



**GYPSUM
ASSOCIATION**
201 NO. WELLS ST., CHICAGO, ILLINOIS 60606
1800 N. HIGHLAND, HOLLYWOOD, CALIF. 90028

Special Recommendations

Application of GYPSUM WALLBOARD ON EXTERIOR LOCATIONS

(METAL FRAME CONSTRUCTION)

MATERIALS AND APPLICATION:

Gypsum wallboard ($\frac{1}{2}$ or $\frac{5}{8}$ inches thick) may be used for canopies, parking garage ceilings and, in general, any horizontal (or downwardly inclined) exterior ceiling area not exposed directly to the elements.

Materials and application shall be in strict conformance with the requirements of USAS A97.1 for the Application and Finishing of Gypsum Wallboard, except as modified below:

Provisions shall be made as required to assure that the gypsum wallboard is protected from direct exposure to water.

The wallboard shall be applied horizontally to the framing members. Framing members shall be spaced no more than 16 inches on center when $\frac{1}{2}$ inch gypsum wallboard is used or no more than 24 inches on center when $\frac{5}{8}$ inch gypsum wallboard is used.

The wallboard shall be fastened to the framing members with self-drilling, self-tapping gypsum wallboard screws spaced a maximum of 12 inches on center.

In large ceiling expanses control joints shall be used and spaced not to exceed 30 feet on center.

Wallboard joints and screw heads shall be finished in the usual manner prescribed for interior ceilings.

When joint treatment is employed caution must be exercised to assure that the joint is not subjected to temperatures below 55°F. until dry.

VENTILATION:

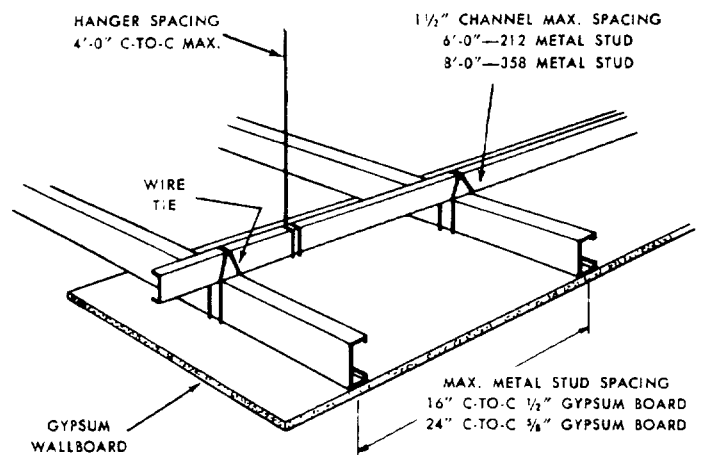
Adequate ventilation shall be provided for the space immediately above such installations.

PAINTING:

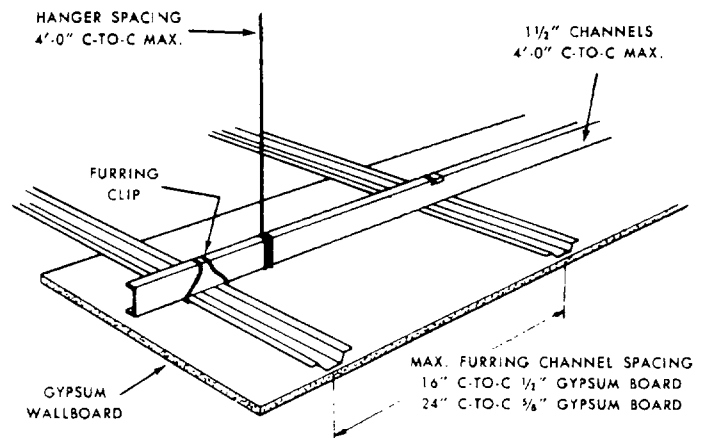
The surface of the board shall be painted with not less than two coats. The first coat shall be a solvent-thinned, oil or oleoresinous paint or primer. The second coat shall be any top-line emulsion or solvent-type exterior paint product.

Printed in U.S.A.

EXTERIOR SOFFIT METAL FRAME CONSTRUCTION



METAL STUD DETAILS



FURRING CHANNEL DETAILS

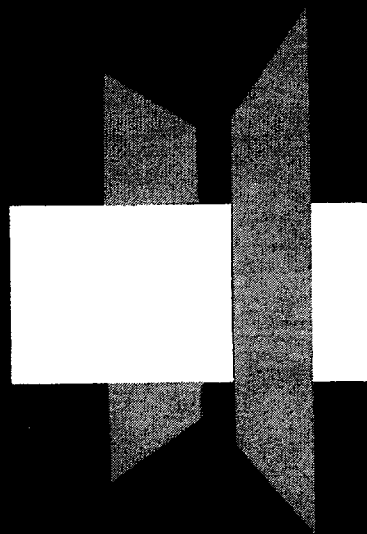
PLAINTIFF'S EXHIBIT

GP-650

SGP 0026929

BESTWALL

GYPSUM PRODUCTS MANUAL



WALLBOARD

BOOK 2



GEORGIA-PACIFIC



GYPSUM DIVISION

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GP-651

SGP 0027520

BESTWALL

GYPSUM
PRODUCTS
MANUAL

WALLBOARD

BOOK 2

SGP 0027521

GEORGIA-PACIFIC CORPORATION

BESTWALL GYPSUM DIVISION

1965 EDITION GYPSUM WALLBOARD PRODUCTS MANUAL

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GEORGIA-PACIFIC CORPORATION

BESTWALL GYPSUM DIVISION

GYPSUM WALLBOARD MANUAL

1965 EDITION

BOOK #2

NOTE:

This Manual # 8452 is the property of the Georgia-Pacific Corporation, Bestwall Gypsum Division for the exclusive use of employees of the Georgia-Pacific Corporation.

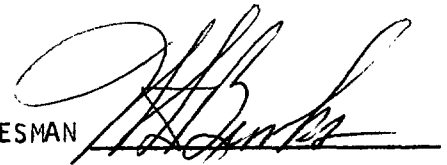
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RECEIPT OF MANUAL

DATE

7/8/65

SIGNATURE OF SALESMAN

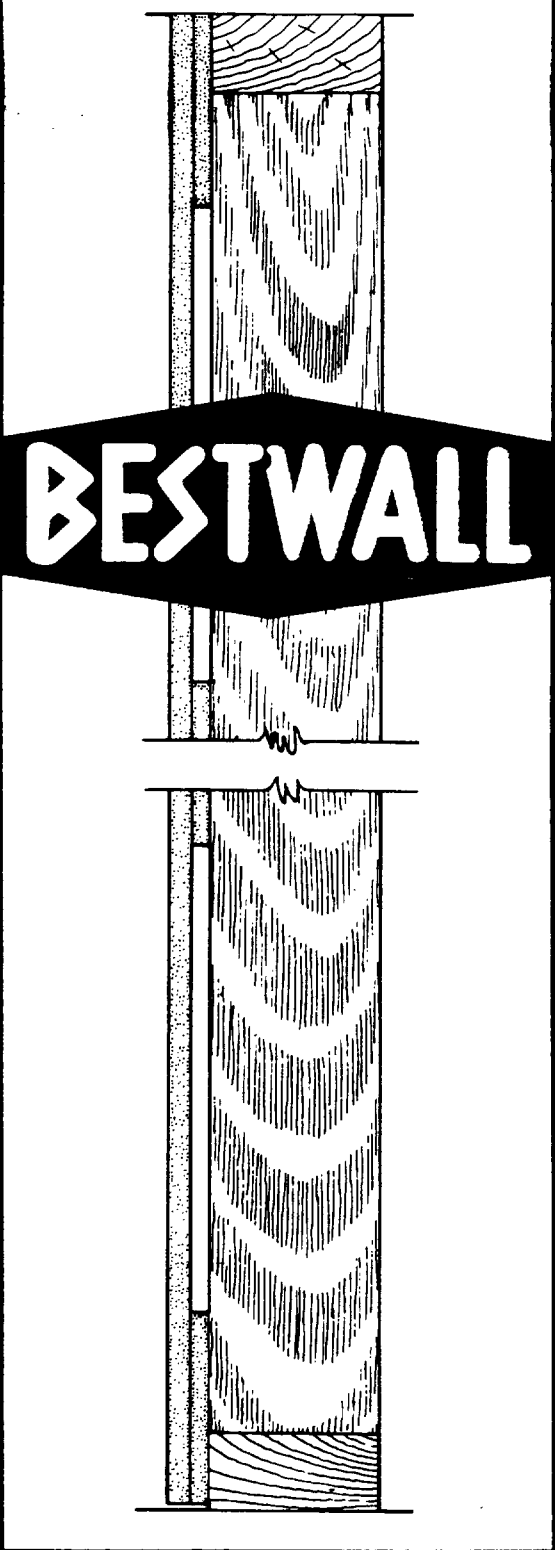


August 1, 1965

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SECRET AND

A technical cross-section drawing of a wall assembly. It shows a vertical section with various layers. At the top, there's a layer with diagonal hatching. Below that is a thick layer with vertical hatching. A horizontal line with a wavy pattern separates this from another thick layer with vertical hatching. Below that is a thin horizontal layer, followed by another thick layer with vertical hatching. At the bottom, there's a layer with diagonal hatching. The drawing is framed by a vertical line on the left and a vertical line on the right.

BESTWALL

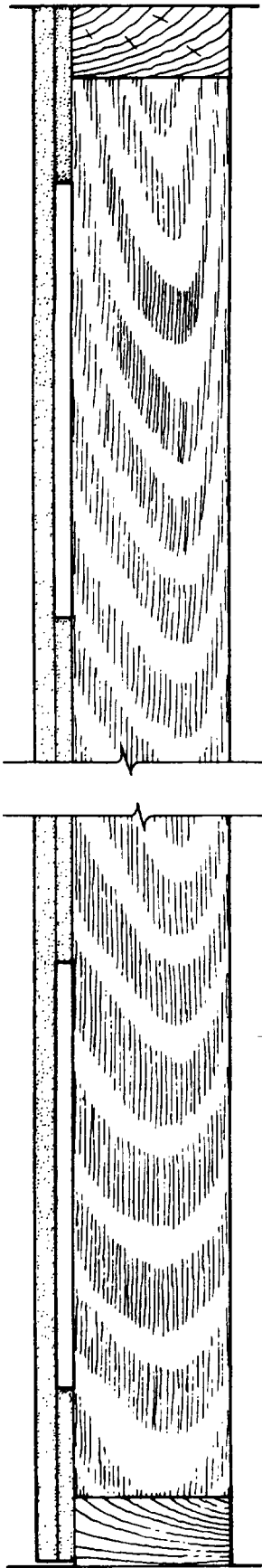
HUMMER SYSTEMS

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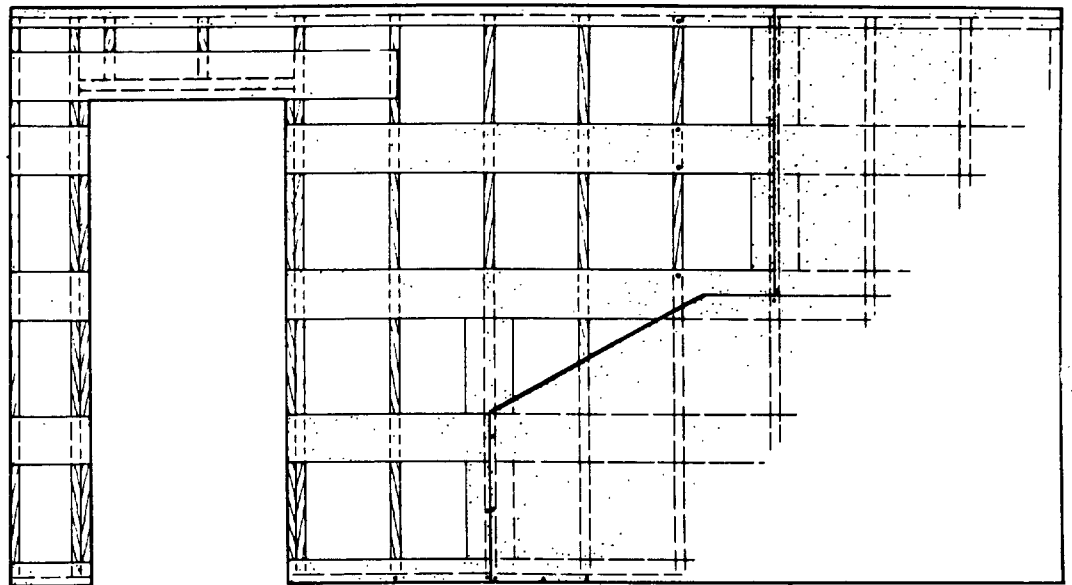
STRIP LAMINATION

This original strip laminated method of applying Bestwall Gypsum Wallboard provides nearly all the advantages of two-ply lamination at lower cost. Full size sheets of Bestwall Gypsum Wallboard are applied to the framing of walls and ceilings over strips of gypsum wallboard. The System is recommended for commercial and residential work in new construction or remodeling — wherever strong, durable walls and ceilings are desired.

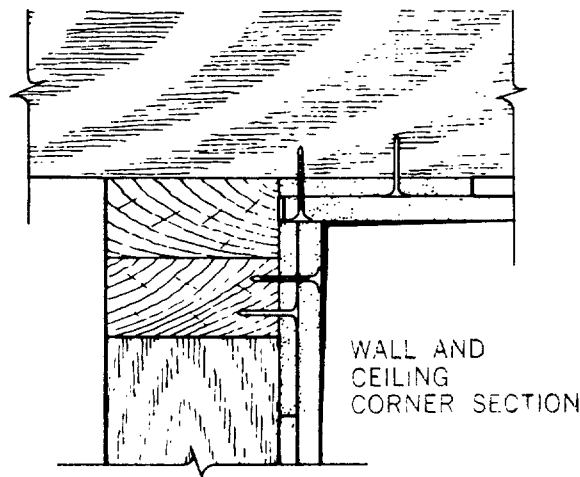
- SOUND TRANSMISSION—34 db.
- STRENGTH—Strip lamination at joining of boards and in center greatly strengthens construction.
- LAMINATED CONSTRUCTION—Smooth surfaces—monolithic finish.



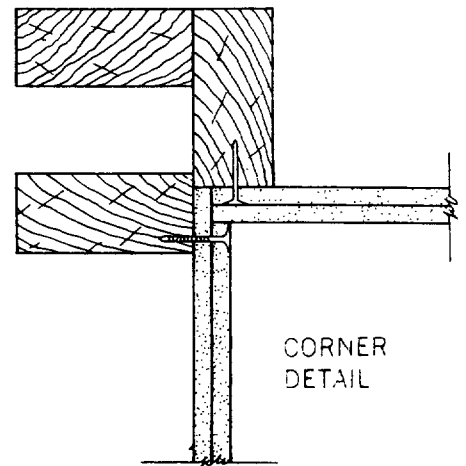
WALL SECTION



WALL ELEVATION SCALE $\frac{3}{8}'' = 1'0''$

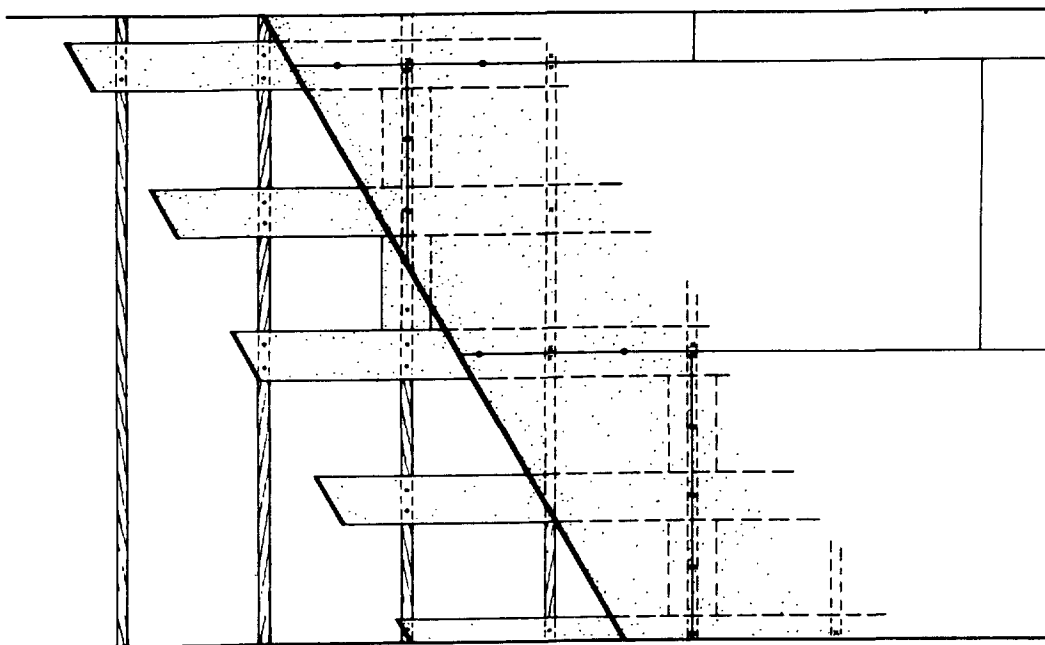


WALL AND
CEILING
CORNER SECTION



CORNER
DETAIL

SCALE $3'' = 1'0''$

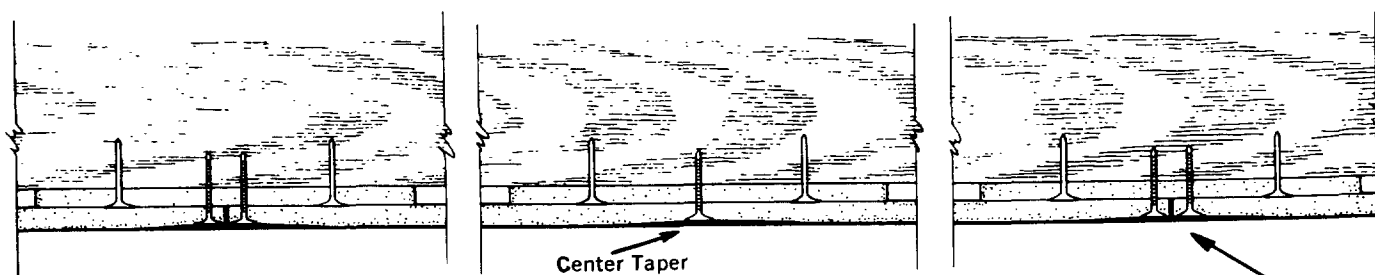


STRIP LAMINATED CEILING—Joist spacing 24" o.c.

NOTE: Screws may be eliminated
if joist spacing is 16" o.c.



Center taper midway between joints if joists are spaced greater than 16" o.c.



CEILING CROSS SECTION PARALLEL TO JOISTS

Permanent Fasteners in Recess
Covered by Tape and Cement

SCALE 3" = 1'0"

SGP 0027526

BESTWALL HUMMER SYSTEMS

STRIP LAMINATION

FEATURES:

1. Sound Transmission Loss: .34 Decibels (Tested before 1957).
2. Strength: Strip lamination at joint of boards and in center greatly strengthens application.
3. Laminated Construction: ... Smooth monolithic walls created by unitized lamination of multi-ply of Gypsum Wallboard.

SPECIFICATIONS:

All gypsum wallboard and joint system materials used, including laminating compound, shall be manufactured by the Bestwall Gypsum Company and shall be installed by a Bestwall Hummer licensed contractor in a first-class workmanship manner.

FIRST (or back) LAYER (apply to ceilings first and then to sidewalls).

Backer Board: Use $\frac{3}{8}$ " thick, 8" wide strips at right angles to the framing. 4" wide strips may be used at floor line and ceiling angles. 8" wide board strips should be spaced 24" o.c.

Nailing: Use $1\frac{1}{4}$ " Drywall nails (or 1" long, flat head divergent point staples). Over metal framing use annular ring nail, serrated staple or Bestwall Drywall screws. Use two fasteners, each 1" from edge, in every nailer, back of strip.

Nail heads (or staples) should be driven flush with the surface of the board.

DO NOT DIMPLE BOARD.

SECOND (or face) LAYER (apply to ceilings first and then to sidewalls).

Face Board: Use $\frac{1}{2}$ " thick, 4' wide, 8' to 16' long, tapered edge Gypsum Wallboard (use wallboard with center taper on ceilings), applied at right angles to the framing. Make joints in face board centered over the 8" board strips.

