भारतीय मानक

एसबेस्टॉस सीमेंट के भवन निर्माण पाइप तथा पाइप फिटिंग, गटर तथा गटर फिटिंग तथा छत निर्माण फिटिंग — विशिष्टि

भाग 3 छत निर्माण फिटिंग

(दूसरा पुनरीक्षण)

Indian Standard

ASBESTOS CEMENT BUILDING TYPES AND PIPE FITTINGS, GUTTER AND GUTTER FITTINGS AND ROOFING FITTINGS — SPECIFICATION

PART 3 ROOFING FITTINGS

(Second Revision)

First Reprint NOVEMBER 1996

UDC 692·4 : 666·961 : 696·121

BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

September 1994

Price Group 6

FOREWORD

This Indian Standard (Part 3) (Second 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.

Asbestos cement roofing fittings are used extensively in conjunction with asbestos cement corrugated and semi-corrugated sheet conforming to IS 459 : 1992 'Specification for unreinforced corrugated and semi-corrugated asbestos cement sheets (*third revision*)'.

This standard was first published in 1960 and subsequently revised in 1981. In the first revision the standard was split into three parts for ease in the use of the standard. Part 1 of this standard covers building pipes and pipe fittings, Part 2 covers gutters and gutter fittings and Part 3 covers roofing fittings.

This part (Part 3) has been prepared to provide guidelines in the manufacture and use of standard asbestos cement roofing fittings used in conjunction with asbestos cement sheets conforming to IS 459 : 1992. Methods of fixing of these fittings are dealt with in IS 3007 (Part 1) : 1964 'Code of practice for laying of asbestos cement sheets: Part 1 Corrugated sheets' and IS 3007) Part 2) : 1965 'Code of practice for laying of asbestos cement sheets: Part 2 Semi-corrugated' (both *under revision*).

The present revision has been taken up in the light of experience gained in its use and also with a view to bringing it in line with current practices in the manufacture of asbestos cement roofing fittings. In this revision water absorption test and acid resistance test have been deleted. In this revision tolerances on dimensions and sampling clause have also been modified and some new fittings have been incorporated.

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

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 BUILDING PIPES AND PIPE FITTINGS, GUTTERS AND GUTTER FITTINGS AND ROOFING FITTINGS — SPECIFICATION

PART 3 ROOFING FITTINGS

(Second Revision)

1 SCOPE

1.1 This standard (Part 3) covers the requirements of asbestos cement roofing fittings, to be used in conjunction with corrugated and semi-corrugated asbestos cement sheets conforming to IS 459 : 1992.

1.2 The following roofing fittings are covered in this standard:

a) Ridges:
   1) Serrated adjustable ridges,
   2) Plain wing adjustable ridges,
   3) One piece plain angular ridges,
   4) Unserrated adjustable ridges for hips,
   5) Close fitting adjustable ridges, and
   6) Northlight adjustable ridges.
b) Eaves filler pieces,
c) Ridge finials,
d) Apron pieces,
e) Barge boards or corner pieces, curved barge boards,
f) Rooflights,
g) North light curves or ventilator curves,
h) Cowl type ventilators,
j) Expansion joints for semi-corrugated sheets and fittings like ridges and northlight curve,
k) Louvres, *S* type,
m) Radial exhaust, and
n) Curved sheets.

2 REFERENCES

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

3 COMPOSITION

The material used in the manufacture of asbestos cement roofing fittings shall be composed of an inert aggregate consisting of clean asbestos fibre including suitable other fibres cemented together by ordinary Portland cement conforming to IS 269 : 1989 or IS 8112 : 1989 or IS 12269 : 1987 or Portland slag cement conforming to IS 455 : 1989 or Portland pozzolana cement conforming to IS 1489 (Part 1) : 1991 or IS 1489 (Part 2) : 1991 or rapid hardening Portland cement conforming to IS 8041 : 1990. Pozzolanic material fillers and pigments 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 roofing fittings may be left in their natural colour or colouring matter may be added in the composition. They may receive coloured or uncoloured coatings on their surface. Pigments which are embodied in asbestos cement for colouring purposes 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 SHAPE, DIMENSIONS AND TOLERANCES

5.1 Shapes

The shapes of the various fittings shall be as detailed in Table 1 read with appropriate figures.

5.2 Dimensions

Dimensions of various fittings shall be declared by the manufacturer.

5.3 Tolerances

5.3.1 *Tolerance on Length and Thickness*

The linear dimensions of fittings shall not vary by more than ± 10 mm.

5.3.2 *Tolerance on Thickness*

Thickness of fittings shall not vary by more than + free, — 1·0 mm.

NOTE — For the purpose of measuring thickness, a thickness gauge having an anvil of not less than 9 mm diameter may be used.

