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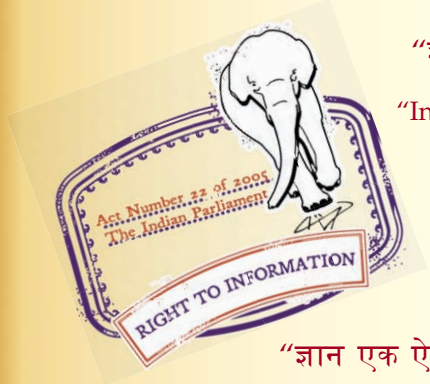
IS 1414 (1989): Code of practice for fixing of wall coverings [CED 13: Building Construction Practices including Painting, Varnishing and Allied Finishing]



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Bhartṛhari—Nītiśatakam
"Knowledge is such a treasure which cannot be stolen"

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IS 1414 : 1989
(Reaffirmed 1999)

Indian Standard

FIXING OF WALL COVERINGS — CODE OF PRACTICE

(First Revision)

UDC 692·232·4 : 006·76

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

December 1989

Price Group 6

FOREWORD

This Indian Standard (First Revision) was adopted by the Bureau of Indian Standards on 20 March 1989, after the draft finalized by the Building Construction Practices Sectional Committee had been approved by the Civil Engineering Division Council.

Wall coverings, such as building boards, sheets, etc, are extensively used in the construction of light partitions. They are also used on solid wall backings to obtain various decorative finishes which are easier to install and maintain than the traditional plaster and allied finishes. The selection of these boards depends upon appearance and performance requirements; and the methods of fixing and joining also differ for different types of boards. This standard is intended to give guidance for the selection and fixing wall of coverings.

This standard is intended chiefly to cover the technical provisions relating to fixing of wall coverings and it does not cover all the necessary provisions of a contract.

This standard was first published in 1962. The contents of this standard are being revised with a view to updating its contents in the light of experience gained over the years. The important changes include incorporation of marine plywood, laminated plywood, commercial plyboards, phenol bonded particle board and veneer and decorative veneered plyboards. In this revision reference has been given to current material standards.

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. 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

FIXING OF WALL COVERINGS — CODE OF PRACTICE

(First Revision)

1 SCOPE

1.1 This standard covers the fixing of the following rigid wall coverings:

a) Gypsum plasterboards and wallboards;
b) Fibre building boards;
c) Plywood and blockboards;
d) Chipboards, particle board and wood-waste boards;
e) Asbestos cement wallboards; and
f) Multiple layer of coverings.

1.2 This standard does not cover the application of flexible wall coverings, such as, wall papering, sheeting, etc, and also wood panelling.

2 REFERENCES

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

3 TERMINOLOGY

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

3.1 Asbestos Cement Boards

Boards made from a mixture of clean asbestos fibre, Portland cement and other ingredients as required.

3.2 Blockboards

A board having a core made up of strips of wood laid separately or glued or otherwise joined to form a slab which is glued between two or more outer veneers with the direction of grain of the core blocks running at right angles to that of the adjacent outer veneers.

3.3 Fibre Building Board

Rigid board made from substances composed of vegetable fibres, such as wood pulp.

3.4 Particle Boards, Chip Boards and Wood-Waste Boards

These are boards made from wood chips or other wood-waste material.

3.4.1 *Phenol Bonded Particle Boards*

These particle boards are bonded with phenol formaldehyde synthetic resin and are water resistant boards.

3.5 Plasterboard

Wallboards normally composed of plaster with some reinforcing joints and contained between facing of heavy papers.

3.6 Plywood

A board formed of three or more layer of veneer cemented or glued together, usually with the grain of adjacent veneers running at right angles to each other.

3.6.1 *Commercial Plyboards*

Plyboards with the commercial ply veneer, the skin layer is not of decorative veneer.

3.6.2 *Decorative Veneered Plyboard*

The finish layer is of decorative teak ply finish, rose wood finish, etc.

3.6.3 *Laminated Plywood*

This type of plywood boards are factory made laminated boards with different colours. The lamination is on one side or two sides but for wall covering one side lamination is required.

3.6.4 *Marine Plywood*

This type of plywood boards are bended with phenol type resins and are water resistant.

3.6.5 *Veneer*

Veneer is the finishing layer of plyboards/block board, etc.

4 NECESSARY INFORMATION

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

a) Wall areas to be covered;
b) Location, size, type of material used and pattern of doors, windows and also details of openings (inside/outside);
c) Type of supporting framework;
d) Type and size of units of the covering to be fixed;
e) Type of finishing treatment to be applied over the covering;
f) Matching and treatment at all corners and at junction with ceiling;
g) Details, such as, picture-rail, penelling rail, etc, which would come over the covering; and
h) Location of service fittings and accessories (electrical, air-conditioning, etc).

4.2 All information as in **4.1** shall be made available to those who are responsible for fixing the coverings. Necessary drawings and instructions for preparatory work shall be given.

4.3 Arrangement shall also be made for proper exchange of information between those engaged in fixing wall coverings and others engaged in trades, such as electrical wirings and fittings, sanitary fixtures, air-conditioning fixture, etc, whose work will affect or will be affected.

