PLAINTIFF'S EXHIBIT

GP-1012

2-PLY wallboard application

2-PLY GYPSUM WALLBOARD is the ultimate in dry-wall construction. It is a modern, up-to-date way to have truly beautiful interiors, because joints between panels are effectively concealed. It is rugged and enduring because two sheets of gypsum wallboard are laminated together, each reinforcing the other. . . . Consider the principle of ply construction that has been proved by the six-ply automobile tire, the laminated tennis racket frame, shatterproof glass and scores of other products where the "ply" principle of construction is employed. These products take on new characteristics above and beyond the sum of the plies. . . . This is also true of 2-PLY GYPSUM WALLBOARD. When two sheets of gypsum wallboard are laminated, the resistance to bending or impact is more than twice that of a single ply.



Gypsum Association

A. I. A. FILE NO. 23-L

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Framing:

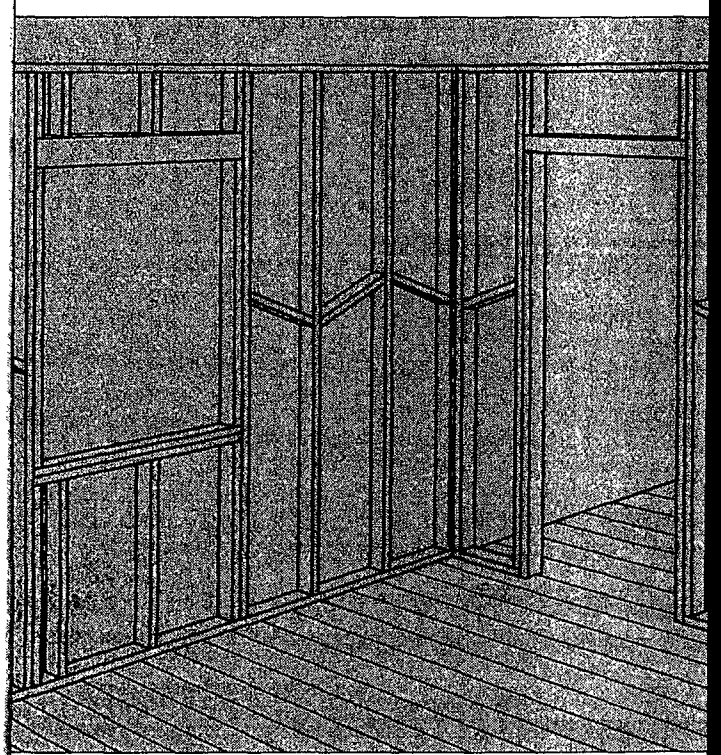
The use of 2-PLY GYPSUM WALLBOARD does not require special framing. Headers at horizontal joints are unnecessary and only the usual provisions for corner nailing are required. Gypsum 2-Ply Wallboard is intended for use on building frames that comply with conventional standards and does not require premium framing materials or unusual workmanship. However, good walls and ceilings, regardless of the surfacing material, depend upon a good frame for lasting beauty. Flimsy constructions are inappropriate because they contribute to high maintenance and a short life for the buildings they support.

Good framing, its design and workmanship, should comply with the following recognized standards:

American Lumber Standards,
National Lumber Manufacturers Ass'n.

Minimum Property Requirements,
Federal Housing Administration

Technique of House Nailing,
Housing and Home Finance Agency



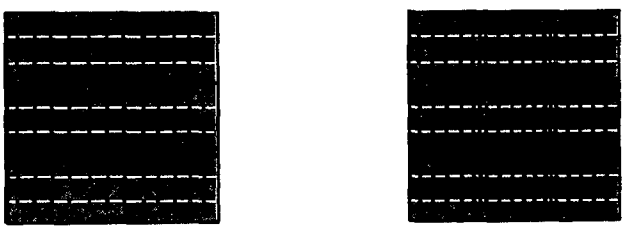
Layout Patterns:

To obtain the maximum that GYPSUM 2-PLY WALLBOARD offers, the following general principles are essential.

The finish panel should be applied at right angles to the direction of the first panel. Cross lamination gives maximum strength.

Gypsum wallboard is manufactured in a 4 ft. width and lengths up to 12 ft. Use the longest length the job will accommodate, particularly on the finish layer, to reduce end joints to a minimum, thereby reducing the amount of joint treatment.

