
International Standard



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Asbestos-cement pipe fittings for building and sanitary purposes

Accessoires en amiante-ciment pour tuyaux de bâtiment et tuyaux sanitaires

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 392 was prepared by Technical Committee ISO/TC 77, *Products in fibre reinforced cement*.

It cancels and replaces ISO Recommendation/R 392-1964, of which it constitutes a technical revision.

Users should note that all International Standards undergo revision from time to time and that any reference made herein to any other International Standard implies its latest edition, unless otherwise stated.

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Asbestos-cement pipe fittings for building and sanitary purposes

1 Scope and field of application

This International Standard specifies the dimensions, characteristics and acceptance tests for asbestos-cement pipe fittings used in building, such as rainwater, sanitary and sewer connections, up to the connection with the main or common sewer.¹⁾ It should be read in conjunction with ISO 391 and ISO 4633.

The commonly used fittings are bends, branches, tees, swan-necks, reducers and traps.²⁾

2 References

ISO 390, *Asbestos-cement products — Sampling and inspection*.

ISO 391, *Building and sanitary pipes in asbestos-cement*.

ISO 4633, *Rubber seals — Joint rings for water supply, drainage and sewerage pipelines — Specifications for materials*.

3 Fittings

3.1 Composition

The fittings to which this International Standard relates consist essentially of an inorganic hydraulic binder³⁾ reinforced by asbestos fibres to which other fibres may be added⁴⁾.

Fillers and pigments may be added.

3.2 Types

The fittings may be of two types :

- fittings with socket;
- fittings with plain ends.

3.3 General appearance and finish

The external surface of the fittings shall be regular and the internal surface shall be regular and smooth. If necessary, the fittings may be coated internally and/or externally with a suitable coating.

3.4 Characteristics

3.4.1 Geometrical characteristics

3.4.1.1 Nominal diameter

The nominal diameter of the fittings corresponds to the internal diameter, ignoring tolerances.

The series of nominal diameters⁵⁾ is as shown in table 1.

Table 1

50/60*
70/80*
100
125
150
200
250
300

* The choice in each group being that of the national standards institution.

1) Fittings for sewerage and drainage are covered by ISO 881.

2) The manufacturer's catalogue shall list all fittings available.

3) National standards may specify the binder to be used.

4) Asbestos-cement-silica fittings to which this International Standard also relates consist essentially of an inorganic hydraulic binder and silica in chemical combination (calcium silicate reaction), reinforced by asbestos fibres to which other fibres may be added.

5) Manufacturer's catalogues shall state the actual dimensions available. When national standards provide for other diameters, these should be chosen from the preferred numbers in the R 10 series (ISO 3).

3.4.1.2 Ovality

The ovality, O , is defined by

$$O = \frac{D_r}{D_t}$$

where

D_r is the value corresponding to the maximum or minimum effective internal diameter, in millimetres, of the spigot end of the fitting or its socket;

D_t is the value of the specified internal diameter, in millimetres, of the spigot end of the fitting or the socket¹⁾.

The ovality shall be within the following limits according to the nominal diameter :

- $D < 100$: 0,975 to 1,025
- $100 < D < 300$: 0,98 to 1,02

The effective internal diameters shall not be measured within 10 mm of any seam.

3.4.1.3 Nominal thicknesses

The nominal thicknesses and their tolerances are given in table 2.

Table 2

Nominal diameter	Nominal thickness mm	Tolerance mm
50	7	
60	7	
70	7	
80	7	+2,0
100	7	-1,0
125	8	
150*	8	
200*	9	+2,5
250*	10	-1,5
300*	11	

* Fittings equal to or larger than 150 diameter used underground shall be provided with suitable protection against ground pressure and external loads.

The thickness shall be measured at the spigot end of the fittings but not within 10 mm of any seam.

3.4.2 Physical characteristics

When tested as in 3.5.2 (optional test), the fittings shall have no fissure, leakage or sweating.

