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मानक

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IS 12818 (2010): unplasticized polyvinyl chloride (PVC-U) screen and casing pipes for bore/tubewell [CED 50: Plastic Piping System]



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“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”

Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”

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भारतीय मानक
बोर/नलकूपों के लिए अनम्यकृत पी वी सी जाली और
आवरक पाइप — विशिष्टि
(दूसरा पुनरीक्षण)

Indian Standard
UNPLASTICIZED POLYVINYL CHLORIDE (PVC-U)
SCREEN AND CASING PIPES FOR
BORE/TUBEWELLS — SPECIFICATION
(*Second Revision*)

ICS 23.040.20

FOREWORD

This Indian Standard (Second Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Plastics Piping Systems Sectional Committee had been approved by the Civil Engineering Division Council.

This standard was first published in 1989 and revised in 1992. In this revision, following major modifications have been made:

- a) New class of pipes 'Deep Well Pipes' has been included,
- b) Two new sizes 35 mm and 115 mm have been included,
- c) Requirements for resistance to external blows at 0°C, thread dimensions, thread profile, sealing ring and opening area have been modified,
- d) Vicat softening temperature value has been aligned with IS 4985 : 2000 'Unplasticized PVC pipes for potable water supplies — Specification', and
- e) Tolerances on effective and segmental lengths of pipes have been modified as per current manufacturing practices.

For guidance on methods of laying and jointing of PVC-U pipes and fitting systems, including storage reference may be made to IS 7634 (Part 3) : 2003 'Plastic pipes selection, handling, storage and installation for potable water supplies — Code of practice: Part 3 Laying and jointing of PVC-U pipes'.

The trapezoidal threads specified in this standard deviate from IS 7008 (Part 1) : 1999 'ISO metric trapezoidal screw threads: Part 1 Basic profile and maximum material profile (*second revision*)' for the following reasons:

- a) The threads depth specified in IS 7008 (Part 1) would result in an unacceptable reduction in wall thickness.
- b) The flat metric trapezoidal thread specified in IS 7008 (Part 1) would give rise to problems in pipe assembly since the flank diameters would not intersect the profile in the middle of the flank.
- c) The thread series specified in IS 7008 (Part 1) is not compatible with the pipe diameters specified in this standard.

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

UNPLASTICIZED POLYVINYL CHLORIDE (PVC-U) SCREEN AND CASING PIPES FOR BORE/TUBEWELLS — SPECIFICATION

(*Second Revision*)

1 SCOPE

This standard covers the requirements of ribbed screen, plain screen and plain casing pipes of nominal diameter 35 mm to 400 mm, produced from unplasticized polyvinyl chloride for bore/tubewells for water supply.

NOTE — It is the responsibility of the purchaser or the specifier to make the appropriate selections taking into account their particular requirements and any relevant national guidelines or regulations and installation practices or codes.

2 REFERENCES

The standards listed 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 subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

<i>IS No.</i>	<i>Title</i>
554 : 1999	Pipe threads where pressure tight joints are made on the threads — Dimensions, tolerances and designation (<i>fourth revision</i>)
4669 : 1968	Methods of tests for polyvinyl chloride resins
4905 : 1968	Methods of random sampling
4985 : 2000	Unplasticized PVC pipes for potable water supplies — Specification (<i>third revision</i>)
10148 : 1982	Positive list of constituents of polyvinyl chloride and its copolymers for safe use in contact with foodstuffs, pharmaceuticals and drinking water
10151 : 1982	Specification for polyvinyl chloride (PVC) and its copolymer for its safe use in foodstuffs, pharmaceuticals and drinking water
12235	Thermoplastics pipes and fittings — Methods of test:

IS No.

Title

(Part 1) : 2004	Measurement of dimensions (<i>first revision</i>)
(Part 2) : 2004	Determination of vicat softening temperature (<i>first revision</i>)
(Part 4) : 2004	Determining the detrimental effect on the composition of water (<i>first revision</i>)
(Part 9) : 2004	Resistance to external blows (impact resistance) at 0° C (round-the-clock method) (<i>first revision</i>)
(Part 13) : 2004	Determination of tensile strength and elongation
(Part 14) : 2004	Determination of density/relative density (specific gravity) (<i>first revision</i>)

3 TERMINOLOGY

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

3.1 Ribbed Screen Pipe — Pipe with external longitudinal ribs and transverse (perpendicular to pipe axis) slots. This shall be designated as RMS pipe and RDS pipe.

3.2 Plain Screen Pipe — Plain surface pipe with transverse slots. This shall be designated as PMS pipe and PDS pipe.

3.3 Casing Pipe — Solid wall plain surface pipe, used as extension pipe to the screen pipe.

3.3.1 Casing pipes are classified into those suitable for shallow, medium and deep depth wells as under:

- a) CS Pipe : Shallow well casing pipes suitable for wells with depths upto 80 m
- b) CM Pipe : Medium well casing pipes suitable for wells with depths above 80 m and upto 250 m
- c) CD Pipe : Deep well casing pipe suitable for wells with depths above 250 m and upto 450 m

3.4 Nominal Size (DN)— The numerical designation for the size of the pipe other than a pipe designated by thread size, which is a convenient round number approximately equal to the manufactured dimension, in mm.

3.5 Nominal Outer Diameter (d_n)— The specified outside diameter, in mm, assigned to a nominal size.

3.6 Mean Outer Diameter (d_{em})— The quotient of the outer circumference of a pipe and $3.142 (\pi)$ in any cross-section, rounded off to the next higher 0.1 mm.

3.7 Minimum Mean Outer Diameter ($d_{em,Min}$)—The minimum value for the mean outside diameter as specified for a given nominal size.

3.8 Maximum Mean Outer Diameter ($d_{em,Max}$)— The maximum value for the mean outside diameter as specified for a given nominal size.

3.9 Outer Diameter at Any Point (d_o)— The value of the measurement of the outer diameter of a pipe through its cross-section at any point of the pipe, rounded off to the nearest 0.1 mm.

3.10 Out-of-Roundness (Ovality)—The difference between the measured maximum and the measured minimum outside diameter in the same cross-section of the pipe.

3.11 Nominal Wall Thickness (e_n)— A numerical designation of the wall thickness of a component which is a convenient round number, approximately equal to the manufacturing dimensions, in mm.

3.12 Wall Thickness at Any Point (e)—The value of the measurement of the wall thickness at any point around the circumference of the pipe, rounded off to the next nearer 0.1 mm.

3.13 Mean Wall Thickness (e_m)—The arithmetical mean of at least four measurements regularly spaced around the circumference and in the same cross-section of the pipe, including the measured minimum and the measured maximum values of the wall thickness in that cross-section and rounded off to the next nearer 0.1 mm

3.14 Tolerance— The permitted variation of the specified value of a quantity, expressed as the difference between the permitted maximum and the permitted minimum value.