The suggested layouts for the arrangement of first and second layers are suggested below.



1ST PLY 2ND PLY

Ceiling with neither dimension more than 12 ft.

The first layer is applied parallel to the joists to the full room dimension
The second layer is cross laminated to the first.
Note: That both layers extend from wall to wall without end joints.

***LEGEND:* Broken white lines indicate framing members. Broken black lines indicate the underlying ply. Solid black lines indicate the exposed ply.**

Cutting and Scoring

Gypsum wallboard should be cut to measure by scoring rather than sawing because scoring is faster and more accurate. With the finish surface up, place a straight edge along the line to be cut, and with a sharp knife cut the surface paper only. Exception: In making circular cuts use a fine tooth key hole saw.

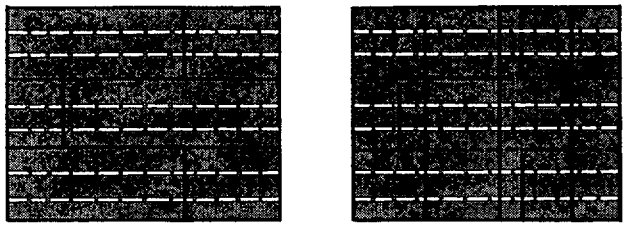
Breaking the core

Slide the board along the pile until the score mark is over the end of the pile of boards. This gives a firm support under the score mark. Press down on the extending end of the board and the gypsum core will snap off straight and clean.

Cutting back paper

With the cut end extending downward, cut the back paper along the line of the break. By lifting the extended portion upward, the cut is complete. With coarse sandpaper smooth the cut edge and remove any loose paper. This minor precaution makes for snug fitting joints with ample nailing surface.

CEILINGS



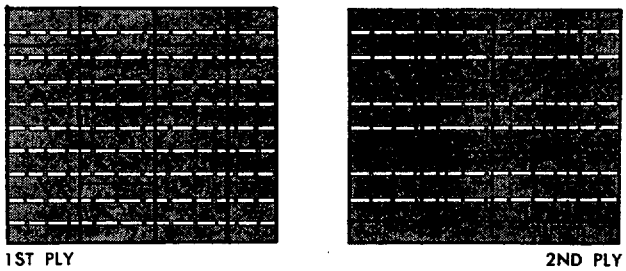
1ST PLY 2ND PLY

Ceilings with one dimension 12 ft. or less

The first layer is parallel to the joists with as few end joints as possible.

The finish layer is cross laminated and extends from wall to wall without end joints.

Note: If the direction of the joists is reversed the same layout should be used. The end joints of the first layer then will be parallel to the joists, and in that event the end joint of this first layer should fall between joists, not over the joist.



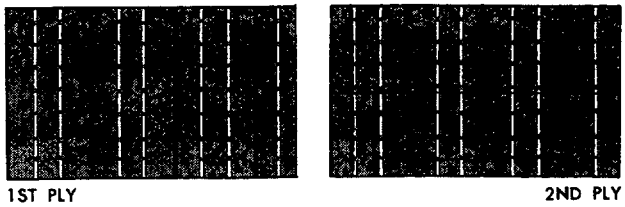
1ST PLY 2ND PLY

Ceilings with both dimensions greater than 12 ft.

The first layer is erected across the joists with end joints falling between joist spaces. The second layer is cross laminated so that the edge falls under the joist. Use large size panels to reduce end joints. End joints should always be staggered.

Note: If the joist direction is reversed the same layout may be used. In that event the longitudinal edges of the first layer will be parallel to the joists. The longitudinal edges however, of the first layer should fall between joist spaces.

SIDEWALLS

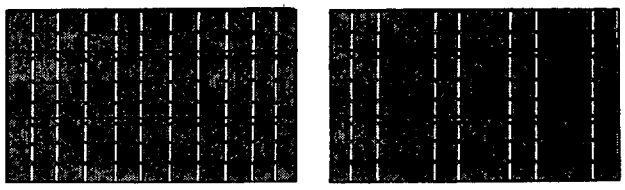


1ST PLY 2ND PLY

Height not over 8 ft. 3 in.

The first layer is erected vertically. The second layer is applied horizontally. If the wall is 12 ft. or less in length large size panels should be used to avoid all end joints.