Laminating Compound: See Bestwall Product Sheet BW-62355. Apply laminating compound to back of board in strips with serrated spreader or on strips on ceilings and walls with a machine glue spreader.

Face Nailing: Use $1\frac{5}{8}$ " long, Drywall nail. Over metal framing use Bestwall Drywall screw. Do not dimple board for fasteners that are under tape or trim.

Ceilings: Nail in edges and center taper at every nailing member.

Sidewalls: Nail in edges only at every stud.

Additional Fasteners: Use Bestwall flat head screws in joints midway between joists or studs, if spaced more than 16" o.c. (as 24" o.c.).

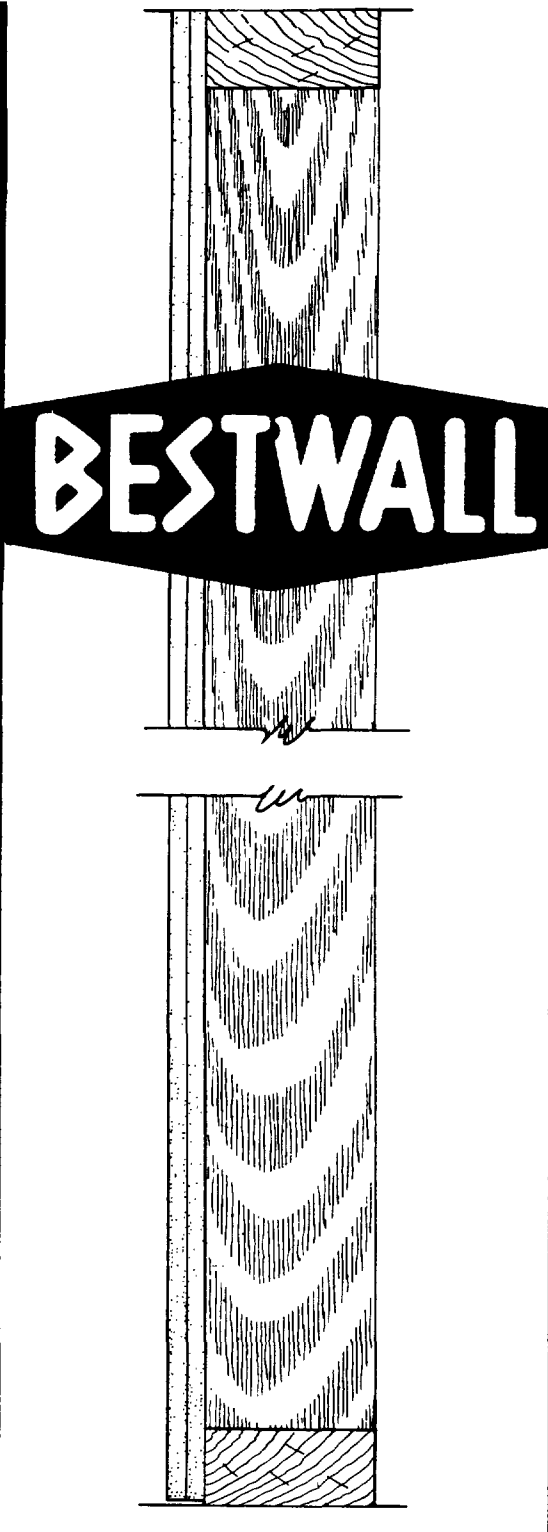
Note: For sidewalls only use a double-headed nail in the center of the sheet at every other stud to hold face board tight to back strips until glue hardens.

Joint Treatment and Decoration: See Bestwall Product Sheet BW-62360.



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BESTWALL GYPSUM COMPANY
PAOLI, PENNSYLVANIA



BESTWALL

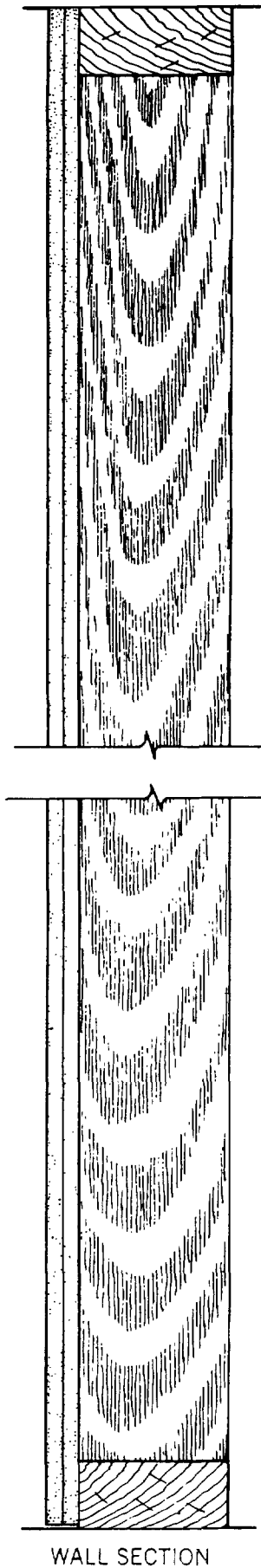
HUMMER SYSTEMS

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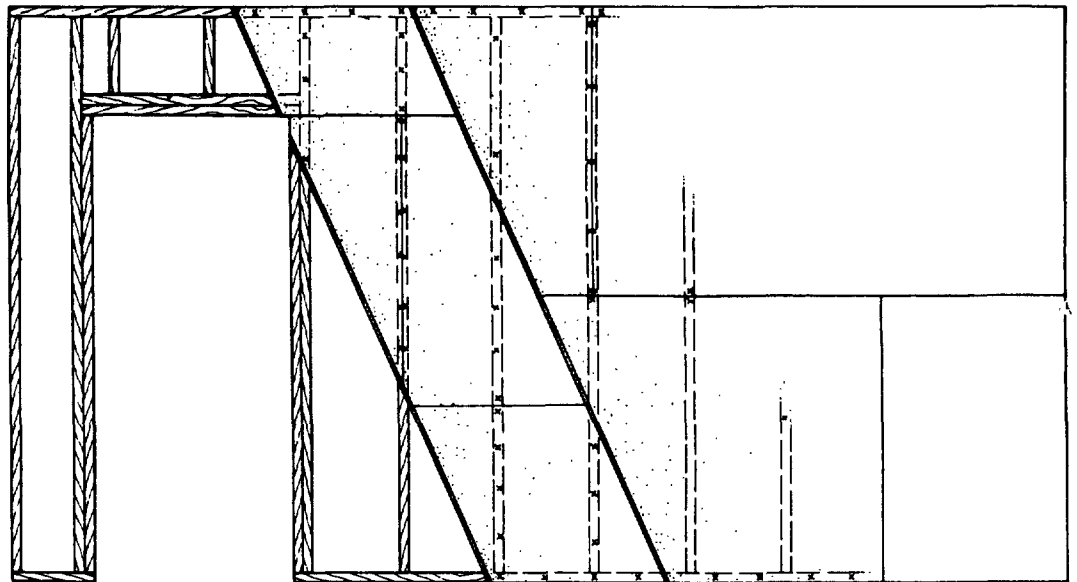
TWO-PLY GYPSUM LAMINATION

Two-Ply Lamination is an advanced system of wall and ceiling construction erected by laminating two plies of $\frac{3}{8}$ " Bestwall Glass Fiber Reinforced Gypsum Wallboard to conventional framing. The first ply is nailed. The second is applied with adhesive and nails. It is the basic system for fire rated, durable walls and ceilings for residential and commercial work in new construction or remodeling.

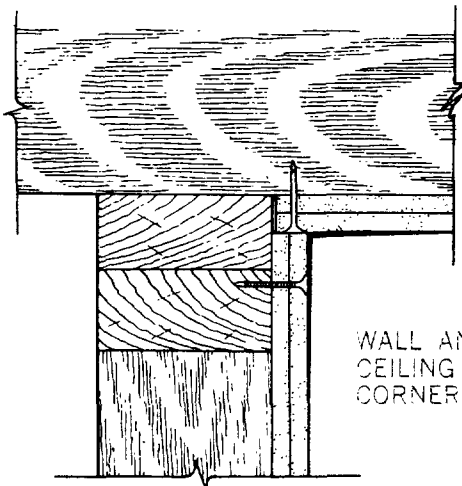
- FIRE RESISTANCE—One-Hour
- SOUND TRANSMISSION—38-43 db.
- STRENGTH—Two-ply lamination offers twice the strength of one-ply application.
- LAMINATED CONSTRUCTION—Smooth surfaces—monolithic finish.



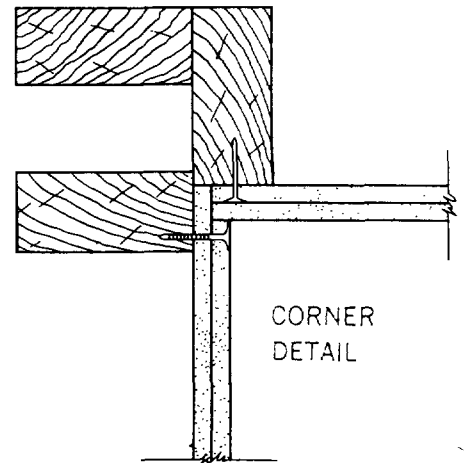
WALL SECTION



WALL ELEVATION SCALE $\frac{3}{8}$ " = 1'0"

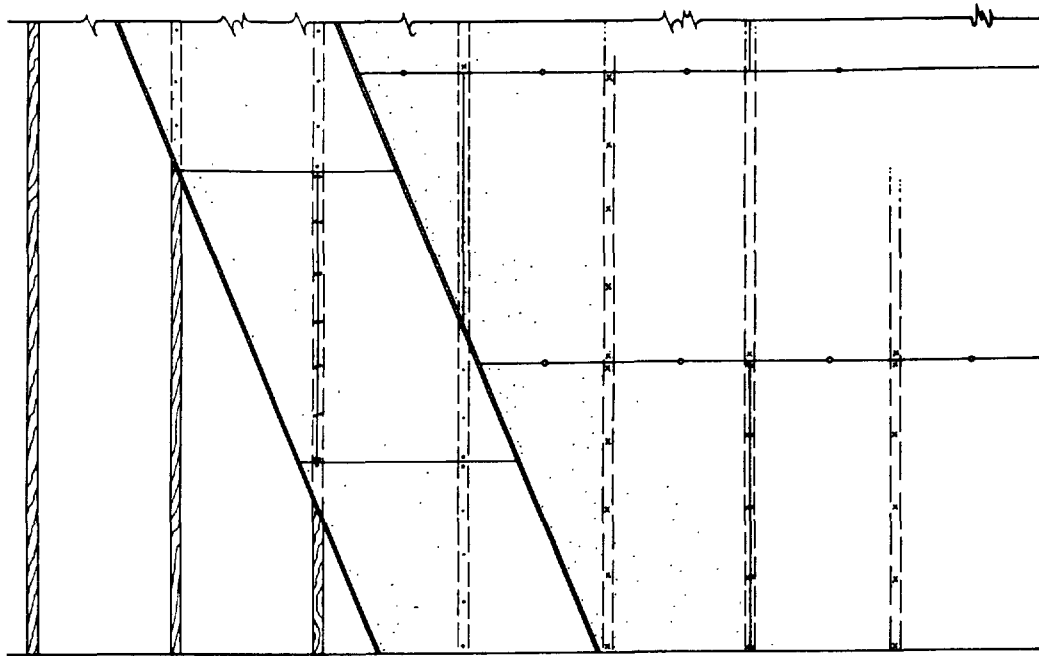


WALL AND
CEILING
CORNER SECTION



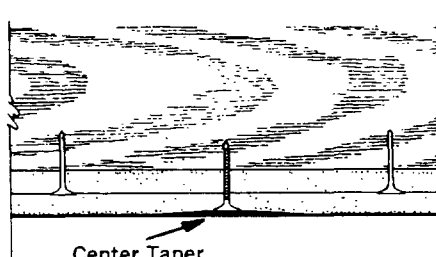
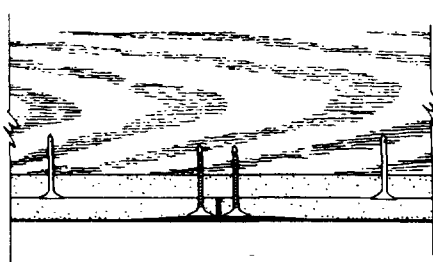
CORNER
DETAIL

SCALE 3" = 1'0"

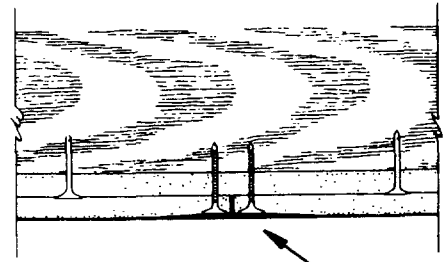


TWO-PLY CEILING—Joist spacing 24" o.c.

NOTE: Screws may be eliminated
if joist spacing is 16" o.c.



Center Taper



CEILING CROSS SECTION PARALLEL TO JOISTS

Permanent Fasteners in Recess
Covered by Tape and Cement

SCALE 3" = 1'0"

BESTWALL HUMMER SYSTEMS

TWO-LAYER LAMINATION

FEATURES:

1. Fire Resistance: One hour.
2. Sound Transmission Loss: .43 Decibels (Tested before 1957).
38 Decibels (Tested 1958).
3. Strength: Two-layer lamination has twice the strength of a single layer application.
4. Laminated Construction: . . Smooth monolithic walls created by unitized lamination of multi-ply of Gypsum Wallboard.

SPECIFICATIONS:

All gypsum wallboard and joint system materials used, including laminating compound, shall be manufactured by the Bestwall Gypsum Company and shall be installed by a Bestwall Hummer licensed contractor in a first-class workmanship manner.

FIRST (or back) LAYER (apply to ceiling first and then to sidewalls).

Backer Board: Use $\frac{3}{8}$ " thick, 4' or 2' wide, square edge gypsum backer, applied at right angles to the framing.

Nailing: Use $1\frac{1}{4}$ " Drywall nails (or 1" long, divergent point staples). Ceiling spacing 5" to 7" o.c. Walls 6" to 8" o.c. Over metal framing use Bestwall Drywall screws or

attachments recommended by metal framing manufacturing specifications.

DO NOT DIMPLE BOARD.

SECOND (or face) LAYER (apply to ceilings first and then to sidewalls).

Face Board: Use $\frac{3}{8}$ " thick, 4' wide, 8' to 16' long, tapered edge Gypsum Wallboard (use wallboard with center taper on ceilings) applied at right angles to the framing. Joints in face board must not occur over joints in the first layer board (spaced 12" min.). Do not dimple board for nails or screws that are under tape or trim.

Laminating Compound: See Bestwall Product Sheet BW-62355. Apply glue to back of face layer with serrated metal blade or to face of back layer with machine glue spreader.

Note: For applying face layer which has a vapor barrier predecorated finish, use a "contact type" adhesive.

Face Nailing: Use $1\frac{1}{8}$ " long Drywall nails.

Ceilings: Nail in edges and center taper at every nailing member.

Sidewalls: Nail in edges only at every stud.

Additional Fasteners: Use Bestwall Drywall screws in joints midway between joists or studs, if spaced more than 16" o.c. (as 24" o.c.).

For sidewalls only, use a double-headed nail in the center of the sheet at every other stud to hold face board tight to back layer until glue hardens.

Joint Treatment and Decorating: See Bestwall Product Sheet BW-62360.



BESTWALL GYPSUM COMPANY
PAOLI, PENNSYLVANIA

SGP 0027531

semi-Solid
Partitions

SGP 0027532



THE PHILADELPHIAN—ARCHITECT, SAMUEL I. OSHIVER AND ASSOCIATES

BESTWALL GYPSUM COMPANY PRESENTS

SGP 0027533



2121 8th AVENUE BUILDING ARCHITECT ROBERT LEE HALL

AND CASACCIO

WHY DRYWALL SYSTEMS:

1. Dry Construction
 - A. Fast installation
 - B. Minimum clean up
 - C. Work progress in any weather
2. Exacting fire rating
3. Exacting sound rating
4. Price competitive with other wall systems

BACKGROUND:

Laminated Gypsum Wallboard Systems are not new. The first patents were issued in 1938 to Mr. E. B. Hummer, Bestwall Gypsum Company's Research and Development Director for Drywall Systems. The development by Bestwall of a **one-hour** fire resistive assembly utilizing a $\frac{5}{8}$ " thick patented gypsum core (Firestop), coupled with the "know how" of laminating multi-ply of Gypsum Wallboard together, made possible the creation of systems which could develop fire resistive qualities and sound attenuation acceptable in multi-story residential buildings. All of these systems have been accepted by F.H.A., lending institutions, and approved under local building codes.

EXPANSION:

In 1962 Bestwall Gypsum Company completed an expansion program that increased production capacities by 90 per cent. This program was designed to accommodate the added uses of Gypsum Wallboard created by the acceptance of commercial application of these systems. Adequate manufacturing facilities are now maintained to service projects regardless of schedule or scope.

THE CREATION OF SYSTEMS ENGINEERING:

Systems Engineers, specialists in application of commercial Drywall Systems, have been thoroughly trained to recommend the proper combination of systems that meet the specifications of the most discriminating architects. They can assist with architectural detailing, lending institution presentations, quantity surveys and actual on-the-job application. Bestwall Systems Engineers are available through all local Bestwall Certain-teed Sales Corporation District Sales Offices. There are twenty-four located in strategic cities across the nation.

CONCLUSION:

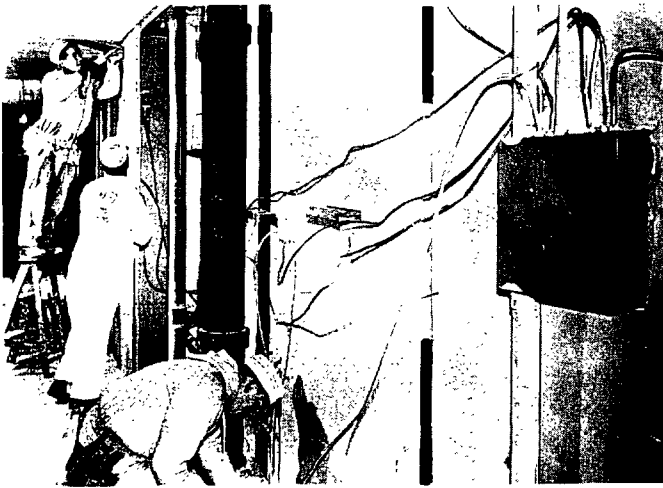
For the **architect** who desires walls that produce a quiet, safe building, the Bestwall Systems Engineer will recommend the proper Bestwall System. The **owner** will appreciate the low insurance rates and the smooth, maintenance-free walls that can receive any type of finish. The **tenant** will renew leases in a comfortable, quiet residence. Consideration and planning **now** will assure a profitable investment.

