent Cement joints for water supplies General Requirements (Second Revision)** **(ICS 23.040.45)**
LAST DATE OF COMMENTS	**19 March 2025**
NAME OF THE COMMENTATOR/ ORGANIZATION	

Sl No.	Clause/Sub-clause/Para No.	Comments/Suggestions	Modified Wording of the Clause	Reasons/ Justifications for the Proposed Changes
(1)	(2)	(3)	(4)	(5)

Draft Indian Standard

INJECTION MOULDED PVC SOCKET FITTINGS WITH SOLVENT CEMENT JOINTS FOR WATER SUPPLIES — SPECIFICATION

(*Second Revision*)

FOREWORD

(*Formal clause to be added later*)

The injection moulded PVC socket fittings are used for connection, by solvent cement, to PVC pipes covered by IS 4985. According to the present manufacturing system, the PVC socket fittings are manufactured to withstand the highest-pressure rating as specified in IS 4985 for the pipes.

This standard was first published in 1975 and covered sizes of fittings up to 160 mm. The standard was revised in 1987 and additional sizes of fittings up to 315 mm were added in the revision.
In this revision, the standard has been brought out in the latest style and format of the Indian Standards. The following major changes have been incorporated:

This standard was earlier divided into eight parts namely:

Part 1 General Requirements

Part 2 Specific requirements for 45° elbows

Part 3 Specific requirements for 90° elbows

Part 4 Specific requirements for 90° tees

Part 5. Specific requirements for 45° tees

Part 6 Specific requirements for sockets

Part 7 Specific requirements for unions

Part 8 Specific requirements for caps.

All the above parts of the standards have been merged in this revision of IS 7834.

Draft Indian Standard

INJECTION MOULDED PVC SOCKET FITTINGS WITH SOLVENT CEMENT JOINTS FOR WATER SUPPLIES — SPECIFICATION

(*Second Revision*)

1 SCOPE

This standard covers general requirements regarding materials, manufacture methods of test, inspection and marking of all types of injection moulded PVC socket fittings intended for connection, by using solvent cement, to PVC pipes covered by IS: 4985 [Specification for Unplasticized PVC pipes for potable water supplies (*fourth revision*)] for water supplies.

It is applicable to PVC-U fittings and to joints with components of PVC-U, other plastics and non-plastics materials intended to be used for the Water mains and service buried in the ground.

It is applicable to fittings in piping systems intended for the supply of water under pressure up to and including 27°C intended for human consumption and for general purposes.

This standard is also applicable to components for the conveyance of water up to and including 45°C. For temperature between 27 °C and 45 °C Fig X of IS 4985 applies.

> Note — The producer and the end user can come to agreement for the possibilities of use for temperature above 45°C on a case to case basis.

This standard IS 7834 covers a range of fittings sizes and pressure classes and gives requirements concerning colors.

2 REFERENCES

The standards given below 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 subjected to revision, and parties to agreement based on this standard are encouraged to investigate the possibility of applying the most recent editions of these standards:

IS No.	*Title*
IS 4905 : 2015 ISO 24153 : 2009	Random Sampling and Randomization Procedures (*first revision*)
IS 4985 : 2021	Unplasticized PVC Pipes for Water Supplies — Specification (*fourth revision*)
IS 12235 (Parts 1 to 19) :2004	Thermoplastics Pipes and Fittings —

	Methods of Test (*first revision*)
Part 1	Measurement of dimensions
Part 2	Determination of Vicat softening temperature
Part 3	Test for opacity
Part 4	Determining the detrimental effect on the composition of water
Part 6	Stress relief test
Part 10	Determination of organotin as tin aqueous solution
Part 14	Determination of density/relative density (specific gravity)

3 MATERIALS

The material from which the fitting is produced shall substantially consist of polyvinyl chloride, to which may be added only those additives that are needed to facilitate the manufacture of sound pipe of good surface finish, mechanical strength and opacity. None of those additives shall be used separately or together in quantities sufficient to constitute a toxic hazard or materially to impair the fabrication or welding properties of the pipe or to impair its chemical and physical properties.

4 SIZE OF FITTING

The sizes of the fittings shall be designated by the inside diameters of their sockets. The inside diameters of the sockets of the fittings shall correspond to the outside diameters of the pipes given in IS 4985.