If the wall length exceeds 12 ft. the end joints should fall between stud spacing and not over the stud.



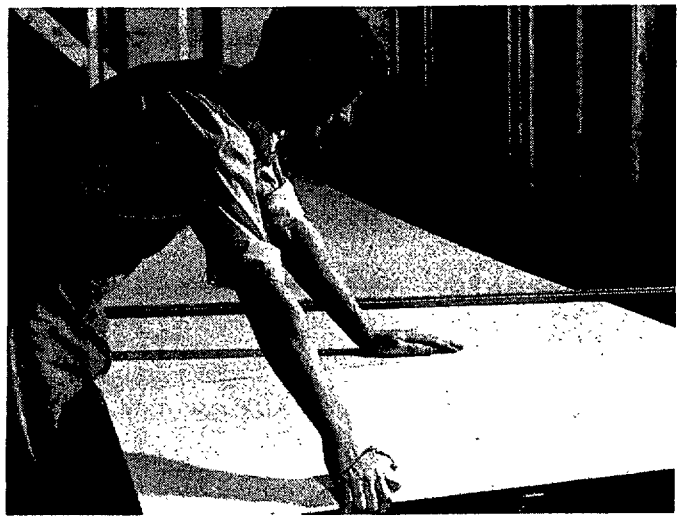
1ST PLY 2ND PLY

Height over 8 ft. 3 in.

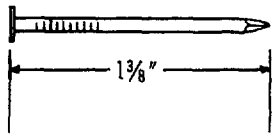
Vertical application of the second layer usually requires less joint treatment than when applied horizontally. Therefore, the first layer is erected horizontally with end joints (staggered) occurring in the stud space rather than on the stud.

If however, horizontal application is preferred for the second layer the same procedure as described for the walls less than 8 ft. 3 in. high should be observed. It should be noted that horizontal application on 12 ft. or less in length, even though unusually high, will result in less joint treatment.





Application:



FIRST PLY

First select the pattern layout that will require the minimum of joint treatment of the second ply. The use of large panels usually reduces the amount of joint treatment. Early planning saves time and labor, assures maximum strength with minimum waste.

Start with the ceiling. Cut the board to size so it fits without forcing. Use 13 gauge, cooler-type, uncoated nails 1⅜" long, spacing them 6" on centers along the joists. Start nailing near center of board working outward toward the edges. This lays the board down flat against the framing without warping or buckling.

Nailing at edges should be at least ⅜" from the outer edge of the board. It is extremely important that the board be held tightly against the framing while nailing. The nail cannot be expected to draw the board up tightly, so with the left hand, press the board hard against the framing while nails are being driven. The last hammer blow should set the nail flush with the surface without breaking the paper.

Having completed the first ply application to the ceiling start the side walls at one corner. Use the same technique and size of nails as described for ceilings except that the spacing of nails may be eight inches or less on centers. Dimpling is unnecessary, but nails should firmly hold the board against the framing with heads driven flush with the surface of the paper. Again, press the board tightly against the framing while driving nails.

SECOND PLY

Adhesive

The second ply of gypsum wallboard is laminated to the first with the same cement that is used for joint treatment because of its strong adhesive qualities. *Use only the joint cement or adhesive recommended by the gypsum wallboard manufacturer.*

To the back side of the second ply of gypsum wallboard, spread the adhesive with a notched trowel in an irregular pattern to an even distribution. The adhesive should extend to the extreme edges of the board. The trowel notches should be approximately ¼" x ¼" spaced not more than 2" on centers.