4 COMPOSITION

4.1 The material from which the pipe is produced shall consist substantially of unplasticized polyvinyl chloride to which may be added only those additives that are needed to facilitate production of sound and durable pipe of good surface finish and mechanical strength under conditions of use. None of these additives shall be used, separately or together, in

quantities sufficient to constitute a toxic, organoleptic or microbial growth hazard or to materially impair the fabrication or welding properties of the pipe, or to impair the chemical, physical or mechanical properties (in particular long-term mechanical strength and impact strength) as defined in this standard. The additives to be used shall be selected from IS 10148 and shall be uniformly dispersed.

4.1.1 The monomer content (VCM content) in the resin shall be within the limits specified in 3.4.1 of IS 10151, when tested as per Annex A of IS 10151.

4.1.2 The composition shall be based on PVC resin having a K-value of 64 or greater, when tested in accordance with IS 4669.

NOTE — A test report or certificate of conformity may be obtained from the manufacturer for the VCM content (see 4.1.1) and K-value (see 4.1.2) of the resin being used, unless the same is tested in an independent laboratory. The frequency of this test report or certificate of conformity shall be once in every three months.

4.2 The addition of the manufacturer's own reprocessed material is permissible. The quantity of the rework material used is to be declared by the manufacturer. No other reprocessed material shall be used.

5 COLOUR

The pipe shall be of regular blue colour throughout. Slight colour deviation is permissible.

6 DESIGNATION

Pipe shall be designated by its type, whether ribbed medium well screen (RMS), ribbed deep well screen (RDS), plain medium well screen (PMS), plain deep well screen (PDS) or casing (CS or CM or CD) followed by its nominal diameter DN, slot width and length of the pipe.

Example — Ribbed screen pipe of DN 200 with slot width 1.5mm and length 2 000 mm shall be designated as: RMS 200 × 1.5 × 2 000.

7 DIMENSIONS

7.1 Screen Pipes

7.1.1 The diameters and wall thickness of medium well screen (RMS) pipes with ribs shall be as given in Table 1 read with Fig. 1A. Deep well screen (RDS) pipes with ribs shall be as given in Table 2 read with Fig. 1A.

7.1.2 Screen pipes (PMS and PDS) for DN above 175 may be plain (without ribs). The diameters and wall thickness of these pipes shall be as given in Table 3 and Table 4 read with Fig. 1B.

7.1.3 Mean outer diameter and outer diameter at any point of screen pipes shall be measured according to IS 12235 (Part 1).

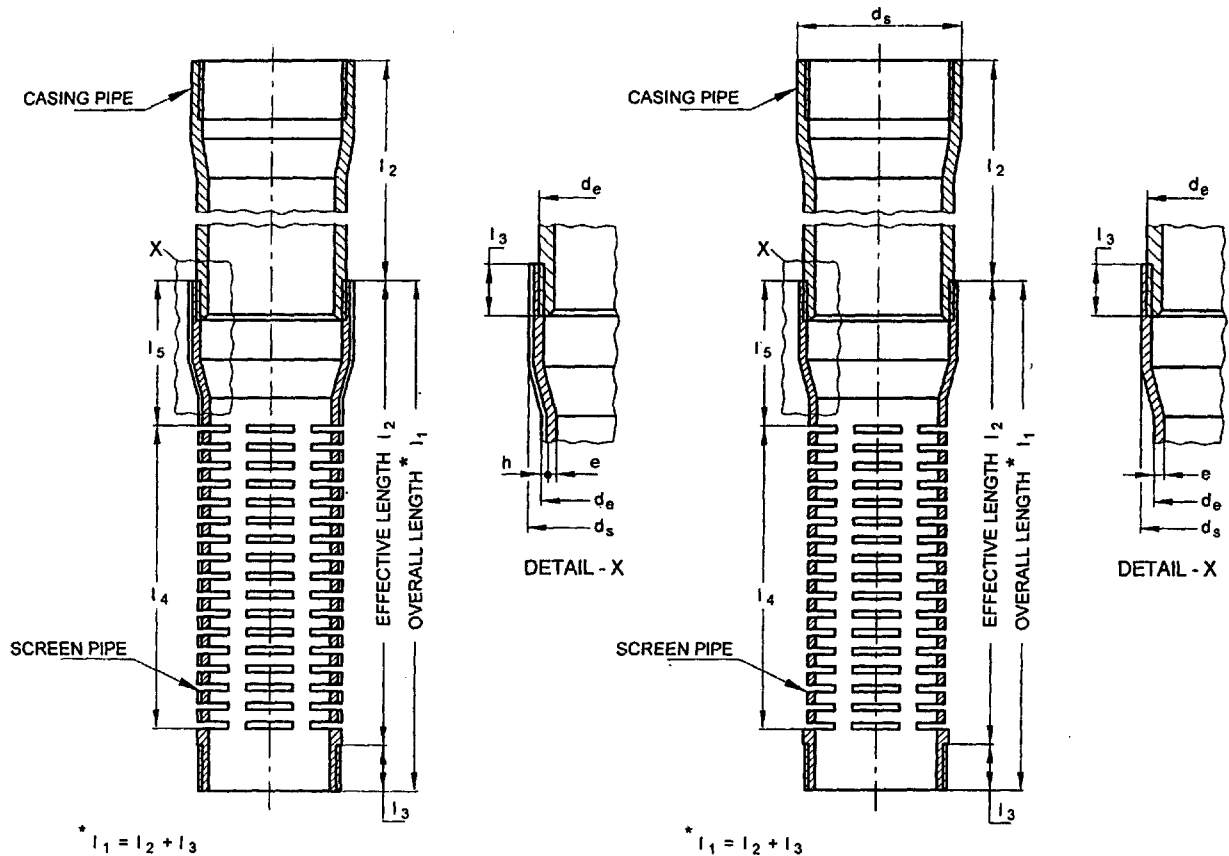
7.1.4 Wall thickness of screen pipes shall be measured in accordance with the method given in IS 12235 (Part 1).

NOTE — For measuring thickness of ribbed screen pipes where no flat portion is available, dial gauge with one arm with a rounded end and the other with a pointed needle end may be used.

