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IS 12987 (1991): Cast iron detachable joints for use with asbestos cement pressure pipes (light duty) [MTD 6: Pig iron and Cast Iron]



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Indian Standard

**CAST IRON DETACHABLE JOINTS FOR USE
WITH ASBESTOS CEMENT PRESSURE PIPES
(LIGHT DUTY) — SPECIFICATION**

भारतीय मानक

**ऐस्बेस्टॉस सीमेंट दाब पाइपों (हल्का कार्य) के साथ प्रयुक्त
ढलवां लोहे के वियोज्य जोड़ — विशिष्टि**

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**BUREAU OF INDIAN STANDARDS
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FOREWORD

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

The essential requirements for any form of joint are simplicity, reliability and flexibility. Various types of joints are used for joining AC pipes. These joints mostly incorporate rubber sealing rings in their design. Rubber is generally accepted as the ideal sealing medium for pressure joints; in addition to imparting flexibility, it enables the joint to withstand vibration from traffic and other sources. Also, in the case of buried pipes, the conditions such as moisture, darkness and compression are ideal for the preservation of rubber.

In detachable joints, the components comprise of a cast iron centre collar and two flanges together with two rubber rings. The assembly is bolted together. It should be noted that the joints are not intended to resist and thrust, and it is essential to adequately anchor end caps and bends.

Reference may be made to IS 1363 (Part 1) : 1984 'Hexagon head bolts, screws and nuts of product grade C : Part 1 Hexagon head bolts (size range M5 to M36) (*second revision*)' and IS 1363 (Part 3) : 1984 'Part 3 Hexagon nuts (size range M5 to M36) (*second revision*)' for use of bolts and nuts with these joints and to IS 12988 : 1990 'Rubber sealing rings for CID joints for light duty AC pipes — Dimensional requirements' for use of rubber sealing rings with CID joints.

Only essential dimensions required for proper functioning and interchangeability of joints have been 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

CAST IRON DETACHABLE JOINTS FOR USE WITH ASBESTOS CEMENT PRESSURE PIPES (LIGHT DUTY) — SPECIFICATION

1 SCOPE

1.1 This standard covers the requirements for cast iron detachable joints to be used with asbestos cement pressure pipes (light-duty) conforming to IS 9627 : 1980.

2 REFERENCE

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

3 SUPPLY OF MATERIAL

3.1 The general requirements relating to the supply of material shall be as laid down in IS 1387 : 1967.

4 MANUFACTURE

4.1 The metal used for the manufacture of joints shall be of requisite quality conforming to any of the grades of IS 210 : 1978.

4.2 The various parts of detachable joints shall be stripped with all precautions necessary to avoid warping or shrinking defects. They shall be free from defects, other than any unavoidable surface imperfections which result from the method of manufacture and which do not affect the use of the joints. By agreement between the purchaser and the manufacturer, minor defects may be rectified.

4.3 The joints shall be such that they could be cut, drilled or machined. In case of dispute, the castings may be accepted provided the hardness measured on the external unmachined surface does not exceed the Brinell hardness of 215 HBS.

5 MECHANICAL TEST

5.1 Mechanical tests shall be carried out on castings at the most twice per day during manufacture. The results obtained are taken to represent all the joints of all sizes made during the day.

5.2 Tensile Tests

Two tensile tests shall be made on bars cast from the same metal in accordance with the method specified in Annex B. The results of the tests shall show a minimum tensile strength of 150 MPa (15 kgf/mm²).

5.3 Brinell Hardness Tests

For checking the Brinell hardness tests specified in 4.3 shall be carried out on the test bars used for the tests in 5.2. The test shall be carried out in accordance with IS 1500 : 1983.

5.4 Retest

If any test piece representing a lot fails to pass the test in the first instance, two additional tests shall be made on test pieces made from the same metal used from the same lot. Should either of these additional test pieces fail to pass the test, the lot shall be deemed as not complying with the standard.

6 HYDROSTATIC TEST

6.1 Hydrostatic test may be carried out for collars only. For this test the collar shall be kept under pressure for 15 seconds, minimum; it may be struck moderately with a 700 g hammer. It should withstand the pressure test without showing any leakage, sweating or other defects of any kind. The hydrostatic test should be conducted before coating the collar, as far as possible.

