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भाग 2 अर्द्ध-नालीदार चादरें

(पहला पुनरीक्षण)

Indian Standard

LAYING OF ASBESTOS CEMENT SHEETS —
CODE OF PRACTICE

PART 2 SEMI-CORRUGATED SHEETS

(*First Revision*)

ICS 91.100.40

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BUREAU OF INDIAN STANDARDS
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FOREWORD

This Indian Standard (Part 2) (First Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Cement Matrix Products Sectional Committee had been approved by the Civil Engineering Division Council.

Semi-corrugated asbestos cement sheets are commonly used in this country for providing structural surfaces exposed to weather, such as roofs of industrial, institutional, commercial and residential buildings. Covering of asbestos cement corrugated sheets have many advantages, such as lightness, ease and quickness of construction and durability but to realize full advantages from this type of covering, proper selection of various accessories and good workmanship are essential. This code is intended to give guidance in the selection of materials and laying of asbestos cement corrugated sheets for obtaining satisfactory performance.

This standard has been published in two parts. Part 1 covers laying of corrugated sheets and Part 2 covers laying of semi-corrugated sheets conforming to IS 459 : 1992 'Specification for unreinforced corrugated and semi-corrugated asbestos cement sheets (*third revision*)'.

This standard was originally published in 1964. This is the first revision of the standard which has been done in the light of experience gained in its use over the years. In this revision storage and handling have been elaborated and new clauses on shade protection and recommended work practice in sawing and drilling of sheet have been added. The unit used in the standard is SI Units.

In the formulation of this standard due weightage has been given to the need for international co-ordination among standards prevailing in different parts of the world. Guidance has been taken from:

BS 5247 (Part 14) : 1975 Code of practice for sheet roof and wall coverings

ISO 8108 : 1986 Directives for fixing asbestos cement corrugated asymmetrical section sheets and fittings for roofing

IS 11769 (Part 1) : 1987 Guidelines for safe use of products containing asbestos: Part 1 Asbestos cement products

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

*Indian Standard***LAYING OF ASBESTOS CEMENT SHEETS —
CODE OF PRACTICE****PART 2 SEMI-CORRUGATED SHEETS***(First Revision)***1 SCOPE**

This standard (Part 2) lays down the method of laying and fixing unreinforced semi-corrugated asbestos cement sheets and roofing accessories used as covering for roofs and walls.

2 REFERENCES

The Indian Standards listed in Annex A 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 these standards are encouraged to investigate the possibility of applying the most recent editions of the standards indicated in Annex A.

3 TERMINOLOGY

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

3.1 Abutment

Sloping intersection of a roof surface with a part of the structure which rises above it.

3.2 Accessories

Purpose-made fittings, such as ridge cappings, north light curves, ridge finials, apron flashing pieces, eaves filler pieces, barge boards, expansion pieces, ventilators, skylights and similar fittings, with which the roof is furnished.

3.3 Apron Flashing Piece

Flashing, the lower edge of which is lapped over the roof covering.

3.4 Asbestos Building Board

Asbestos cement flat panel used for interior work, that is, ceiling, partition etc, with a good workability and flexibility.

3.5 Asbestos Cement

A material composed of asbestos fibre and Portland cement.

3.6 Eaves

The lower edge of an inclined roof.

3.7 Eaves Filler or Closure Piece

Asbestos cement accessory used to fill or close the corrugation spaces under the roof sheeting at the eaves.

3.8 Finial or Ridge End

Asbestos cement accessory to form water-proof covering at the end of a ridge.

3.9 Gable

Part of a wall above the general eaves level at the end of a ridged or partially hipped roof.

3.10 Gutter

Any form of roof-water channel.

3.11 Hip

Raking salient angle formed by the intersection of two inclined roof surfaces.

3.12 Hip Ridge or Capping

Asbestos cement accessory used to form water-proof covering to a hip.

3.13 Mitre

Cutting the joining edges of two sheets at an angle.

3.14 Pitch

Angle of inclination with the horizontal of the rafters or substructure surface on which the roof covering is laid.

3.15 Ridge

Line of intersection of two inclined roof surfaces at the apex of a roof.

3.16 Ridge Capping

Asbestos cement accessory to form a water-proof covering to a ridge.

3.17 Valley

Re-entrant racking angle formed by the intersection of two inclined roof surfaces.

3.18 Verge

Free edge of a roof surface finishing at a gable.

4 NECESSARY INFORMATION

4.1 For the efficient planning and execution of the work, detailed information with regard to the following is necessary:

- a) Roof area to be covered;
- b) Details of sub-structure of roof;
- c) Pitch of the roof;
- d) Location and size of openings and details of roofing accessories to be fixed;
- e) Sizes of sheets to be used;
- f) Type, dimensions and spacing of purlins;
- g) Height of the building, to the eaves; and
- h) The end and side laps to which the sheets are to be laid.

4.2 All the information stated in 4.1 shall be made available by the appropriate authority responsible for the construction of the whole building to those who are entrusted with the work of laying roof sheeting before the work is started. Necessary drawings and instructions for preparatory work shall also be given, where required.

4.3 Arrangements shall also be made for the proper exchange of information between those engaged in laying the roof covering and all other whose work will be effected.

5 MATERIAL

5.1 Asbestos Cement Sheets

Asbestos cement sheets shall conform to IS 459.

5.2 Asbestos Cement Building Boards

Asbestos cement building boards where required, shall conform to IS 2098.

5.3 Fixing Accessories

Fixing accessories, such as J-bolts, L-bolts, roof washers, etc, shall conform to IS 730.

5.3.1 Coach screws shall conform to IS 1120.

6 DESIGN CONSIDERATIONS

6.1 In order to secure a sound and permanent roof with maximum economy, the requirements specified

in 6.1.1 to 6.1.5 shall be followed.

6.1.1 Roof Plan

The roof plan shall be as simple as possible. Formation of hips and valleys should be avoided, as far as possible. Isolated projections above roof should, as far as possible, be avoided at the design stage itself, as it is difficult to make the junctions between such projections and the roof sheeting weatherproof.

6.1.2 Pitch of the Roof

The pitch of roofs shall, wherever possible, be preferably not less than 18°. Should it, however, be found desirable to adopt roofs with a pitch less than 18°, the values prescribed in 6.1.6 for the end laps between adjacent sheets shall be correspondingly increased and/or the joints suitably sealed in accordance with the manufacturer's recommendations or the instructions of the engineer-in-charge.

6.1.3 Purlins

All purlins shall be in one plane and shall be properly anchored to the supporting structure.

6.1.3.1 Spacing of purlins

The spacing of purlins shall be arranged to suit the standard lengths of sheets but shall not exceed the following:

Thickness of Sheets	Distance Between Purlin Centres	
	For Roof Covering	For Side Cladding
mm	m	m
6	1.4	1.7

6.1.3.2 Ridge purlins shall be fixed 75 mm to 115 mm from the apex of the roof, that is, to hold the bolt point.

6.1.4 Additional trimmers or bridging shall be used between purlins at all points where considerable roof traffic is likely to occur, for example, adjoining valley or box gutters, below glazing and around chimneys, ventilators or other uptakes. This should be done on new roofs and when recovering or repairing existing roofs. Similarly, when a course of sheets of smaller length necessitating closer purlin spacing is required to make up a roof slope, it is desirable to arrange the closer purlin spacing at eaves rather than at ridges, as this will bring additional support where it is most required.

6.1.5 Hip and valley runners should be provided, fixed flush with the top face of purlins and spanning between them, to give adequate support to the

taking cut edges of roof sheets at hips and valleys. The runners should run parallel to the edge of the sheeting and placed so as to permit the fixing of the sheets and hip covering accessories.

6.1.6 Laps

The sheets shall be laid with a side lap of one corrugation, the left hand corrugation of each sheet being covered by the right-hand corrugation of the next sheet (*see* Fig. 1). For normal roof pitch (that is, inclinations greater than or equal to 1°), the end laps (*see* Fig. 2) in sheets shall not be less than 150 mm. For low roof pitches (that is, inclinations less than 18°) or for normal pitched roof in exposed position, the end laps shall be increased and it is desirable to consult the manufacturers in such cases. The side laps shall as far as possible be sheltered from the prevailing wind direction. The free overhang at eaves measured as the length of sheet from its lower edge to the centre of bolt holes shall not be more than 300 mm.

6.1.6.1 Wherever four corners of sheets overlap, two of them shall be mitred in the manner described in 6.3.4 and 6.3.5, in order to secure a perfect fit.