5 DIMENSIONS

5.1 Measurement of Dimensions

The dimensions of fitting shall be measured in accordance with IS 12235 part 1

5.2 Dimensions of Fitting

5.2.1 Minimum Thickness — Minimum wall thickness of fitting should be minimum of pipe wall thickness to which fitting is joined but shall not be less than 3 mm.

> Note — Reduction in 5 percent of the wall thickness resulting from core shifting is permitted. In such case, the average of two opposite wall thicknesses shall be equal to or exceed the minimum wall thickness of 3.0 mm.

5.2.2 Socket Length and Diameter at Mid-Point of Socket Length

The minimum socket length of any fitting (*see* Fig.1) shall be as given by the expression

L = 0.5 D + 6 mm with a minimum of 12 mm.

Where,

L = socket length, and
D = nominal inside diameter of fitting (corresponding to the outside diameter of the pipe covered in IS: 4985).

5.2.2.1 The socket length is applicable to socket fittings for pipes, of any diameter under pressure.

The minimum socket length is based on the formula in **5.2.2** for socket diameters ranging from 16 to 315 mm are given in Table 1.

5.2.2.2 The maximum and minimum dimensions of mean inside diameter at mid-point of socket depth shall comply with those given in Table 1.

Notes

1. The mean inside diameter of the socketed portion of the fitting is defined as being the arithmetical mean of two diameters measured at 90” to each other at the mid-point of socket length using the same cross section. The diameter of the socket may be decreased from mouth to root, for pipe sizes 16 to 75 mm, the total included angle of taper shall not exceed 0° 40’; and for pipe sizes 90 mm and above , the total included angle of taper shall not exceed 0° 30’.

2. Only the manufacturer of injection moulded fittings is equipped to measure the socket inside diameter. Since the socket length is minimum only (no tolerance is given to this dimension it is not practical, other than for the manufacturer, to establish the exact position of the mid-point of the socket. He can, therefore, tool up to measure his own fittings but such equipment will not necessarily give the correct figures for a fitting of other manufacturer.

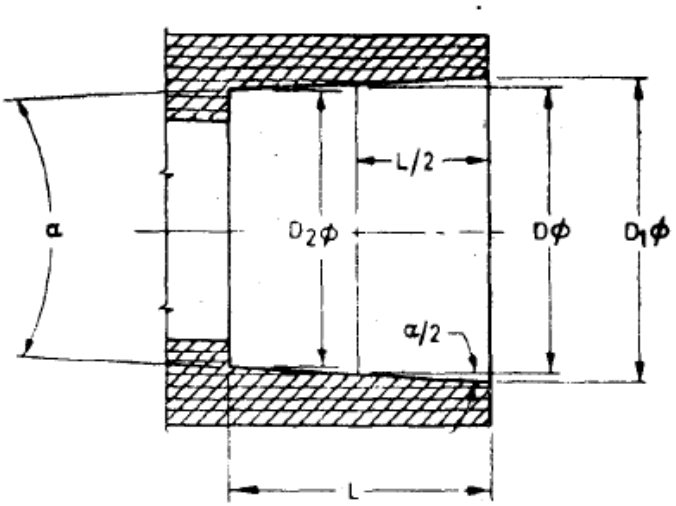

Fig. 1

Note - This drawing is only intended to define the terms used in Table 1 and is not intended to illustrate **speci**fic design features.

It is possible to calculate the diameter D_1 and D_2 knowing D, L and a from the following equations:

$D_2 = D - L \tan \alpha/2$, and

$D_1 = D + L \tan \alpha/2$.

Where,

D = diameter at mid-point of socket length,
D_1 = diameter at mouth,
D_2 = diameter at root,
L = socket length, and
α = total included angle of taper.

Table 1 Socket Dimensions

(*Clauses* 5.2.2, 5.2.2.1, 5.2.2.2, *and* Fig. 1)

All dimensions in millimeters

Nominal Size	Minimum Socket Length	Mean Socket Internal Diameter at Mid-Point of Socket Length	
(1)	(2)	(3)	(4)
16	14	16.1	16.3
20	16	20.1	20.3
25	19	25.1	25.3
32	22	32.1	32.3
40	26	40.1	40.3
50	31	50.1	50.3
63	38	63.1	63.3

Nominal Size	Minimum Socket Length	Mean Socket Internal Diameter at Mid-Point of Socket Length	
75	44	75.1	75.3
90	51	90.1	90.3
110	61	110.1	110.4
125	69	126.1	125.4
140	76	140.1	140.5
160	86	160.2	160.5
186	96	180.2	180.5
200	106	200.3	200.6
225	119	225.3	225.7
250	131	250.4	250.8
280	146	280.4	280.9
315	164	315.4	316.0

4.2.3 *Out-of-roundness Tolerances of Socket Inside Diameter* — The maximum out-of-roundness tolerances (maximum diameter-minimum diameter) shall be:

a) less than or equal to 0.007 *D,* or
b) equal to 0.2 mm (if 0.007 *D* is less than 0.2 mm).