**DOUBLE
SOLID
PARTITION
SYSTEM**

**SEMI-
SOLID
PARTITION
SYSTEM**

**METAL
STUD
PARTITION
SYSTEM**

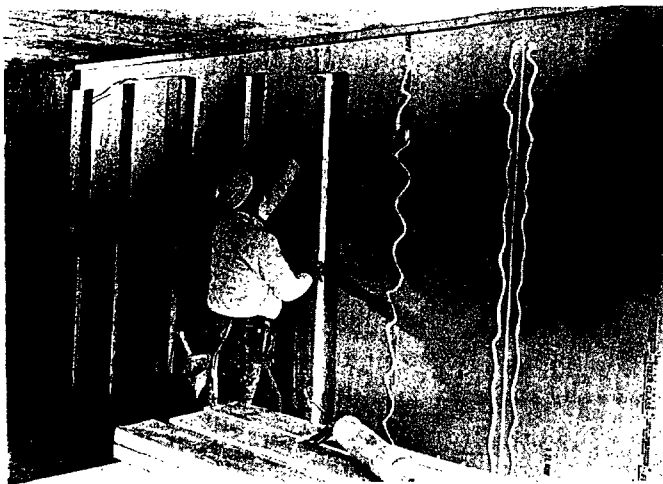
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Electrical work roughed in, ready for 1" coreboard



Laminating finished layer to 1" coreboard

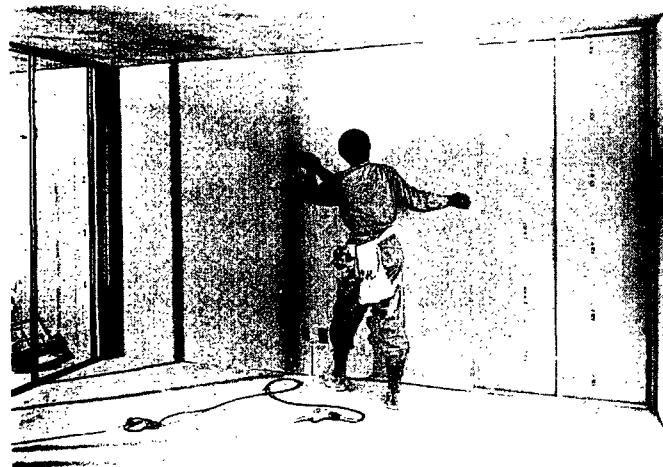


Stud lamination to first side



Completion of partition

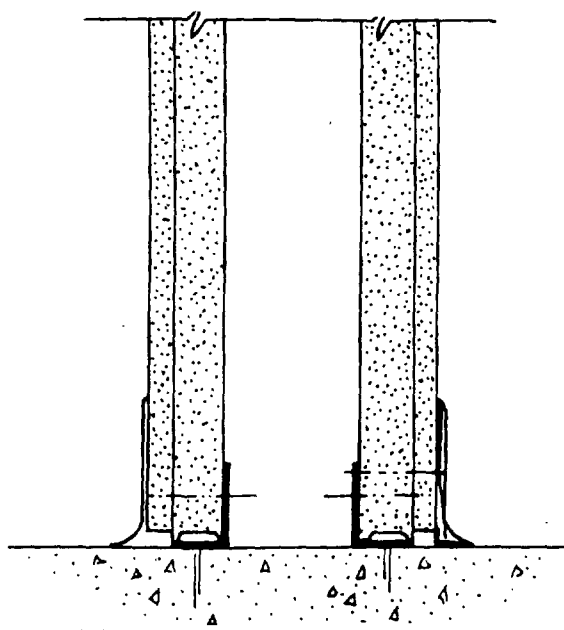
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Applying first layer to metal studs



Face layer being laminated

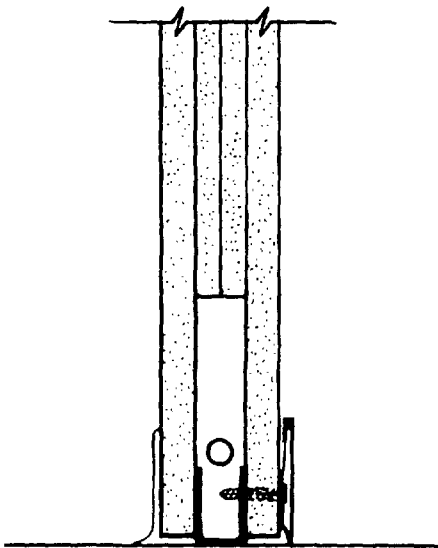


DESCRIPTION

This non-load bearing gypsum partition is recommended for high-rise apartment houses, commercial installations and institutional buildings, wherever party walls with particularly good sound resistance and fire protection are desired. It is erected by laminating $\frac{1}{2}$ " ply to 1" homogeneous board on each side of an air space. This center air cavity allows space for concealed wiring, electrical boxes, hose boxes, piping, and other rough work. It also provides greater resistance to sound transmission. For specifications see Bestwall Systems Engineering Folder BW-62400.

FEATURES

- Fire Resistant: The Double Solid Partition System (6" thick-basic) provides 2-hour fire protection.
- Sound Transmission Loss: 47.2 db. (6" thick-basic).
- Strength: Proven in ASTM "Bump" tests and performance to have greater resistance to deflection and cracking than a standard frame or thin solid wall.
- Laminated Construction: Smooth monolithic walls created by unitized lamination of multi-ply of Gypsum Wallboard.
- Center Air Space: (1" to 6" as required) space for piping—conduit—fixture framing—additional resistance to sound transmission.

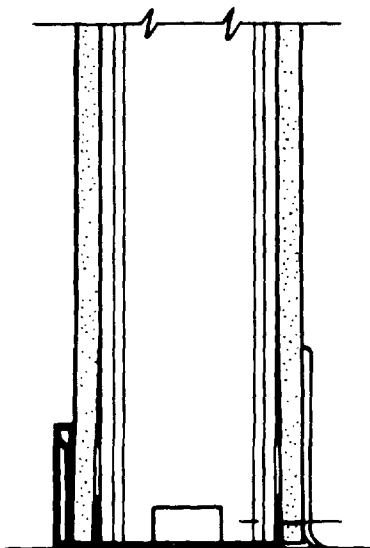


DESCRIPTION

This basic system is the original method for erecting non-load bearing corridor and party walls. It is erected by laminating $\frac{5}{8}$ " Bestwall Fire-stop Gypsum Wallboard to gypsum ribs with metal or wood floor and ceiling runners. It provides thin, yet strong, lightweight, highly fire resistive partitions. A Bestwall Systems Engineer can modify this, and all other Bestwall Partition Systems, to meet your specific job requirements of sound and fire resistant characteristics and also electrical and telephone conduits, mechanical and air equipment, etc. For specifications see Bestwall Systems Engineering Folder BW-62390.

FEATURES

- Fire Resistant: Semi-Solid Laminated Gypsum Partitions ($2\frac{1}{4}$ " thick-basic) provide 1-hour fire protection. With modifications $1\frac{1}{2}$, 2, and 3-hour fire resistance can be obtained.
- Sound Transmission Loss: $2\frac{1}{4}$ " partitions—35 db., $2\frac{3}{4}$ " partitions—37.5 db., 4" partitions—37 db., 5" partitions—40 db.
- Strength: At least 10 per cent less deflection under standard ASTM "Bump" test than walls within 2" x 4" studs 16" o.c. faced with $\frac{1}{2}$ " Gypsum Wallboard.
- Laminated Construction: Smooth monolithic walls created by unitized lamination of multi-ply of Gypsum Wallboard.



DESCRIPTION

This is a complete non-load bearing system that integrates Bestwall, the original glass fibered gypsum wallboard, with lightweight steel framing. It is designed and engineered to create an economical partition that may be fire rated. It offers accurate and speedy installation with savings in material and labor. In addition, this system provides a varied range of functional and decorative space design for new and remodeling work in commercial, industrial, institutional and residential buildings. For specifications consult Bestwall's Metal Stud Partition Folder BW-62120.

FEATURES

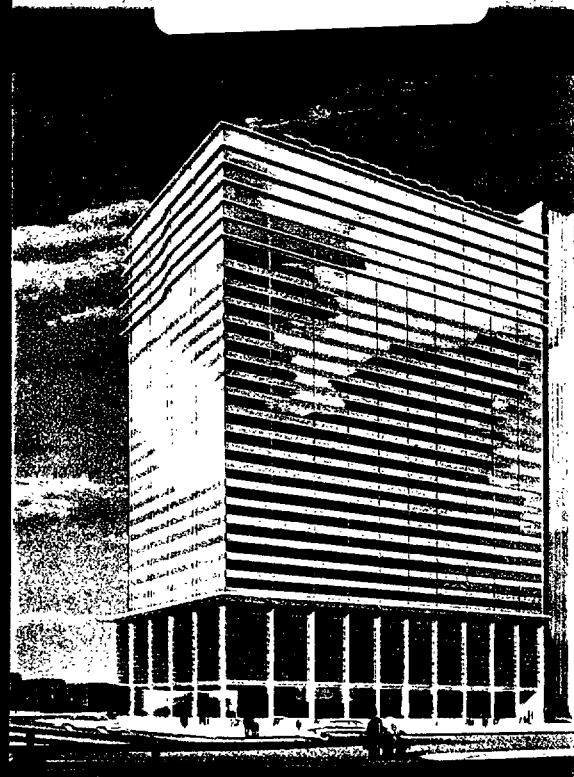
- Versatility: System components may be combined with a variety of board thicknesses to meet individual requirements.
- Light Weight: This is a factor which can result in savings in structural design requirements.
- Workability: Simplicity of design assures minimum on-site construction delays.
- Fire Resistant: 1-hour fire rating is achieved with a single layer of $\frac{5}{8}$ " Bestwall Gypsum Wallboard on both faces. A 2-hour fire rating is achieved with a double layer of $\frac{5}{8}$ " Bestwall Firestop on both faces.



PARK CITY WEST—ARCHITECT, SAMUEL I. OSHIVER AND ASSOCIATES

"GYPSUM WALLBOARD IN HIGH-RISE BUILDINGS"

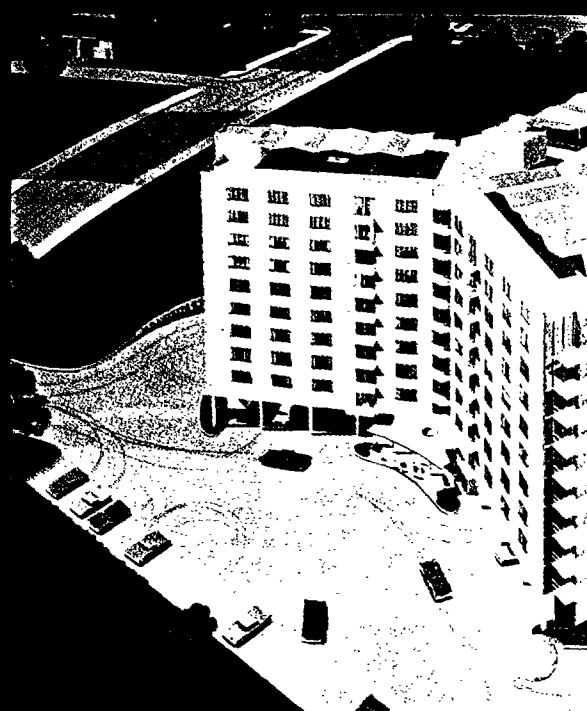
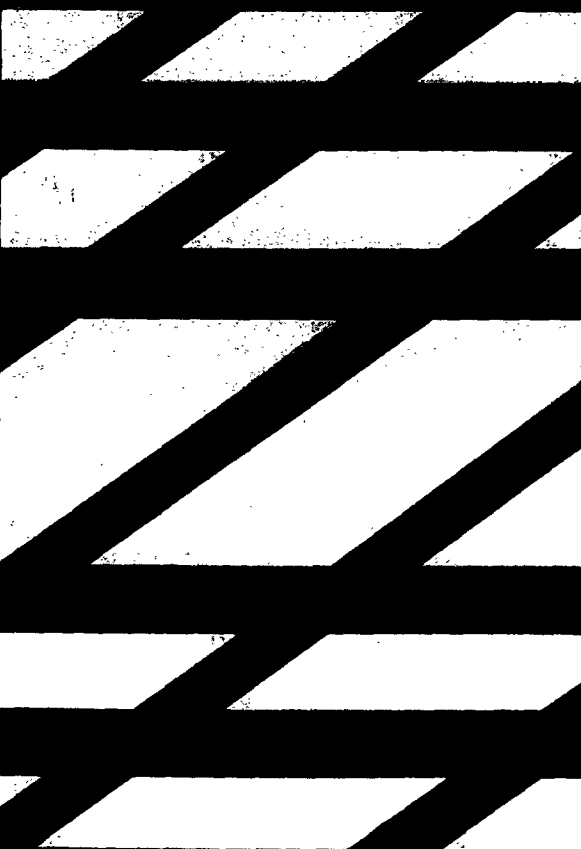
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PENN TOWERS—ARCHITECT, SAMUEL I. OSHIVER AND ASSOCIATES



PENN CENTER INN—ARCHITECT, CHARLES LUCKMAN ASSOCIATES



EVERGREEN TOWERS—ARCHITECT, ANDERSON



AND ASSOCIATES

SGP 0027538

BESTWALL GYPSUM COMPANY

GYPSUM WALLBOARD MANUAL

1965 EDITION

Section 7

Sub-Section A

SEMI-SOLID PARTITION

Correct Erection Method

The semi-solid partition which involves a layer of wallboard on each side of gypsum ribs is the present name for the original Bestwall Hummer System "B". Much of the Company literature has shown the manufacture of a panel and the erection of this panel in a wall. In some instances, this involved a two faced panel and in other instances, it was one face with ribs. This prefabrication was done in a warehouse or on the job by the drywall applicator's men.

Current literature no longer shows 3-1/2" and 6-1/4" ribs nor 12" ribs. A standard 6" wide rib is used in the semi-solid partition. A full scale fire test with 5/8" Firestop and 1" thick ribs made of this assembly has proven that the fire resistance is applicable with 6" wide ribs at the joint between the face boards and in the center, that is, 2' on center. Furthermore, the test was made without joint treatment but with mechanical fasteners, as shown in the details.

The Bestwall Laboratory has experimented with and shown that it is practical to erect a semi-solid partition in place without any prefabrication. The new sound slide film showing "Gypsum Wallboard in High Rise Buildings", shows this method.

Install the floor runners, plumb up and install the ceiling runners. Then start at the exterior wall columns, etc., and set the wallboard vertically on one side, fastening it with 1" long Bestwall Drywall Screws (nails may be used in wood runners) to the ceiling and floor runner. Next to the backside of this first layer, apply Bestwall Laminating Compound with a glue spreader 3" on each of the joints between sheets and in a 6" width down the center of the board.

A 6" gypsum rib (1" thick, or as specified) should then be held in place against the back of the board over the glue by a workman with one centered over the joint and the other rib at the center of the sheet. A second workman on the face side of an initial layer should attach a 1-1/2" long Bestwall Drywall screw (designed for this use and shown in the Price Schedule) with an electric power screw driver, approximately 2' on center, with 4 screws to an 8' high partition to hold the rib tight in the board. A screw should be used on the edge of each board into the rib and in the center of the sheet.

After the ribs are all in place and the various electrical wiring, piping, and other rough in work completed, the applicator should run Bestwall laminating compound with a mechanical glue spreader down the ribs and then install the other face side of the semi-solid partition, using Bestwall Drywall Screws (1" long) at the top and bottom runners, and (1-1/2" long) in the face board into the ribs in the same manner as on the first side.

The next day when the glue has set, the partition will show remarkable rigidity and strength. This semi-solid partition with 5/8" Firestop and 1" ribs is one

SGP 0027539

hour fire resistant.

Advantages

1. The screw attachment is no more costly than the screw attachment of gypsum board to metal studs. Actually, this construction method is similar to the installation followed by many applicators for 8' to 9' high partitions of single layer Gypsum Board over metal studs.
2. Stronger by test than conventional 5" partition, stud and 1/2" gypsum wallboard.
3. Saved -- 20 square feet more usable floor area than 2" x 4" wood stud wall construction for every 100 lineal feet of partition.

LAMINATED GYPSUM WALLBOARD SYSTEMS

Bowing Board

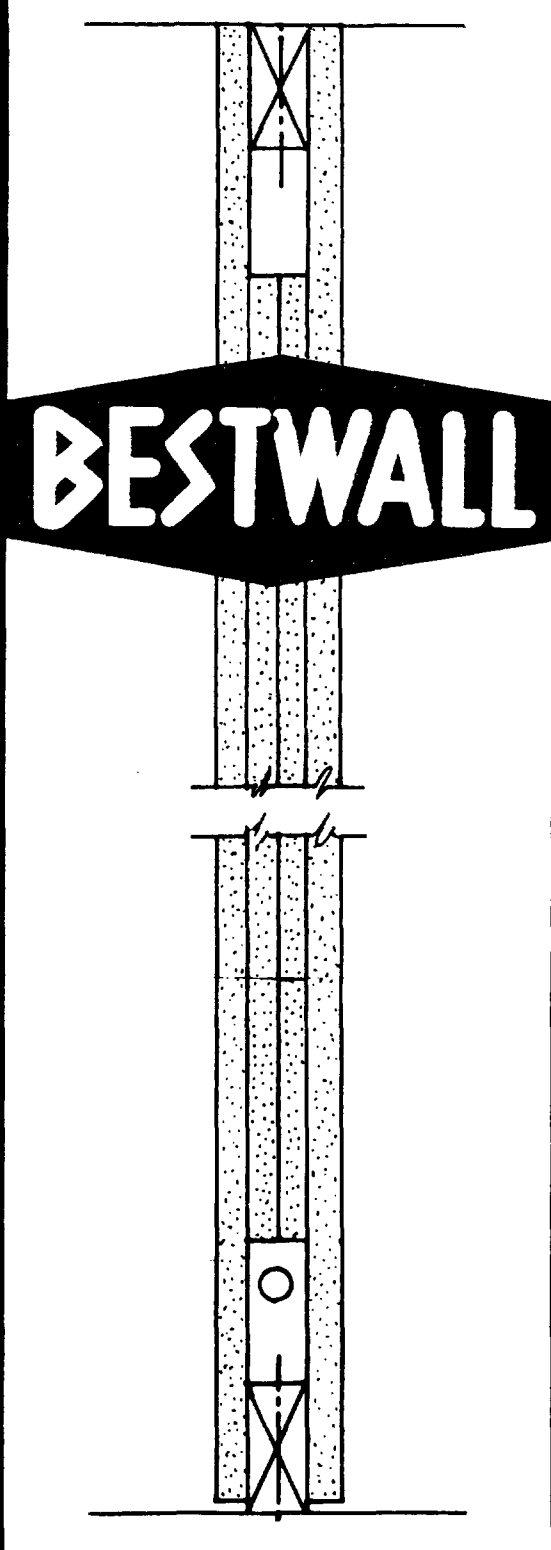
For years E. E. Hummer has advocated bowing the face board in all laminated gypsum wallboard work. After the base layer is in place, the face layer to be laminated if it is bowed so that the outer or exposed face is concave and the backside is convex, the board will hug the wall in application and reduce to eliminate the necessity for fasteners within the field of the board. This bowing should very generally be across the long dimension of the board, that is the long dimension should be bent in the curve.

Where the face board is erected vertically it is obvious that by doing this the board can be nailed at the top plate, pressed down and nailed at the bottom plate, hugging the wall all the way down and eliminating the need of the nailing through the face of the board in the field. This is particularly helpful when applying predecorated board as Woodgrain board, Eternawall, or the Decorator line. This is equally applicable to the application of the board to wood framing and those framing members are in the same plane or where the board is being applied to an existing surface. When the face board is applied horizontally, bow the board across the short direction of the board, that is make the 4' width curved, and again applying the board with the top edge in place first and pull the bottom edge in, nailing along the tapered edge.

Bestwall literature many years ago had detailed drawings showing the method of piling board to develop this curvature. While competition minimized the idea at that time, you will see USG, National and other manufacturers showing details on bowing gypsum wallboard in some of their current literature.

Do not place a support in the middle of a sheet of board and let the ends hang down to accomplish this curvature. This will result in very badly misshaped and warped board which will defeat the purpose of curving the board. Have the board flat on the floor with the surface that is to be concave up and then lay supports under the edges of the board to raise the edge up and allow the weight of the board to accomplish the curvature. This should be no more than 1" in 4' or 2" in 8'. Generally, allowing the board to set in this position over night will accomplish the desired curvature on the face board. Allowing the board to remain too long in this position will again defeat the purpose and result in some badly warped board.

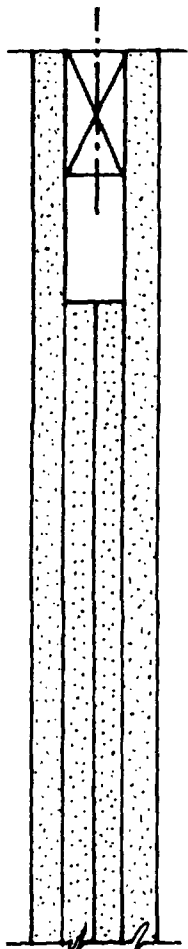
With care E. B. Hummer's idea as advocated by Bestwall for many years and now by other gypsum manufacturers can assist the contractor in getting good laminated installations and eliminate the need of fasteners in the field thereby reducing the cost of the installation.



