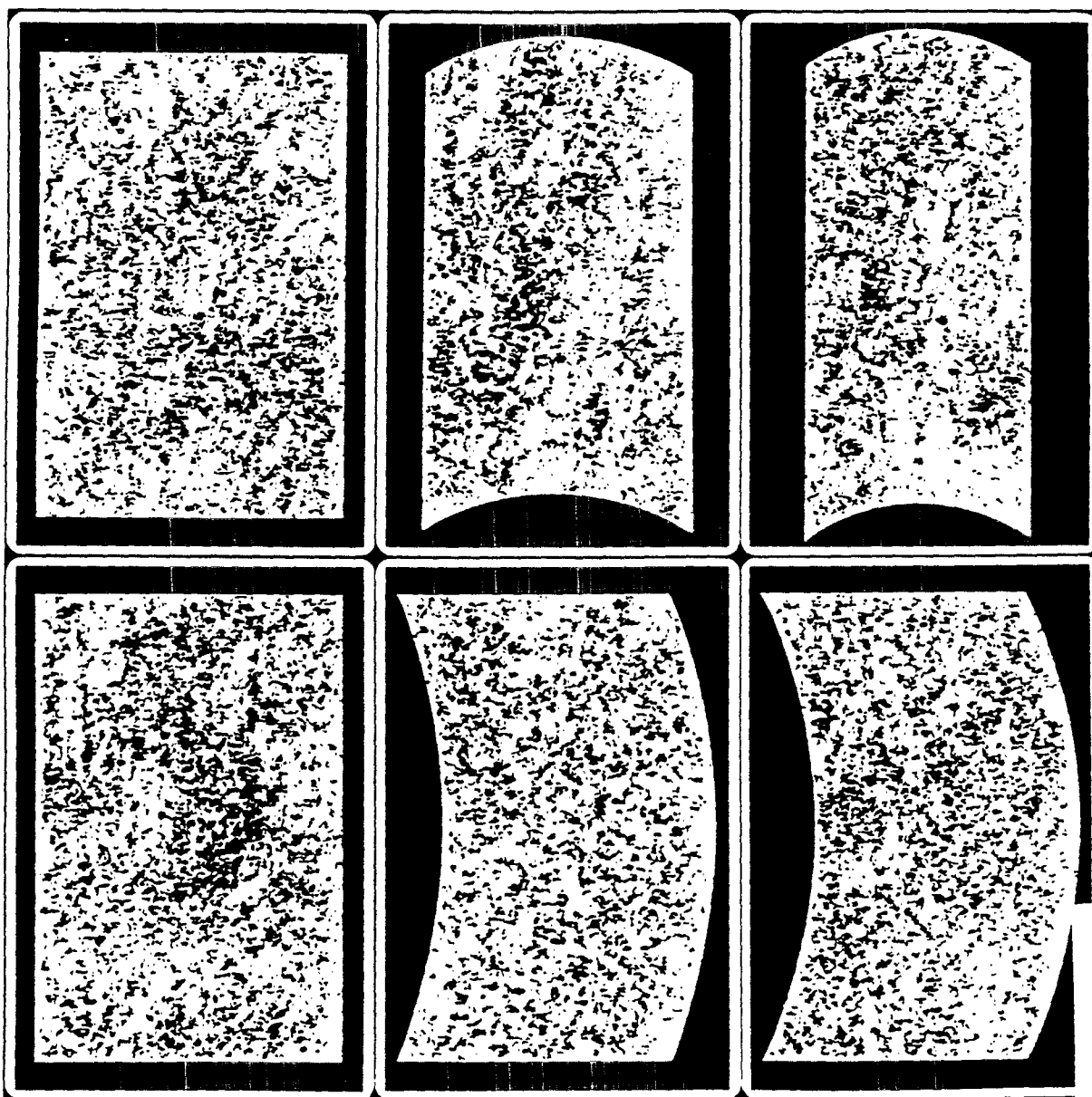


Installation Guide for Flexboard®

Mineral Fiber Cement Sheets



Johns-Manville



DUP 1010468

Construction Details • Descriptive Information • Cutting Methods

Johns-Manville **Flexboard®** Mineral Fiber Cement Sheets

What It Is

Flexboard is a flexible stone-like sheet made from mineral fiber and portland cement, combined under pressure while being formed and then hydraulically repressed to give it extra strength and toughness.

SIZE AND COLORS —

STANDARD FLEXBOARD — available in sheets 4' X 8', 4' X 10', and 4' X 12' and 1 8", 3 16", 1 4", 3 8" and 1 2" thick. The color is light gray. The finish is smooth and hard.

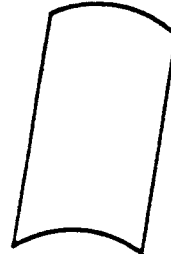
PRE-PRIMED FLEXBOARD — sheets are 4' X 8', 4' X 10' and 4' X 12' and either 1 8", 3 16", or 1 4" thick. The primer coat is a light tan.

Why It Is Superior

FIRE-RESISTANT AND ROT-RESISTANT — Made of mineral fiber and cement, Flexboard does not burn. It bears the Underwriters' Laboratories, Inc. label as a non-combustible material. It is rot and rust resistant, hard to scratch or mar, never needs preservatives and is easy to keep clean.