For rest of the dimensions like laying length and tolerance thereon refer annexure A for different fittings as given below:

45° bends	Fig 2 read with table 5
90° bends	Fig 3 read with table 6
90° tees	Fig 4 read with table 7
45° tees	Fig 5 read with table 8
Sockets	Fig 6 read with table 9
Unions	Fig 7 read with table 10
Caps	Fig 8

6 TESTS AND PERFORMANCE REQUIREMENTS PHYSICAL AND CHEMICAL CHARACTERISTICS

6.1 Color — The color of the fitting shall be grey throughout the wall.

6.2 Visual appearance — When viewed without magnification ,the internal and external surfaces of the fitting shall be smooth ,clean and free from scoring ,cavities and other surface defects to an extent that would prevent conformity to this part of IS 7834.

6.3 Opacity — The wall of fitting shall not transmit more than 0.2 % of the visible light falling on it when tested in accordance with IS 12235 part 3

6.4 Density — The density ρ at 27°C of the fitting , when measured in accordance with IS 12235 part 14 shall be between 1.40 to 1.46 gms/cc.(Both inclusive)

6.5 Vicat softening Temperature — When tested by the method prescribed in IS 12235 Part 2, the Vicat Softening temperature of the specimen shall not be less than 74°C

6.6 Stress Relief Test — When tested by the method described in IS 12235 part 6**,** none of the specimens tested shall show blisters, excessive delamination or cracking or signs of weld line splitting.

The weld line or lines may become more pronounced during the test but this shall not be deemed to constitute failure.

6.6.1 Special care shall be taken in examining the area around the point of injection, where no cracks or de-laminations shall penetrate to a depth greater than 20 percent of the wall thickness at that point. The assessment of the depth of penetration of cracks or de-laminations shall be carried out' by 'sectioning the specimen at the point of injection and measuring the depth to which these defects penetrate the wall thickness of the fitting.

6.7 Effect on Water — The fittings shall not have any detrimental effect on the composition of the water flowing through them. When tested by the method described in IS 12235 part 4 and 10 the quantities of lead, di alkyl tin , and higher homologues (measured as tin 3, and any other toxic substances extracted from the internal walls of the fittings shall not exceed the following concentrations in the test solution:

Lead (first extraction)	1.0 mg/litre (1.0 part per million by mass 1)
Lead (third extraction)	0.3 mg/litre (0.3 part per million by mass)
Di alkyl tin C, and higher homologues measured as tin (third extraction)	0.02 mg/litre(0.02 part per million by mass)
Other toxic substances (third extraction)	0.01 mg/litre (0.01 part per million by mass)

6.7.1 When so required by the purchaser, the manufacturer for the purpose of these tests shall disclose all the toxic substances present.

7 MECHANICAL CHARACTERISTICS

7.1 Hydrostatic Characteristics

When subjected to internal hydrostatic pressure test in accordance with the procedure given in Annexure B, the fitting shall not fail during the prescribed test duration. The temperatures and the test duration of test shall conform to the requirements given in Table 2

Table 2 Requirements of Fittings for Internal Hydrostatic Pressure test

(*Clause* 7.1)

Test	Test temperature (Min) °C	Test duration (Min Holding Time), (h)	Test Pressure (Min) MPa
(1)	(2)	(3)	(4)
Type Test	27	1000	1.16 x PN
Acceptance Test	27	1	4.19 x PN

8 SAMPLING

8.1 Type Tests — Type tests are intended to prove the suitability and performance of a new composition, a new compounding or processing, technique, or a new design or size of joint or fitting. Such tests, therefore, need be applied only when a change, if made in polymer composition or method of manufacture, or when a new size or type of fitting is to be introduced.