BESTWALL

HUMMER SYSTEMS

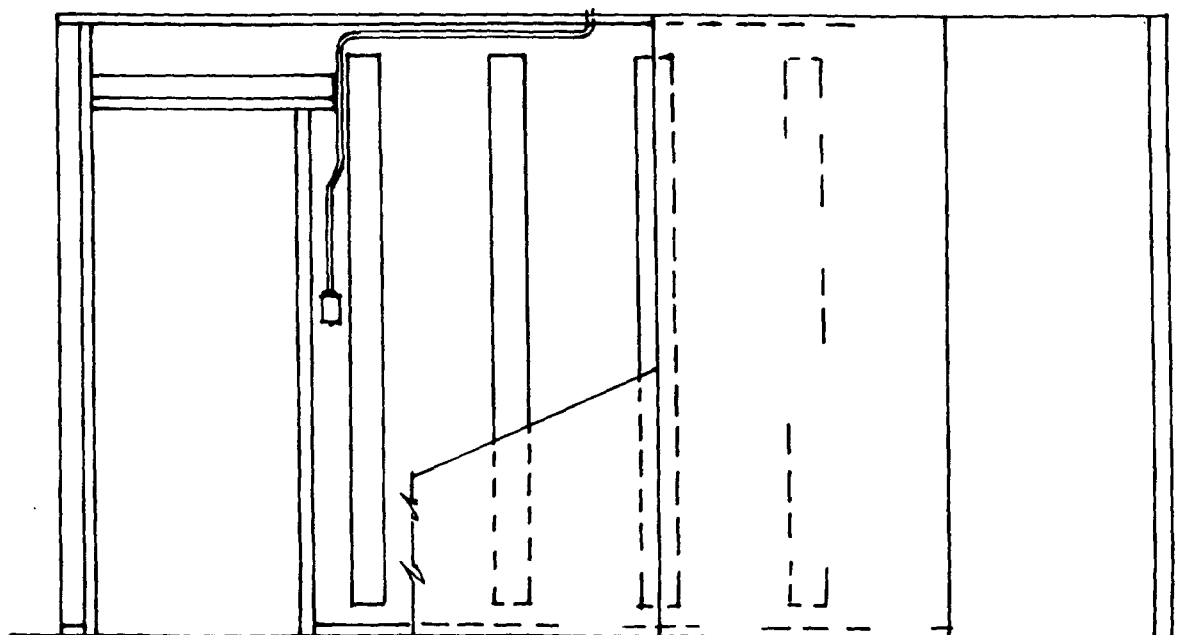
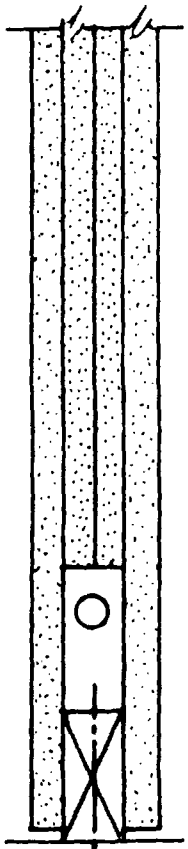
SGP 0027542



SEMI-SOLID LAMINATED GYPSUM PARTITIONS

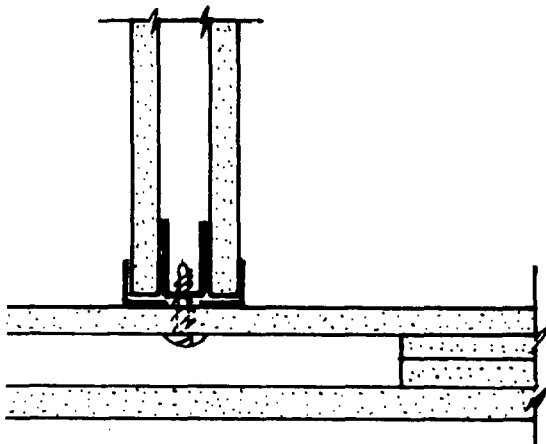
The Semi-Solid Gypsum Partition System is a non-load bearing construction erected by laminated $\frac{5}{8}$ " Bestwall Firestop Gypsum Wallboard to gypsum ribs inserted in metal or wood floor and ceiling runners. It is recommended for commercial and residential work in both new construction and remodeling—wherever fire-rated, non-load bearing partitions are required.

- FIRE RESISTIVE—One-hour.
- SOUND TRANSMISSION—35 db.
- STRENGTH — More rugged, less joint breakage, no nail pops.
- LAMINATED CONSTRUCTION—Smooth surfaces—monolithic finish.

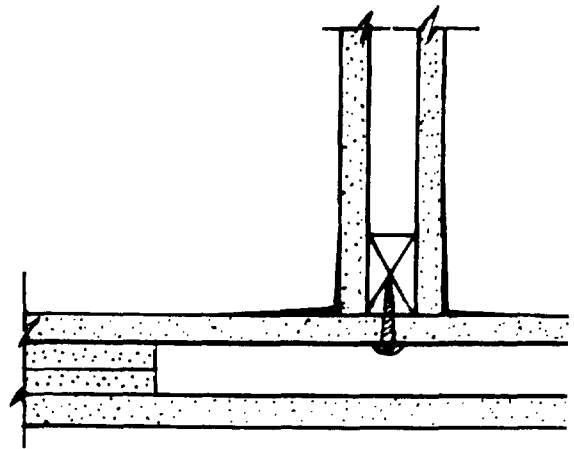


WALL ELEVATION SCALE $\frac{3}{8}$ " = 1' 0"

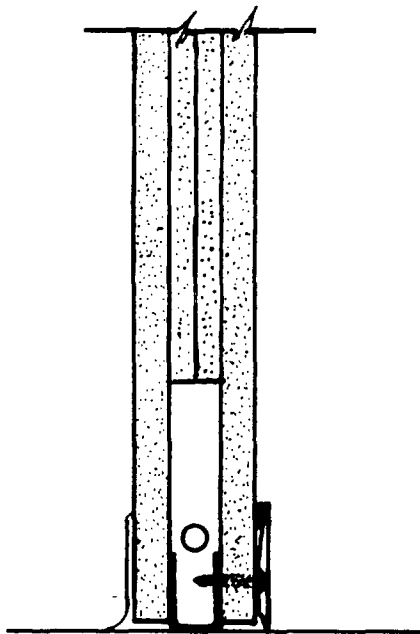
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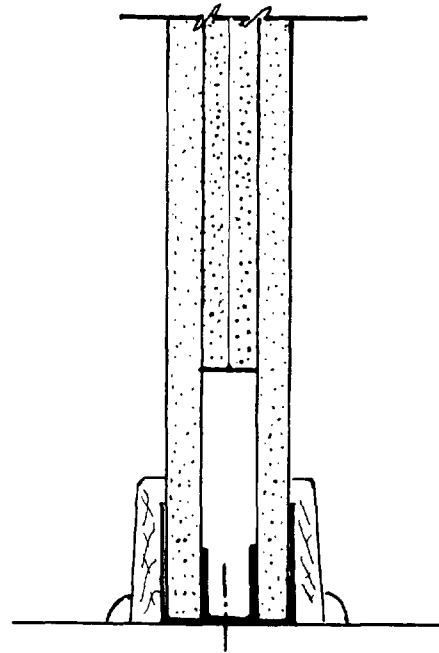
INTERSECTING WALL METAL



INTERSECTING WALL WOOD



TYPICAL METAL RUNNER WITH VINYL OR METAL BASE



TYPICAL METAL RUNNER WITH WOOD BASE

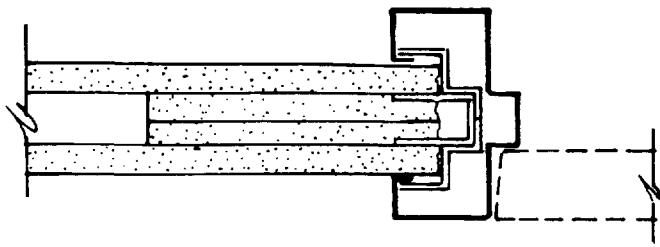
SCALE 3" = 1'0"

SYSTEMS ENGINEERING

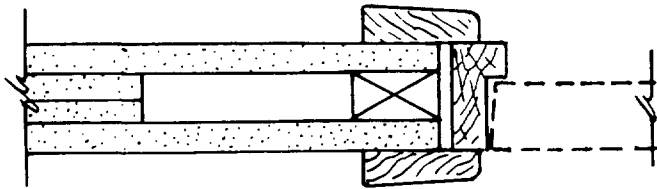
SGP 0027544

Bestwall research and engineering combine Bestwall Glass Fiber Reinforced Gypsum Wallboard with the most comprehensive and advanced techniques in gypsum drywall construction. These include single ply, laminated plies, metal studs, screw application and movable partitions with and without metal framing. Each system tailors space to your requirements

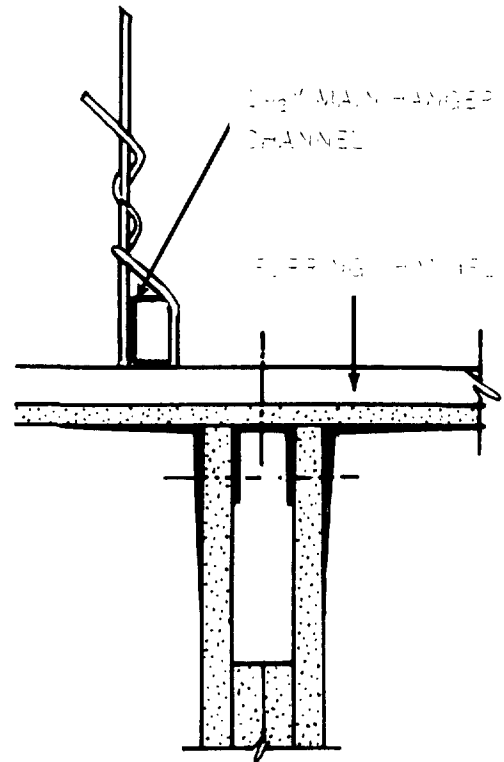
with substantial savings on material and labor. A staff of Bestwall Systems Engineers is available from coast-to-coast to assist you in quantity survey, detailing and installation of drywall systems to help you meet your requirements. For detailed data, check your Sweet's File or write directly to the Bestwall Gypsum Company.



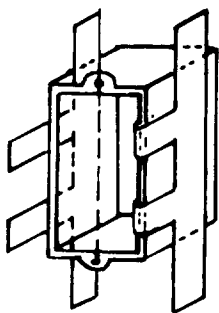
TYPICAL METAL DOOR



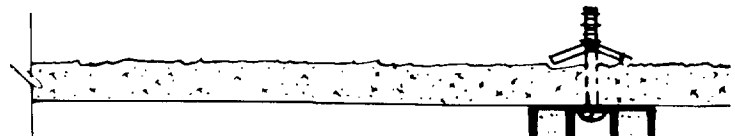
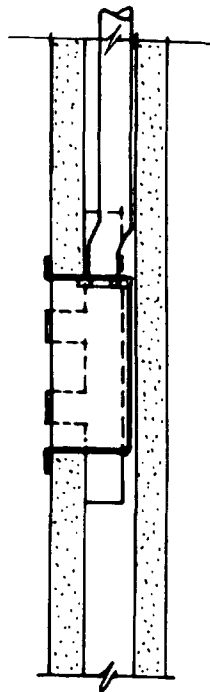
TYPICAL WOOD DOOR



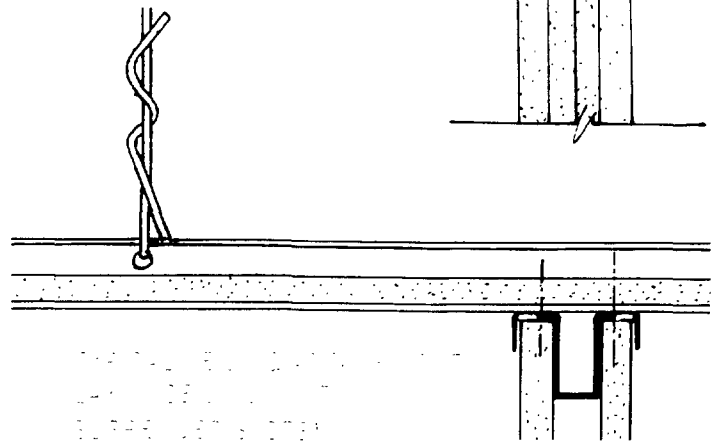
TYPICAL CEILING ATTACHMENT
SUSPENDED GYPSUM CEILING TILE



ELECTRIC BOX
MOUNTING DETAIL



TYPICAL CEILING ATTACHMENT
EXISTING CEILING OR
PLASTER CEILING



TYPICAL CEILING ATTACHMENT
SUSPENDED GYPSUM CEILING
TILE

SGP 0027545

SCALE 3" = 1'0"

BESTWALL HUMMER SYSTEMS

2 1/4" SEMI-SOLID GYPSUM WALLBOARD NON-LOAD BEARING PARTITION

FEATURES:

1. Fire Resistance: One hour with Bestwall Fire-stop.
2. Sound Transmission Loss: 35 Decibels (Tested before 1957).
30 Decibels (Tested 1958).
3. Strength: More rugged, under standard "Bump" test than wall with 2" x 4" studs, 16" o.c., faced with 1/2" gypsum wallboard.
4. Laminated Construction: .. Smooth monolithic walls created by unitized lamination of multi-ply of Gypsum Wallboard.
5. Extra Usable Floor Space: 20 sq. ft. more than 2" x 4" stud wall construction for every 100 lin. ft. of wall.

SPECIFICATIONS:

All gypsum wallboard and joint system material used, including laminating compound, shall be manufactured by the Bestwall Gypsum Company and shall be installed by a

Bestwall Hummer licensed contractor in a first-class workmanship manner.

Floor and Ceiling Runners: Use 1" x 1 5/8" wood or metal hat section runners. #105 Metal Casings for 5/8" board may be used at ceiling line in lieu of wood or metal runners.

Laminated Ribs:

Construction: Made by laminating 2—1/2" gypsum strips 6" wide.

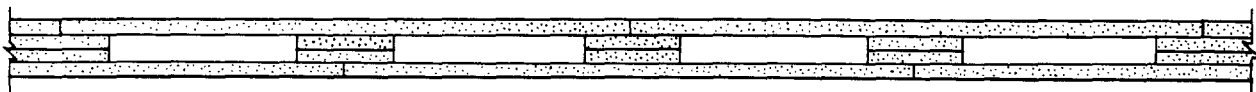
Spacing: One rib centered over joint between first layer boards. Another centered between joints.

Face Board: Use 5/8" Bestwall Firestop, 4' wide, floor to ceiling height (12' max.), tapered edge, applied vertically with joints on center of rib.

Laminating Compound: See Bestwall Product Sheet BW-62355. Apply glue to back of face layer with serrated knife in strips or to rib on wall with a mechanical glue spreader.

Face Nailing: Use 1 5/8" long, Drywall nails at ceiling and floor line, space 5" o.c. If board is set on floor, space 8" o.c. Use 1 1/2" long, Bestwall Drywall screws in joints spaced max. 24" o.c. as shown. Do not dimple board for fasteners that are under tape or trim.

Joint Treatment and Decoration: See Bestwall Product Sheet BW-62360.



ONE-HOUR FIRE RESISTANCE

4" SEMI-SOLID GYPSUM WALLBOARD NON-LOAD BEARING PARTITION

FEATURES:

1. Fire Resistance: Two-hours with 5/8" Bestwall Firestop.
2. Sound Transmission Loss: 42 Decibels (Tested before 1957).
37 Decibels (Tested 1958).
3. Strength: At least 10% less deflection under standard ASTM "Bump" test than walls with 2" x 4" studs 16" o.c. faced with 1/2" Gypsum Wallboard.
4. Laminated Construction: .. Smooth monolithic walls created by unitized lamination of multi-ply of Gypsum Wallboard.

SPECIFICATIONS:

All gypsum wallboard and joint system materials used, including laminating compound, shall be manufactured by the Bestwall Gypsum Company and shall be installed by a Bestwall Hummer licensed contractor in a first-class workmanship manner.

Floor and Ceiling Runners: Use 1 1/2" x 1 5/8" wood runner or metal hat section with 1/2" thick 2" wide gypsum board

strip applied to metal runner.

Laminated Ribs:

Construction: Made by laminating 2—1/2" gypsum strips 6" wide.

Spacing: One rib centered over joint between first layer boards. Another centered between joints.

First Layer Board: Use 5/8" Bestwall Firestop, 4' wide, floor and ceiling height (12' max.). Apply vertically with joints centered over rib.

Nailing: Use 1 5/8" long, Drywall nail at ceiling and floor lines spaced 8" o.c. or Bestwall Drywall screws with metal floor and ceiling runners.

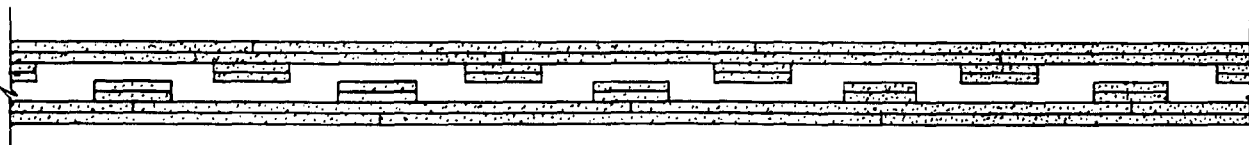
Face Layer Board: Use 5/8" Bestwall Firestop, 4' wide, floor to ceiling height (12' max.) tapered edge, applied vertically with joints off those in first layer.

Laminating Compound: See Bestwall Product Sheet BW-62355. Apply glue to back of face layer with serrated knife in strips or to ribs on wall with a mechanical glue spreader.

Face Board Nailing: Use 2 1/2" nail at ceiling and floor, 8" o.c. or Drywall screws with metal runners.

Screws: Use 2" long Bestwall Drywall screws at edges of first layer and face boards, 24" o.c.

Joint Treatment and Decorating: See Bestwall Product Sheet BW-62360.



TWO-HOUR FIRE RESISTANCE

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BESTWALL HUMMER SYSTEMS

5" SEMI-SOLID GYPSUM WALLBOARD NON-LOAD BEARING PARTITION

FEATURES:

1. Fire Resistance:Three-hours with Bestwall Firestop.
2. Sound Transmission Loss: 47 Decibels (Tested before 1957).
40 Decibels (Tested 1958).
3. Strength:At least 10% less deflection under standard ASTM "Bump" tests than walls with 2" x 4" studs, 16" o.c., faced with 1/2" Gypsum Wallboard.
4. Laminated Construction: ..Smooth monolithic walls created by unitized lamination of multi-plyes of Gypsum Wallboard.

SPECIFICATIONS:

All gypsum wallboard and joint system materials used, including laminating compound, shall be manufactured by the Bestwall Gypsum Company and shall be installed by a Bestwall Hummer licensed contractor in a first-class workmanship manner.

Floor and Ceiling Runners: Use metal hat sections or 1" x 1 1/8" wood runners spaced 1/2" apart.

Laminated Ribs:

Construction: Made by laminating 2—1/2" gypsum strips 6" wide.

Spacing: One rib centered over joint between first layer boards. Another centered between joints.

First Layer Board: Use 5/8" Bestwall Firestop, 4' wide, floor and ceiling height (12' max.). Apply vertically with joints centered over rib.

Nailing: Use 1 5/8" long, Drywall nail at ceiling and floor lines spaced 8" o.c. or Bestwall Drywall screws with metal floor and ceiling runners.

Face Layer Board: Use 5/8" Bestwall Firestop, 4' wide, floor to ceiling height (12' max.) tapered edge, applied vertically with joints off those in first layer.

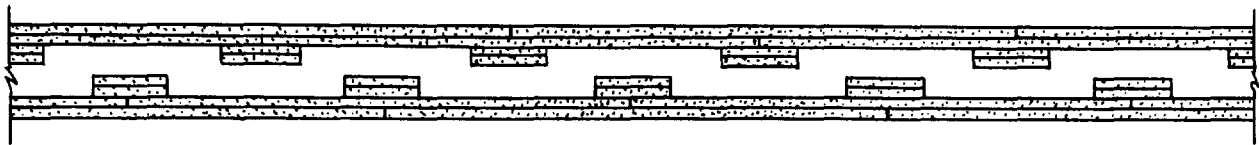
Laminating Compound: See Bestwall Product Sheet BW 62355. Apply glue to back of face layer with serrated knife in strips or to ribs on wall with a mechanical glue spreader.

Face Board Nailing: Use 2 1/2" nail at ceiling and floor, 8" o.c. or Drywall screws with metal runners.

Screws: Use 2" long Bestwall Drywall screws at edges of first layer and face boards, 24" o.c.

Joint Treatment and Decorating: See Bestwall Product Sheet BW 62360.

Note: For best value in reducing sound transmission a 1/2" rigid glass fiber low density material should be inserted in center space between two sides of wall.