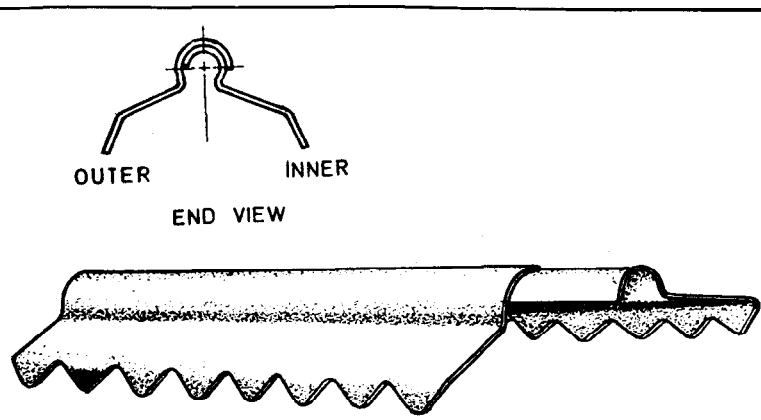
Table 1 Details of Figures for Asbestos Cement Roofing Fittings

(*Clauses* 5.1 *and* 10.1)

Sl No.	Name of Fitting	Code No.	Figure No.
	a) For Use with Fully Corrugated Sheets		
1.	Corrugated serrated adjustable ridges	C1[2]	1
2.	Plain wing adjustable ridge[1]	C2[2]	2
3.	One piece plain angular ridge[1]	C3[1]	3
4.	Unserrated adjustable ridge for hips[1]	C4[2]	4
5.	Corrugated eaves filler piece	C5	5
6.	Corrugated apron piece	C6	6
7.	Barge board or corner piece[1]	C7	7
8.	Corrugated roof light	C8	8
9.	Corrugated north light curve	C9	9
10.	'*S*' type louvre[1]	C10	10
11.	Corrugated cowl type ventilator	C11	11
12.	Corrugated close fitting adjustable ridge	C12[2]	12
13.	North light adjustable ridge	C13[2]	13
14.	Curved barge board[1]	C14	14
15.	Radial exhaust	C15	15
16.	Curved sheet	C16	16
	b) For Use with Semi-Corrugated Sheets		
17.	Semi-corrugated serrated adjustable ridge	SC1[2]	17
18.	Semi-corrugated eaves filler piece	SC2	18
19.	Semi-corrugated ridge finials	SC3	19
20.	Semi-corrugated apron piece	SC4	20
21.	Semi-corrugated roof light	SC5	21
22.	Semi-corrugated north light curve	SC6	22
23.	Expansion joint for semi-corrugated sheets	SC7	23
24.	Semi-corrugated cowl type ventilator	SC8	24
25.	Expansion joint for semi-corrugated north light or ventilator curve	SC9	25
26.	Expansion joint for semi-corrugated serrated ridge	SC10	26
27.	Semi-corrugated ventilator curve	SC11	27
28.	Ridge finials	SC12	28

[1]These items are also used with semi-corrugated sheets.

[2]These items are generally supplied in pairs (inner and outer).



NOTE — Serrations to suit corrugated sheets conforming to IS 459 : 1992.