8.1.1 Type tests for compliance with **6.3** and **6.5** shall be carried out on three samples taken at random from each size, class and design of fittings. Type tests for compliance with **6.7** shall be carried out on three samples taken at random from the smallest size and lowest class of fitting (that is, on fittings having the thinnest wall and greatest surface area : mass ratio).

8.1.2 All the fittings tested shall comply with the requirements for which they are examined.

8.2 Acceptance

8.2.1 Acceptance tests are carried out on samples selected from a lot for the purpose of acceptance of the lot.

8.2.1.1 *Lot*

All socket fittings-of the same size, same thickness, and produced from an injection moulding machine, in a single consignment, shall be grouped together to constitute a lot.

8.2.1.2 The conformity of the lot to the requirements of this standard shall be ascertained for each lot separately.

8.2.3 Visual and Dimensional Requirements

8.2.3.1 The number of test samples to be taken from a lot shall depend on the size of the lot and shall be in accordance with Table 3.

8.2.3.2 These fittings shall be selected at random from the lot and in order to ensure the randomness of selection, a random number table shall be used. For guidance and use of random number tables, IS 4905 may be referred to. In the absence of a random number table, the following procedure may be adopted:

Starting from any pipe in the lot, count them as 1, 2, 3, etc, up to *r* and so on, where *r* is the integral part of *N/n, N* being the number of pipes in the lot, and n the number of fittings in the sample. Every r^{th} fitting so counted shall be withdrawn so as to constitute the required sample size.

8.2.3.3 The number of fittings given for the first sample in col 3 of Table 3 shall be taken from the lot and examined for visual and dimensional requirements given in **5**, **6.2** and **6.3** of this specification. A fitting failing to satisfy any of these requirements shall be considered as defective. The lot shall be deemed to have satisfied these requirements, if the number of defectives found in the first sample is less than or equal to the corresponding acceptance number given in col 5 of Table 3 The lot shall be deemed not to have met these requirements, if the number of defectives found in the first sample is greater than or equal to the corresponding rejection number given in col 6 of Table 3 If, however, the number of defectives found in the first sample lies between the corresponding acceptance and rejection numbers given in col 5 and 6, a second sample of the size given in col 3 shall be taken and examined for these requirements. The lot shall be considered to have satisfied these requirements if the cumulative sample is less than or equal to the corresponding acceptance number given in col 5, otherwise not

Table 3 Scale of Sampling for Visual Appearance and Dimensional Requirements

(*Clause* 8.2.3.1 *and* 8.2.3.3)

No. of fittings in the lot	Sample Number	Sample Size	Cumulative Sample Size	Acceptance Number	Rejection Number
(1)	(2)	(3)	(4)	(5)	(6)

Up to 1000	First	5	5	0	2
	Second	5	10	1	2
1000 to 3000	First	8	8	0	2
	Second	8	16	1	2
3001 to 10000	First	13	13	0	2
	Second	13	26	1	2
10001 and above	First	20	20	0	3
	Second	20	40	3	4

8.2.4 *Density, Stress Relief Test and Hydrostatic Characteristics*

8.2.4.1 The lot, having satisfied visual and Dimensional requirements, shall be tested for Density, Stress Relief Test and Hydrostatic Characteristics.

8.2.4.2 For this purpose, the number of pipes given for the first sample in col 3 of Table 4 shall be taken from the lot. The sample fitting failing any test shall be considered as defective. The lot shall be deemed to have met the requirements given in this specification for the above test, if the number of defectives found in the first sample is less than or equal to the corresponding acceptance number given in col 5. The lot shall be deemed not to have met these requirements, if the number of defectives found in the first sample is greater than or equal to the corresponding rejection number given in col 6. If, however, the number of defectives in the first sample lies between the corresponding acceptance and rejection numbers given in col 5 and col 6, a second sample of size given in col 3 shall be taken and examined for the requirement. The lot shall be considered to have satisfied the requirements, if the number of defectives found in the cumulative sample is less than or equal to the corresponding acceptance number given in col 5, otherwise not.