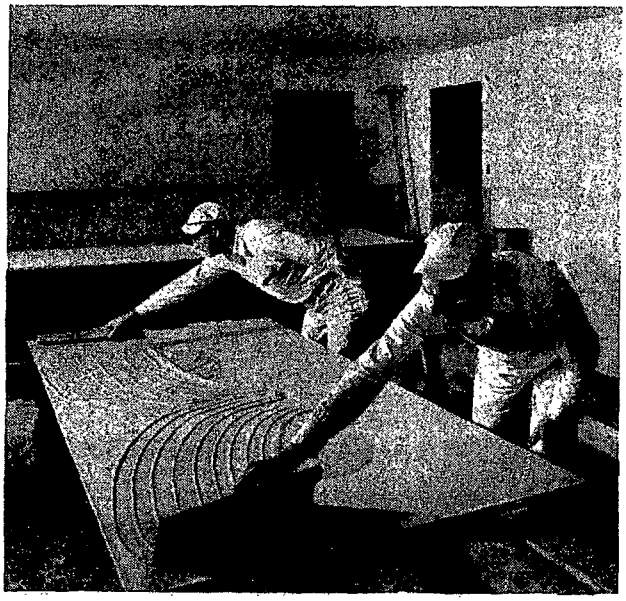


Using a clean metal container, mix the adhesive according to the printed directions on the package. Always clean tools and mixing pails between batches. Do not retemper.

Erection

As soon as the adhesive has been applied to the back side, the second ply should be erected into place without delay, starting first with the ceiling and finishing with the side walls. If the side walls are applied horizontally the top course should be applied first, the lower course last.

The second ply should be pressed tightly against the first, but no attempt should be made to completely level out the ridges of the adhesive with undue pressure. Continuous and intimate contact between the two plies is unnecessary. At this point nailing is un-





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necessary except as an expedient to hold the board in place until the cement sets or hardens—usually 24 hours. The following methods are recommended.

NAILING

Using the same nails as employed in the first ply, 1⅜" cooler type nail, secure the second ply by spacing nails approximately 12" on centers on ceilings, and approximately 16" on centers on side walls. After the adhesive has set hard, nails may be treated by one of the following methods:

At least 24 hours after the second ply has been erected drive the nails with a crown-headed hammer so the head rests slightly below the surface of the paper without breaking. This is called "dimpling," and the nail heads are subsequently concealed during the joint treatment operation.

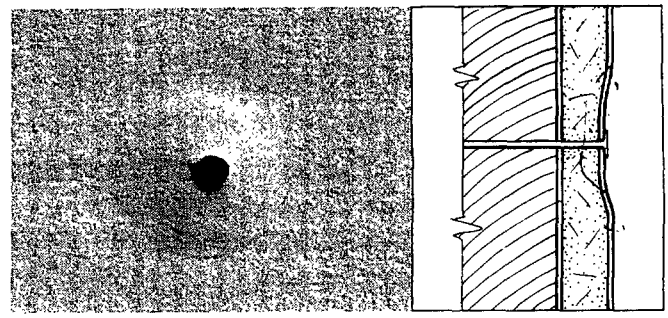
Instead of dimpling, the nails may be counter-sunk about ⅜" and the nail holes later filled and concealed when the joints are treated. This procedure minimizes the possibility of nail spots on exterior walls.

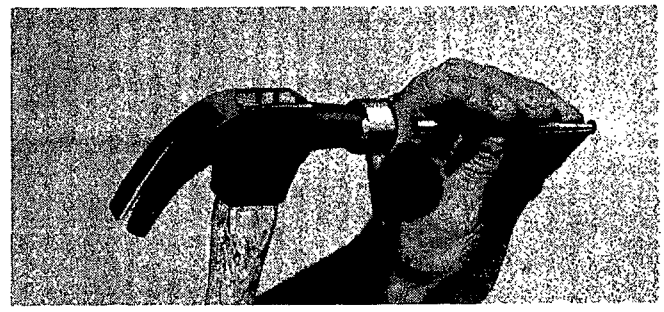
Temporary Nailing

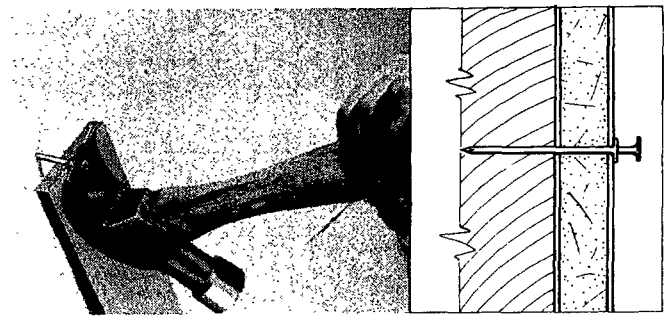
Instead of the 1⅜" wallboard nail, double-headed or scaffolding nails may be used to temporarily hold the second ply in position while the cement is setting, spacing them 12" on centers on ceilings and 16" on centers on side walls. After the cement has set and hardened the double headed nails are removed and the holes filled and concealed with joint cement.