EASY TO HANDLE — One person can lift and carry a full size sheet. A 4' X 8' sheet in 1 8" thickness weighs 40 lbs., in 3 16" thickness 60 lbs. and in 1 4" thickness 80 lbs.

FLEXIBILITY — Makes Flexboard ideal for arched ceilings and circular alcoves. The sheets may be curved in either direction. See table below for minimum curving radii.

	
Minimum Longitudinal Radius	Minimum Transverse Radius
30" (1/8") thick	36"
36" (3/16") thick	54"

Where To Use It

In new construction or for remodeling, Flexboard may be used on ceilings, exterior walls and interior partitions. Depending on the thickness used, it may be applied directly to studs, over wood or non-wood sheathings and over existing siding. When used for residing, replace or repair all rotten or damaged members and renaill all loose siding. Provide a reasonably smooth base for the Flexboard. Standard Flexboard may also be used for roofing range shelters and similar semi-weatherproof structures. It is also a good finishing material for miscellaneous uses such as counter tops and chute or duct linings.

Fabrication

Always cut Flexboard so any roughness from cutting will be largely on the underside of the sheet. For smoothing or shaping the cut edge, use a horseshoe or wood rasp or a block and No. 1 sandpaper.

SAWING — For sawing by hand use a 10 point saw with little or no set. An expensive one is not necessary. Wet the saw with water for faster cutting.

For power saws, either portable or stationary, use Abrasive Wheels No. C203-NB3 or No. 203 rxb made by the Carborundum Co., Niagara Falls, New York; Dimet Rimlock Blade, Type "Standard Copper" made by the Felker Manufacturing Co., Torrence, California; Norton Crystolon "R" made by the Norton Co., Worcester, Mass., or silicon carbide blades made by New England Carbide Tool Co. Inc., Peabody, Mass.

For production work, carbide tipped saws (Carbide Saw & Tool Co., Louisville, Kentucky) are recommended, providing speed or power equipment is correct for saw blade used. Saw blades with 20 or more points are recommended.

DUST CONTROL — Dust Control facilities should be provided for machining operations. In wet cutting, sufficient water in the form of mist or spray must be applied to assure that the dust does not become airborne and is properly flushed away. When dry machining, the tools must be properly hooded and connected to a source of exhaust air that includes a filter medium, preferably a fabric bag filter.

The OSHA asbestos standard requires that exhaust and dust collection systems be designed and maintained in accordance with American National Standard, "Fundamentals Governing the Design and Operation of Local Exhaust Systems," ANSI 29.2-1971.*

Table saws generate dust as follows:

1. Dust escapes from bottom side as leading edge of material engages downward moving saw teeth. Dust is propelled downward and towards back of saw below table top.
2. Some dust generated over top of material cut due to rubbing of saw or binding in saw cut. Dust rises over saw and towards operator.

A typical dust control system for table saws is shown here.

The dust collection system shown here has proven to be satisfactory for use with portable saws.

"SCORE AND SNAP" — Place a straight edge, such as 2 X 4, along the cutting line. Score several times with a Carbide Tipped Blade (Carbide Saw & Tool Co., Chicago, Ill.) in the Stanley No. 199 Knife (The Stanley Works, New Britain, Conn.), or with a hard pointed ice pick or awl using the straight edge as a guide. Then, with the scored line along the edge of the bench, hold the straight edge firmly on the line, and starting at one end, "snap" off the projecting strip intact.

CIRCULAR CUTS — Lay out the circle to be cut. For small circular cuts, punch a series of holes approximately 1 8" apart, using a sharpened nail-set. Tap with a hammer to knock out the piece.

For larger cuts, first drill a hole on the circumference line as a starting point, then use a keyhole saw to complete the cut.

For curves, a 9" radius (minimum) can be cut using the point of an ordinary carpenter's saw; a 22" radius (minimum) can be cut using about half the blade.

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*American National Standards Institute Inc.
 1430 Broadway
 New York, New York 10018

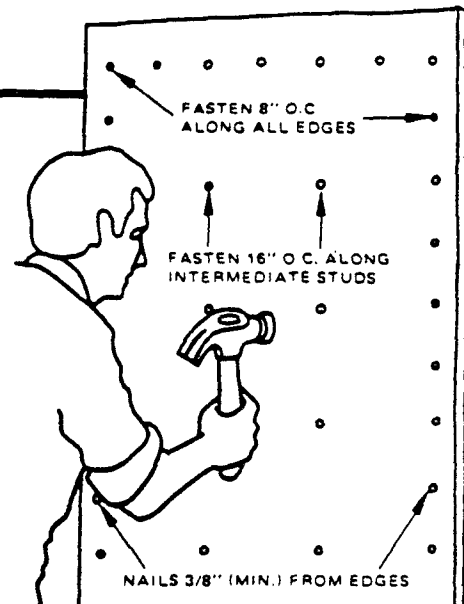
How To Fasten

NAILS—It is not possible to specify exactly the type of nail to use for each application because of the widely varying job conditions. Users must exercise judgment in selecting the appropriate type of nail. The nails listed in the following table have been selected because their characteristics are generally satisfactory for most types of application.

To permit driving through the sheets without pre-punching nail holes, points should be diamond, special cupped or blunt design.

