

BB026 1889

HANDBOOK
of
DRYWALL
CONSTRUCTION

2nd EDITION

PRINTED BY:



UNITED STATES GYPSUM
THE GREATEST
NAME IN
BUILDING

FOREWORD

Because of the vastly increased use of gypsum drywall products, there is a great need for mechanics skilled in its application and a need for organized instructional material to help upgrade job quality. For drywall contractors who install gypsum wallboard, for builders, architects and students of architecture, this handbook of SHEETROCK Wallboard construction will be invaluable. It provides information that represents many years of practical manufacturing and on-the-job experience by the United States Gypsum Company.

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SHEETROCK Wallboard, Sealer
PERF-A-TAPE Joint System
PERF-A-BEAD Corner Reinforcement
TEXOLITE Paint
DURAVAL Paint
TEXTONE Plastic Paint
*FIRECODE Wallboard
BAXBORD Gypsum Backing Board
DUR-A-BEAD Metal Corner Reinforcement
PERF-A-TRIM Gypsum Wallboard Trim,
USG Metal Trim, Gypsum Wallboard Trim,
Texture Paints
TRUSSTEEL Studs
TRUS-LOK Clips
BRIDJOINT Clips

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UNITED STATES GYPSUM
The Greatest Name in Building

GYPSUM**DRYWALL CONSTRUCTION**

Gypsum wallboard is composed of a gypsum core encased in a tough, finish paper on the face side and a strong liner paper on the back side. Gypsum wallboard represents decades of laboratory research and on-the-job testing.

The nation's foremost home builders prefer fireproof SHEETROCK Wallboard over all other drywall systems when it comes to truly fine interiors. Through long experience they know that pre-formed SHEETROCK panels will meet their own high standards for walls and ceilings every time—and will provide the quality features expected by discriminating home buyers. In response to today's building needs for economy and speed of erection without sacrifice of quality or durability, SHEETROCK Wallboard is installed in millions of fine residential and commercial buildings everywhere.

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FRAMING REQUIREMENTS

The framework is the backbone of any building. Good framing is essential regardless of the type of wall surfacing material used.

The framework, studs, joists, rafters and plates to which SHEETROCK Wallboard is applied perform the triple function of supporting the structure, transferring loads to the foundation and also provide a base for wall and ceiling finishes.

The Essentials of Good Framing are:

1. Framework should meet minimum requirements of F.H.A., V.A. and/or local building code regulations.
2. Framing and bridging members should be adequate to carry the design or code loading.
3. Lumber should be of a good grade with a moisture content as low as practical or economically sound. U.S. Department of Agriculture publication, Wood Handbook No. 72, recommends 7% to 12% for dry southern states and 9% to 14% for the remainder of the United States.
4. Framing lumber should be straight, true, and of uniform dimension.
5. Studs, plates, joists and headers should be checked for accurate spacing and alignment. Spacing of framing should not exceed maximum allowable for the thickness of SHEETROCK to be used.
6. Horizontal load bearing members should be of sufficient dimension, and trusses should be fabricated in such a manner that when the full design load is applied the deflection should not exceed 1/360 of its span.
7. Provide studs at corners for end or edge nailing of SHEETROCK.
8. All joists must be level and correctly bridged in spans over 6'. Bridging should be securely nailed and should not extend below the bottom of the joists.
9. Electrical outlets, switch boxes, all concealed heating ducts and rough plumbing work should be set to receive the thickness of the SHEETROCK Wallboard to be used on the job so that none will cause the board to be held away from the framing. Rough plumbing work and heating ducts should be tested before SHEETROCK application.
10. Window openings should be properly framed with double studs and headers.
11. Provide members for nailing at both sides of SHEETROCK interior vertical angles.
12. Top plate shall be of sufficient dimension to transfer load from joists and rafters in a load bearing wall. Single plate may be used in non-load bearing partition.
13. Provide adequate headers to support fixtures such as sinks, cabinets, towel rods, soap dishes, etc.
14. Exterior door frames, window frames and sash should be set for the thickness of wallboard to be used.
15. After the house is enclosed, allow it to stand as long as possible prior to the application of the gypsum wallboard. Heating in winter or during damp conditions is recommended. Provide a uniform temperature in a range of 50° to 70°F. Ventilation must be provided to eliminate excess moisture.

ADVANTAGES OF GYPSUM DRYWALL CONSTRUCTION

FIREPROOF

Gypsum will not support combustion. Gypsum when exposed to fire behaves like a cake of ice when the flame from a blow torch is applied to its surface. The ice melts on the surface in contact with the flame while the opposite side remains cool. Similarly, the surface of gypsum wallboard opposite the flame remains at a relatively low temperature until the gypsum core is completely decomposed.

SMOOTH UNBROKEN SURFACES

PERF-A-TAPE Joint System provides a means for concealing the joints between SHEETROCK panels.

DECORATION

The strong highly-calendered manila face paper on SHEETROCK Wallboard is suitable for any type of decorative treatment such as paint, texture or wallpaper and permits repeated redecoration during the life of the building.

FREEDOM FROM EXCESS MOISTURE

SHEETROCK Gypsum Wallboard eliminates the use of tons of water on the job. Since excess moisture is not put into the house, the possibility of moisture damage is minimized.

CRACK RESISTANT

"Welded" together by PERF-A-TAPE Joint System, SHEETROCK panels form walls and ceilings that are exceptionally resistant to cracks caused by structural movement, vibrations or minor settlement.

UNIFORM QUALITY

SHEETROCK Gypsum Wallboard panels are factory-made products in which the raw materials and the manufacture are carefully controlled.

SPEED OF ERECTION

Homes in which SHEETROCK Gypsum Wallboard is used can be quickly completed.

SNUG FITTING TRIM

Because of the uniform thickness of each panel, it is easy to install wood or metal trim snug and tight against the wall surfaces.

NON-WARPING

Expansion or contraction of SHEETROCK under normal atmospheric changes is negligible and does not cause harmful warping or buckling.

PLANNING THE JOB

Planning is the first step towards completing walls and ceilings. Prior to the assignment of a drywall application crew to a job, the individual structures that will receive SHEETROCK Wallboard should be thoroughly inspected to be certain that all the trades who have previously worked on the job have completed their work in good order. A check should be made to determine if the necessary inspections have been satisfactorily completed. The essentials of good framing as previously outlined on Page 6 should be accomplished.

Builders usually assign to a capable carpenter in their employ the responsibility of checking to see if studs or joists are out of alignment. Considerable emphasis should be placed on this work. Corrections should be made immediately. SHEETROCK Wallboard, when applied to studs and joists, follows the contour of the framing faces. If the framing is out of alignment, the surface of the wall will be correspondingly out of plane.

If joists are out of alignment, 2"x6" leveling plates attached perpendicular to and across top of ceiling joists may be used. Toe nailing into joists pulls framing into true horizontal alignment and insures a smooth level ceiling construction.



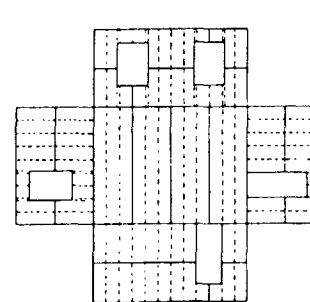
Bowed or warped studs may be straightened by sawing the hollow sides at the middle of the bow and driving a wedge into the saw kerf until the stud is in line. Reinforcement of the stud is accomplished by securely nailing 1"x4" wood strips or "scabs" on each side of the cut.

ESTIMATING LENGTHS AND FOOTAGE NEEDED

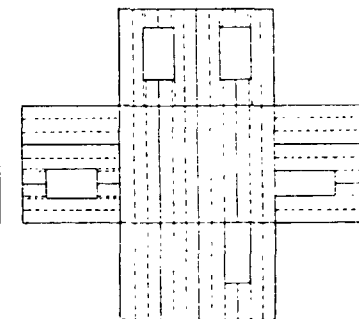
Professional estimators have, from practical experience, developed many methods of determining footage required to complete various types of jobs. Basically, these methods stem from the simple principle of "scaling a plan", and determining the length and width and ceiling height of each room on the plan. Frequently, door and window openings are "figured solid" or no openings are included as openings. Exceptions may be large picture windows and large door openings. From these dimensions the estimator determines the square footage of each room. The footage of each room is added to determine the total footage required. From these figures, the lengths of gypsum wallboard needed may be determined. Generally, the professional has found that a maximum of three lengths of board are sufficient. The longest practical length of SHEETROCK that will span the ceiling and wall area, eliminating butt joints entirely, or lengths that will result in the minimum number of butt joints to later be concealed, should be used. Care should be taken where figuring walls adjacent to sloping ceilings so that the minimum amount of waste results and resulting waste pieces may be utilized elsewhere in the structure.

In the event that the estimator or drywall contractor wishes to plot the wallboard layout graphically, sketches like the ones shown here may be made. Draw two horizontal lines crossed with two vertical ones. Close in the two ends and your layout represents ceiling and walls.

Next, draw in doors and windows. Now indicate lengths of SHEETROCK panels to be used. If ceiling height is 8'-3", or less, horizontal layout (at right angles to framing) of SHEETROCK panels will result in fewer joints, easier handling and less cutting. If ceiling height is greater than 8'-3" or wall is 4' wide or less, vertical application will be more practical.



HORIZONTAL LAYOUT



VERTICAL LAYOUT

SELECTING THE MATERIAL

There is a SHEETROCK Gypsum Wallboard for every wall and ceiling need. Consult the Product Information chapter of this handbook for the selection of the type most suited to the construction requirements of the job.

Job Storage

If possible, the SHEETROCK Wallboard should be ordered for delivery a day in advance of the drywall application. Materials stored on the job for a long period of time are subject to excessive abuse.

The SHEETROCK may be placed in the house. The material may be piled flat on the floor in the centers of the largest rooms. It is often desirable to place a select number of pieces of SHEETROCK Wallboard in each room of the house.

The SHEETROCK planned for use on the ceilings should be placed on top of the pile for removal first. Piling long lengths on short lengths is apt to break the board due to the weight of the overhang of the longer board. This manner of storage should be avoided.

An alternate method of on-the-job storage is that of placing the wallboard vertically against the framing. With this type of storage, however, some houses cannot be stocked until the electrical and plumbing installations are made.

Caution should be exercised not to overload the framing members acting as a brace for this manner of storage and not to overload the floor space as a storage area when the board is piled flat on the floor.

There are so many variable conditions of outside storage that in general outside storage of SHEETROCK Wallboard is not recommended.

If outside storage is absolutely necessary, contact the manufacturers of temporary covers or shrouds for their recommendations. A list of manufacturers will be supplied upon request.

Under all temporary outside storage conditions the bed, possibly consisting of 2x4's lengthwise of the pile constructed with adequate crosswise support not more than 3 feet apart, should be raised from the ground a sufficient amount to provide circulation of air beneath the bed. No wrapping or shroud which is 100% effective is presently known.

PRINCIPLES OF SHEETROCK ERECTION

Measurements

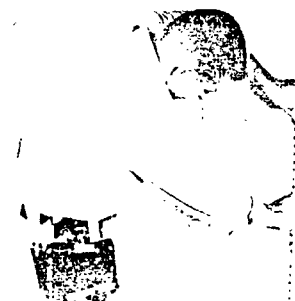
All measurements should be carefully taken and be accurate. They should be taken at the approximate wall location of each edge or end of the board, whichever the case may be. Two measurements are a check, one on the other, and it will usually warn the applicator of partitions or door bucks out of plumb so that allowances in cutting may be made. A twelve foot steel tape rule is recommended.

Cutting the SHEETROCK Wallboard

Straight line cuts across the full width or length of the board are made by scoring the face paper, snapping the core of the board, and then cutting the back paper. The common tools used to score and cut gypsum wallboard are a Stanley wallboard trimming knife or a linoleum knife. Regardless of the type used, the blade should always be kept sharp so that the score will be made through the paper into the core of the gypsum wallboard.

The use of a straight edge is recommended. An aluminum 4' T-square, ruled on both sides, facilitates clean, straight cuts.

SCORING AND CUTTING



Score the paper on the face of the board with a cutting knife using a straight edge as a guide.



Break the gypsum core of the SHEETROCK by snapping or bending away from the scored paper side. Complete the cutting by running the knife through the back paper from above or below.

Smooth the cut edges with coarse sandpaper wrapped around a block of wood, a rasp, or trim with a cutting knife.



SINGLE LAYER SYSTEM

SHEETROCK Wallboard panels should be cut so as to slip easily into place. All joints should be loosely butted together. Boards should never be forced into position, as this will often cause one edge or end to override the other, resulting in a continuous ridge along the center of the joint. Tapered edges, except at angles, should always be placed next to one another. Butt joints should never be placed next to a tapered edge. To do so would result in a very difficult joint to conceal in the later stage of finishing with PERF-A-TAPE Joint System.

All ends and edges of SHEETROCK Wallboard must be supported on framing members (except where end joints are to be back blocked and floated—see chapter SYSTEMS—"Back Blocking System").

Wherever possible, SHEETROCK should be applied horizontally and in lengths to span ceilings and walls without end joints. If butt joints occur, they should be staggered and located as far from the center of the walls and ceilings as possible.

SHEETROCK Wallboard Application— Over-Under Windows; Over Doors

In wall areas containing openings it is desirable, if practical, to apply SHEETROCK Wallboard of sufficient length to span individual wall areas with large sheets, however, if it is necessary that joints occur near an opening, the gypsum wallboard should be applied so that no vertical joints occur within 8" of external corners of windows, doors or similar openings. Interior or exterior angles within the room excepted.

Types and Spacing of Nailing Members

SHEETROCK may be applied directly over wood studs, joists and rafters.

Wood Furring

SHEETROCK may be applied to wood furring strips as follows: Furring strips over wood framing shall be 2" x 2" (nominal) minimum size. Where SHEETROCK is applied parallel to furring strips securely attached to masonry walls, the furring strips should be 2" x 3" or 1" x 3" (nominal) minimum size; where long edges of the SHEETROCK are applied across the furring, the strips should be 2" x 2" or 1" x 2" (nominal) minimum size. Spacing of furring strips should follow the recommendations for maximum spacing of nailing members shown in the table below.

Nails for application of SHEETROCK over wood furring on masonry walls should not penetrate through the furring strip into the masonry. Special 1 1/4" long nails preferably GWB-54 type (except for length) will be necessary for applying 3/8" SHEETROCK over 1" thick (nominal) furring. For application of panel SHEETROCK over wood furring, see chapter SYSTEMS—"Panel SHEETROCK System."

NOTE: The application of SHEETROCK over 1" thick (nominal) wood furring applied across framing members is not recommended since the relative flexibility of the furring during nailing prevents proper nailing and tends to loosen nails already driven.

Maximum spacings for wood nailing members to receive SHEETROCK Gypsum Wallboard shall not exceed those in the following table:

WALLBOARD THICKNESS	LOCATION	APPLICATION METHOD	MAXIMUM SPACING NAILING MEMBERS
3/8"	Ceilings	Horizontal	16" o.c.
3/8"	Sidewalls	Horizontal or vertical	16" o.c.
1/2"	Ceilings	Vertical	16" o.c.
1/2"	Ceilings	Horizontal	24" o.c.
1/2"	Sidewalls	Horizontal or vertical	24" o.c.
5/8"	Ceilings	Vertical	16" o.c.
5/8"	Ceilings	Horizontal	24" o.c.
5/8"	Sidewalls	Vertical or horizontal	24" o.c.

CEILING are applied first. Usually two men work on a ceiling, nailing from the center of the wallboard towards the ends and edges.



SIDEWALLS are applied next. Where horizontal construction is used on walls, the top wall panel is applied first and butted against the ceiling. Vertical application should be used when the ceiling height is over 8'3", or where this method results in less waste or less joint treatment.



Horizontal Application

Vertical Application

TYPES OF APPLICATION OF SHEETROCK WALLBOARD

Horizontal—Applying the long edges of the SHEETROCK at right angles to the framing.

Vertical —Applying the long edges of the SHEETROCK Wallboard parallel to the framing members.

Advantages of Horizontal Versus Vertical Application

1. Reduces lineal footage of joint treatment up to 25%.
2. Strongest dimension of board runs across framing members.
3. Bridges irregularities in alignment and spacing of framing members.
4. Better bracing continuity—each panel ties more framing members together.
5. Joints on walls are at a convenient height for the finishing operation with PERF-A-TAPE Joint System.

ADHESIVE NAIL-ON SHEETROCK WALLBOARD CONSTRUCTION

SHEETROCK Brand Adhesive is specially formulated to adhere SHEETROCK (plain or insulating) to wood framing members in conjunction with supplemental nailing. The adhesive is of a rubber, resin type; plastic in nature. It is available in 5 gallon cans (approximate weight 52 lbs.). *Meets Dry-Wall Adhesive Manufacturers Association Specifications.*

SHEETROCK Brand Adhesive is manufactured by Miracle Adhesive Corporation, New York, N. Y. They have developed and pioneered many adhesives used in the building field and were the first to market a dry-wall adhesive for nail-on attachment of gypsum wallboard.

SHEETROCK Brand Adhesive has unique characteristics. There is no other product that has all the *necessary* qualities provided in SHEETROCK Brand Adhesive. Adhesion *alone* is not the predominant feature of adhesive nail-on wallboard attachment to framing. A product formulated primarily to provide adhesion will lack the other important qualities. The necessary qualities are as follows:

1. Bond.
 - a. Contact adhesion—minimum droppings.
 - b. Strength.
2. Resiliency.
3. Does not detract from inherent fireproof qualities of gypsum wallboard.
4. No bleeding through decoration.
5. Retention of bond on aging.
6. Uniform quality.
7. Workability.
8. Minimum delayed shrinkage.
9. Heavy body.
 - a. Bridges irregularities.
 - b. Provides maximum area of contact.
 - c. Provides *thick* film.

Advantages of Adhesive Nail-On Construction

1. 50% fewer nails—less nails to spot—less labor.
2. Reduces impact sound.
3. Reduces incidence of loose board due to improper nailing.
4. Bridges minor framing irregularities.
5. Resistant to moisture, vermin and heat.
6. Does not detract from inherent fire resistance of SHEETROCK Wallboard.

Preparation

All framing members should be in alignment. All plumbing, electrical conduit and receptors, fire blocks, backing, bridging, etc., should be flush with the plane of the framing members. All surfaces to come into contact with the adhesive should be free of dirt, grease, oil or other foreign material. 24 hours prior to application of the adhesive, it should be stored at a temperature of approximately 70°F. to facilitate ease of flow. Spacing of framing members shall be conventional for thickness of board used.

Materials

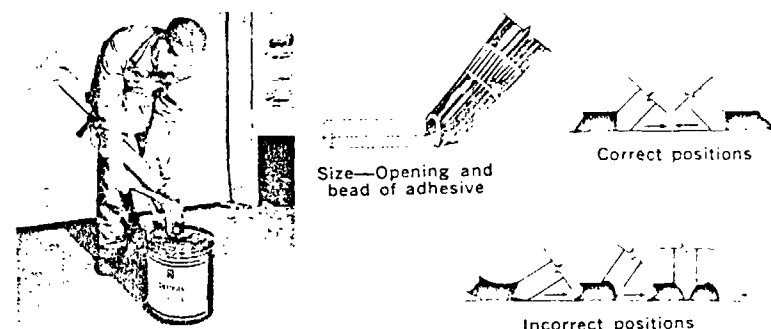
SHEETROCK Brand Adhesive—approximately 2½ gallons required per 1000 sq. ft. of SHEETROCK Wallboard erected.



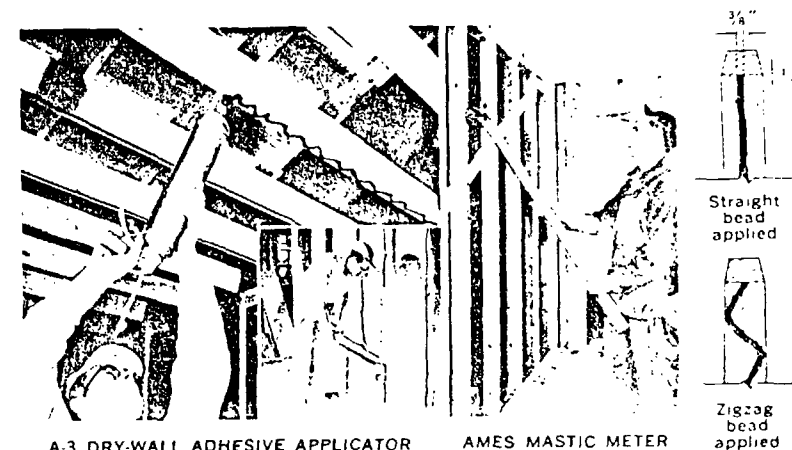
NOTE: The film of adhesive, after nailing wallboard, should not exceed 1/16", which does not result in a sufficient reduction in the depth of the nail penetration into the wood framing to warrant the use of a longer nail to compensate for the thickness of adhesive.

Equipment and Application

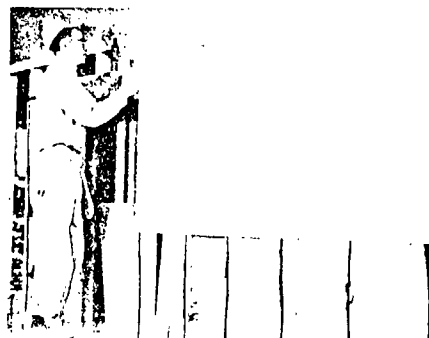
Recommend USG Model A-3 DRY-WALL ADHESIVE APPLICATOR. (2½ quart capacity caulking type gun has 3/8" nozzle cut to point at 45° angle). Mechanically loaded (below—left) by Alemite Loader Pump Model 7197-L clamped on SHEETROCK Brand Adhesive pail. (Alemite Pump available from Alemite Co. distributors). Ames Mastic Meter (below—right) loaded with Ames Pump also recommended. (See chapter—TOOLS).



A continuous bead of SHEETROCK Brand Adhesive is applied to the center of the face of all framing members which will be employed as a supporting member for the gypsum wallboard. Adhesive is not required at inside corners, top or bottom plates, bracing or firestops, and is not ordinarily used in closets. On framing members where a joining of two adjacent pieces of wallboard will occur (ends or edges), a serpentine or zigzag bead pattern should be applied to permit proper bond when only half of the framing member's surface is initially covered.



The size and shape of the bead applied is partially dependent on the size and shape of the aperture in the tool used by the mechanic. In addition, the pressure built up within the tool (if any) may affect the amount of material extruded. A properly formed bead should extend out from the face of the framing member a minimum of $\frac{1}{4}$ " and contain a sufficient amount of material to spread over the entire surface of the framing member when the adhesive is flattened to a $\frac{1}{16}$ " thickness. The proper formation of the bead is most important in achieving the desired results.



No more adhesive should be applied than can be covered in a 15 minute interval. It contains volatile materials which may begin to evaporate and cause an initial surface hardness preventing full bond.

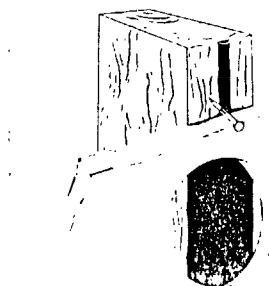


DIAGRAM shows how the bead will spread over the stud face to about $\frac{1}{16}$ " thickness when it is compressed by gypsum wallboard. This increases contact between the wallboard and framing members to create a more solid-sounding wall and acts as a leveling cushion between the two.

As each piece of wallboard is put into place it should immediately be completely nailed, using the proper nail for the wallboard erected. Supplemental nails are required and should be spaced 16" o.c. on side walls and 12" o.c. on ceilings. Nails should be placed a minimum of $\frac{3}{8}$ " from all ends and edges and nails on adjacent panels should not be staggered. If any adhesive is accidentally placed on an exposed surface, the excess should be removed. Although it may cause a discoloration, it will not bleed through a painted surface. There are no asphaltic materials in SHEETROCK Brand Adhesive.

Removal of Excess Material

A petroleum solvent such as naphtha, kerosene or white gasoline, should be used to clean tools or remove excess adhesive. Tools should be cleaned or they may be immersed in water to prevent hardening.

Precautions

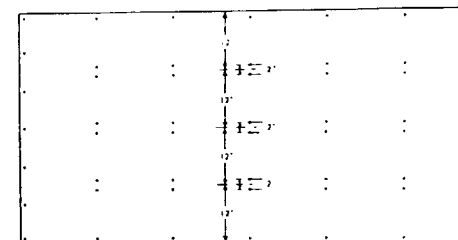
Adequate ventilation should be provided. *Normal precautions should be observed with regard to fire, sparks and smoking.* Unused portions remaining in the can should be resealed or covered with a film of water which will temporarily prevent evaporation of thinners. All water must be removed prior to re-use.

THE DOUBLE NAILING SYSTEM

Loose board may be the result of improper application procedures or lumber shrinkage. (See chapter—FIELD PROBLEMS for data relative to loose board and nails caused by lumber shrinkage.) By closely following the double nailing procedures, the danger of loose board caused by *improper application* is minimized. **NOTE:** Use of the Double Nailing System will not reduce the incidence or severity of nail pops due to wood shrinkage.

The Double Nailing System was developed in 1954 and since then has been used on thousands of jobs with excellent results. The use of the second nail in close proximity (2") to the first, results in *less* loose board due to carelessness—it is assurance that the board is initially nailed tight.

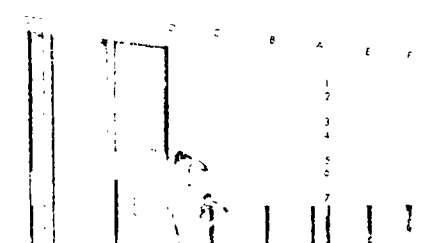
Based upon extensive investigations, we recommend the Double Nailing System. The Double Nailing System basically consists of nailing the board to each framing member with nails spaced approximately 12" o.c.—5 nails per 4' width for each nailing member plus an extra nail spaced approximately 2" from each nail in the field of the board, making a total of eight nails for each 4' width of board. The sketch shows the correct finished nail pattern. Note that nails are spaced approximately 7" o.c. at the ends of the board.



Procedure

CEILINGS: Starting in the center of the board and working towards the edges and ends, nail the board to the ceiling joists with nails spaced approximately 12" o.c. Continue nailing the board with nails spaced 12" o.c. until the board is supported, then proceed to drive the secondary nails approximately 2" from the first nails driven. Only single nails are used around the perimeter of the board.

SIDE WALLS: The picture illustrates the correct double nailing procedure on side walls. The board is first "hung" by driving edge nails at points "A," "B," "C," "D," etc. After the board is "hung," the mechanic completes the nailing in the sequence indicated in the picture.



GENERAL

- As the second nail in each group of two nails is driven home, the mechanic may observe movement between the board and the head of the first nail driven. Any movement indicates that the first nail was not holding the board tight against the framing and it should be given an additional blow or blows.
- Start nailing at the center of the board and work towards the ends.
- Hold the SHEETROCK tight against the framing members while nailing.
- Check all nails for proper dimpling.
- Maximum spacing between nails in any one row is approximately 11".

RESURFACING OLD WALL & CEILING SURFACES

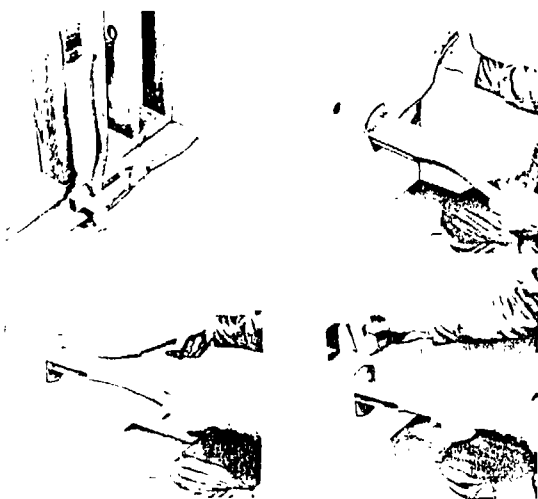
Where ceilings or sidewalls are so badly disfigured that an entirely fresh surface is desirable, they may be resurfaced using a layer of 1/4" or 3/8" SHEETROCK Wallboard.

Remove all trim. (This is not always necessary when using 1/4" SHEETROCK). Remove all loose or poorly bonded material. Except when only small sections are removed, voids must be brought out into a reasonably continuous plane with the wall surfaces by firmly nailing SHEETROCK in place, cut to fit and shimmed out as required.

SHEETROCK is nailed through the old surface into joists and studs. Normally a 6d cooler type nail should be used, but the nail must be of such length as to penetrate into framing members 5/8" minimum depth. Application of 3/8" woodgrained SHEETROCK over existing surfaces (walls) require 1 1/4" extra long matching colored nails (see "Nail Specifications"—this chapter.) Joists and studs are located by probing, and a chalk line is snapped to mark their full run. Where great irregularities of surface exist, furring strips should be applied not over 16" o.c., using wood shingles to shim out to a true, even plane.

Complete details on recommended nails and nail spacing for the application of SHEETROCK Wallboard is found in this chapter under the heading—"Nail Specifications."

ELECTRIC CUT-OUT OPENINGS



An alternate method of making cut-outs is accomplished with the use of a keyhole saw. (See chapter 1001.S.1)

Cut-out openings required for electrical switches, outlet boxes, etc., may be made with specially designed cutting tools, so that die cut openings are produced to provide the exact shape of opening needed for various types of outlets. Detail at left shows use of one of several types of outlet box cutters.



APPLICATION OF PREDECORATED SHEETROCK WALLBOARD

3/8" Woodgrained SHEETROCK is usually applied vertically because of the difficulty of successfully handling butt joints in a wall surface. Predecorated SHEETROCK is available in 4' widths and in 7', 8', 9' and 10' lengths. 1 1/4" long colored nails are available to blend with each predecorated wall-board finish. Drive nails with a plastic headed hammer, a raw hide mallet, or with a regular hammer having pliable leather placed over the head. Nail spacing should not be less than 3/8" from ends or edges and spaced a maximum of 12" o.c. on walls. Generally, predecorated SHEETROCK is not used on ceilings; however, if so applied, nail spacing should be a maximum of 7" o.c. If the specific lengths used do not span the ceiling, butt joints will result. For this reason, it is not a practical ceiling finish. (See chapter PRODUCT INFORMATION-3/8" Woodgrained SHEETROCK for details as to additional decoration data and recommendations for the use of this material. See "Nail Specifications" section in this chapter for additional information regarding colored nails.)

ARCHES

Arches of any radii are easily faced with SHEETROCK. Score or cut through the back paper at approximate 1" intervals on a piece of SHEETROCK previously cut to the width and desired length of the soffit.