Shoring

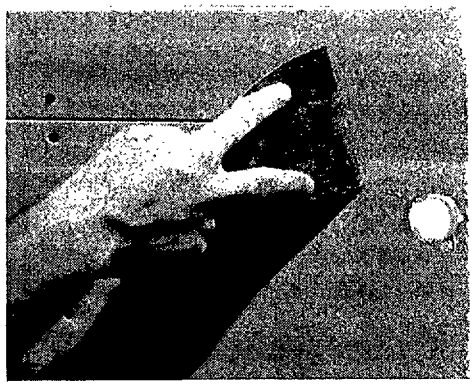
In lieu of nailing, the second ply of gypsum wallboard may be held in position simply by shoring with props and headers to insure adequate pressure for proper bonding. The shore should be held in place until the cement has hardened.







Joint concealment



Gypsum wallboard, with its recessed edges and reinforcing tape and joint cement, provides a method for producing a smooth expanse of wall with concealed joints that is exclusive with gypsum wallboard. With this system it is easy to have smooth, beautiful walls by following this time-tested application sequence carefully.

Materials should be genuine gypsum wallboard with reinforcement and joint cement especially prepared for the purpose, as recommended by the wallboard manufacturer. Both are made to exacting and rigid requirements. Substitutes for any part of the system should be avoided. See "Application of Second Ply" for mixing directions.

First Coat Application

Using a broad knife, spread the cement into the channel formed by the recessed edges of adjoining boards, completely covering the channel to a thickness of about 1/16".

Apply reinforcing tape to the full length of the wall, centering it over the joint. Use moderate pressure on the broad knife to embed tape in cement. A thin coating of adhesive then will separate the tape from the wallboard. The joint is wiped clean with the broad knife and the excess cement removed. It should be noted that the joint is slightly concave. Vertical joints are treated in the same manner.

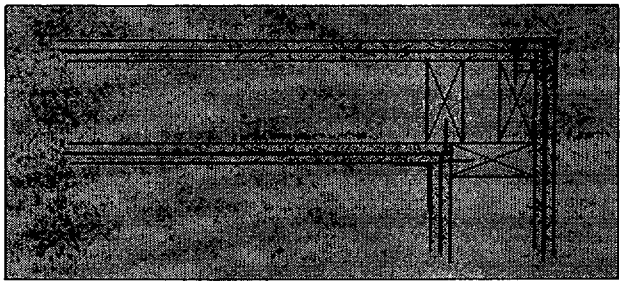
Second Coat Application

After the first coat has had sufficient time for drying, preferably 24 hours, a second coat of cement is applied to a width of approximately twice the width of the broad knife. This coat completely conceals the recess. Leave the surface as smooth as possible avoiding broad knife marks in the cement. Edges are feathered-out smooth. Give ample time for the drying, at least 24 hours, and longer if possible. If necessary, rough spots should be smoothed with fine sandpaper.