Table 4 Scale of Sampling for Density, Stress Relief test and Hydrostatic Characteristics

(*Clause* 8.2.4.2)

No. of fittings in the lot	Sample Number	Sample Size	Cumulative Sample Size	Acceptance Number	Rejection Number
(1)	(2)	(3)	(4)	(5)	(6)
Up to 1000	First	2	2	0	2

	Second	2	4	1	2
1001 to 3000	First	3	3	0	2
	Second	3	6	1	2
3001 to 10000	First	3	3	0	2
	Second	3	6	1	2
10001 and above	First	5	5	0	2
	Second	5	10	1	2

9 MARKING

9.1 All fittings shall be clearly and indelibly marked at a prominent place visible even after the installation of the fitting with the following:

a) Manufacturer's identification mark, and
b) Size of the fitting *(see* **4**) and the appropriate class (working pressure) to which the pressure rating of the fitting corresponds.

9.1.1 PVC fittings also conforming to specific requirements as prescribed in the standard may also be marked with the Standard Mark. For fittings for which specific requirements have not- been laid in the various parts of this standard, Standard Mark may be based on general requirements.

9.2 Standard Marking — Details available with the Bureau of Indian Standards,

ANNEXURE A

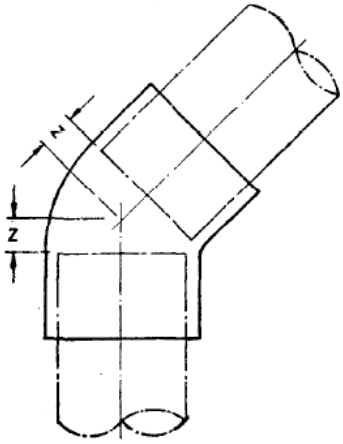

FIG. 2 (45° Elbow)

TABLE 5 DIMENSIONS FOR LAYING LENGTHS OF 45° ELBOWS

Size (mm)	Laying Length
16	4.5 ± 1.0
20	5.0 ± 1.0
25	$6.0^{+1.2}_{-1.0}$
32	$7.5^{+1.6}_{-1.0}$
40	$9.5^{+2.2}_{-1.0}$
50	$11.5^{+2.5}_{-1.0}$
63	$14.0^{+3.2}_{-1.0}$
75	$16.5^{+4.0}_{-1.0}$
90	$19.5^{+5.0}_{-1.0}$
110	$23.5^{+6.0}_{-1.0}$
125	$27.0^{+6.0}_{-1.0}$
140	$30.0^{+7.0}_{-1.0}$
160	$34.0^{+6.0}_{-1.0}$
180	$38.0^{+6.0}_{-1.0}$
200	$43.0^{+9.0}_{-1.0}$

225	$48.0^{+10.0}_{-1.0}$
250	$53.0^{+11.0}_{-1.0}$
280	$60.0^{+12.0}_{-1.0}$
315	$67.0^{+13.0}_{-1.0}$