5 DESIGN CONSIDERATIONS

5.1 Suitability of Different Types of Coverings

5.1.1 *Gypsum Plasterboards and Wallboards*

These coverings contribute high fire resistance to the partitions on to which they are fixed. Gypsum boards also form a satisfactory backing for further wall finishes, such as, plastering, rendering, etc.

Gypsum boards are sensitive to moisture and shall not be used for exterior wall coverings.

5.1.2 *Fibre Building Boards*

5.1.2.1 These boards may be homogeneous or laminated and are produced in a variety of sizes, qualities and thicknesses. They facilitate easy handling and fixing, speedy and dry construction and are light in weight. They are self-decorative or provide a base for practically any kind of decorative finish. The use of fibre building boards will be specially advantageous in prefabricated construction.

The types of fibreboards are:

a) *Insulating boards*

1) Homogeneous,
2) Laminated, and
3) Bitumen impregnated.

b) *Wallboards*

1) Laminated fibre,
2) Bitumen laminated, and
3) Homogeneous fibre.

c) *Hardboards* (*see also* IS 1658 : 1977)

1) Medium,
2) Standard, and
3) Super.

NOTE — Insulating boards are available for thermal insulation, acoustical insulation or for a combined purpose.

5.1.2.2 Ordinarily low and medium density fibreboards may absorb moisture but bitumen bonded and bitumenimpregnated grades have high resistance to moisture.

5.1.2.3 Fibreboards of low and medium density burn easily, but some manufacturers market treated boards which have better fire resistance. Hardboards do not burn so easily and they can be treated to give satisfactory fire resistance.

5.1.2.4 Most insulating and medium density fibreboards can be finished with a skim coat of hard wall plaster, if desired, but the manufacturer's instructions should be consulted on this point.

5.1.3 *Plywood and Blockboards*

5.1.3.1 Plywood is available in several grades and types depending upon the finish and the type of veneers as well as the adhesives used.

5.1.3.2 Plywood may be used as a continuous flush surface for covering walls generally in small areas. It is not advisable to use it for very large surfaces as some moisture movements in the supporting ground may be inevitable and the joints would shrink. This defect will be perceptible where butt joints are used but may not be so apparent in the case of V-joints.

5.1.3.3 Special plywoods veneered with decorative hardwoods, or faced with sheet metals on one or both sides, or faced with decorative plastics are available. Metal-faced plywood is specially suited where an impervious easily cleaned surface is required.

5.1.3.4 Blockboards find generally the same use as plywood in wall coverings.

5.1.3.5 The surface of the plywood blockboards is smooth and can be finished with colour paint, satin, etc. For decorative veneer finish boards, the finishing shall be either wax polish, lacquer/French polish or melamine finish or such finish by which the decorative veneer figures will be seen through polish.

5.1.3.6 Marine ply with phenol bonded resins is water resistant and is specially recommended wherever there is a possibility of moisture absorption, particularly external walls and walls outside toilets, etc.

5.1.3.7 Factory made pre-laminated plywood/blockboards are suitable for having even quality finish. As the boards are pre-laminated, nailing and screwing spoils the finish. It is, therefore, recommended that these should be fixed in frames or through grooves or by any other design which will avoid direct nailing.

5.1.4 *Chipboards, Particle Boards and Wood-Waste Boards*

These boards have satisfactory structural strength and stiffness. They work well with ordinary saws and drills and can be easily nailed or screwed. The surface is smooth and may be finished with wax polish, satin or paint.

5.1.5 *Asbestos Cement Wallboards*

5.1.5.1 Flat sheets of asbestos cement are suitable where moisture is present, such as bathrooms, kitchens, etc.

5.1.5.2 As the surface of asbestos cement boards is very dense and almost impervious, condensation readily occurs on the surface.

5.1.6 *Other Miscellaneous Types of Boards*

There are many proprietary boards manufactured from several materials, such as wood fibres, wood-wool, strawboard, paper, diatamaceous earth, synthetic resins, plastics, reeds strung or bonded together, etc. Some of them may be of composite construction with a core of one material and facing of another. They shall generally be used in accordance with the manufacturer's instructions.

5.2 Strength and Stability

5.2.1 The spacings at which the covering is attached with fixtures to the supporting framework or to the wall itself shall be such as to enable the doors to withstand its own weight without appreciable distortion.

5.2.2 The spacings for supports and for fixtures for the various types of coverings shall be as given in Table 1.

5.2.3 The fixing of coverings shall reasonably permit the adjustment of the coverings to thermal and moisture movements without cracking or appreciable distortion.

5.3 Heat Insulation

5.3.1 The thermal insulating properties of different types of insulating materials are covered in IS 3792 : 1978.

5.4 Sound Insulation

5.4.1 Regarding the selection of different types of boards for sound insulation reference may be made to IS 1950 : 1962.

5.5 Fire Protection

In addition to that of the covering proper, the fire resistance of the fixtures, the jointing material and the supporting framework also play effective role in the overall fire protection afforded by the cladding to the wall. The fire resistance ratings for common types of partitions with different wall coverings and inner partition space of 100 mm are given in Table 2.