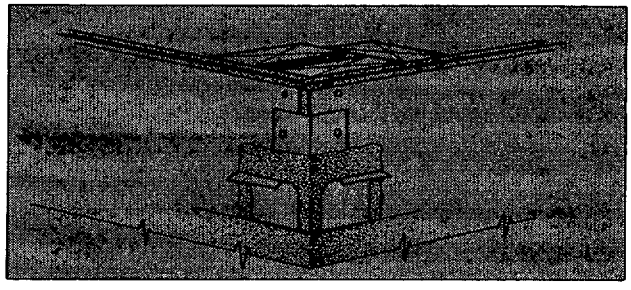
Third Coat Application

After the second coat has thoroughly dried and just before the trim is to

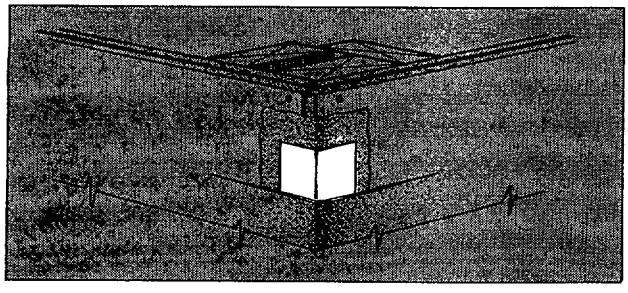
CONSTRUCTION DETAILS



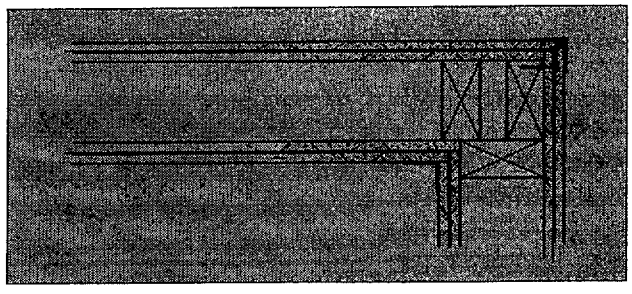
Reinforced Angles—Apply joint cement at the angle, extending about 1½" on adjacent walls. Fold the reinforcing tape down the middle and gently press the folded tape into position. With a broad knife embed the tape snugly into the cement to a true and straight line. Remove the excess cement and feather out edges. Apply second and third coats of cement as described under joint treatment.



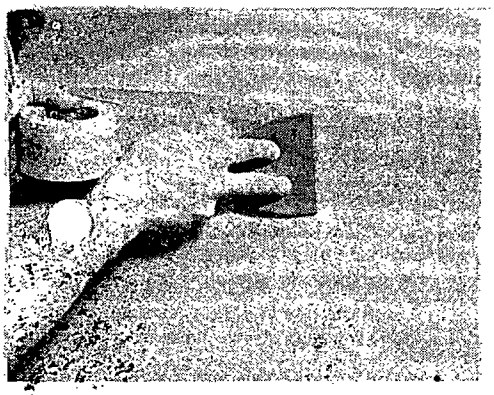
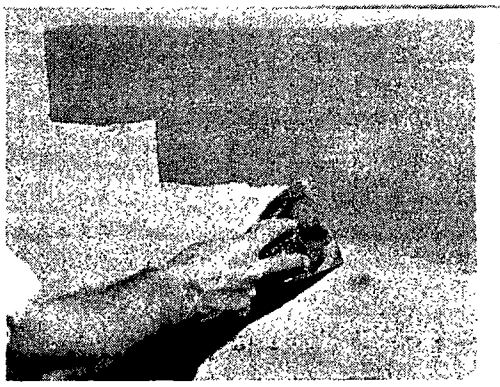
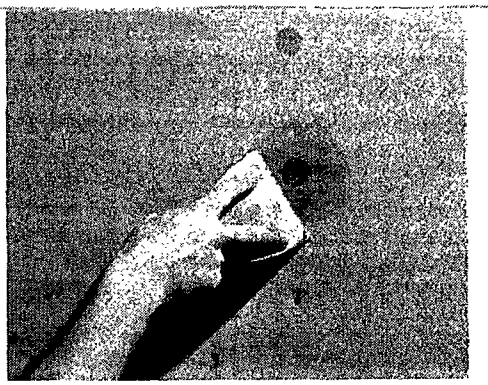
Metal Angle Bead—A metal corner angle is formed from a three inch strip of 26 gauge aluminum or galvanized iron by bending along the center line and folding to slightly less than a 90° angle so that it fits snugly on the corner. It is secured in position by nailing both wings at 8" intervals. Apply cement and reinforcing tape over both wings as shown. Finish with second and third coats of joint cement and sand the corner to slightly expose the metal.



Corner Reinforcement—Angle reinforcements are available consisting, generally, of a small metal angle to which is secured a heavy fabric reinforcement. The exterior corner of the second ply of wallboard is buttered with joint cement and the approved angle reinforcement (shown diagrammatically in white) is embedded. Finish the corner with joint cement.



Metal Corner Bead—After the first ply of gypsum wallboard has been applied, a pressed metal angle bead, as shown, is nailed at 8" intervals to framing. Care must be exercised in positioning the bead because the outer edge determines and forms the corner. The second ply of wallboard is fitted closely and the joint filled with adhesive. Finish the corner with tape and cement.