THREE-HOUR FIRE RESISTANCE



BESTWALL GYPSUM COMPANY
PAOLI, PENNSYLVANIA

SGP 0027547

CONSULT YOUR

BESTWALL

SYSTEMS ENGINEER

BESTWALL FIRESTOP GYPSUM WALLBOARD

ONE HOUR NON-LOAD-BEARING STUDLESS WALL

REPRODUCTION FROM UNDERWRITERS' LABORATORIES, INC. GUIDE NO. 40 U18.23.

Guide No. 40 U18.23.
Wallboard.

June 3, 1957

File R2717

Bestwall Gypsum Co., Ardmore, Pa.

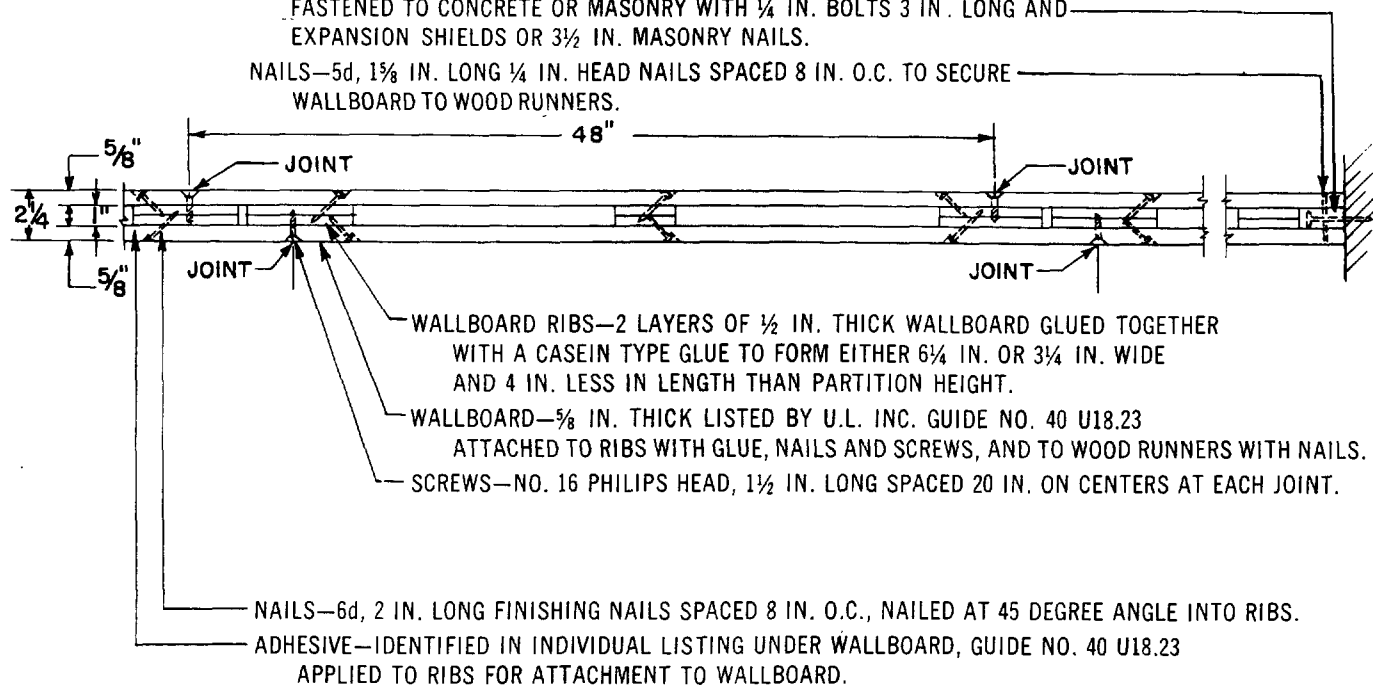
For Wall and Partition Design No. 10-1 Hr.

GUIDE NO. 40 U18
GENERAL INFORMATION (CONT'D)
WALLS AND PARTITIONS

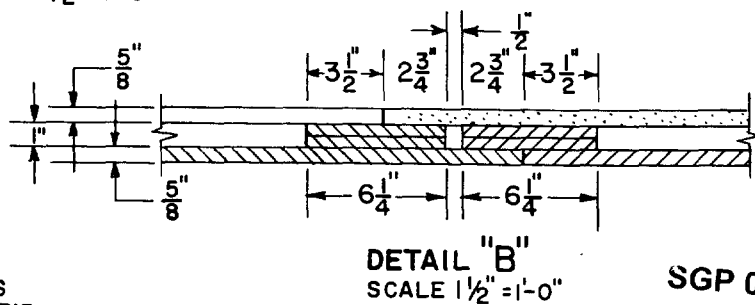
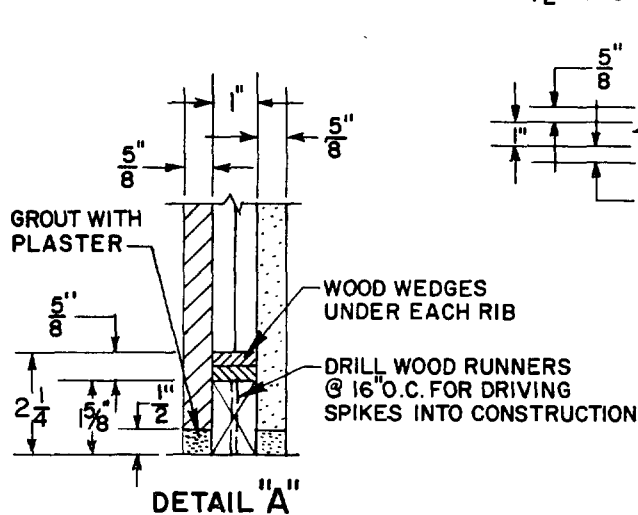
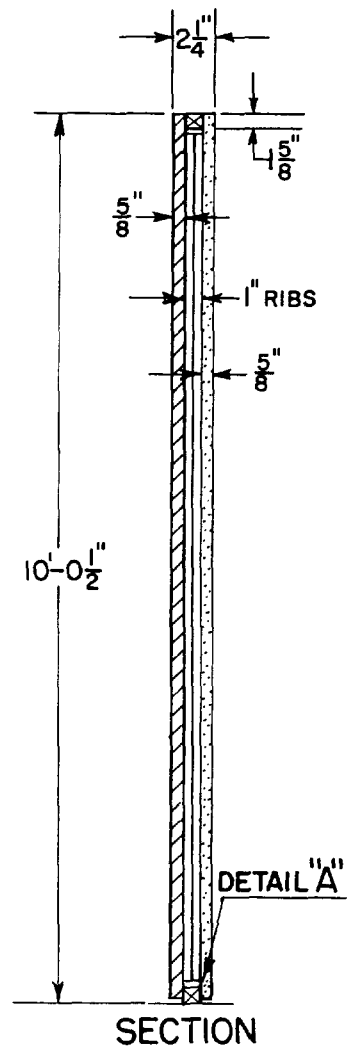
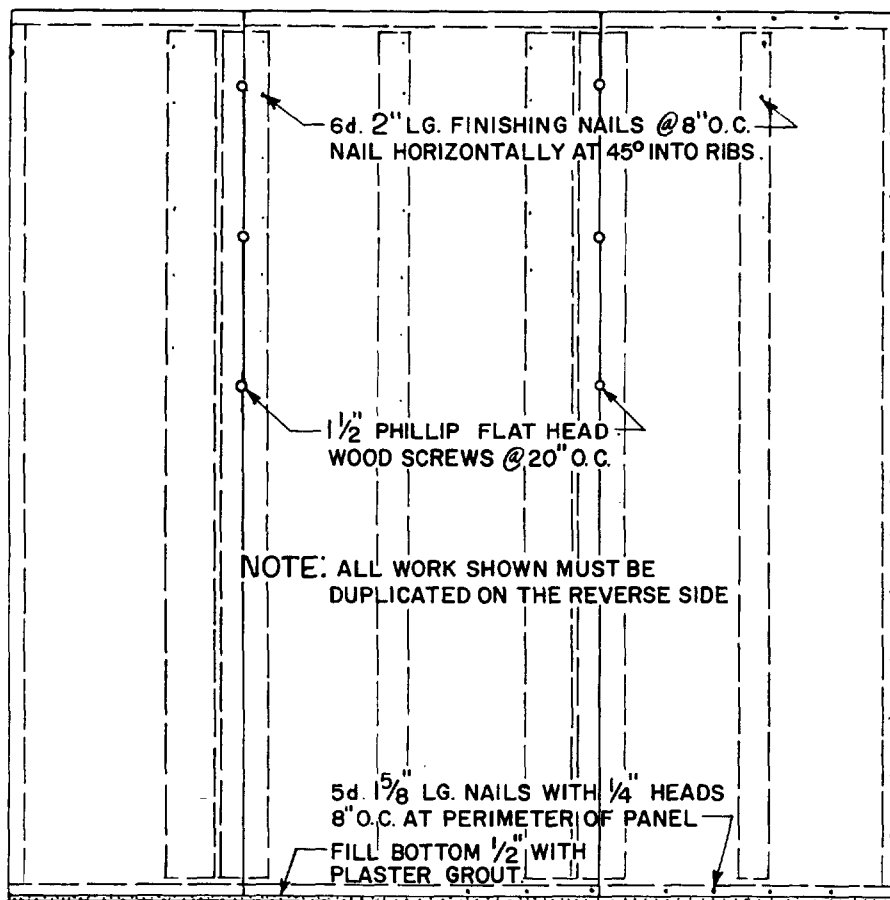
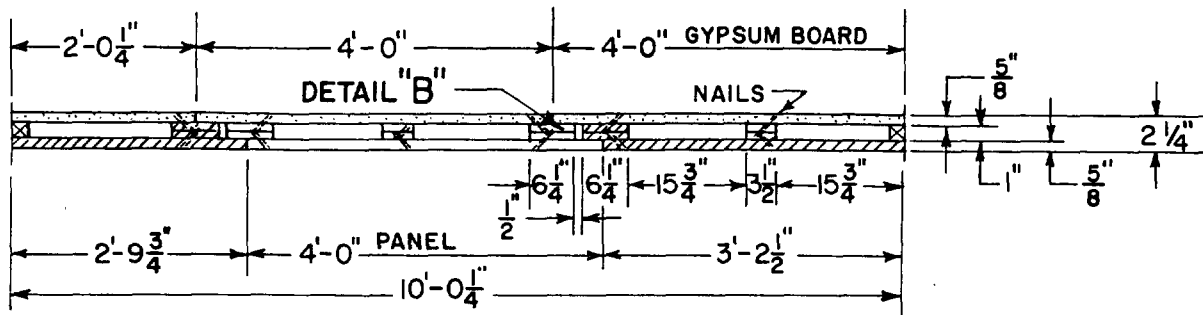
CLASS E-1 DESIGNS DESIGN NO. 10-1 HR.—(NON-BEARING PARTITION)

WOOD RUNNERS—1 BY 1½ IN. YELLOW PINE USED ON SILL, LINTEL AND SIDES
FASTENED TO CONCRETE OR MASONRY WITH ¼ IN. BOLTS 3 IN. LONG AND
EXPANSION SHIELDS OR 3½ IN. MASONRY NAILS.

NAILS—5d, 1½ IN. LONG ¼ IN. HEAD NAILS SPACED 8 IN. O.C. TO SECURE
WALLBOARD TO WOOD RUNNERS.



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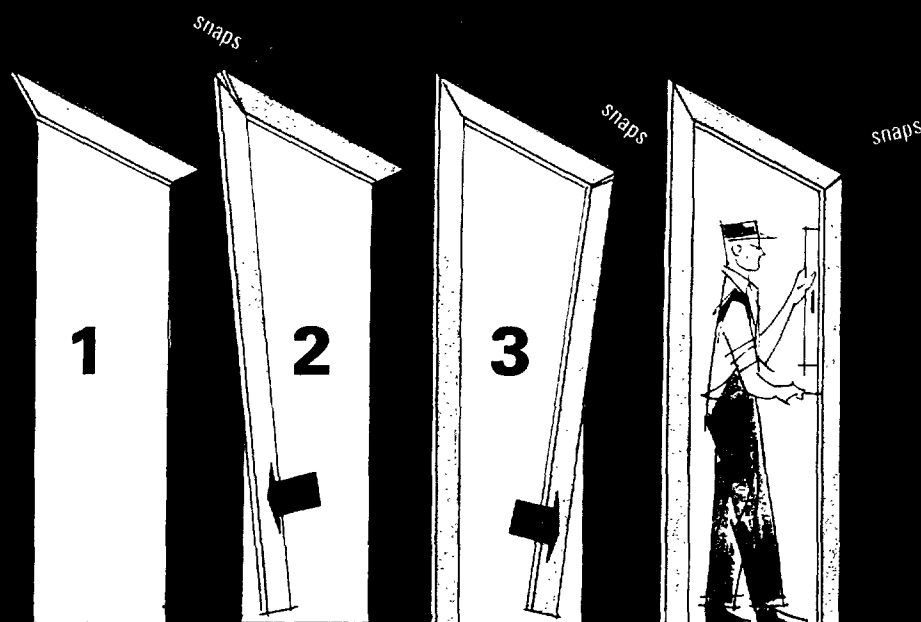


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BESTWALL GYPSUM CO. SYSTEMS ENGINEERING, ARDMORE, PA.	
BESTWALL HUMMER SYSTEM "B" (MODIFIED) NON LOAD BEARING PARTITION	4-8-57 2-21-57

FIG. 1
R 2717-19-21

Now....



*finest name
in metal
doors and
frames*

the new STEELCRAFT DRYWALL FRAME

**WITH EXCLUSIVE SNAP-LOCK JOINTS*
AND ADJUSTABLE JAMB ANCHORS***

Here's the ideal *standard* frame that's specially designed for drywalls using steel stud or laminated construction.

It is installed with little or no preliminary preparation—*after* the wall is up.

It's *simple* to install. It consists of just three precision-fitted sections; a header bar and two jambs.

SPECIAL FRAME FEATURES INCLUDE

- A** A double return backband which allows the frame to slip snugly over the drywall without marring its surface.
- B** Adjustable jamb anchors* that provide for plumb alignment by simple screwdriver adjustment.
- C** Exclusive SNAP-LOCKS* in the precision-mitred joints securely lock the frame in position without the use of screws.
- D** Frames come with base anchors that are pre-drilled for attaching to the wall with screws.

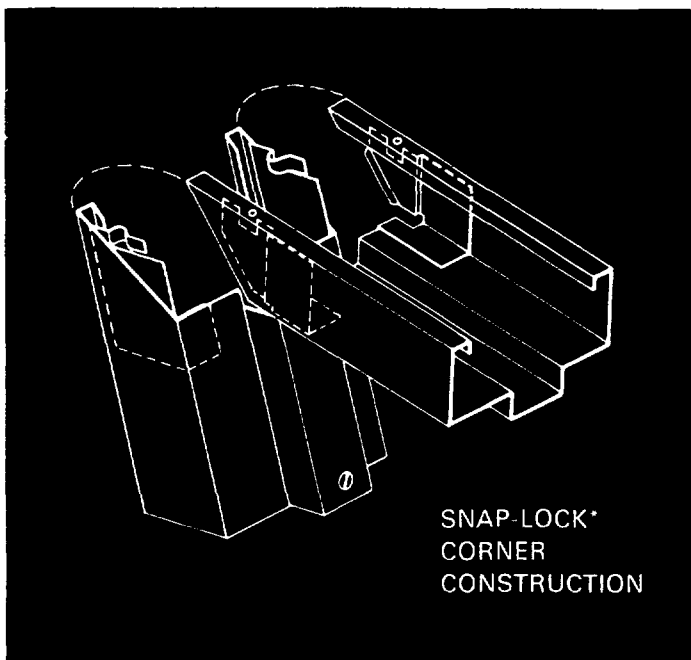
Jambs are pre-mortized and reinforced for hinges and A.S.A. STRIKE to allow for freedom of hardware selection.

FOR SIZES, TYPES AND TYPICAL INSTALLATIONS.
SEE OTHER SIDE OF THIS SHEET.

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THE STEELCRAFT MANUFACTURING CO.

9017 Blue Ash Road • Cincinnati, Ohio 45242 • Phone: Area Code 513—791-8800



**SNAP-LOCK*
CORNER
CONSTRUCTION**

*U.S. and Canadian Patents Applied For.

STEELCRAFT MATCHING STEEL DOORS

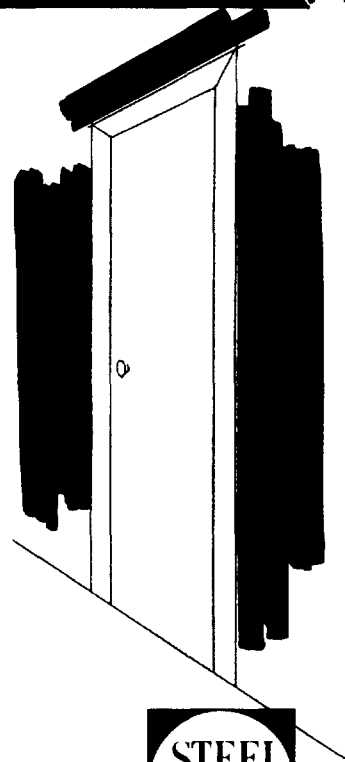
A Steelcraft DOOR makes the perfect companion for the drywall frame and carries out the clean simplicity of this modern construction.

Bonded honeycomb core construction sound-deadens and insulates the door while giving it strength and permanent flatness.

Doors are prepared for hardware of your choice, and may be furnished with any variety of vision lights, glass panels, louvers and grilles.

FIRE DOORS

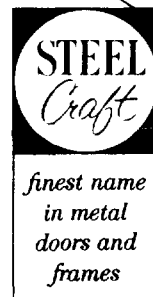
Steelcraft has a complete line, all tested and rated for full protection by Underwriters Laboratories.



THE STEELCRAFT MANUFACTURING CO.

9017 Blue Ash Road • Cincinnati, Ohio 45242 • Phone: Area Code 513-791-8800

SGP 0027551



Paoli, Pennsylvania

2 February 1967

TO:	All Regional Managers All Area Managers All Salesmen	FROM:	MEMORANDUM ADVERTISING DEPARTMENT
		SUBJECT:	<u>SOUND MATERIAL INFORMATION</u>
		BY:	Ronald F. Ball/mlI

Attached you will find a sound slide presentation, in booklet form, of Architectural Acoustics and Acoustical Materials.