Nails must penetrate lumber sheathing and if application is directly to studs, nails must penetrate studs one inch.

LOCATION OF NAILS—From the starting edge work toward the opposite edge to "wipe" the sheet smooth. Sketch at right shows approved location and spacing of nails. If nails have to be pulled out, use a wood block between the hammer and the Flexboard.



NAILS FOR FLEXBOARD

For Application to Lumber Sheathing or Directly to Studs

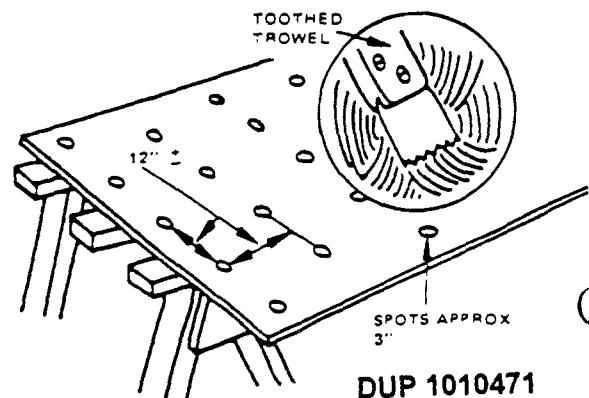
(Length and wire size must be increased if nailing through non-lumber sheathing to frame)

METAL	DESIGNATION	HEAD	$\frac{1}{4}$ " & $\frac{3}{8}$ " FLEXBOARD	$\frac{1}{2}$ " FLEXBOARD	INTERIOR & EXTERIOR	CEILINGS
Hot-Dipped Zinc-Coated Steel	Roofing	Flat*	$1\frac{1}{4}$ " x .105"	$1\frac{1}{2}$ " x .120"	Yes	Yes 3/8" Head
Aluminum Alloy	Asbestos Shingle Face Nail	Flat	Not Available	Not Available	Yes	Yes
Hardened Steel**	Asbestos Sheet — Helix Screw Nail	Flat or Slight Button*	$1\frac{1}{4}$ " x .080"	$1\frac{1}{4}$ " x .105"	Yes	Yes 3/8" Head

*For exterior application where penetration of moisture might be a problem, a weather sealing device such as neoprene washers should be used under the head

**If hardened steel nails are used for exterior application or in areas of high humidity, they must be hot-dipped, zinc-coated or stainless.

ADHESIVES—To prevent drumming, sheets may be cemented, using synthetic rubber base ceramic tile adhesives (3M CTA-11 or equivalent) (1 gal. covers 225 sq. ft. approx.) Apply with toothed trowel in 3" spots, 1/8" thick, staggered on approximately 12" centers and kept 1" from sheet edge. See sketch. Cement should only be used over continuous wood backing or plaster and must be supplemented by nailing or other means of fastening. The Flexboard must, in addition, be temporarily braced until the cement has set.



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Painting

PRE-PRIMED FLEXBOARD

FLEXBOARD sheets are available with a high quality, factory-applied primer that was designed to prepare the surface for decoration with any type of durable exterior paint, or with any type of interior finish. The use of Pre-Primed FLEXBOARD is strongly recommended when painting is planned.

Pre-Primed FLEXBOARD installed outdoors should be topcoated within three months after installation. If the primer is allowed to weather for a long time, it will become slightly chalky. Severely chalked surfaces should be reprimed with the type of primer recommended below for Standard FLEXBOARD, especially if a water emulsion paint will be used for decoration.

In ordinary exposures, FLEXBOARD unlike conventional wood and metal materials, requires no paint for preservation. For unusual situations such as in chemical plants where acidic corrosive atmospheres prevail, chemically resistant coatings should be used. Johns-Manville technologists will be glad to offer advice for specific applications.

FLEXBOARD installed outdoors and painted

- a) Use Pre-primed FLEXBOARD, or primed with a good quality solvent base alkali resistant primer or equivalent as recommended by reputable paint manufacturers.
- b) For topcoats, use any high quality, exterior grade emulsion paint, or any alkyd-based (solvent-type) gloss, semi-gloss, or flat paint, exterior grade.

FLEXBOARD installed indoors and painted

- a) For very damp locations (such as shower rooms), use Pre-Primed FLEXBOARD, or prime as recommended above. Then topcoat with any type of good quality interior paint, either emulsion-type or solvent-type, in any desired gloss range.
- b) For normal locations, proceed as follows for gloss and semi-gloss finishes:
 - Prime with an emulsion-type primer-sealer
 - Use alkyd enamels for glossy effects
 - Use alkyd—or emulsion-type semi-gloss paints for medium luster finishes.

For a flat finish, use one or two coats of an emulsion or alkyd-type interior flat wall paint.

Painting wood battens and trim

FLEXBOARD is frequently used with wood battens and trim. Prime new wood with a so-called "new wood" oil-based, zinc-free primer if the wood is installed outdoors.

As stated previously, use Pre-Primed FLEXBOARD or the recommended primer outdoors, then paint the appropriately primed wood and FLEXBOARD with an emulsion-type paint, or any solvent-type paint recommended for outdoor wood. Properly primed FLEXBOARD will accept any paint that is satisfactory for wood.

For indoor construction, prime new wood with an "enamel undercoater", then use the same flat, semi-gloss or gloss topcoat on both the wood and FLEXBOARD.