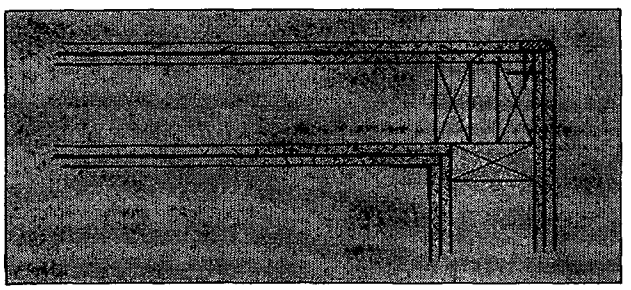
be installed a third very thin finishing coat is applied with the broad knife. The purpose of this coat is to fill in any irregularities or imperfections in the second coat. It covers an area 2 to 4 inches wider than the second coat and is feathered out neatly on the wallboard surface. The third coat should be left smooth enough to require a minimum of sanding. In fact sanding of the third coat is discouraged, unless necessary to attain a perfectly smooth surface for decoration. In that event, use fine sandpaper and a minimum of hand pressure. Do not sand the wallboard surface.

Nail Head Concealment

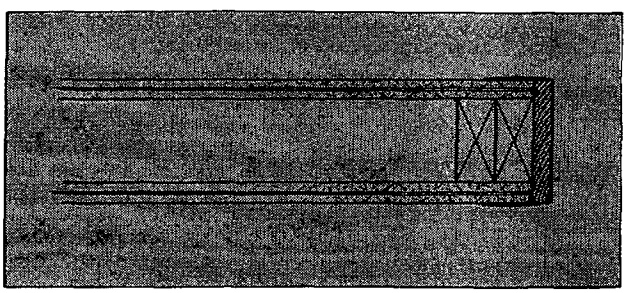
Having previously inspected the nailing to make certain that nail heads are dimpled below the surface, with cement on the broad knife blade completely fill the nail head depression. Then with the blade at about 45° draw the knife across the nail spot in the opposite direction to wipe the surface clean. This is accomplished very quickly with two fast hand movements.

After the spots are dry, a second coat of nail concealment is applied in the same manner as the first. With this coat, however, considerably less cement is used. Similarly a third coat should be given to the nail spots, using a small amount of cement to fill in any irregularities or depressions for a true even surface.

Sanding of the successive coats of nail concealment should be unnecessary and is not recommended because a free easy motion of the broad knife over the nail heads automatically feathers the cement at the edges and leaves a texture in the cement that resembles the wallboard surface.



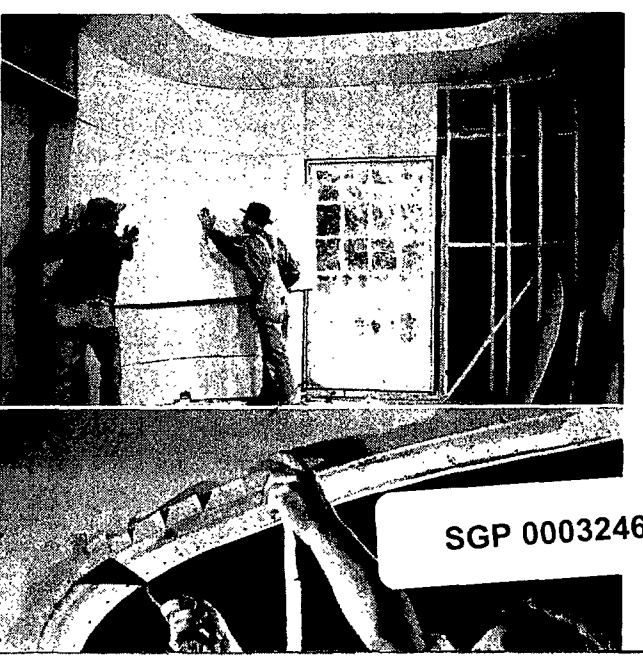
Wooden Molding—The second ply of one face is held back from the corner and the space filled with a rounded molding held in position by cementing. Nail the molding to the framing. Apply cement and embed reinforcing tape. Smooth out with a broad knife and remove excess cement. Follow with second and third coats as described for joint treatment. The wood molding should be small enough to permit a ½" lap of the reinforcing tape over the wallboard. If larger moldings are used two ribbons of reinforcing tape may be necessary.