REPAIRING DAMAGED SHEETROCK WALLBOARD

Any wall may occasionally be subject to excessive abuse or heavy blows that will fracture or break the finished wall surface. Should SHEETROCK Wallboard walls become damaged or broken, the fracture or hole can easily be repaired in the following manner:

Inscribe an equilateral triangle on the wall surface large enough to cover the hole or broken area. (An equilateral triangle is one in which all angles and sides are equal. The triangle should clear the damaged section by at least one inch on all sides. Cut the triangular plug of damaged SHEETROCK Wallboard from the wall with key hole saw, sloping the edges of the plug inward at a 45° angle.

A similar triangle of the same size should be prepared from a piece of SHEETROCK Wallboard of like thickness. Again cut all sides inward at a 45° angle. Shape the plug to a loose fit with a sanding block and #2 sandpaper.

Butter all edges of the plug with PERF-A-TAPE Cement and fit it to the wall opening. Apply PERF-A-TAPE Joint System to all joints and finish in the manner recommended for a butt joint.

The equilateral triangle is recommended to save time in fitting. As all sides are equal, the new plug will fit the wall opening regardless of its orientation.

Damaged areas of SHEETROCK walls treated in this manner are permanently repaired and concealed.



NAILS AND NAILING

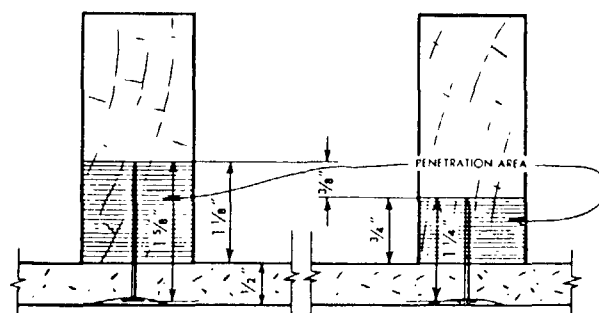
One of the most important steps in the proper application of a SHEETROCK Wallboard job is the nailing of the SHEETROCK to the framing members. Knowledge of the type of nail and nailing procedure is vital if a good job is to be assured. It is obvious that the nail selected must have sufficient holding power to keep the board in place.

1 $\frac{5}{8}$ " (5d) and 1 $\frac{3}{4}$ " (4d) cement coated and bright finish cooler type nails have been used for the application of $\frac{1}{2}$ " and $\frac{3}{8}$ " SHEETROCK Wallboard for many years and have proven that their holding power is adequate. The holding power of these nails was determined to provide a yardstick for designing a shorter nail which would have sufficient "in service" holding power.

Extensive experiments have shown that the holding power of an annular ring nail with an over-all length of 1 $\frac{1}{4}$ " is approximately equivalent to that of the 1 $\frac{1}{2}$ " cement coated cooler type nail. Thus the 1 $\frac{1}{4}$ " annular ring nail satisfies the holding power requirements and its use results in reduced penetration of the lumber and less exposure of the nail shank due to subsequent wood shrinkage.

The figure below illustrates a comparison of the penetration of the wood by a 1 $\frac{5}{8}$ " nail and a 1 $\frac{1}{4}$ " nail. The 1 $\frac{5}{8}$ " nail penetrates the wood $\frac{3}{4}$ " deeper than the 1 $\frac{1}{4}$ " nail, or 50% more. Therefore, we can expect that the additional exposure of the 1 $\frac{5}{8}$ " nail will be approximately 50% more than the 1 $\frac{1}{4}$ " nail under similar wood shrinkage conditions.

The diameter of the shank of the nail appears to have little or no effect on nail behavior. Authorities are in some disagreement on the effect of the design of the shank (annular ring versus plain shank versus other designs) on the reduction of nail exposure. It is the opinion of the majority that there is little, if any, difference. However, the annular ring design is advantageous because the greater holding power of such a design permits the use of shorter nails.



NAIL SPECIFICATIONS

The chart on next page indicates nail specifications and nail spacing recommendations. Additional nail spacing recommendations pertaining to the Double Wall System, SHEETROCK Wallboard—TRUSSELL Stud Partition System, and Panel SHEETROCK System will be found under the chapter SYSTEMS. Also see chapter—MISCELLANEOUS APPLICATION METHODS.

NAIL SPECIFICATION CHART

For $\frac{5}{8}$ " SHEETROCK and $\frac{5}{8}$ " BAXBORD (Where No Specific Fire Rating Required)

1 $\frac{1}{8}$ " Annular Ring Nail (Specifications Same as GWB-54, Except 1 $\frac{1}{8}$ " in Length)

Space a maximum of 7" on ceilings, 8" on walls; approximately 315 nails per pound, 4 $\frac{1}{4}$ lbs. per 1,000 sq. ft.

For $\frac{1}{2}$ ", $\frac{3}{8}$ " and $\frac{1}{4}$ " SHEETROCK; $\frac{3}{8}$ " and $\frac{1}{2}$ " BAXBORD Backing Board

1 $\frac{1}{4}$ " GWB-54 Annular Ring Nail, Flat-head, $\frac{1}{4}$ " Dia. Slightly Countersunk, .098 Gauge, Bright Finish, $\frac{1}{2}$ " Clearance at Head, 20 Rings per Inch, Medium Diamond Point. (ASTM - C380 - 56T)

Space a maximum 7" on ceilings, 8" on walls; approximately 355 nails per pound, 6 $\frac{1}{4}$ lbs. per 1,000 sq. ft.

Alternate Nail for $\frac{1}{2}$ " SHEETROCK Wallboard

1 $\frac{5}{8}$ " 5d Cooler Type Nail (Bright Finish)

Space a maximum 7" on ceilings, 8" on walls; approximately 364 nails per pound, 6 lbs. per 1,000 sq. ft.

Alternate Nail for $\frac{3}{8}$ " SHEETROCK

1 $\frac{3}{8}$ " 4d Cooler Type Nail (Bright Finish)

Space a maximum 7" on ceilings, 8" on walls; approximately 488 nails per pound, 4 $\frac{1}{2}$ lbs. per 1,000 sq. ft.

Alternate Nails for $\frac{1}{4}$ " SHEETROCK

1 $\frac{3}{8}$ " 4d Cooler Type Nail (Bright Finish)

For direct application to framing. Space a maximum 7" on ceilings, 8" on walls; approximately 488 nails per pound, 4 $\frac{1}{2}$ lbs. per 1,000 sq. ft.

1 $\frac{5}{8}$ " 6d Cooler Type Nail (Bright Finish)

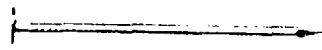
For use over existing surfaces. Space as above; approximately 275 nails per pound, 6 $\frac{1}{4}$ lbs. per 1,000 sq. ft.

For $\frac{5}{8}$ " SHEETROCK FIRECODE 60 (Where 1 Hour Fire Rating Required)

1 $\frac{5}{8}$ " 6d Cement Coated Cooler Type Nail

Nailed to wood framing members; space 6" on ceilings, 7" on walls, 275 nails per pound, 6 $\frac{1}{4}$ lbs. per 1,000 sq. ft.

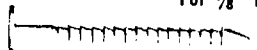
For 1/2" SHEETROCK FIRECODE 45 (Where 45 Minute Fire Rating Required)



1 1/4" 5d Cement Coated Cooler Type Nail

Nailed to wood framing members: space nails 6" o.c. on ceilings, 7" on walls; 275 nails per pound, 6 1/4 lbs. per 1,000 sq. ft.

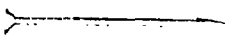
For 5/8" BAXBORD or SHEETROCK FIRECODE 60



No. 11 ga. 1 1/4" Fetter Ring Annular Type Nail 3/16" Head

For use with nailing channels: space 6" o.c. on ceilings; approximately 355 nails per pound, 6 1/4 lbs. per 1,000 sq. ft.

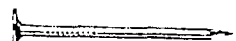
For Woodgrained SHEETROCK and Striated Finishes



1 1/4" Predecorated Nail

For use with all predecorated SHEETROCK, matching colored nails; space 12" o.c. on walls; approx. 840 nails per lb., 2 lbs. per 1,000 sq. ft. 1 1/4" extra long matching color nail over existing walls; 350 nails per lb. 7 1/2 lbs. per 1,000 sq. ft. (16" wide), 5 lbs. per 1,000 sq. ft. (4" wide).

For 3/8" Plain Panel SHEETROCK



1 1/4" 3d, 15 1/2 ga. 3/8" Flathead Cooler Type Nail

For use with Plain Panel SHEETROCK; space 12" o.c. on walls; approximately 838 nails per pound, 3 pounds per 1,000 sq. ft.

While the spacing of the nails is most important, care should also be taken in their placement. Nails should be driven not less than 3/8" from ends or edges of SHEETROCK. Nails on adjacent ends or edges should be opposite each other to assure edge conformation. Nailing should be accomplished from the center of the SHEETROCK Wallboard toward the outer ends or edges. While nailing, apply pressure on the wallboard adjacent to the nail being driven. The use of a crowned head hammer or a WAL-BOARD hammer (see chapter TOOLS) is recommended. Drive nails with the shank reasonably perpendicular to the face of the board. With the last blow of the hammer, seat the nail so that the head is in a slight uniform dimple formed by the last blow of the hammer. Do not break the paper at the nail head or around the circumference of the dimple by over-driving. Maximum depth of the dimple should not exceed 1/32".

After the board has been completely installed, inspect by pounding on walls to detect rattles which indicate loose nails, and by pushing on the board adjacent to nails to see if there is any movement. If loose nails are detected, drive them tight. Whenever nails have punctured the paper, hold the board tight against the framing and renail properly approximately 1 1/2" away from the nailhead which punctured the paper.

IMPROPER APPLICATION PROCEDURES

NAIL HEADS PUNCTURING FACE PAPER

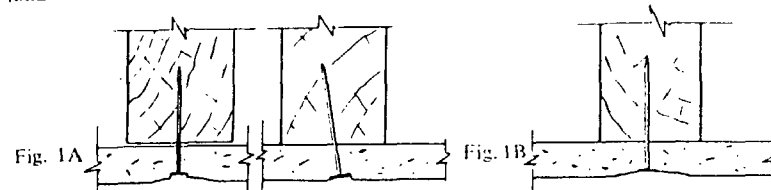
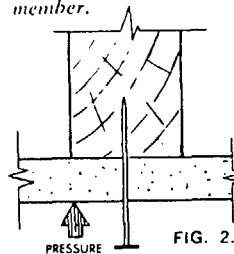
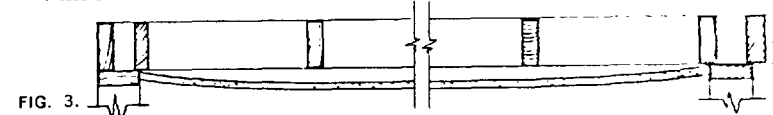


Fig. 1A—Nail heads have punctured paper and shattered core of the board. Such nails have very little grip on the wallboard and will very likely cause a nail pop. Fig. 1B—A properly driven nail. Note slight uniform dimple—with nail head bearing on paper and holding the gypsum wallboard securely against framing member.



LACK OF PRESSURE ON BOARD DURING NAILING

It is impossible to align all studs or joists perfectly, because of minor bowing and warping of individual framing members prior to erection. The 1 1/4" head of the nail alone cannot be relied upon to pull the wallboard into firm contact with all uneven framing members—additional pressure is needed. During final blows of the hammer, apply ample pressure with the hand on face of board adjacent to nail (Fig. 2) to bring board into firm contact with nailing member.



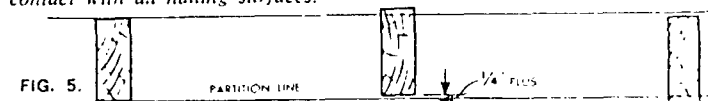
BOARD IMPROPERLY FITTED

Fig. 3—Board wedged into place—it is too long for the space intended. Back of board cannot be brought into natural contact with the framing. In all probability a high percentage of nails on the central studs will puncture the paper. Boards like this should be removed and replaced with boards cut to fit properly.



NAILING FROM ENDS AND EDGES TOWARD CENTER

Fig. 4 illustrates what can happen when the practice of nailing from ends toward the center is followed. Obviously, if the ends of the board are securely anchored, it will be impossible to bring the back of the board into contact with the face of the center nailing member. However, by starting to nail on center framing member and proceeding towards each end or edge, board can be brought into firm contact with all nailing surfaces.



FRAMING MEMBERS OUT OF ALIGNMENT

Framing members which are more than 1/4" out of alignment with respect to adjacent members (as illustrated in Fig. 5) also cause a situation in which it is difficult to bring the back of the board into firm contact with all nailing surfaces. Before beginning the application of board, the alignment of studs and joists should be checked, and corrections made wherever necessary. In addition to reducing nail pops, this procedure will result in straighter walls or ceilings.

FRAMING MEMBERS TWISTED

Figure 6 illustrates wallboard applied to a framing member which has not been properly squared with the plates. In nailing the board to this member, there is danger of puncturing the paper with the nail head. There is also the danger of a reverse twisting of the member as it "dries out," in which case the board will be loosely nailed and a pop will occur. All twisted studs should be squared before the application of wallboard.

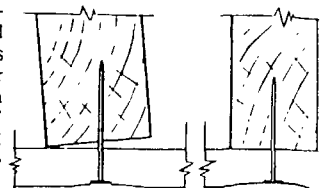


FIG 6

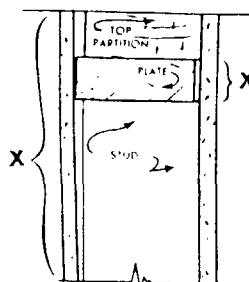


FIG 7

IMPROPERLY ALIGNED STUDS, JOISTS OR HEADERS

Figure 7 illustrates a misaligned top plate and stud. Hammering in the areas indicated by "X" will probably result in the nail heads puncturing the paper or cracking the board. Even though the paper is not punctured, the chances of a pop are far greater than if the stud and plate had been properly aligned. *Studs, plates or headers which are not in alignment should be corrected before the application of the board. If necessary, the faces of the studs or plates should be shimmed out flush with adjoining surfaces.*

WALLBOARD APPLIED OVER PROTRUSIONS

Figure 8 illustrates bridging projecting beyond the face of the joist. This projection will prevent the back of the board from being brought into contact with the nailing surface. Nails driven in the area of the protrusion will probably puncture the face paper. Headers, firestops or various mechanical installations can create similar situations. *Before applying board, make certain that there are no materials projecting beyond the plane of the nailing surface.*

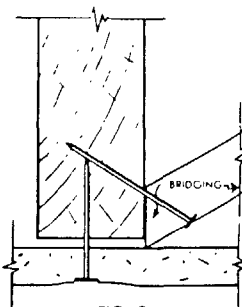


FIG 8

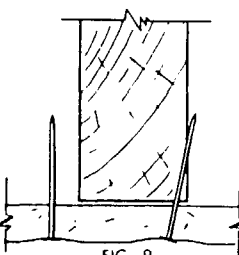


FIG 9

NAILS INSECURELY DRIVEN

Figure 9 illustrates nails not properly anchored. If the nails are not properly anchored within the wood framing member, vibrations from doors closing, bumps against the wall or sounds may work the nail loose, causing a nail pop. *Nails that miss framing members or are not secure should be removed promptly, and a new nail driven properly.*

BOWED STUDS—IMPROPERLY PLACED JOISTS

A badly bowed stud, a highly crowned joist or a joist placed with the crown down creates a situation in the area of the bow similar to a framing member badly out of alignment. *Badly bowed studs may be detected during the alignment check and should be straightened within reasonable limits. All ceiling areas should be checked for alignment and proper crowning of joists, and adjustments made.*

NAILS LOOSENED BY POUNDING

Occasionally when board is applied to the second side of a partition, the driving of the nails will tend to loosen the nails on the opposite side. This is particularly true when lightweight, soft lumber or undersized studs (2x3 or under) are used. *A good practice is to check the tightness of the board on the side of the partition where the board was first applied. If looseness is detected, strike each nail head an additional blow with the hammer.*

TREATING JOINTS AND CORNERS WITH PERF-A-TAPE JOINT SYSTEM

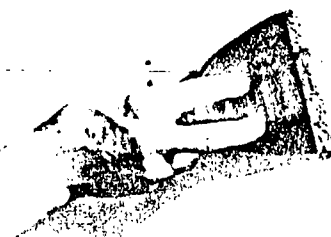
Mixing the Cement

Mix PERF-A-TAPE Cement in a clean, metal container. A 1" x 2" (4' long) makes a convenient wood mixing paddle or the common commercial potato masher is effective. Power mixing saves considerable time, particularly where mixing in a central location is convenient. Power may be supplied by a ½" heavy duty electric drill operating on 115 volts AC-DC at not over 400 R.P.M. (200 to 300 R.P.M. even better). Drills operating at high speeds whip air bubbles into cement. Mixing paddles may be of many variations. (See chapter TOOLS).

Mix clean, lukewarm water (not hot) in the proportion of 16½-17½ pints per 25 lbs. of powder for hand application; up to, but *NOT OVER* 19½ pints for machine application. Add the powder to the water. Stir vigorously for several minutes; make sure all cement is uniformly damp. Allow the mix to soak for 30 minutes (longer at lower temperatures) to allow proper solution of the material. **DO NOT OVER-THIN CEMENT WITH WATER.** Excess water will not accelerate the solution process although the cement may appear to be in a workable consistency. Over-thinned or "soupy" cement often leads to excessive or delayed shrinkage as well as bond failure. A final short mix prior to use is necessary to properly disperse all the materials in the cement.

IMPORTANT: Add nothing to PERF-A-TAPE Cement except clean water; otherwise, the bonding quality may be seriously affected and a job failure may result.

CAUTION: In cold weather heat must be provided both day and night prior to and during the entire joint treatment operation. A minimum temperature of 55° F. is required at all times until the cement is completely dry. Ventilation should be provided to eliminate excessive moisture. In glazed buildings, this may be accomplished by keeping windows open approximately two inches top and bottom (or side pivoted windows approximately four inches) to provide air circulation. In enclosed areas lacking in natural ventilation, temporary circulators should be used. Under slow drying conditions, allow additional drying time between coats of cement. Avoid drafts during hot, dry weather to prevent too rapid drying. (See chapter FIELD PROBLEMS—"Cold Weather Tips—PERF-A-TAPE Joint System Products".)



Buttering the Joints

Check all nails. Protruding nails in the field of the board should be driven home, leaving a dimple in the surface paper of the SHEETROCK Wallboard to receive PERF-A-TAPE Cement. Butter the PERF-A-TAPE into the channel formed by the tapered edges of SHEETROCK Gypsum Wallboard, filling the channel fully and evenly. Avoid heavy fills.



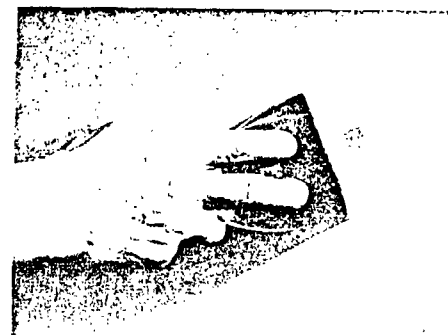
Embedding the Tape

Center the PERF-A-TAPE reinforcement and press it down into the fresh cement. By holding knife at an approximate 45° angle to the board, draw knife along joint with sufficient pressure to remove excess cement. Leave sufficient cement under the tape for proper bond but not over 1/4" under feathered edge. Do not use topping or finishing cement for embedding tape.



Covering the Tape

As soon as the tape is embedded, cover with a thin layer of cement to fill the recess between the tape and the board surface flush with the board.



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Spotting Nail Heads

Apply the first covering coat of cement over all nail heads immediately prior to or after embedding tape. Use sufficient pressure on the knife to finish cement level with wall surface. Spot nail heads in a similar manner during the second coat application of cement over joints. During the application of the third coat over the joints, sand nail heads lightly and apply a third finishing coat over nail heads to level any defects. Allow cement over nail heads to completely dry. Light sanding may be necessary before decoration.

ment over joints. During the application of the third coat over the joints, sand nail heads lightly and apply a third finishing coat over nail heads to level any defects. Allow cement over nail heads to completely dry. Light sanding may be necessary before decoration.

PERF-A-TAPE Topping and Finishing Materials

PERF-A-TAPE Topping or Finishing Material is used for finish work only. This easier sanding, smoother working material is available only in 25 lb. bags. Most professional applicators prefer this material for second and third coats and especially for spotting nail heads on all three coats. PERF-A-TAPE Topping or Finishing may be applied over PERF-A-BEAD or DUR-A-BEAD external corner reinforcement. (See chapter METAL PRODUCTS ACCESSORIES)



Second Coat Application

After the embedding and covering coat is completely dry (under good drying conditions, 24 hours) apply second coat, feathered beyond edges of first coat approximately one and one-half inches

ALL PURPOSE READY MIXED PERF-A-TAPE CEMENT

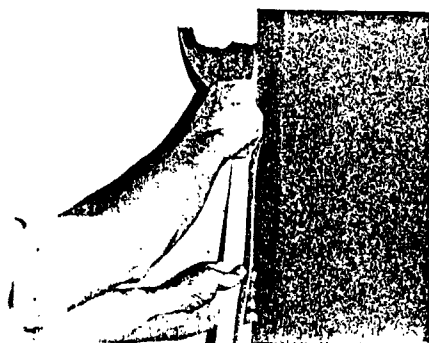
Third Coat Application

After second coat is dry, sand lightly. Apply a thin "finishing" coat to joints. Feather joint edges an inch or two beyond second coat. Sand lightly when dry.

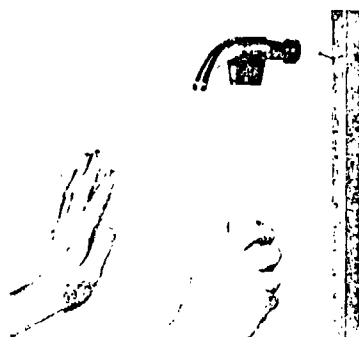


Finishing Corners

INSIDE: Fold tape along center crease. Butter both sides of the corner with PERF-A-TAPE cement and apply the tape. Apply the second and third coats of cement in the same manner that you would use to finish flat joints.



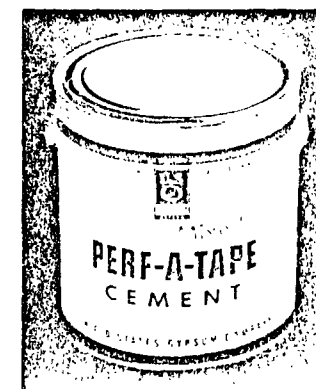
OUTSIDE: Use DUR-A-BEAD (as shown) or PERF-A-BEAD corner reinforcement for all outside corners. (Consult chapter METAL PRODUCTS ACCESSORIES for product and application details.)



Buying Data

Advantages

- Ready mixed—no job mixing—saves time and effort.
- Outstanding coverage.
- Excellent bond.
- Less shrinkage—especially on nail heads.
- Pleasant odor.
- Non-irritating.
- Practically no droppings—eliminates costly job cleanup.
- No waste—use what's needed—replace the lid.
- Fast tool cleanup—cleans easily with water.
- Extra smooth finish—good workmanship makes most sanding unnecessary. Sands easier than powder cement.
- Tends to minimize ridging.
- No paint discoloration—will not burn through paint.



Recommendations for Use

1. Store in warm place before use.
2. If any liquid has separated from cement, remix before using.
3. Normally thinning is not required.
4. Allow cement to dry thoroughly between coats. Overnight drying is usually sufficient. Spot nail heads as required. In some cases two coats will be sufficient.

ALL PURPOSE READY MIXED PERF-A-TAPE CEMENT—PROFESSIONAL APPLICATOR USE

All Purpose Ready Mixed Cement is packaged in a polyethylene bag enclosed in a 5-gal. corrugated carton.

Advantages

1. Available in two consistencies; one for hand application and the other especially designed for Ames tools.
2. A 3 in 1 material out of one package . . . embedding, topping and texturing cement.
3. Easier sanding. Low shrinkage.
4. Better slip—a butter-like property.
5. Less tendency to surface crust.
6. If thinning required for use with mechanical tools, the addition of water can easily be made and mixed with a potato masher type tool (see chapter —TOOLS).
7. Extra smooth finish. Minimized sanding required especially on feathered edges.
8. Has package life of 1 year—longer under ideal storage conditions. *Ames tool formulation has package life of 60 days.*
9. Compatible with PERF-A-TAPE powder cements. Thorough "clean-out" of tools and containers to avoid contamination no longer necessary. Use as a Topping over thoroughly dried powder cement or as taping cement when powdered PERF-A-TAPE Cement is used as a Topping.

Limitations

Ready Mixed PERF-A-TAPE Cement products must be protected from freezing and are sensitive to cold weather. If material becomes frozen allow it to thaw at room temperature (do not force the thawing process). Retemper and it will again be usable, unless it has been subjected to several freeze-thaw cycles.

HOW TO REPAIR PLASTER CRACKS WITH PERF-A-TAPE JOINT SYSTEM AND ALL PURPOSE READY MIXED PERF-A-TAPE CEMENT

Large structural cracks and cracked interior corner angles in plaster can be readily repaired with PERF-A-TAPE Joint System or All Purpose Ready Mixed PERF-A-TAPE Cement. In remodeling or redecorating old plastered surfaces, it gives lasting concealment and reinforcement to disfiguring cracks.

The strength of PERF-A-TAPE Joint System helps assure enduring concealment of cracks in old plastered walls. Merely filling large cracks with a putty type material will not usually provide the reinforcement needed to prevent reopening.

Remove all loose material. Sand a 12" wide area around crack. "Butter" it with cement; embed PERF-A-TAPE Reinforcement. Finish with two coats of cement for a strong, smooth surface.

Occasionally pits or craters may develop in the cement as it dries due to application over a well sealed surface. These are not cause for alarm, as the pits are easily filled on the final thin skim coat.

Order PERF-A-TAPE Joint System in handy 60' packages containing 60' of tape and 4½ lbs. cement; or large economical 250' bags containing 250' of tape and 18 lbs. of cement. Tape is available separately in 60', 250' and 500' rolls.

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FIELD PROBLEMS

Field Problems

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NAIL POPPING: DEFINITION AND CAUSES

The use of drywall has increased in volume as the efficiency of drywall mechanics developed, and its use has spread from low cost housing to the most expensive homes. This has resulted in greater over-all perfection of the finished job as a normal requirement.

As more serious difficulties have been overcome, the problem of nail popping has become relatively more important.

A nail pop is a protrusion, from an otherwise smooth surface, located directly over the head of a nail. The protrusion or bump is caused by an outward movement of the concealed head of the nail in relation to the finished surface. Or it can be caused by an inward movement of the finished surface in relation to the nail head. Nail popping may occur whenever materials of any kind are joined with nails of any kind, size or shape.

Nail popping may occur with any type of material secured to wood with nails. The same principles which cause nail popping in gypsum wallboard construction also apply to any other type of construction where nails are used.

Causes: Whenever the back of the gypsum wallboard is not held reasonably tight and secure against the face of the framing member by the head of the nail, a potential nail pop exists.

Figure 1 shows gypsum wallboard held reasonably tight and secure against framing member. Figure 2 shows the board spaced away from the framing. Visualize an inward pressure on the face of both boards and you can readily see that the nail head in Figure 2 will push through the thin covering pad of cement to produce a protruding nail or nail pop. In Figure 1, movement of the face of the board with relationship to the head of the nail will not take place; hence no pop will occur. The condition which is illustrated in Figure 2 will henceforth be referred to as a "loose nail".

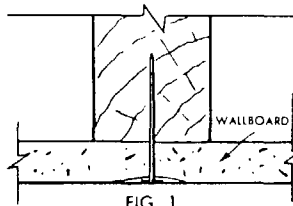


FIG. 1

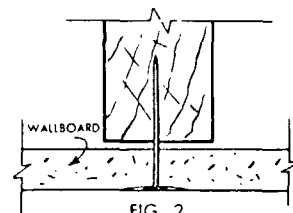


FIG. 2

LOOSE NAILS ARE CAUSED BY:

1. Improper application procedures.
2. Lumber shrinkage.
3. A combination of 1 and 2.

See section "Improper Application Procedures" in chapter—BOARD APPLICATION AND FINISHING which is a compilation of pertinent data and information which is also relative to the conditions which cause loose nails.

LUMBER SHRINKAGE AND RESULTING NAIL POP

When wood penetrated by a nail shrinks, the nail tends to protrude from the wood. (This condition is sometimes referred to as "nail creep".) The emergence of the nail or increased exposure of the nail shank results in loose nails—the basic cause of nail pops. Here is an explanation of this condition.

Characteristics of Wood Shrinkage

Framing lumber as commonly used has a moisture content in the range of 15% to 19%. However, individual pieces may be considerably higher or slightly lower.

Wood having a moisture content at the time of construction in the 15% to 19% range may, in service, eventually reach a moisture content of from 5% to 10%, except in the damp Southern coastal states and the dry Southwestern states, where the ranges may be 8% to 13% and 4% to 9% respectively. Thus, when wood is framed into a building and the building is put into service, the framing lumber loses some of its moisture content. After the lumber has eventually reached equilibrium with surrounding conditions, there will be only minor residual increases and decreases in its moisture content.

The important fact to be established here is that the first and by far the greatest change in moisture content usually occurs during the first year after construction.

Living wood may contain from 30% to 300% of water. This water is divided roughly into two parts—free water in cell cavities and water absorbed by the capillaries of the fibers and ray cells. When all the free water has been removed and the absorbed water remains, the wood is said to have reached the fiber saturation point, which is approximately 30%.

Wood shrinks as the moisture content of the wood is reduced below 30%. Very little, if any, shrinkage occurs for reductions of more than 30% in moisture content. As the moisture content of a piece of wood is reduced below the fiber saturation point, the unit of shrinkage is fairly uniform, being approximately $\frac{1}{30}$ of the total shrinkage which may occur for each 1% loss of moisture content.

Wood shrinks most in the direction of the growth rings (flat grain) somewhat less across the growth rings (edge grain; see Figure 3) and very little, as a rule, along the grain (longitudinally). Generally, heavier pieces of the same wood species shrink more than the lighter ones. (These characteristics often account for a concentration of nail pops along the length of a particular stud or joist.)

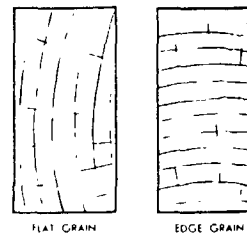


FIG. 3.