FIG. 1 CORRUGATED SERRATED ADJUSTABLE RIDGES

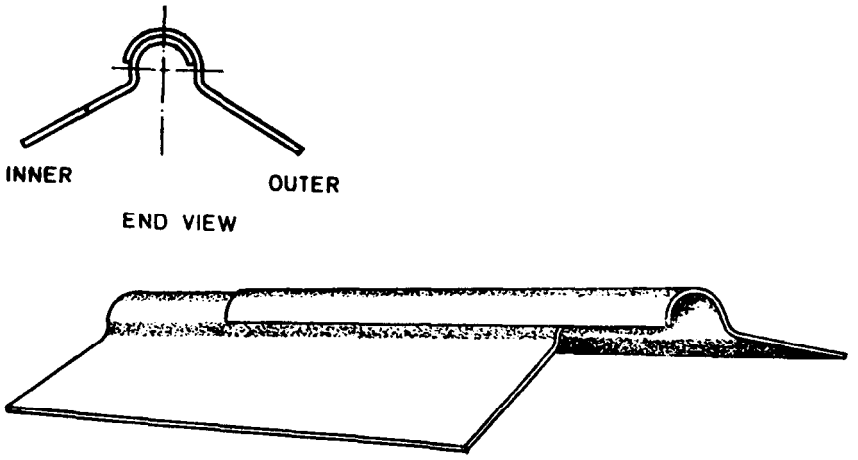


FIG. 2 PLAIN WING ADJUSTABLE RIDGE

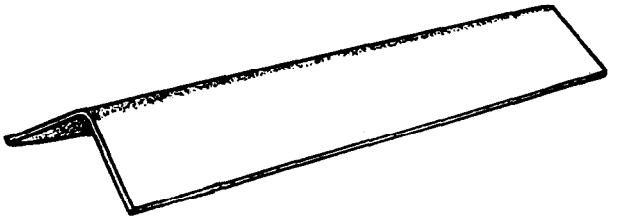
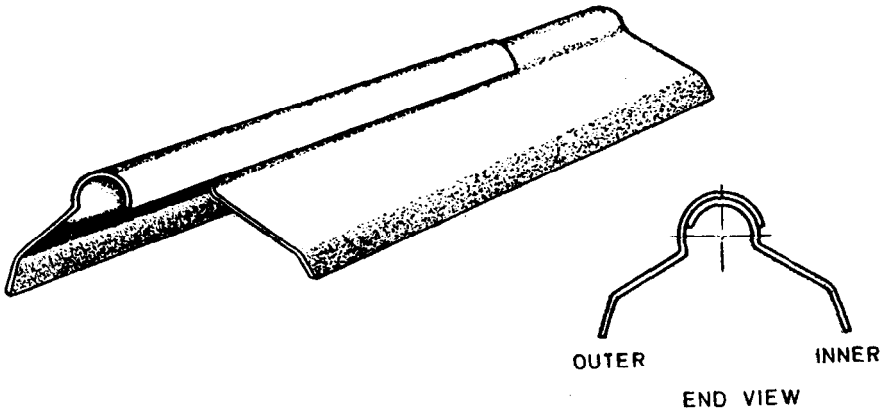
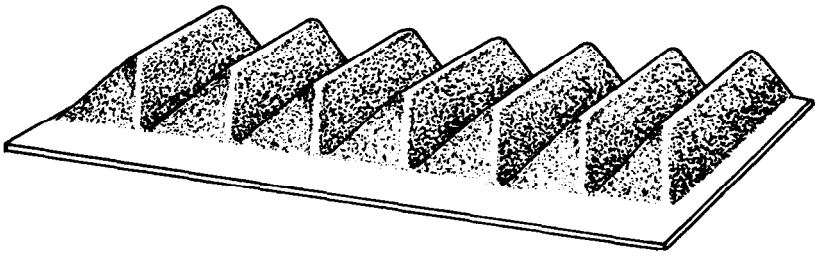


FIG. 3 ONE PIECE PLAIN ANGULAR RIDGE



NOTE — Serrations, as desired, should be cut at site to fit corrugations at hip slopes.

FIG. 4 UNSERRATED ADJUSTABLE RIDGE FOR HIPS



NOTE — Profile to suit corrugated sheets as per IS 459 : 1992.