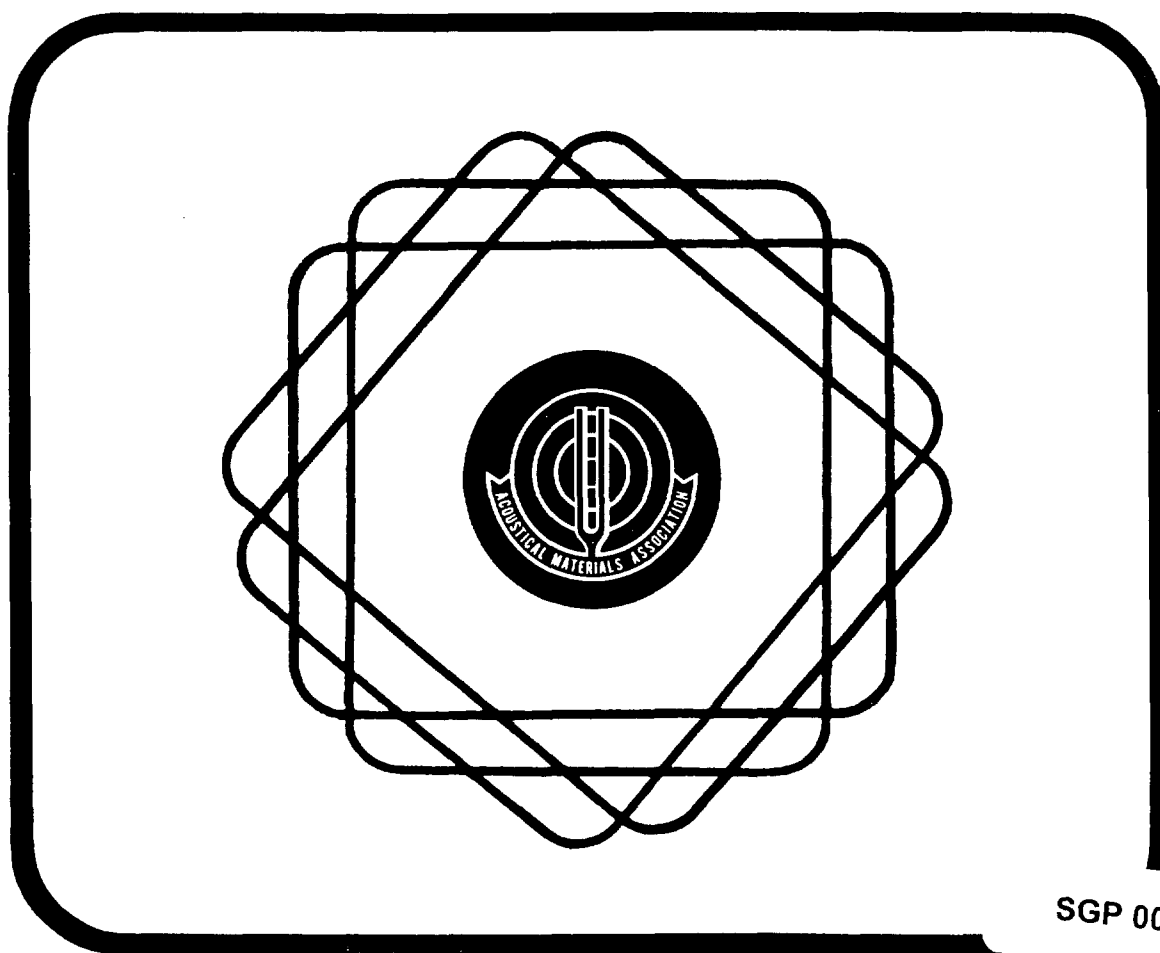
This picture story is a presentation of slide material which has been prepared by the Acoustical Materials Association and distributed by the Producers' Council

The presentation covers subjects such as acoustical terms, recommended treatment for occupancies, sound transmission, test methods and installation practices. Of course our material is not mentioned because this book covers acoustical materials and treatments in a general sense only. Read through this carefully so that you will receive all the information available in this excellent and informative brochure

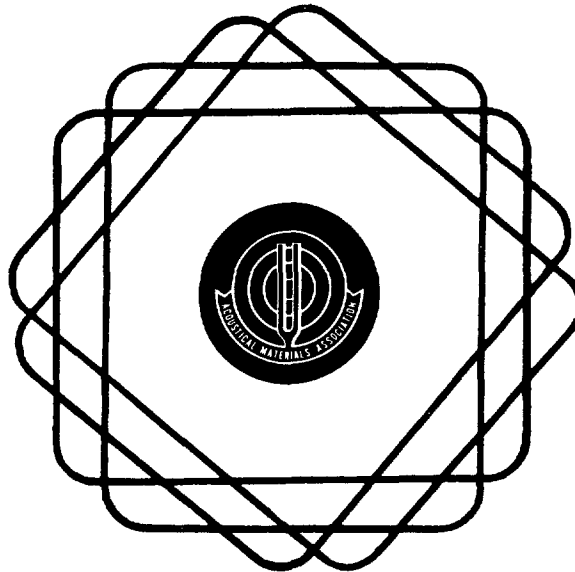
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a picture story of

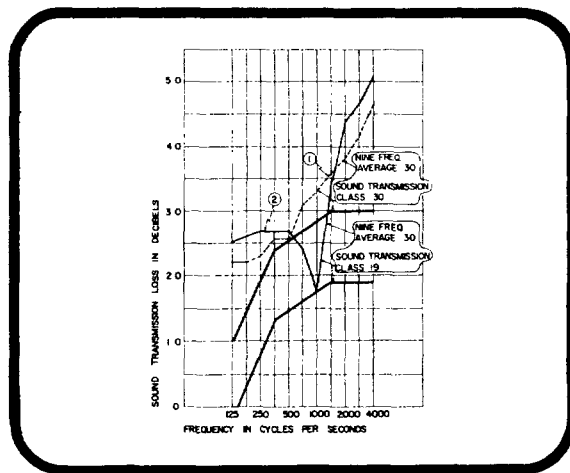
ARCHITECTURAL ACOUSTICS and ACOUSTICAL MATERIALS



SGP 0027553



This picture story is a presentation of slide material which has been prepared by the Acoustical Materials Association and is sponsored and distributed by the Producers' Council and the Association of Collegiate Schools of Architecture. It is being sent to 91 schools of architecture in the United States of America for instructional purposes. □ The Acoustical Materials Association is an industry organization which incorporates practically all manufacturers of acoustical materials, representing approximately 95% of the acoustical materials industry. It publishes a BULLETIN annually and another booklet, THE USE OF ARCHITECTURAL MATERIALS: THEORY AND PRACTICE. □ Members of the Acoustical Materials Association include the following: Armstrong Cork Company, Lancaster, Pennsylvania; Baldwin-Ehret-Hill, Inc., Trenton, New Jersey; The Celotex Corporation, Tampa, Florida; Gustin-Bacon Manufacturing Company, Kansas City, Missouri; The E. F. Hauserman Company, Cleveland, Ohio; Johns-Manville Sales Corporation, New York, New York; Kaiser Gypsum Company, Inc., Oakland, California; National Gypsum Company, Buffalo, New York; Owens-Corning Fiberglas Corporation, Toledo, Ohio; Simpson Timber Company, Seattle, Washington; United States Gypsum Company, Chicago, Illinois; and Wood Conversion Company, St. Paul, Minnesota. □ Additional copies of this booklet and slide sets can be secured from Center for Instructional Communications, Building D-7, Colvin Lane, Cortland Campus, Syracuse, New York or — ACOUSTICAL MATERIALS ASSOCIATION, 335 East 45 Street, New York, New York 10017

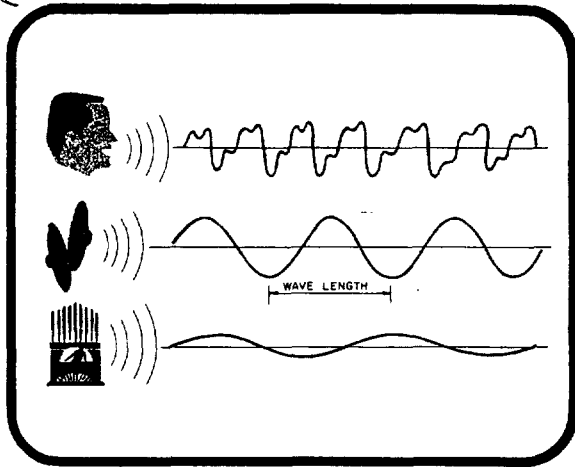
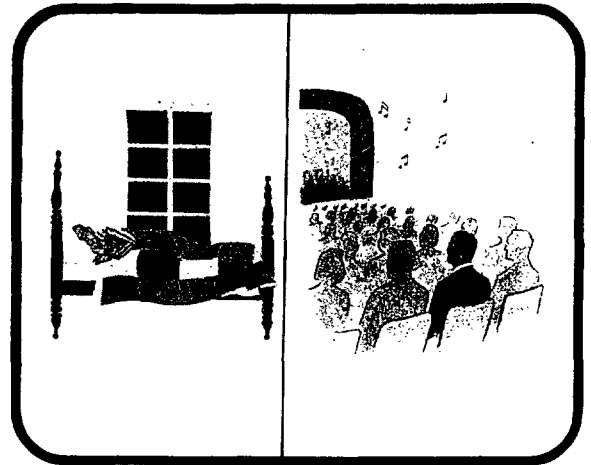
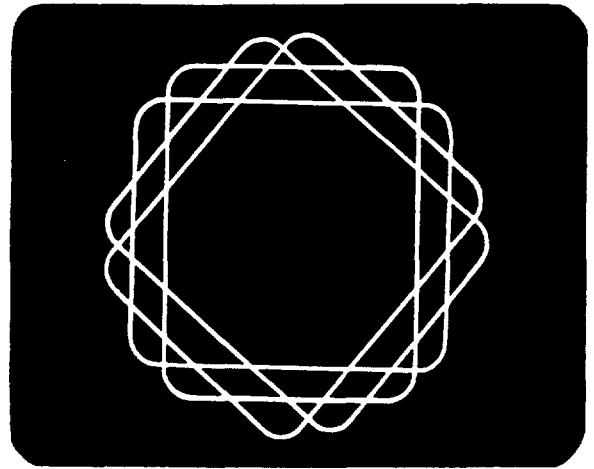


PASTE THE ABOVE SLIDE ILLUSTRATION
OVER THE ILLUSTRATION NOW SHOWN FOR
SLIDE 305. (SOUND-TRANSMISSION CLASS)

FUNDAMENTALS OF ARCHITECTURAL ACOUSTICS

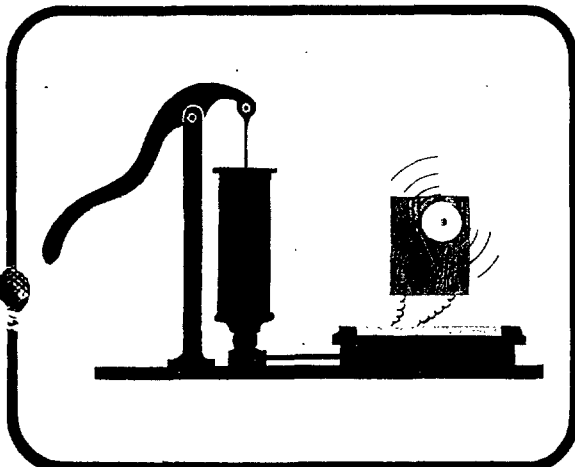
ARCHITECTURAL ACOUSTICS—SIGNAL AND NOISE. When we apply the science of acoustics to architecture, we find that we have two tasks in mind: □ We must propagate an audible signal of some sort—usually either speech or music—from one part of a room to another part—from the speaker to listeners—from the musicians to the audience. This we call sound control. □ We must provide an acoustical environment that is acceptable for the use to which the space is put. This usually entails, in a broad sense, noise reduction.

Ref: *Acoustical Designing in Architecture*. Knudsen & Harris, John Wiley & Sons, 1950.



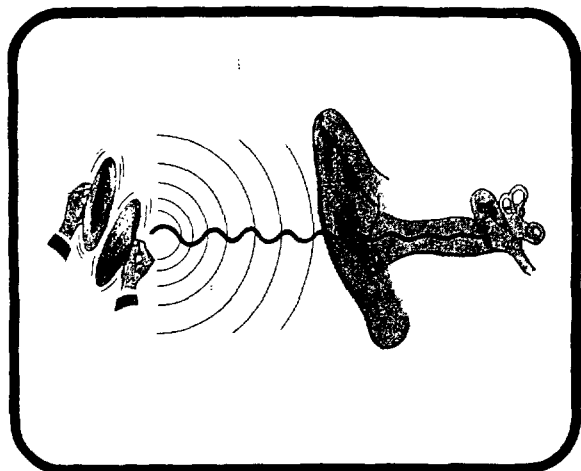
SOUND—VIBRATION OF AIR. Any audible signal is sound. The source of a sound is some system in vibration. Musical systems include vibrating strings, diaphragms, such as drum heads or cymbals, or vibrating air columns exemplified by flutes, horns, or the human singing voice. Less-musical generators of sound include vibrating machinery surfaces, air flow through orifices, or the impact of two or more hard surfaces. □ A sound source causes stress changes in the surrounding medium, air. These changes fluctuate with time in sympathy with the source and may be rapid or slow, or may fluctuate in a regular or irregular way, or may be transient. A musical instrument producing a high note causes a regular rapid fluctuation of stress; traffic, an irregular continuously fluctuating stress; a gun shot, a nonrepetitive stress. A sound source can cause compressive stress changes in gases and liquids, and compressive, shear, and bending stresses in solids.

Ref: *The Use of Architectural Acoustical Materials. Theory and Practice*, p. 3.

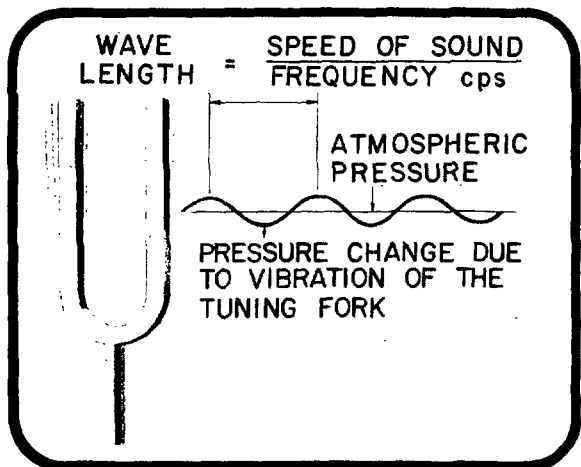


NO SOUND IN VACUUM. The vibrating system usually transfers its vibration to air, which is the most common medium. However, sound may also be transmitted in water, gases other than air, and in solids. Without a transmitting medium, sound cannot exist. Early experiments made by placing a bell in a vessel from which the air was being exhausted showed that sound becomes fainter and fainter as the vacuum becomes more perfect. □ The vibrations established in the medium travel with a finite velocity characteristic of the medium. In air, the vibrations travel about 1100 ft per second, in water about 5000 ft per second, in steel about 15 000 ft per second.

Ref: *The Use of Architectural Acoustical Materials. Theory and Practice*, p. 4.



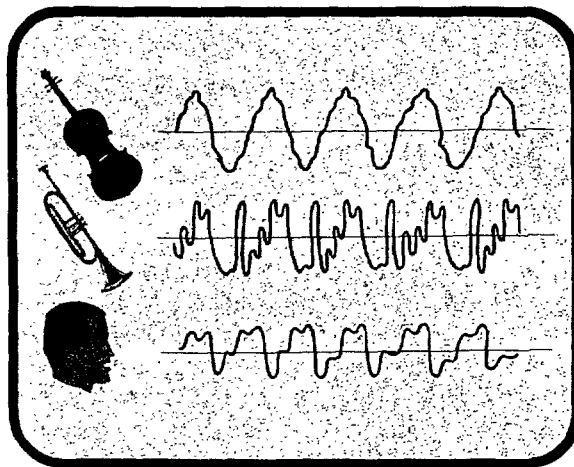
SOUND AND THE EAR. The end of the sound-propagation chain is the ear. The vibrations of the sound source set the air in motion, which, in turn, transmits its small changes in pressure to the drum membrane of the ear. □ The vibrations on the eardrum are multiplied by means of small bones arranged as levers in the middle ear. These vibrations are then transmitted through a fluid to nerve endings and then to the brain, which translates these impulses as a message.



WAVELENGTH AND FREQUENCY. The quality of a sound is dependent upon many things, such as pure tones, overtones, and harmonics. All are frequency-dependent. By frequency we mean the number of times per second that the atmospheric pressure of the air is changed by the vibrations of the sound source. Only rarely do we encounter a regular periodic atmospheric pressure change. When we do, it is called a pure tone.

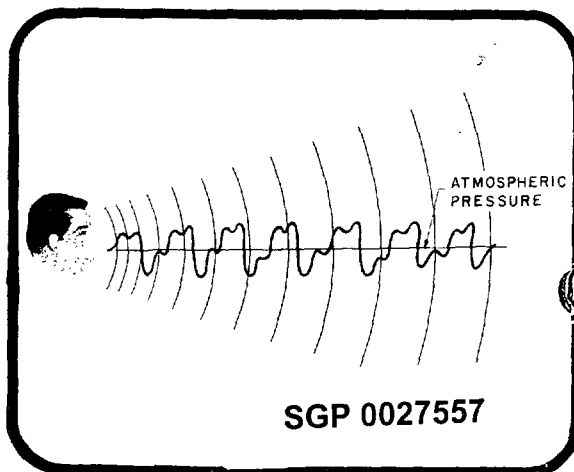
Ref: The Use of Architectural Acoustical Materials. Theory and Practice, p. 4.

SOUND QUALITY IS COMPLEX. Most of the sounds that we hear are quite complex in quality. While our ear does not respond to pressure changes that occur at a rate of less than 20 times a second and more than approximately 20 000 times a second, this range permits a practically unlimited number of combinations of sounds. □ A violin, trumpet, or the human voice provide good examples of these multifrequency complex sounds. Their frequency spectra may be studied by measuring how the sound energy is distributed in narrow contiguous frequency bands, such as octave, $\frac{1}{2}$ -, or $\frac{1}{3}$ -octave bands.



SOUND QUANTITY AND PRESSURE. The concept of the quantity of sound is easy to understand since it is merely the average deviation in atmospheric pressure above or below the static atmospheric pressure. □ The deviation in pressure is very small. For example, a very loud noise produces a change in pressure of only 0.001% of the atmospheric pressure. Since this is an alternating pressure change, it may be defined as a root mean square (rms) quantity. This rms pressure change is known as the sound-pressure level and is measured by microphones and sound-level meters.

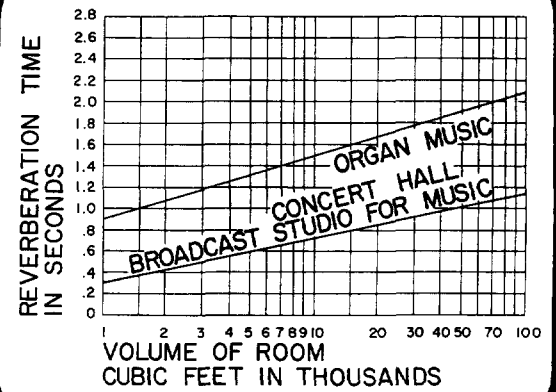
Ref: The Use of Architectural Acoustical Materials. Theory and Practice, p. 3



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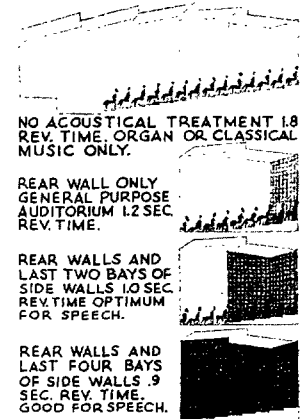
OPTIMUM REVERBERATION TIME. Reverberation is one of the most important principles of acoustics that may be applied to architecture. Reverberation consists of the diminishing of the loudness of a sound after the source has stopped. If the sound dies out very slowly, the room is considered **live**; if it dies out very rapidly, it is considered a **dead** room. Outdoors, sound usually dies out very rapidly unless there are large reflecting surfaces present. □ Reverberation time is defined as the number of seconds required for a sound to fade to one millionth of the value that it had at the instant when the source was stopped. □ The time of reverberation in an auditorium has an important effect upon speech intelligibility since the prolongation of each speech sound causes an overlapping and confusion of successive words or syllables, resulting in a loss of speech intelligibility. A reasonably long time of reverberation is required, however, for the enjoyment of music. □ The optimum time of reverberation for a space, therefore, is based upon the use and size of the room.

Ref: The Use of Architectural Acoustical Materials. Theory and Practice, p. 6.



SOUND ABSORPTION AND REFLECTION. The reverberation time of a space is determined by the quantity and acoustical properties of sound-absorptive and sound-reflective materials that form the surface of the space as related to room volume. □ Sound absorption takes place in porous materials as a result of the friction between the walls and fibers of the interconnecting pores. This friction converts the sound energy to a very small quantity of heat. □ To clarify the line of demarcation, we define a sound-absorptive surface as one that has a noise reduction coefficient of at least 50%. □ The laboratory method of measuring the sound-absorption coefficients and computing the noise-reduction coefficient is explained in another slide of this series.

Ref: The Use of Architectural Acoustical Materials. Theory and Practice, p. 12.



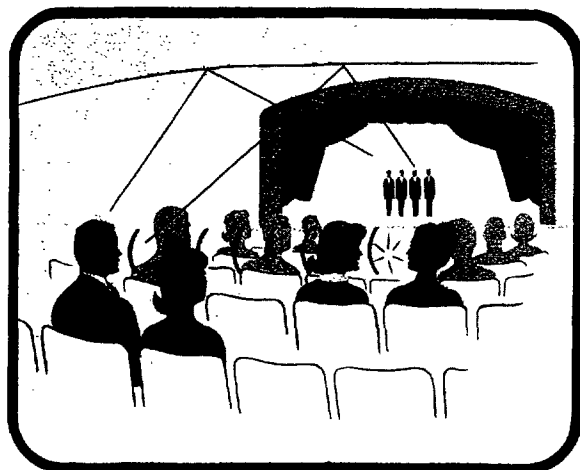
ROOM ACOUSTICS. The reflection of sound signals from large plane or convex surfaces enhances the quality and signal strength of both speech and music. □ The paths of the reflected sound may be predicted by the law of sound propagation, "the angle of incidence equals the angle of reflection." □ The first reflection is especially important. Reflected sound that arrives at the ear within an interval of 50 milliseconds after the direct sound tends to reinforce the sound of individual speech syllables. All later-arriving reflected sounds have a blurring and interfering effect, which reduces speech intelligibility. □ It is considered good practice to arrange the room surfaces so that as much reflected sound as possible arrives at each seat by a path not more than 50 ft longer than the direct sound path. □ 50 ft corresponds to approximately 50 milliseconds at the speed of sound.