6.1.1 The collar shall withstand the test pressure specified in Table 1 of IS 9627 : 1980 for the class of asbestos cement pressure pipes with which they are to be used. When collars are required for higher pressure, the test pressure are subject to special agreement between the purchaser and the manufacturer.

6.2 The number of samples required and the criteria for conformity shall be as prescribed in Annex C.

7 DIMENSIONS AND MASS

7.1 Dimensions for the cast iron flanges and collars to be used with asbestos cement pressure pipes of IS 9627 : 1980 shall conform to Table 1 and Table 2 respectively for the nominal dia *DN* and class specified.

NOTES

1 Nominal diameter of detachable joints shall refer to the corresponding nominal diameter of the asbestos cement pressure pipes.

2 Nominal diameter of asbestos cement pipe — A numerical designation of size which is common to all components in a piping system other than components designated by outside diameters or other dimensions. It is a convenient round number for reference purpose only and is not subjected to measuring and is not meant to be used for the purpose of calculation.

3 Cast iron detachable joints to nominal diameter more than 200 mm may also be manufactured. In such cases detailed dimensions and tolerances may be as mutually agreed to between the purchaser and the supplier.

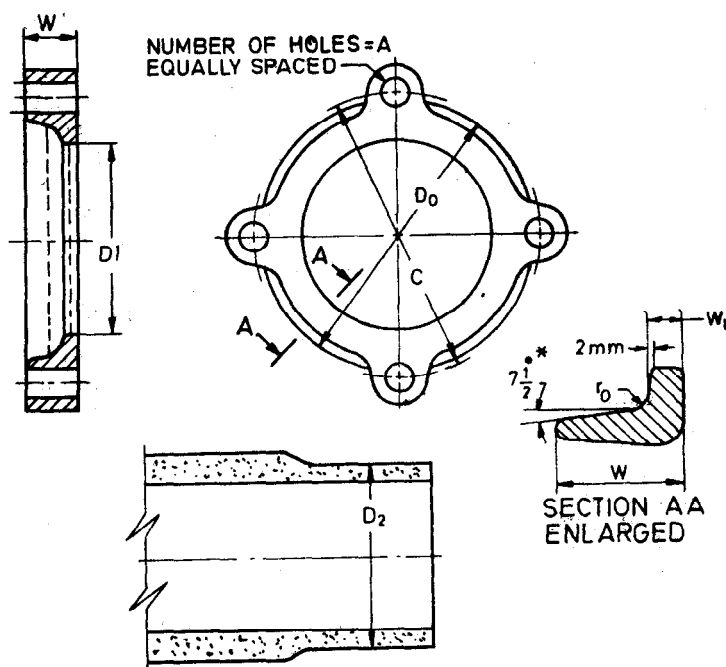
7.2 Diameter and length of bolts to be used with cast iron flanges of Table 1 shall be as given in Table 3.

7.3 Approximate mass of joints (excluding rubber rings and bolts), calculated by taking the density of cast iron as 7.15 kg/cm^3 is given in Table 4 for information.

7.4 The diameter of engagement end of joints shall match the corresponding outside diameter of asbestos cement pressure pipes of appropriate classes conforming to IS 9627 : 1980, as relevant.

Table 1 Cast Iron Flange

(Clause 7.1)



D_1 — Outside diameters of AC pipes.

All dimensions in millimetres.

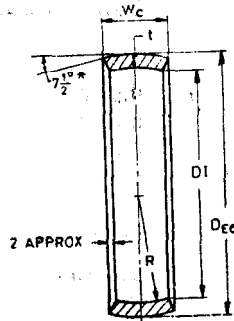
Nominal Dia DN	Class	External Dia of AC Pipe D_1	Width of Flange W	Outside Dia of Flange D_0	Inside Dia of Flange D_1	Bolt Circle Dia C	Internal Radius of Flange r_0 †	Holes	
								Dia d	No. A
50	5	69	20	115.5	73	125.5	5	16	3
50	10	69	20	115.5	73	125.5	5	16	3
80	5	99	27	146.5	103	154.0	5	16	3
80	10	99	27	146.5	103	154.0	5	16	3
100	5	119	27	167.5	123	177.5	5	16	3
100	10	122	27	170.5	126	180.5	5	16	3
125	5	144	29	190.0	148	199.0	5	16	4
125	10	147	29	193.0	151	202.0	5	16	4
150	5	169	31	217.0	173	227.0	5	16	4
150	10	173	31	221.0	177	231.0	5	16	4
200	5	219	35	272.0	223	280.0	5	20	4
200	10	230	35	285.0	234	291.0	5	20	4

*This is for information only, however the internal slope of the flange and outer slope of the collar shall be such that there is no interference during assembly.