6.1.7 On large roofs where there is likely to be some movement of the structure due to the variations in climatic conditions, it is important that expansion joints should be used in association with the sheets to permit any such movement being taken up. On long stretches of roof, an expansion joint should be provided at definite intervals recommended for each particular class of roof (*see* Fig. 3, 4 and 5).

6.1.7.1 The spacing for expansion joints shall not be greater than 35 m. The end lap of expansion joint should be not less than 150 mm. If expansion joints lap between purlins they should be stitched by seam-bolts.

7 STORAGE AT SITE

7.1 All asbestos cement units shall be protected from damage while stored on site. They shall be carefully

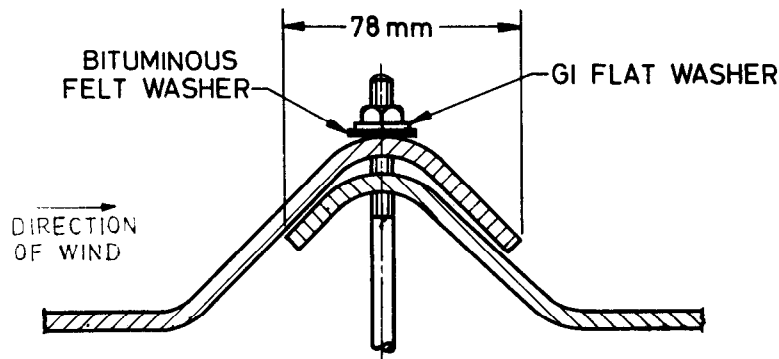


FIG. 1 DETAIL OF SIDE LAP

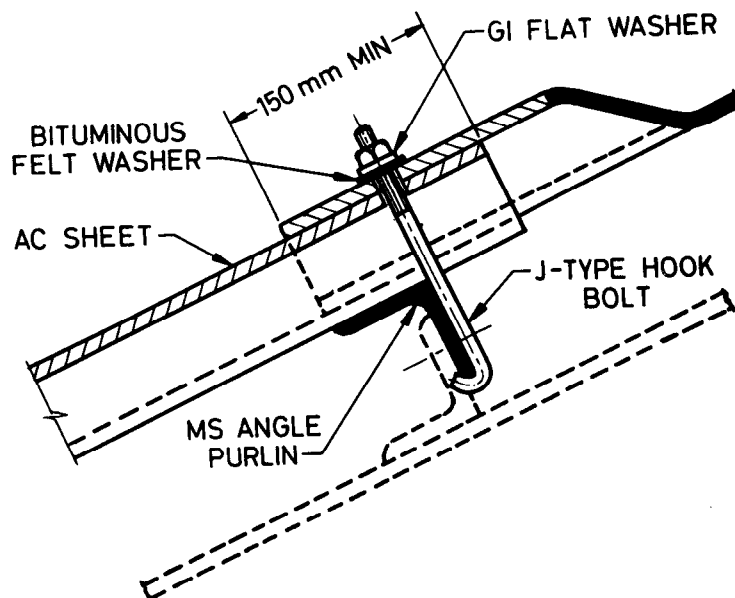
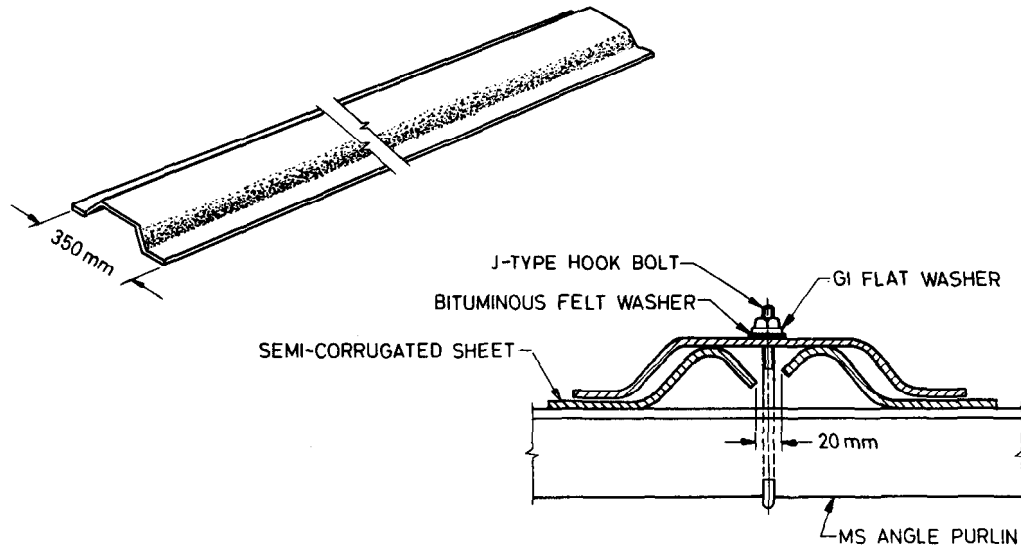


FIG. 2 DETAIL OF END LAP



NOTE — The end lap of expansion joints is the same as that of the roofing sheets, that is, usually 150 mm. If expansion joints lap between purlins they should be stitched by roofing bolts.

FIG. 3 TYPICAL EXPANSION JOINT FOR SEMI-CORRUGATED SHEETS

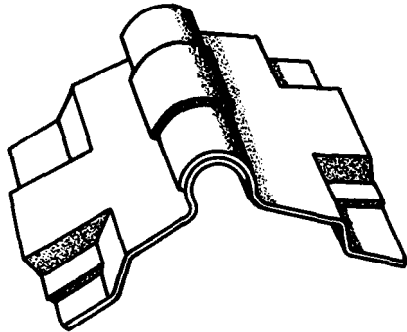


FIG. 4 TYPICAL EXPANSION JOINT FOR SERRATED RIDGE

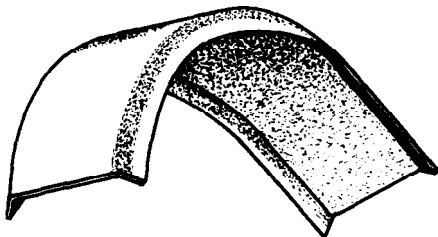


FIG. 5 TYPICAL EXPANSION JOINT FOR NORTHLIGHT CURVE

stacked on firm level ground, in sheltered positions as near as possible to the parts of the building on which they will be fixed.

7.2 Sheets shall be stacked to a height of not more than one metre on firm and level ground, with timber or other packing beneath them. If, of necessity, they are to be placed in an exposed position, they shall be protected from damage by the winds. When they are to be stored or stacked in the open for a long period, it is recommended that a suitable cover against exposure to sun be provided.

7.3 Asbestos cement materials of the same variety

and size shall be stacked together. Damaged material shall not be stacked with sound materials. All damaged materials shall be salvaged as early as possible.

7.4 All sheets and fittings, including gutters and downpipes, brackets, fixing bolts or screws and any accessories required for a particular roof area, shall be on the site or available before the work is commenced.

7.5 The sheets shall be raised to the roof using adequate manual or mechanical means, in particular avoiding impacts.

7.6 During receiving and storing of asbestos cement corrugated sheets and fittings, recommendations given in 4 of IS 11769 (Part 1) shall be followed to ensure minimum release of airborne dust and thus minimum exposure of workers to such airborne asbestos dust.

7.7 Shade Protection

If asbestos cement sheets are stored and stacked in the open for long periods without protection from the sun, the sun's rays may make one side of a stack of sheets very hot leaving the other side at shade temperature and thereby setting up stresses which may result in cracking. Hence it may be necessary to protect stacks of sheets from the sun using methods suggested in 7.7.1, 7.7.2 and 7.7.3.

Where site condition is very hot and dry the sprinkling of water may help in controlling the cracks.

7.7.1 Method 1

Three metre sheets are laid transversely on a stack of sheets. This method also provides shade to the side of the sheets (see Fig. 6).