FIG. 5 CORRUGATED EAVES FILLER PIECE

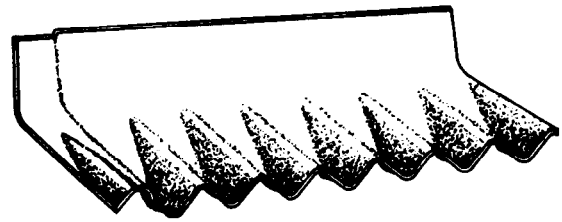


FIG. 6 CORRUGATED APRON PIECE

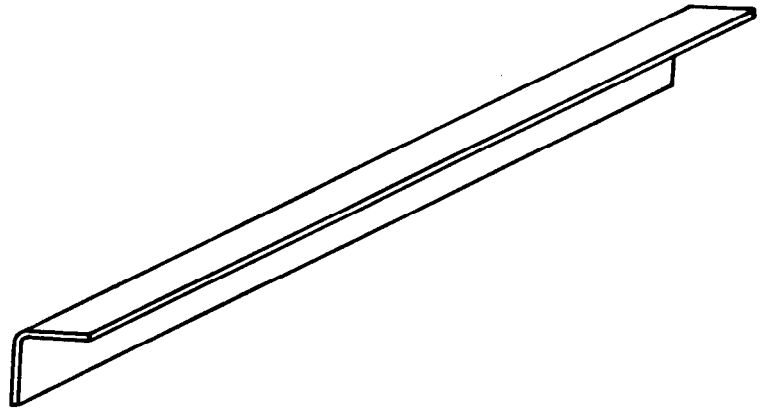


FIG. 7 BARGE BOARD OR CORNER PIECE

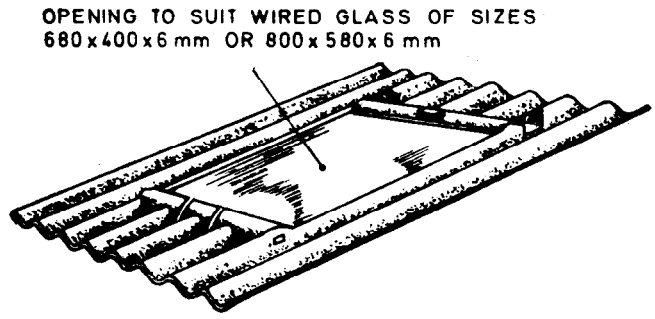


FIG. 8 SEMI-CORRUGATED ROOF LIGHT

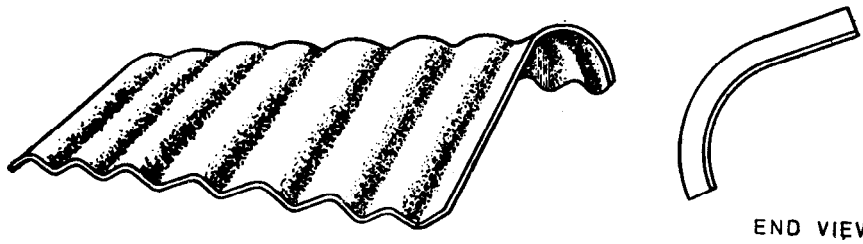


FIG. 9 CORRUGATED NORTH LIGHT CURVES

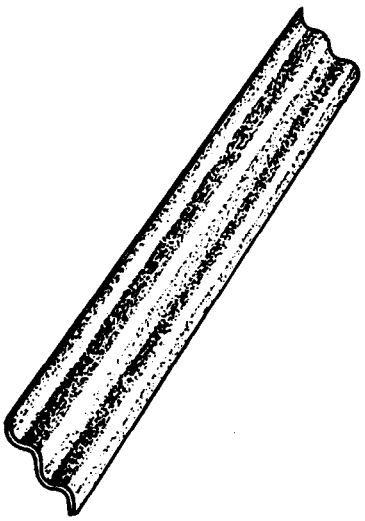


FIG. 10 'S' TYPE LOUVRE

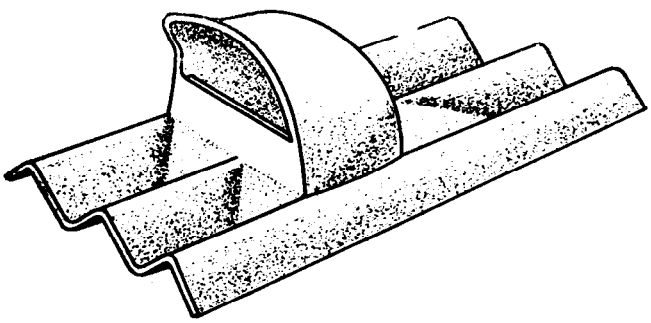


FIG. 11 CORRUGATED COWL TYPE VENTILATOR

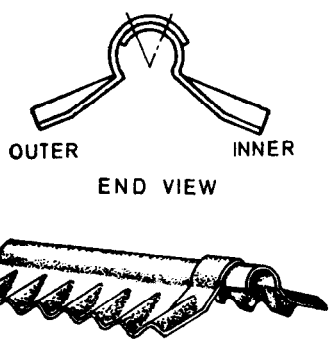


FIG. 12 CORRUGATED CLOSE FITTING ADJUSTABLE RIDGE

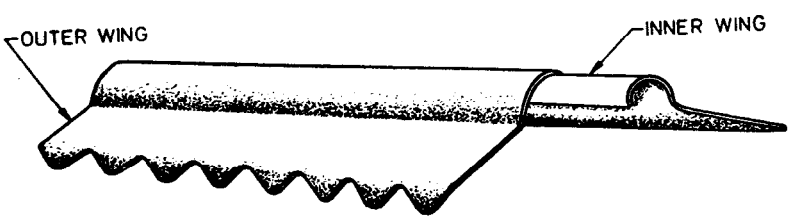
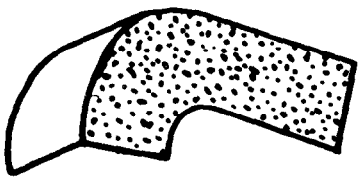


FIG. 13 TYPICAL NORTH LIGHT TWO-PIECE ADJUSTABLE RIDGE



CURVED BARGE BOARDS
FOR NORTHLIGHT CURVES
LEFT HAND
RIGHT HAND

FIG. 14 CURVED BARGE BOARD

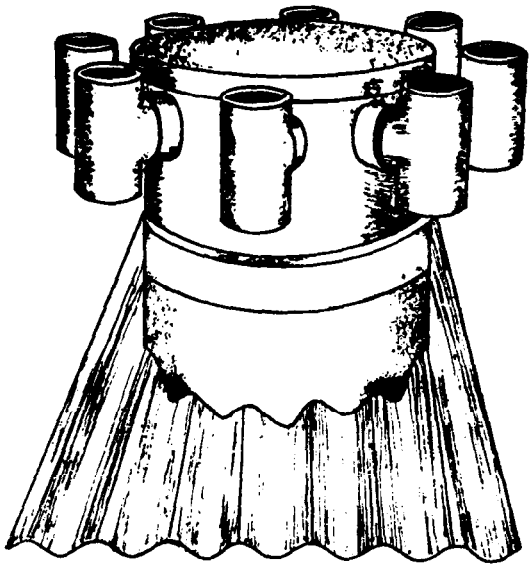


FIG. 15 RADIAL EXHAUST

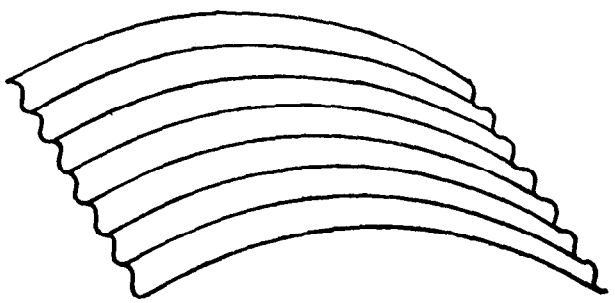
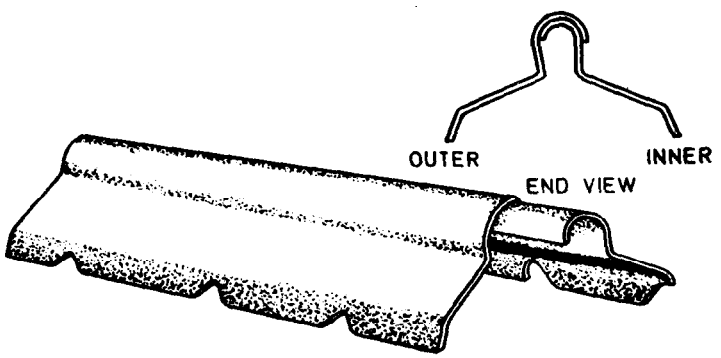


FIG. 16 CURVED SHEET



NOTE — Serrations to suit semi-corrugated sheets conforming to IS 459 : 1992.