†For information only.

Table 2 Cast Iron Collar

(Clause 7.1)

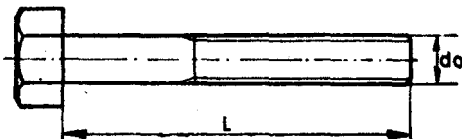


All dimensions in millimetres.

Nominal Diameter DN	Class	External Dia of AC Pipe D ₂	Inside Dia D ₁	External Dia at Centre D _{EC}	Collar Width W _C	Thick- ness t	Radius of Curvature R
50	5	69.0	73.0	98.0	34.0	8.5	30
50	10	69.0	73.0	98.0	34.0	8.5	30
80	5	99.0	103.0	128.5	38.0	9.0	34
80	10	99.0	103.0	128.5	38.0	9.0	34
100	5	119.0	123.0	149.5	42.0	9.0	50
100	10	122.0	126.0	152.5	42.0	9.0	50
125	5	144.0	148.0	172.0	46.0	9.0	75
125	10	147.0	151.0	175.0	46.0	9.0	75
150	5	169.0	173.0	199.0	50.0	9.5	80
150	10	173.0	177.0	203.0	50.0	9.5	80
200	5	219.0	223.0	249.0	56.0	10.0	115
200	10	230.0	234.0	260.0	56.0	10.0	115

Table 3 Details of Bolt

(Clause 7.2)



All dimensions in millimetres.

Nominal Dia DN	Class	Nominal Dia of Bolt do	Minimum Preferred Length of Bolts L
50	5, 10	12	75
80	5, 10	12	90
100	5, 10	12	100
125	5, 10	12	100
150	5, 10	12	110
200	5, 10	16	120

NOTE — The thread length of bolts shall conform to the requirement specified in the relevant part of IS: 1363.

Table 4 Mass of Joint (Approximate)

(Clause 7.3)

Nominal Diameter DN	Class	Mass of Joint (Approximate) (Excluding Rubber Rings and Bolts)
mm		kg
50	5, 10	1.7
80	5, 10	2.9
100	5	3.8
100	10	3.9
125	5	4.8
125	10	5.0
150	5	6.1
150	10	6.2
200	5	8.7
200	10	9.4

8 TOLERANCES

8.1 The tolerances on the various dimensions shall be as follows:

<i>Dimensions</i>	<i>Tolerances, mm</i>
Wall thickness of collar	$-(1 + 0.05 t^*)$
Cored holes and other dimensions	± 2
Drilled holes	± 1.5

**t* = the standard thickness of collar.

NOTE — No limit for plus tolerance is specified.

9 COATING

9.0 After inspection, each part of joint shall be coated as specified in 9.1 to 9.6.

9.1 Coating shall not be applied to any part unless its surface is clean, dry and free from rust.

9.2 Unless otherwise agreed to between the purchaser and the manufacturer, all cast iron parts shall be coated externally and internally with the same material; the parts being pre-heated prior to total immersion in a bath containing a uniformly heated bituminous/tar or other suitable base.

NOTE — Coal tar should not be used in cast iron detachable joints used with AC pipes for carrying potable water.

9.2.1 Alternatively, the coating on the cast iron parts may be done without preheating with two coats of black Japan conforming to Type C of IS 341 : 1973, if agreed to at the time of enquiry and order.

9.3 The coating material shall set rapidly with good adherence and shall not scale off.

9.4 In all instances where the coating material

has a tar or similar base, it shall be smooth and tenacious and hard enough not to flow when exposed to a temperature of 66°C but not so brittle at a temperature of 0°C as to chip off when scribed lightly with a penknife.