7.2 Casing Pipes

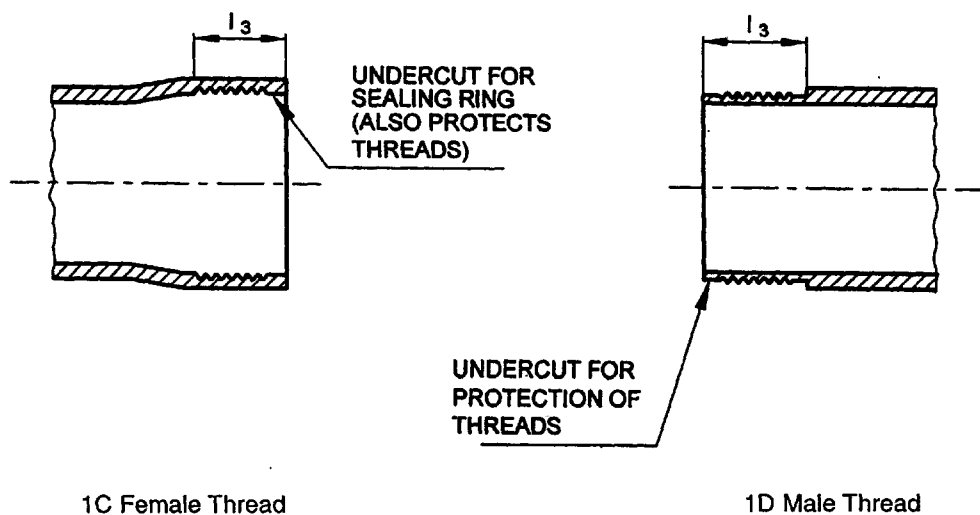
7.2.1 The diameters and wall thickness of 'CM' casing pipes shall be as given in Table 5 read with Fig. 1B.

7.2.2 The diameters and wall thickness of 'CS' casing pipes for sizes DN 150 to DN 400 shall be as given in Table 6 read with Fig. 1B.



1A Ribbed Screen Pipe with Casing Pipe

1B Plain Screen Pipe with Casing Pipe



1C Female Thread

1D Male Thread

FIG.1 SCREEN AND CASING PIPE

Table 1 Dimensions of Medium Well Screen (RMS) Pipes with Ribs
(Clause 7.1.1)

All dimensions in millimetres.

SI No.	Nominal Diameter DN	Mean Outer Diameter of Pipe, d_{em}		Outer Diameter at Any Point, d_c		Mean Outer Diameter Over Connection d_s	Wall Thickness (Under Ribs), e	
		Min	Max	Min	Max		Max	Min
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
i)	35	46.0	46.2	45.9	46.3	50.0	3.5	4.0
ii)	40	52.0	52.2	51.9	52.3	56.0	3.5	4.0
iii)	50	64.0	64.2	63.9	64.3	69.0	4.0	4.6
iv)	80	92.0	92.3	91.8	92.4	98.0	4.0	4.6
v)	100	117.0	117.3	116.8	117.4	124.0	5.0	5.7
vi)	115	129.0	129.3	128.8	129.4	136.0	5.0	5.7
vii)	125	144.0	144.4	143.7	144.5	154.0	6.5	7.3
viii)	150	169.0	169.4	168.6	169.6	182.0	7.5	8.5
ix)	175	204.0	204.5	203.6	204.6	219.0	8.8	9.8
x)	200	229.0	229.5	228.5	229.8	247.0	10.0	11.2
xi)	250	284.0	284.5	283.4	284.8	302.0	12.5	14.0
xii)	300	334.0	334.6	333.3	335.0	356.0	14.5	16.2
xiii)	350	404.0	404.7	403.2	405.2	432.0	17.5	19.5
xiv)	400	454.0	454.8	453.1	455.3	483.0	19.5	21.7

7.2.3 The diameters and wall thickness of 'CD' casing pipes for sizes DN 100 to DN 400 shall be as given in Table 7 read with Fig. 1B.

7.2.4 Mean outer diameter and outer diameter at any point for casing pipes shall be measured in accordance with the method given in IS 12235 (Part 1).

7.2.5 Wall thickness of casing pipes shall be measured in accordance with the method given IS 12235 (Part 1).

7.3 Ribs

7.3.1 Minimum number of ribs provided shall be 2.5 ribs/cm on the circumference.

7.3.2 Minimum height, h , of the rib shall be 2 mm. The ribs should not have sharp edges.

7.4 Length of Pipes

7.4.1 Effective and segmental lengths of screen and casing pipes shall be as given in Table 8 and Table 9 respectively, read with Fig. 1. The pipes may be supplied in other lengths where so agreed upon between the manufacturer and the purchaser.

7.4.2 Tolerances on effective length and segmental

lengths of pipes shall be as follows:

- Effective length, l_2 ± 10 mm
- Segmental length, l_3 (effective thread length)
 - for DN up to and including 200 spigot end $+0$ mm
 -7 mm
 - socket end $+7$ mm
 -0 mm
 - for DN above 200 spigot end $+0$ mm
 -12 mm
 - socket end $+12$ mm
 -0 mm
- Segmental length, l_4 (screen portion) ± 25 mm
- Segmental length, l_5 $+25$ mm
 -0

7.5 Slots

7.5.1 The dimensions and layout of the screens shall be as indicated in Table 10 read with Fig. 2A and Fig. 2B.

7.5.2 Tolerance on width of slot (w), given in Table 10 shall be as under:

Slot Width w , mm	0.2	0.3	0.5	0.75	1.0	1.5	2.0	3.0
Tolerance, mm	+0.06 -0.0	+0.06 -0.0	+0.10 -0.0	+0.20 -0.0	+0.20 -0.0	+0.20 -0.0	+0.20 -0.0	+0.30 -0.0

Table 2 Dimensions of Deep Well Screen (RDS) Pipes with Ribs

(Clause 7.1.1)

All dimensions in millimetres.

Sl No.	Nominal Size DN	Mean Outer Diameter d_{cm}		Outer Diameter at Any Point, d_c		Mean Outer Diameter Over Connection d_s	Wall Thickness e		
		Min	Max	Min	Max		Max	Min	Max
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	
i)	100	117.0	117.3	116.8	117.4	129.0	7.0	7.9	
ii)	115	129.0	129.3	128.9	129.4	141.0	7.5	8.5	
iii)	125	144.0	144.4	143.7	144.5	156.0	8.0	9.0	
iv)	150	169.0	169.4	168.6	169.6	184.0	9.5	10.7	
v)	175	204.0	204.5	203.6	204.6	221.0	11.8	13.6	
vi)	200	229.0	229.5	228.5	229.8	251.0	13.0	14.8	
vii)	250	284.0	284.5	283.4	284.8	309.0	16.0	17.6	
viii)	300	334.0	334.6	333.3	335.0	363.0	19.0	21.0	
ix)	350	404.0	404.7	403.2	405.2	437.0	21.5	23.9	
x)	400	454.0	454.8	453.1	456.3	494.0	23.5	26.1	

Table 3 Dimensions of Plain Medium Well Screen (PMS) Pipes

(Clause 7.1.2)

All dimensions in millimetres.