FIG. 17 SEMI-CORRUGATED SERRATED ADJUSTABLE RIDGE

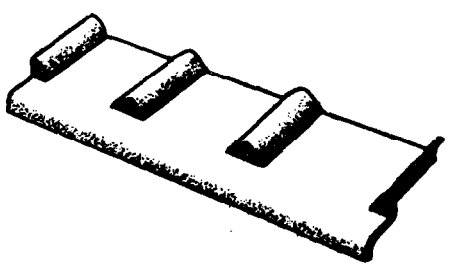


FIG. 18 SEMI-CORRUGATED EAVES FILLER PIECE

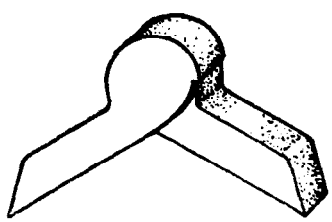


FIG. 19 SEMI-CORRUGATED RIDGE FINIALS

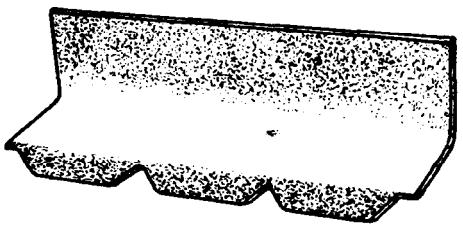
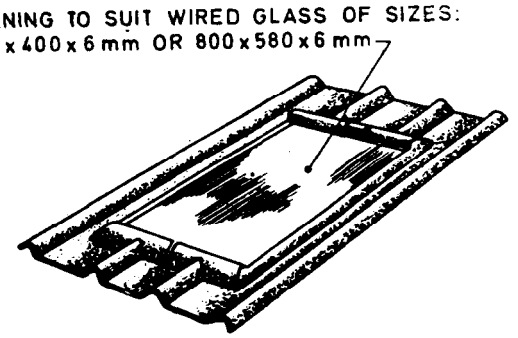
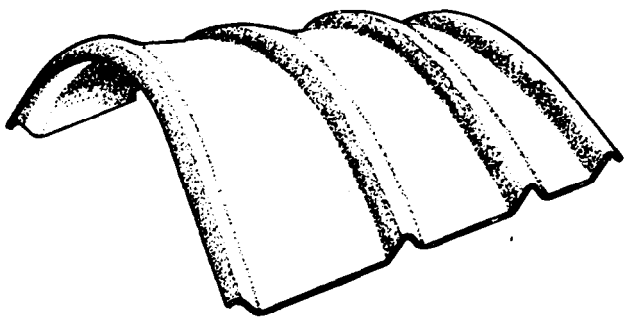


FIG. 20 SEMI-CORRUGATED APRON PIECES



NOTE -- The word 'Top' may be engraved to point towards the ridge.