NOTE — For standard procedure for testing fire resistance rating, reference may be made to IS 1641 : 1960.

6 MATERIALS

6.1 Gypsum Wallboard

This shall conform to IS 2095 : 1982.

6.2 Fibre Building Board

Hardboard shall conform to IS 1658 : 1977.

6.3 Plywood

This shall conform to IS 1328 : 1982, IS 7316 : 1976, IS 710 : 1976 and IS 303 : 1975.

Table 1 Spacings for Support and Fixing of Rigid Wall Coverings

(*Clauses* 5.2.2, 9.3, 10.2.1, 10.3.1 *and* 12.1)

All dimensions in millimetres.

Sl No.	Type of Board	Thickness	Spacing of Supports	Nail Spacing Centre to Centre		Minimum Clearance for Nails from Edges
				At Edges	At other Supports	
1.	Gypsum board	9·5 12·5 15	400 500 600	100 to 150	100 to 150	10
2.	Fibre building board, particle board, etc	10 12 20	400 500 600	75	150 to 200	10
3.	Plywood, blockboard, etc	6·9 12 16 and above	400 500 600	150	300	10
4.	Asbestos board	6 — —	400 — —	150 to 200 (Screws)	150 to 200	—

NOTE — The nails with a shank diameter of 2·00, 2·24 or 2·50 mm are commonly used.

Table 2 Fire Resistance Ratings of Stud Partition Walls with Various Types of Wall Coverings
(*Clause* 5.5)

Sl No.	Covering on Each Side	Other Details of Partition				Fire Resistance Rating
		Partition Inner Space	Type of Stud	Spacing of Stud	Filling	
		mm		mm		h
1.	12-mm gypsum wallboard	100	Timber	400	Nil	$\frac{1}{2}$
2.	12-mm gypsum wallboard	100	,,	400	Mineral wool	$\frac{3}{4}$
3.	6-mm plywood	100	,,	400	-do-	$\frac{3}{4}$
4.	18-mm plywood	100	,,	400	-do-	$\frac{3}{4}$
5.	Two layers of 10-mm gypsum wallboard	100	,,	400	Nil	$\frac{3}{4}$
6.	Two layers of 12-mm gypsum wallboard	100	,,	400	Nil	1

6.4 Particle Board

This shall conform to IS 3097 : 1980.

6.5 Blockboard

This shall conform to IS 1659 : 1979.

6.6 Nails

Nails used as fixing accessories for wall coverings shall conform to IS 723 : 1972. Wood screws shall conform to IS 451 : 1972.

6.7 Fixing Accessories

These shall conform to the relevant provisions given in IS 1946 : 1961 and IS 2097 : 1983.

6.8 Asbestos Cement Sheets

Corrugated asbestos cement sheets used as wall coverings shall conform to IS 459 : 1970. Plain asbestos cement sheets shall conform to IS 2098 : 1964.

6.9 Water Proof Resins

Synthetic resins are recommended for lamination and joinery of wood, plywood and other wood work.

6.10 Edge Seal

Edges of plywood/blockboard are sealed by primer, beeding, etc, followed by sealing coat.

7 FACILITIES FOR THE WORK

7.1 The facilities mentioned in **7.1.1** and **7.1.2** are necessary and shall be provided to the person entrusted with the work of fixing of wall coverings, for carrying out his work satisfactorily.

7.1.1 The supporting walls and framework for the coverings shall be completed. Timber stud framing for partition or furrings shall be treated in accordance with IS 401 : 1982.

7.1.2 Assembled components, such as, frames of doors, windows, etc, shall be installed in position before the wall covering work is commenced.

8 PREPARATORY WORK

8.1 Storage and Handling of Boards

8.1.1 *Gypsum Boards*

The boards shall be kept dry in transit and stored flat in a clean dry place.

8.1.2 *Fibreboards, Plywood, etc*

The boards shall be stored and handled in accordance with the manufacturer's instructions. They shall be stored in the room where they are to be used, for a minimum period of 24 hours before use.

9 FIXING GYPSUM PLASTERBOARDS AND WALLBOARDS

9.1 The details of fixing gypsum boards are explained in Fig. 1, and shall generally be followed.

9.2 It shall be ensured in the first instance that the moisture content of the timber background is such that dimensional changes will not be serious to cause distortion or cracking in the coverings fixed on it.

9.3 The spacing of nails shall be as given in Table 1 for gypsum wallboards. During fixing, the nailing shall be done starting from the centre of the row, working outwards. The nails with a shank diameter of 2·00, 2·24 or 2·50 mm are commonly used.

9.4 Jointing

The boards shall be fixed with a joint thickness of about 6 mm. All vertical joints shall be staggered, particularly where both sides of the wall are covered.

9.5 Finishing of Joints

The joints shall be filled with gypsum plaster or other finishing material recommended by the manufacturers of the boards. After filling the joints, a thick skin of the finishing materials shall be spread about 50 mm wide on either side of the joint and on to it shall be trowelled dry a reinforcing scrim cloth about 100 mm wide. When metal scrim is used a stiffer plaster will be necessary to enable the trowelling of the scrim down to the board (*see* Fig. 2). The joints may be left open also, if desired.