Ref: The Use of Architectural Acoustical Materials. Theory and Practice, p. 9.

ECHOES. It would be a mistake, however, to consider only the beneficial effects of sound-reflective surfaces in an auditorium. Long delayed reflections from the rear of the room and multiple-reflected sounds may become undesirable echoes. □ If a first reflection of a short impulsive sound, such as a speech syllable, is delayed more than 50 milliseconds longer than the direct sound (difference in sound path greater than 50 ft), the first reflection may be heard as an echo. Rear walls are the most common source of echoes and, for this reason, usually require the application of sound-absorptive materials.

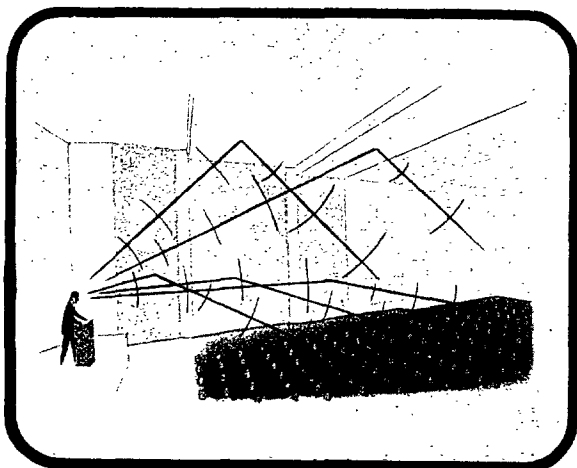
Ref: The Use of Architectural Acoustical Materials. Theory and Practice, p. 9.

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NOISE CONTROL – AUDITORIUM. Maintaining a strong sound signal by means of sound-reflective surfaces is only half of the problem. It also becomes necessary to keep the noise level in the auditorium low. The use of efficient sound-absorptive surfaces is essential in reducing disturbing ventilating noise and audience noise such as shuffling of feet, body movement, talking, coughing, etc.

Ref: The Use of Architectural Acoustical Materials. Theory and Practice, pp. 11 to 14 inclusive.

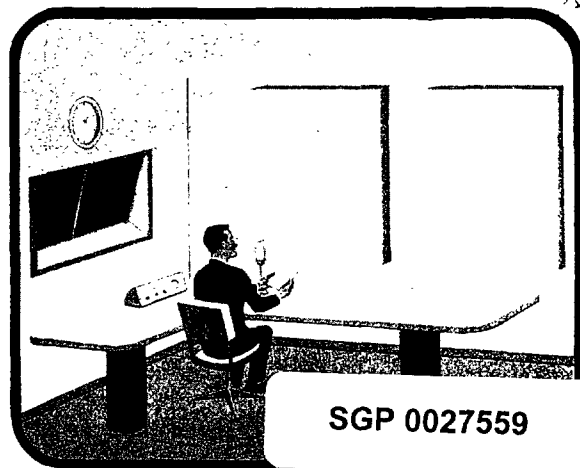


SIGNAL PROPAGATION – AUDITORIUM. The location of the acoustical treatment in the auditorium is very important. We must not apply acoustical materials to surfaces that aid in propagating the speech signal. These surfaces, called the first reflection surfaces, consist primarily of the front one-half to two-thirds of the ceiling and the front one-half of the sidewalls. The remaining wall or ceiling surfaces, however, may receive acoustical treatment without reducing the speech-signal reinforcement or propagation. The remaining wall and ceiling surfaces and especially the rear wall surfaces may be the source of long delayed reflections and echoes that materially reduce the intelligibility of the speech signal. It is usually mandatory for good acoustics that these surfaces be acoustically treated.

Ref: The Use of Architectural Acoustical Materials. Theory and Practice, pp. 9 and 10.

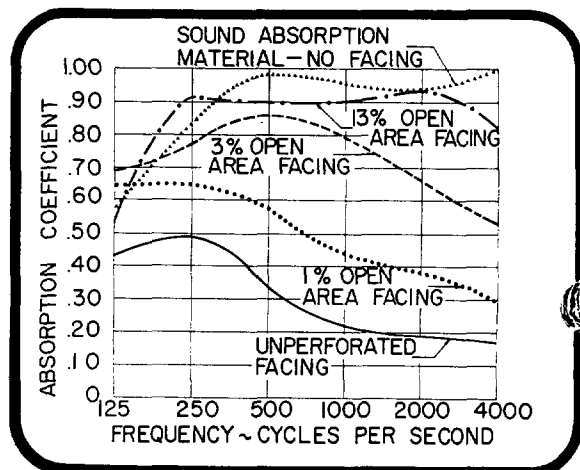
SOUND DIFFUSION – AUDITORIUM. We can use a combination of sound-reflective and sound-absorptive materials to control reverberation and to also obtain a diffuse sound field. □ Diffusion is important to good acoustics in a room used for speech or music. While diffusion can be obtained by providing large and small projections on wall and ceiling surfaces, these projections may be undesirable from an aesthetic design viewpoint. An equally diffuse room environment can be obtained by patches of sound-absorptive materials.

Ref: The Use of Architectural Acoustical Materials. Theory and Practice, pp. 9 and 10.



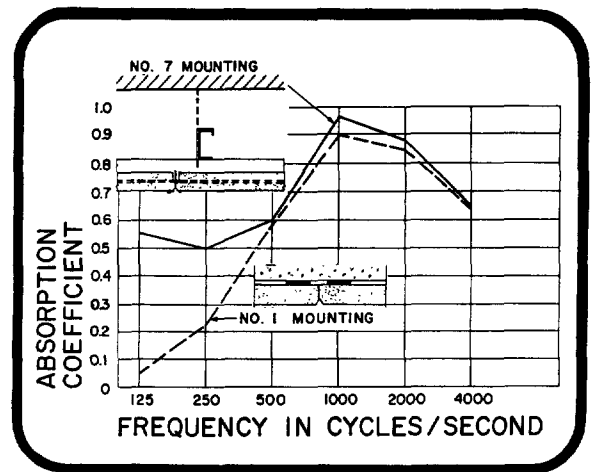
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PERFORATED FACINGS. When rooms are used for speech or music, the sound-absorbing material is preferably located on wall surfaces. The usually soft sound-absorbing material must be covered with a perforated facing material in order to resist abuse. □ The open area of the facing can have a considerable effect on the sound-absorption efficiency and frequency characteristics of the absorption spectrum. □ The acoustical analysis of calculated versus optimum reverberation time will indicate the best construction.



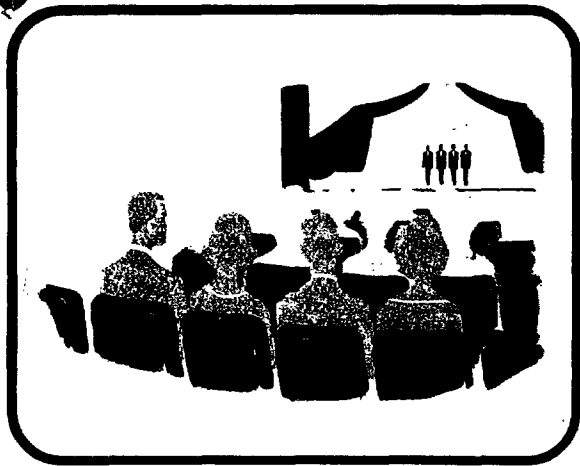
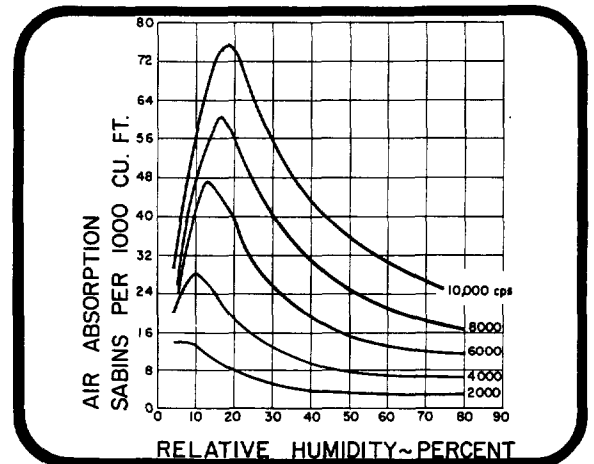
ACOUSTICAL-MATERIAL MOUNTINGS. The method used to install acoustical ceilings will also affect the efficiency and frequency characteristics of the sound-absorption spectrum. ☐ When the acoustical tile or lay-in board is installed on a mechanical suspension system (No. 7 Mounting), it will provide maximum sound absorption over the entire audible frequency range. Acoustical tile cemented to a hard surface such as plaster or gypsum board (No. 1 Mounting) will have very little low-frequency sound absorption.

Ref: Acoustical Materials Association Bulletin.



AIR ABSORPTION. Another absorber of sound that must be considered in large rooms is air. This absorption is very small for frequencies below 2000 cps but increases rapidly at 2000 cps and higher frequencies. It also increases with decreasing relative humidity, as is shown on this graph.

Ref: The Use of Architectural Acoustical Materials. Theory and Practice, p. 5.

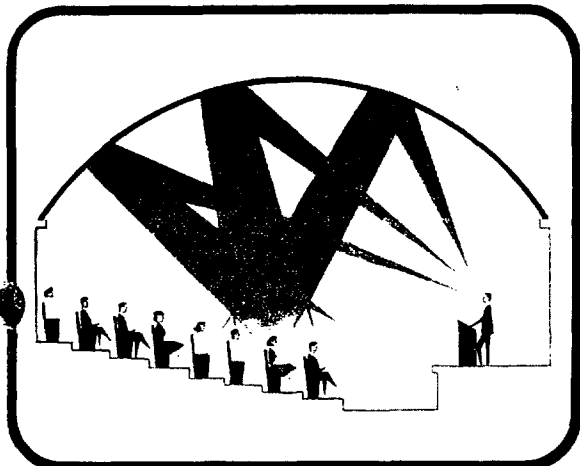


UPHOLSTERED-CHAIR ABSORPTION. The acoustical environment of an auditorium will always benefit from the use of upholstered chairs. The sound absorption provided by an unoccupied upholstered chair is approximately equal to the occupied chair. As a result, the reverberation time in the auditorium remains constant regardless of occupancy. ☐ Pew cushions can serve in a similar manner in a church. ☐ For example, the following are coefficients of absorption at 500 cps for people and chairs:

Man seated in upholstered chair	4.0 sabins
Upholstered chair without occupant	3.0 sabins
Chair-plywood seat & back without occupant	0.3 sabins

The unit "sabin" is the equivalent of one square foot of surface having an absorption coefficient of 1.00. An upholstered chair (3 sabins) therefore has the same amount of sound absorption as five square feet of a surface having an absorption coefficient of 0.60.

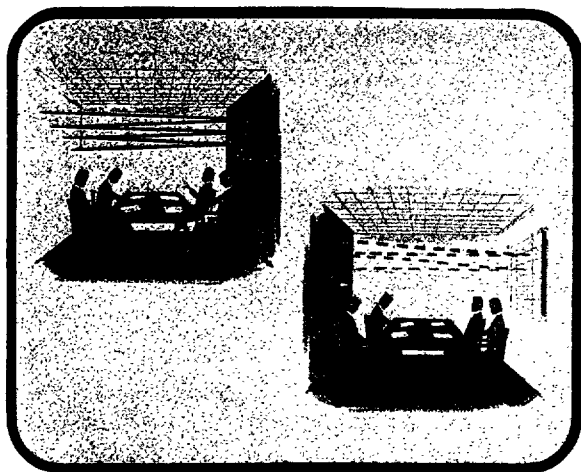
Ref: The Use of Architectural Acoustical Materials. Theory and Practice, p. 14.



ROOM SHAPE AND ACOUSTICS. The shape of a room used for speech or music is very important. ☐ Large concave surfaces tend to focus and increase the severity of echoes. They also concentrate sound energy at a small focal point. If this point is near the height of the listener's ear, speech intelligibility deteriorates rapidly and music listening becomes unsatisfactory. ☐ Large convex surfaces, on the other hand, provide beneficial sound dispersion and propagation, thus increasing the uniformity of sound throughout the room. The size of the convex surface, to be an effective diffuser, must be in the same order of magnitude as the wavelength of the sound that it is to radiate; 100-cps sound is about 11 ft long; 1000-cps, about 13 in. long.

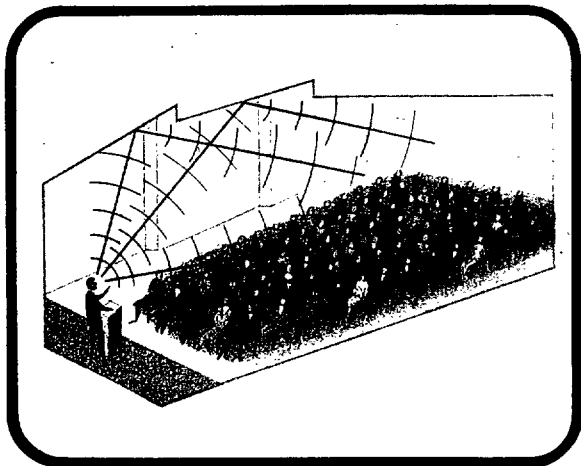
Ref: The Use of Architectural Acoustical Materials. Theory and Practice, pp. 9 and 10.

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FLUTTER ECHO. Large parallel wall surfaces should also be considered as problem sources in the design of rooms used for speech. □ This potential problem consists of a rapid echo, called **flutter echo**, that results from multiple reflections of an impulsive sound such as a speech syllable or a hand clap. □ The flutter echo sounds somewhat like a stick run rapidly across a picket fence. □ A small area of acoustical material, or an out of parallel wall surface, or even a large slanted mirror or glazed frame will provide sufficient diffusion to alleviate **flutter echo**.

Ref: The Use of Architectural Acoustical Materials. Theory and Practice, p. 18.

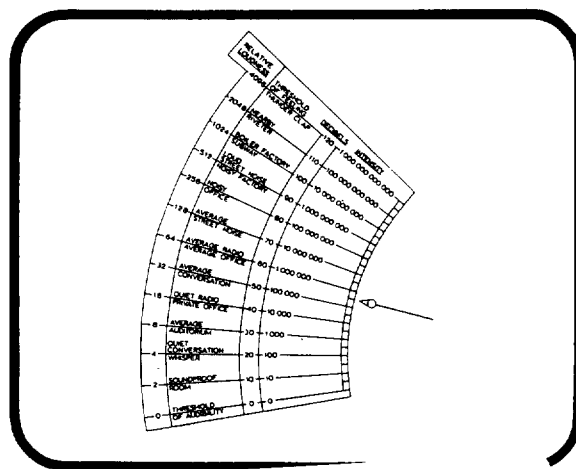


SIGNAL — NOISE RATIO. Auditoriums are intended for listening. Whether we listen to speech or to music signals, the signal must be considerably louder than the noise in the auditorium. We can maintain a high speech signal throughout the auditorium by restricting the distance between the speaker and listener to a maximum of 40 or 50 ft and by providing sound-reflective surfaces to supplement the direct speech signal. □ The most important sound-reflecting surface is usually the front half of the ceiling of the auditorium. We therefore do not use this space for the application of sound-absorptive materials. □ When the distance between speaker and listener exceeds 50 ft or the auditorium volume exceeds 50 000 cu ft, it becomes necessary to provide an electronic speech-amplification system.

Ref: The Use of Architectural Acoustical Materials. Theory and Practice, pp. 9 and 10.

SOUND INTENSITY — DECIBELS. Many of the problems in the field of architectural acoustics require that we identify the quantity of the sound that we hear. □ Placing a numeric value on the quantity of sound is difficult because of the tremendous sensitivity of the ear, which can detect atmospheric pressure alterations over a range of a million million to one. □ In order to measure and calculate this vast range of audible sound, a compact scale has been devised. This scale is logarithmic and it states that the same proportional change shall be covered by the same number of units. That is, a tenfold increase from 1 to 10, or 10 to 100, or 100 to 1000 shall be represented by a change of 10 units from 0 to 10, or 10 to 20, or 20 to 30. □ In this way, the intensity range of 1 to one million million is covered by 120 units called **decibels (dB)**.

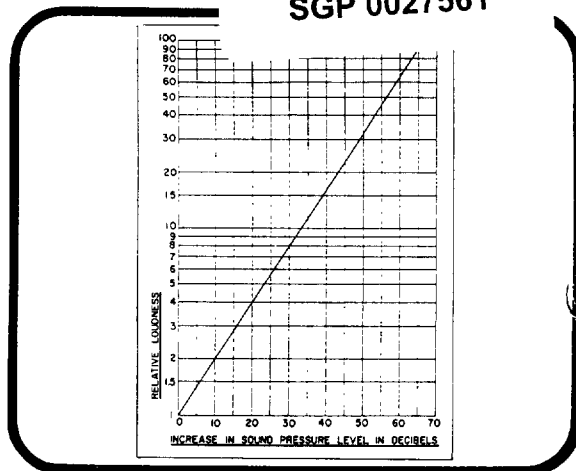
Ref: The Use of Architectural Acoustical Materials. Theory and Practice, Appendix A.



RELATIVE LOUDNESS — DECIBELS. While the decibel scale makes it possible to deal with this huge range of sound quantity because it is logarithmic, it does not permit an easy comparison between two sounds of different intensities. For example, a sound of 100 dB is much more than twice as loud as a sound of 50 dB. □ The graph on this slide shows a relative loudness scale wherein a 10 dB increase in sound-pressure level equals a doubling in loudness. The arithmetic relationship shown on this graph is used in this slide series to relate changes in loudness as they are heard.

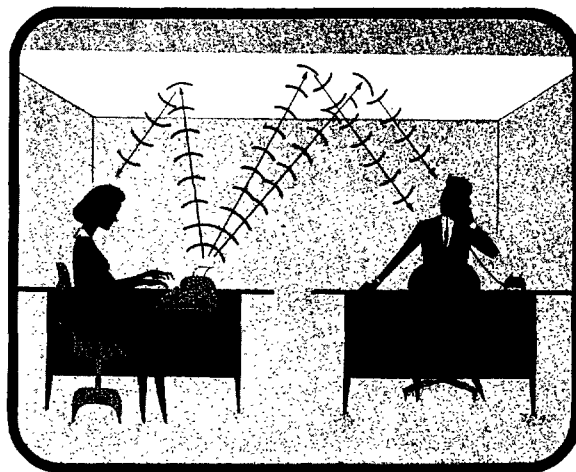
Ref: The Use of Architectural Acoustical Materials. Theory and Practice, Appendix A.

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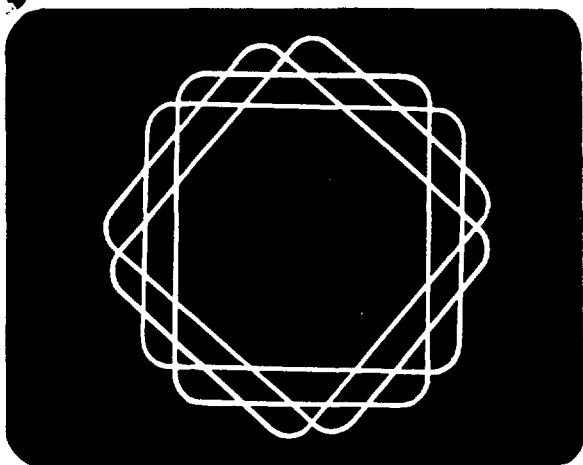
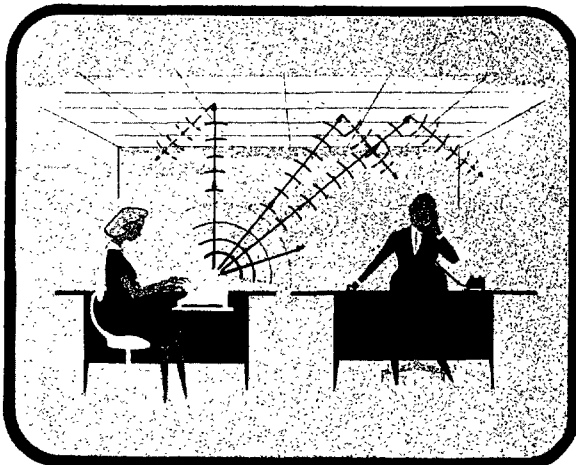
NOISE – UNWANTED SOUND. A noisy environment is one with unwanted sound. In an office, a typewriter is a necessary piece of equipment. The sound that it makes, however, is unwanted and therefore noise. □ The most common method of reducing noise originating in the same room is by the application of sound-absorptive materials to ceiling and/or wall surfaces of the room.