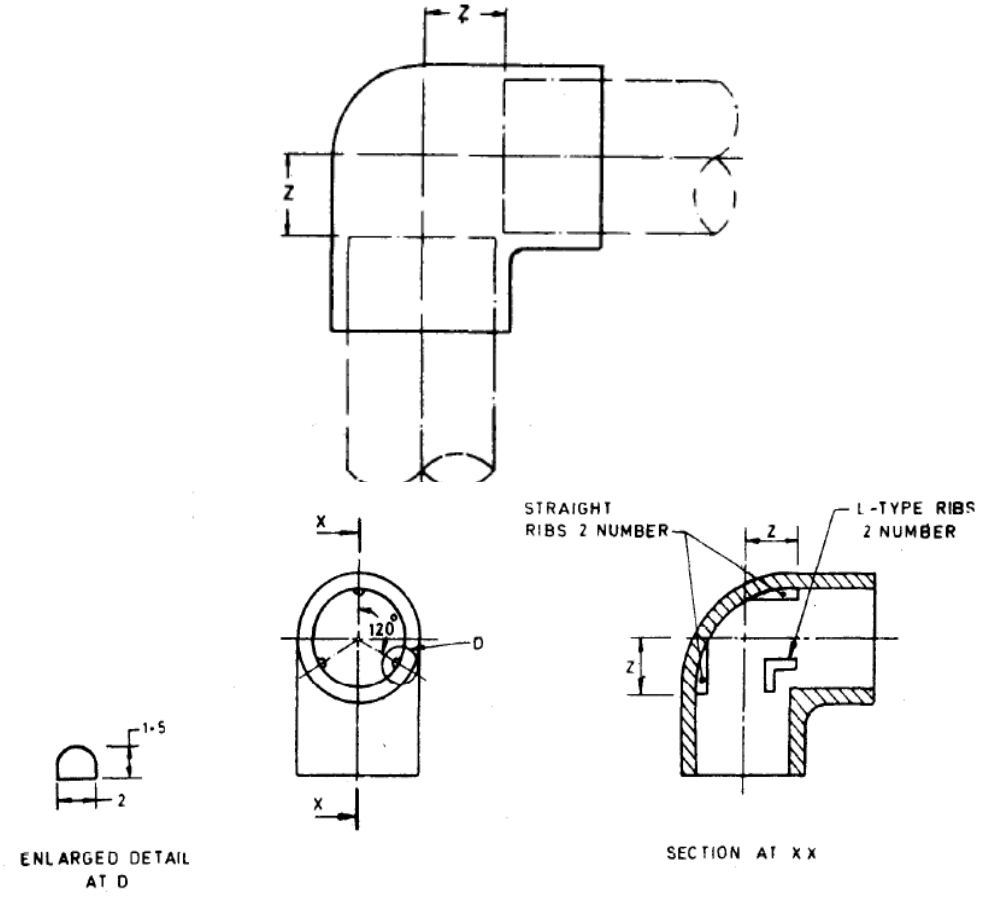

FIG. 3 90° Elbow

TABLE 6 DIMENSIONS FOR LAYING LENGTHS OF 90° ELBOWS

Size (mm)	Laying Length
16	9 ± 1.0
20	11 ± 1.0
25	$13.5^{+1.2}_{-1.0}$
32	$17.0^{+1.6}_{-1.0}$

40	$21.0^{+2.0}_{-1.0}$
50	$26.0^{+2.5}_{-1.0}$
63	$32.5^{+3.2}_{-1.0}$
75	$38.5^{+4.0}_{-1.0}$
60	$46.0^{+5.0}_{-1.0}$
110	$56.0^{+6.0}_{-1.0}$
125	$63.5^{+6.0}_{-1.0}$
140	$71.0^{+7.0}_{-1.0}$
160	$81.0^{+8.0}_{-1.0}$
180	$91.0^{+9.0}_{-1.0}$
200	$101.0^{+9.0}_{-1.0}$
225	$114.0^{+10.0}_{-1.0}$
250	$126.0^{+11.0}_{-1.0}$
280	$141.0^{+12.0}_{-1.0}$
315	$158.0^{+13.0}_{-1.0}$

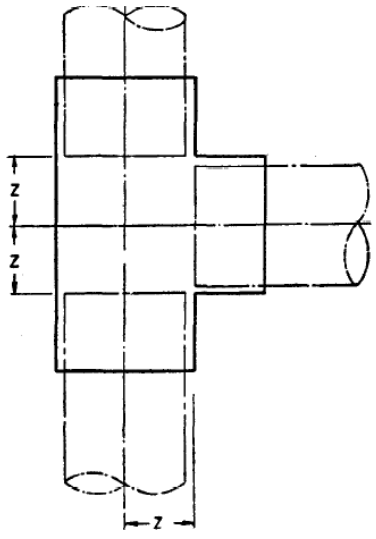

FIG. 4 90° Tee

TABLE 7 DIMENSIONS FOR LAYING LENGTHS OF 90° TEES

Size (mm)	Laying Length
16	9 ± 1.0
20	11 ± 1.0
25	$13.5^{+1.2}_{-1.0}$
32	$17.0^{+1.6}_{-1.0}$
40	$21.0^{+2.0}_{-1.0}$
50	$26.0^{+2.5}_{-1.0}$
63	$32.5^{+3.2}_{-1.0}$
75	$38.5^{+4.0}_{-1.0}$
90	$46.0^{+5.0}_{-1.0}$
110	$56.0^{+6.0}_{-1.0}$
125	$63.5^{+6.0}_{-1.0}$
140	$71.0^{+7.0}_{-1.0}$
160	$81.0^{+8.0}_{-1.0}$
180	$91.0^{+9.0}_{-1.0}$
200	$101.0^{+9.0}_{-1.0}$
225	$114.0^{+10.0}_{-1.0}$
250	$126.0^{+11.0}_{-1.0}$
280	$141.0^{+12.0}_{-1.0}$
315	$158.0^{+13.0}_{-1.0}$