Untrimmed Openings—This procedure is recommended where openings are cased but left untrimmed. The facing trim should be secured to the wood framing with edges flush with the second ply of wallboard. Apply cement to the edges of the trim, extending it over the wallboard about 1½". Press reinforcing tape into the cement and smooth out with a broad knife. Remove excess cement and feather out edges. Apply second and third coats of joint cement.

Electrical Outlets—Wall and ceiling finishes should be kept in intimate and continual contact with the nailing surface of the framing. The support for electrical boxes, outlets and all conduits, heating ducts, pipes, etc. must be recessed into the framing and kept back of the general plane of the nailing surface.

Curved Surfaces—By simply bending gypsum wallboard it will conform to moderately curved surfaces. For surfaces of greater curvature such as the soffits of arches, etc. gypsum wallboard is quickly made to conform by simply scoring the back paper of the board at intervals and breaking the core beneath each cut. Nail the board to the curved contour and treat the corners as elsewhere shown. If the curved corners are to be treated with reinforcing tape, the tape is first folded along its center and then snipped at intervals along one side. The snipped edges are applied to the flat side of the arch thus permitting the tape to conform to the curvature.



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SURFACE PREPARATION

FOR PAINTING

After the third coat of joint and nail concealment has been applied and sanded where necessary, first apply a coat of good primer-sealer. A lime locking cold water primer or a pigmented oil primer is recommended. For a good three coat job both are recommended and should be applied in the order mentioned, followed by the final or finished coat of paint. It is extremely important that the difference in absorption between the field of the wallboard and the joint cement be equalized to assure uniformity of color and texture over the entire wall.

FOR WALLPAPER

For the application of wallpaper the use of a primer-sealer is advisable so that the wallpaper may be readily removed for subsequent redecoration. Wallpaper should never be applied to gypsum wallboard without priming the surface and varnish is recommended for the purpose, thinned to the manufacturer's recommendations. After drying, wallpaper is applied directly to the varnish size.

GYPSUM 2-PLY WALLBOARD

Specifications

SCOPE:

All interior wall and ceiling areas shall be finished with two layers of 3/8" Gypsum Wallboard. The Gypsum Wallboard shall be laminated on the job in accordance with the following information. NOTE: Double layer is optional in closets; not considered necessary except on closet walls dividing occupancies.

MATERIALS:

(1) 3/8" Recessed Edge Gypsum Wallboard. (2) Adhesive Reinforcing Tape and Joint Cement as approved by the Wallboard Manufacturer. (3) 4D Cooler Type Nails, 1 3/8" long.

FRAMING:

Framing members shall be straight and in alignment (check alignment before proceeding with *first* layer). Stud and joist spacing may be 16", 20" or 24" depending on structural requirements.

ERECTION:

1. The *first* layer shall be 3/8" recessed edge (or square edge) Gypsum Wallboard. As far as practical, the panels shall be in lengths corresponding to ceiling heights and room widths or lengths. All joints shall be loosely butted. Joints in *first* and *face* layers (other than corners and at ceiling) shall not underlie each other, but shall overlap at least 10".

2. The *face* layer shall be 3/8" recessed edge Gypsum Wallboard of sufficient length, up to 12', to span wall and ceiling areas from corner to corner. All joints shall be loosely butted. Where joints occur in both the *first* and *face* layers parallel to framing members, joints in one layer or the other must fall between supports. See layout diagrams for further details. After cutting the *face* layer to size, adhesive shall be spread over the back surface of the Gypsum Board with a spreader blade. The spreader shall be used in a manner to produce an irregular pattern with adhesive. The *face* layer shall then be placed in position on wall or ceiling and temporarily held in place with sufficient nails, applied in the field and on edges of the board to insure bond between the layers.

3. Fill all nail holes and deep gouges in the *face* layer, as well as any wide spaces that may occur between *face* layer panels, with Adhesive. All joints, corners, nicks and filled areas shall then be finished with Joint System applied according to manufacturer's directions.

NAIL SPECIFICATIONS:

TYPE REQUIRED	4D COOLER TYPE NAILS
Spacing—*first* layer ceilings	5"-7" o.c.
Spacing—*first* layer sidewalls	6"-8" o.c.
Spacing—*face* layer ceilings	12" o.c.
Spacing—*face* layer sidewalls	16"-24" o.c.

CERTAIN-TEED PRODUCTS CORPORATION

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