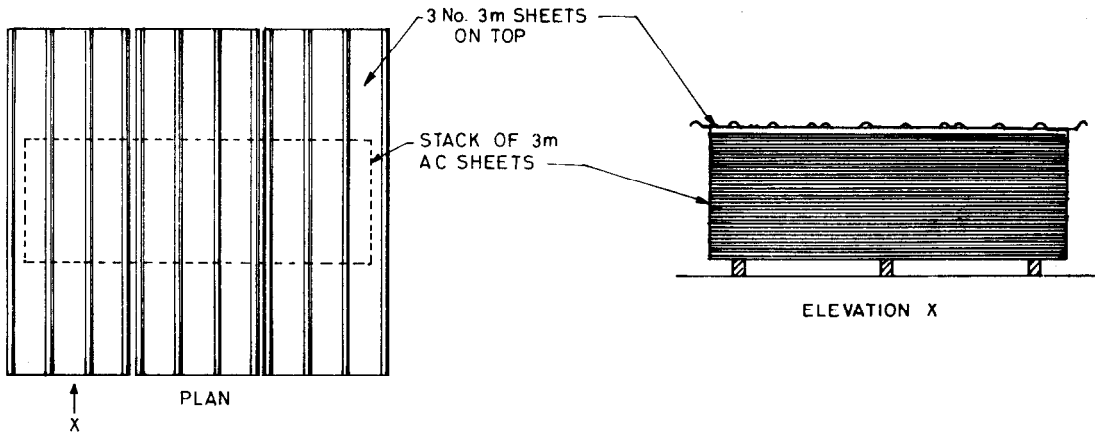


FIG. 6 SHADE PROTECTION, METHOD 1

7.7.2 Method 2

Same as in Method 1 and Fig. 6 with addition of one 1.5 m sheet laid at each end of the stack to provide requisite shade (see Fig. 7).

7.7.3 Method 3

Lay 1.5 m sheets around to lean against the stack as indicated in Fig. 8. This method provides shade from all directions. It is recommended that sheets placed in shade protection as demonstrated in the foregoing illustrations should be prevented from being blown away by suitable them.

8 SAFETY PRECAUTIONS

8.1 No person other than workmen employed shall be permitted access to any area over which the sheeting is being laid. If, however, it is not possible to keep this area clear, protective measures shall be taken during the progress of the work.

8.2 Notices warning workmen not to step on to the roof sheeting should be provided in conspicuous

positions on the walkways and at all usual points of access to the roof.

8.3 Cat ladders or roof boards shall invariably be used by men working on the roofs for safety which will incidentally avoid damage to the roofing materials also. Roof boards shall not be less than 375 mm wide and shall be well constructed to avoid tilting of materials. The battens or cross pieces of roof board shall not project beyond the edges of the board and shall be properly secured to the board.

8.4 Supervisors should ensure proper distribution to and use by the workmen of such safety devices such as cross ladders, safety belts and helmets.

8.5 Use of shoes without slippery sole is recommended for workmen.

8.6 Before leaving the site all sheets on the roof shall be fixed and no loose tools, fasteners or sheets which are not fixed shall be left on the roof.

8.7 Laying of sheets should be suspended at times of high winds.

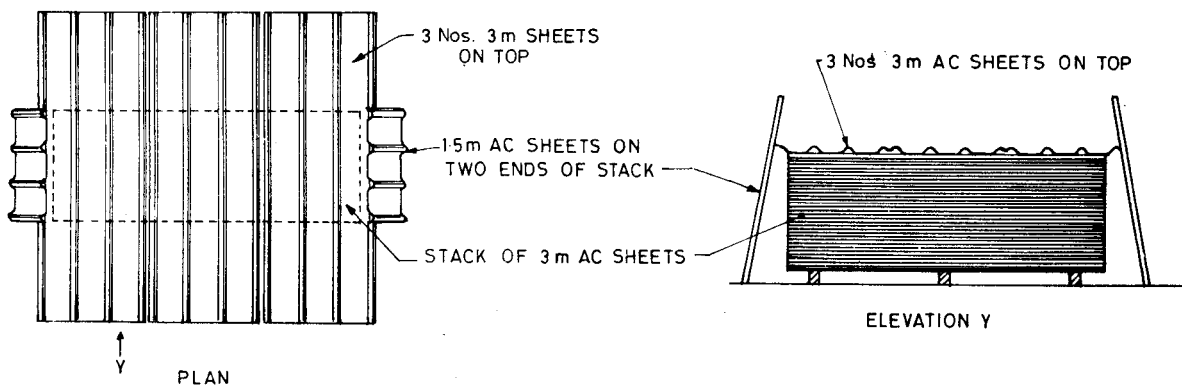


FIG. 7 SHADE PROTECTION, METHOD 2

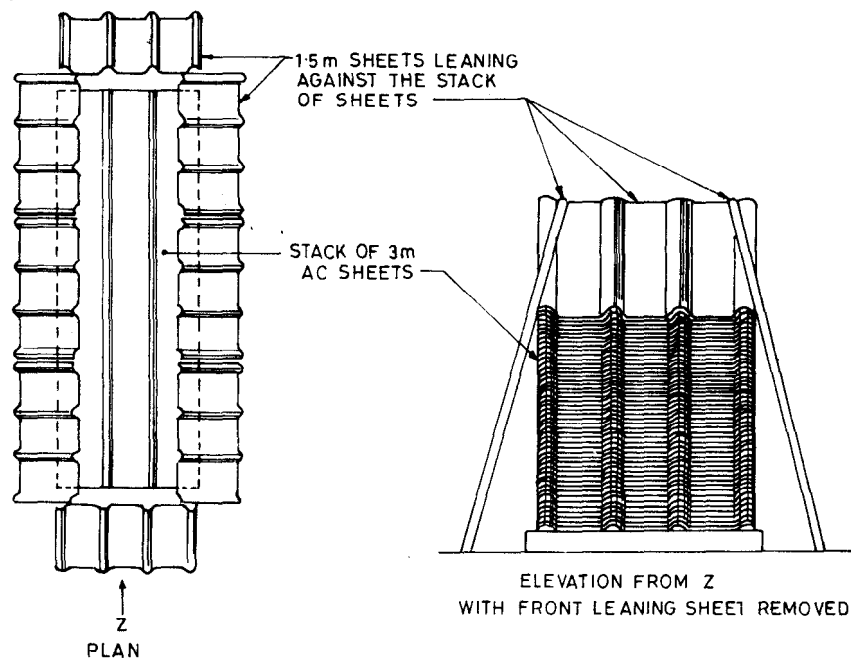


FIG. 8 SHADE PROTECTION, METHOD 3

9 LAYING AND FIXING OF SHEETS

9.1 Sawing and Drilling

Sheets shall be cut as necessary with a wood saw. Holes in the sheets shall be drilled, they shall on no account be punched. The latter method not only splays out the aperture, thus weakening the material at vulnerable points, but is also likely to commence a fracture of the sheet which will ultimately open out in weathering. The holes for fixing shall be 2 mm larger than the diameter of the fixing bolts, and shall always be drilled through crown of the corrugation and not on the valleys.

9.1.1 Holes for fixing the sheeting shall be drilled in the centre of the end lap of sheets to suit the purlins (see Fig. 2), that is, on the centre line of the purlins if these are of timber and square head coach screws are used, or as close as possible to the back of the purlins if J or L bolts are used with steel angles or precast concrete or timber purlins, tubular or Z purlins. It is recommended, therefore, to drill the

holes on the roof with the sheeting laid in the correct position. No hole shall be nearer than 75 mm to any edge of a sheet or an accessory. In cases of flat roofs where bigger end laps are required, the purlin position instead of being in the centre of the end lap should be more towards the apex in which case the rainwater will have a longer travel to the bolt hole.

9.1.2 Recommended Work Practices in Sawing and Drilling

In cutting of sheets different tools as mentioned in Table 1 may be used with a view to maintain the dust emission at the lowest practicable level, while taking into account working efficiency and quality of work, but if any doubt exists, clarification should be sought from the manufacturer.

9.2 Fixing Accessories

9.2.1 The satisfactory service of the roofing depends to a great extent upon the efficiency of fixing accessories. It is, therefore, important that particular attention is paid to the proper selection and use of

Table 1 Working Processes and Recommended Tools:
Corrugated Sheets and Fittings

(Clause 9.1.2)

Working Process	Recommended Tools
Mitring	Hand saw, Scriber, *Jig saw, Nibbler, Hand guided, Band saw, Low speed circular saw
Cross cutting	Hand saw, *Jig saw, Nibbler, Low speed circular saw
Longitudinal cutting	Scriber, *Jig saw, Nibbler, Hand saw, Low speed circular saw
Cut-outs	*Jig saw, Hand saw, Low speed circular saw
Drilling	Hand or power operated drill

* Other mechanically operated saws may be used with special precautions. Circular high speed saws are not recommended.

fixing accessories. The fixing accessories shall conform to the requirements of IS 730.

9.2.2 Galvanized iron J-type hook bolts or cranked hook bolts, and nuts bearing on galvanized iron washers and bitumen washers shall be used for fixing sheets on angle iron, and tubular purlins.

9.2.3 Galvanized iron L-type hook bolt and nut bearing on galvanized iron washer and bitumen washer shall be used for fixing sheets on R.S. joist, precast concrete or timber purlins.

9.2.4 Galvanized iron coach screw bearing on galvanized iron flat washer and bitumen washer shall be used for fixing sheets on timber purlins.