Cleaning

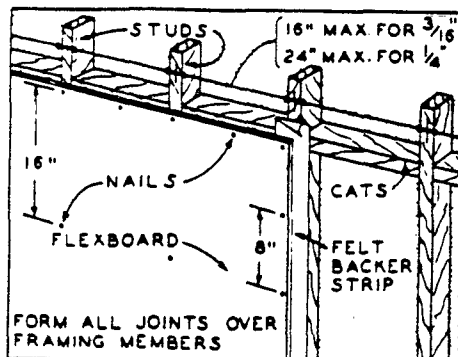
UNPAINTED FLEXBOARD — Ordinary dirt may be removed with a fiber brush, soap and water. Detergent cleaners, like Comet, may also be used. Severe dirt stains can usually be removed by using a strong solution of sodium hypochlorite or a two per cent solution of oxalic acid. To remove oil, grease or

similar stains, use carbon tetrachloride (Carbona). Rinse off all cleansers and acids thoroughly with clear water.

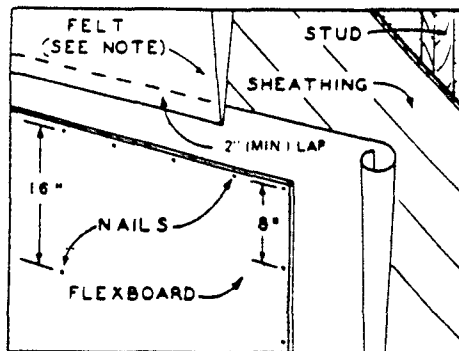
PAINTED FLEXBOARD — Follow standard practices for cleaning painted surfaces.

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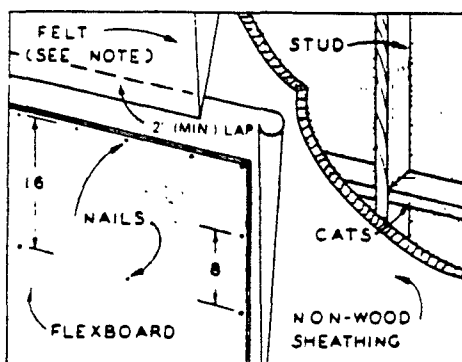
Exterior Walls



DIRECTLY TO STUDS—Use $\frac{3}{16}$ " or $\frac{1}{4}$ " Flexboard only. Maximum stud spacing for this method is 16" for $\frac{3}{16}$ " and 24" for $\frac{1}{4}$ ". Cats must be installed so that all joints are formed over framing members.



OVER SOLID WOOD BACKING—Use $\frac{1}{8}$ " or $\frac{3}{16}$ " Flexboard over closely boarded wood, $\frac{5}{16}$ " (minimum) plywood or old siding made reasonably smooth. First apply felt* underlayment, then erect the Flexboard.

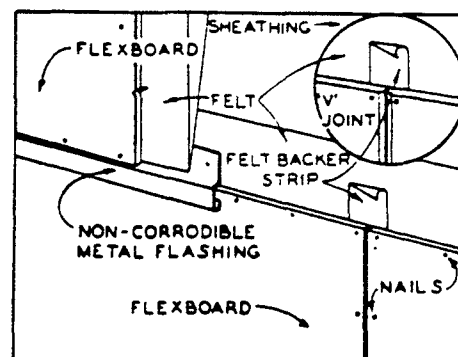


OVER NON-WOOD SHEATHING—Use $\frac{1}{8}$ " or $\frac{3}{16}$ " Flexboard. First apply a continuous felt* underlayment, then erect the Flexboard. Nails must penetrate into solid wood.

NOTE Continuous felt underlayment may be omitted over impregnated insulating board sheathing and water repellent gypsum sheathing.

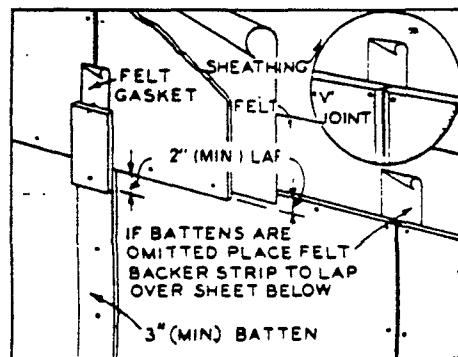
*NOTE Use a waterproof but not vaporproof membrane such as J-M No. 15 Asphalt Saturated Felt, lapped 2" at horizontal joints and 6" at vertical joints.

Exterior Joints



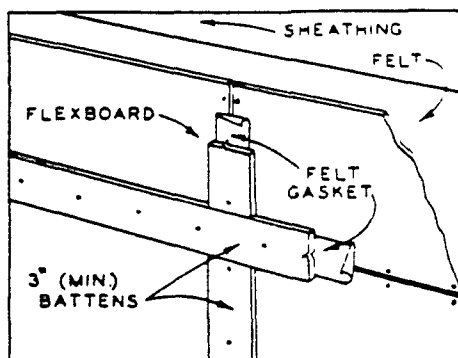
BUTT JOINTS—A non-corrodible metal "Z" flashing must be used at butted horizontal joints. Flashing is turned up under both the Flexboard and felt underlayment. Over non-wood sheathing form all joints over framing members.