10 FIXING OF FIBRE BUILDING BOARDS

10.1 General

10.1.1 The details of fixing fibreboards are explained in Fig. 2.

10.1.2 All fibreboards are subject to slight movements due to moisture and temperature changes, and this shall be allowed for in fixing. Preferably, the boards shall be stored for at least 24 hours before use in the same environment as the one in which they are to be fixed.

10.2 Framework

10.2.1 The studs and grounds for fixing the fibreboard shall be spaced as specified in Table 1 for fibreboards. All edges of the fibreboards shall be supported. Intermediate support shall be provided at dado heights for picture-rails and cornices, etc. Fibreboards are generally fixed to wood grounds or studs.

10.2.2 Planed battens 40 × 20 mm shall be used for grounds on solid walls. The battens shall be plugged to the wall at intervals of 300 mm and it is advisable to use fixing expansion plugs and rustless screws, unless fixing blocks have been built the wall. On uneven wall faces the battens shall be plumbed and fitted with packing peices at the back where necessary. If there is any possibility of dampness, the battens shall be treated with odourless preservative.

10.3 Nailing

10.3.1 The nails with a shank diameter of 2·00, 2·24 or 2·50 mm are commonly used. Nails shall be spaced as specified in Table 1.

10.4 Joints

10.4.1 An open but joint shall have at least 3 mm clearance.

10.4.2 Joints shall not normally be filled with plaster, but where low or medium density fibreboard is to be plastered, the joints shall be left with a gap of about 6 mm which shall be covered with scrim bedded in plaster before the finishing coat of plaster is applied.

10.4.3 The various types of joints for fibreboard are shown in Fig. 3, and shall generally be followed.

10.4.4 Uncovered joints may be bevelled or parallel grooved, using plane and chisel, but it is quicker and better to use a special fibreboard cutter. Edges may also be rounded with glass-paper or with a rasp.

10.4.5 Fibreboards may be specially moulded on the edges by the manufacturers. It will not be possible to cut these mouldings at the site. The edges may be rebated also for fixing purposes, but nailings shall not be done through the rebates.

10.4.6 Open joints may also be covered with strips of various materials. The cover strips shall be nailed or screwed along the centre so that the fixing passes through the open joints.

10.4.6.1 Wood cover strip may be about 45 × 15 mm or less. Wood mouldings will make a neater cover. Mouldings of fibreboard and hardboard are also available for use in this connection. Plain strips cut from standard sheets may also be used for the purpose.

10.4.6.2 Metal cover strips are made of aluminium, chromium-plated brass, etc. Moulded plastic, linen-backed adhesive paper strip, and other types of metal section specially shaped for the purpose may also be used as cover strips. Linen-backed adhesive board is fixed by wetting it and pressing it over the edges of the boards.

11 FIXING OF PLYWOOD, BLOCKBOARD, ETC

11.1 It is advantageous to use plywoods in the form of panels with stiffened edges by rails, stiles or narrow strips of wood, metal, plastic or other materials. The panels shall be sufficiently thick and stiff to be self-supporting from edge to edge. Sometimes, plywood may also be nailed as such to the partition under special instructions obtained from the manufacturer.

11.2 The details of fixing plywood, blockboard, etc, as explained in Fig. 4 shall generally by followed.

12.3 The edges of plywood panels shall be protected before fixing with a suitable sealer. Where there is any possibility of dampness, the back of the plywood, and also the supporting wood grounds shall either be treated with an odourless preservative or by giving a priming coat of paint followed by a sealing coat.

11.4 Both vertical panelling as well as horizontal panelling are possible with plywood.

11.5 In horizontal panelling with plywood in large rooms, the work may preferably be done in bays not exceeding 2·7 m in length. In vertical panelling the width of panels may be 0·9 to 1·2 m.

11.6 Joints

The various types of joints for plywood and blockboards are shown in Fig. 5 and 6, respectively, and shall generally be followed. Where it is desired to make a butt joint done in a blockboard, both the edges shall be grooved and a separate tongue glued in. In long lengths, this joint shall be strengthened by dowels.

12 FIXING CHIPBOARDS, PARTICLE BOARDS AND WOOD-WASTE BOARDS

12.1 The fixing shall generally be done in the same manner as for the fibreboards described in **10.**

13 FIXING ASBESTOS CEMENT WALLBOARDS

13.1 The details of fixing asbestos cement sheets are shown in Fig. 7 and 8, and shall be generally followed.

13.2 In fixing asbestos cement sheets care shall be taken to avoid rigid fixing as this may cause cracking if the supporting structure expands or shrinks. The sheet shall be fixed with wood screws to wooden grounds, and the screw holes shall be drilled slightly larger than the screw. Asbestos sheets may also be advantageously fixed on to walls with a cement plaster backing. Corrugated asbestos sheets may generally be fixed (*see* Fig. 8) with the same precautions as for flat sheets but a lap for the corrugations shall be given over the joint.

14 FIXING A MULTIPLE LAYER OF COVERINGS

14.1 When the number of coverings to be fixed is more than one, the first covering shall be nailed or otherwise fixed as specified in **9** to **13** and further coverings shall be bonded on to the first covering either with suitable adhesive or as specified by the manufacturer.