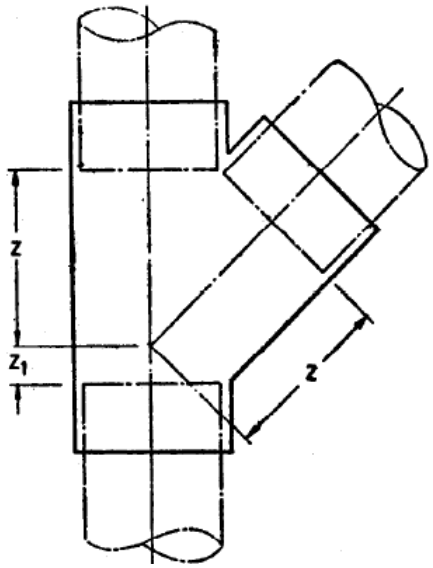

FIG. 5 45° Tee

TABLE 8 DIMENSIONS FOR LAYING LENGTHS OF 45° TEES

Size (mm)	Laying Length (Z)	Laying Length (Z_1)
20	27.0 ± 3.0	$6.0^{+2.0}_{-1.0}$
25	33.0 ± 3.0	$7.0^{+2.0}_{-1.0}$
32	$42.0^{+4.0}_{-3.0}$	$8.0^{+2.0}_{-1.0}$
40	$51.0^{+5.0}_{-3.0}$	$10.0^{+2.0}_{-1.0}$
50	$63.0^{+6.0}_{-3.0}$	$12.0^{+2.0}_{-1.0}$
63	$79.0^{+7.0}_{-3.0}$	$14.0^{+2.0}_{-1.0}$
75	$94.0^{+9.0}_{-3.0}$	$17.0^{+2.0}_{-1.0}$
90	$112.0^{+11.0}_{-3.0}$	$20.0^{+3.0}_{-1.0}$
110	$137.0^{+13.0}_{-4.0}$	$24.0^{+3.0}_{-1.0}$
125	$157.5^{+15.0}_{-4.0}$	$27.0^{+3.0}_{-1.0}$
140	$175.0^{+17.0}_{-5.0}$	$30.0^{+4.0}_{-1.0}$
160	$200.5^{+20.0}_{-6.0}$	$35.0^{+4.0}_{-1.0}$
Higher size of 45 ° elbow are not recommended by ISO also.		

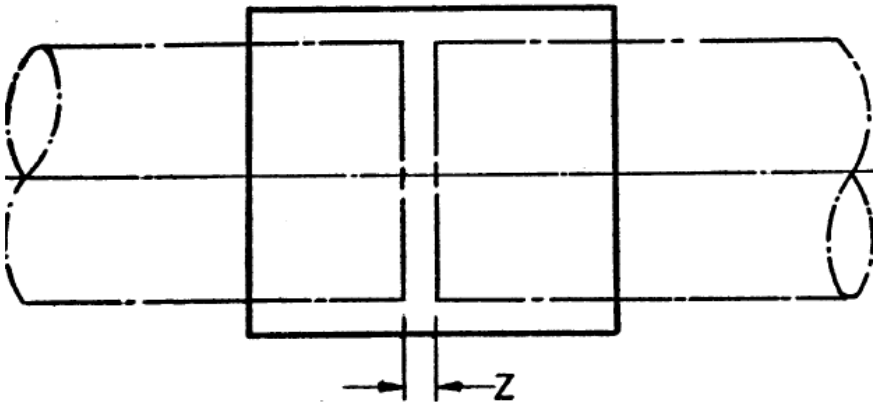

FIG. 6 SOCKET

TABLE 9 DIMENSIONS FOR LAYING LENGTHS OF SOCKET

Size (mm)	Socket Laying Length
16	3 ± 1.0
20	3 ±1.0
25	$3.0^{+1.6}_{-1.0}$
32	$3.0^{+1.6}_{-1.0}$
40	$3.0^{+2.0}_{-1.0}$
50	$3.0^{+2.0}_{-1.0}$
63	$3.0^{+2.0}_{-1.0}$
75	$4.0^{+2.0}_{-1.0}$
90	$5.0^{+2.0}_{-1.0}$
110	$6.0^{+3.0}_{-1.0}$
125	$6.0^{+3.0}_{-1.0}$
140	$8.0^{+3.0}_{-1.0}$
160	$8.0^{+40}_{-1.0}$
180	$8.0^{+4.0}_{-1.0}$
200	$8.0^{+5.0}_{-1.0}$
225	$10.0^{+5.0}_{-1.0}$