Under job conditions, the gypsum wallboard is usually applied within two to four weeks after the building has been enclosed. During this period the framing will dry out to a certain extent, depending upon drying conditions. However, even under the most favorable drying conditions and four weeks exposure, it is doubtful that the moisture content of the framing will reach a percentage as low as that which will occur "in service."

(The authority for the preceding is U.S. Department of Agriculture publication, Wood Handbook No. 72, in a section titled "Control of Moisture Content and Shrinkage of Wood.")

It is obtainable by writing to Supt. of Documents, U.S. Government Printing Office, Washington 25, D.C.)

Each increment or part of a mass of wood shrinks at a fairly uniform rate. Shrinkage in a mass of wood is towards the center. The movement of any point on the wood or boundary, such as an outer surface towards the center, is equal to the total of the shrinkage of each increment between that point or boundary and the center.

For example, in Figure 4 we illustrate a mass of wood 4" wide by 2" thick divided into 1" increments. For purposes of illustration, a total of $\frac{1}{8}$ " shrinkage has been selected for each 1" increment under conditions wherein the moisture content has been reduced from 19% to 10%. The outer plane of Areas "A" has moved $\frac{1}{8}$ " closer to the horizontal center line. The outer surface of Areas "B" has moved $\frac{1}{8}$ " closer to the horizontal center line ($\frac{1}{8}$ " for the shrinkage in Areas "A" plus $\frac{1}{8}$ " for the shrinkage in Areas "B"). Similar proportionate shrinkage also occurs in relationship to the vertical center line.

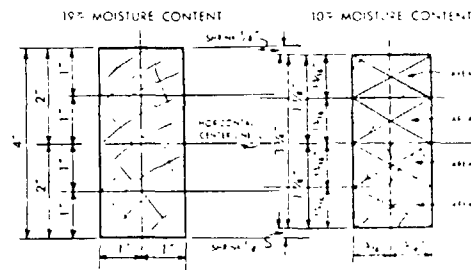


FIG. 4.

Effect of Wood Shrinkage on Nails

Nail Pops Due to Wood Shrinkage

BB026 1906

IMPORTANT NOTE:

The dimensions used in Figures 6 to 8 inclusive are selected only for convenience to illustrate principles and are not to be construed as actual measurements.

The left hand drawing Figure 5 represents the cross section of a piece of framing lumber with a moisture content of 19% through which has been driven a steel rod with both ends sheared off flush with the surface. The right hand drawing represents the same piece of wood after the moisture content has been reduced to 10%. Note that the shrinkage of the wood has resulted in a movement of each outer edge surface of the wood $\frac{1}{8}$ " towards the center line, also, that the steel rod protrudes from the lumber on each edge $\frac{1}{8}$ ".

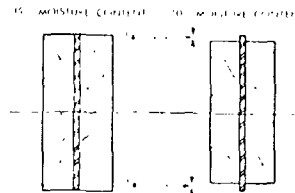


FIG. 5.

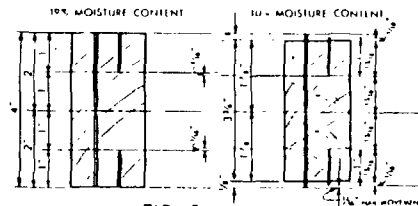


FIG. 6.

Figure 6 illustrates the same conditions as in Figure 5 except that nails have been driven different distances into the 19% moisture content wood, one nail penetrating 2" and the other 1". The sections of the nails protruding from the wood were then sheared off flush with the surface as illustrated by the drawing on the left.

In the drawing on the right, the wood penetrated by the 2" section of the nail shrank $\frac{1}{8}$ ", resulting in an exposure of $\frac{1}{8}$ " of the nail shank. In this same drawing, note that the wood penetrated by the 1" nail shrank $\frac{1}{8}$ ", resulting in an exposure of the nail shank of only $\frac{1}{16}$ ". The $\frac{1}{16}$ " shrinkage of the wood between the point of the 1" nail and the center line resulted in the nail's moving $\frac{1}{16}$ " towards the center line.

In Figures 7 and 8 we illustrate $\frac{1}{2}$ " gypsum wallboard attached with nails having a penetration of 2" and 1" respectively. The figures on the right show how the emergence of the nail due to wood shrinkage creates a space between the back of the board and the nailing surface. A comparison of the distances between the backs of the boards and the nailing surfaces of Figures 7 and 8 shows that the use of the shorter nail resulted in a smaller space between the back of the board and the nailing surface.

Extensive experiments conducted by Forest Products Laboratory and Purdue University have shown conclusively that the recession of the wood nailing surface from the nail head is almost in direct proportion to the depth of the penetration. That is, the longer the nail, the greater the exposure of the nail shank; the shorter the nail, the less the exposure of the nail shank.

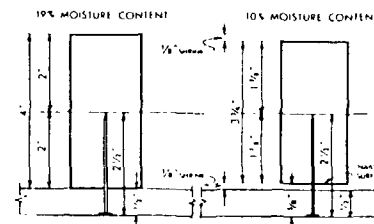


FIG. 7.

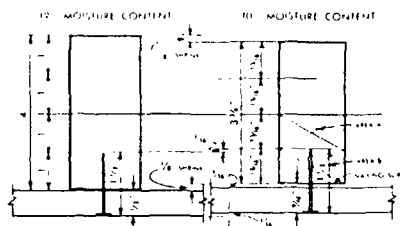


FIG. 8.

As previously shown, as the framing lumber shrinks the distance between the head of the nail and the nailing surface of the framing member increases. Assuming that the nail originally held the gypsum wallboard reasonably secure against the framing, the board is held less securely after the framing has shrunk. If the additional nail shank exposure is in the range of $\frac{1}{16}$ " (.0625) to $\frac{1}{32}$ " (.03125) the board will no longer be held tightly against the framing. This is the condition (loose nail) which is the basic cause of nail pops.

Fortunately, minor emergence of a properly driven nail (up to .005") seldom results in a visible pop. Were it not for this, nail pops due to lumber shrinkage would be much more common.

Nail pops of the magnitude of .004" to .005" may be objectionable when they occur in a surface painted with a smooth, uniform paint film or a surface having a gloss or semi-gloss paint finish. If the surface is painted or treated with a paint or material that has some grain or texture, pops of minor magnitude will be somewhat less visible.

Many pops have been measured and, as a matter of interest, they range from .003" to .022". The latter, of course, are very unsightly. Actually, pops of over .006" are usually considered objectionable.

REPAIRING NAIL POPS

When to Repair

Nail pops which are apparent before or during decoration should be repaired immediately. In all probability, they are caused by improper job procedures.

Nail pops which occur after one month's heating or more are, in all probability, caused by shrinking lumber or a combination of shrinking lumber and poor nailing. These should not be repaired until near the end of a heating season. If the pops are repaired before the lumber has shrunk sufficiently, further shrinking may occur; as a result, the pops may reappear—even if to a lesser degree.

How to Repair

Using the proper nail for the thickness of wallboard used placed approximately $1\frac{1}{2}$ " away from the popped nail, drive it in the prescribed manner while at the same time applying sufficient pressure against the board adjacent to the nail head to bring the board in firm contact with the framing. Strike the popped nail with a light blow or blows as required to seat it below the surface of the board. Remove loose cement and then apply finishing coats of joint cement and paint.

Will Pops Recur?

If the framing lumber has been subjected to a full heating season, the chances are good that the lumber has reached a moisture content approaching the lowest point of its equilibrium range. During the following spring, summer and fall seasons, the lumber will undoubtedly pick up some moisture and swell to a degree. During the following winter's heating there will again be a loss of moisture content and subsequent shrinkage. Although there are no factual data on what actually occurs, it is believed that the seasonal fluctuations are, except in unusual cases, in the range of not more than 2% to 4% moisture content differences. Under these conditions, the movement is so slight that there is little danger of future pops.

SHEETROCK WALLBOARD PROBLEMS

It is to your advantage to know and understand certain conditions which may adversely affect the quality of the finished job.

Irregularities which are the result of joint treatment will occur in a straight line pattern. These can be caused by starved joints, joints on twisted studs, joints on high studs or joists, boards out of plane, joint finishing in which delayed shrinkage has occurred, or any combination of the above.

Cements used for joint finishing are a "drying type" material and therefore harden as the contained water is evaporated. As they dry, their volume shrinks. The shrinkage is proportionate to the amount of water used in mixing the cement (consistency) and also to the depth of cement application. Watery cement and deep fills will obviously shrink more than heavy cement and shallow fills. Three coats of powder cement should be applied over joints and nail heads, though ready mixed material may only require two coats over nails or outside angles; and, in all cases, the underlying coat should be dry before application of the next coat.

JOINT TREATMENT CONDITIONS	CAUSE	REMEDY OR PREVENTION
Starved Joints	Delayed shrinkage — caused principally by the failure to allow each coat of joint cement (and underlying board paper) to fully dry before applying the next coat of cement or before painting. Under the above conditions joint cement shrinkage progresses until drying is complete. Insufficient cement applied over tape to fill channel formed by tapered joint — Cement too watery — Insufficient drying time between successive layers of cement — Over sanding.	Apply full covering coat (1st) of cement over tape immediately after embedding since this will be the heaviest application of cement. Most of the shrinkage will take place in this coat making it easier to properly fill channel.
High Joint	Needless piling of cement in channel. Cement not feathered out beyond shoulders — Insufficient or no sanding.	Sand joints to a flush surface. Opposite of "starved joint" above. Framing out of alignment contributes to this problem. (See "Framing Requirements" and "Improper Application Procedures" in chapter — BOARD APPLICATION AND FINISHING.)

JOINT TREATMENT CONDITIONS	CAUSE	REMEDY OR PREVENTION
Blisters in Tape	Insufficient cement under the tape — Tape not initially pressed into good contact with the cement.	Open up blistered area by slitting tape. Fill cut with joint cement and press tape back in place with knife blade. When dry, sand to a smooth level finish.
Edge Crack in Tape Adjacent to Tape Edges	Improper application — too fast drying conditions — too deep a fill under tape — cement mixed too thin.	Do not apply PERF-A-TAPE Joint System over hot surfaces caused by hot pipes, radiators, salamanders. In hot dry weather avoid application in drafts and prevent radical changes of temperature and humidity by controlling ventilation during the drying cycle. Repair cracks as soon as they appear and when cement is dry, by grooving out crack with a sharp tool to remove all loose material. Apply a coat of shellac to this grooved area. When dry, fill with PERF-A-TAPE Cement.
Cracks in Inside Corners	Too much cement over the tape at apex of angle.	Wipe down corners correctly leaving only a small amount or no cement in the apex.
Paint Discoloration	Painting over a joint before it is completely dry throughout.	No painting should be done until all cement is thoroughly dry. In cold damp weather this may require 48 hours or more.

FIELD PROBLEMS

Cont'd.

Cont'd.

JOINT TREATMENT CONDITIONS	CAUSE	REMEDY OR PREVENTION	JOINT TREATMENT CONDITIONS	CAUSE	REMEDY OR PREVENTION
Nail Pops	See "Framing Requirements", "Nails and Nailing", chapter — BOARD APPLICATION AND FINISHING and "Lumber Shrinkage and Resulting Nail Pop", chapter — FIELD PROBLEMS.	See "Framing Requirements", "Nails and Nailing", chapter — BOARD APPLICATION AND FINISHING and "Lumber Shrinkage and Resulting Nail Pop", chapter — FIELD PROBLEMS.	Damaged Edges	Paper-bound edges of gypsum wallboard damaged or otherwise abused results in a loosening of the paper from the gypsum core, a ply separation along the paper edge as well as a certain fracturing or powdering of the core itself in this immediate area. Even when not compressed, these damaged portions of the board edges are seemingly more susceptible to expansion of the paper surfaces upon wetting, thereby tending to contribute more readily to the ridge when joint system is applied.	Avoid butting together such edges that may easily be compressed. Handle SHEETROCK with reasonable care. Any severely damaged edges should be cut back to sound board before application.
Nail Spots	Due to a greater dissipation of heat directly over the nail head, a deposit of dirt (dust particles) may accumulate over the nail heads in outside walls and top floor ceilings.	Nail spots are greatly minimized in the Double Wall System using SHEETROCK Wallboard because face layer nails are removed. In single layer construction, the spots can be washed off enameled surfaces, removed with wallpaper cleaner or surfaces affected may be redecorated. The severeness of spotting will be directly proportionate to the cleanliness of the air within the house, and to temperature differences between the framing and the room side of the board.	Compressed or Forced Boards	Boards that have been forced into place or nailed opposite to the recommended procedure will often buckle causing one end or edge to over-ride the other.	Cut SHEETROCK Wallboard so as to slip easily into place. Nail from center of the board toward the ends and edges. Apply pressure to wallboard while nailing.
Ridging	See "Back-Blocking System", chapter — SYSTEMS.	See "Back-Blocking System", chapter — SYSTEMS.	Twisted Studs or Joists	Framing members that are twisted in place presenting an angular nailing surface which, when board is applied, projects an uneven surface or offset along the entire joint. Warped dimension lumber may contribute to this type of deformity.	Align all twisted framing members before application. See "Improper Application Procedure" and "Framing Requirements", chapter — BOARD APPLICATION AND FINISHING.
Burred Ends	Ends of the boards become roughed up and can be felt as a ridge along the end of the board.	The burr should be sanded off before board is erected.			

Cont'd.

COLD WEATHER TIPS

PERF-A-TAPE JOINT SYSTEM PRODUCTS

All joint cements react to cold weather. *Under adverse conditions, particularly if cold mixing water is used, the cement mix should stand at least 30 minutes and often much longer.* Failure to recognize and adhere to proper cold weather practices can lead to serious and costly complaints.

DO'S AND DON'TS

- **DO** provide ventilation and adequate heat. (See chapter—BOARD APPLICATION AND FINISHING). Temporary heat provided by salamanders, space heaters or unvented gas burners is often unsatisfactory. Insufficient venting to carry off fumes can cause staining of joint cement. Inadequate heat causes uneven drying, leading to bond failure, delayed shrinkage and joint discoloration.
- **DO** allow sufficient drying time between coats of cement and before decoration. Under adverse job conditions 24 to 48 hours drying time is often insufficient. (See chapters—BOARD APPLICATION AND FINISHING—FIELD PROBLEMS).
- **DO** plan work well ahead. Coordination between builder and dry wall contractor is particularly essential during cold weather.
- **DON'T** add extra water to speed up or ease mixing. Extra water causes excessive "watering down". Drying time is significantly slowed down, resulting in delayed shrinkage on the surface.
- **DON'T** store PERF-A-TAPE and PERF-A-TAPE cement in areas subject to dampness.
- **DON'T** use dirty or excessively cold water. Bond failure and delayed shrinkage can occur. (Blow torch applied to side of water bucket will take chill off cold water.)

Metal Products Accessories

METAL PRODUCTS
ACCESSORIES

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No. 100 PERF-A-BEAD Corner Reinforcement

PERF-A-BEAD is a metal corner formed of electro-galvanized steel with PERF-A-TAPE wings securely gripped by metal flanges. It is easily applied with PERF-A-TAPE cement (embedding) and designed to provide lasting corner protection in drywall construction. PERF-A-BEAD forms an excellent corner for any outside angle, uncased opening, pilaster, beam or soffit. PERF-A-BEAD is packaged 200 lin. feet and 1000 lin. feet per carton. (6'8" or 8' lengths).

(1) Apply PERF-A-TAPE cement on both sides of the corner over the entire area to be covered by PERF-A-BEAD. (2) Holding the PERF-A-BEAD in a vertical position, place it tightly against the corner. (3) Completely seat the bead by running the thumb and forefingers up and down the outside nose of the corner.

Apply pressure with the fingers to both of the paper flanges. (4) Embed the paper flanges by drawing the board knife down in each side of the corner. Excess cement thus removed under flanges later used in filling. Hold metal corner in place with one hand adjacent to the knife during embedding operation. (5) Using the metal corner angle as a screed, cover both the paper flanges with a smooth fill of cement 3" to 4" wide. Allow to dry 12 to 24 hours. (6) Apply second coat of cement (third coat if necessary) feathering edges 2" to 3" beyond preceding coat. Sand as required after each coat to remove jagged particles from metal angle.

No. 101 DUR-A-BEAD Metal Corner Reinforcement

DUR-A-BEAD is a metal corner reinforcement of electro-galvanized steel, to provide lasting protection to outside angle corners in gypsum wallboard construction. DUR-A-BEAD is easily nailed to framing through SHEETROCK Wallboard, and concealed with PERF-A-TAPE cement to a smooth finished corner. Lengths and Packaging—6'8", 8'—200' cartons and 1000' cartons.

(1) Apply with gypsum wallboard nails spacing nails 3" apart. (2) Using metal bead as a screed, cover both flanges with PERF-A-TAPE cement about 3" to 4" wide. Allow 12 to 24 hours to dry. (Under slow drying conditions, allow more time.) (3) Sand lightly if necessary—apply second coat (third coat if necessary) feathering edges 2" to 3" beyond preceding coat.

No. 300 PERF-A-TRIM Metal Casing

An electro-galvanized channel with PERF-A-TAPE flange attached. It is designed for use as a casing around door and under openings and at ceiling angles, and suitable for single layer or double wall gypsum wallboard construction. PERF-A-TRIM is embedded with joint cement to produce a flush edge reinforcement. It is ready for painting.

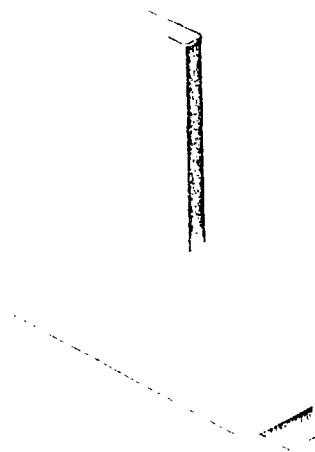
The SHEETROCK is erected in the conventional manner, except that it is not nailed closer than one stud away from the area in which PERF-A-TRIM is to be installed. A space $\frac{3}{8}$ " to $\frac{1}{2}$ " wide is left between the edges of the jamb and the gypsum wallboard. This spacing adds a fluted effect to openings and provides space for hardware or door bucks. The PERF-A-TAPE wing is held open, the metal flange of the PERF-A-TAPE is inserted between the frame and wallboard and pressed into place. The face of the trim is aligned parallel to, and $\frac{3}{8}$ " to $\frac{1}{2}$ " away, from the face of the jamb. With the wing still open the SHEETROCK is nailed in position. The nail will penetrate the flange and hold it to the framing. The wing is then embedded with PERF-A-TAPE cement and the fill and finish coats are applied in the regular manner, using the edge of the trim as a screed to get a smooth, even finish.

PERF-A-TRIM may be cut with either a hack saw or tin snips. Corners may be mitered by using a miter box. Lengths and Packaging— $\frac{3}{8}$ " and $\frac{1}{2}$ " in 7' and 10' lengths.

No. 400 USG METAL TRIM

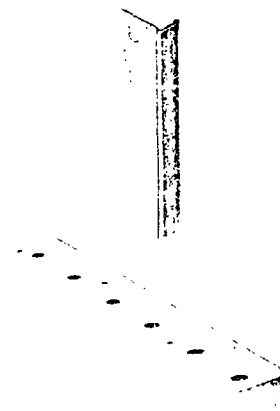
A strong electro-galvanized metal channel for use as an edge protection and trim around door and window openings and as a moulding at ceiling angles in single and double layer gypsum wallboard construction. USG Metal Trim is economical, easy to install and provides a clean appearance often replacing old fashioned wood trim.

USG Metal Trim is applied to the wall before the SHEETROCK goes up, by nailing into the framing through the long leg at approximately 8" intervals. USG Trim comes unpainted for use with plain SHEETROCK, and may be painted to harmonize with Striated Panel SHEETROCK, and with Woodgrained SHEETROCK. It is available in 7' and 10' lengths and in $\frac{3}{8}$ "- $\frac{1}{2}$ " thickness. The exposed face leg is $\frac{1}{2}$ " wide; the concealed or nailing leg is $1\frac{1}{16}$ " deep. The metal trim is easily cut with a hack saw. For angular cuts a miter box may be used. USG Metal Trim is packaged 350 and 500 lin. ft. per carton.



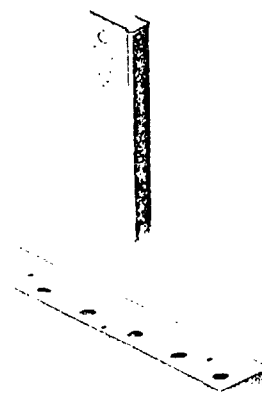
No. 200-B USG METAL TRIM

No. 200-B USG Metal Trim is similar in finished job appearance to the No. 200-A Metal Trim. By the elimination of a back flange, installation is simplified. Metal trim is applied to the edge of the wallboard with the knurled flange exposed and nailed not more than 6" o.c. No mitring is required; simply butt trim together at corners. Complete installation by applying PERF-A-TAPE cement as for No. 200-A Trim. Designed for $\frac{1}{2}$ " wallboard thickness only.



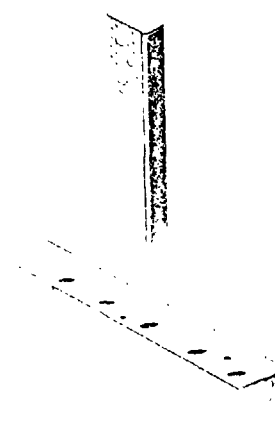
No. 200-A USG METAL TRIM

No. 200-A USG Metal Trim is a channel type steel casing that provides maximum protection and a neat finished edge to gypsum wallboard at window and door jambs. Apply SHEETROCK Wallboard omitting nails at framing member where metal trim is to be installed. A space $\frac{3}{8}$ " to $\frac{1}{2}$ " wide is left between the edge of the wallboard and the face of the jamb. Slip metal trim over edge of wallboard and nail through nail holes provided in knurled flange into wallboard and framing or jamb, using nail recommended for thickness of wallboard being applied. Space nails not more than 6" o.c. Complete installation by applying PERF-A-TAPE cement using nose of trim as a guide for determining proper thickness of cement. Apply cement in at least two coats, allowing adequate drying between coats. For $\frac{1}{2}$ " SHEETROCK Wallboard only.



No. 200-C USG METAL TRIM

No. 200-C USG metal trim requires a slotted jamb for installation. By inserting the open "V" flange into the slot of the jamb, this trim is adjustable for use with $\frac{3}{8}$ ", $\frac{1}{2}$ " and $\frac{5}{8}$ " wallboard. Prior to installation, door and window jambs are kerfed $\frac{1}{8}$ " wide and $\frac{1}{2}$ " deep, the kerf being $\frac{3}{8}$ " back from face of jamb. Insert metal trim in kerf, with knurled flange over the face of the board. Nail as above. Design assures a clean tight joint without precision fitting. Apply PERF-A-TAPE cement as described previously.



Systems

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No. 500 USG SNAP-ON TRIM

No. 500 USG Snap-On Trim is a modern metal trim for doors and windows and is designed to snap into position quickly and stay in place permanently. It reduces labor costs as much as 50%. The positive locking action holds the trim tight. No unsightly voids between trim and frame—no shrinkage to cause miters to open up. Resists damage and eliminates dust catching ledges. Also provides an excellent guiding edge for the application of wallpaper. It's bonderized ready for painting with no special preparations required. Snap-On-Trim goes on amazingly fast. The wood jambs are purchased slotted or kerfed from the millwork manufacturer or can be done on the job by using a 16 gauge planer type saw and making a slot not more than 1/16" wide the entire length of both sides and head jambs. This slot or kerf, should be 5/8" in depth and at approximately an 85 degree angle toward the opening. No cutting is done. Every package is complete and precut to size of door openings in following door sizes: 1-6, 2-0, 2-4, 2-6, 2-8, 3-0, 4-0, 5-0, 6-0 inclusive. Package contains 12-7 ft. pieces, left mitre, 12-7 ft. pieces right mitre, 12 head pieces cut to exact length, and 24 corner clips. A single package is enough for two sides of six doors. Instructions for installation are contained in each package. Requires no special tools except a carpenter's hammer and nail punch.

JOB LAMINATED SHEETROCK GYPSUM WALLBOARD—THE DOUBLE WALL SYSTEM

The basic double wall system consists of two layers of $\frac{3}{8}$ " gypsum wallboard laminated together on the job. A base layer of BAXBORD Gypsum Backing Board is nailed to the framing, and a face layer of SHEETROCK Wallboard is adhesively applied to the base layer. Walls and ceilings so constructed offer greater strength, greater fire resistance and greater resistance to sound transmission. Moreover, they are highly resistant to cracking, easy to decorate; and they minimize the possibility of imperfections from face nails. Speedy erection cuts building time, permits earlier occupancy.

Materials Needed

BASE LAYER— $\frac{3}{8}$ " BAXBORD Gypsum Backing Board in 4' x 8' panels specially designed for the double wall system. Both faces and the long round edges are encased in strong gray liner paper. This is not a finished product. The face side is not suitable for decoration. BAXBORD Backing Board is economical, easy to handle, available plain or with aluminum foil on one surface to provide a vapor barrier and reflective insulation on exterior walls and top floor ceilings. (Regular $\frac{3}{8}$ " SHEETROCK Wallboard may be used as an alternate to BAXBORD for the base layer.)

FACE LAYER— $\frac{3}{8}$ " Tapered Edge SHEETROCK—4' wide and up to 14' long. Several face layer alternates are available for walls: $\frac{3}{8}$ " Panel SHEETROCK 16" wide—7', 8', 9' and 10' long (depending on location)—Plain—Striated—and Ranch Pine finishes; $\frac{3}{8}$ " Woodgrained SHEETROCK Wallboard—4' wide—7', 8', 9' and 10' long.

NAILS—For base layer 4d cooler type, GWB-54 nails or power driven staples, 16 U. S. Standard gauge flattened galvanized wire, $\frac{1}{2}$ " wide, 1" long, with divergent points. For temporary support of face layer nails of sufficient length to penetrate minimum $\frac{3}{4}$ " into nailing member, temporary bracing, shoring or by double headed scaffold nails, stucco furring or 6d cooler type nails.

ADHESIVE—Use PERF-A-TAPE Cement. Approximately 55 to 60 lbs. per 1000 sq. ft. of wall area. *Note:* The high ridges obtained bridge uneven areas and assure continuous bond.

JOINT TREATMENT PERF-A-TAPE Joint System. For Tapered Edge SHEETROCK 1000 sq. ft. wall area requires approximately 312½ lin. ft. of PERF-A-TAPE and 52 lbs. of Joint Cement.

Spacing of Nailing Members

Two layers of $\frac{3}{8}$ " wallboard are the usual thicknesses used in the double wall system, however, greater thicknesses may be used to achieve additional value.

The maximum spacings for nailing members is determined by the thickness of the base layer employed. Nailing member spacing should not exceed those shown in the following table:

BASE LAYER THICKNESS	LOCATION	APPLICATION METHOD	MAXIMUM SPACING OF NAILING MEMBERS
$\frac{3}{8}$ "	Ceilings	Horizontal	16" o.c.
$\frac{3}{8}$ "	Sidewalls	Horizontal or vertical	24" o.c.
$\frac{1}{2}$ " & $\frac{5}{8}$ "	Sidewalls	Horizontal	24" o.c.
$\frac{1}{2}$ " & $\frac{5}{8}$ "	Ceilings	Horizontal or vertical	24" o.c.

NOTE: Where adhesive is not used between layers, limitations of nailing member spacing of single layer construction apply to both the base and face layers.

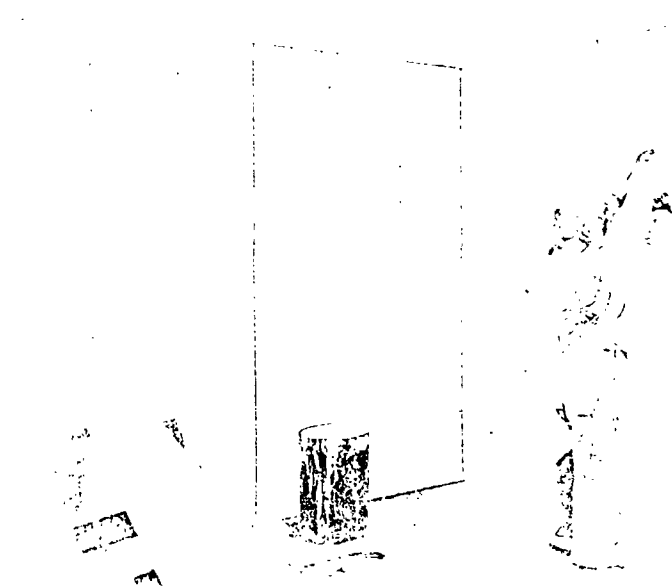
Framing

Make a thorough check of the framing. Studs and joists must be in true alignment; bridging, fire stops, soil pipes, etc., must not protrude beyond framing. For best results heat should be provided to maintain a uniform temperature in the range of 45°F. to 70°F. well in advance of and during board application, joint finishing and decorating. Ventilation should be provided to eliminate excessive moisture.

Planning

Two secrets of a good gypsum wallboard job are the elimination of unnecessary joints and locating joints which must occur at the least conspicuous locations. *Careful advance planning of the job is important because the manner in which the face layers may be applied is largely dependent upon the placement of the base layer panels, since joints between the two layers should be offset a minimum of 10"*. Generally, horizontal construction on sidewalls results in less lineal feet of joints. However, ceilings should be spanned with a single sheet if possible, regardless of the direction of the joists. The first step in good planning is to determine how the face layer board should be applied. Then, considering the location of the joints in the face layer, erect the base layer board so that the joints between the two layers shall be offset as described above.

Application—Base Layer



Nail BAXBORD Backing Board horizontally on ceiling first. Space nails a maximum of 7" o.c. End joints may occur on or between framing members and must be staggered. On walls, apply BAXBORD vertically, long edge joints must occur on framing members. Space nails a maximum of 8" o.c. If staples are used, drive staple crown parallel to long dimension of framing member so that crown bears tightly against BAXBORD, but does not cut into paper. Spacing is the same as for nails.

Application—Face Layer

The face layer on ceilings may be applied either vertically or horizontally (refer to preceding paragraph "Planning"), depending on whichever results in least number of end joints. On walls, horizontal application is normally used.



Cut and fit face layer of 4' wide SHEETROCK Wallboard for the ceilings. Then spread the PERF-A-TAPE cement adhesive uniformly over the entire back surface to the extreme edges of the board, using the adhesive spreader blade.



After the adhesive has been applied to the back surface, the face layer board is erected. Wipe off any adhesive forced out along the edge.



Following application of the upper boards, erect face layer of SHEETROCK Wallboard on lower walls. Upper and lower boards should be loosely butted together. Note how the PERF-A-TAPE cement adhesive has been applied to the back surface of the board.