A V-joint (see inset sketch) is preferred for vertical joints not covered with battens.*



LAPPED HORIZONTAL JOINTS—Both the Flexboard and the felt underlayment are lapped. Over non-wood sheathing form all joints over framing members.

A V-joint (see inset sketch) is preferred for vertical joints not covered with battens.*

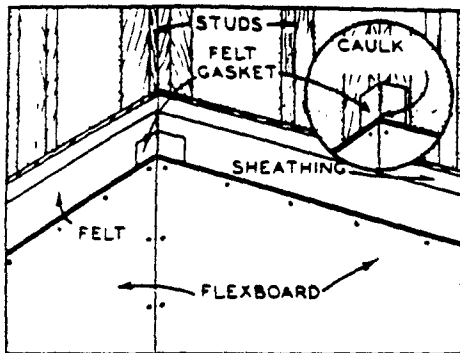


BATTENED JOINTS—Over each joint between sheets use a felt gasket then apply the Flexboard batten, nailed 8" c. to c. (max.) Over non-wood sheathing form all joints over framing members.

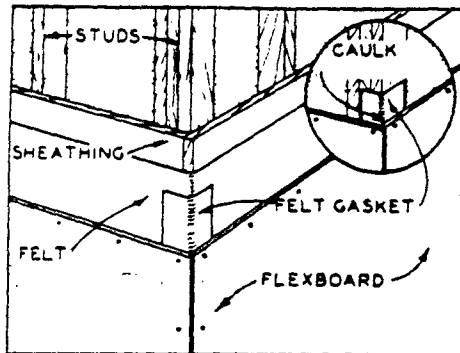
*NOTE A V-joint is made by beveling the edges of the sheets approximately 1/16" with a rasp or block and sandpaper.

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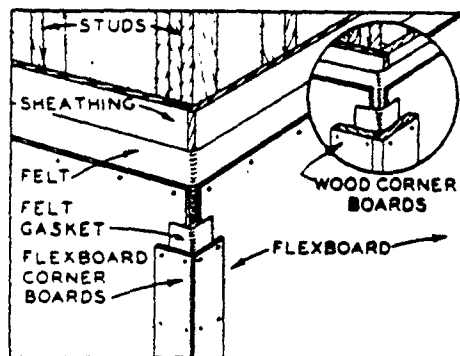
Exterior Corners



INSIDE CORNER (exterior of building)—Apply a felt gasket at corner and butt the Flexboard sheets. Inset sketch shows 3/16" or 1/4" Flexboard applied directly to studs.

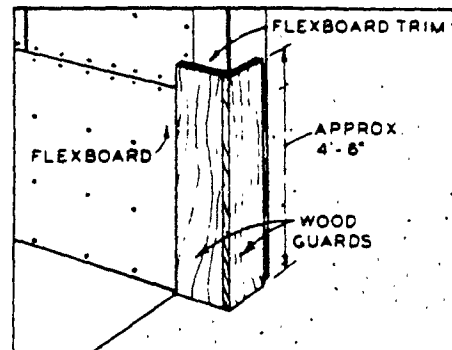


OUTSIDE CORNER (butted)—Apply a felt gasket at corner and butt the Flexboard sheets. Inset sketch shows 3/16" or 1/4" Flexboard applied directly to studs.

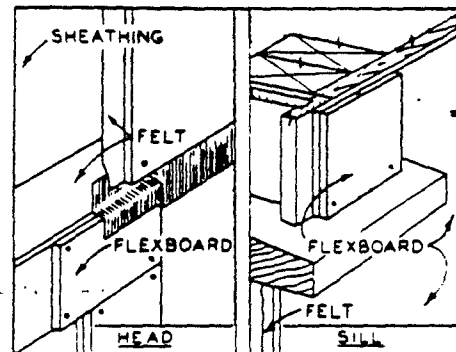


CORNER BOARDS—An alternate way to treat exterior corners is to install a felt gasket over the Flexboard and install Flexboard or wood corner boards.

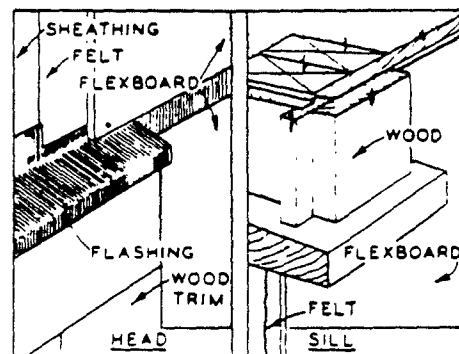
Openings



GUARDS—In openings accommodating truck traffic, provide substantial wood guards carried high enough to protect the Flexboard.



FLEXBOARD TRIM—The use of Flexboard trim at head and jambs of openings minimizes upkeep. Provide a non-corrodible metal flashing at the head.



WOOD TRIM—With conventional wood trim the Flexboard may butt against the trim or the trim may be rabbeted to receive the Flexboard. Provide a non-corrodible metal flashing at the head.