In case of some coverings, such as fibreboards, the second or subsequent layers may also be nailed, but the nails shall be long enough to penetrate through the first covering into the supporting framework to the required extent.

14.2 For better stability and strength successive layers may be fixed in perpendicular direction (that is, if one is horizontal, the other immediately above or below it may be vertical); or if all the layers are fixed vertically the joints of each layer shall not occur over the joints of the preceding layer (that is, the joints shall be staggered).

14.3 When bonding is done with adhesives, temporary supports shall be given to the succeeding layer till the adhesive has set. The temporary supports may be nails driven at about 300 mm centres both horizontally and vertically or wood framing may be applied to the face of the boards. When the adhesive has set, the temporary supporting nails shall be countersunk to a depth equal to the thickness of the face layer of wall board, and any wood framing used shall be removed.

15 INSPECTION

15.1 The important aspects for inspection during fixing of wall coverings are the soundness and rigidity of the supporting framework. There shall be no further movement or distortion of this framework so as to affect the coverings. If inspection shows the likelihood of further movements of the background, special resilient devices in fixing wallboards, capable of absorbing shocks and strains due to movements shall be provided.

16 MAINTENANCE AND REPAIRS

16.1 Gypsum wallboards and asbestos cement boards do not ordinarily require any further finishes to maintain. Plywood and other boards of wood-based material may require protective finishes periodically renewed to prolong their life.

16.2 Repairs would arise in the coverings due to cracking or distortion (bulging) as a result of movements of the background, or supporting framework. The cause of these defects shall be first ascertained and rectified. The coverings that are affected shall be replaced with new ones and fixed with resilient fixing devices so as to remain free from the effect of the background movements.

ANNEX A

(*Clause* 2.1)

LIST OF REFERRED INDIAN STANDARDS

IS No.	*Title*	*IS No.*	*Title*
2-1960	Rules for rounding off mumerical values (*revised*)	1328-1982	Specification for veneered decorative plywood (*second revision*)
303-1975	Specification for plywood for general purposes (*second revision*)	1658-1977	Specification for fibre hardboards (*second revision*)
401-1982	Code of practice for preservation of timber (*third revision*)	1946-1961	Code of practice for use of fixing devices in walls, ceilings and floors of solid construction
451-1972	Technical supply conditions for wood screws (*second revision*)	2097-1983	Specification for foam makings branch pipe (*first revision*)
459-1970	Specification for unreinforced corrugated and semi-corrugated asbestos cement sheets (*second revision*)	2098-1964	Specification for asbestos cement building boards
659-1964	Safety code for air-conditioning (*revised*)	3097-1980	Specification for veneered particle boards (*first revision*)
710-1976	Specification for marine plywood (*first revision*)	3792-1978	Guide for heat insulation of non-industrial buildings (*first revision*)
723-1972	Specification for steel countersunk head wire nails (*second revision*)	7316-1974	Decorative plywood using plurality of veneers for decorative faces