After the laminating adhesive has thoroughly dried (usually 24 to 48 hours) the temporary nails should be pulled or the double headed scaffold nails, the nails supported by washers, and the temporary shoring or bracing, should be removed.

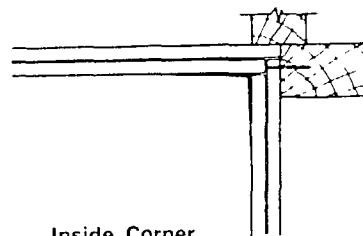
Where double headed or furring nails have been used without a washer, a thin wood block should be placed under claw hammer head when nails are pulled to prevent damage to face layer surface. For best results dimple holes left by temporary nails with crown head hammer directly over hole to facilitate concealment with PERF-A-TAPE cement during joint treatment application.

In horizontal application, face layer end joints may occur on or between framing members. When the end joints occur between framing members, the back blocking surface alignment procedure should be followed, using wood supporting strips to assure alignment.

The face layer may be temporarily held in place with nails of sufficient length to penetrate a minimum of $\frac{3}{4}$ " into the nailing member, by temporary bracing, shoring or by means of double headed scaffold nails to which large fiber or wood washers are applied, stucco furring nails or 6d cooler type nails backed up by BXBORD or SHEETROCK blocks (used as washer). Temporary nailing or bracing should provide support every 16" to 24".

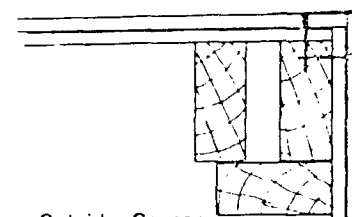
DIRECTIONS FOR MIXING PERF-A-TAPE CEMENT (used as a laminating adhesive)

- Mix PERF-A-TAPE Cement in clean metal container, using sturdy mixing paddle. (See Chapter—TOOLS.)
- Use clean lukewarm (not hot) water for mixing up to 22 pints of water to 25 lb. bag of cement.
- Pour all the water into a pail of suitable size, then pour all the cement to be mixed into the water.
- Without waiting, stir vigorously for approximately 1½ minutes; make sure all cement is uniformly damp.
- Allow the mix to stand for 30 minutes. This is important.
- Stir vigorously for approximately 1 minute taking care to break down any lumps. The cement is now ready for use.
- Approximately 55 to 60 lbs. of cement are required for 1,000 sq. ft. of second or face layer of SHEETROCK.



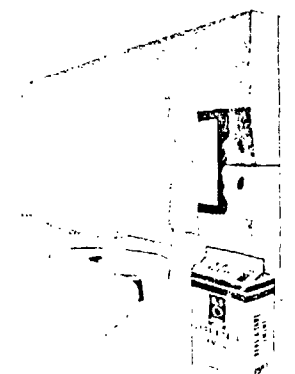
Inside Corner

Only the overlapping panel of BXBORD is nailed to the corner framing, securing both boards into the corner. The $\frac{3}{8}$ " SHEETROCK face layer is not nailed. A "floating" type of corner results after reinforcement by application of the PERF-A-TAPE Joint System.



Outside Corner

Only the face layer of SHEETROCK—not the BXBORD—is nailed to the framing. When nail-on corner reinforcement is applied, use temporary nails at locations shown; otherwise use permanent nails penetrating framing approximately $\frac{3}{4}$ " and countersink as shown or conceal by the corner reinforcement.



Finishing

Nail heads are spotted with PERF-A-TAPE Cement and joints are treated with PERF-A-TAPE Joint System according to directions. (See chapter BOARD APPLICATION AND FINISHING—"Joint and Corner Treatment" and chapter TECHNICAL DATA—"Paint and Finishing Guide").

Handy, Easy-To-Make Spreader Blade

Metal blades are recommended. With blades made of other materials the cement tends to accumulate and dry in the notches, preventing proper spreading action. Stainless or galvanized steel makes the best spreader. It should have the approximate stiffness of a plaster-trowel blade. The blade should be kept reasonably clean at all times. A 5" x 10" blade is most effective for spreading cement. As shown above, the recommended spacing of notches is 1½", with notches ½" deep, tapering out to 5/16" in width at edge of tool. Note that notches have a rounded, rather than a sharp "V" apex. (See chapter 10015).

USG BACK BLOCKING SYSTEM*

Introduction

Gypsum wallboard drywall construction has made rapid progress in the last few years. Gypsum wallboard is fast becoming the standard wall and ceiling material for residential construction. The proficiency of the mechanics doing joint finishing work has been highly instrumental in the growth and public acceptance.

The skill with which joints are now being concealed highlights certain basic problems which several years ago were not noticed or recognized. We refer to the difficulty of properly concealing end and edge joints under all practical working conditions. We refer specifically to a deformity at the joint called "ridging" or "beading."

The construction procedure herein described was developed by the United States Gypsum Company as a means of minimizing "ridging" deformities. The procedure is simple and effective. It has been tried and proven.

The following has been prepared in order to give you general information on the subject of ridging and the steps which may be taken to minimize it.

Ridging Defined

"Ridging" or "beading" is a joint deformity which appears, as the name implies, as a continuous ridge or bead along the length of the joints. It is often confused with other types of deformities, principally a starved joint, or joints, which occur on twisted studs. In general, ridging can be diagnosed reasonably accurately by its uniform fine ridge-like pattern along the exact center of joint.

Characteristics

Unlike other defects which are apparent almost immediately, ridging generally develops and becomes apparent after the joint finishing work has been completed. This period of time may be from a few hours up to several months before it first becomes apparent depending upon factors described later on.

Many drywall contractors, general contractors and builders are of the opinion that ridging is a relatively new problem—that years ago they were never bothered by such a condition. Actually, we first observed ridging in 1940. We know that this condition has always existed and we have observed that ridging does not become a serious problem until a certain skill in joint finishing is attained. Ridging in the past was generally not specifically noticed because of the many other imperfections due to relatively poor workmanship. Today, with large numbers of drywall contractors doing extremely high quality work and with a more critical market, ridging has become a problem requiring recognition.

It is often felt that ridging occurs only on ceilings. Actually, it occurs on side walls with the same frequency as on ceilings. However, it is much more apparent on ceilings than side walls because the ceiling is the largest unbroken surface in the room and the angle of view and light conditions are more favorable for the detection of blemishes; however there is usually a need for minimizing ridging of horizontal sidewall joints.

Conditions Causing Ridging

We know, not only by observation but also by laboratory tests, that not all jobs ridge to the same degree. The degree to which they will ridge depends upon a combination of factors. We know definitely that the possibility of ridging is greater on jobs when the joints are taped and finished during cold, damp or high humidity periods. We also know that in the case of two joints—one finished with a high crown or heavy fill and 14" wide, and one finished flat and 8" wide—that under the same climatic conditions during taping and drying the flat and narrow type of joint concealment will ridge to a lesser degree. Joints finished with a high crown during damp, cold climatic conditions or under conditions of high humidity are almost certain to ridge to an objectionable degree, whereas joints finished flat and narrow under ideal drying conditions seldom ridge to a degree where it is visible to the eye under

*The Back Blocking System herein described is covered by U.S. Patent No. 2736929

normal lighting conditions. These two combinations represent the extremes of causes and results. There are many in-between combinations which may cause objectional ridging. *Ridging is not a result of a quality defect.*

The explanation as to exactly what causes the ridges to develop is complicated and difficult to explain with a lengthy dissertation on the subject. Since we feel that this information has little practical value, it is not covered.

Prior to World War II, construction activity was generally stopped during the winter months or periods of inclement weather. However, since that time, and due to an unprecedented demand for homes, residential construction is carried on during all months of the year. To maintain the year-around building program, builders have found ways and means of protecting various other components of the building from the hazards of extreme climatic conditions. These measures are costly but are the penalty for building during adverse weather conditions. The costs are reflected in the price of the house and the buying public has accepted the penalty.

Building under adverse conditions and at an increased tempo has had its effect upon the overall quality of joint finishing, and particularly with respect to the more frequent occurrence of ridging. This fact, combined with the increased proficiency of the joint finisher and a more critical market, dictates that steps must be taken to minimize the danger of ridging in gypsum wallboard jobs.

Recommendations for Minimizing Ridging

The United States Gypsum Company back blocking system was developed to minimize ridging. Its continuous use over a period of years by many drywall contractors and builders is conclusive proof of its effectiveness, and likewise it is also proof that the cost is not prohibitive. We urge all drywall contractors, builders and general contractors to adopt this system as a standard for all single layer wallboard construction.

We recommend back blocking all ceiling joints along tapered edges and floating and back blocking all end joints, side walls, and ceilings. End joints, side walls and ceilings may be tapered as shown at the discretion of the contractor or applicator. On almost every job there are exceptionally critical wall areas where joint ridging would be noticeable, such as large unbroken surfaces subject to harsh natural or artificial side lighting which magnifies any surface variation. Noticeable ridging in these areas can be minimized by back blocking only the one side of the partition that is most critical in appearance.

In cold weather when back blocking is used the building should be heated during the application to maintain a uniform temperature range of 45° to 70°F and ventilation should be provided to eliminate excessive moisture.

Following is a pictorial presentation of the procedure for floating, back-blocking and tapering end joints and back blocking edge joints.

BACK BLOCKING CEILING JOINTS



FIG. 1

permits easy spreading and leaves a standing ribbon of cement. The spreader as shown can be made locally. The notches should be $\frac{5}{16}$ " wide by $\frac{1}{2}$ " deep and spaced approximately $1\frac{1}{2}$ " o.c.



FIG. 2

twisted stud or joist is eliminated. As described later, the back blocked, floated end joint may be tapered to facilitate easier joint treatment.



FIG. 3

1. Tools and Materials Needed—

Backing blocks are cut from scrap wallboard. Use $\frac{3}{8}$ " or $\frac{1}{2}$ " thick backing blocks for $\frac{1}{2}$ " wall or ceiling finish; $\frac{1}{2}$ " or $\frac{5}{8}$ " thick blocks for $\frac{3}{4}$ " wall and ceiling finish—use face side of blocks for lamination if foil back material is used. They should be approximately 10" wide and of sufficient length to fit loosely between the joist spaces. They need not be accurately cut. The adhesive is PERE-A-TAPE (embedding) Cement or All Purpose Ready-Mixed PERE-A-TAPE Cement mixed to a consistency which

2. Applying Ceiling—When the back blocking is used the gypsum wallboard must be applied with the long edges at right angles to the joists as shown in the picture. This procedure facilitates the placement of the blocks along the full length of the edge and ends of the board. The board in figure 2 and following sequence of pictures will be applied in a manner illustrating floating end joints. Additional advantages are gained by floating the end joints, in that the difficulty of forming a good joint over a

3. Spreading Adhesive —The adhesive is spread on the blocks as shown. The adhesive is applied so that the ridges will be perpendicular to the joint. It is important that the ridges are well formed and are a minimum of $\frac{1}{4}$ " high before installation. The cement should be spread on the blocks just before the blocks are to be installed. Vibration due to nailing of face boards will cause blocks to settle and the adhesive to spread.

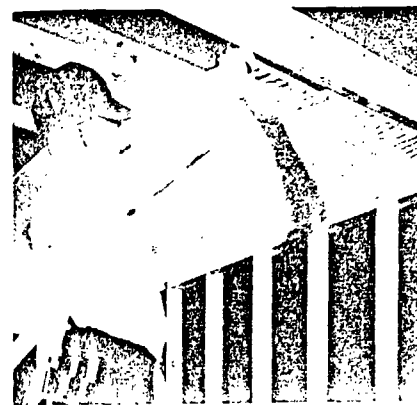


FIG. 4

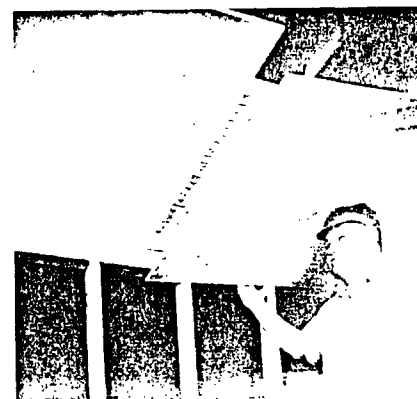


FIG. 5

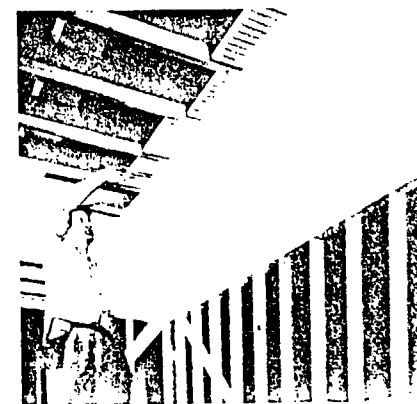


FIG. 6

4. Positioning Blocks for Floating End Joints—Note a different procedure is used in blocking ceiling end joints. Blocks are placed prior to erection of succeeding board. The same size blocks, which are used for the ends, thus eliminating the need for different sized blocks. Blocks and cement are generally cut and mixed respectively in advance of the erection of the board. The general procedure on the job is for one man to complete nailing the board while the other applies cement to the blocks and places them.

5. Continuing Board Erection —Immediately after all the blocks are in place the next board, which has been previously cut, is erected. To prevent the cement from drying and a resultant loss of bond always apply cement on blocks just prior to erection of the wallboard. The ends are loosely butted. Care should be exercised to avoid tight fitting ends. On the other hand they should not be spaced apart. The ends of the boards should be free to move independently of one another.

6. Positioning Blocks for Edge Joints —After the next board has been cut to the proper size, the blocks along the tapered edge are positioned. Slightly over half of the width of the block is resting on the ceiling board. Note that in all cases the cement ridges are perpendicular to the joint. The partner of the mechanic placing the blocks has finished nailing and is getting the next two gypsum wallboards cut to size.

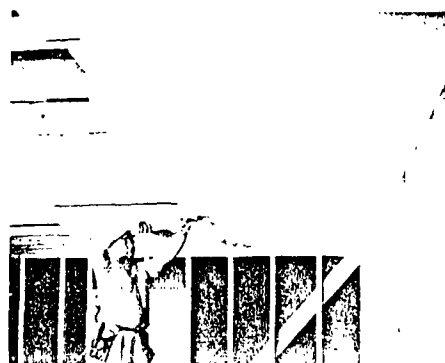


FIG. 7

7. Continuing Board Erection

The mechanic is finishing nailing the first board of the second course in place. His partner is spreading cement on the blocks for the end joint. The next board which has been cut to size, will be positioned and nailed as soon as the end joint is blocked. Mechanics should always apply all face boards required to conceal blocks in position before going to lunch or taking normal job breaks. Nails, nail spacings and nailing practices are the same as for the conventional single layer gypsum wallboard construction.

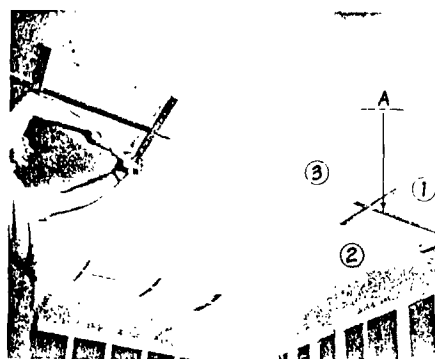


FIG. 8

8. Tapering Ceiling End Joints

End joint "A" should be tapered as soon as board 1, 2 and 3 are in position. It is necessary to have board 3 in position before tapering since the wood strip over the end joint extends beyond the joint and on to the surface of board 3. The procedure for tapering end joints is the same as shown in steps 7 and 8. Do not depress ends of board more than $\frac{1}{8}$ ". The wood tapering strips are $\frac{3}{8}$ " x $1\frac{1}{2}$ " oak flooring or any good quality wood strips. The

three shorter strips are approximately 4" to 6" longer than the distance between nailing members (22" long for framing spaced 16" c. to c.), pre-drilled at each end to accept a $2\frac{1}{2}$ " double head scaffold nail. Pre-drilled nail holes in wood strips to conform with framing spacing. The shorter strips are first loosely nailed to the SHEETROCK surface. The longer strip, which is approximately 54" long, is then centered over the joint and underneath the horizontal strips as shown. (In lieu of wood tapering strips, supporting strips of wallboard may be used as described in step 14 merely to assure alignment of adjoining ends.)

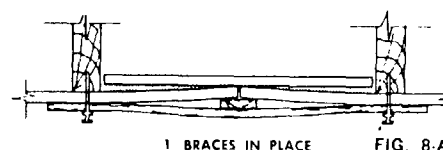


FIG. 8-A



2. BRACES REMOVED

FIG. 8-A

8-A. Cross Section of Tapered Butt Joint

Here is a cross section showing tapering and back blocking of a floated end joint. Note the wood strip in the top drawing, depressing the ends of the boards. When this strip is removed, a tapered formation remains as shown in the bottom drawing. Taping should not be started until 24 hours' drying time has elapsed following the installation of the back blocking System.

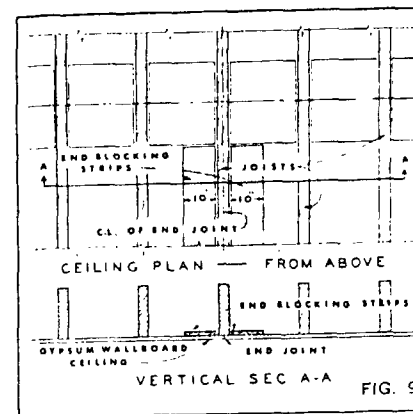


FIG. 9

FLOATING-BACK BLOCKING END JOINTS -SIDE WALLS



FIG. 10

9. Back Blocking End Joints Which are Centered on Joists

As shown above, end joints may be successfully back blocked without floating the joint between the joists. In this method the ends of the board are nailed to the joist in the conventional manner. Then the back blocking strip, with adhesive applied, is placed on top of the ceiling board as shown in the sketch. FIG. 9 This system is effective in minimizing ridging. However, it does not have the advantage of compensating for twisted joists as does the floating method.



FIG. 11

11. Side Wall Blocks — The side wall back blocking is cut slightly less than the width of the stud space and approximately 4" longer than the space to be blocked, allowing the block to extend behind the upper course of board as shown. Note the high ridges of PIRF-A-TAPE Cement or All Purpose Ready-Mixed PIRF-A-TAPE Cement applied so as to be at right angles to the vertical end joint. (Ceiling end joints are blocked in a slightly different manner as shown in Fig. 4.)



FIG. 12

12. Positioning Side Wall Blocks—The block is in position and is being nailed to the stud from the face as shown above. Three nails along each edge are sufficient. The block is held in the plane of the wall as formed by the studs and by the scabs along the sides of the studs as shown in Figure No. 10. Always make certain that the blocking is flush or slightly back of the nailing face of the studs—never allow it to protrude.

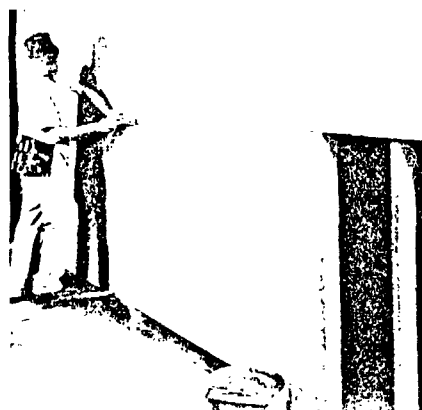


FIG. 13

13. Applying Gypsum Wallboard—The next step is to position and nail one wallboard panel in place. Note the end of this board occurs approximately mid-way between the supports and over the blocking. Also note that the end joints between the upper and lower courses of panels are staggered. As the gypsum wallboard is nailed along the stud, the end of the board is forced into the cement on the blocking.

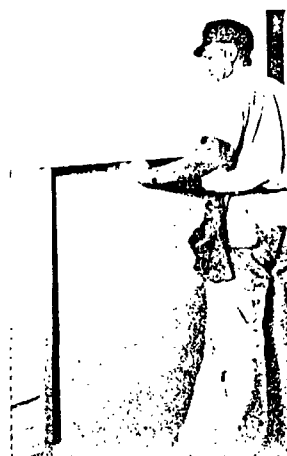


FIG. 14

14. Applying Gypsum Wallboard Continued—The adjacent panel is put into place, loosely butted to the preceding one and nailed to the studs bringing the face board into contact with the cement. To assure alignment of the adjoining ends of the wallboard, 6" wide strips of wallboard are used in lieu of the oak flooring strips shown in Figure 15. After 24 hours the strips are removed and the joint is back blocked ready for taping. Joints treated in this manner will require the usual finishing technique of crowning necessary for end joints.

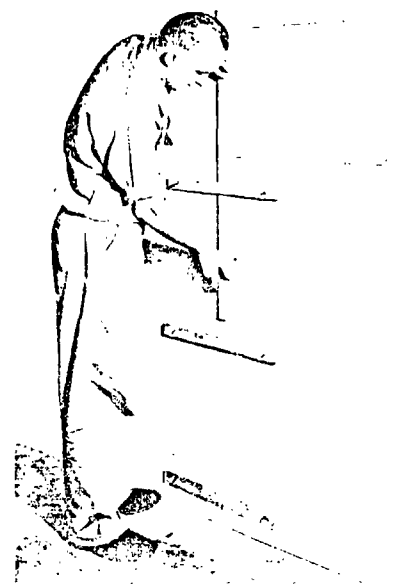


FIG. 15

15. Tapering End Joints—In lieu of using strips of wallboard to maintain alignment as described in Figure 14, the end joints may be tapered by following the procedure pictured on the left. The strips are pieces of $\frac{3}{4}$ " x $1\frac{1}{2}$ " oak flooring. The horizontal strips are first loosely nailed, with double headed nails, to the underlying supports. The vertical piece, which is approximately 54" long, is then centered over the joint and underneath the horizontal strips as shown. Ceiling joints are tapered in the same manner.

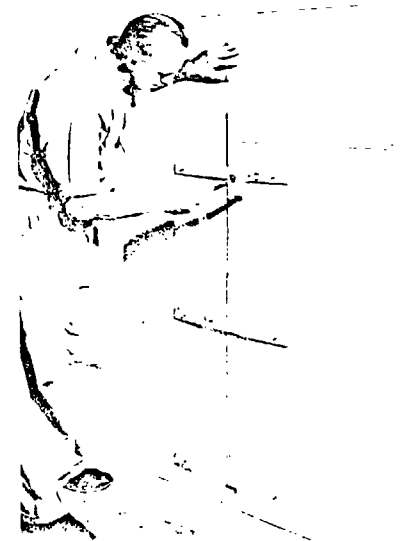


FIG. 16

16. Tapering End Joints Continued—After the vertical strip is in position and centered over the joint, the double headed nails are driven in tight causing an inward pressure on the vertical strip. This pressure aligns and depresses the adjoining ends of the board. After 24 hours when the strips are removed, the end joints will spring outward, but a slight concave depression will remain. The depression is usually sufficient to permit concealing and finishing the joint flat without the usual crowning.

BACK BLOCKING HORIZONTAL SIDEWALL JOINTS—BOTH SIDES OF PARTITION



FIG. 17

17. Stopping Strips for Horizontal Sidewall Back Blocking
—When both sides of a critical wall are to be back blocked, two gypsum wallboard stopping strips cut from scrap SHEETROCK are tacked in place at the 4' level of the joint along the side of each stud. Two nails per strip are sufficient. They are set back from the surface of the stud the thickness of the back blocking which is to be used. The thickness of the back blocking used, therefore, governs the width of the stopping strips (approximately 2½" wide for ½" SHEETROCK). Stopping strips are approximately 10" long.



FIG. 18

18. Positioning Sidewall Blocks
—The stopping strips hold the back blocking in the plane of the wall as formed by the studs and the stopping strips along the sides of the studs. The blocks are toe nailed to the stud from the face. The blocks are cut slightly less than the width of the stud space and approximately 10" wide. When a sufficient number of back blocking strips have been tacked in place, PERF-A-TAPE Cement or All Purpose Ready Mixed Cement may be spread on the blocks already in position. Immediately following the application of the cement the top and bottom sheets of SHEETROCK Wallboard should be nailed in place in the conventional manner on *one* side of the wall.

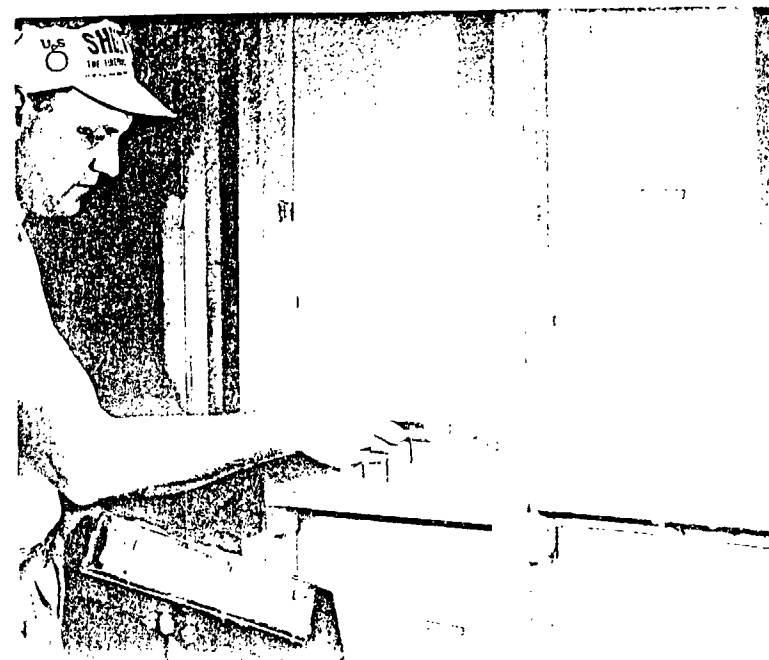


FIG. 19

19. Spreading Adhesive on Blocks—To complete the back blocking installation of *both* sides of a critical wall the same procedure described in Figure 18 is followed on the opposite side of the wall. Always make certain that the back blocking is flush or slightly back of the nailing face of the studs—never allow it to protrude beyond the stud face. PERF-A-TAPE Cement or All Purpose Ready Mixed Cement is spread on the blocks after a sufficient number of blocks are in place. Note the high ridges of the cement applied so as to be at right angles to the horizontal joint formed by the SHEETROCK soon to be applied.



FIG. 20

BACK BLOCKING CRITICAL SIDE OF PARTITION

On almost every job there are exceptionally critical wall areas where joint ridging would be noticeable, such as large unbroken surfaces subject to harsh natural or artificial side lighting which magnifies any surface variation. Noticeable ridging in these areas can be minimized by back blocking only the one side of the partition that is most critical in appearance.



FIG. 21

21. Block Installation on Finished-One Side Partition—Where back blocking is desired **ONLY ON ONE SIDE** of a critical wall, back blocking strips are adhesively applied to the back side of the horizontal joint formed after the SHEETROCK has been applied to the framing members. The blocks are merely tacked into place by nailing into the stud to provide bracing while the cement dries. The gypsum wallboard *stopping strips are not necessary.*

RECOMMENDATIONS FOR CORRECTING A RIDGING CONDITION

When ridging occurs on joints which *have not been back blocked take following steps:*

1. Let ridge develop fully before repair is undertaken. Usually six months is sufficient time. It should be repaired under hot and dry conditions.
2. Sand the ridge down to the reinforcing tape without cutting through the tape. Fill the concave areas on either side of the ridge with a light fill of thick mix cement. After this is dry, float a very thin film of cement over the entire area.
3. Examine the area with strong side lighting to make certain that the ridge has been concealed. If not, use additional coats of cement. Redecorate.

20. Applying Gypsum Wallboard—Horizontal application of the top sheet of SHEETROCK Wallboard in the conventional manner follows *immediately* after spreading adhesive on the blocks. The adjacent and bottom panel is then put in place. The tapered edge joint so formed is now back blocked. After 24-48 hours drying time, joints should be treated in the normal manner.

Joint ridging is almost never encountered when job laminated Double Wall System with SHEETROCK Wallboard is used. If cost is a consideration, the USG Double Wall System can be used on ceilings only where joint ridging is generally most noticeable. Recognizing that not all jobs can afford the additional cost of the Double Wall System, it is suggested that consideration be given to the back blocking system.

THE FOLLOWING GOOD JOB PRACTICES WILL TEND TO MINIMIZE RIDGING ON JOBS WHERE THE PRECEDING DESCRIBED METHODS ARE NOT USED

1. Houses should be heated at least two days before joint treatment is started. Temperature of 70°F should be maintained day and night until the house is occupied. Ventilation should be provided to eliminate excessive moisture.
2. Cement for all coats should be used at its heaviest workable consistency.
3. Embed the tape and immediately follow up with a covering coat.
4. At least two days' drying time should be allowed between the first and second coat of cement.
5. The fill and finish coats over tapered edge or butt joints should be held to the minimum width required to produce a smooth finished joint.
6. At least one day's drying time should be allowed between the second and third coats of cement.
7. At least four days' drying time should be allowed before decorating.
8. Use of All Purpose Ready Mixed PERF-A-TAPE Cement in itself will tend to minimize ridging.

SHEETROCK WALLBOARD-TRUSSTEEL STUD PARTITION SYSTEM

DESCRIPTION AND ADVANTAGES

The SHEETROCK Wallboard-Trussteel Stud Partition System is a non-load bearing partition consisting of lightweight, open-web steel studs faced on each side with a base layer of 3/8", 2' wide by 8' long BAYBORD Gypsum Backing Board clipped to the studs and surfaced with a layer of 3/8" SHEETROCK Gypsum Wallboard 16" wide or 4' wide adhesively bonded to the base layer. Either metal or wood floor and ceiling runners may be used, depending on code regulations or insurance requirements. Savings and adaptability are inherent in the SHEETROCK-TRUSSTEEL Partition System. Along with the usual drywall advantages of speed and cleanliness, the system offers:

Open-Web Stud Construction—The open-web stud design simplifies installation of electrical conduit and plumbing pipes—generally no cutting of stud is required.

Fire Resistant—Consists of incombustible steel studs and attachment accessories plus SHEETROCK Gypsum Wallboard facings.

Lightweight—The finished partition will weigh approximately 7 lbs. per square foot—less than other steel stud partitions with 3/4" or 7/8" thick facing materials.

Adaptable—May be used in new construction or for modernizing old buildings—for commercial, industrial or residential work. During modernization, the normal work can progress with a minimum of mess and disturbance.