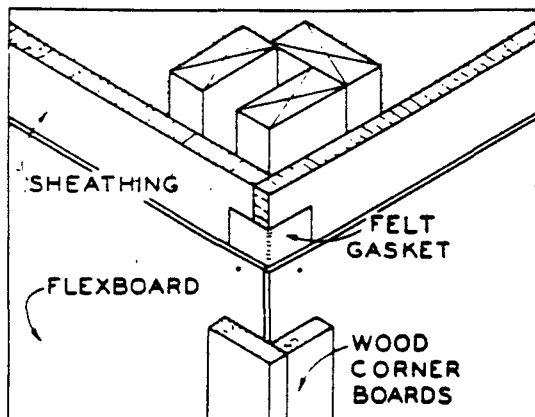
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Board & Batten

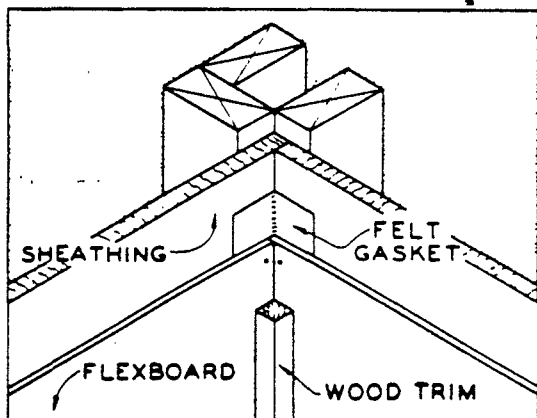
These instructions cover field application of BOARD and BATTEN construction for Standard and Pre-Primed Flexboard

1. **FRAMING:** Studs shall be spaced 16" c. to c. (maximum) and suitable framing for nailing shall be provided at all openings.
2. **SHEATHING:** The insulation sheathing must provide solid backing for the Flexboard. J-M 25/32" Weathertite Sheathing when nailed as specified provides sufficient stiffness to permit omission of corner bracing. This construction is acceptable to FHA.
3. **FLEXBOARD:** Flexboard must be prime coated if surface is to be painted. Use Pre-Primed Flexboard or prime Standard Flexboard in the field following recommendations on Page 5.
4. **BATTENS:** Wood battens and Standard Flexboard battens must be primed on all four sides following recommendations on Page 5.