9.2.5 Galvanized iron roof bolt and nut bearing on galvanized iron flat washer and bitumen washer shall be used for stitching on the sheets, fixtures like ridge cappings, corner pieces, ventilators, northlight curves, etc.

9.2.6 Where sheets are laid on tubular purlins, the fixing bolt should be designed to encompass at least half the tube periphery and precautions should be taken to prevent its rotation. Sections other than angles and tubes may require an adopted form of hook bolt.

9.2.6.1 Direct fixing of sheets to drilled metal framework or by stud welding is undesirable as it tends to restrain movement of sheets.

9.2.7 It is essential that the bolt holes are made watertight by the use of bituminous felt washers in conjunction with suitable galvanized iron washers. These form essential accessories to good fixing work. Fixing bolts and screws shall be 8 mm or more in diameter and nuts of the hook crank bolts (or heads of coach screws) shall bear on galvanized iron washer (flat, curved or diamond pattern) which in turn shall

be bedded on a bituminous felt washer (round or diamond pattern corresponding to the shape of galvanized iron washer). The screw, or nut shall be tightened sufficiently only to seat the bitumen washer over the corrugations, so that natural movement in the sub-structure of the roof may not damage the sheeting.

9.2.7.1 The length of the J-bolt or crank bolt shall be 75 mm longer than the depth of the purlin for single sheet fixing and 90 mm longer than the depth of the purlin where two sheets overlap or where ridges or other accessories are to be fixed with the sheet. The minimum length of square head coach screw for timber purlins shall be 115 mm. The number and length of bolts and the number of bitumen and galvanized iron washer for fixing asbestos cement semi-corrugated sheets shall be as given in Table 2.

9.2.8 The galvanized iron flat washer shall generally be 25 mm in diameter, and 1.6 mm thick with hole to suit the required size of fixing accessory. The bitumen washer shall be 35 mm in diameter and 3 mm thick with hole to suit the required size of fixing accessory for other shapes of galvanized iron and bitumen washers, suitable sizes as approved by the engineer-in-charge may be used.

9.2.9 Ridge cappings shall, as far as possible, be secured to the ridge purlins by the same bolts which secure the sheeting. Other asbestos cement accessories such as barge boards, eaves filler pieces and apron flashing pieces, shall be secured either to the structure or by seam bolts to the sheeting.

9.3 Laying the Sheets

9.3.1 Before the actual laying of sheets is started, the purlin spacing and the length of the sheets shall be checked to ensure that the arrangement will provide the laps required and the specified overhang at the eaves and at ridge.

Table 2 Number and Length of Bolts and Number of Bituminous Felt and Galvanized Iron Washers

(Clause 9.2.7.1)

S1 No.	Situation	No. of Bolts and Bituminous Washers and Galvanized Iron Washers	Length of Bolt
(1)	(2)	(3)	(4)
i)	At horizontal (end) laps of sheets. At eaves when filler pieces are used. At ridge when sheets and ridge pieces are secured by the same bolt	<i>Short bolts</i> : The number of sheets in one horizontal course plus two <i>Long bolts</i> : The number of sheets in one course less one	Depth of purlin plus 75 mm Depth of purlin plus 90 mm
ii)	At eaves when filler pieces are not used. At ridge when sheets and ridge pieces are not secured by the same bolt	Twice the number of sheets in one horizontal course plus one	Depth of purlin plus 75 mm
iii)	At intermediate purlins where horizontal laps do not occur	The number of sheets in one horizontal course plus one	Depth of purlin plus 75 mm

9.3.2 The sheets shall be laid with the smooth side upwards and with the side and end laps as given in 9.1.6 (see Fig. 1 and Fig. 2). The courses of sheets shall be so laid that the corrugations run in continuous straight lines.

9.3.3 If a building is in an exposed position and is subject to driving winds and rains, it is advisable to commence laying the sheets from the end opposite to the direction of prevailing winds.

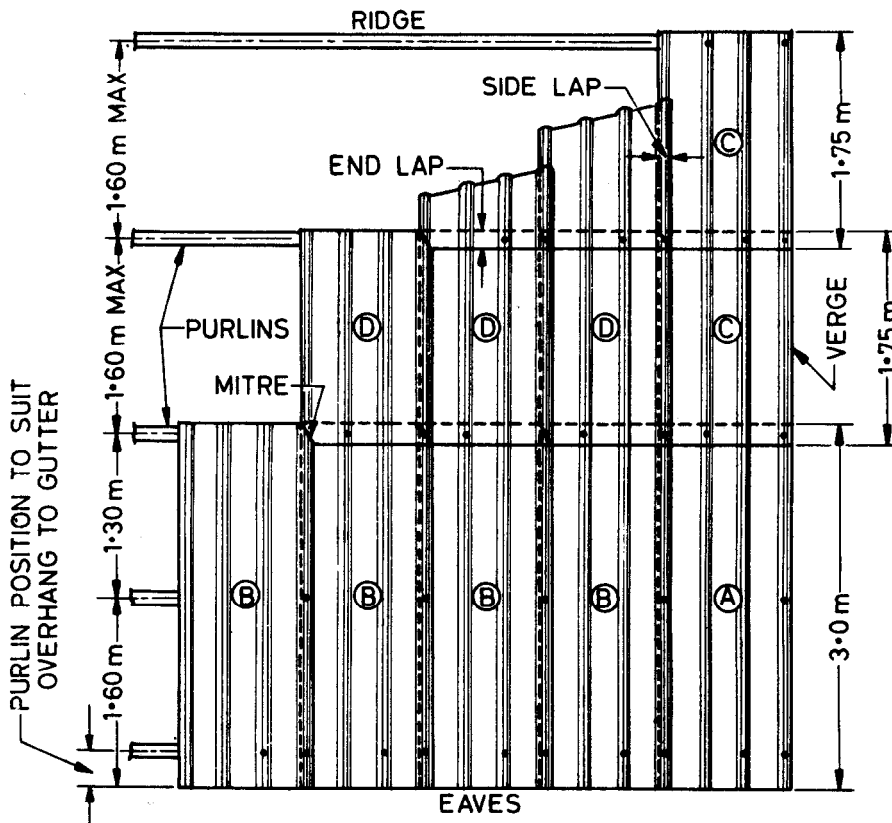
9.3.4 Asbestos cement semi-corrugated sheets shall be laid, starting at the eaves, either from left to right or from right to left, depending upon the prevailing wind direction. If laid from right to left (see Fig. 9) the first sheet shall be laid uncut, but the remaining sheets in the bottom row shall have the top right-hand corners cut or mitred. The sheets in the second and other intermediate rows shall have the bottom left-hand corners of the first sheet cut, all other sheets except the last sheet shall have both the bottom left-hand corner and top-right hand corner cut; the last sheet shall have only the top right-hand corner cut. The last or the top row sheets shall also have the bottom left-hand uncut. If the sheets are laid from left to right,

the first sheet shall be laid uncut and the remaining procedure shall be reversed.

9.3.5 The mitre described in 9.3.4 is necessary to provide a snug fit where four sheets meet at a lap. The length of the mitre shall be 150 mm (or whatever the length of the end lap may be) and the width of the mitre shall be equal to the width of the side lap. This cutting shall be done with an ordinary wood saw at site (see 6.1.6.1).

9.3.6 The ends of all sheets at the eaves shall be supported and the support shall be placed as near to the margin of the sheets as practicable. The maximum free overhang at the eaves shall be not more than the limits specified in 6.1.6.

9.3.7 Hook-bolts, crank bolts or square head coach screws of at least 8 mm size shall be fitted with a galvanized iron washer and a bituminous felt washer of suitable shape to fit the outer face of sheets and inserted through holes of corresponding size (see 9.1) drilled in the crown of the corrugation. One bolt or screw shall be used in every vertical side lap corrugation at the verges and at one of the two



- | | |
|-------------------------------|---|
| A = Uncut sheet | C = Bottom left-hand corner cut |
| B = Top right-hand corner cut | D = Top right-hand corner and bottom left-hand corner cut |

(SHEETS LAID FROM RIGHT TO LEFT)

FIG. 9 LAYING OF SEMI-CORRUGATED SHEETS

intermediate corrugations on each sheet. When the sheets are supported over intermediate purlins, and also an additional fixing bolt shall be provided through each side-lap corrugation only. The bituminous felt washer shall be used under the galvanized iron flat washer (*see* Fig. 1). Nuts or screws shall be tightened lightly at first, and then fully tightened when a dozen or more sheets have been laid. On no account shall the fixing screws or the nuts on fixing bolts be screwed down too tightly.