Economical—Because

- A. Low Material Cost B. Speedy Erection C. Dry Wall Assembly

LIMITATIONS OF USE

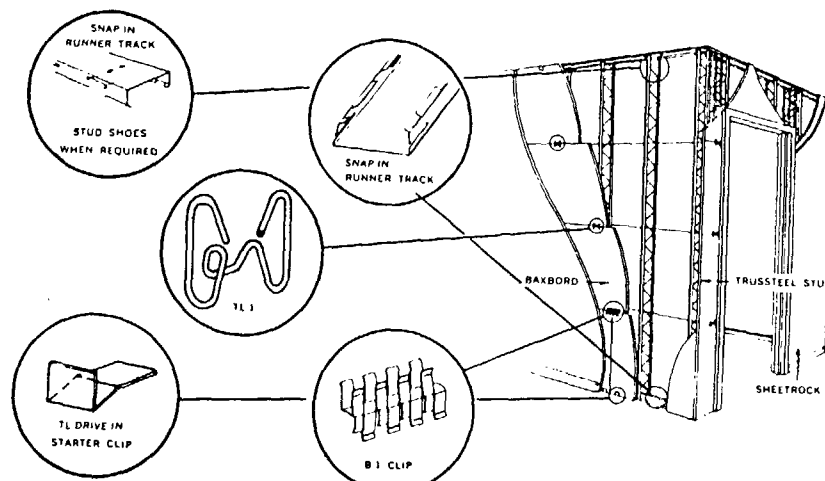
1. The SHEETROCK Wallboard-TRUSSTEEL Stud Partition System was designed for use only as a non-bearing partition.
2. Maximum stud spacing 24" o.c.
3. Should not be used where normally exposed to excessive moisture or humidity.
4. SHEETROCK facings shall be adequately protected against wetting or moisture absorption.

TECHNICAL DATA

Stud Width	Maximum Stud spacing	Maximum partition height	Finished Wall Thickness	
			Snap-in track and shoes	Snap-in track only
2 1/2"	24" o.c.	10'	4 7/16"	4 7/16"
3 1/4"	24" o.c.	12'	5 1/16"	5 1/16"
4"	24" o.c.	14'	6 1/16"	5 1/16"
6"	24" o.c.	14'	8 1/16" (1)	Not applicable

(1) 6" Snap-in track not available—for 6" wide studs use 6" Standard track and shoes.
 Sound transmission Rating—Approximately 45 db. (studs spaced 16" o.c.).
 Test conducted at Riverbank Acoustical Laboratories June, 1954.
 Fire Resistance Rating—45 minutes, face layer 3/8" SHEETROCK Wallboard, 1 hr., face layer 1/2" SHEETROCK FIRECODE 45. (Studs spaced 16" o.c.). Where fire rating is required use stud shoes at ceiling runner. Nationally recognized Fire Testing Laboratory—name and special details on request. See chart page 92.
 Approximate Weight—7 lbs. per square foot.

CUTAWAY PERSPECTIVE



COMPONENT PARTS

TRUSSTEEL Stud Snap-In Runner Track

Width—for 2 1/2", 3 1/4", and 4" studs. For 6" stud width, use standard 6" runner track and stud shoes at floor and ceiling.

Lengths—8' only.

Packaged—10 pieces per bundle.

TRUSSTEEL Studs

Width—2 1/2", 3 1/4", 4" and 6".

Lengths—7' to 14' in 3" increments.

Packaged—10 pieces per bundle.

Stud Shoes

Length—8".

Packaged—500 per carton.

Usage—See Note.

NOTE: (Use at ceiling only). Where fire rating is not required and/or ceiling height variation permits use of studs pre-cut to length, stud shoes may be eliminated. Where wood runners are used, use shoes as shown in details.

TRUS-LOK TL-1 Clip

Packaged—500 pieces per carton.

Usage—Approximately 1 per lineal foot of stud less 2 for each stud.

TL-Drive-In Starter Clip

Packaged—500 per carton.

Usage—Approximately 1 per lineal foot of runner track.

BRIDJOINT B-1 Clip

Packaged—500 pieces per carton.

Usage—Approximately 2 per piece of BAXBORD less 1 for each 2 lineal feet of partition.

BAXBORD Backing Board

Size—3/8" x 2' x 8'—Round edge.

Packaged—2 pieces per bundle.

SHEETROCK Gypsum Wallboard

Sizes—3/8" x 4' x Lengths 6' to 14' or 16' wide Panel SHEETROCK in 7', 8', 9' or 10' lengths.

Edge—Tapered or beveled for 4' wide SHEETROCK, round edge for 16' wide Panel SHEETROCK.

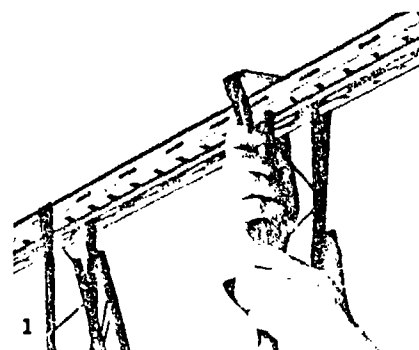
Packaged—2 pieces per bundle (4' width).
 4 pieces per bundle (16' width).

Adhesive

PERF-A-TAPE Joint Cement.

ERECTION DETAILS

Snap-in runner tracks are aligned and anchored securely to concrete ceiling and floor slabs with suitable fasteners (equivalent to power driven studs). Stud locations are marked on ceiling. Studs spaced not more than 24" o.c. should be snapped in place vertically in the notches provided in the runner track. Each stud should be secured to runner track with two attachment shoes at top if required (see "note" component parts) by inserting the wing of the shoe clip in opening provided in snap-in ceiling runner. Snap stud into stud shoe, then

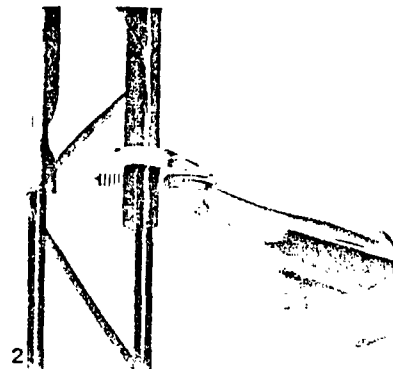


Attaching stud to snap-in ceiling runner with stud shoes.

attach second stud shoe as the mechanic is doing in picture No. 1. Stud shoes are anchored to studs by crimping flanges around stud flanges as shown in picture No. 2. Studs need not be accurately placed nor perfectly plumb.

STUDS—

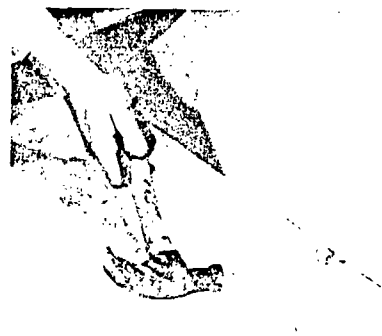
To be located approximately 2" from all door buck jambs, abutting partitions or other construction. Studs supporting steel door frames shall be secured to ceiling runner track with stud shoes. With steel bucks, an additional anchorage stud is required at each jamb. Anchor studs adjacent to door bucks to the jamb anchors (see details), see page 72. All corners should be framed with one stud approximately 2" from the external corner and one stud approximately 2" from the internal angle of each of the meeting partitions.



Crimping flanges of stud shoes.

BASE LAYER—

Loosely position the TL-Drive-in Starter Clips spaced not more than 24" o.c. with the long leg between the floor runner and floor and located near the point at which the runner is anchored to the floor. The first course of BAXBORD Gypsum Backing Board is applied, starting at the floor level and working upward with the long (8') edge parallel to the floor. The BAXBORD is inserted between the floor runner and the upstanding leg of the TL-Drive-in Starter Clip and held in position against the stud at the top by the TL-1 Clip hooked around each stud crossed as shown in figure 4. The TL-Drive-in Starter Clips are then driven home to hold the BAXBORD securely against the runner or stud shoes when used.



Setting TL-Drive-in Starter Clips against BAXBORD.

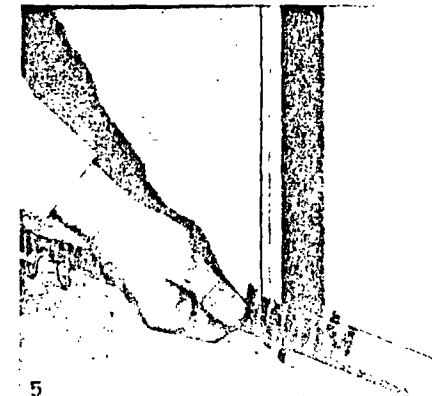


Securing BAXBORD to stud with TL-1 Clip.

BASE LAYER Cont.—

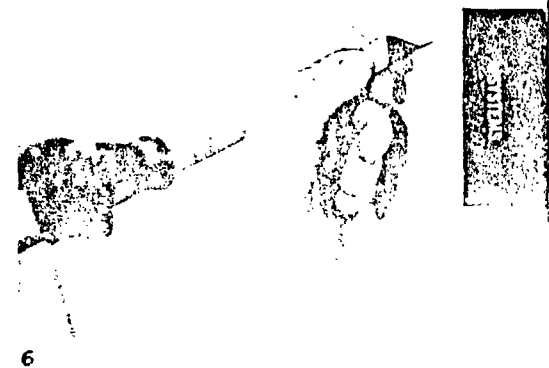
The mechanic is positioning a TL-1 Clip as shown in fig. 4 to hold the BAXBORD Backing Board at its top edge. Note the downward angle of the loop of the clip which engages the TRUSSIEEL Stud (see arrow). The BAXBORD is secured at the bottom between upright wings of the clip which engage the stud.

The BRIDJOINT B-1 Clip shown in fig. 5 in the mechanic's hand is used to anchor adjoining ends of BAXBORD to one another and to adjoining edges. The prongs of the clip are flared on both sides for easy entry. BAXBORD end joints are staggered in adjacent courses and always occur between studs. Succeeding courses of BAXBORD Backing Board must be attached by inserting the bottom edge into the top portion of the TL-1 Clip of preceding course and securing it at the top edge as previously described.



Anchoring adjoining ends of BAXBORD with B-1 Clip.

The last or top course of BAXBORD should be cut to the proper width. The bottom edge secured to the studs as previously described. Fig. 6 shows the top edge of BAXBORD solidly held in contact with the stud shoes, if required, or runner at the ceiling line by TL-Drive-in Starter Clips spaced a maximum of 24" o.c. and located adjacent to the runner anchors. One or two such clips are placed adjacent to end joints.



Placing a TL-Drive-in Starter Clip at ceiling to anchor BAXBORD at ceiling.

FACE LAYER—

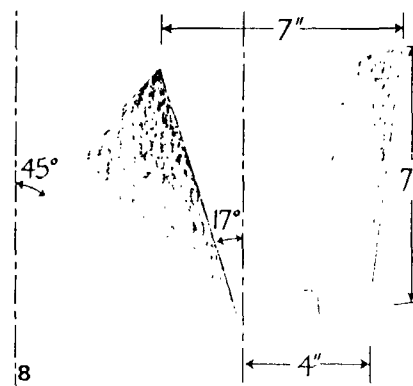
The facing units should be cut to full floor to ceiling height lengths less 1/4". Full width boards are to be used wherever possible. Boards with broken or damaged edges should not be used. Adhesive mixed in accordance with the manufacturer's directions should be applied to the back side of the SHEETROCK facing unit in ribbons of cement spaced not more than 7" apart and approximately 1 1/2" to 2" from each edge, end and cut-outs of doors (fig. 7). The ribbons of cement must be approximately 1/2" wide at the base and 5/8" high.



Spreading adhesive on back of SHEETROCK.

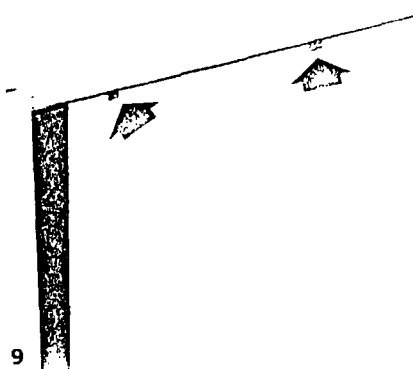
THE SPREADER—

The spreader blade may be made on the job or at a sheet metal shop. The spreader blade is 7" across the top, 4" across the bottom and 7" high. Face slants approximately 17° off of vertical. Angle of wing cut edge is approximately 45° off of vertical. The notch in the spreader is 1½" wide at the base and 5/8" high.

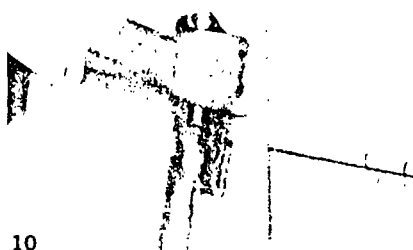


Spreader Blade

Immediately after applying the cement, each board shall be placed vertically against the BAXBORD base layer and held in position at the top by TL-Drive-in Starter Clips (see arrow), fig. 9, until adhesive has set. The clips may then be removed or driven tight against the BAXBORD. The face layer of SHEETROCK Wallboard is held in position by mechanical attachment or bracing until the adhesive bonds the two units together. Attachment may be accomplished by face nailing at a 45° angle, bracing from the floor or using a Paslode Air Tacker (air actuated) No. PTL-75 and No. P-3375—¾" staples or equivalent (fig. 10). Staples shall be driven with the heads slightly below the SHEETROCK face paper surface and shall remain in place until the adhesive bonds the two units together. The number and spacing of temporary attachments is governed by job conditions; however, usually temporary attachment is required only at edges and center of the wallboard. Succeeding units are likewise positioned with vertical edges abutting the surface flush with the ones previously erected.



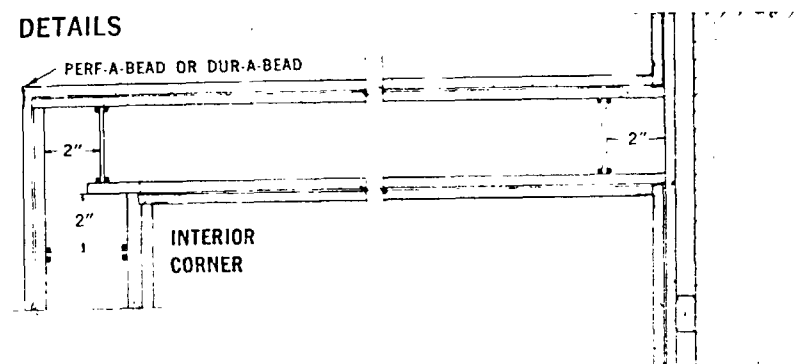
Face layer held temporarily in place.



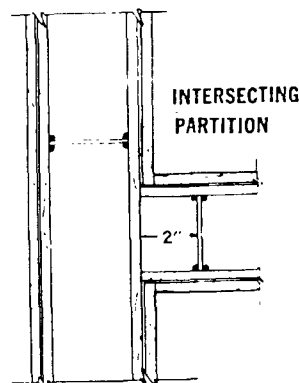
10

Temporary attachment by stapling.

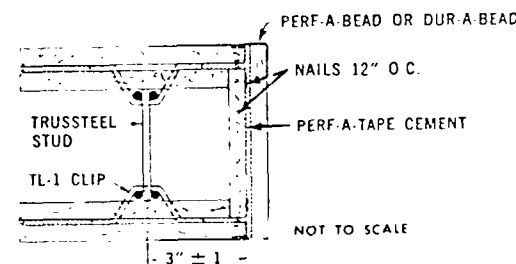
DETAILS



INTERIOR CORNER



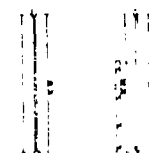
INTERSECTING PARTITION



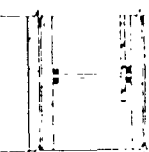
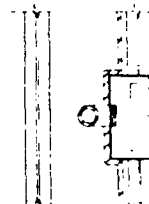
PARTITION TERMINAL DETAIL

It is not necessary to nail on DUR-A-BEAD corner reinforcement. Apply PERF-A-TAPE cement (embedding type only) to corner and seat DUR-A-BEAD firmly into cement. Allow to dry and finish corner in normal manner with PERF-A-TAPE cement.

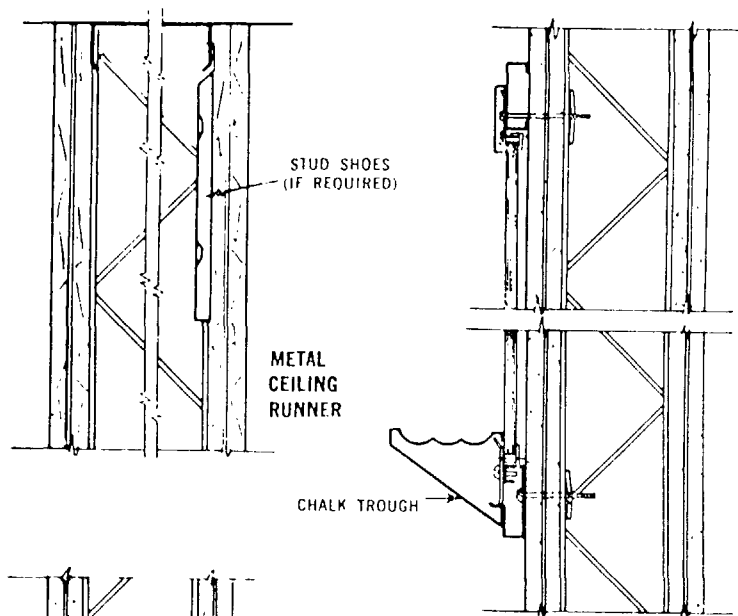
FURRED WALL



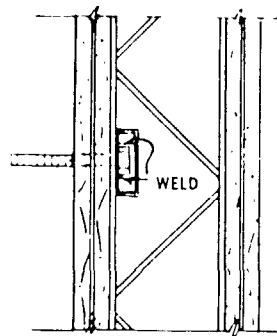
PLAN SEC.
THRU OUTLET
BOX



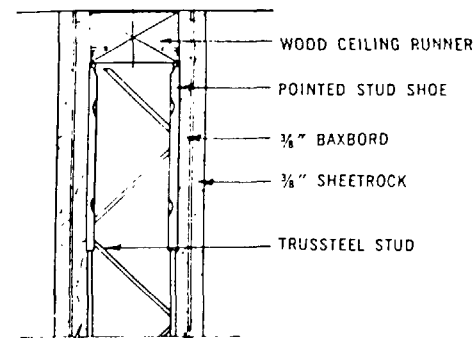
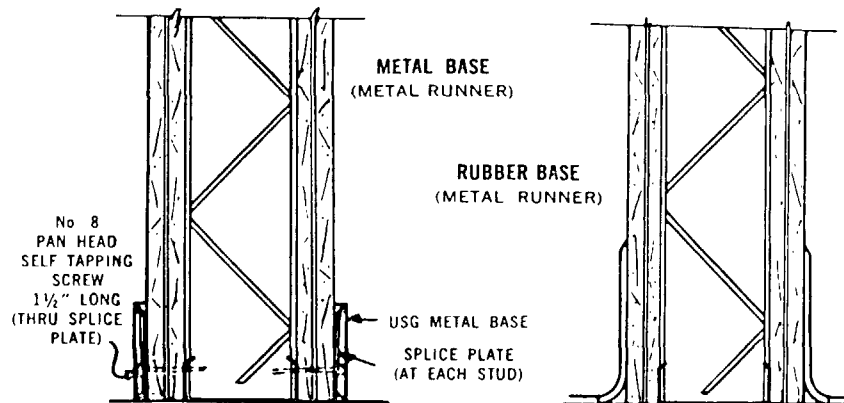
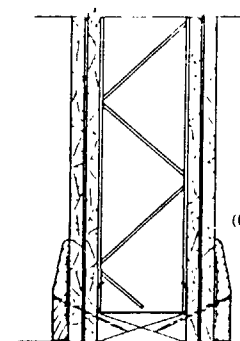
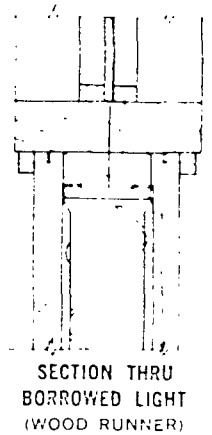
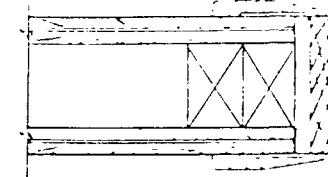
PLAN SEC.
THRU OUTLET
BOX



CHALK BOARD ATTACHMENT

FIXTURE
ATTACHMENT

The chalkboard details shown here are typical. Consult the chalkboard manufacturer's printed directions for specific installation directions.

CEILING RUNNER
(WOOD)WOOD TRIM
(WOOD RUNNER)

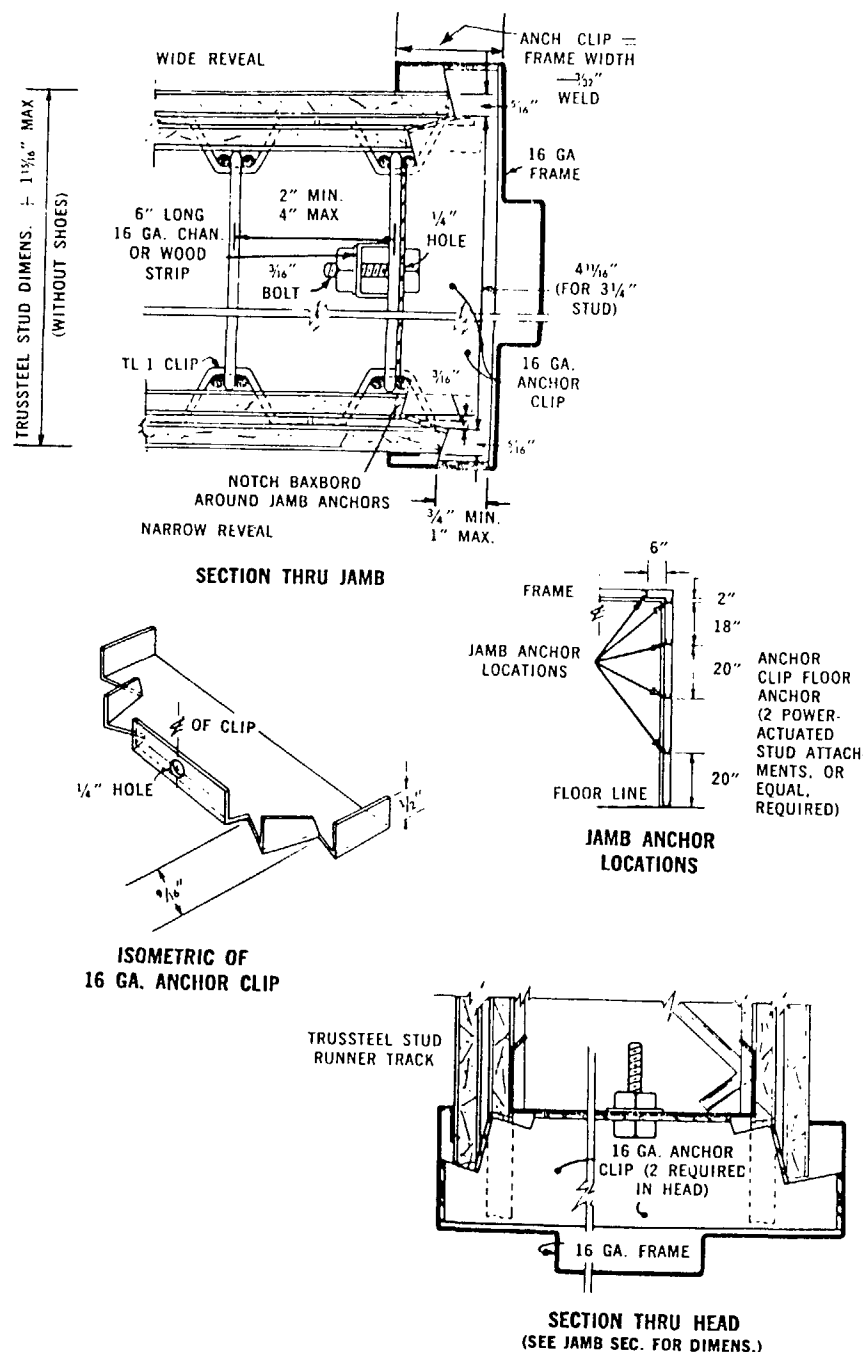
SPECIFICATIONS COVERING THE USE OF WOOD FLOOR AND CEILING RUNNERS ARE ESSENTIALLY THE SAME AS FOR STEEL RUNNER TRACK EXCEPT:

A. Pointed TRUSSTEEL Stud shoe clips are used and are secured to the wood floor or ceiling runners by driving the points into the wood.

B. The TL-Drive-in Starter Clip is not required. BXBORD Backing Board is secured in position by nailing through the BXBORD into the wood floor and ceiling runners. Likewise, the facing unit may be held in position by nails driven through the facing unit, BXBORD and into the wood ceiling runner.

C. Optional use of the Snap-In Runner Track is suggested when wood floor and ceiling runners are used. The Snap-In Runner Track is anchored to the wood runner. Studs are secured by snapping in place vertically in the notches provided in the Snap-In Runner Track. Stud shoes are not required at floor or ceiling. *Wood runners are milled to runner track width dimension.*

DETAILS—METAL DOOR FRAMES



NAILABLE STEEL STUD PARTITION SYSTEM (SINGLE LAYER CONSTRUCTION)

Detailed information concerning the fire resistance ratings for this type construction and specific construction data pertaining to this system is covered in chapter—TECHNICAL DATA—"Fire Resistance Ratings for SHEETROCK Wallboard". See construction reference (H).

SHEETROCK WALLBOARD AND BAXBORD BACKING BOARD ACOUSTICAL TILE BASE

5/8" SHEETROCK FIRECODE 60 Wallboard and 5/8" BAXBORD FIRECODE 60 Backing Board is recommended as a base for acoustical tile (adhesive or screw-on application). These products provide an extra strong rigid base for acoustical tile on steel joist concrete floor and ceiling construction when attached to nail-on channels. (Construction data and application recommendations relative to steel construction on ceilings is covered in chapter—TECHNICAL DATA—see "Fire Resistance Ratings for SHEETROCK Wallboard" reference (K)).

Installation drawings of the above mentioned system described in the "TECHNICAL DATA" chapter are shown on the following pages.

These products are also recommended for acoustical back-up on wood frame construction where extra fire resistance and rigidity are desired, but a one-hour rating is not required.

1/2" BAXBORD GYPSUM BACKING BOARD

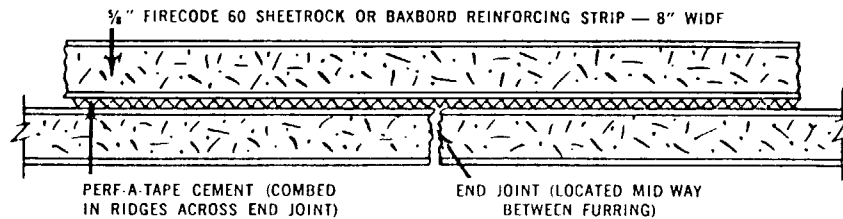
1/2" BAXBORD Gypsum Backing Board is also recommended for a ceiling back-up material for acoustical tile (adhesive or screw-on application). BAXBORD is always applied with long edges at right angles to framing members. Nailing to wood framing is accomplished with GWB-54 or 5d cooler type nails. Nail spacing should be 7" o.c. for joists spaced 16" o.c. Joists spaced 24" o.c. require nail spacing of 5" o.c. 1/2" BAXBORD may be nailed to metal supporting members such as Jackson, Pomeroy or similar bars and various nailable steel joists (consult Sweet's Catalog).

3/8" BAXBORD GYPSUM BACKING BOARD (4' WIDE)

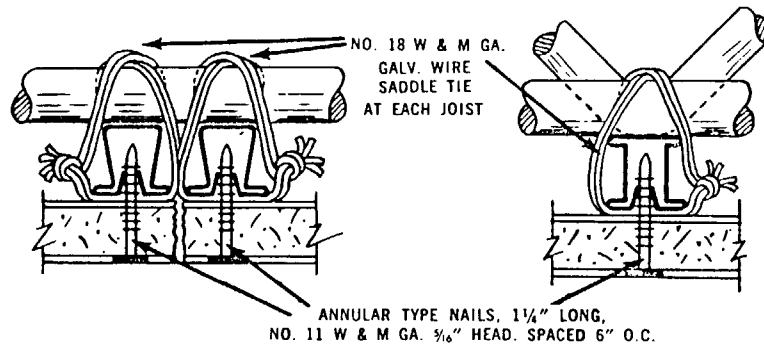
3/8" BAXBORD Gypsum Backing Board (4' Wide) may be used as a base for adhesive application of acoustical tile on ceilings when nailed perpendicular to wood joists 16" o.c. maximum. Use GWB-54 or 4d cooler type nails, 7" o.c.

DETAILS—ATTACHMENT OF $\frac{3}{8}$ " SHEETROCK FIRECODE 60 WALLBOARD AND $\frac{3}{8}$ " BAXBORD FIRECODE 60 BACKING BOARD TO METAL NAILING CHANNELS (ALTERNATE METHODS).

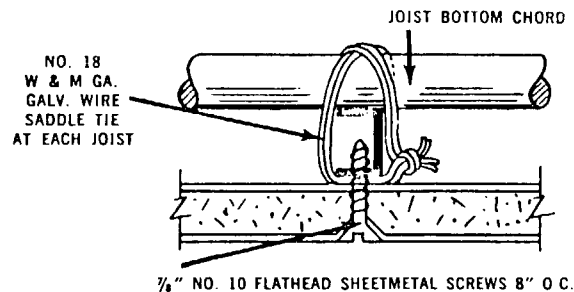
SECTION THROUGH END JOINT — BACK BLOCKING METHOD OF SUPPORT



SECTION THROUGH END JOINT —
DOUBLE NAILING CHANNEL METHOD OF SUPPORT



SECTION THROUGH — $\frac{3}{8}$ " COLD ROLLED CHANNEL SPACED 16" O.C.



PANEL SHEETROCK WALLBOARD SYSTEM

Panel SHEETROCK is excellent for surfacing walls in new construction and remodeling. It is available in panels $\frac{3}{8}$ " thick, 16" wide; and may be ordered (depending on geographic location) in 7', 8', 9' and 10' lengths.

Plain Panel—The face side is surfaced with a highly calendered manila paper suitable for any decoration.

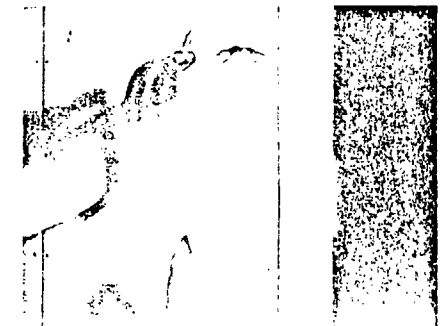
Ranch Pine—The face side is surfaced with a high quality predecorated paper to simulate the color and graining of real wood.