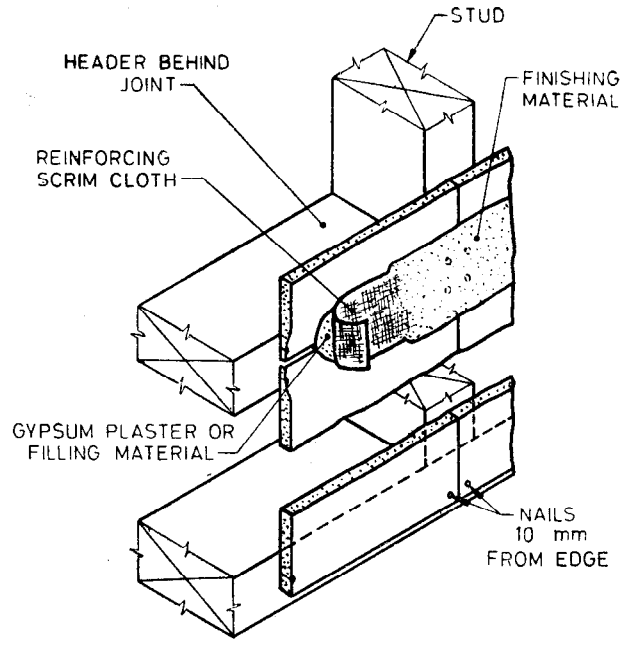


FIG. 1 FIXING GYPSUM BOARDS

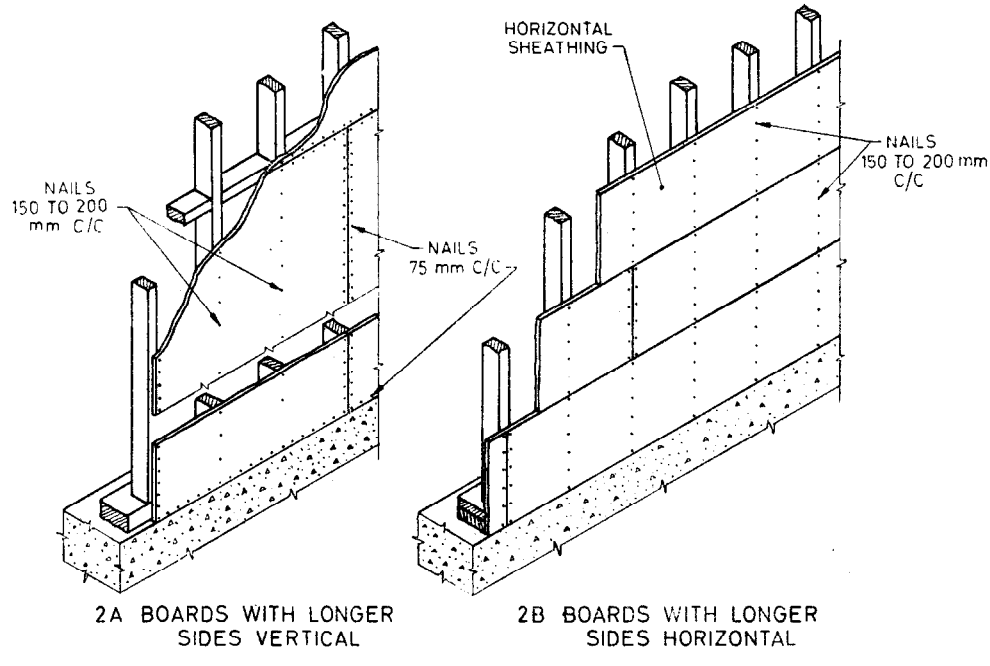


FIG. 2 FIXING FIBREBOARD WALL SHEATHING

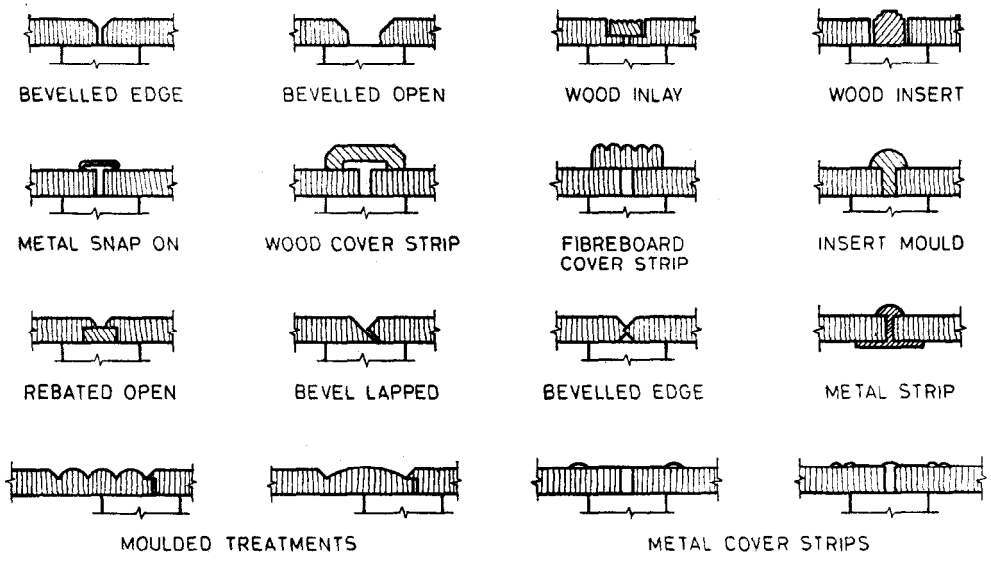