3.5 Test

3.5.1 General

The acceptance test shall be carried out at the manufacturer's works on sufficiently matured fittings.

The conditions and methods of test shall apply equally to coated or uncoated fittings.

3.5.2 Internal hydraulic pressure tightness test

If requested this test shall be carried out on certain fittings²⁾, including the socket where appropriate.

The test shall be carried out on dry fittings placed horizontally, sealed at the ends and connected to the pressure source. In order to withstand the secondary effects due to the internal pressure and to the direction of the axes varying according to the type of fitting, the latter shall be covered above, underneath and at the sides with a layer of dry sand, free from clay, at least 100 mm thick, the top layer not exceeding 150 mm.

The assembly shall be contained in a box designed for the purpose and loaded uniformly in the vertical direction by means of the plate of a press parallel to the horizontal plane, transmitting a pressure of 0,01 MPa.

The hydraulic pressure shall be raised gradually to 0,05 MPa and maintained for 60 s to check that there is no fissure, evident leakage or sweating on the fitting when removed from the sand.

No reduction of the testing time is permitted.

3.6 Marking

The fittings shall be marked legibly and indelibly to show at least

- manufacturer's mark;
- nominal diameter for unequal fittings.

The method of marking shall conform to national standards.

1) The specified diameter of the fittings is equal to the nominal diameter of the fittings. The specified diameter of the sockets is defined by national standards or, failing this, in the manufacturer's catalogue.

2) For practical reasons this test cannot apply to certain shapes or very large diameter fittings.

4 Joints

The tightness of the conduct is achieved by assembling the spigot ends on the socket of the pipes or fittings, or by using separate sleeves.

In the traditional system, the tightness of the spigot and socket joint is achieved by caulking or pressing suitable soft material into the free space of the socket.

Other systems use elastomeric gaskets which shall ensure tightness of socket and spigot joints, or separate sleeves.

5 Sampling, inspection and acceptance

Enquiries and orders shall specify whether or not acceptance tests are required and if so, which tests. Otherwise, the purchaser is presumed not to require acceptance tests.

5.1 Inspection by sampling

5.1.1 All requirements concerning the fittings shall be verified, if requested, by sampling.

5.1.2 The procedure in ISO 390 applies for the sampling, inspection and acceptance. Each inspection lot shall include only items of the same diameter and of the same type. The maximum and minimum inspection lots shall be agreed between the manufacturer and purchaser; failing such an agreement, these shall be 200 and 100 fittings.

5.1.3 If the sample is not satisfactory, the customer or manufacturer may request inspection of each item for the failing characteristic in accordance with 5.2.

5.2 Inspection of each item of the consignment

5.2.1 The requirements concerning the general appearance and finish (see 3.3), the geometrical characteristics (see 3.4.1) and the marking (see 3.6) of the fittings may be verified on each item of the consignment.

5.2.2 The fittings which do not satisfy the requirements when submitted to inspection of each item of the consignment (see 5.2.1) may be rejected.

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Annex A

Acceptance test

(This annex forms an integral part of the Standard.)

A.1 Carrying out of test

Unless agreed otherwise, the purchaser shall inform the manufacturer, when ordering, which tests are required. The tests shall be carried out at a time and place fixed by agreement.

A.2 Access to the works

The purchaser shall have access to the place of testing and to the stocks for the sole purpose of inspecting and testing the materials which he has ordered, at any time by agreement with the manufacturer.

A.3 Costs of testing

The test in clause 3.5 is carried out at the expense of the manufacturer.

By agreement between the manufacturer and purchaser when ordering, additional tests may be carried out at the purchaser's expense, at the works or in an independent laboratory designated by agreement. The manufacturer shall have the right to be represented.

A.4 Inspection of each item of the consignment

In order to reduce the duration and the costs of the acceptance operations in practice, the inspection of the characteristics

made on each item of the consignment (see clause 5.2.1) may, at the purchaser's request, be replaced by an inspection by sampling.