Sl No.	Nominal Size DN	Mean Outer Diameter d_{cm}		Outer Diameter at Any Point, d_c		Mean Outer Diameter Over Connection d_s	Wall Thickness e		
		Min	Max	Min	Max		Max	Min	Max
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	
i)	200	225.0	225.5	224.5	225.8	243.0	10.0	11.2	
ii)	250	280.0	280.5	279.4	280.8	298.0	12.5	14.0	
iii)	300	330.0	330.6	329.3	331.0	352.0	14.5	16.2	
iv)	350	400.0	400.7	399.2	401.2	428.0	17.5	19.5	
v)	400	450.0	450.8	449.1	451.3	479.0	19.5	21.7	

Table 4 Dimensions of Plain Deep Well Screen (PDS) Pipes

(Clause 7.1.2)

All dimensions in millimetres.

Sl No.	Nominal Size DN	Mean Outer Diameter d_{cm}		Outer Diameter at Any Point, d_c		Mean Outer Diameter Over Connection d_s	Wall Thickness e		
		Min	Max	Min	Max		Max	Min	Max
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	
i)	200	225.0	225.5	224.5	225.8	247.0	13.0	14.8	
ii)	250	280.0	280.5	279.4	280.8	304.0	16.0	17.6	
iii)	300	330.0	330.6	329.3	331.0	359.0	19.0	21.0	
iv)	350	400.0	400.7	399.2	401.2	433.0	21.5	23.9	
v)	400	450.0	450.8	449.1	451.3	490.0	23.5	26.1	

Table 5 Dimensions of Medium Well Casing (CM) Pipes
(Clause 7.2.1)

All dimensions in millimetres.

SI No.	Nominal Size <i>DN</i>	Mean Outer Diameter <i>d_{cm}</i>		Outer Diameter at Any Point, <i>d_c</i>		Mean Outer Diameter Over Connection <i>d_s</i>	Wall Thickness <i>e</i>	
		<i>Min</i>	<i>Max</i>	<i>Min</i>	<i>Max</i>		<i>Max</i>	<i>Min</i>
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
i)	35	42.0	42.2	41.9	42.3	46.0	3.5	4.0
ii)	40	48.0	48.2	47.9	48.3	52.0	3.5	4.0
iii)	50	60.0	60.2	59.9	60.3	65.0	4.0	4.6
iv)	80	88.0	88.3	87.9	88.4	94.0	4.0	4.6
v)	100	113.0	113.3	112.9	113.4	120.0	5.0	5.7
vi)	115	125.0	125.3	124.9	125.4	132.0	5.0	5.7
vii)	125	140.0	140.4	139.9	140.5	150.0	6.5	7.3
viii)	150	165.0	165.4	164.6	165.6	178.0	7.5	8.5
ix)	175	200.0	200.5	199.6	200.6	215.0	8.8	9.8
x)	200	225.0	225.5	224.5	225.8	243.0	10.0	11.2
xi)	250	280.0	280.5	279.4	280.8	298.0	12.5	14.0
xii)	300	330.0	330.6	329.3	331.0	352.0	14.5	16.2
xiii)	350	400.0	400.7	399.2	401.2	428.0	17.5	19.5
xiv)	400	450.0	450.8	449.1	451.3	479.0	19.5	21.7

Table 6 Dimensions of Shallow Well Casing (CS) Pipes
(Clause 7.2.2)

All dimensions in millimetres.

SI No.	Nominal Size <i>DN</i>	Mean Outer Diameter <i>d_{cm}</i>		Outer Diameter at Any Point, <i>d_c</i>		Mean Outer Diameter Over Connection <i>d_s</i>	Wall Thickness <i>e</i>	
		<i>Min</i>	<i>Max</i>	<i>Min</i>	<i>Max</i>		<i>Max</i>	<i>Min</i>
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
i)	150	165.0	165.4	164.6	165.6	174.0	5.7	6.5
ii)	175	200.0	200.5	199.6	200.6	211.0	7.0	7.8
iii)	200	225.0	225.5	224.5	225.8	238.0	7.6	8.8
iv)	250	280.0	280.5	279.4	280.8	292.0	9.6	11.0
v)	300	330.0	330.6	329.3	331.0	346.0	11.2	13.3
vi)	350	400.0	400.7	399.2	401.2	420.0	14.0	15.5
vii)	400	450.0	450.8	449.1	451.3	470.0	16.0	17.5

8 THREADING OF SCREEN AND CASING PIPES

8.1 The screen and casing pipes shall have male threads at spigot end and female threads at the socket end.

8.2 Screen and casing pipe of nominal diameter from 40 to 80 mm shall have threads in accordance with IS 554.

8.3 Screen and casing pipe of nominal diameter from 100 to 400 mm shall have threads in accordance with basic profile for metric trapezoidal threads as specified in 8.3.1 and 8.3.2.

8.3.1 Pipes of nominal size 100 to 200 shall have thread dimensions as given in Table 11 read with Fig. 3A.

Table 7 Dimensions of Deep Well Casing (CD) Pipes

(Clause 7.2.3)

All dimensions in millimetres.

Sl No.	Nominal Size <i>DN</i>	Mean Outer Diameter <i>d_{em}</i>		Outer Diameter at Any Point, <i>d_t</i>		Mean Outer Diameter Over Connection <i>d_t</i>	Wall Thickness <i>e</i>	
		Min	Max	Min	Max		Max	Min
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
i)	100	113.0	113.3	112.8	113.4	125.0	7.0	7.9
ii)	115	125.0	125.3	124.9	125.4	137.0	7.5	8.5
iii)	125	140.0	140.4	139.7	140.5	152.0	8.0	9.0
iv)	150	165.0	165.4	164.6	165.6	180.0	9.5	10.7
v)	175	200.0	200.5	199.6	200.6	217.0	11.8	13.6
vi)	200	225.0	225.5	224.5	225.8	247.0	13.0	14.8
vii)	250	280.0	280.5	279.4	280.8	304.0	16.0	17.6
viii)	300	330.0	330.6	329.3	331.0	359.0	19.0	21.0
ix)	350	400.0	400.7	399.2	401.2	433.0	21.5	23.9
x)	400	450.0	450.8	449.1	451.3	490.0	23.5	26.1

8.3.2 Pipes of nominal size 250 to 400 shall have thread dimensions as given in Table 12, read with Fig. 4A.

8.4 Sealing rings made of elastomeric material such as EPDM, and of appropriate diameter ensuring secure fit, shall be used to seal the joint. These sealing elements shall be of shore hardness 65 ± 5 .

8.4.1 Dimensions of sealing elements for pipes of nominal sizes *DN* 100 to 400 shall be as given in Table 13 read with Fig. 3B.

8.5 No gauging practices exist for PVC threads. Verification of thread dimensions for conformity to the standard is sufficient criteria for acceptance. Accordingly, thread gauges made according to gauging practices for metal threads are not recommended for checking threads of PVC pipes.