10 FIXING OF ACCESSORIES

10.1 General

Moulded asbestos-cement accessories should be selected as far as possible from the range of standard patterns. Special fittings, if required should be designed to conform closely to the sheet profile. When the use of moulded accessories is impracticable, other methods as approved by the engineer-in-charge may be employed.

10.1.1 Roofing accessories should be secured to the roof or wall cladding as far as possible, by the same bolts which secure the sheets.

10.2 Ridge Cappings

Ridge cappings should also be secured to the ridge purlins as far as possible by the same bolts which secure the sheets. Where this is not possible, each wing of the ridge capping should be adequately secured to the sheets by roofing bolts.

10.2.1 Serrated Adjustable Ridge Capping

Serrated adjustable type ridge cappings are supplied in pairs, the inner and the outer being made easily distinguishable (*see* Fig. 10). The serrations of these ridges have to register with the corrugations of the sheets underneath. The method of laying and fixing these ridges is shown in Fig. 11. Three or four inner

pieces are laid first so that the serrations of each piece register with the sheets underneath and each piece overlaps the end of the next similar piece by 100 mm. The corresponding numbers of outer pieces are then fixed starting the same end so that each piece overlaps the end of next similar piece by 100 mm and the roll of each outer piece snug fits the roll of corresponding inner piece. The overhang of the first outer piece over the verge shall be cut off by a wood saw.

10.2.2 Fixture with a typical plain wing adjustable ridge and one piece plain angular ridge are illustrated in Fig. 12 and 13 respectively.

10.2.3 Fixture with a typical northlight two-piece adjustable ridge is illustrated in Fig. 14.

10.3 Covering at Hips and Valleys

10.3.1 The roof sheeting at hips should be cut to the required shape and be close butted. The hip joint may be covered with two piece unserrated adjustable ridge (*see* Fig. 15). Alternatively, an apron type of capping may be used for scribing on site, over the corrugations. On timber roof, the hip tile should be fixed to the rafter by means of coach screws.

A neat three way mitre should be made at the intersection of two hips with the ridge and the joint made waterproof by a provision of a lead saddle.

10.3.2 For the valley, if there is sufficient space, half round gutters can be used and if the space is not sufficient, plastering covered with lead sheets forming a flat gutter should be used (*see* Fig. 11).

10.4 Ridge Finials

10.4.1 Two piece ridge finials should be secured to the ridge capping and roof sheeting by one bolt through each wing of the fittings. In addition, they should be secured to the ridge capping by one roofing bolt at the crown.

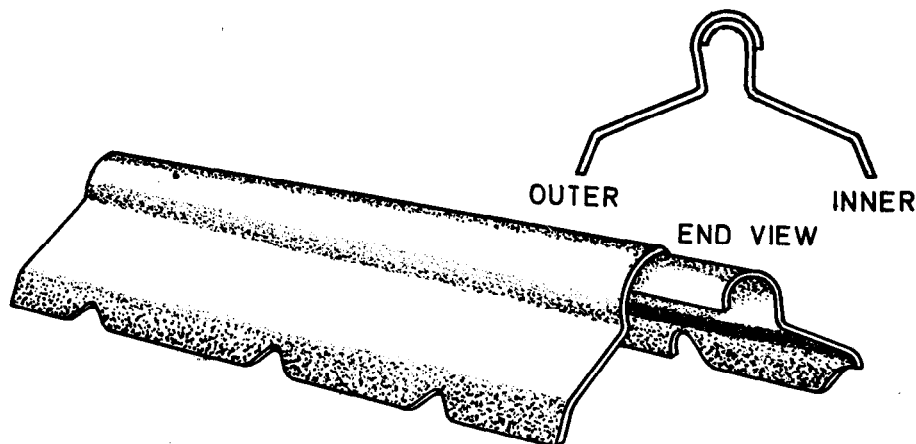


FIG. 10 TYPICAL SEMI-CORRUGATED SERRATED ADJUSTABLE RIDGE

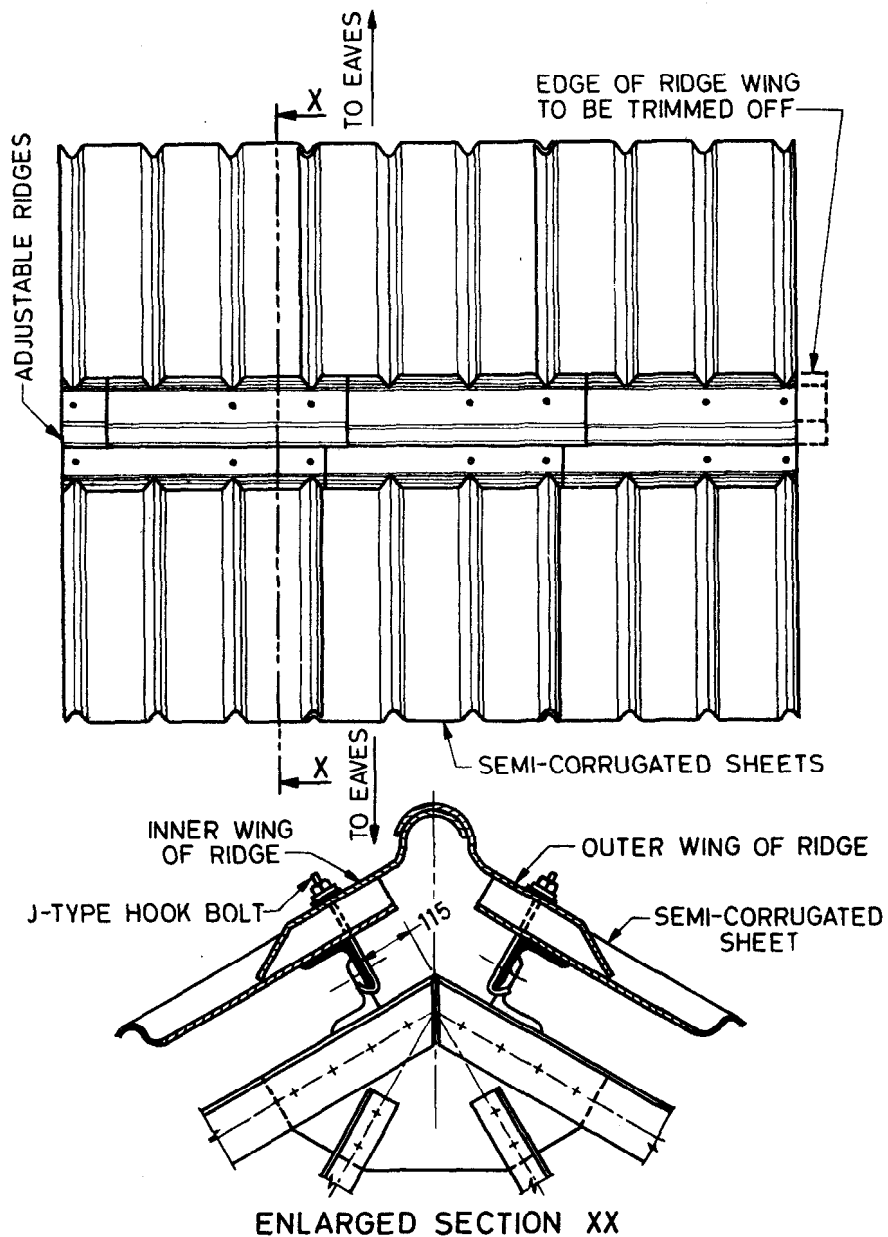


FIG. 11 DETAILS SHOWING FIXING OF SEMI-CORRUGATED ADJUSTABLE RIDGES

10.5 Eaves, Verges and Gable Ends

Asbestos-cement accessories may be used to close the corrugations at eaves (see Fig. 16), above glazing and at the bottom of vertical sheeting. Alternatively, sheeting at the verges may be bedded in mortar if the walls of the building are of brick, block, or similar construction. Barge boards or corners rolls may be used at gable ends.

10.6 Top Edges and Abutments

At top edges against walling, asbestos cement apron pieces should generally be used (see Fig. 17). If the wall consists of vertical sheeting, this should lap over the upstand of the flashing piece, and the apron

should lap over the roof sheeting; no metal flashings are required. If, however, the wall is of brick or masonry, the apron should be secured to the sheeting, and metal or felt over flashing should be used over the upstand of the flashing piece.