FIG. 21 CORRUGATED ROOF LIGHT



END VIEW

FIG. 22 SEMI-CORRUGATED NORTH LIGHT CURVE

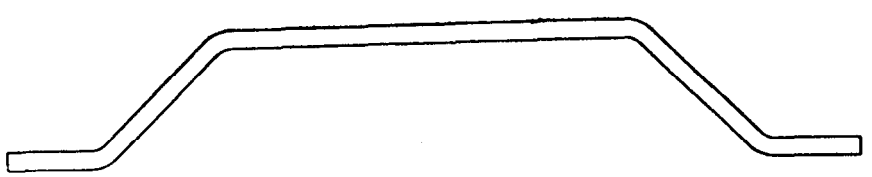


FIG. 23 EXPANSION JOINT FOR SEMI-CORRUGATED SHEETS

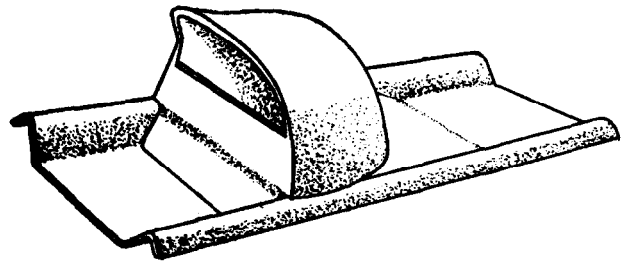


FIG. 24 SEMI-CORRUGATED COWL TYPE VENTILATOR

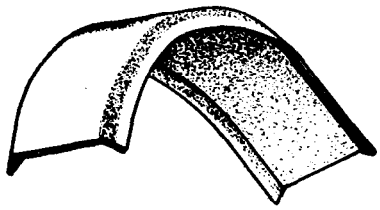


FIG. 25 EXPANSION JOINT FOR SEMI-CORRUGATED NORTH LIGHT CURVE OR VENTILATOR CURVE

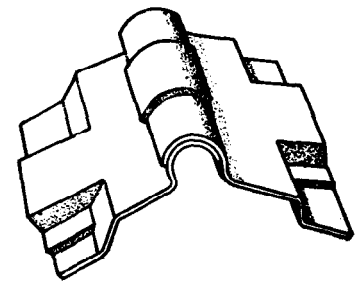


FIG. 26 EXPANSION JOINT FOR SEMI-CORRUGATED SERRATED RIDGE

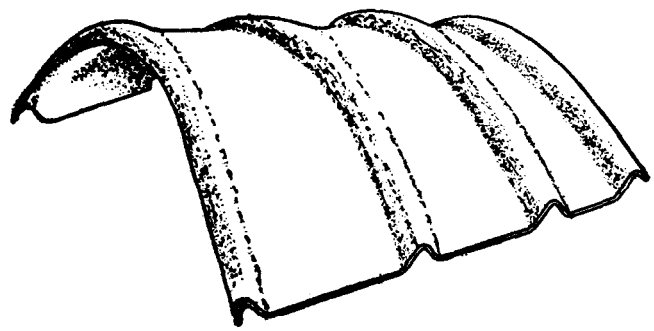


FIG. 27 SEMI-CORRUGATED VENTILATOR CURVE

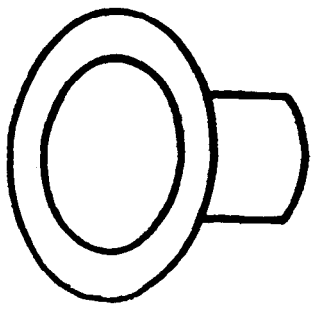


FIG. 28 RIDGE FINIAL

6 PHYSICAL REQUIREMENTS

6.1 All the finished products shall be inspected for freedom from visual defects.

6.2 When tested for impermeability as per the Method 1 described in IS 5913 : 1989, the specimens shall not show during 24 hours of test any formation of drops of water, except traces of moisture on the lower surface. This test on roofing fittings may be done at any suitable place on the fittings without cutting any separate test piece.

6.3 The manufacturer shall ensure that the roofing fittings reasonably match with the roofing sheets intended to be fitted.

7 GENERAL APPEARANCE AND FINISH

The surface of fittings intended to be exposed to the weather shall be generally of smooth finish and the finish should permit any minor

variation of the surface appearance due to the method of manufacture, which does not impair the performance of the fittings.

The fittings shall be clean with straight and regular edges.

8 SAMPLING AND NUMBER OF TESTS

8.1 Scale of Sampling

8.1.1 *Lot*

In any consignment, all the fittings of the same type and of the same thickness and manufactured under similar conditions of production shall be grouped together to constitute a lot.

8.1.1.1 The conformity of a lot to the requirements of this specification shall be ascertained on the basis of tests on the fittings selected from it.

8.1.1.2 The number of fitting to be selected at random from the lot shall be in accordance with Table 2.

Table 2 Sample Size

Lot Size	Sample Size
(1)	(2)
Up to 500	3
501 to 1 000	5
1 001 to 1 500	7
1 501 and above	10

8.2 Number of Tests

All the fittings selected as in **8.1.1.2** shall be examined for visual defects and impermeability.

9 MANUFACTURER'S CERTIFICATE

The manufacturer shall satisfy himself that his asbestos cement roofing fittings conform to the requirements of this standard, and if required, shall furnish a certificate to this effect to the purchaser or his representative.

10 MARKING

10.1 Each item shall be stamped or marked by any suitable method with the following information:

a) Indication of the source of manufacture,

b) Code No. according to Table 1,

c) Date of manufacture, and

d) Pictorial warning signs as given in IS 12081 (Part 2) : 1987.

10.2 BIS Certification Marking

Each fitting may also be marked with the Standard Mark.

10.2.1 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 the licence for the use of Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

11 SAFETY RULES SHEET

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

ANNEX A

(*Clause* 2)

LIST OF REFERRED INDIAN STANDARDS

IS No.	*Title*
269 : 1989	33 Grade ordinary Portland cement (*fourth revision*)
455 : 1989	Portland slag cement (*fourth revision*)
459 : 1992	Corrugated and semi-corrugated asbestos cement sheets (*third revision*)
1489 (Part 1) : 1991	Portland pozzolana cement: Part 1 Fly ash based (*third revision*)
1489 (Part 2) : 1991	Portland pozzolana cement : Part 2 Calcined clay based (*third revision*)
5913 : 1989	Methods of tests for asbestos cement products (*first revision*)
8041 : 1990	Rapid hardening Portland cement (*second revision*)
8112 : 1989	43 Grade ordinary Portland cement (*first revision*)
11769 (Part 1) : 1987	Guidelines for safe use of products containing asbestos: Part 1 Asbestos cement products
12081 (Part 2) : 1987	Recommendations for pictorial warning signs and precautionary notices for asbestos and products containing asbestos : Part 2 Asbestos and its products
12269 : 1987	53 Grade ordinary Portland cement

ANNEX B
(*Foreword*)