Striated—The face side is surfaced with a durable plastic in a neutral tone, forming a pattern of raised lengthwise ridges.

NAILING DIRECT TO WOOD FRAMING

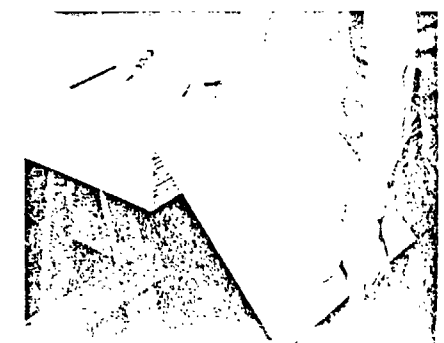
The vertical edges must be reasonably well centered on the underlying framing member. Each panel must be securely nailed at each edge of the panel to the support.

The width of individual boards of Panel SHEETROCK will sometimes vary sufficiently from 16" wide to make it impractical to attempt to center the edges on studs or framing members previously spaced exactly 16" o.c. In new construction the studs should be erected just ahead of the Panel SHEETROCK and spaced to allow for slight variations in panel widths rather than standard 16" o.c. spacing. If studs have been previously erected and the edges of the Panel SHEETROCK Wallboard tend to occur off center to make nailing impossible, 1" x 2" wood furring strips may be nailed to the sides of the studs to provide bearing and a nailing surface. Framing must be carefully aligned.



NAILING OVER MASONRY WALLS

Panel SHEETROCK may be nailed to exterior and interior masonry walls furred out with 3" minimum nominal width wood furring strips applied vertically or 2" width strips applied horizontally 16" o.c. The furring strips should be securely attached to the masonry walls, plumb and in a uniform plane.



CUTTING

Cut the face paper and the edges, then snap the board as shown, breaking the core. Cut the back paper from the reverse side and snap forward for a clean break.

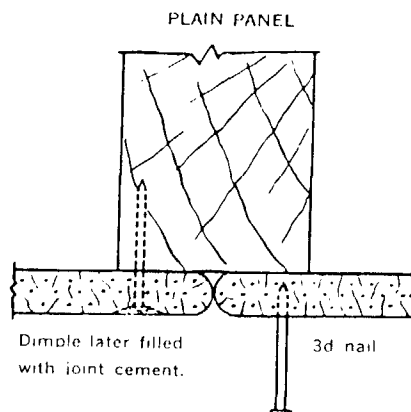
NAILING PANEL SHEETROCK

NAILING TO STUDS—

Use 3d, 1½" 15½ Gauge ¾" flat head nail spaced 12" o.c. (approximately 3 lbs. per 1,000 sq. ft.).

NAILING TO FURRING STRIPS—

Use 3d, 1½" long nail spaced 12" o.c. Space nail as far from the edge as possible and still drive it at a right angle to board and into underlying framing or furring. Dimple board lightly with final blow of the hammer taking care not to deform the rounded edge of the board. Fill dimples over nail heads with 3 coats of PERF-A-TAPE Cement. Over an extended period of time there may be some discoloration of the paint film over the featured round edge joints of panels over horizontal furring strips due to breathing caused by temperature and humidity differentials on each side of the wallboard. However, the period before which this discoloration may be noticeable will probably not be less than the normal redecoration period.



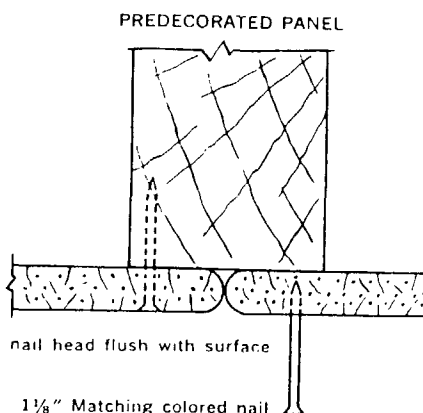
NAILING TO STUDS—

Predecorated Panel SHEETROCK is nailed with 1½" long matching colored nails spaced 12" o.c. (approximately 2 lbs. per 1,000 sq. ft.). Drive nails flush with the surface, using plastic headed hammer to prevent chipping the nail head coating.

NAILING TO FURRING STRIPS—

Use 1½" long predecorated nails spaced 12" o.c. No additional finish normally required.

Corner Construction—For a true fit at internal corners, scribe the corner on a piece of Panel SHEETROCK to be used as a pattern. Measure the width top and bottom and use the pattern for marking the corner panel to be cut. *Internal angles* of plain Panel SHEETROCK may be finished with PERF-A-TAPE Joint System. *Inside corners* of predecorated SHEETROCK may be butted together over which may be attached a wood quarter round or cove mold painted to match. *Outside corners* of plain Panel SHEETROCK may be finished with PERF-A-BEAD or DUR-A-BEAD Corner Reinforcement in the same manner as regular SHEETROCK Wallboard. Corners of predecorated panels may be finished with wood trim stained or painted to be harmonious.



ADHESIVE APPLICATION

Panel SHEETROCK Wallboard may be applied over existing surfaces that are sound and sufficiently true to permit reasonable continuity of contact between the adhesive and the surface of the base.

In new construction Panel SHEETROCK may also be laminated to a base layer of ¾" gypsum wallboard erected horizontally or ¾" BXBORD, Gypsum Backing Board, erected on framing. In remodeling work when applied over existing surfaces, all wallpaper, calcimine, and poorly adhered, loose or scaly paint must be removed. Surfaces textured on a medium to coarse pattern must have the high points of such texture removed by appropriate means. Areas of plaster that are loose, badly cracked, or poorly bonded to the plaster base, must be removed and the surface brought into a reasonable continuous plane with the rest of the wall by nailing in place gypsum board, cut to fit and shimmed out as required. Insulation board surfaces that are badly warped or buckled between studs, and are more than ¼" out of plane are not satisfactory bases. Likewise surfaces of gypsum board or insulation board that are loose must be renailed as required.

During refinishing work the trim at the ceiling, base, doors and windows must generally be removed. Before the installation is finished, a ¾" wide strip of wood must be used to fill the gap left under the replaced trim around doors and windows. It is generally easier to use U.S.G. No. 400 Metal Trim in lieu of wood trim and therefore achieve a flush effect.

PANEL SHEETROCK APPLICATION

Assemble materials in the center of the room to permit easy access to all wall areas. After removing all wrappings from the bundles of Panel SHEETROCK, place each piece face down in a pile on sawhorses, work table or clean floor.

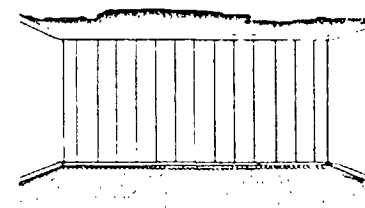
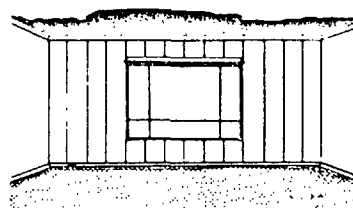
MIXING ADHESIVE

PERF-A-TAPE Joint Cement (embedding type only) is mixed using approximately 22 pints of water per 25 lbs. of dry powder.

GENERAL CONDITIONS

Heat should be provided to maintain a continuous and uniform temperature range of 45° to 70°F. unless adhesively applied, then maintain a range of 55° to 70°F. Ventilation must be provided to eliminate excessive moisture.

JOB LAYOUT



1. Before starting application, plan the layout of the panels. In all cases, joints in the face layer should occur between underlying joints in base layer. If a large window, door or fireplace is a wall feature, center the panels or the joints so that a balanced effect is achieved.

2. If the wall does not have an opening to feature, arrange the panels so the two end panels are approximately the same width. Avoid narrow strips that may be difficult to install.

A normal variation of color tones may exist between individual boards of Striated Panel SHEETROCK. Panels should be laid out prior to erection and sorted to avoid unpleasant color contrast between adjacent boards. The range is so slight that contrasting tones will blend at corners. Like shades should be used on same wall.

Similarly when Ranch Pine Panel is used, it is to the advantage of the finished appearance, that the panels be laid out prior to erection and inter-mixed from the original bundles to eliminate the occurrence of a possible pattern repeat of the design.

SPREADING ADHESIVE

Use a 2-notch spreader blade (made on the job). Fill the blade about half full of mixed PERE-A-TAPE Cement. Draw the spreader the full length of the panel applying downward pressure on the top of the blade leaving two sharp firm ridges and a minimum of cement between ridges.

CARRYING CEMENT FROM PANEL TO PANEL

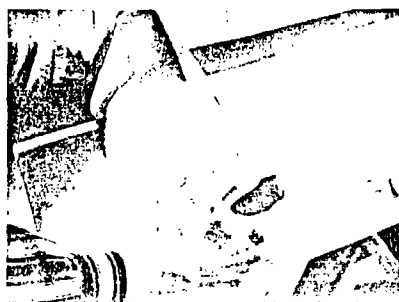
Without moving the spreader, shove the top board forward about 10". Then continue spreading cement on the top board over the end onto the underlying board, as shown. The top panel is now ready to apply. To spread cement on the next panel, reverse the direction of the spreader and continue. Be careful to keep cement off the edges of boards.

Spreading cement on narrower panels is accomplished with a 1-notch blade of similar design (also made on the job) one ribbon on panels 6" wide; two ribbons on panels 10" to 16" wide. Cut-outs are replaced after the board is cut to fit, the joint cement spread and then the cut-outs are discarded.

Start the wall application by placing the first panel at a corner. Press the board against the backing surface to assure adhesion and plumb with a carpenter's level.

Drive 5d, 1 3/4" cooler type nails at top and bottom of each panel located so as to be covered by baseboard, picture moulding, or other trim. This holds panels in place until adhesive hardens. No. 400 USG Metal Trim may be used at ceiling angle, applied prior to the erection of the panels.

To insure tight joints, apply force to the leading edges of every panel with a length of 2x4 stud. Check every third panel with carpenter's level to be sure panels are plumb. Over uneven surfaces it may occasionally be necessary to nail down an edge in position with a 4d finishing nail driven at an angle.



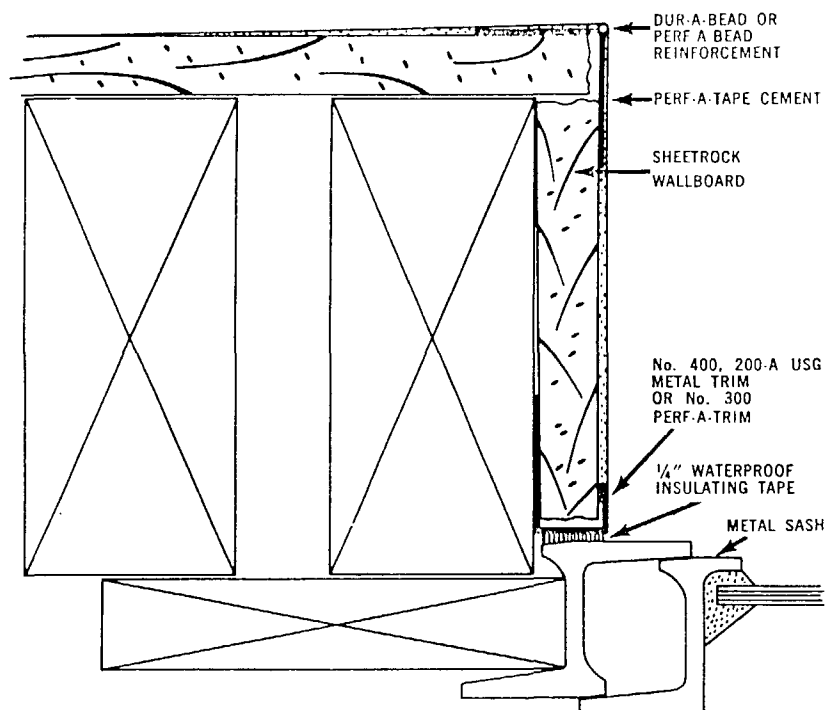
Miscellaneous Application Methods

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METAL WINDOW INSTALLATION

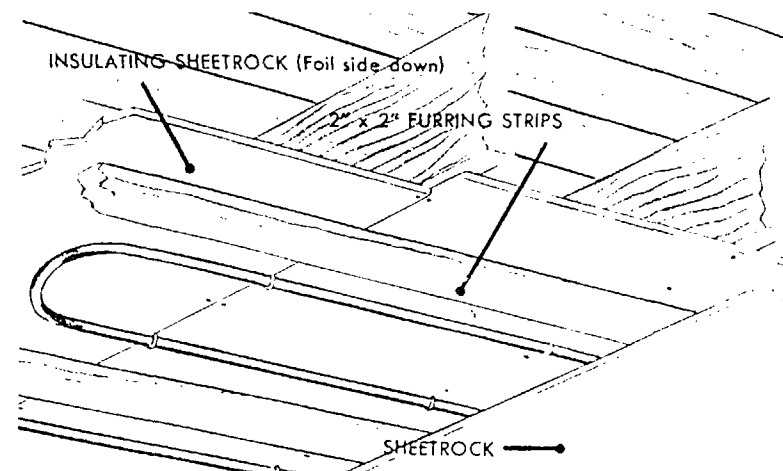
In conjunction with metal window installation, builders normally allow $\frac{1}{8}$ " to $\frac{1}{4}$ " space between the metal windows and the end of SHEETROCK Wallboard. This space is filled with a caulking compound prior to painting. This method of installation, after a year or more, allows moisture from condensation on the metal window frame to penetrate into the end of the gypsum wallboard and may result in paper delamination from the core. By placing No. 400, No. 200-A U.S.G. Metal Trim or No. 300 PERF-A-TRIM between the window and the board, protection will be provided against moisture penetrating the core of the SHEETROCK.



SHEETROCK Return for Openings Where Aluminum or other Metal Sash is to be Installed

Waterproof insulating tape, $\frac{1}{32}$ " thick, $\frac{1}{4}$ " wide is used to separate metal sash and metal trim and will provide some measure of insulation between the two different metals. Direct contact of an aluminum frame and metal trim in the presence of condensation moisture may cause an electrolytic deterioration of the aluminum frame.

APPLICATION OF SHEETROCK ON RADIANT HEATED CEILINGS



HOT WATER TYPE RADIANT HEATING SYSTEM

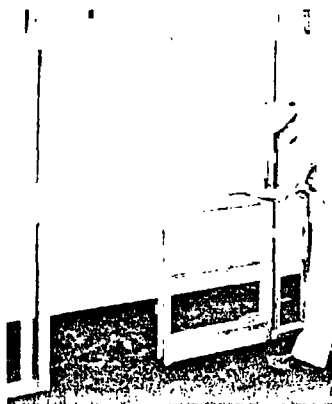
During recent years the use of radiant heating systems has become more prevalent in building construction. When SHEETROCK Wallboard is to be used on ceilings having radiant heating, the following recommendations will help to ensure best results:

Design

1. In radiant heating systems where SHEETROCK Wallboard is used, the maximum surface temperature of the SHEETROCK must not exceed 115°F.

Application—Hot Water Type System

1. Apply Insulating SHEETROCK parallel to the joists with the aluminum foil facing downward, as a reflector behind the heating coils.
2. Nail 2" x 2" furring strips 16" o.c. over the Insulating SHEETROCK and at right angles to the joists. Wood must be dry and thoroughly seasoned to avoid movement of green lumber in the heated space.
3. Suspend heating coils from the joists, at right angles to them and never from the SHEETROCK Wallboard alone. Heating coils shall not be in direct contact with the SHEETROCK surfaces.
4. Use only that thickness of SHEETROCK on which the Heating Engineer has based his design. For example, do not substitute $\frac{3}{8}$ " SHEETROCK for the face layer when the design calls for and is based on $\frac{1}{2}$ " SHEETROCK.
5. Apply the face layer in the normal manner, at right angles to the furring strips.
6. Do not operate radiant heating system until after taping and finishing of ceiling joints is completed, and cement has thoroughly dried.



SLIDING DOOR LAMINATION

Sliding Door Frame

SHEETROCK is laminated to the framing members with PERF-A-TAPE joint cement (embedding type only). This *HELPS* to prevent "nail pops" and eliminates the possibility of nails protruding through the usual $\frac{3}{4}$ " backing of the frame. After installing the sliding door frame, check to make sure there is sufficient backing where the SHEETROCK panels join. Normally, this is about 4' up from the sub floor.



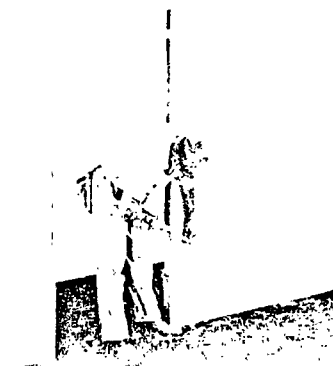
Adhesive Application

Properly measure and cut the SHEETROCK to fit over the frame. Using a spreader blade (see chapter—TOOLS), spread a liberal amount of regular PERF-A-TAPE joint cement on that section of sliding door frame to be covered first (normally the top section). This prevents pre-drying of the adhesive. The PERF-A-TAPE joint cement should be mixed to a consistency which will flow easily under the spreader blade, yet retain ridges when applied to the backing.



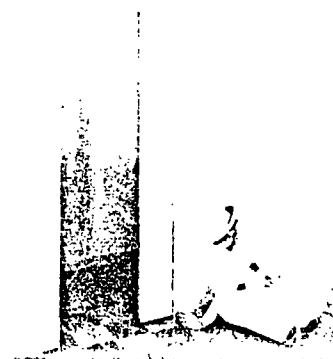
Application of SHEETROCK

Immediately following the application of cement, prefitted SHEETROCK Wallboard is applied to the upper section of the frame. The lower section of the frame is then spread with cement and prefitted SHEETROCK Wallboard is applied.



Shoring

Once the wallboard is in place, pieces of wood or strips of SHEETROCK are temporarily nailed to the frame with 6d double headed nails to hold the SHEETROCK firmly in place while the cement is drying.



Finish

When the PERF-A-TAPE joint cement has dried (usually overnight), remove the temporary shoring. Fill all of the remaining nail holes in the wallboard with PERF-A-TAPE Joint Cement and finish the wallboard in the normal manner. Finally apply the finish trim.

SHEETROCK GYPSUM WALLBOARD AS A BASE FOR ADHESIVE APPLICATION OF CERAMIC, PLASTIC, METAL TILE AND PLASTIC FINISHED WALL PANELS

Framing

1. Framing members should be plumb and true.
2. All framing around tub enclosures and shower stalls should allow sufficient room so that the inside lip of the tub, prefabricated receptor or hot mopped subpan should be even with the face of the gypsum wallboard. This will necessitate furring out from the studs the thickness of the SHEETROCK Gypsum Wallboard to be used ($\frac{3}{8}$ ", $\frac{1}{2}$ ", $\frac{5}{8}$ ") less the thickness of the lip, on each wall abutting a tub, receptor or pan.
3. Furring of the proper thickness should be applied as required parallel to the lip of receptor, pan or tub. The top of furring or if beveled, the start of bevel should be flush with the upper edge of receptor, pan or tub.
4. A continuous metal spacer strip as specified under the "Materials" section (below) should be applied with the $\frac{3}{4}$ " leg behind the furring with the apex of the angle abutting the top surface of the furring and the $\frac{3}{8}$ " leg protruding away from the stud face. (Note: If a metal spacer strip is not used the wood furring must be beveled as shown in details).
5. (a) For walls to be surfaced with ceramic tile over $\frac{1}{4}$ " thick: When $\frac{3}{8}$ " SHEETROCK Gypsum Wallboard is to be used on studs spaced 16" o.c. or $\frac{1}{2}$ " or $\frac{5}{8}$ " SHEETROCK Gypsum Wallboard on studs spaced more than 16" o.c., suitable blocking should be installed between all studs; one row of blocking located approximately 1" above the top of the tub or receptor and another row at the mid point between the tub and ceiling.
(b) Blocking is not required for $\frac{3}{4}$ " SHEETROCK Gypsum Wallboard on studs spaced 12" o.c. or less, or for $\frac{1}{2}$ " or $\frac{5}{8}$ " SHEETROCK Gypsum Wallboard on studs spaced 16" o.c. or less.
6. Appropriate blocking, headers or supports should be provided to support tub, other plumbing fixtures, and to receive soap dishes, grab bars, towel racks and similar items as may be required.

Materials

SHEETROCK Gypsum Wallboard may be $\frac{3}{8}$ ", $\frac{1}{2}$ " or $\frac{5}{8}$ " in thickness. NOTE: *Insulating (foil-backed) SHEETROCK Gypsum Wallboard should not be used as a backing material in shower stalls or tub enclosures.*

PERF-A-TAPE Joint System is recommended for treating joints and concealing nailheads.

The metal spacer strip should be fabricated of 16 gauge galvanized steel, with one leg $\frac{3}{4}$ " wide and one leg $\frac{3}{8}$ " wide bent at a 45° angle.

Materials (continued)

The surface sealer should be either the water resistant adhesive recommended by the manufacturer of the surfacing material spread in a continuous film 1/16" thick over the entire surface of the wallboard or a waterproof sealer such as varnish. Either to be applied after joints are "treated". *Shellac should not be used.*

The adhesive used for application of the surfacing material should be approved by the manufacturer of the surfacing material for use over gypsum wallboard.

The surfacing material should provide a durable surface and prevent the passage the free water to the backing material, also it should prevent the passage of water vapor which may lead to condensation within or on the surface of the backing material or framing members.

Waterproof receptors, pans or sub-pans should have an upstanding lip or flange a minimum of 1" higher than the water dam or threshold contained in the entry way to the shower.

Application

Shower pans, receptors or tubs should be installed prior to the erection of the gypsum wallboard. They should be properly furred away from the framing members as specified in section on "Framing" (Page 84), and installed so that the inside surface of the lip or upstanding leg of the receptor or pan should be in alignment with the surface of the gypsum wallboard.

$\frac{3}{8}$ ", $\frac{1}{2}$ " or $\frac{5}{8}$ " SHEETROCK Gypsum Wallboard should be applied horizontally with the factory edge (paper bound) abutting the top edge of the metal spacer strip or bevelled furring, which should allow a minimum of a $\frac{1}{4}$ " space between the lip of the receptor, tub or sub-pan and the gypsum wallboard. The SHEETROCK should be nailed in the conventional manner except where ceramic tile over $\frac{1}{4}$ " thick is to be used as a surfacing material, then nails should be spaced a maximum of 4" o.c. All joints between adjacent pieces of wallboard, including those at all angle intersections, should be treated with PERF-A-TAPE Joint System in the conventional manner.

Prior to the erection of surfacing materials, a waterproof sealer should be applied to the entire surface of the gypsum wallboard, treated joints and angles. When the adhesive is used as a sealer, it should be applied as a separate operation, independent of the application used to adhere the surfacing material. All edges of cut-outs made in the gypsum wallboard for pipes, fixtures, etc., should be sealed in a like manner. All openings around pipes, fixtures, etc., should be caulked flush with waterproof, non-hardening caulking compound.

The surfacing material should be applied down to the top surface or edge of the finished shower floor, return or tub and installed so as to overlap the top lip of receptor, pan or tub. The surfacing material should cover the following areas:

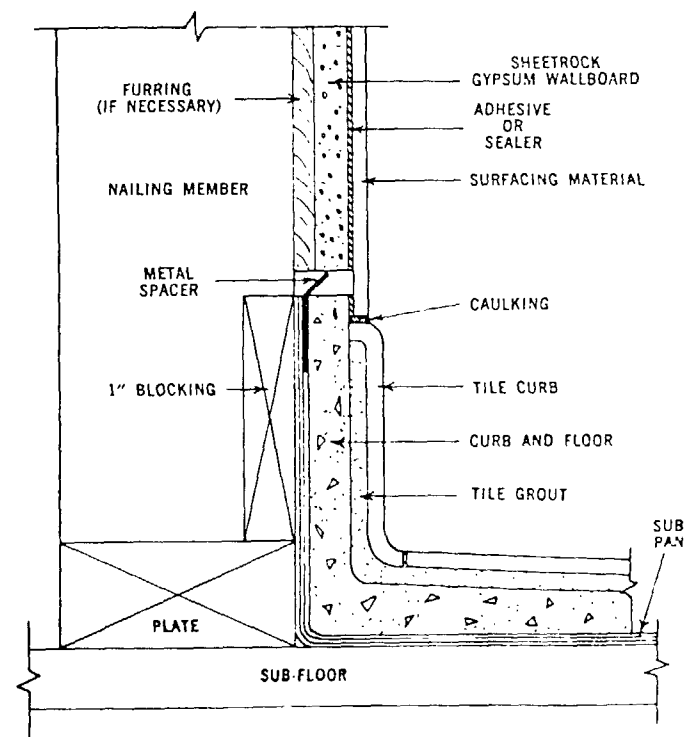
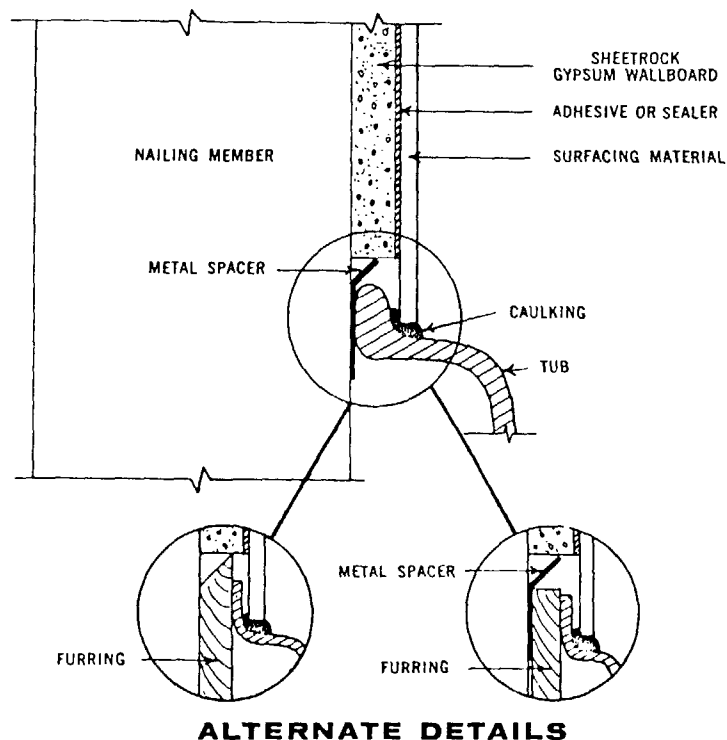
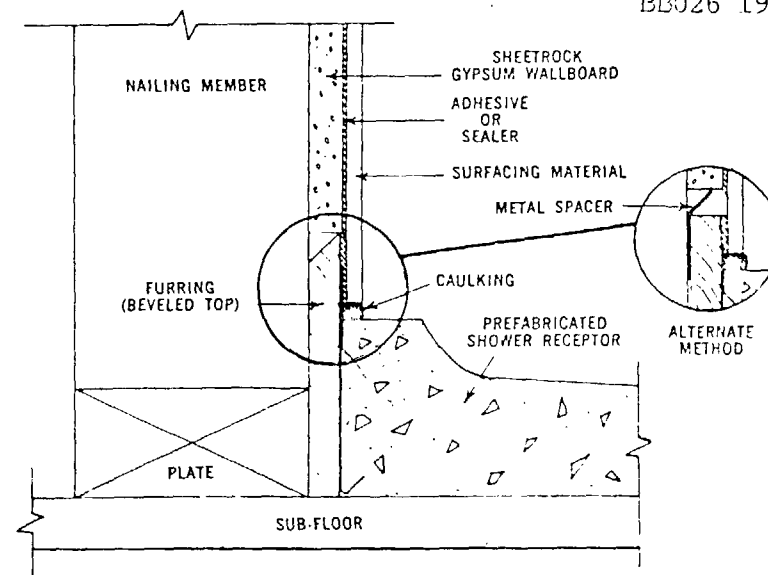
- (1) Over tubs without shower heads—6" above the rim of the tub.
- (2) Over tubs where showers occur—a minimum of 5 feet above the rim or 6" above the height of the shower head, whichever is higher.
- (3) Shower stalls—a minimum of 6 feet above the shower dam or 6" above the shower head, whichever is higher.
- (4) All jambs in shower stall should be covered to a like height.
- (5) All areas extending beyond the face of the tub should be covered a minimum of 4" from the required height to the finished floor of the bathroom (below rim of tub). Areas beyond an exterior corner excluded.

Where *plastic finished wall panels* are used as a surfacing material, the following precautions should be taken:

- (1) Only the type and shape of mouldings recommended by the manufacturer of the surfacing material should be used. All interior and exterior angles should be treated with mouldings containing a flange projecting behind the surfacing material on each leg of the angle. Only recommended tub mouldings should be used at the base where the surfacing materials abut the tub, shower floor or curb. Such mouldings should be set in caulking compound.
- (2) A bead of caulking compound should be applied at the angle formed by the gypsum wallboard backing and the moulding used around the top edge of the surfacing material to prevent leakage of water behind the moulding.

Where *other types of surfacing materials* are used, the following precautions should be taken:

- (1) All joints should be grouted in such manner as to leave no voids for water penetration.
- (2) Nonsetting caulking compound should be applied between the wall surfacing materials and the floor of the shower or rim of the tub.
- (3) The angle between the edge and the surfacing material should likewise be caulked.



THE USE OF 1/2" AND 5/8" SHEETROCK ON OPEN PORCH AND CARPORT CEILINGS AND FOR SOFFITS OF EAVES AND RAKES

(The purpose of the following recommendations is to provide provisions which, under all normal conditions, will protect the SHEETROCK Wallboard from coming into direct contact with water.)

1. Spacing of Supports and Board Placement

PORCH AND CARPORT CEILINGS

Framing should be spaced not more than 16" o.c. for 1/2" SHEETROCK and 24" o.c. for 5/8" SHEETROCK. The board should be applied perpendicular to supports.

SOFFITS OF EAVES AND RAKES

For eave or rake projections of 26" or more, framing must be spaced not more than 16" o.c. for 1/2" board and 24" for 5/8" board. The board should be applied perpendicular to the framing members.

For eave or rake projections of 26" or less, framing may be spaced 24" o.c. provided that both edges of the SHEETROCK parallel to the building wall are supported by moldings or other suitable means. The board may be applied either perpendicular to or parallel to the framing.