At a sloping abutment, if the direction of the corrugations, is parallel to or running away from the wall face, metal or felt flashings may be used. The flashing should be dressed as an apron over the roof sheeting to cover at least the first full corrugation of the sheeting and should be not less than 150 mm wide; the upstand should be provided with cover flashing or should be turned into and secured to the wall. If

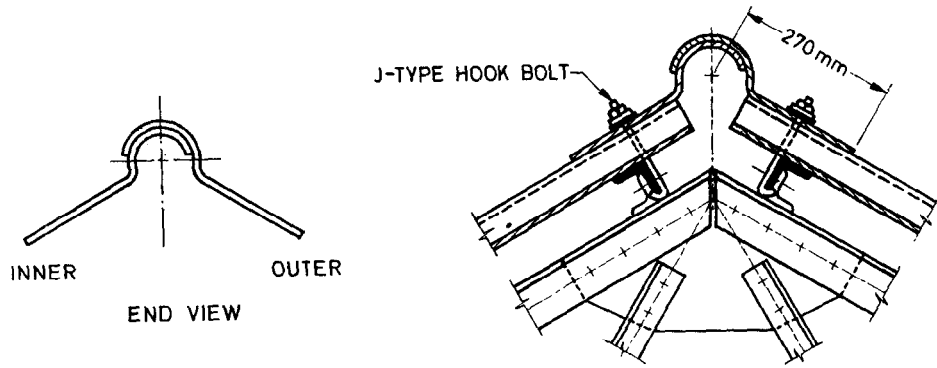


FIG. 12 PLAIN WING ADJUSTABLE RIDGE

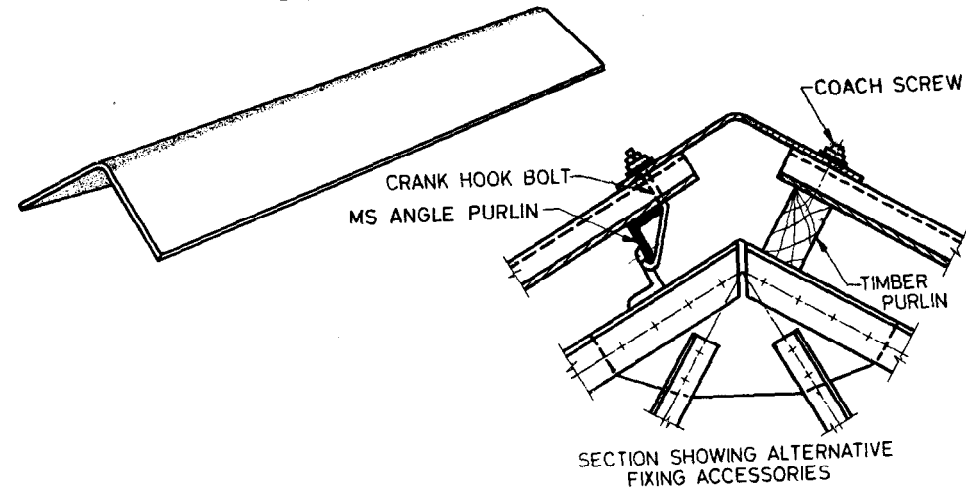


FIG. 13 TYPICAL ONE PIECE PLAIN ANGULAR RIDGE

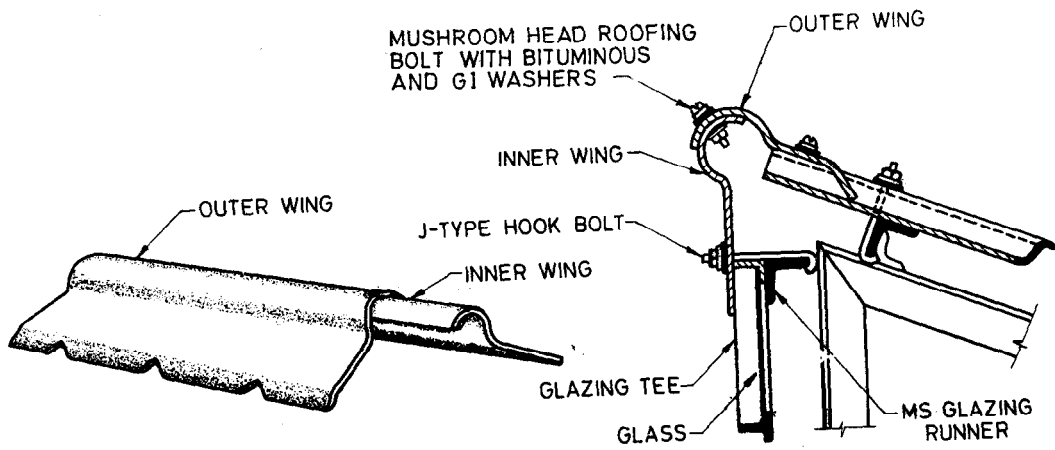
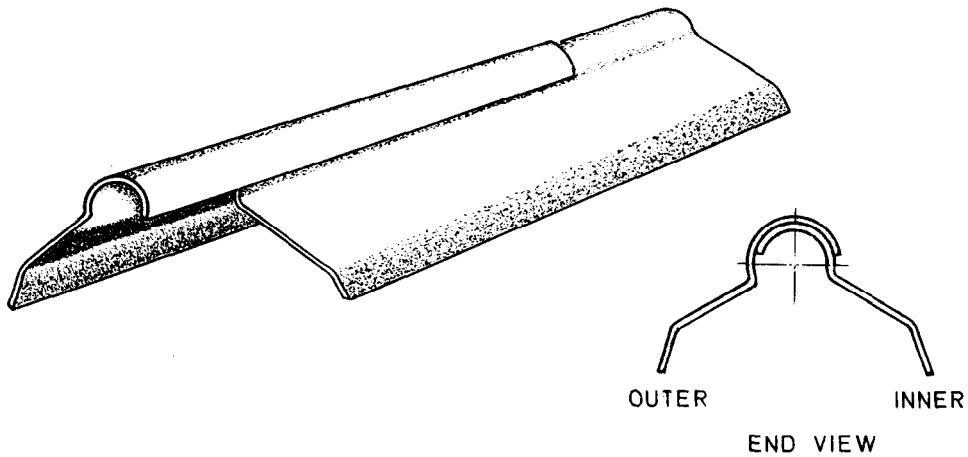


FIG. 14 TYPICAL SEMI-CORRUGATED NORTHLIGHT TWO PIECE ADJUSTABLE RIDGE



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

FIG. 15 TYPICAL UNSERRATED ADJUSTABLE RIDGE FOR HIPS

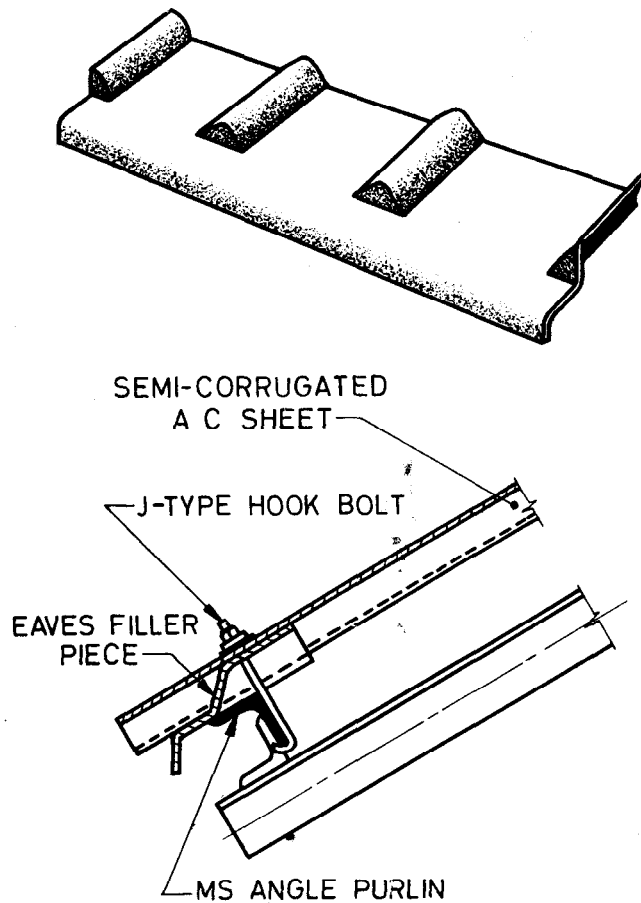


FIG. 16 TYPICAL SEMI-CORRUGATED EAVES FILLER PIECE

the corrugations run into the wall face, the edge of the sheeting should be kept back at least 125 mm clear of the wall face and a suitable gutter should be provided.

10.7 Ventilators and Lights

Permanent ventilation through roofs and walls may

be effected by the use of specially-moulded asbestos-cement accessories which include wing type ventilating ridge capping, louvre, louvre ventilators, purpose made ventilators (see Fig. 18, 19 and 20).