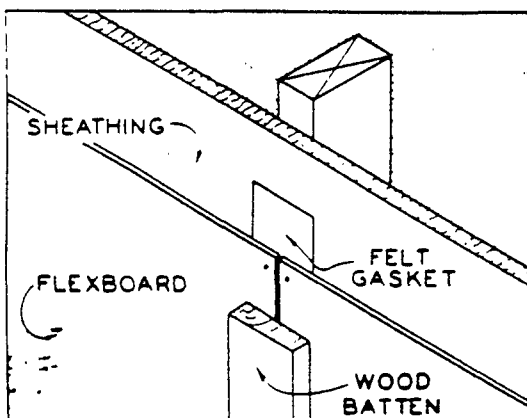
OUTSIDE CORNER



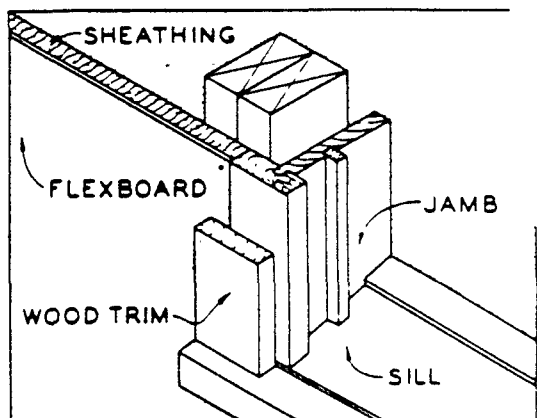
INSIDE CORNER



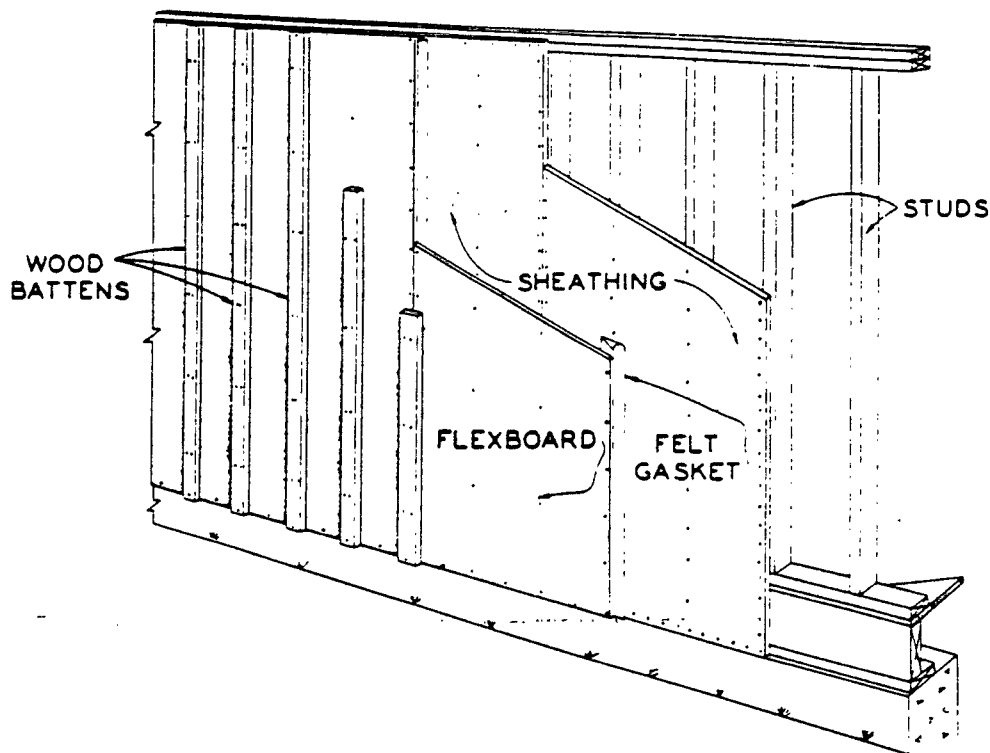
VERTICAL JOINT



WINDOW DETAIL



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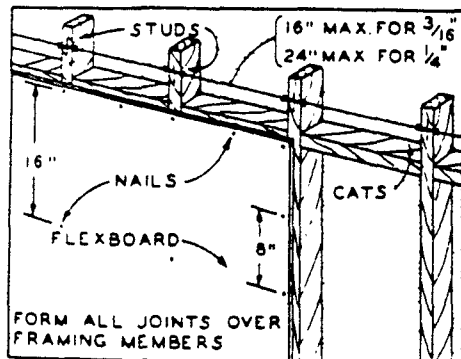
APPLICATION:

1. **SHEATHING:** Apply 4' wide by suitable length sheets of 25/32" Weathertite Sheathing over studs spaced 16" c. to c. (maximum). Form all joints over framing members. Fasten sheets 3" c. to c. at all edges and 6" c. to c. at intermediate studs. Keep fasteners 3/8" from edges. For types of fasteners follow "Directions for Applying" shipped with the sheathing.
2. **FELT:** If felt is required by local building codes, apply continuous underlayment over the sheathing. See "Notes" on Page 6.
3. **FLEXBOARD:** Apply 4' wide by suitable length sheets of Flexboard forming all joints over framing members but breaking vertical joints with vertical joints of the sheathing. Using 2" galvanized roofing nails, nail at all edges 8" c. to c. (3/8" minimum from edges) and 16" c. to c. at intermediate studs. Install a gasket behind all vertical joints of the Flexboard. If horizontal joints are required, use treatments shown on Page 6.
4. **BATTENS:** Apply 1" x 3" wood battens over all stud locations and nail with two 8d nails 16" c. to c. but staggered relative to the underlying nails in the Flexboard. Nails in battens should be countersunk and later puttied. Flexboard battens may also be used.
5. **PAINTING:** For finish painting, follow recommendations on Page 5.

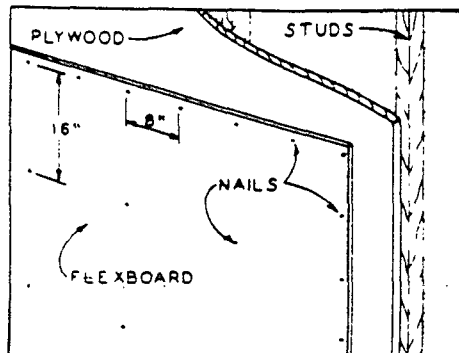
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(NOTE Details on this and preceding page show wood battens and trim. Standard Pre Primed Flexboard battens and trim may also be used.

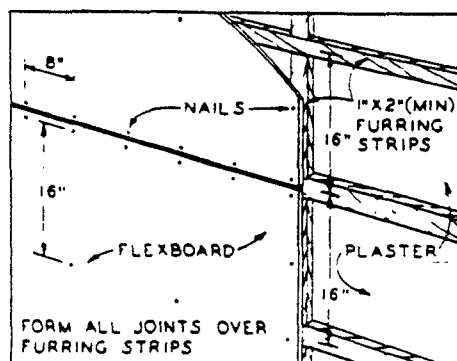
Interior Walls



DIRECTLY TO STUDS—Use 3/16" or 1/4" Flexboard only. Maximum stud spacing for this method is 16" for 3/16" and 24" for 1/4". Cats must be installed so that all joints are formed over framing members.

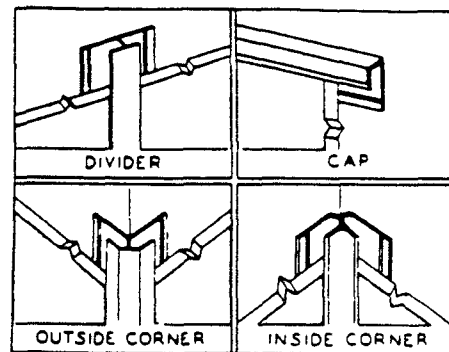


OVER SOLID BACKING — If the backing is plywood (minimum thickness 5/16"), use either 1/8" or 3/16" Flexboard. Flexboard qualifies for a one hour rating when applied over gypsum sheathing and conventional wood framing.