COMMITTEE COMPOSITION

Cement and Concrete Sectional Committee, CED 2

Chairman

DR H. C. VISVESVARAYA
University of Roorkee, Roorkee 247 667

Members	*Representing*
SHRI H. BHATTACHARYA	Orissa Cement Limited, New Delhi
SHRI G. R. BHARTIKAR	B. G. Shirke and Co, Pune
SHRI U. N. RATH (*Alternate*)	
DR A. K. CHATTERJEE	The Associated Cement Companies Ltd, Bombay
SHRI S. H. SUBRAMANIAN (*Alternate*)	
CHIEF ENGINEER (DESIGN)	Central Public Works Department, New Delhi
SUPERINTENDING ENGINEER (S&S) (*Alternate*)	
CHIEF ENGINEER, NAVAGAM DAM	Sardar Sarovar Narmada Nigam Ltd, Gandhinagar
SUPERINTENDING ENGINEER, QCC (*Alternate*)	
CHIEF ENGINEER (RESEARCH-CUM-DIRECTOR)	Irrigation and Power Research Institute, Amritsar
RESEARCH OFFICER (CONCRETE TECHNOLOGY) (*Alternate*)	
DEPUTY DIRECTOR (I)	National Buildings Organization, New Delhi
ASSISTANT DIRECTOR (EH) (*Alternate*)	
DIRECTOR	A. P. Engineering Research Laboratories, Hyderabad
JOINT DIRECTOR (*Alternate*)	
DIRECTOR (CMDD) (N&W)	Central Water Commission, New Delhi
DEPUTY DIRECTOR (CMDD) (NW&S) (*Alternate*)	
SHRI K. H. GANGWAL	Hyderabad Industries Ltd, Hyderabad
SHRI V. PATTABHI (*Alternate*)	
SHRI V. K. GHANEKAR	Structural Engineering Research Centre (CSIR), Ghaziabad
SHRI S. GOPINATH	The India Cements Ltd, Madras
SHRI R. TAMILAKARAN (*Alternate*)	
SHRI S. K. GUHA THAKURTA	Gannon Dunkerley and Co Ltd, Bombay
SHRI S. P. SANKARANARAYANAN (*Alternate*)	
DR IRSHAD MASOOD	Central Building Research Institute (CSIR), Roorkee
DR MOHAMMAD KHALID (*Alternate*)	
SHRI N. C. JAIN	Cement Corporation of India, New Delhi
DR S. P. GHOSH (*Alternate*)	
JOINT DIRECTOR STANDARDS (B&S) (CB-I)	Research, Designs and Standards Organization (Ministry of Railways), Lucknow
JOINT DIRECTOR STANDARDS (B&S) (CB-II) (*Alternate*)	
SHRI N. G. JOSHI	Indian Hume Pipes Co Ltd, Bombay
SHRI P. D. KELKAR (*Alternate*)	
SHRI D. K. KANUNGO	National Test House, Calcutta
SHRI B. R. MEENA (*Alternate*)	
SHRI P. KRISHNAMURTHY	Larsen and Toubro Limited, Bombay
SHRI S. CHAKRAVARTHY (*Alternate* I)	
SHRI C. REDDY (*Alternate* II)	
DR A. G. MADHAVA RAO	Structural Engineering Research Centre (CSIR), Madras
SHRI K. MANI (*Alternate*)	
SHRI G. K. MAJUMDAR	Hospital Services Consultancy Corporation (India) Ltd, New Delhi
SHRI S. O. RANGARI (*Alternate*)	
SHRI M. K. MUKHERJEE	Ministry of Transport, Department of Surface Transport (Roads Wing), New Delhi
SHRI M. K. GHOSH (*Alternate*)	
MEMBER SECRETARY	Central Board of Irrigation and Power, New Delhi
DIRECTOR (CIVIL) (*Alternate*)	
SHRI NIRMAL SINGH	Development Commissioner for Cement Industry Ministry of Industry), New Delhi
SHRI S. S. MIGLANI (*Alternate*)	
SHRI R. C. PARATE	Engineer-in-Chief's Branch, Army Headquarters, New Delhi
COL R. K. SINGH (*Alternate*)	
SHRI Y. R. PHULL	Central Road Research Institute (CSIR), New Delhi
SHRI S. S. SEEHRA (*Alternate*)	
SHRI Y. R. PHULL	Indian Roads Congress, New Delhi
SHRI N. K. SINHA (*Alternate*)	
DR C. RAJKUMAR	National Council for Cement and Building Materials, New Delhi
DR S. C. AHLUWALIA (*Alternate*)	
SHRI G. RAMDAS	Directorate General of Supplies and Disposals, New Delhi
SHRI R. C. SHARMA (*Alternate*)	

(*Continued on page* 11)

(*Continued from page* 10)

Members	*Representing*
SHRI S. A. REDDI	Gammon India Ltd, Bombay
SHRI N. PRABHAKAR (*Alternate*)	
REPRESENTATIVE	Builder's Association of India, Bombay
SHRI J. S. SANGANERIA	Geological Survey of India, Calcutta
SHRI L. N. AGARWAL (*Alternate*)	
SHRI S. B. SURI	Central Soil and Materials Research Station, New Delhi
SHRI N. CHANDRASEKARAN (*Alternate*)	
SUPERINTENDING ENGINEER (DESIGN)	Public Works Department, Government of Tamil Nadu, Madras
EXECUTIVE ENGINEER (S. M. R. DIVISION) (*Alternate*)	
SHRI TARWINDER SINGH	Hindustan Prefab Ltd, New Delhi
SHRI ALOK AGGARWAL (*Alternate*)	
DR H. C. VISVESVARAYA	The Institution of Engineers (India), Calcutta
SHRI D. C. CHATTURVEDI (*Alternate*)	
SHRI Y. R. TANEJA, Director (Civ Engg)	Director General, BIS (*Ex-officio Member*)