9 TESTS

9.0 General

The tests listed at 9.1 to 9.7 shall be carried out on casing pipes and plain/ribbed pipes produced for the manufacture of screen pipes before cutting slots.

9.1 Visual Appearance

The internal and external surfaces of the pipe shall be smooth, clean and free from other defects. Slight shallow irregularities in the wall thickness shall be permissible provided the pipe remains within permissible limits. The ends shall be clean, smoothly cut and reasonably square to the axis of the pipe.

9.2 Internal Diameter

A test mandrel of diameter as specified below, of 100 mm length, shall pass smoothly through the pipe:

<i>DN</i>	Diameter of Test Mandrel, mm
35	33
40	39
50	50
80	77
100	94
115	105
125	118
150	139
175	165
200	188
250	236
300	281
350	345
400	390

9.3 Density

When tested by the method described in IS 12235 (Part 14), the density of the material of the pipe shall be between 1.40 and 1.46 g/cm³.

9.4 Resistance to External Blows at 0°C

When tested by the method described in IS 12235 (Part 9), the pipe shall have a True Impact Rate of not more than 10 percent. The total mass of the

Table 8 Effective and Segmental Lengths of Screen Pipes

(Clause 7.4.1)

All dimensions in millimetres.

SI No.	Nominal Size DN	Effective Length, l_2	Segmental Lengths		
			l_3	l_4	l_5
(1)	(2)	(3)	(4)	(5)	(6)
i)	35	1 000	25	840	60
		2 000	25	1 840	60
		3 000	25	2 840	60
ii)	40	1 000	25	880	60
		2 000	25	1 880	60
		3 000	25	2 880	60
iii)	50	1 000	30	870	70
		2 000	30	1 870	70
		3 000	30	2 870	70
iv)	80	1 000	40	860	80
		2 000	40	1 860	80
		3 000	40	2 860	80
v)	100	1 000	48	850	90
		2 000	48	1 850	90
		3 000	48	2 850	90
vi)	115	1 000	48	800	120
		2 000	48	1 800	120
		3 000	48	2 800	120
vii)	125	2 000	63	1 800	160
		3 000	63	2 800	160
viii)	150	2 000	63	1 770	170
		3 000	63	2 770	170
ix)	175	2 000	63	1 770	170
		3 000	63	2 770	170
x)	200	2 000	74	1 760	180
		3 000	74	2 760	180
xi)	250	2 000	90	1 720	220
		3 000	90	2 720	220
xii)	300	2 000	90	1 720	220
		3 000	90	2 720	220
xiii)	350	2 000	90	1 700	240
		3 000	90	2 700	240
xiv)	400	2 000	102	1 700	240
		3 000	102	2 700	240

striker and height of free fall shall correspond to the values given in Table 14.

NOTE — The test shall be carried out on the plain/ribbed portion of the pipe taken at least 100 mm away from the root of the socket.

9.5 Tensile Strength

When tested by the method described in IS 12235 (Part 13), the average tensile strength of two test

specimens cut longitudinally from the same pipe at maximum load shall be not less than 45 MPa.

NOTE — The specimen for the test shall be prepared from a section of the pipe heated to a temperature of 125°C to 130°C and subsequently flattened and machined.

9.6 Vicat Softening Temperature

The Vicat softening temperature shall not be less than 80°C when tested by the method described in IS 12235 (Part 2).

Table 9 Effective and Segmental Lengths of Casing Pipes
(Clause 7.4.1)

All dimensions in millimetres.

SI No.	Nominal Size <i>DN</i>	Effective Length <i>l₂</i>	Segmental Length <i>l₃</i>
(1)	(2)	(3)	(4)
i)	35	2 000	25
		3 000	25
		4 000	25
ii)	40	2 000	25
		3 000	25
		4 000	25
iii)	50	2 000	30
		3 000	30
		4 000	30
iv)	80	2 000	40
		3 000	40
		4 000	40
v)	100	2 000	48
		3 000	48
		4 000	48
vi)	115	2 000	48
		3 000	48
		4 000	48
vii)	125	2 000	63
		3 000	63
		4 000	63
viii)	150	2 000	63
		3 000	63
		4 000	63
ix)	175	2 000	63
		3 000	63
		4 000	63
x)	200	2 000	74
		3 000	74
		4 000	74
xi)	250	2 000	90
		3 000	90
		4 000	90
xii)	300	2 000	90
		3 000	90
		4 000	90
xiii)	350	2 000	90
		3 000	90
		4 000	90
xiv)	400	2 000	102
		3 000	102
		4 000	102

NOTE — The test may be done on a test piece cut from a sample of the pipe used for some other test (such as density or resistance to external blows) as long as that sample has not been subjected to conditions that could influence the Vicat softening temperature. The specimen shall be supported on a

suitable concave surface of radius equal to that of the sample pipe, ensuring support on all ends.

9.7 Effect on Water

The pipes shall not have any detrimental effect on

the composition of water flowing through them. The pipes shall meet the requirements/tests specified in 10.3 of IS 4985, when tested by the method described in IS 12235 (Part 4).

10 SAMPLING AND CRITERIA FOR CONFORMITY

10.1 Acceptance Tests

The scale of sampling and criteria for conformity of a lot for acceptance tests specified in 7, 8 and 9.1

to 9.4 shall be as given in Table 15 and for test under 9.5 as given in 10.1.6.

10.1.1 All pipes, in a single consignment, of the same type (screen or casing), same size and manufactured under essentially similar conditions, shall constitute a lot.

10.1.2 For ascertaining conformity of the lot to the requirements of the specification, samples shall be tested from each lot separately.

Table 10 Dimensions and Layout of Slots on Screen Pipes
(Clause 7.5.1)

All dimensions in millimetres.