2. Flashing Under Shingled Roofs

In areas subject to freezing temperatures, shingled roofs should be provided with eave flashing strips of not less than 55 lb. smooth rolled roofing or two layers of 15 lb. felt cemented together extending inside the face of the exterior walls not less than: (a) 24" for pitches under 5 in 12. (b) 12" for pitches of 5 in 12 or over. If the pitch or overhang requires the strip to be wider than can be covered by a single strip, all laps are to be cemented.

METAL ROOF EDGE

Suitable metal drip edge extending a minimum of 3" under the shingles must be provided at all roof edges.

3. Facia Boards

Facia boards of sufficient width to provide a minimum of 1/4" drip below adjacent trim on the underside of the eave, rake or ceiling must be provided.

4. Ventilation

PORCHES AND CARPORT CEILINGS

Attic spaces above open porches and carport ceilings shall be provided with ventilation in compliance with F.H.A. requirements for attic spaces over living quarters.

Where the SHEETROCK is applied direct to rafters, vents should be provided at each end of each span as required in the following section.

SOFFITS OF EAVES AND RAKES

Rafters or joist spaces shall have a minimum of 2" x full width (space between rafters or joists) screened vent at each end of each space. The vent openings are to be located within 6" of the outer edge of the eave and be framed with wood.

5. Insulation

Areas covered herein that do not have a heated living space above are not to be insulated.

6. SHEETROCK Adjacent to Brick or Masonry Work

Wood facings must be provided between SHEETROCK Wallboard ceilings or soffits of eaves and rakes and brick or masonry work of any kind.

7. Nails and Nailing

1/2" SHEETROCK should be nailed with 1 1/4" GWB-54 nails, 5/8" SHEETROCK should be nailed with 1 3/8" ring shank nails (see chapter —BOARD APPLICATION AND FINISHING—"Nail Specifications") spaced not more than 8" o.c. along framing supports. All edges and ends around the perimeter must be supported by moldings of sufficient size and nailed securely to prevent sagging of the SHEETROCK. All nails in the field of the board shall be driven in the manner prescribed for interior finish work.

8. Back-Blocking

For best results, it is recommended that all joints in ceilings be back-blocked and end joints floated. This, however, is not a mandatory requirement.

9. Finishing Joints

All joints and nail heads are to be finished with PERF-A-TAPE and PERF-A-TAPE Cement in accordance with directions.

10. Painting

All exposed surfaces should be painted with a minimum of 2 coats of a good grade exterior paint.

LIMITATIONS

1. SHEETROCK Wallboard is not recommended for soffits or carport or open porch ceilings which project upwards and away from the building proper.
2. Joint treatment and painting should not be attempted during freezing or other adverse temperature or drying conditions. For best results, apply joint treatment and finish during a uniform temperature range of 55° F. to 70° F.
3. USG SHEATHING is not recommended due to undesirable color and surface unsuitable for painting.

BB026 1934

Technical Data

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TECHNICAL DATA

Construction References—SHEETROCK Fire Resistance Ratings

PARTITIONS

A. 2x4 wood studs spaced 16" o.c. (fire stopped at mid-height) faced both sides with 1/2" SHEETROCK. Board nailed with 5d cooler type nails spaced 7" o.c. Board applied either vertically or horizontally. Joints reinforced and concealed with PERF-A-TAPE Joint System.

B. 2x4 wood studs spaced 16" o.c. (fire stopped at mid-height) faced both sides with SHEETROCK FIRECODE Wallboard. 5/8" board nailed with 6d, cement coated 1/4" diam. flat head, 1 7/8" long nails. 1/2" board nailed with 5d, cement coated 1 5/16" diam. flat head, 1 5/8" long nails. Nails spaced 7" o.c. Joints reinforced and concealed with PERF-A-TAPE Joint System.

C. 2x4 wood studs spaced 16" o.c. (fire stopped at mid-height) faced both sides with 1/2" SHEETROCK. Board nailed with 5d cooler type nails spaced 7" o.c. Mineral wool fill (0.6 to 1.2 lbs. per sq. ft.) between studs. Board applied either vertically or horizontally. Joints reinforced and concealed.

D. 2x4 wood studs spaced 16" o.c. (fire stopped at mid-height). Studs faced both sides with 2 layers of 3/8" SHEETROCK. Base layer applied with long edges parallel to and abutting on studs. Board nailed with 4d, cement coated cooler type nails spaced 8" o.c. Face layer applied horizontally, ends abutting either between or over studs and nailed (permanent) along framing with 5d, cement coated nails spaced 8" o.c. The 2 layers are bonded together with PERF-A-TAPE cement. Face layer joints are reinforced and concealed with PERF-A-TAPE Joint System.

E. 2x4 wood studs faced both sides with regular SHEETROCK Wallboard. Rating applies to non-bearing partitions only. Construction: first layer applied vertically with 5d, cement coated, 7/32" diam. head, 1 5/8" long nails spaced 6" to 8" o.c. Finish layer applied horizontally with 8d, cement coated, 1/4" diam. head, 2 3/8" long nails spaced 6" to 8" o.c. Joints reinforced and concealed with PERF-A-TAPE Joint System.

F. 2x4 wood studs spaced 16" o.c. (fire stopped at mid-height) faced both sides with 2 layers 5/8" SHEETROCK FIRECODE 60. Both layers nailed with 6d, cement coated, 1/4" diam. flat head, 1 7/8" long nails. Base layer nails spaced 6" o.c. Face layer temporary nails spaced 12" o.c. Base layer applied with long edges parallel to and joining on studs. Face layer applied at right angles to base layer. 2 layers adhesively bonded together with PERF-A-TAPE Cement—cement spread on back side of face layer in ribbons 1/4" wide by 1/4" high, 1" apart. Face layer joints treated with PERF-A-TAPE Joint System.

G. TRUSSTEEL Studs spaced 16" o.c., attached to TRUSSTEEL runner track, to which a base layer of 3/8" BXBORD is attached by means of TRUS-LOK TL-1 clips. End joints are located between studs and secured with Bridjoint

FIRE-RESISTANCE RATINGS FOR SHEETROCK WALLBOARD CONSTRUCTIONS

TYPE CONSTRUCTION	RATING	WALLBOARD	TEST REFERENCE (SEE BOTTOM OF PAGE)	CONSTRUCTION REFERENCE (SEE FOLLOWING PAGES)
Partitions—Wood framing	40 Minutes 45 Minutes 1 Hour 1 Hour	1/2" SHEETROCK FIRECODE 45 1/2" SHEETROCK FIRECODE 60 5/8" SHEETROCK FIRECODE 60 1/2" SHEETROCK (Mineral Wool Fill between studs) 2 Layers 3/8" SHEETROCK 2 Layers 1/2" SHEETROCK 2 Layers 5/8" SHEETROCK FIRECODE 60	1 2 2 1 3 4 2	A B B C D E F
Partitions—Steel framing TRUSSTEEL Studs Available Steel Studs	45 Minutes 1 Hour * 1 Hour	3/8" SHEETROCK over 3/8" BXBORD Backing Board 1/2" SHEETROCK FIRECODE 45 over 3/8" BXBORD 5/8" SHEETROCK FIRECODE 60	3 3 3	G G H
Ceilings—Wood Frame and Floor	25 Minutes 45 Minutes 1 Hour	1/2" SHEETROCK FIRECODE 45 5/8" SHEETROCK FIRECODE 60 1/2" SHEETROCK FIRECODE 60	1 2 2	I J J
Steel Frame and Concrete Floor	1 Hour 1 1/2 Hours	5/8" SHEETROCK FIRECODE 60 5/8" BXBORD FIRECODE 60—Base Layer 1/2" SHEETROCK FIRECODE 45—Face Layer	2 2 2	K K K
Columns Steel	1 Hour 1 1/2 Hours 2 1/2 Hours	2 Layers 1/2" SHEETROCK 3 Layers 1/2" SHEETROCK 4 Layers 1/2" SHEETROCK	7 6 5	L M N

TEST REFERENCES

1. National Bureau of Standards Publication B.M.S. 92, tables 30 and 42.
2. Underwriters' Laboratories, Inc.
3. Nationally recognized Fire Testing Laboratory.
4. National Bureau of Standards Reference No. FP 2708.
5. National Bureau of Standards Test No. 315, May 22, 1952.
6. National Bureau of Standards Test No. 304, May 25, 1951.
7. National Bureau of Standards Test No. 303, May 23, 1951.

* Non Load Bearing

B-1 clips. The face layer is $\frac{3}{8}$ " SHEETROCK for 45 min. fire endurance rating or $\frac{1}{2}$ " SHEETROCK FIRECODE 45 for 1-hr. rating applied vertically and adhesively bonded to BXBORD with PERF-A-TAPE Joint Cement applied uniformly in ridges over back of SHEETROCK with notched spreader. For 1-hr. rating apply sufficient adhesive to *completely* cover backing board. Joints in face layer do not occur over joinings of base layer. Face layer joints are treated with PERF-A-TAPE Joint System.

H. Nailable steel studs, 2" x $3\frac{5}{8}$ " consisting of two formed channels spot welded back to back with webs deformed to exert a clinching action on nails driven into the stud, are spaced 24" o.c. A single layer of SHEETROCK FIRECODE 60 is applied to both sides of the studs and nailed with 7d cement coated cooler nails spaced a maximum of 8" o.c. Board is applied vertically with the tapered edges falling on the center line of the studs and anchored by nailing through the joint using diamond shaped clips under the nail head. Joints reinforced and concealed with PERF-A-TAPE Joint System.

CEILINGS

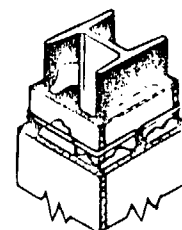
I. Wood joists spaced 16" o.c. faced on top with rough and finish floor and on underside with $\frac{1}{2}$ " SHEETROCK Wallboard. SHEETROCK nailed to joists with $1\frac{3}{4}$ " No. 12 ga. nails having $\frac{1}{2}$ " heads, spaced 6" o.c. Joints concealed with PERF-A-TAPE Joint System.

J. Wood joists spaced 16" o.c. faced underside with SHEETROCK FIRECODE Wallboard applied horizontally and finished on top with 1" nominal wood sub and finish flooring with rosin sized paper between. $\frac{5}{8}$ " board nailed with 6d, cement coated, $\frac{1}{4}$ " diam. flat head, $1\frac{1}{8}$ " long nails. $\frac{1}{2}$ " board nailed with 5d, cement coated, $1\frac{1}{4}$ " diam. flat head, $1\frac{5}{8}$ " long nails. Nails spaced 6" o.c. Joints reinforced and concealed with PERF-A-TAPE Joint System.

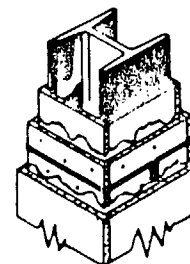
K. Steel joists (open web design) spaced 24" o.c. supporting 2" of reinforced concrete on 3.4 lb. $\frac{3}{4}$ " ribbed diamond mesh metal lath. Nailing channels spaced 16" o.c. wire tied to bottom cord of joists. FIRECODE board nailed to nailing channels with No. 11 ga. $\frac{5}{16}$ " diam. head, $1\frac{1}{4}$ " long annular ring nails spaced 6" o.c. FIRECODE Wallboard applied with long edges perpendicular to channels. Ends may be secured by (A) breaking joints between nailing channels and back-blocking with FIRECODE board, (B) providing double nailing channel at ends of abutting boards (not necessary to treat the joints to obtain a one hour rating).

NOTE: For $1\frac{1}{2}$ hour rating, the steel joists, floor, nailing channel and $\frac{5}{8}$ " BXBORD FIRECODE 60 base layer application is identical to that described above, except nail base layer 7" o.c. Apply $\frac{1}{2}$ " SHEETROCK FIRECODE 45 face layer over base with long edges perpendicular to channels nailed through the base into channels with $1\frac{3}{4}$ " annular ring nails spaced 6" o.c.

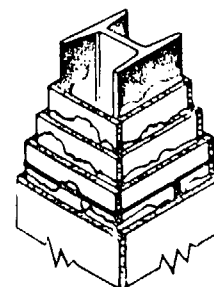
COLUMNS



L. Steel column protected with two layers of SHEETROCK cut and applied as in four-layer construction below, except inner layer is tied around column with double strands of 18 ga. tie wire, spaced 15" apart. Corners of face layer finished with PERF-A-TAPE Joint System.



M. Steel column protected with three layers of SHEETROCK cut and applied as below except first two layers are cemented and clinch-nailed together; then tied around column with double strand of 18 ga. tie wire spaced 15" apart. Third layer is then applied and corners are finished with PERF-A-TAPE Joint System.



N. Steel column protected with four layers of SHEETROCK cut in widths to span the flanges or re-entrant spaces and to bear on the edges of the flanges and of the other layers of board with edge overlap staggered; cut in lengths to cover the column height. Each layer applied vertically with joint cement to bond inner layer to column and successive layers to each other. Tied around the column with double strands of 18 ga. tie wire spaced 15" apart after third layer is in place. Face layer held in place with wood forms until cement is hardened. Corners finished with PERF-A-TAPE Joint System.

Fire Hazard Classification

A flame spread rating of 10 to 15 is applicable to SHEETROCK Gypsum Wallboard.

Sound Transmissions

SHEETROCK Wallboard partition systems have provided average sound transmission loss values up to 45 db. based on tests at recognized sound testing laboratories. These values will vary depending upon the mass (weight), extent of isolation of the partition faces and openings through the partition. In general the greater mass (wallboard thickness) and greater isolation (staggered studs etc.) will give higher sound transmission loss values. TRUSSELL Stud partition framing is particularly adaptable to locations where sound transmission loss is a design consideration. (See chapter—SYSTEMS—Page 64.)

Sound transmission from one room to another is not dependent on the reduction afforded by the wall construction alone. Of great importance is the transfer through the floor and ceiling construction, electrical boxes placed back to back, cracks around door openings, etc. and transfer through ducts, piping or other utilities common to the adjacent rooms.

Insulating SHEETROCK Wallboard (Foil Back) Vapor Barrier Data

Insulating SHEETROCK Wallboard is made by laminating a sheet of bright aluminum foil on the back surface of any SHEETROCK Wallboard except Panel SHEETROCK.

It is an effective vapor barrier for *exterior walls* and *ceilings* when applied (1) with foil surface next to the studs in single layer application or (2) as the base layer (with foil surface next to the studs) in the USG Double Wall System. A thermal insulating value is achieved when SHEETROCK is installed with the aluminum foil facing a "dead" air space of $\frac{3}{4}$ " or more.

Vapor Barriers

Provides an efficient vapor barrier which resists the passage of moisture through the interior lining of exterior walls, and minimizes the possibility of condensation within the wall, and of consequent failure of the exterior paint film. Vapor barrier should be on the warm side of the wall.

Insulation

Insulating SHEETROCK installation keep interiors cooler in summer by reducing heat flow into the home, and in the winter keeps interiors warmer and fuel bills lower by reducing the heat flow upward and outward.

Effect of Vapor Barriers on Condensation

Air always contains moisture in the form of an invisible gas (water vapor). Like all gases this water vapor exerts pressure, the greater quantity of it present in the air at a given temperature, the higher the pressure. Consequently, just as water at a higher level will flow to a lower point unless a barrier is interposed, so water vapor at a higher pressure will flow to an area of lower pressure unless a suitable barrier intervenes.

In the typical example shown (Page 98) the higher water vapor on the inside exerts a higher pressure than exists outside. It, therefore, flows towards the outside, progressively meeting colder and colder temperatures. As the temperature decreases, the air can hold less and less water vapor without becoming saturated with it. So, at a point near the back of the sheathing in both walls, temperatures are reached where the air can no longer hold the water vapor moving into it, and the excess water vapor condenses within the construction. However, the rate of vapor flow toward the outside in the "conventional wall" is about 20 times as great as it is in the "vapor barrier wall," because the vapor permeability of the SHEETROCK in the former is about 20 times that of SHEETROCK and foil in the "vapor barrier wall." As a result, the condensation in the "conventional wall" is about $2\frac{1}{2}$ gallons per one thousand square feet of wall per day, whereas only about $\frac{3}{8}$ pint can be condensed in the same area of "vapor barrier wall."

When the atmospheric conditions indicated are of considerable duration, the amount of condensation in the "conventional wall" is sufficient to damage the interior decoration, exterior paint, or any of the other wall components. In the "vapor barrier wall," however, the quantity of condensate is so minor as to be readily dissipated.

Thermal Resistance of Insulating SHEETROCK

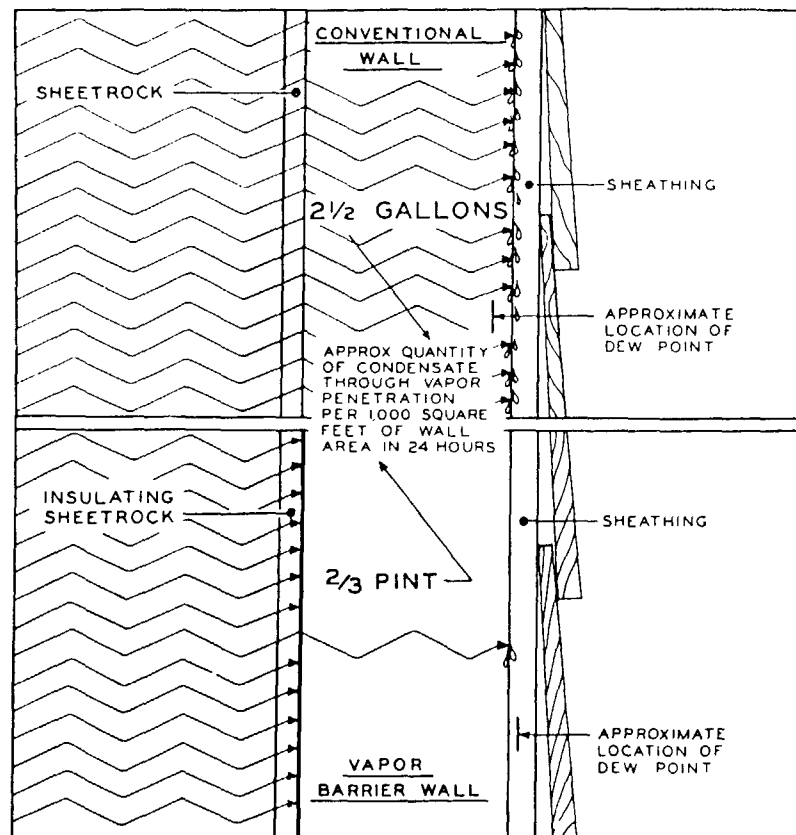
The thermal resistance provided by an air space faced with Insulating SHEETROCK is approximately equal for horizontal heat flow through walls in both summer and winter conditions and upward heat flow for ceilings under winter conditions. Thermal resistance to downward heat flow for ceilings under summer conditions is approximately three times that for upward heat flow under winter conditions.

FOR INFORMATION ON CALCULATING THERMAL RESISTANCE OF AIR SPACES FACED WITH REFLECTIVE INSULATION (INSULATING SHEETROCK), CONSULT THE LATEST EDITION OF THE HEATING VENTILATING AIR CONDITIONING GUIDE PUBLISHED BY THE AMERICAN SOCIETY OF HEATING AND AIR CONDITIONING ENGINEERS, INC.

(See illustration on importance of vapor barrier on Page 98.)

ILLUSTRATION OF IMPORTANCE OF VAPOR BARRIER

INSIDE ATMOSPHERE		OUTSIDE ATMOSPHERE
70°F	TEMPERATURE	10°F
45%	RELATIVE HUMIDITY	90%
3.63	GRAINS MOISTURE PER CU. FT.	0.69
0.332 IN.HG.	RESULTANT VAPOR PRESSURE	0.067 IN.HG.



Vapor Permeability of Insulating SHEETROCK

A vapor barrier construction should not have a vapor permeability of more than 1.00 perm.† Insulating SHEETROCK Wallboard meets ASTM requirements for a vapor permeability not exceeding 0.30 Perms† for foil-backed gypsum wallboard.

† 1 Perm = 1 grain per sq. ft. per hour, per inch of mercury vapor pressure difference.

Bending Radii of SHEETROCK Wallboard

Thickness	Lengthwise	Width
1/2"	20'*	..
3/8"	7 1/2'	25'
1/4"	5'	15'

* Bending two 1/4" pieces successively permits radii shown for 1/4" SHEETROCK.

SHEETROCK Wallboard can be formed to almost any curved surface. To apply board, place a stop at one end of the curve and then gently and gradually push on the other end of the board, forcing the center against the framing until the curve is complete.

By moistening the face and back paper thoroughly and allowing the water to soak well into the core, the board may be bent to still shorter radii. When the board dries thoroughly, it will regain its original hardness.

SHEETROCK Weights

The following are the *approximate weights* per thousand square feet of SHEETROCK Wallboard:

1/4" SHEETROCK	1097 lbs.
3/8" SHEETROCK (Plain)	1526 lbs.
3/8" SHEETROCK (Insulating)	1556 lbs.
1/2" Panel SHEETROCK (Plain)	1526 lbs.
1/2" Woodgrained SHEETROCK	1556 lbs.
1/2" Ranch Pine Panel SHEETROCK	1556 lbs.
1/2" Striated Panel SHEETROCK	1556 lbs.
1/2" BAXBORD (Plain)	1526 lbs.
1/2" BAXBORD (Insulating)	1556 lbs.
1/2" BAXBORD (Plain)	2025 lbs.
1/2" BAXBORD (Insulating)	2070 lbs.
1/2" SHEETROCK (Plain)	2025 lbs.
1/2" SHEETROCK (Insulating)	2070 lbs.
1/2" SHEETROCK FIRECODE 45	2120 lbs.
1/2" SHEETROCK FIRECODE 45 (Insulating)	2165 lbs.
3/8" SHEETROCK FIRECODE 60	2640 lbs.
3/8" SHEETROCK FIRECODE 60 (Insulating)	2685 lbs.
3/8" BAXBORD FIRECODE 60 Gypsum Backing Board	2640 lbs.
3/8" SHEETROCK (Regular Core) Wallboard	2640 lbs.
3/8" SHEETROCK (Regular Core) Wallboard (Insulating)	2685 lbs.

All weights subject to change.

Painting and Finishing Guides

TYPE OF SHEETROCK WALLBOARD	FINISH WANTED	FIRST COAT	FINISH COAT
Plain-tapered edge; 5/8", 1/2", 3/8", 1/4". Plain Panel SHEETROCK 1/2" & 3/8" Beveled Edge SHEETROCK	Flat or Velvet Pastel Colors	SHEETROCK Sealer or TEXOLITE Primer (tinted to approxi- mate shade of finish coat).	TEXOLITE DURAVAL TEXOLITE Alkyd Latex TEXOLITE Standard Flat Oil Paint
	Semi-Gloss	TEXOLITE Vinyl Sealer. SHEETROCK Sealer (tinted to approximate shade of finish coat).	1 or 2 coats of TEXOLITE Semi-Gloss enamel as required.
	Gloss	TEXOLITE Vinyl Sealer. SHEETROCK Sealer. Then one coat 1/2 enamel and 1/2 enamel undercoater (tinted to approximate shade of finish coat).	Apply finish coat of Gloss Enamel.
	Stipple	TEXOLITE Vinyl Sealer. SHEETROCK Sealer (tinted to approxi- mate shade of finish coat).	1 coat of TEXOLITE Ripple or 1 coat of oil-type stipple paint.
	Sand Finish	1 coat TEXOLITE Texture	

	Texture	TEXTONE or USG Tex- ture Paint	1 or 2 coats TEXOLITE DURAVAL, TEXOLITE Alkyd Latex, TEXOLITE Standard.
	Multi-Color Enamel Effect	Not needed	NEO-FLECK Odor-less Multi- Color enamel.
	Wallpaper?	SHEETROCK Sealer (required for later removal of wallpaper).	Wallpaper or other wall covering.
Woodgrained Ranch Pine Cherrywood Sablewood Ranch Pine Panel SHEETROCK	Note: Woodgrained SHEETROCK is pre- finished at factory. If additional protection is desired apply—	1. Paste wax or 2. Satin varnish	
Striated Panel SHEETROCK	PREFINISHED AT FACTORY—NO OTHER FINISH REQUIRED		

On Plain Panel SHEETROCK the wallpaper normally is split into widths of paper necessary to cover each panel from joint to joint. The wallpaper is then applied to Panel SHEETROCK with the joints in the wallpaper occurring directly over the joints in the Panel SHEETROCK installation. The unused narrow strip cut from the roll is then thrown away. When, due to the design of the paper, it is necessary to use the full width of wallpaper to retain the pattern, the paper should be slit for joining over the joints between the units of Panel SHEETROCK. The remaining strip is then used to start the next panel, thereby preserving the design. If the paper is not cut at the joint between the panels of SHEETROCK Wallboard, as the wallpaper dries it will contract and tend to bridge the joint, with the result that at a later date an unsightly break or wrinkle will occur in the wallpaper over the joint.

DESCRIPTION OF TEXOLITE PAINTS**SHEETROCK Sealer—**

Ready to use, quickly applied. Provides excellent "tooth" for subsequent coats of paint. Seals off impurities, lays the nap of face paper, controls suction and equalizes porosity over gypsum wallboard face paper and joint finishing cement. Provides uniformly smooth surface. Highly pigmented. One gallon will cover up to 500 sq. ft. May be tinted.

TEXOLITE Vinyl Sealer—

Ready to use, quick drying sealer. Painting possible with oil paints in two to four hours depending on drying conditions. One gallon will cover up to 500 sq. ft. Highly pigmented. May be tinted.

TEXOLITE Primer—

In powder form ready to use with addition of water. Provides excellent "tooth", equalizes suction. Locks in alkali. Provides a hard, dependable prime coat for any type paint. Covers up to 75 sq. ft. per pound.

TEXOLITE Duraval—

Ready to use self-leveling, easy to apply, dries to a velvet finish within an hour; leaves no "painty" odor. One gallon covers up to 500 sq. ft. It's highly washable with soap and water or a detergent. Apply with brush, roller, or spray.

TEXOLITE Alkyd Latex—

Ready-to-use, self-leveling, easy to apply, dries within an hour to a dead flat finish; leaves no "painty" odor. One gallon covers up to 450 sq. ft. Highly washable with soap and water or a detergent. Apply with brush, roller, or spray.

TEXOLITE Standard—

Economical water-thinned paint in concentrated paste form. One-half gallon of water added to one gallon of paste provides 1½ gallons of paint which will cover up to 800 sq. ft. Self-leveling, easy to apply, dries in an hour to a dead flat finish, leaves no "painty" odor. Cleanable with mild soap and water. Apply with brush, roller, or spray.

TEXOLITE Semi-Gloss Enamel—

Odor-less, alkyd semi-gloss enamel. Ready to use from the can. One gallon covers up to 450-550 sq. ft. Apply by brush.

TEXOLITE Ripple—

Ready to use, smooth stipple-finish latex paint. Easy to apply with roller or brush and roller. One coat usually sufficient. No "painty" odor. One gallon covers up to 225 sq. ft.

TEXOLITE Texture—

Ready to use, sand finish latex paint. Easy to apply with roller or brush and roller. One coat usually sufficient. No "painty" odor. One gallon covers up to 225 sq. ft.

TEXTONE—

In powder form ready to use with addition of water. Provides rugged, highly durable medium or heavy textured surfaces. Will cover from one to four square yards per pound.

USG Texture Paint—

In powder form ready to use with addition of water. Provides economy and versatility. Provides excellent medium or light textured surfaces.

NEO-FLECK Enamel—

Decorative multicolored enamel. Durable, highly washable, odor-less, non-toxic, extremely tough. No prime coat required. Long life. Apply by spray only. Economical—only one double-spray coat required.

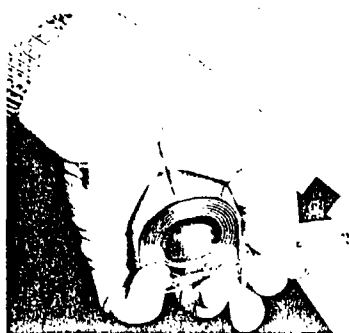
Tools**CONTENTS**

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SHEETROCK WALLBOARD TOOLS

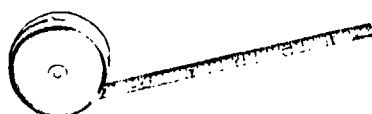
Measuring and Cutting

(See Key on page 114 in this chapter denoting additional availability of tools)



Straight Edge

A calibrated metal straight edge with T-square used as a guide in making upright cuts across the full width of the board. It eliminates the need for drawing lines and expedites accurate cutting. A metal or metal edge straight edge is preferred because it prevents the knife from cutting into the edge as the board is scored. ★



Flexible Steel Tape

(Available locally at any hardware store.)

Steel Rule

King size white face steel rule with Tru-Guide measuring aid and Tru-Cut tape-tip. ★

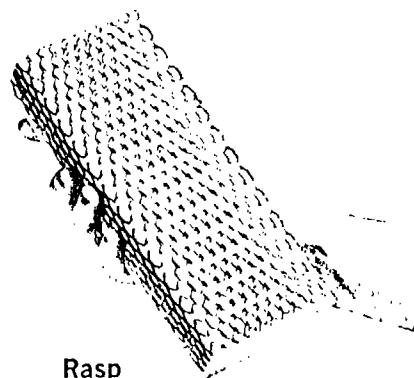


A hook-nosed linoleum knife is an excellent cutting tool. However, the point must be rounded off approximately $\frac{3}{8}$ " from the tip to avoid its gathering the paper of the SHEETROCK Wallboard. (Available locally at any hardware store.)



Trimming Knife

The Stanley Trimming Knife, with changeable blades is an increasingly popular tool. A pocket knife or an awl may also be used. Whatever the instrument, it should be kept sharp to cut the paper cleanly and score the core. Stanley Trimming Knife No. 199. Stanley Tools Company, New Britain, Connecticut. (Available locally at most hardware stores.) †

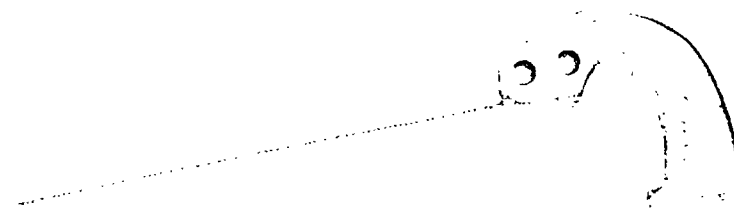


Rasp

2"x4" wood block with metal lath stapled to face. Made on the job. Used to trim or smooth job-cut SHEETROCK ends or edges.

Saws

Carpenters Cross Cut Saw (not shown) is generally used for making one side of a right angle cut at door or window openings. Wide tooth saw preferable to minimize clogging with gypsum. (Available locally at hardware stores.)