Secretary

SHRI J. K. PRASAD
Joint Director (Civ Engg), BIS

Fibre Reinforced Cement Products Subcommittee, CED 2 : 3

Convener	
DR C. RAJKUMAR	National Council for Cement and Building Materials, New Delhi
Members	
SHRI S. K. BENERJEE	National Test House, Calcutta
SHRI N. G. BASAK	Directorate General of Technical Development, New Delhi
SHRI P. K. JAIN (*Alternate*)	
SHRI S. N. BASU	Directorate General of Supplies and Disposals, New Delhi
SHRI T. N. UBOVEJA (*Alternate*)	
SHRI S. GANAPATHY	Ramco Industries Limited, Madras
SHRI K. P. GOENKA	Sarbamangala Industries, Calcutta
SHRI I. P. GOENKA (*Alternate*)	
SHRI MOTWANI GURBUX	All India Small Scale A. C. Pressure Pipe Manufacturer's Association, Hyderabad
SHRI H. R. OZA (*Alternate*)	
SHRI SRINIVASAN N. IYER	Eternit Everest Limited, Bombay
DR V. G. UPADHYAYA (*Alternate*)	
JOINT DIRECTOR STANDARDS (B&S)	Research Design and Standards Organization, Lucknow
JOINT DIRECTOR STANDARDS (B&S) (*Alternate*)	
DR KALYAN DAS	Central Building Research Institute (CSIR), Roorkee
SHRI P. S. KALANI	Kalani Asbestos Cement Pvt Ltd, Indore
SHRI T. S. SUMMI (*Alternate*)	
LT-COL KAMLESH PRAKASH	Engineer-in-Chief's Branch, Army Headquarters
LT-COL A. K. BANGIA (*Alternate*)	
SHRI A. K. LAL	National Buildings Organization, New Delhi
SHRI A. G. DHONGADE (*Alternate*)	
SHRI P. N. MEHTA	Geological Survey of India, Calcutta
SHRI V. K. KASLIWAL (*Alternate*)	
SHRI V. PATTABHI	The Hyderabad Industries Limited, Hyderabad
SHRI A. K. GUPTA (*Alternate*)	
SHRI S. PRAKASH	Municipal Corporation, Delhi
DR N. RAGHAVENDRA	National Council for Cement and Building Materials, New Delhi
SHRI RAJ KUMAR	Development Commissioner, Small Scale Industries, New Delhi
SHRI S. C. KUMAR (*Alternate*)	
REPRESENTATIVE	Indian Institute of Science, Bangalore
SHRI S. B. SURI	Central Soil and Materials Research Station, New Delhi
SHRI N. CHANDRASEKARAN (*Alternate*)	
SUPERINTENDING SURVEYOR OF WORKS (CZ)	Central Public Works Department, New Delhi
SURVEYOR OF WORKS (*Alternate*)	
SHRI U. N. VENKATESH	Shree Digvijay Cement Company Limited, Bombay
SHRI K. S. RAMAKRISHNAN (*Alternate*)	

Bureau of Indian Standards

BIS is a statutory institution established under the *Bureau of Indian Standards Act, 1986* to promote harmonious development of the activities of standardization, marking and quality certification of goods and attending to connected matters in the country.

Review of Indian Standards

Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the latest issue of 'BIS Handbook' and 'Standards Monthly Additions'.

This Indian Standard has been developed from Doc : No. **CED 2 (4925).**

Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

BUREAU OF INDIAN STANDARDS

Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110002
Telephones : 323 01 31, 323 83 75, 323 94 02

Telegrams : Manaksanstha
(Common to all offices)

Regional Offices :		Telephone
Central	: Manak Bhavan, 9 Bahadur Shah Zafar Marg NEW DELHI 110002	323 76 17 323 38 41
Eastern	: 1/14 C. I.T. Scheme VII M, V. I. P. Road, Maniktola CALCUTTA 700054	337 84 99, 337 85 61 337 86 26, 337 91 20
Northern	: SCO 335-336, Sector 34-A, CHANDIGARH 160022	60 38 43 60 20 25
Southern	: C. I. T. Campus, IV Cross Road, MADRAS 600113	235 02 16, 235 04 42 235 15 19, 235 23 15
Western	: Manakalaya, E9 MIDC, Marol, Andheri (East) MUMBAI 400093	832 92 95, 832 78 58 832 78 91, 832 78 92

Branches : AHMADABAD. BANGALORE. BHOPAL. BHUBANESHWAR. COIMBATORE. FARIDABAD. GHAZIABAD. GUWAHATI. HYDERABAD. JAIPUR. KANPUR. LUCKNOW. PATNA. THIRUVANANTHAPURAM.

Printed at Dee Kay Printers, New Delhi-110015, India.