Sl No.	Nominal Size DN	Pipe Designation	N Min	$\Sigma a \pm 5\%$ mm	Approximate Free Passage Area, in Percent (Mean Value) for Width of Slot (w), mm							
					0.2	0.3	0.5	0.75	1.0	1.5	2.0	3.0
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
i)	35	RMS	3	75	3.7	5.2	6.0	9.1	9.4	9.7	12.1	—
ii)	40	RMS	3	85	3.7	5.2	6.0	9.1	9.4	9.7	12.1	—
iii)	50	RMS	3	108	3.7	5.2	6.0	9.1	9.4	9.7	12.1	—
iv)	80	RMS	3	168	3.7	5.2	6.0	9.1	9.4	9.7	12.1	—
v)	100	RMS	5	216	3.7	5.2	6.0	9.1	9.4	9.7	12.1	—
		RDS	5	206	—	5.2	6.0	9.1	9.4	9.7	12.1	—
vi)	115	RMS	5	240	3.7	5.2	6.0	9.1	9.4	9.7	12.1	—
		RDS	5	230	—	5.2	6.0	9.1	9.4	9.7	12.1	—
vii)	125	RMS	5	240	—	4.7	5.6	8.2	8.5	8.8	11.0	13.5
		RDS	5	235	—	—	5.6	8.2	8.5	8.8	11.0	13.5
viii)	150	RMS	5	285	—	—	5.6	8.2	8.5	8.8	11.0	13.5
		RDS	5	278	—	—	5.6	8.2	8.5	8.8	11.0	13.5
ix)	175	RMS	6	340	—	—	5.6	8.3	8.5	8.8	11.0	13.5
		RDS	6	330	—	—	—	8.3	8.5	8.8	11.0	13.5
x)	200	RMS/PMS	6	390	—	—	—	8.3	8.5	8.8	11.0	13.5
		RDS/PDS	6	380	—	—	—	7.6	7.9	8.1	10.2	12.5
xi)	250	RMS/PMS	6	450	—	—	—	7.6	7.9	8.1	10.2	12.5
		RDS/PDS	6	435	—	—	—	7.6	7.9	8.1	10.2	12.5
xii)	300	RMS/PMS	6	530	—	—	—	7.6	7.9	8.1	10.2	12.5
		RDS/PDS	6	512	—	—	—	7.6	7.9	8.1	10.2	12.5
xiii)	350	RMS/PDS	8	640	—	—	—	—	7.9	8.1	10.2	12.5
		RDS/PMS	8	626	—	—	—	—	7.9	8.1	10.2	12.5
xiv)	400	RMS/PMS	8	720	—	—	—	—	7.9	8.1	10.2	12.5
		RDS/PDS	8	706	—	—	—	—	7.9	8.1	10.2	12.5
Width of material between slots (b) \pm 0.5 (see Note 3)					4.0	4.0	5.5	5.5	6.8	9.5	9.5	11.0

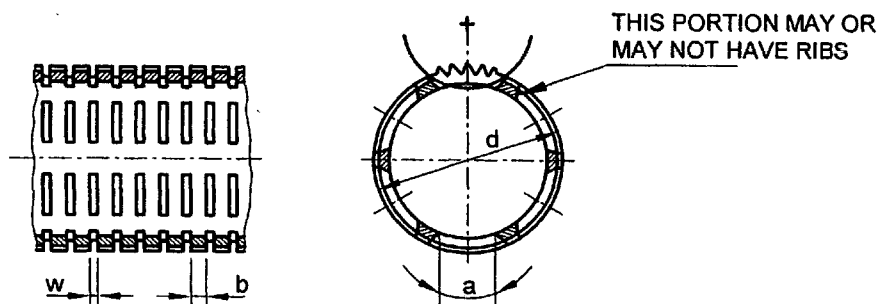
NOTES

1 Σa is the summation of slot lengths over internal circumference of the cross-section.

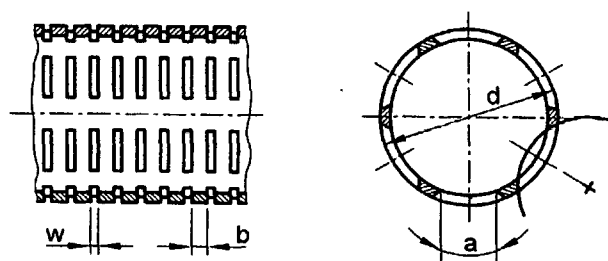
2 N is the minimum number of slots on the circumference of the cross-section.

3 In each meter of screen, the distance between slots 'b' can be wider to the extent of 2 mm more than the maximum allowed, up to 10 such distance 'b' per meter.

4 Percentage of opening (approximate free passage area) given in Table 10 is for guidance for selection only.



2A Ribbed Screen — Example Showing
6 Slot on Circumference



2B Plain Screen — Example Showing
6 Slot on Circumference

FIG. 2 EXAMPLE SHOWING 6 SLOTS ON CIRCUMFERENCE

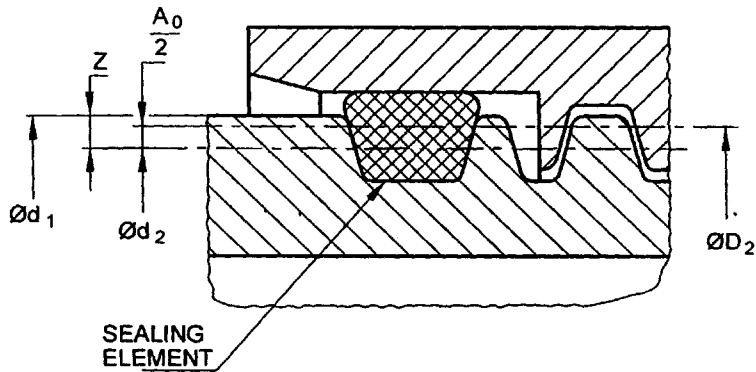
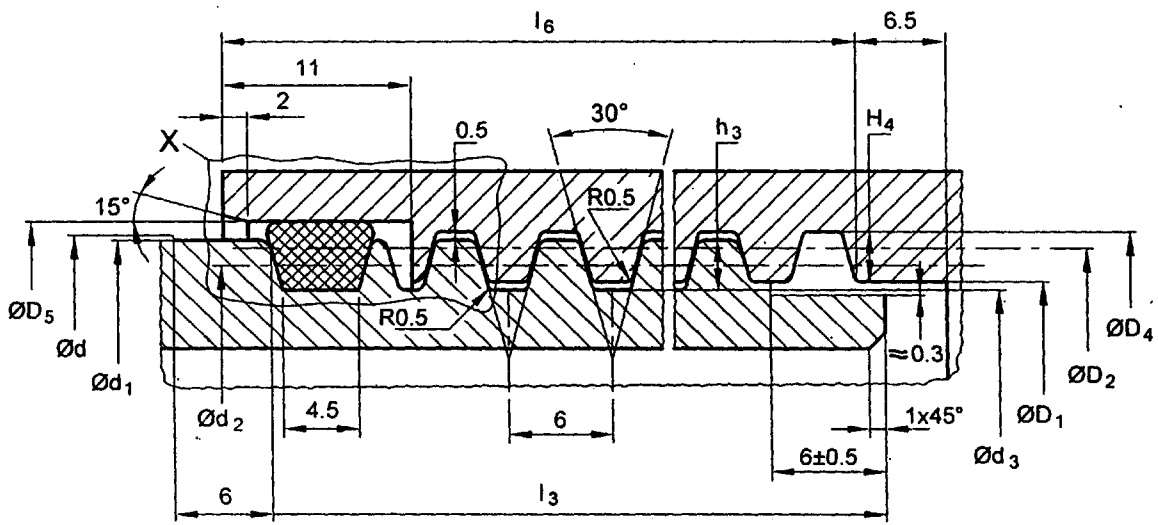
10.1.3 The pipes shall be selected at random from the lots in order to ensure randomness of selection, a random number table shall be used. For guidance on the use of random number tables, IS 4905 may be referred to. In the absence of a random number table, the following procedure may be adopted :