FIG. 3 DETAILS OF FIBREBOARD JOINTS

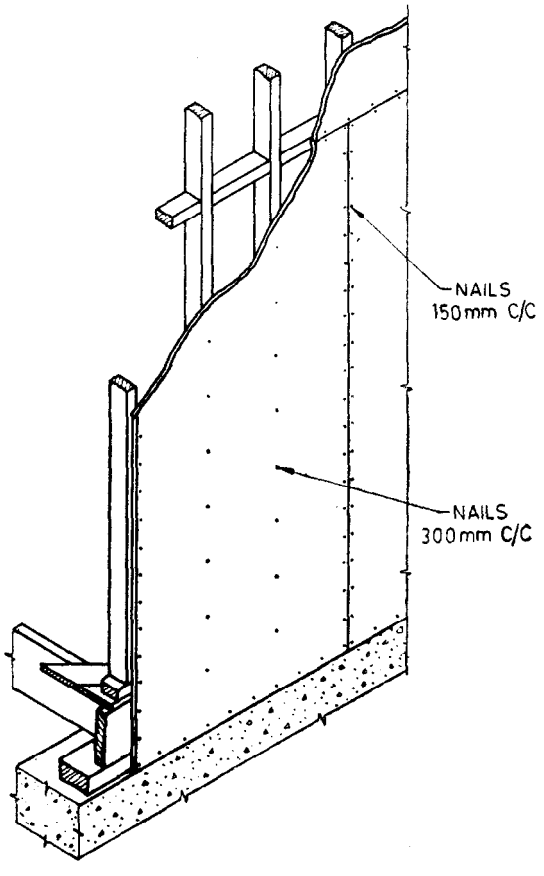
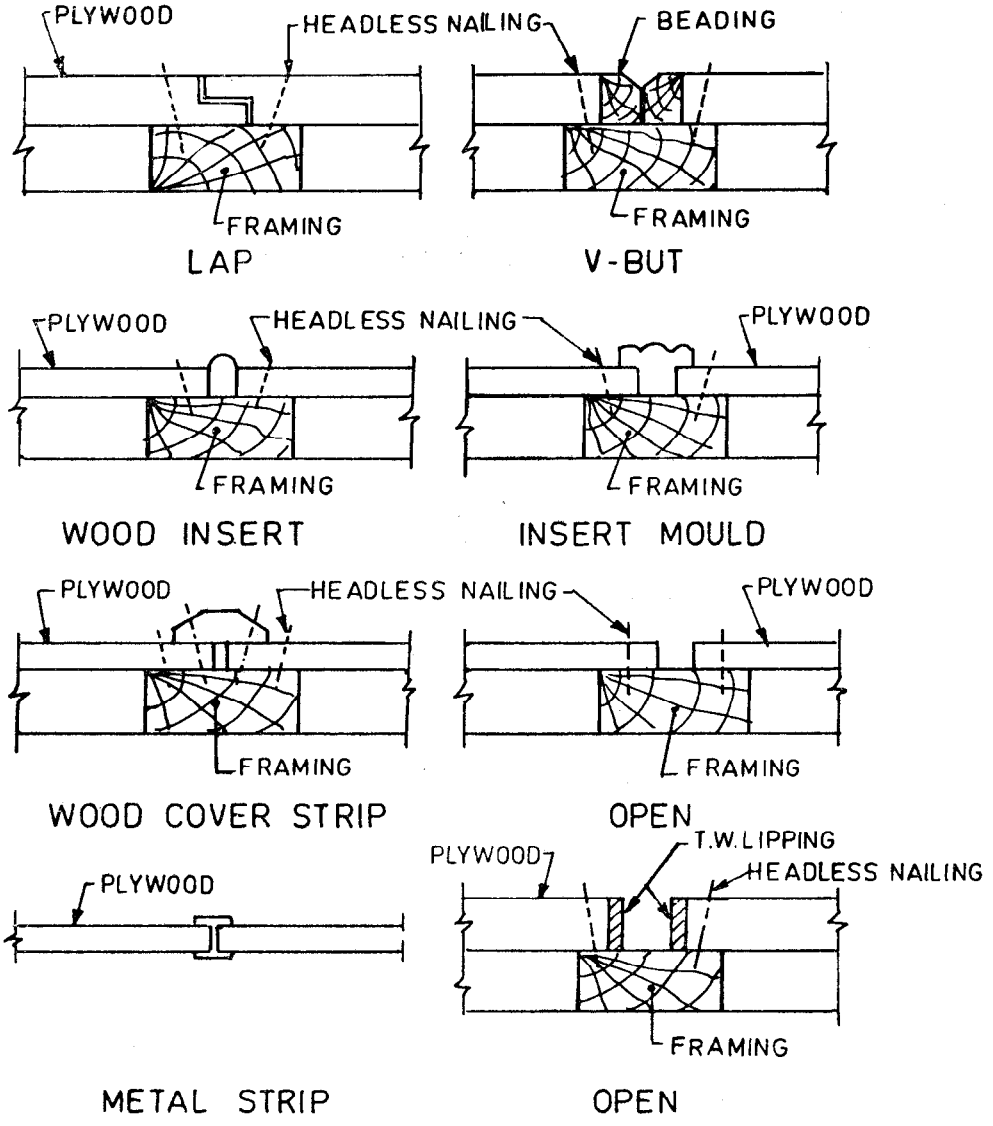


FIG. 4 FIXING PLYWOOD WALL SHEATHING



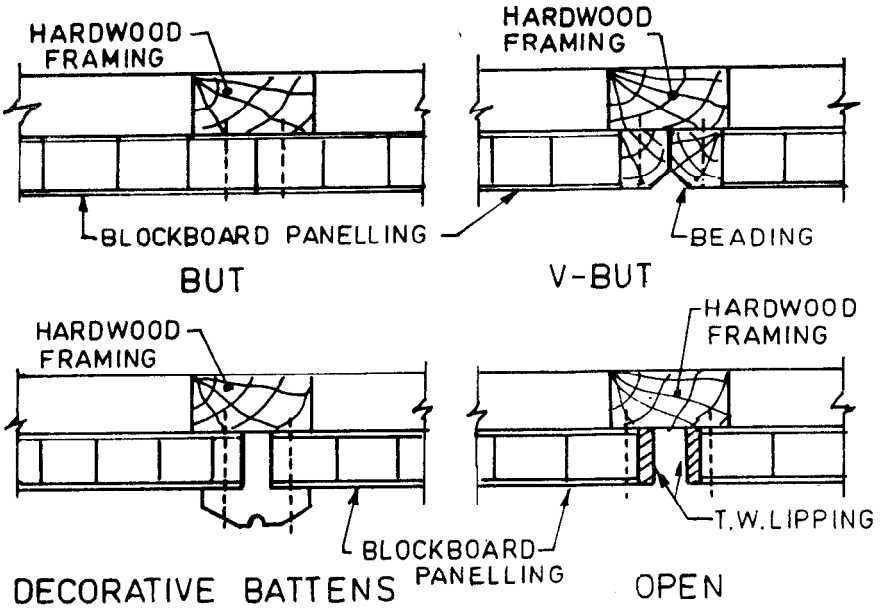
NOTES :