Key Hole Saw

Used for cutting small openings. (Available locally at hardware stores.)

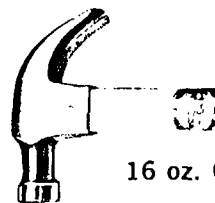


Utility Saw

Used for cutting out small openings. ★

Hammers

The proper hammer for nailing SHEETROCK Wallboard has a round edged, slightly crowned head which forms a "dimple" in the face of the board as the nail is "driven home". A hammer with a flat head and sharp edges will fracture the paper around the nail head, and these cracks around the hammer head imprint may eventually appear through the decoration. The head of a lathers' hatchet is too flat, its corners too sharp, and a ball-peen hammer is too heavily crowned. A regular hammer head may be easily crowned with a file, if necessary. In driving the nails used in erecting Woodgrained SHEETROCK Wallboard, a *plastic headed* hammer, a raw hide mallet, or a regular hammer covered with pliable leather should be used to avoid chipping the enameled nail head.



16 oz. Crown Head

Carpenters' Claw Hammer (crown head) designed to dimple nails properly. (Available locally at most hardware stores.)



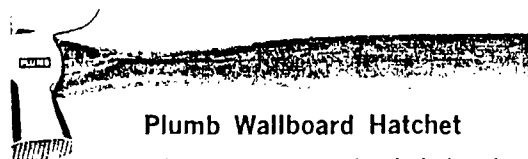
Plastic Headed Hammer

For driving special nails used with Woodgrained SHEETROCK. (Available at most hardware stores.)



Wal-Board Hammer

The symmetrical convex face is designed to compress the board and leave a perfect "dimple".★



Plumb Wallboard Hatchet

Also has a crown head designed to properly "dimple" the board. Checkered face designed to prevent slipping over nail heads. Fayette R. Plumb, Inc., Philadelphia, Pa. and St. Louis, Mo. (Available at most hardware stores.)†



Leather Tool Pouch

Holds nine wallboard application tools.★



Leather Nail Bag

Soft leather riveted for long life—round bottom designed so nails won't "pack"—big belt loop.★

Foot Power Wallboard Lifter

The Lifter shown here is designed for moving board against the wall as it lifts. Available from B. E. Gillespie, Box 446, Refugio, Texas. (An alternate device or floor jack may be made from a piece of 2x4 bevel-cut on one end like a chisel. Such a tool may be used to raise the lower course of the horizontally applied SHEETROCK Wallboard into nailing position. A piece of automobile spring leaf may also be used.)



Swearless Trimmer

A tool designed to trim either 3/8" or 1/2" board edges or ends. Torrington Metal Products, 400 Riverside Ave., Torrington, Connecticut.



All-Round Circle Cutter

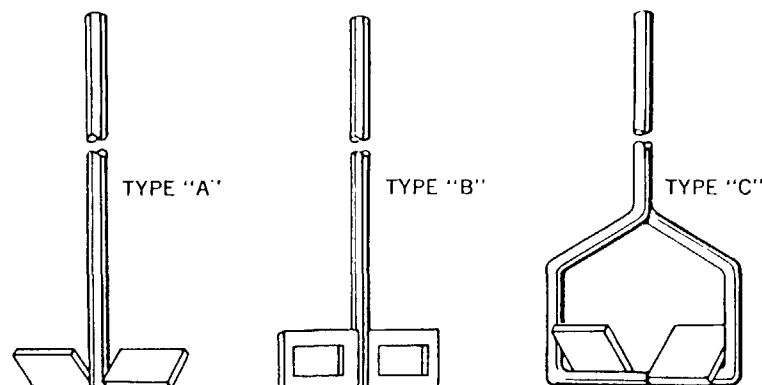
Cuts clean sharp round holes—up to 12" in diameter.★



Electric Mixers for PERF-A-TAPE Cement

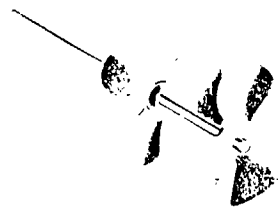
(Made on the job)

While hand mixing of PERF-A-TAPE Cement is perfectly adequate, many applicators are currently using electric mixers to good advantage. Power mixing saves considerable time, particularly on a large job where mixing in a central location is convenient.



Mixing paddles may be any one of the above types or variations thereof consisting of a $\frac{3}{8}$ " diameter shaft about 24" long with blades welded thereto. Type "A" blades are approximately $1\frac{1}{4}$ " x 3" welded on at an angle of 45 degrees. Type "B" has three equally spaced blades approximately 2" x $3\frac{1}{2}$ " welded in line with the shaft. Slots approximately 1" x 2" are cut out of the blades to allow the cement to work through the blades in a folding action. Type "C" has blades approximately 2" x 2" welded at a 45 degree angle on the bottom leg of a 4" x 6" stirrup. Material for the blades is $\frac{1}{8}$ " strap iron, for the shaft, $\frac{3}{8}$ " round iron—both available at most wrought iron fabricating shops.

Power is supplied by a $\frac{1}{2}$ " heavy duty electric drill operating on 115 volts AC-DC at *not over 400 rpm*. Drills operating at higher speeds will whip air bubbles into the cement, rendering it unfit for finish coat purposes. If available at reasonable cost, drills of 200 to 300 rpm are even better.



Mixbit Blades

Mixbits counteracting blades churn and mix joint cement into a smooth, creamy mix. Designed for use with $\frac{1}{2}$ " electric drill.

Available from:
Park Manufacturing Company
Grant Park, Illinois†



USG PERF-A-TAPE Corner Tool

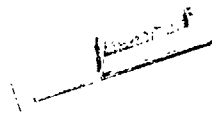
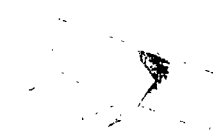
U. S. Gypsum Company

(Available locally at lumber dealers, paint or hardware stores.)

Spreader Blades

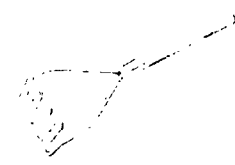
Made on the job from semi-rigid galvanized steel sheet metal approximately 5" x 10". Notch the long edge, $1\frac{1}{2}$ " apart with round $\frac{5}{16}$ " wide inverted "V", $\frac{1}{2}$ " deep notches. A common trowel may be prepared in same manner. (See chapter—SYSTEMS—"The Double Wall System.")

2 and 1 notched spreader blade made on job and suggested for use with Panel SHEET-ROCK adhesively applied. (2 notch) $17\frac{1}{2}$ " top, 15" bottom, $5\frac{1}{2}$ " high, $6\frac{1}{2}$ " wings. (1 notch) 2" top tapering to 5", 2" bottom, $5\frac{1}{2}$ " wings. Notches $\frac{5}{8}$ " wide inverted "V" shape, $\frac{5}{8}$ " deep. Notches placed 1" in from blade edge on 2-notch blade. Made of semi-rigid galvanized sheet metal.



11" Trowel

(Available locally at most hardware stores.)



Restaurant Potato Masher

Used to hand mix joint cement. (Available at most restaurant supply companies or Ames Taping Tools, Inc., Belmont, California.)▽



4" USG Joint Steel Finishing Knife

U. S. Gypsum Company

Either plain (as shown) or hammer head handle. (Available locally at lumber dealers, hardware and paint stores.)



5" USG Steel Joint Finishing Knife

U. S. Gypsum Company

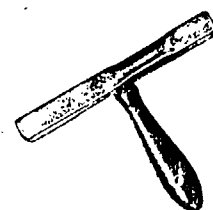
Either plain (as shown) or hammer head handle. (Available locally at lumber dealers, hardware and paint stores.)



6" USG Steel Joint Finishing Knife

U. S. Gypsum Company

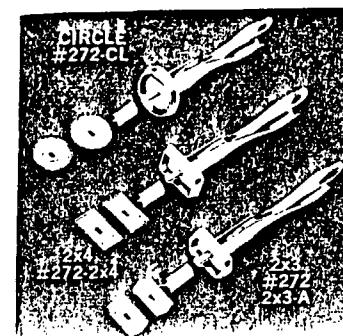
Either plain (as shown) or hammer head handle. (Available locally at lumber dealers, hardware or paint stores.)



10" USG Steel Joint Finishing Knife

U. S. Gypsum Company

Plain handle only. (Available locally at lumber dealers, hardware or paint stores.)



Hand Finisher

Picture at right shows Ames Hand Finisher in use during the application of the first coat of cement over PERF-A-TAPE.

Quic-Kutter

These tools are designed to produce perfect die-cut openings in gypsum wallboard walls and ceilings. Shown at left are the tools recommended by the manufacturer for cutting the most common sizes and shapes. Available from: Hartmeister Manufacturing, Inc., 1544 Lowell Blvd., Denver 4, Colorado.

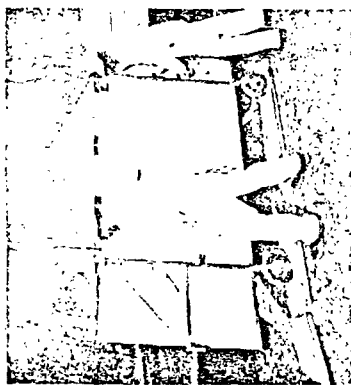


COMPLETE LISTING OF AMES TOOLS, DATA, DESCRIPTION

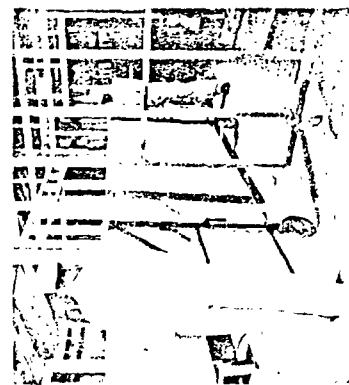
Automatic Taper (Bazooka)	Applies tape and cement simultaneously to flat joints and corners	Rental
Corner Applicator	Applies cement to corners preparatory to laying in tape by hand and is used for handle and cement dispenser for corner finisher	Rental
Flat Applicator	Applies cement to flat joints preparatory to laying on tape by hand	Rental
Corner Roller	For forming corners	Rental
Corner Finisher 2" or 3"	To be used with the Corner Applicator for applying finish coat of cement over inside corners	Rental
7" Hand Finisher	Applies first coat of cement over tape leaving cemented area smooth with feathered edges	Rental
10" Hand Finisher	Applies second coat of cement over tape leaving a finished joint	Rental
12" Hand Finisher	Applies third coat of cement over tape leaving a finished joint. May be used instead of 10" hand finisher for second coat if a wider joint is desired	Rental
Hand Pump	Pump with appropriate nozzles is used to fill the Automatic Taper, Corner Applicator, Flat Applicator and 7" and 10" Hand Finishers	Rental
Universal Pole Sander and Block Sander	Furnished at no additional charge with each set of Hand Finishers. Additional sanders may be purchased if desired.	
Broadknife and Pan	Furnished at no additional charge with the Automatic Taper or Flat Applicator. Additional pans and broadknives may be purchased if desired.	
Cement Mixer	Furnished with each set of tools of any type. May be purchased.	
Mastic Meter	Applies Sheetrock Brand Adhesive to wood framing	Rental
Mastic Meter Pump	Pump similar to hand pump with special valves and adaptor to fill Mastic Meter	Rental

VERTI-ROLL

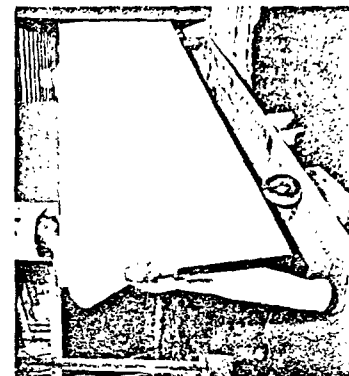
A VERTI-ROLL UNIT consists of two steel clamping devices, each mounted on a wheel for each end of the bundle. The pair, which weigh a total of 30 pounds and measure 27x55 inches, are designed for easy hauling from job to job. Handle "A" locks the clamp which is designed to hold from one to four boards four feet wide. Handle "B" steers the wheel which is capable of a 180-degree turn. Handle "C" may be used to give a slight lift over obstacles.



THE BOARD ROLLS EASILY over rough ground or over boards into the room desired.



NARROW STUD SPACINGS pose no problem. Note steering handles turned down for easier clearance.

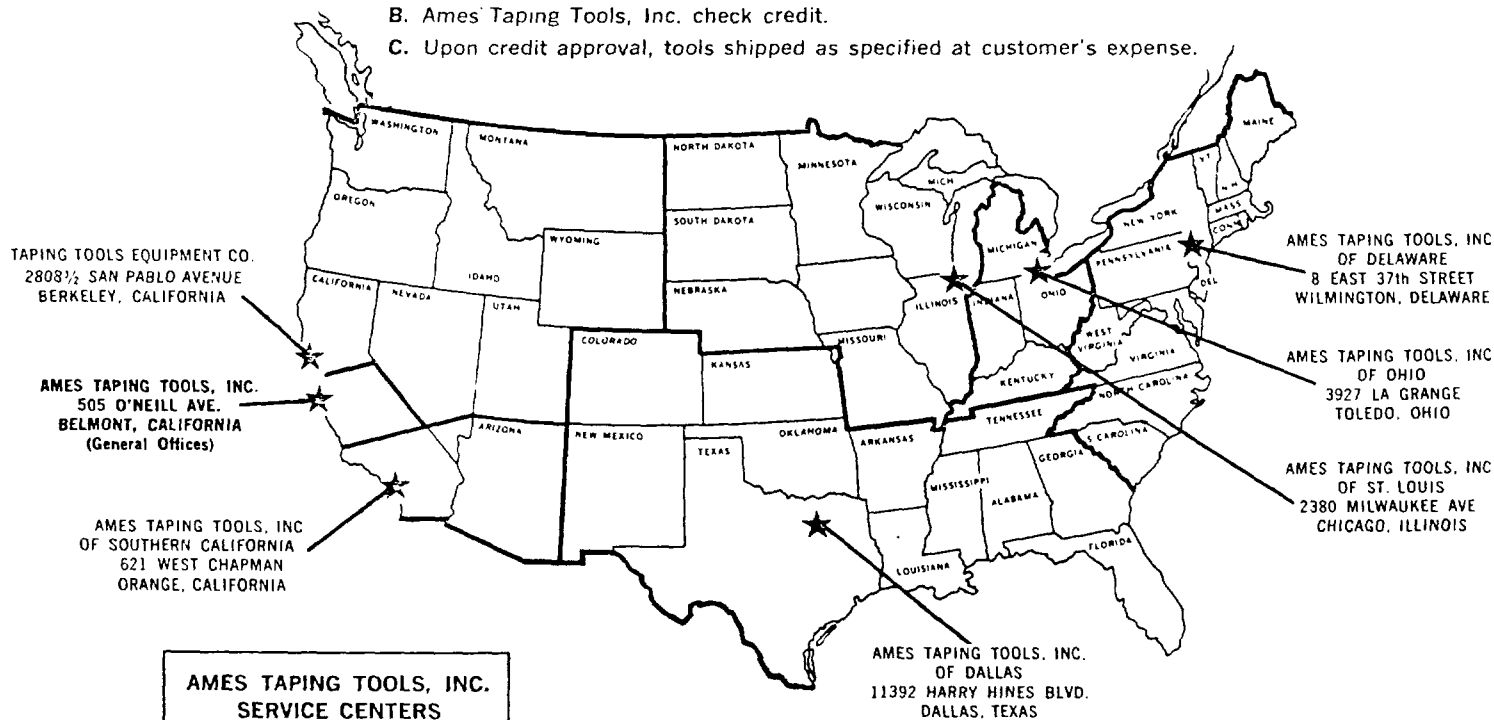


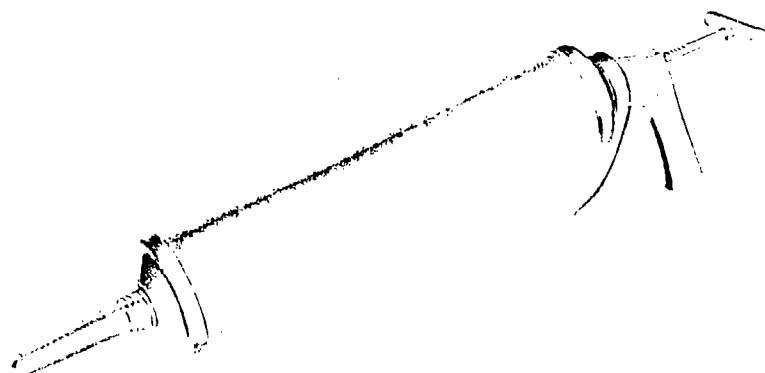
TWO BUNDLES of 1/2-inch SHEET-ROCK Wallboard in 12-foot lengths roll up metal lath-surfaced ramp without shifting or wrestling.

Available from: Palmer Industries, Inc., 846 W. 56th Street, Indianapolis, Ind. Operating details, performance data and price information available.

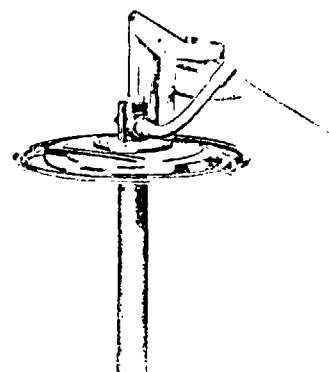
PROCEDURE FOR ORDERING AMES TOOLS

- Applicator sends signed rental agreement and check covering first month's rent and deposit to applicable Ames branch office. Succeeding months' rentals paid per rental agreement to applicable branch of Ames Taping Tools, Inc. (Deposits refunded when tools returned to Ames Taping Tools, Inc.)
- Ames Taping Tools, Inc. check credit.
- Upon credit approval, tools shipped as specified at customer's expense.





Model A-3 DRY-WALL ADHESIVE APPLICATOR has trigger mechanism that stands rough usage—offers minimum resistance to a large bulk load of adhesive. Ratchet rod and precision construction aids even application of adhesive. Barrel is 16" x 3½"—has quarter-turn breech cap. Nozzle has ¾" orifice, wedged nose. 2½ quart capacity. Weight approximately 8 lbs. (Available from U.S. Gypsum Co.).



Alemite Loader Pump Model 7197-L clamps on 5-gal. pail of SHEETROCK Brand Adhesive. Eliminates mess and waste of hand and paddle loading methods of A-3 gun (shown above). Standard pipe thread reducer 1" x ¾" (available from hardware or plumbing supply stores) may be obtained and used for connection of A-3 gun to pump. (Loader pump available from Alemite Co. distributors.)

Key

*Wallboard Tool & Equipment Company, 1708 Seabright Avenue, Long Beach, California.

†Goldblatt Tool Company, 1910 Walnut Street, Kansas City, Missouri.

▽Camco Supply Co., Inc., 5833 Outlook, Mission, Kansas.

★Available from the above companies.

Product Information

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SHEETROCK PRODUCTS

QUALITY CONSTRUCTION

The three top requirements of a wall and ceiling surfacing material are that it be fireproof, that smooth unbroken wall and ceiling surfaces can be obtained with it, and that it can take any type of decoration. Of all the wallboards, only gypsum wallboard meets all three basic requirements.

TYPES OF SHEETROCK

The long edges of SHEETROCK panels are manufactured with various types of edges; tapered, square, beveled, round and "V" T & G shapes. The choice of edges permits a wide variety of decorative effects. Popular preference for smooth unbroken walls and ceilings, however, makes tapered edge SHEETROCK the most widely used of these types, as joints can be completely concealed and reinforced with PERF-A-TAPE Joint System. Plain and Insulating 4' wide SHEETROCK are used in a manner requiring the concealment of end joints, and for this reason the 4' wide SHEETROCK panels are produced with SMOOTH ENDS. This permits easier and better finishing of wall and ceiling butt end joints.

TAPERED EDGE SHEETROCK

FIVE-EIGHTHS INCH REGULAR SHEETROCK—For best results in single layer construction use $\frac{5}{8}$ " regular (plain core) SHEETROCK Wallboard. $\frac{5}{8}$ " regular SHEETROCK has all the advantages of other regular SHEETROCK products. It has a number of plus advantages which make it a popular product with builders and drywall applicators. $\frac{5}{8}$ " regular SHEETROCK is extra thick—extra strong; tapered edges, 4' wide and is available in lengths of 8', 10', and 12'. It has increased bracing strength and resistance to racking loads. *Its most important use is with ceiling trusses spaced up to 24" o.c.* It has greater impact resistance than other boards of lesser thickness and reduced sound transmission. It is fire resistant and although it does not carry a fire resistant rating of one hour, it is an ideal companion product on jobs where $\frac{5}{8}$ " SHEETROCK FIRECODE 60 is used in areas requiring a one hour rating. (See chapter—BOARD APPLICATION AND FINISHING.)

ONE-HALF INCH— $\frac{1}{2}$ " tapered edge SHEETROCK Wallboard has for many years been the accepted product for walls and ceilings of single layer construction and still remains a recommended product for that use. Available lengths: 6', 7', 8', 9', 10', 12', 14'—longer lengths available on special order depending on location. (See chapter—BOARD APPLICATION AND FINISHING.)

THREE-EIGHTHS INCH—This product is considered the standard wallboard for remodel and alteration jobs. It differs from $\frac{1}{2}$ " tapered edge SHEETROCK Wallboard only in thickness and weight. For ease of handling, it is recommended that $\frac{3}{8}$ " tapered edge SHEETROCK be used for remodel and repair work where the greater strength and rigidity of $\frac{1}{2}$ " board is not required. Available lengths: 6', 7', 8', 9', 10', 12', 14'—longer lengths available on special order depending on location. (See chapter—BOARD APPLICATION AND FINISHING.)

QUARTER-INCH— $\frac{1}{4}$ " SHEETROCK is a utility gypsum wallboard. Made with tapered edges at most mills it is lightweight and low in cost. Available in 8' and 10' lengths. Joints between panels are treated with PERF-A-TAPE Joint System. Quarter Inch SHEETROCK is excellent for covering old walls and ceilings and for temporary space divisions. It is flexible and can be applied

to almost any curved surface, providing a full range of design possibilities. When used to refinish old walls, trim generally need not be removed. The panels are merely butted against the trim. A small moulding may be used to cover the joint around the door and window openings. (See chapter—BOARD APPLICATION AND FINISHING.)

THREE-EIGHTHS AND ONE-HALF INCH BEVELED EDGE SHEETROCK—Beveled edge SHEETROCK Wallboard is made *on special order only* for use where the speed and economy of featured rather than concealed joints are desired. The edges are precision beveled and where two panels are placed side by side, a "V" type joint results. When using Beveled Edge SHEETROCK Wallboard for vertically paneled walls, care should be taken to see that all joints in the room form a pleasing pattern. The board should be erected according to a predetermined design. Since all joints must fall on framing members, the framing members must be accurately spaced. To prepare for decoration, only the nail heads need to be concealed with PERF-A-TAPE Cement. Available lengths: 6', 7', 8', 9', 10' and 12'. Longer lengths manufactured on special order depending on location. *Minimum footage requirement on all orders.*

THREE-EIGHTHS, ONE-HALF AND FIVE-EIGHTHS INSULATING SHEETROCK—Insulating SHEETROCK Wallboard has bright aluminum foil laminated to its back surface. (For details of insulation values, see chapter—TECHNICAL DATA — "Vapor Barrier Data.") $\frac{3}{8}$ " and $\frac{1}{2}$ " Tapered Edge Insulating SHEETROCK available in 6', 7', 8', 9', 10', 12' lengths—14' and 16' lengths available on special order depending on location. $\frac{5}{8}$ " Regular Core Tapered Edge Insulating SHEETROCK available in 8', 10' and 12' lengths. $\frac{5}{8}$ " Tapered edge Insulating SHEETROCK FIRECODE 60, available in 8', 9', 10' and 12' lengths.

THREE-EIGHTHS INCH WOODGRAINED SHEETROCK — Standard in $\frac{3}{8}$ " thickness with beveled and square edges, Woodgrained SHEETROCK is a special predecorated board, combining the many SHEETROCK Wallboard advantages with the appearance of the natural grain of wood paneling. Joint treatment and further decoration are not required. A factory applied lacquer helps protect and preserve the finish. Commercial paste and emulsion waxes give a satisfactory finish where applied to the woodgrained surface. Wax should *not* be applied, however, if subsequent painting is contemplated. Satin finish varnish may be applied without shellac or a sealer being applied first. Predecorated SHEETROCK may be painted with oil, resin emulsion or rubber base paint, providing the surface has not been waxed. Matching colored nails are available. Picture mouldings, cove mouldings, chair rails, plate rails, and base assemblies may be of a wide variety commonly used and may be stained to harmonize or contrast with the wallboard. Woodgrained SHEETROCK is recommended for use in libraries, dens, hallways, attics and basement rooms, shops, offices, restaurants, clubs, display rooms, etc. It is excellent for lining closets and effects worthwhile economies. Available lengths: 7', 8', 9' and 10'. (See chapter—BOARD APPLICATION AND FINISHING—"Application of Predecorated SHEETROCK Wallboard.")

THREE-EIGHTHS INCH PANEL SHEETROCK—Panel SHEETROCK is $\frac{3}{8}$ " thick, 16" wide with rounded edges. Panel SHEETROCK comes in Plain, Ranch Pine and Striated finish. It may be nailed directly to studs, or wood furring strips. It may also be applied directly over an existing plaster wall or over a base course of BAXBORD Gypsum Backing Board or insulation board using PERF-A-TAPE Cement as an adhesive. The vertical joints become a decorative feature and give a smart panel effect. There are no joints to

treat. The Ranch Pine and Striated finishes are predecorated. Plain Panel SHEETROCK will take any decoration. Available lengths: 7', 8', 9' and 10' depending on location. (See chapter—SYSTEMS—"Panel SHEETROCK System.")

FIVE-EIGHTHS INCH SHEETROCK FIRECODE 60 WALLBOARD—The core of $\frac{5}{8}$ " SHEETROCK FIRECODE 60 is especially formulated to give increased fire resistance to meet requirements of certain more rigid building codes. Partitions faced both sides, and floor and ceiling construction faced with SHEETROCK FIRECODE 60 have a one-hour fire resistance rating with specific design requirements. Underwriters' Laboratories tested; each bundle bears the Underwriters' Laboratories label.

SHEETROCK FIRECODE 60 is especially suited for all requirements for single occupancy units, common walls to attached garages, basement ceilings, utility rooms and ceilings, corridor walls and ceilings, stair halls, column and beam fireproofing, backup for acoustical treatment, walls and ceilings of volatile storage areas, and in other areas where a one-hour fire resistant rating may be required. Available lengths: 8', 9', 10', 12', 14'. (See chapter—TECHNICAL DATA—"Fire Resistance Ratings.")

ONE-HALF INCH SHEETROCK FIRECODE 45 WALLBOARD—Underwriters' Laboratories rated for 45 minutes fire resistance for partition and floor-ceiling construction. Recommended for use in areas where building codes require a 45 minute fire resistance rating. Each bundle bears the Underwriters' Laboratories label. Available lengths: 8', 9', 10', 12', 14'. (See chapter—TECHNICAL DATA—"Fire Resistance Ratings.")

BAXBORD PRODUCTS

THREE-EIGHTHS INCH BAXBORD— $\frac{3}{8}$ " BAXBORD Gypsum Backing Board is available in two sizes: 2' x 8' and 4' x 8'. Both sizes have round edges. Plain BAXBORD is encased with strong gray paper on both sides. Use Insulating BAXBORD with bright aluminum foil laminated to one surface to provide a vapor barrier and reflective insulation where BAXBORD is applied to exterior walls and top floor ceilings. (See chapter—SYSTEMS—"Job Laminated SHEETROCK Wallboard—The Double Wall System" and TECHNICAL DATA—"Insulation Values".) 2' x 8' BAXBORD is available on order only and is primarily recommended for use with the SHEETROCK Wallboard-TRUSSTEEL Stud Partition System (see chapter—SYSTEMS—"SHEETROCK Wallboard-TRUSSTEEL Stud Partition Systems"). 4' x 8' BAXBORD is recommended for the base layer of the SHEETROCK Wallboard Double Wall System. (For technical data see chapter—SYSTEMS—"Job Laminated SHEETROCK Wallboard, The Double Wall System.") $\frac{3}{8}$ " BAXBORD under certain conditions may be used as a base for acoustical tile (see chapter—SYSTEMS—Page 73).

FIVE-EIGHTHS INCH BAXBORD FIRECODE 60— $\frac{5}{8}$ " BAXBORD FIRECODE 60 carries the Underwriters' Laboratories approval for a one hour fire resistance rating for steel joist, concrete floor, and gypsum wallboard ceiling construction when attached to metal "nail-on" channels. Available in 2' x 8' size only, "V" T & G edges encased with strong gray paper on both sides, it is an ideal base for acoustical tile (adhesive or screw-on application). Taped joints are not required to meet the one hour fire rating. $\frac{5}{8}$ " BAXBORD FIRECODE 60 is also an extra strong rigid base for acoustical tiles on wood frame construction where extra fire resistance is desired, but where a one hour rating is not required. This product also provides a lining for heater rooms, garages, volatile storage areas. (See chapter—SYSTEMS; refer to "SHEETROCK Wallboard and BAXBORD Backing Board Acoustical Tile Base; also see chapter—TECHNICAL DATA—"Fire Resistance Ratings.")

ONE-HALF INCH BAXBORD— $\frac{1}{2}$ " BAXBORD Gypsum Backing Board is a low-cost, easy-to-handle gypsum board manufactured in 2' x 8' size only with "V" T & G edges. Plain BAXBORD is encased with strong gray paper on both sides. Insulating BAXBORD has a bright aluminum foil laminated to one surface to provide a vapor barrier and reflective insulation as in the case of $\frac{3}{8}$ " BAXBORD. $\frac{1}{2}$ " BAXBORD may be used as a backup for acoustical tile on ceiling construction or it may be used for a base layer with the USG double wall system. (See chapter—SYSTEMS—"Job Laminated SHEETROCK Wallboard—The Double Wall System"—Page 48; also see chapter—SYSTEMS—"1/2" BAXBORD Gypsum Backing Board" Page 73.)

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MEMORANDUM

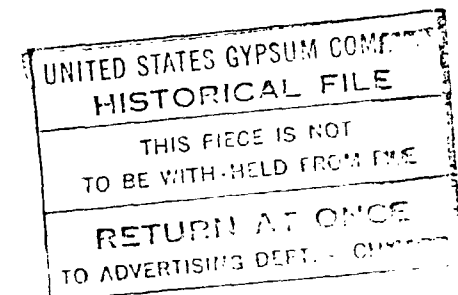
MEMORANDUM

MEMORANDUM

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