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

10.1.4 The number of samples given for the first sample of col 5 of Table 15 shall be taken from the lot and examined for requirements given in 7, 8, 9.1 and 9.2. A pipe failing to satisfy any of these requirements shall be considered as defective. The lot shall be deemed to have satisfied the requirements if the number of defectives found in the first sample is less than or equal to the corresponding acceptance number given in col 7. The lot shall be deemed not to have met these requirements, if the number of defectives found in the first sample is greater than

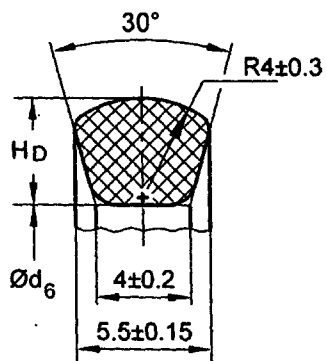
or equal to the corresponding rejection number given in col 8. If, however, the number of defectives found in the first sample lies between the corresponding acceptance and rejection numbers given in col 7 and 8, a second sample of the size given in col 5 shall be taken and examined for these requirements. The lot shall be considered to have satisfied these requirements if the number of defectives found in the cumulative sample is less than or equal to the corresponding acceptance number given in col 7, otherwise not.

10.1.5 The lot, having satisfied the requirements under 10.1.4 shall be tested for 9.3 and 9.4. For this purpose, a sub-sample from those tested under 10.1.4 shall be drawn as given in col 10 of Table 15 for the first/second sample size. The lot shall be deemed to have met the requirements given in the specification, if the number of defectives found in the first sample is less than or equal to the corresponding acceptance number given in col 12. 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 13. If, however, the number of defectives found



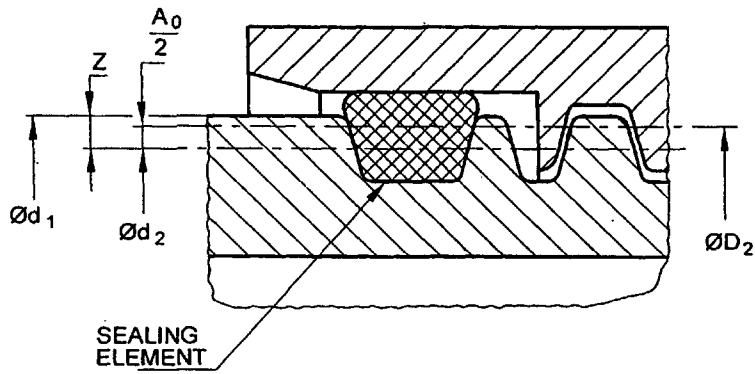
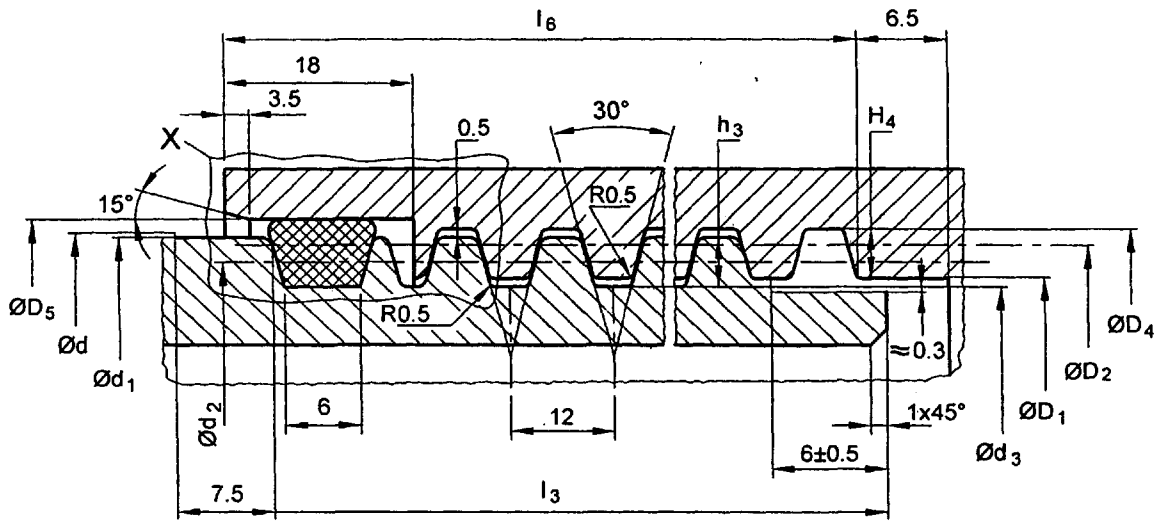
DETAIL - X

3A Thread Profile



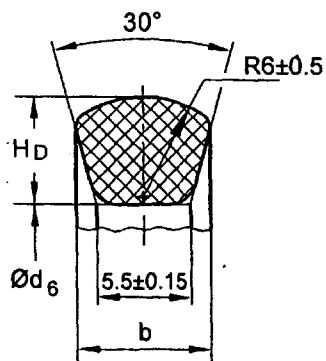
3B Sealing Element

FIG. 3 METRIC TRAPEZOIDAL THREAD PROFILE (DN 100 TO 200)



DETAIL - X

4A Thread Profile



4B Sealing Element

FIG. 4 METRIC TRAPEZOIDAL THREAD PROFILE, (DN 250 TO 400)

Table 11 Trapezoidal Threads (DN 100 to 200)

(Clause 8.3.1)

All dimensions in millimetres.

Sl No.	Nomi- nal Size DN	Out- side Dia- meter <i>d</i>	$d_{1-0.3}^{+0}$	d_2	d_3	$D_{1-0}^{+0.3}$	D_2	D_4	$D_{5-0}^{+0.3}$	Z	$h_{3-0.1}^{+0}$	$d_{3-0.1}^{+0}$
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
i)	100	113	112.5	110.0	108.5	109.5	112.0	113.5	115.5	1.25	2.0	2.0
ii)	115	125	124.5	122.0	120.5	121.5	124.0	125.5	127.5	1.25	2.0	2.0
iii)	125	140	139.5	136.4	134.3	135.3	138.4	140.5	141.3	1.55	2.6	2.6
iv)	150	165	164.5	161.4	159.3	160.3	163.4	165.5	166.3	1.55	2.6	2.6
v)	175	200	199.5	196.4	194.3	195.3	198.4	200.5	201.3	1.55	2.6	2.6
vi)	200	225	224.5	221.4	219.3	220.3	223.4	225.5	226.3	1.55	2.6	2.6

Table 12 Trapezoidal Threads (DN 250 to 400)

(Clause 8.3.2)

All dimensions in millimetres.