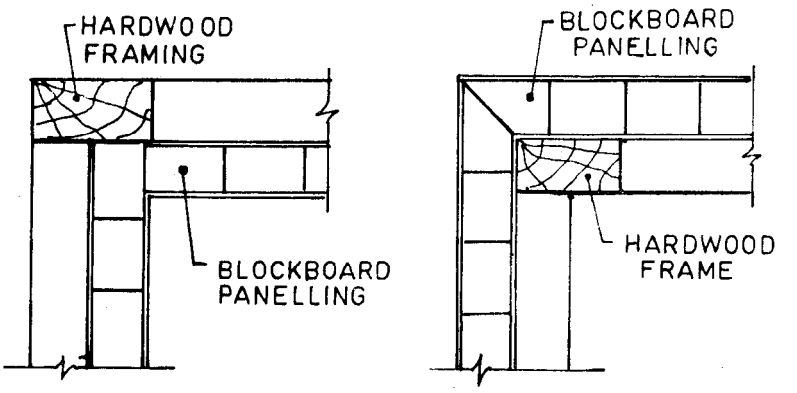
EDGE SEALING : Protect All the EDGES of the Board using a suitable sealant or edge lipping to prevent moisture assorption.

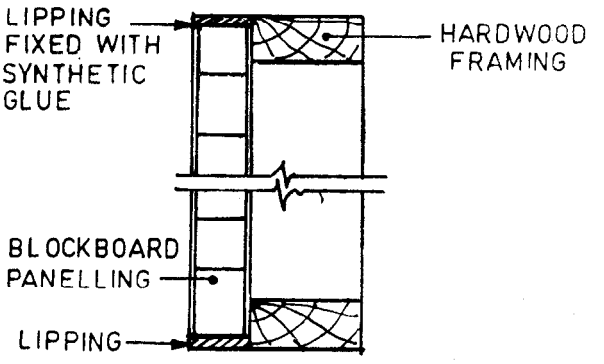
SUGGESTED SEALANT : For 6 mm Ply : Epoxy resin, nitrocellulose lacquer.

SUGGESTED LIPPING : Veneers - 1·5 mm thick, solid wood strips, P.V.C. bands, alastic laminates, aluminium strips.

FIG. 5 DETAILS OF PLYWOOD JOINTS







LIPPING OF EDGES

NOTES :

EDGE SEALING : Protect all the edges of the board using a suitable sealawt or edge pipping to prevent moisture absorption.

SUGGESTED LIPPING : Veneers - 1·5 mm thick, solid wood - strips, P.V.C. bands, ylastic laminates, aluminium strips.

FIG. 6 DETAILS OF BLOCK BOARD JOINTS

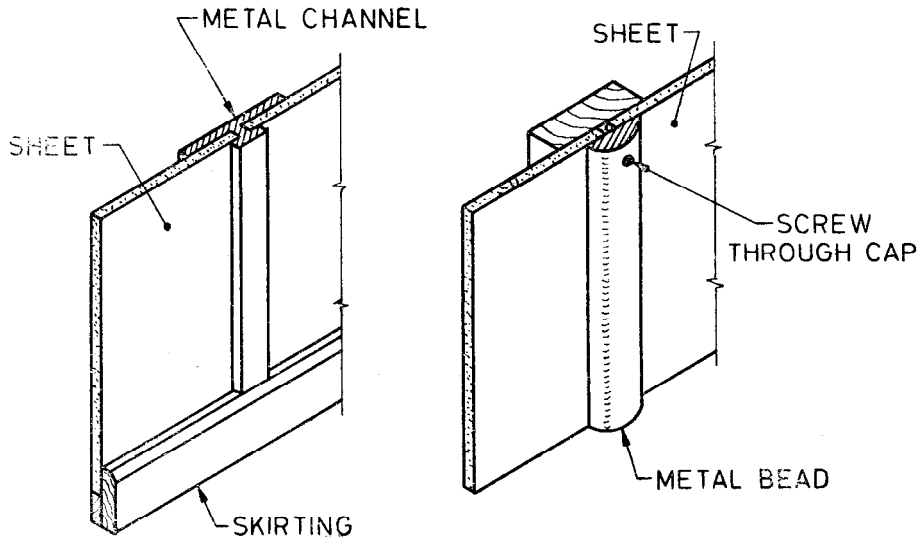


FIG. 7 FIXING FLAT ASBESTO — CEMENT SHEETS

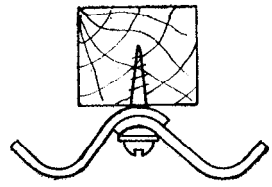


FIG. 8 FIXING CORRUGATED ASBESTOS — CEMENT SHEETS

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