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**एसबैसटॉस सीमेंट की सपाट चादरें — विशिष्टि**  
**(पहला पुनरीक्षण)**

*Indian Standard*  
**ASBESTOS CEMENT FLAT SHEETS —**  
**SPECIFICATION**  
*( First Revision )*

(Incorporating Amendment No. 1)

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**BUREAU OF INDIAN STANDARDS**  
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**Price Group 3**

## FOREWORD

This Indian Standard (First Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Cement and Concrete Sectional Committee had been approved by the Civil Engineering Division Council.

For the past several years asbestos cement flat sheets are being manufactured and used in India. These sheets are either water cured or humid cured.

These sheets are mainly used for external wall claddings, partitions, false ceilings, panelling, furniture and dado work.

Asbestos cement flat sheets are different from asbestos cement building boards which are more porous and flexible and are intended mainly for internal use. Asbestos building boards are covered separately in IS 2098 : 1964 'Specification for asbestos cement building boards'.

This standard was originally published in 1966. The present revision has been taken up in the light of experience gained during its use. In this revision frost cracking test, test for resistance to acidified waters, and test for water absorption and impermeability have been deleted, since it has been found that sheets fulfilling requirements for density and bending strength are weather-proof. Classification and strength of sheets have also been modified in this revision.

In formulation of this standard due weightage has been given to international co-ordination among the standards and practices prevailing in different countries in addition to relating it to the practices in the field in this country. Assistance has been derived from BS 690 (Part 2) : 1981 'Asbestos cement slates and sheets, Part 2 Specification for asbestos cement and cellulose asbestos cement flat sheets'.

The composition of the Committee responsible for the formulation of this standard is given in Annex B.

This edition 2.1 incorporates Amendment No. 1 (August 1997). Side bar indicates modification of the text as the result of incorporation of the amendment.

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*

# ASBESTOS CEMENT FLAT SHEETS — SPECIFICATION

( *First Revision* )

**1 SCOPE**

This standard lays down the requirements regarding composition, dimensions and tests of asbestos cement flat sheets (semi-compressed and fully-compressed). These sheets are different from autoclaved silica asbestos cement flat sheets which are covered in IS 13000 : 1990.

**2 REFERENCES**

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

**3 COMPOSITION**

Asbestos cement flat sheets shall be made from a thorough and homogeneous mixture of ordinary Portland cement, conforming to IS 269 : 1989 or IS 8112 : 1989 or IS 12269 : 1987 or rapid hardening Portland cement conforming to IS 8041 : 1990 or Portland slag cement conforming to IS 455 : 1989 or Portland pozzolana cement conforming to IS 1489 (Parts 1 and 2) : 1991 and asbestos fibre to which other suitable fibres may be added. Pozzolanic materials, pigments and fillers which are compatible with asbestos cement may be added.

NOTE — In case of Portland pozzolana cement and Portland slag cement, addition of pozzolanic materials shall not be permitted.

**4 COLOURING MATTER**

The sheets may be left in their natural colour or colouring matter may be added in the composition. They may receive coloured or uncoloured coating on their surface. Pigments which are embodied in asbestos cement for colouring purpose shall be of permanent colour and shall conform to the relevant Indian Standards. For guidance in ascertaining the colour and staining power of the pigments IS 5913 : 1989 may be referred to.

**5 CLASSIFICATION**

Asbestos cement flat sheets shall be classified in two types according to the value of minimum bending strength and density as given in Table 1.

**6 GENERAL APPEARANCE AND FINISH**

The finished product when delivered, shall be free from visible defects that impair its

appearance or serviceability. The surface of the sheets shall be flat rectangular and shall have neatly trimmed straight and regular edges and shall be square at the corners.

**Table 1 Classification of Asbestos  
Cement Flat Sheets**

( Clause 5 )

Class of Sheet	Description of Sheet	Minimum Bending Strength in N/mm <sup>2</sup>		Minimum Density g/cc
		Loading Parallel to the Fibre of Sheet	Loading at Right Angles to the Fibre of Sheet	
(1)	(2)	(3)	(4)	(5)
1	Semi-compressed	13	16	1.2
2	Fully compressed	20	28	1.6

NOTE — In case where the direction of the fibre is difficult to identify, the lower value obtained shall be more than the value of the third column and the higher value shall be not less than the corresponding value of the fourth column.

**7 DIMENSIONS AND TOLERANCES**

**7.1** The nominal thickness of asbestos cement flat sheets shall conform to those value specified below:

3, 4, 5, 6, 8, 10, 12 and 15 mm.

**7.2** The nominal lengths and widths of asbestos cement flat sheets shall conform to the values specified in Table 2.

**Table 2 Nominal Dimensions of Asbestos  
Cement Sheets**

Length	Width	
	1 200	1 220
600	x	
610		x
1200	x	
1220		x
1800	x	
1830		x
2400	x	
2440		x
3000	x	
3050		x

NOTE — By mutual agreement between the purchaser and the manufacturer the sheets may be supplied in dimensions other than specified in **7.1** and **7.2**.

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### 7.3 Tolerances

#### 7.3.1 Tolerance on Thickness

From 3 mm to 5 mm —  $\pm 0.5$  mm

From 6 mm and above —  $\pm 0.1 e$  mm

where 'e' is nominal thickness of sheet.