In this case, if the inspection results tend towards the rejection of the lot, the manufacturer may ask for a 100 % inspection on all items of the consignment with regard to the failing characteristic; in this case, rejection shall be according to clause 5.2.2.

A.5 Period of testing

The test shall be completed before delivery of the consignment and at the latest four weeks after the date of sampling.

A.6 Manufacturer's certificate

A.6.1 Orders with acceptance test

If the purchaser or his representative is not present at the whole or part of the test, the manufacturer shall supply the purchaser with a certificate that the fittings satisfied the test he was unable to witness.

A.6.2 Orders without acceptance test

For orders without an acceptance test, the manufacturer is considered to have discharged his obligations on completion of delivery.

Annex B

Extracts from ISO 390

Asbestos-cement products — Sampling and inspection

4 Division of a consignment into inspection lots

4.1 Homogeneous consignments

4.1.1 Any homogeneous consignment (or sub-consignment, see 4.2) shall be divided by the manufacturer into inspection lots, the maximum size of which shall be as given in the relevant International Standard.

4.1.2 Any fraction of a consignment remaining after removal of the highest possible number of maximum inspection lots and any homogeneous consignment (or sub-consignment) smaller than the maximum lot size, shall form an inspection lot if larger than the minimum lot size given in the relevant International Standard.

4.1.3 Consignments or fractions of consignments smaller than the minimum lot size given in the relevant International Standard shall not be submitted to sampling and testing.

4.2 Non-homogeneous consignments

Any consignment which is known to be or is expected to be non-homogeneous as regards any of the properties to be tested by sampling shall be divided by the manufacturer into assumed homogeneous sub-consignments prior to the division into inspection lots in accordance with 4.1.

5 Sampling

5.1 From each inspection lot (4.1.1 and 4.1.2), the purchaser may draw a sample, the size of which is indicated in table 1 (see 5.2 and 5.3).

5.2 The entry to table 1 is the number of units of product in the inspection lot (column 1), the sample size being indicated in column 2.

5.3 For products where all units undergo a compulsory non-destructive test during manufacture¹⁾, the reduced sample size obtained by entering table 1 at column 7 may be applied.

5.4 The possibility mentioned in 5.3 is also available when the manufacturer guarantees his production or has it guaranteed by an independent control organization²⁾.

5.5 When test pieces are cut from the units of the sample, the cutting shall be carried out by the manufacturer in the presence of the purchaser.

5.6 When the relevant International Standard calls for more than one property to be tested, the sample size shall be appropriately multiplied so as to secure for each test a number of test pieces equal to the sample size (see 5.2 and 5.3). From one unit of a sample, one test piece only shall be cut for a particular test, but for different tests, the necessary test pieces may be cut from the same unit of the sample.

7 Determination of acceptability of inspection lots

7.1 Inspection by attributes

7.1.1 When the number of non-conforming units found in the sample is equal to or less than the acceptance number Ac_1 indicated in column 3 of table 1, the inspection lot from which the sample was drawn shall be considered acceptable.

7.1.2 When the number of non-conforming units found in the sample is equal to or greater than the rejection number Re_1 indicated in column 4 of table 1, this may justify rejection of the inspection lot.

7.1.3 When the number of non-conforming units found in the sample lies between the acceptance number and the rejection number (columns 3 and 4 of table 1), a second sample of the same size as the initial sample (5.2, 5.3 and 5.4) shall be drawn and examined.

7.1.4 The second sample shall be inspected as indicated in 5.5 and 5.6.

7.1.5 The number of non-conforming units found in the initial and in the second samples shall be totalled.

7.1.6 If the total number of non-conforming units is equal to or less than the acceptance number Ac_2 indicated in column 5 of table 1, the inspection lot shall be considered acceptable.

1) Such as the watertightness test for pipes.

2) For example, use of statistical quality control methods in the works.