Sl No.	Nomi- nal Size DN	Out- side Dia- meter <i>d</i>	$d_{1-0.3}^{+0}$	d_2	d_3	$D_{1-0}^{+0.3}$	D_2	D_4	$D_{5-0}^{+0.3}$	Z	$h_{3-0.1}^{+0}$	$H_{3-0.1}^{+0}$
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
i)	250	280	278.0	273.0	269	270.0	275.0	279	279.8	2.5	4.5	4.5
ii)	300	330	327.0	322.0	318	319.0	324.0	328	328.8	2.5	4.5	4.5
iii)	350	400	397.0	392.0	388	389.0	394.0	398	398.8	2.5	4.5	4.5
iv)	400	450	446.0	439.5	434	435.0	441.5	447	448.4	3.25	6.0	6.0

Table 13 Dimensions of Sealing Element (DN 100 to 400)

(Clause 8.4.1)

All dimensions in millimetres.

Sl No.	Pipe or Casing Nominal Size DN	Ring Seal			
		Diameter d_6		Height H_D	Width b
		Nominal size	Limit deviations		
(1)	(2)	(3)	(4)	(5)	(6)
i)	100	107.4	± 0.5	4.2 ± 0.15	—
ii)	115	119.4	± 0.5	4.2 ± 0.15	—
iii)	125	133.0	± 0.5	4.2 ± 0.15	—
iv)	150	157.7	± 0.8	4.2 ± 0.15	—
v)	175	192.5	± 0.8	4.2 ± 0.15	—
vi)	200	217.0	± 0.8	4.2 ± 0.15	—
vii)	250	266.5	± 1.2	6.2 ± 0.15	7.9 ± 0.2
viii)	300	314.5	± 1.2	6.2 ± 0.15	7.9 ± 0.2
ix)	350	384.0	± 1.5	6.2 ± 0.15	7.9 ± 0.2
x)	400	429.0	± 2.0	8.2 ± 0.2	8.7 ± 0.2

in the first sample lies between the corresponding acceptance and rejection numbers given in col 12 and 13, a second sample of the size given in col 9 shall be taken and considered for the requirement, the lot shall be deemed 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 12, otherwise not.

10.1.6 The lot, having satisfied the requirements under **10.1.4** and **10.1.5**, shall be tested for **9.5**. For this, a sub-sample of 3 pipes from each lot irrespective of the lot size shall be selected from those tested under **10.1.4** and **10.1.5**. All pipes in the sub-sample shall be tested for requirements as specified in **9.5**. The lot shall be considered to have passed only if no failure is reported.

10.2 Type Tests

The tests are intended to prove the suitability and performance of pipes whenever there is a change in the composition, size and type of pipe as well as in the method/technique in the manufacturing process. Tests specified in **9.5**, **9.6** and **9.7** shall be taken as type tests.

10.2.1 However, even if no change is envisaged, at

least one sample from each size and type produced during the period shall be subjected to type test once in six months.

For effect on water, the smallest size of pipe produced shall be subjected to type test once every six months.

11 MARKING

11.1 Each pipe shall be legibly and indelibly marked in:

- Red colour for RMS, PMS, and CS pipes,
- Yellow colour for CM pipe, and
- Green colour for CD pipe and RDS pipes.

With the following information:

- Indication of the source of manufacture;
- Letters RMS, RDS, PMS, PDS, CS, CM or CD to denote ribbed medium well screen pipe, ribbed deep well screen pipe, plain medium well screen pipe, plain deep well screen pipe, shallow well casing pipe, medium well casing pipe or deep well casing pipe as applicable;
- Nominal diameter, in mm;
- Slot size, in mm; and
- Effective length of pipe, in mm.

Table 14 Mass of Striker and Height of Free Fall

(Clause 9.4)

Sl No.	Type of Pipe	Nominal Size DN	Total Mass of Striker kg	Height of Free Fall m	Nm
(1)	(2)	(3)	(4)	(5)	(6)
i)	CM and CD (Plain/ Ribbed)	35	0.5	0.6	3
		40	0.5	0.8	4
		50	0.8	1.0	8
		80	0.8	1.2	10
		100	1.0	1.6	16
		115	1.25	2.0	25
		125	1.6	1.8	29
		150	1.6	2.0	32
		175	2.0	2.0	40
		200	2.5	1.8	45
ii)	CS	250	3.2	1.8	58
		> 300	3.2	2.0	64
		150	3.2	2.0	64
		175	4.0	2.0	80
		200	5.0	1.8	90
		250	6.3	1.8	113
		> 300	6.3	2.0	126

NOTES

- The permissible tolerance on the mass of a striker shall be ± 0.5 percent.
- The permissible tolerance on the drop height shall be ± 10 mm.

Table 15 Scale of Sampling and Criteria for Conformity

(Clauses 10.1, 10.1.4 and 10.1.5)

Sl No.	Number of Pipes in the Lot	Nominal Size DN mm	For Tests Under 7, 8, 9.1 and 9.2					For Tests Under 9.3 and 9.4					
			Sample		Cumulative Sample Size	Acceptance No.	Rejection No.	Sub-sample		Cumulative Sample Size	Acceptance No.	Rejection No.	
			No.	Size				No.	Size				
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	
i)	Up to 1 000	≤ 100	1st	13	13	0	2	1st	3	3	0	2	
			2nd	13	26	1	2	2nd	3	6	1	2	
		> 100	1st	5	5	0	2	1st	3	3	0	1	
			2nd	5	10	1	2	2nd	3	6	1	2	
ii)	1 001-3 000	≤ 100	1st	20	20	0	3	1st	3	3	0	1	
			2nd	20	40	3	4	2nd	3	6	1	2	
		> 100	1st	8	8	0	2	1st	3	3	0	1	
			2nd	8	16	1	2	2nd	3	6	1	2	
iii)	3 001-10 000	≤ 100	1st	32	32	0	3	1st	3	3	0	1	
			2nd	32	64	3	4	2nd	3	6	1	2	
		> 100	1st	13	13	0	3	1st	3	3	0	1	
iv)	10 001 and above	≤ 100	2nd	13	26	3	4	2nd	3	6	1	2	
			1st	50	50	2	5	1st	6	6	0	1	
		> 100	2nd	50	100	6	7	2nd	6	12	2	3	
			1st	20	20	1	4	1st	4	4	0	1	
			2nd	20	40	4	5	2nd	4	8	1	2	

NOTE — For test under 9.4 the numbers mentioned in col 10 to col 13 represent the number of times the test is to be carried out. They do not represent the number of pipe samples nor the number of blows nor the number of failures.

11.2 BIS Certification Marking

Pipes may also be marked with the Standard Mark.

11.2.1 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 details of conditions under which a licence for use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

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Amendments Issued Since Publication

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