250	$10.0^{+6.0}_{-1.0}$
280	$12.0^{+6.0}_{-1.0}$
315	$12.0^{+7.0}_{-1.0}$

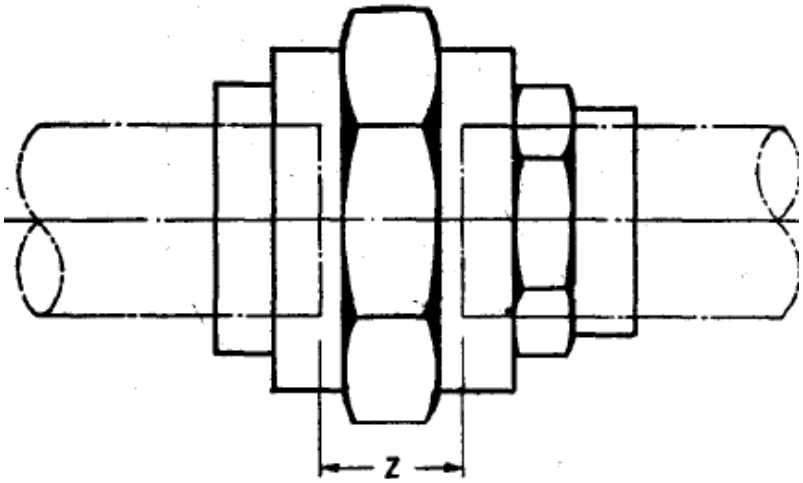

FIG. 7 UNION

TABLE 10 DIMENSIONS FOR LAYING LENGTHS OF SOCKET

(*Clause* 3.2.2 and Fig. 1)

Size (mm)	Union Laying Length (mm)
16	13.5±1.0
20	13.5±1.0
25	$13.5^{+1.2}_{-1.0}$
32	$13.5^{+1.6}_{-1.0}$
40	$15.0^{+2.0}_{-1.0}$
50	$17.0^{+2.5}_{-1.0}$
63	$21.0^{+3.2}_{-1.0}$

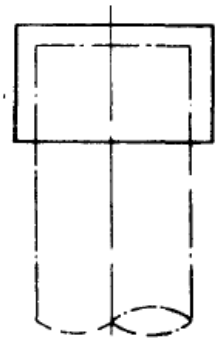

FIG. 8 CAP

The diameter of the socket cap shall be as follows**:**

16, 20, 25, 32, 40, 50, 63, 75, 90, 110, 125, 140, 160, 180, 200, 225, 250, 280, 315 mm

ANNEXURE B

(*Clause* 6.0)

SHORT TERM HYDRAULIC TEST

B-1. Apparatus

B-1.1 Equipment which permits the application of an internal hydraulic pressure of $4.2^{+0.2}_{-0.0}$ times the normal pressure for at least one hour on the fitting to be tested.

B-2. Test Specimen

B-2.1 Each test specimen shall consist of a fitting, solvent welded to a section of pipe having a minimum length of 250 mm and capable of withstanding an internal pressure of at least 4.2 times the normal pressure of the fitting. A period of at least 24 hours shall be allowed to ensure satisfactory setting of the joint.

B-3. Procedure

B-3.1 The free end of the pipe section shall be connected to the hydraulic pressure equipment. The other end(s) of the test specimen shall be closed by any appropriate means.

B-3.2 The test specimen thus assembled shall be subjected for 60 minutes to an internal pressure of $4.2^{+0.2}_{-0.0}$ times the normal pressure of the fitting, at a temperature of 27 ± 2 °C.

B-3.3 Throughout the test, the specimen shall be suspended or placed in such a manner that the induced stress is not limited by external forces.

B-4. Interpretation of Results

B-4.1 A fitting shall be considered as having passed the test if it shows no sign of deterioration, leakage, fracture or other failure under specified conditions. The test shall be repeated if the pipe bursts or if the solvent-welded joints leak.

B-4.2 The specimen tested as above shall meet the requirement specified in **7.4**.

Note - The fitting can be tested by the method indicated as above after a period of setting for 24 hours and, if passes the test, shall be accepted as meeting the requirements specified in **7.1**. In case of failure of the joint, retest can be done taking another test specimen and allowing at least 10 days time for satisfactory setting of the joint and the final decision should be taken based on the test result obtained on this test' specimen.