Alternatively, if a wide continuous ventilating space at the ridge is required, the normal type of ridge

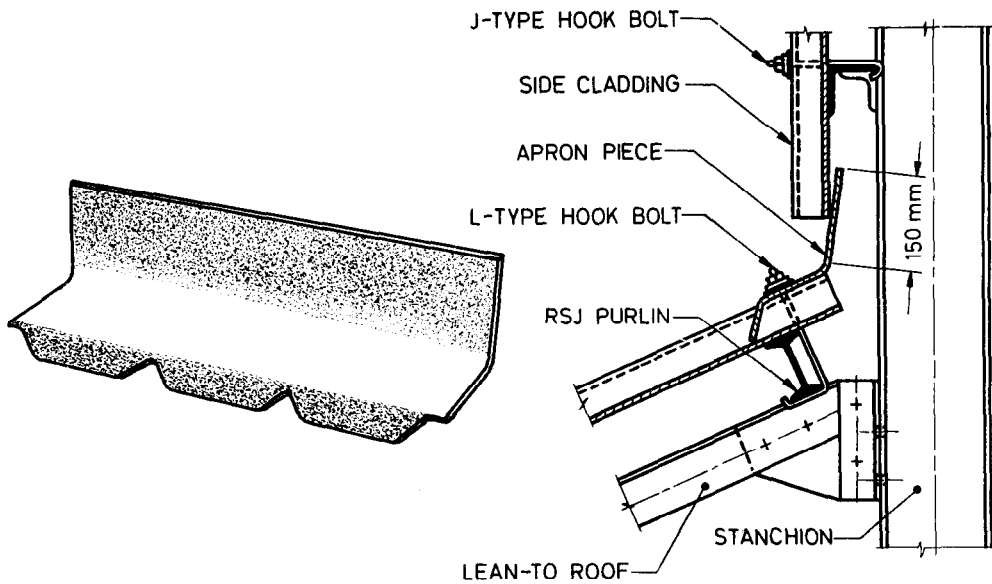


FIG. 17 SEMI-CORRUGATED APRON PIECES

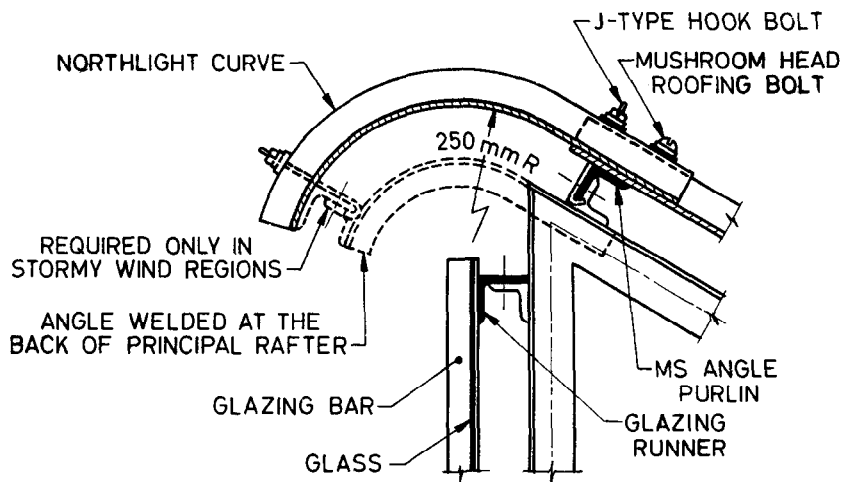
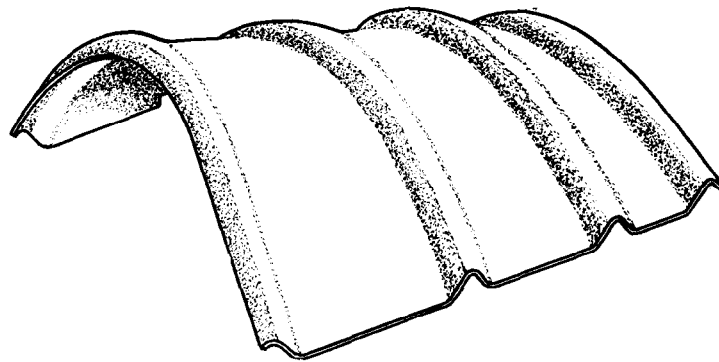


FIG. 18 TYPICAL SEMI-CORRUGATED NORTHLIGHT CURVE FOR VENTILATORS

capping may be omitted, the upper course of roof sheets on each slope may have up-turned ends and the gap at the ridge may be roofed over at a higher

level with segmental or down curved sheets. If rooflights are required, purpose-made rooflights integral with standard size sheets may be used and

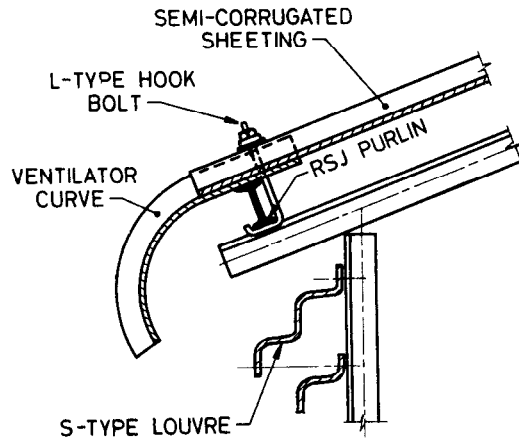


FIG. 19 TYPICAL SEMI-CORRUGATED VENTILATOR CURVE

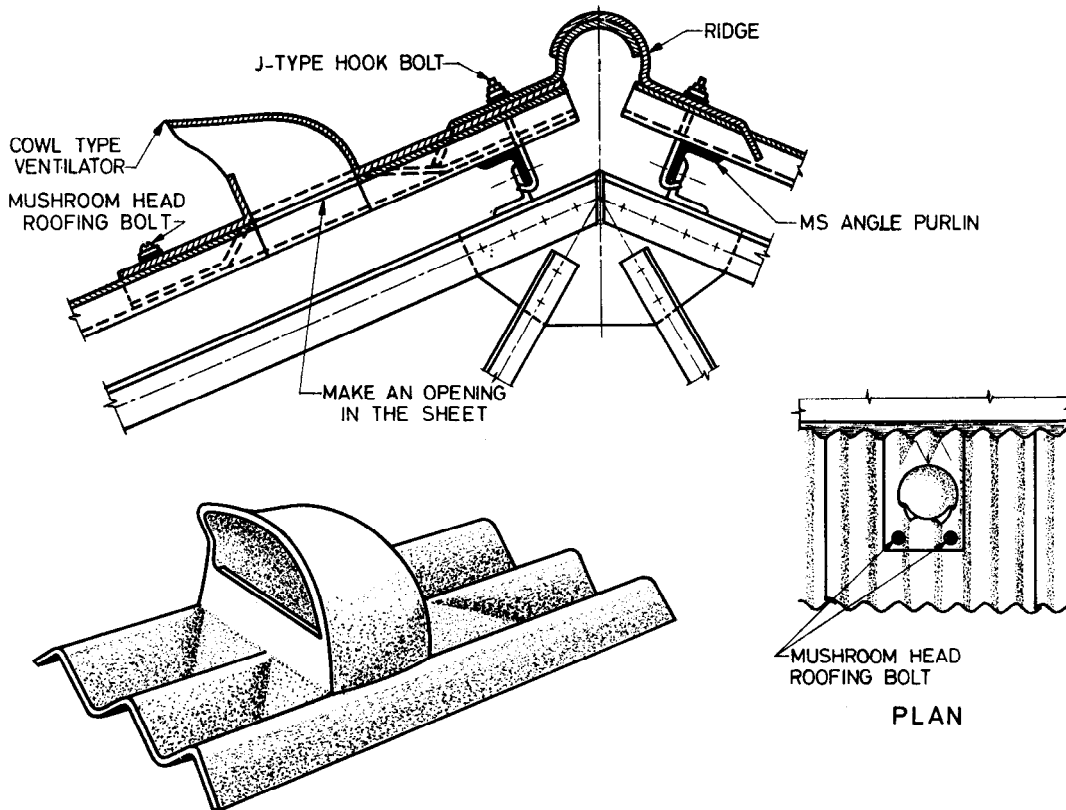


FIG. 20 TYPICAL SEMI-CORRUGATED COWL TYPE VENTILATOR

are available as fixed skylights or as adjustable skylights (see Fig. 21 and 22). Alternatively glass may be used.