9.5 When the parts of the joint are to be used for conveying potable water, the inside coating shall not contain any constituent soluble in such water or any ingredient which could impart any taste or odour, whatsoever, to the potable water after sterilization and suitably washing out the mains.

9.6 In case of parts (wholly or partially coated) which are imperfectly coated or where the coating does not set or conform to the quality specified above, the coating shall be removed and the parts re-coated.

10 SAMPLING

10.1 The requirements for sampling and criteria for conformity shall be as given in Annex C.

11 MARKING

11.1 Each joint shall have cast, stamped or indelibly painted on it, the following appropriate marks;

- Identity of the source of manufacture;
- The nominal diameter of pipe;
- Class reference;
- Last two digits for the year of manufacture; and
- Any other mark if required by the purchaser.

11.1.1 The material may also be marked with the Standard Mark, the details for which may be obtained from the Bureau of Indian Standards.

ANNEX A

(Clause 2.1)

LIST OF REFERRED INDIAN STANDARDS

<i>IS No.</i>	<i>Title</i>	<i>IS No.</i>	<i>Title</i>
210 : 1978	Grey iron castings (<i>third revision</i>)	1500 : 1983	Method for Brinell hardness test for metallic materials (<i>second revision</i>)
341 : 1973	Black Japan, Types A, B and C (<i>first revision</i>)	4905 : 1968	Methods for random sampling
1387 : 1967	General requirements for the supply of metallurgical materials (<i>first revision</i>)	9627 : 1980	Asbestos cement pressure pipes (<i>light duty</i>)

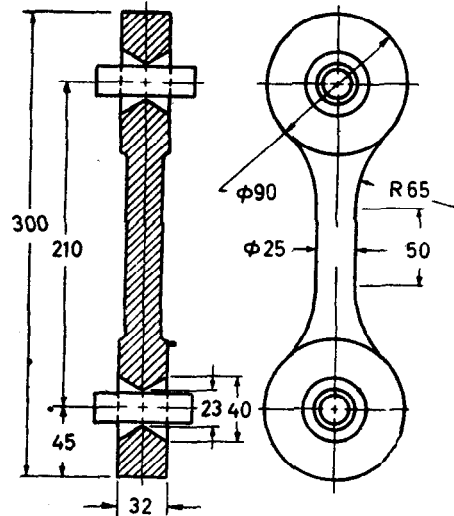
ANNEX B

(Clause 5.2)

TENSILE TEST**B-1 TESTS ON BARS FOR CI DETACHABLE JOINTS CAST IN SAND MOULDS**

B-1.1 The tensile test bars are properly moulded, free from defects and are either unmachined, or

machined to give a diameter of about 20 to 25 mm. The ends are selected by the manufacturer to fit the testing machine. Fig. 1 shows one such satisfactory design.



All dimensions in millimetres.

FIG. 1 TENSILE TEST SPECIMEN

ANNEX C

(Clauses 6.2 and 10.1)

SAMPLING OF CAST IRON DETACHABLE JOINTS**C-1 LOT**

C-1.1 In any consignment, all the joints/collars manufactured under similar conditions shall be grouped together to constitute a lot.

C-1.2 Samples shall be taken and tested from each lot for ascertaining the conformity of the lot.

C-2 SCALE OF SAMPLING

C-2.1 The number of joints/collars, to be sampled shall be according to col 1 and 2 of Table 5. These joints/collars shall be taken at random (see IS 4905 : 1968).

C-3 NUMBER OF TESTS AND CRITERIA FOR CONFORMITY

C-3.1 The joints/collars selected according to col 1 and col 2 of Table 5 shall be tested for dimensions, tolerances, coating and hydrostatic pressure tests.

A joint/collar failing to meet the requirements of any of the tests, shall be called a defective joint/collar.

C-3.2 If the number of defectives found in a lot is less than or equal to the corresponding number of permissible number of defectives, the lot shall be considered as conforming to the requirements of the standard, otherwise not.

Table 5 Scale of Sampling and Permissible Number of Defectives
(Clause C-2.1)

Lot Size	Sample Size	Permissible No. of Defectives
(N)	(n)	(a)
Up to 500	8	0
501 to 1 000	13	1
1 001 to 3 000	20	2
3 001 to 10 000	32	3
10 001 and above	50	5

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