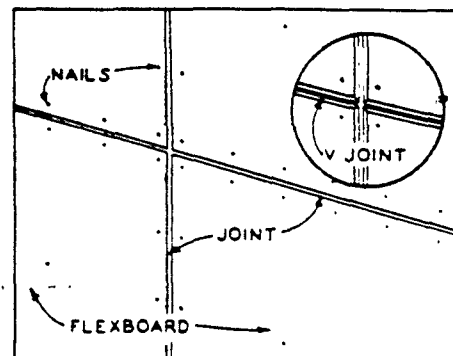


OVER PLASTER—Install furring strips 16" c. to c. and apply 3/16" or 1/4" Flexboard. All joints must be formed over furring strips.

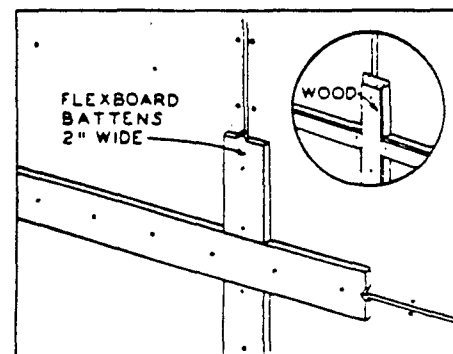
Interior Joints



MOULDINGS—Interior joints may be formed with mouldings applied according to manufacturer's directions. Supplemental face nailing or adhesives should be used.



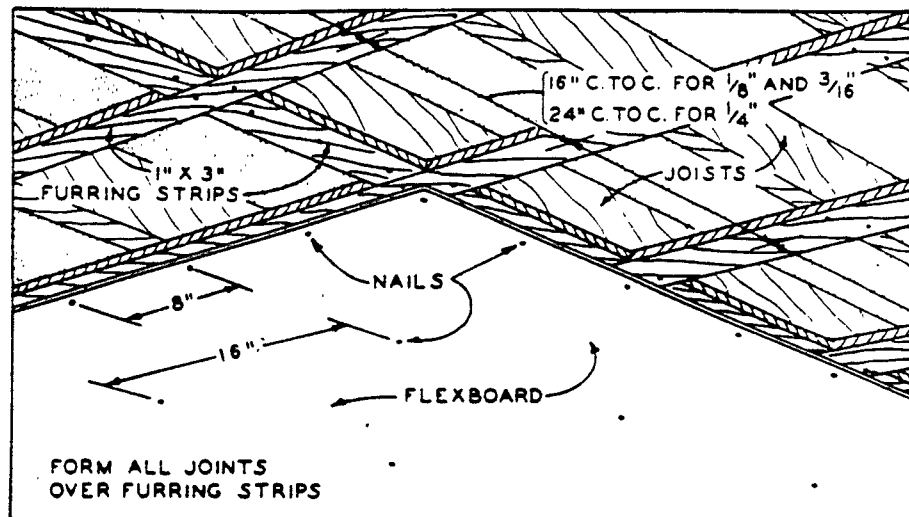
BUTT JOINTS—Joints may be butted with edges fitted neatly. Inset sketch shows a V-joint (preferred) made by beveling the edges of the sheets approximately 1/16" with a rasp or block and sandpaper.



BATTENS—Interior joints may be covered with Flexboard (2" minimum) or wood battens.

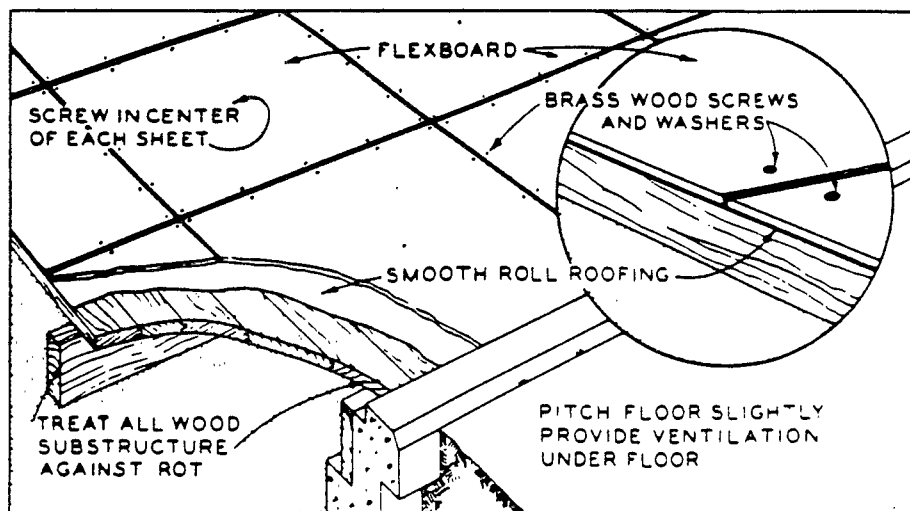
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Ceilings



Provide 1" x 3" furring strips 16" c. to c. for 1/8" and 3/16" Flexboard; 24" c. to c. for 1/4". Install furring at right angles to joists and secure with two nails at each joist. Form all joints over furring strips. Over plaster, sound for joists before installing furring strips. For easier handling and application, 4' x 4' sheets are recommended. If desired, joints may be covered with Flexboard or wood battens.

Floors



Standard Flexboard, if installed over the proper subfloor, is well suited for exterior floors and requires little upkeep. Use 4' x 4' sheets of 3/16" or 1/4" Flexboard secured with brass screws and washers.

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For information on other J-M Products and Systems call Product Information Center at (303) 979-1000



Johns-Manville

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