The maximum difference between extreme values of the thickness measurements within a sheet shall not exceed 10 percent of the maximum measured value.

#### 7.3.2 Tolerance on Length and Width

Asbestos cement flat sheets shall not vary from the nominal dimensions for length and width specified in 7.2 by more than  $\pm 5$  mm.

#### 7.3.3 Tolerance on Shape

##### 7.3.3.1 Straightness of edges

The tolerance on the straightness of edges shall be not more than 2 mm/m for the relevant dimension (length or width).

##### 7.3.3.2 Squareness of edges

The tolerance on squareness of the edge shall be not more than 3 mm/m.

### 8 TESTS

**8.1** The samples of sheets taken as described in 9 and tested for the various characteristics shall conform to the requirements specified in 8.2 to 8.4.

#### 8.2 Bending Strength Test

The values of bending stress which determine Class of sheet shall be not less than the values given in Table 1, when tested in accordance with 7.2 of IS 5913 : 1989.

#### 8.3 Thickness

Carry out three measurements at one end cover width at approximately 20 mm from the edge by means of a gauge having a flat anvil of not less than 9 mm diameter accurate to measure 0.1 mm as shown in Fig. 1. The average of the three measurements shall correspond to the nominal thickness and the tolerance specified in 7.1 and 7.3 respectively.

The maximum difference between extreme values of the measurement shall be inside the tolerance given in 7.3.1.

#### 8.4 Straightness and Squareness of Edges

Apply the edge to the relevant arm of the square. Measure to the nearest 0.5 mm, by

means of a steel rule, the greatest separation between the edge of the sheet and the arm of the square. This shall not be more than the value specified in 7.3.3.1.

#### 8.5 Squareness of Edges

Place each of the four corners of the sheet in succession between the arms of the square keeping on the one hand the large side against the large arm and on the other hand the small side in contact with the small arm. In this position, measure the distance of the apex of the corner from the small arm of the square. This shall not be more than the value specified in 7.3.3.2.

#### 8.6 Density

The density of the sheets shall be not less than the values specified in Table 1, when tested in accordance with 13 of IS 5913 : 1989.

### 9 SAMPLING

The sampling, inspection and acceptance shall be in accordance with IS 7639 : 1975. Unless otherwise agreed to between the manufacturer and the purchaser, the maximum and minimum inspection lots shall be 3 000 and 400 sheets respectively.

### 10 MANUFACTURER'S CERTIFICATE

The manufacturer shall satisfy himself that the sheets conform to the requirements of this standard and, if required, shall furnish a certificate to this effect to the purchaser or his representative clearly stating class of the sheet.

### 11 MARKING

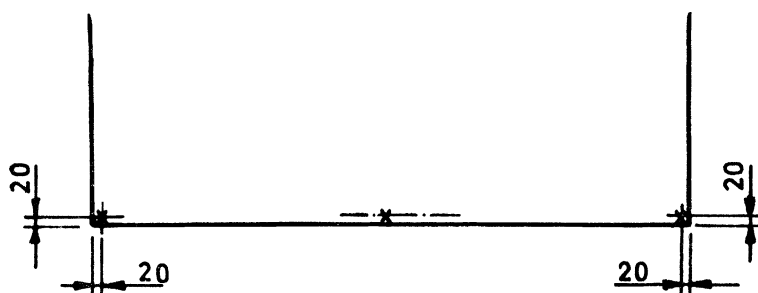
**11.1** Each sheet shall be stamped or marked by any suitable method on the surface not exposed to the weather with the following information:

- a) Class of sheet,
- b) Indication of the source of manufacture,
- c) Nominal thickness of sheet,
- d) Pictorial warning sign as given in IS 12081 (Part 2) : 1987, and
- e) Year and date of manufacture.

**11.2** Each sheet may also be marked with the Standard Mark.

### 12 SAFETY RULES SHEET

All deliveries of asbestos cement flat sheets shall be accompanied by a safety rules sheet as given in IS 11769 (Part 1) : 1987.



All dimensions in millimetres.

FIG. 1 LOCATION FOR MEASURING THICKNESS

## ANNEX A

( Clause 2 )

### LIST OF REFERRED INDIAN STANDARDS

<i>IS No.</i>	<i>Title</i>	<i>IS No.</i>	<i>Title</i>
269 : 1989	Ordinary Portland cement, Grade 33 ( <i>fourth revision</i> )	8112 : 1989	Ordinary Portland cement, Grade 43 ( <i>first revision</i> )
455 : 1976	Portland slag cement ( <i>fourth revision</i> )	11769 (Part 1) : 1987	Guidelines for safe use of products containing asbestos: Part 1 Asbestos cement products
1489 (Part 1) : 1991	Portland pozzolana cement: Fly ash based ( <i>third revision</i> )	12082 (Part 2) : 1987	Recommendations for pictorial warning signs and precautionary notices for asbestos and products containing asbestos: Part 2 Asbestos and its products
(Part 2) : 1991	Calcined clay based ( <i>third revision</i> )		
5913 : 1989	Method of tests for asbestos cement products ( <i>first revision</i> )	13000 : 1991	Silica asbestos cement flat sheets
7639 : 1975	Methods of sampling of asbestos cement products		
8041 : 1978	Rapid hardening Portland cement ( <i>second revision</i> )		

## ANNEX B

( Foreword )

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