10.8 Expansion Joints

Asbestos-cement accessories and the completed fixtures with them at the expansion joints are shown in Fig. 6, 7 and 8.

10.9 Other Fittings

Other asbestos cement accessories such as corner

rolls, barge board, should be secured either to the structure or to the sheeting with the help of roofing bolts (see Fig. 23).

11 GUTTERS AND RAIN-WATER PIPES

Gutters and rain-water pipes shall be fixed in accordance with the recommendations of relevant Indian Standard Codes of Practice.

OPENING TO SUIT WIRED GLASS OF SIZES:
680 x 400 x 6 mm OR 800 x 580 x 6 mm

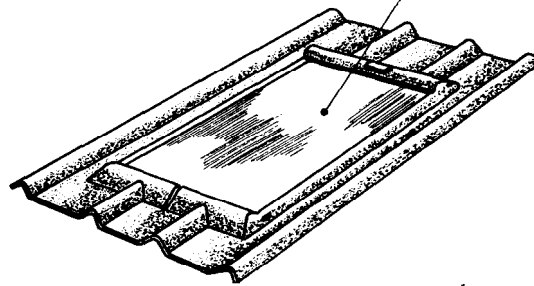


FIG. 21 TYPICAL SEMI-CORRUGATED ROOF LIGHT

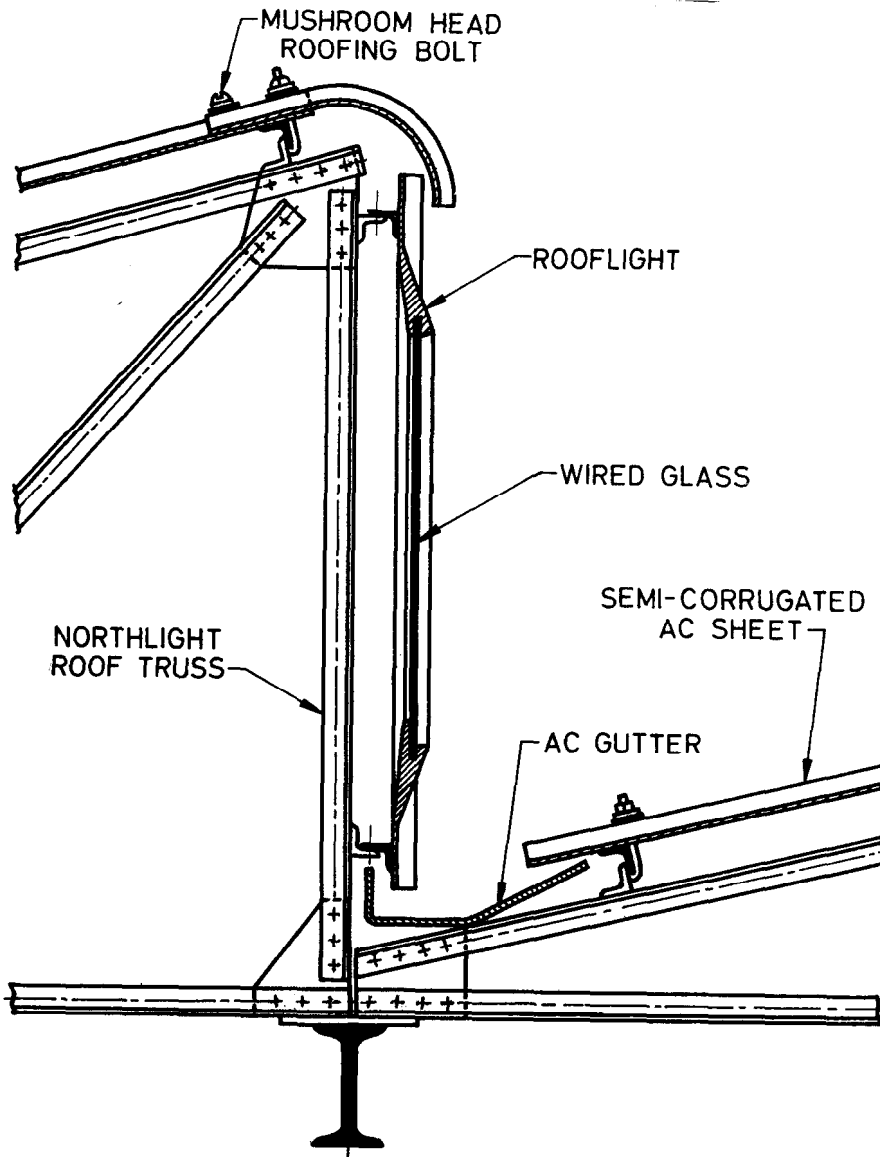


FIG. 22 TYPICAL ROOFLIGHT USED AS NORTHLIGHT GLAZING

For pipes passing through roofs and walls, soaker flange sheet suitable for the different pipe diameters and roof pitches may be used. When such accessories are not suitable for the specific purpose, the positions

of any necessary perforations of the sheeting should be considered in relation to the position of the end laps so that the length of flashing above the pipe outlet will not be unduly extended.

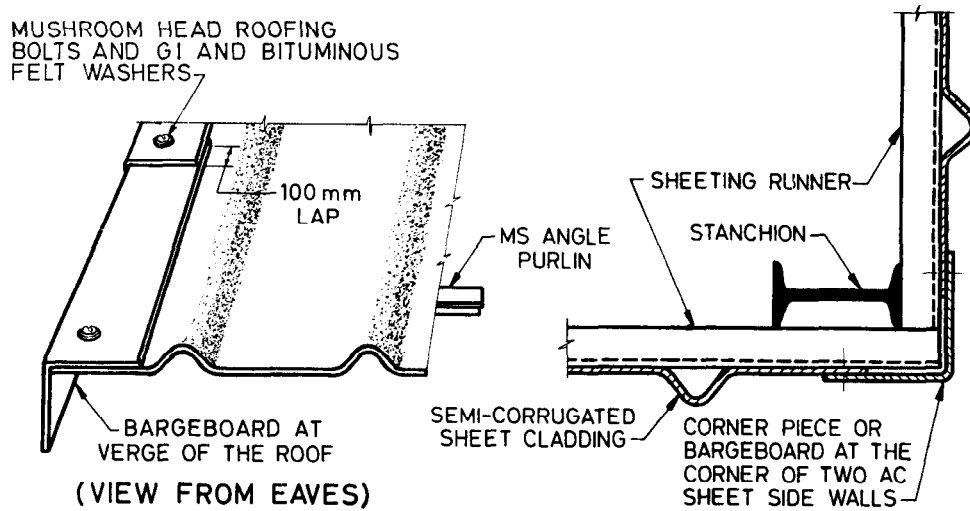


FIG. 23 TYPICAL BARGEBOARD AND CORNER ROLL

12 MAINTENANCE

The roof covering shall be periodically examined; any broken units shall be replaced promptly and

flashings redressed if necessary. Roof covering which have been painted or coated to protect them from chemically laden atmosphere shall be repainted from time to time.

ANNEX A

(Clause 2)

LIST OF REFERRED INDIAN STANDARDS

IS No.	Title	IS No.	Title
459 : 1992	Specification for unreinforced corrugated and semi-corrugated asbestos cement sheets (second revision)	1120 : 1975	Specification for coach screws (first revision)
		2098 : 1997	Specification for asbestos cement building boards (first revision)
730 : 1978	Specification for hook bolts for corrugated sheet roofing (second revision)	11769 (Part 1) : 1987	Guidelines for safe use of product containing asbestos : Part 1 Asbestos cement products

ANNEX B
(Foreword)

COMMITTEE COMPOSITION

Cement Matrix Products Sectional Committee, CED 53

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SHRI P. D. GAIKAWAD (<i>Alternate</i>)	
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SHRI T. CHOUDHURY (<i>Alternate</i>)	
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DR IRSAD MASOOD	Central Building Research Institute, Roorkee
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SHRI B. V. B. PAI	The Associated Cement Companies Ltd, Thane
SHRI M. G. DANDWATE (<i>Alternate</i>)	
SHRI S. P. RASTOGI	Federation of U.P. Pipe Manufacturers, Lucknow
SHRI G. S. SHIRLAKAR	Spun Pipes Manufacturers Association of Maharashtra (SSI), Pune
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SHRI K. P. ABRAHAM (<i>Alternate</i>)	
SHRI C. H. SUBRAMANIAM	Small Scale Industries, New Delhi
SHRI A. DUTTA (<i>Alternate</i>)	
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Addl Director (Civ Engg), BIS	

(Continued on page 18)

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(Continued from page 17)

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Amendments Issued Since Publication

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