Ref: The Use of Architectural Acoustical Materials. Theory and Practice, p. 16.



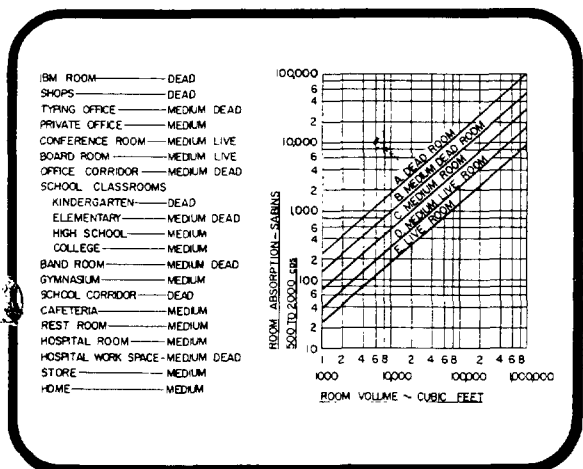
NOISE – REFLECTED SOUND. A sound-absorptive ceiling's main function is to reduce the reflected noise in the room. □ The annoyance caused by reflected noise, because it is sensed as being unnecessary, contributes more to the subjective discomfort than the direct (nonreflected) noise. □ Reflected noise is also more disturbing because the normal decrease in loudness as a function of increasing distance from the source is lacking and the reflected sound is nondirectional. □ The amount of reflected noise in a room can vary from **dead** – little or no reflected sound, a highly sound-absorptive room – to **live** – a great deal of reflected sound, very little sound absorption present. □ Note how the sound-absorptive ceiling tends to localize sound and reduce its propagation.

Ref: The Use of Architectural Acoustical Materials. Theory and Practice, p. 16.



SLIDES 205-231

RECOMMENDED TREATMENT FOR TYPICAL OCCUPANCIES



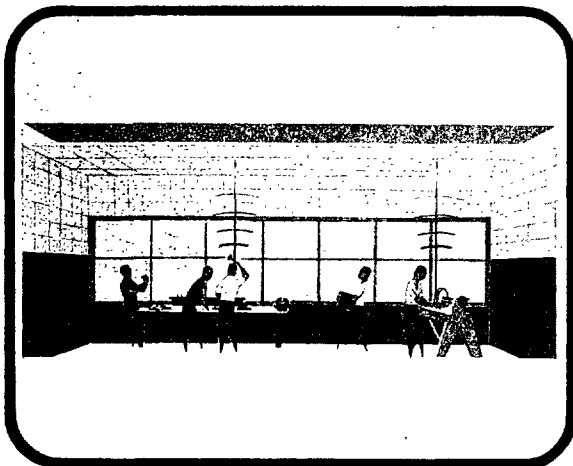
ROOM ACOUSTICAL ENVIRONMENT. The use of the room will determine whether the acoustical environment should be **dead**, **medium dead**, **average**, **medium live**, or **live**. When the acoustical environment criterion has been selected, the amount of sound-absorbing material required can be determined. □ The graph shown on this slide will aid in selecting the amount of acoustical materials required. □ Select the room volume at the bottom of the graph. Room absorption in sabins may be read at the left for a complete range of room environments.

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"DEAD" — ACOUSTICAL ENVIRONMENT. In dealing with spaces containing machines that create high noise levels, the optimum acoustical environment is one that is as **dead** as possible. A **dead** room has many sound-absorptive surfaces and is very much like an open field where we hear only direct sound and no reflected sound. □ We can most closely approximate the outdoor environment by applying acoustical treatment to wall surfaces in addition to the usual acoustical ceiling. □ This results in a rapid reduction in noise level as a function of distance from the source of the sound. Thus the disturbing high noise level is localized at the machine.

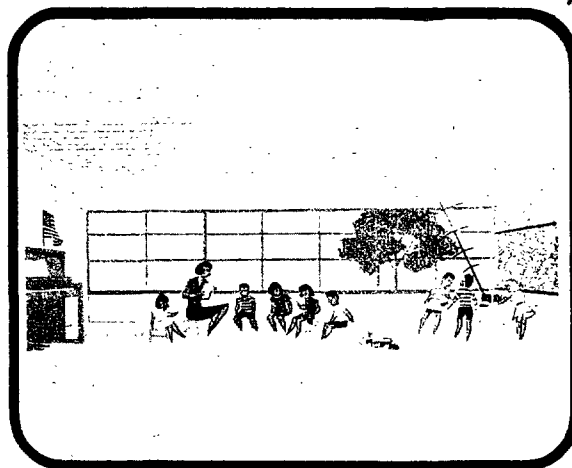
Ref: The Use of Architectural Acoustical Materials. Theory and Practice, p. 17.



PLANNING A "DEAD" ACOUSTICAL ENVIRONMENT. Vocational classrooms and shops fall under the classification of very noisy spaces and should have **dead** acoustical environment. □ These spaces generally contain noisy machines or activities that involve hammering or other noises. □ The acoustical treatment of these rooms should consist of acoustical tile or lay-in board ceilings and acoustical wall treatment of available upper wall areas. □ Special care should be taken to locate rooms of this type in a part of the school building where the noise will not disturb teaching or studying activities.

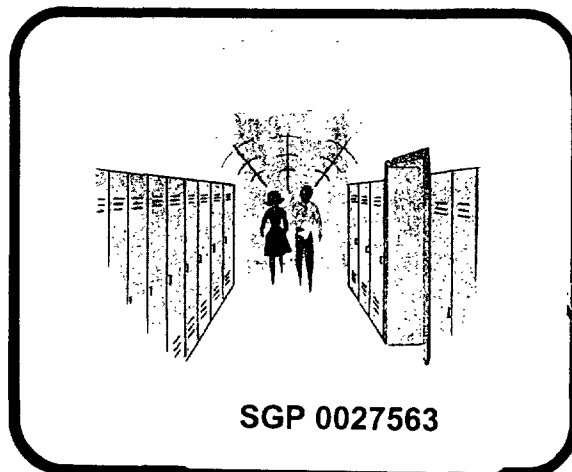
Ref: The Use of Architectural Acoustical Materials. Theory and Practice, p. 17.

THE KINDERGARTEN ACOUSTICAL ENVIRONMENT. The acoustical environment of the kindergarten classroom may be compared to that of the business-machine office or school shop. Both spaces are noisy in their basic function. Children of kindergarten age play with blocks and other toys that generate sufficient noise to require the maximum of acoustical treatment — ceiling and available wall surfaces, in other words, a **dead** room environment. □ The information from teacher to child is usually transmitted over short distances to individual children or small groups. Therefore, sound-reflecting surfaces are not essential.



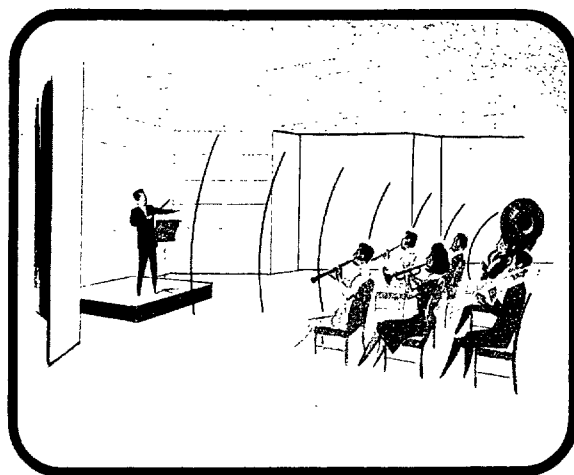
SCHOOL CORRIDORS. Corridors are potential speaking tubes unless they are acoustically **dead** or **medium dead**. A late student walking down a classroom corridor can distract hundreds of other students. □ If the width of the corridor is less than the height, provide acoustical treatment on wall surfaces in addition to the acoustical ceiling.

Ref: The Use of Architectural Acoustical Materials. Theory and Practice, p. 18.

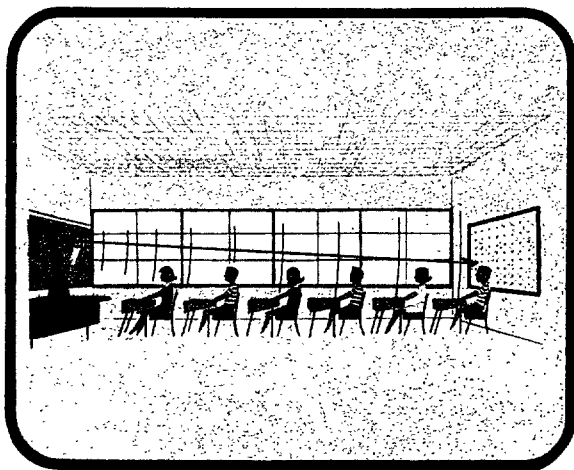


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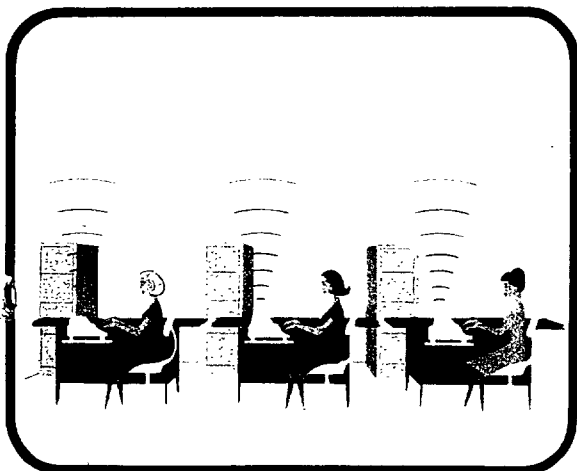
MUSIC ROOMS. Music, when controlled in loudness to conform to room size, is delightful. Music rooms, however, are basically spaces where bands, orchestras, and choral groups practice for performances to be held in large auditoriums or outdoors. □ In order to make these rehearsals realistic for the musician and conductor, it becomes necessary to acoustically treat much of the wall and ceiling surfaces of the room. Specifically, the entire ceiling, sidewalls, and the wall facing the musicians should be acoustically treated to provide a **medium dead** environment. □ The wall behind the musicians may be left sound-reflective to enable the violinist to hear the flute and other instruments. □ Band and music rooms, like shops, should be located in a part of the school building away from standard-use classrooms.



ELEMENTARY-GRADE CLASSROOMS. The elementary-grade classroom is a step up the ladder of the learning environment. Noise, especially in the lower grades, is still the major problem. Moving of chairs, shuffling of feet, talking, can create an irritating level of noise when one is attempting to control a group of energetic youngsters. A highly efficient acoustical ceiling is essential. Supplementing the ceiling absorption with sound-absorbing blankets faced with perforated boards on wall surfaces will be helpful and result in the required **medium dead** acoustical atmosphere.

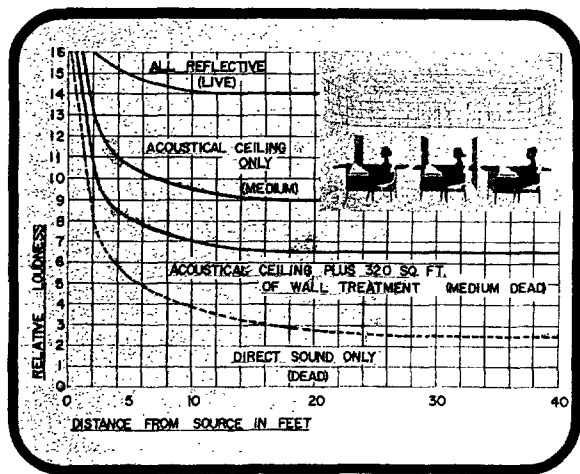


HOSPITAL WORK SPACES. Acoustical-tile ceilings and, if possible, acoustical tile on some wall surfaces as well (a **medium dead** environment) are necessary to reduce the noise level in hospital work spaces. This benefits the hospital employees and reduces the noise radiation to nearby quiet spaces. □ Many metal- or plastic-faced acoustical materials are available that will withstand the abuse and moisture common to these types of rooms. Ref: The Use of Architectural Acoustical Materials. Theory and Practice, p. 17.



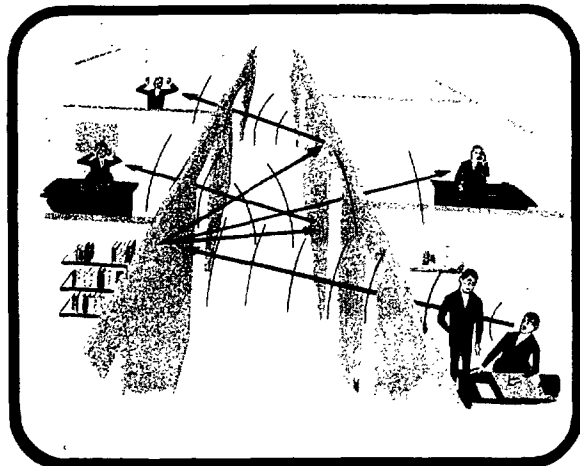
ACOUSTICAL ENVIRONMENT — TYPING OFFICES. An office occupied exclusively by typists may be considered somewhat less noisy than a business-machine space. Although the acoustical treatment of wall surfaces, in addition to the ceiling, is certainly beneficial, it may not be possible because of other uses of the lower wall areas. Filing cabinets, desks, and other furniture may cover these wall surfaces. Acoustical environment required — **medium dead**.

Ref: The Use of Architectural Acoustical Materials. Theory and Practice, p. 17.



ACOUSTICAL TREATMENT – TYPING OFFICES. A highly sound-absorptive ceiling is essential in typing rooms. Preferably the tile or lay-in board should be mechanically suspended for maximum sound absorption. Supplemental treatment of the upper wall areas with acoustical tile will frequently be possible. At 5 ft, the relative loudness of the noise of each typewriter is reduced from 15 to 11 by the acoustical ceiling, or from 15 to 8 when treatment of high wall areas is also included. Final reduction 30%.

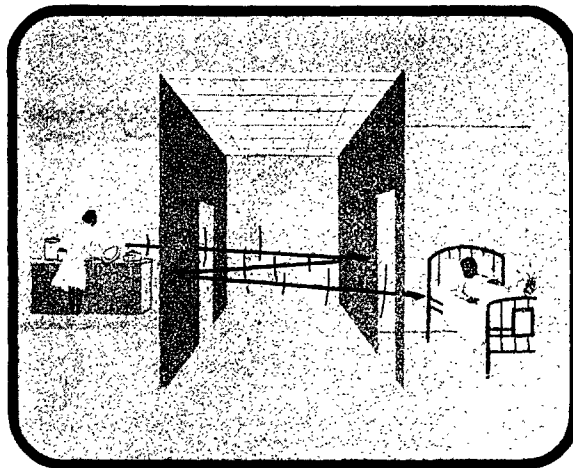
Ref: The Use of Architectural Acoustical Materials. Theory and Practice, p. 17.



OFFICE CORRIDORS. The application of acoustical tile or boards on office corridor ceilings may not provide sufficient separation between offices common to the corridor. □ A **medium dead** acoustical environment is required in the corridor if the corridor width is less than the height. □ It will be necessary to apply acoustical treatment to the wall surfaces of the corridor as well as the ceiling to obtain this environment.

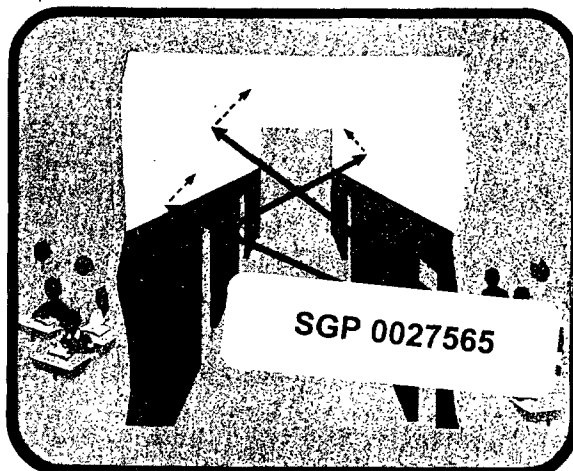
HOSPITAL CORRIDORS. Most noise in hospital patient spaces originates outside patients' rooms. Hallways with sound-reflective surfaces can transmit noise the length of the corridor with amazing clarity. □ Acoustical-tile ceilings are essential to hospital corridors. If the corridor width is less than its height, it becomes advisable to also apply acoustical tile to the wall surfaces of the corridor.

Ref: The Use of Architectural Acoustical Materials. Theory and Practice, p. 18.



SCHOOL CORRIDORS. Some teachers will leave doors ajar. If the open door of one classroom is opposite another classroom, distracting sound transmission will result. While the architect cannot enforce a closed-door policy, he can stagger the door locations and acoustically treat the corridor ceilings and walls to obtain a **medium dead** acoustical environment.

Ref: The Use of Architectural Acoustical Materials. Theory and Practice, p. 18.

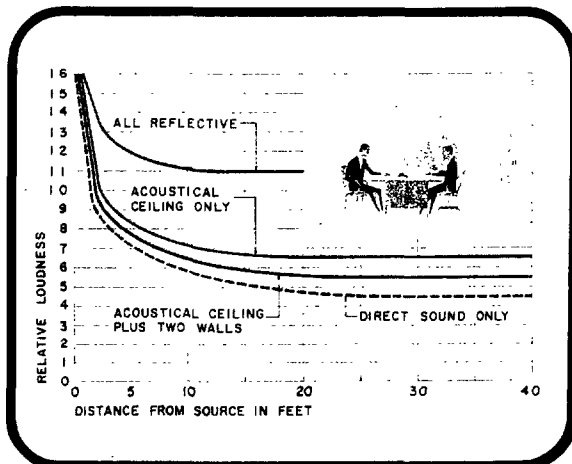


PRIVATE-OFFICE ENVIRONMENT. A private or executive office requires an acoustical environment that may be considered a compromise. Both the reduction of noise and the propagation of speech over short distances are important. What may be called a **medium** acoustical environment is required to maintain a high signal-to-noise ratio for optimum speech intelligibility. Either an acoustical ceiling or sound-absorptive wall treatment, but not both, will provide the optimum environment.

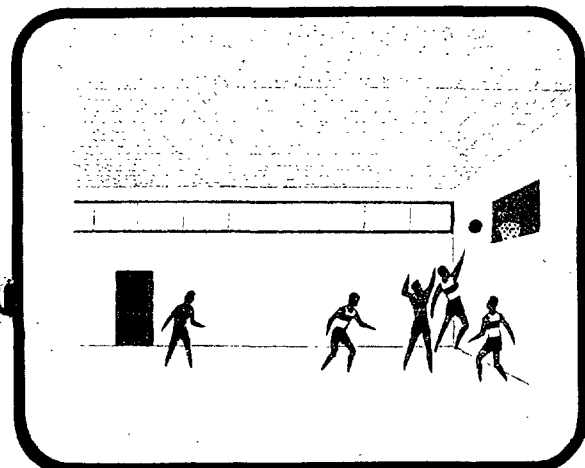


ACOUSTICAL TREATMENT IN PRIVATE OFFICES. Note that at a distance of 5 ft — a conventional distance for speech communication in a private office — a major reduction in noise is accomplished by the acoustical ceiling. Additional acoustical treatment provides little added noise reduction.

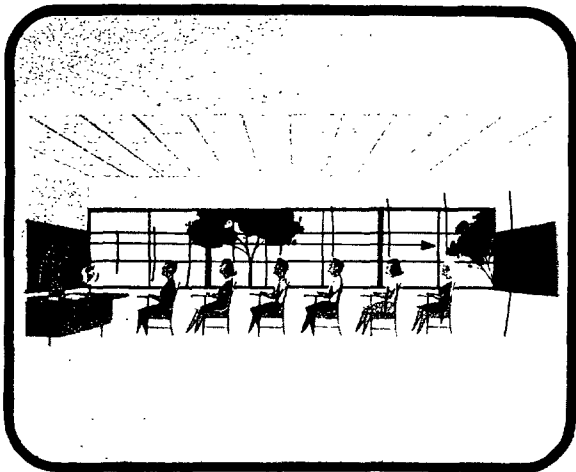
Ref: The Use of Architectural Acoustical Materials. Theory and Practice, p. 17.



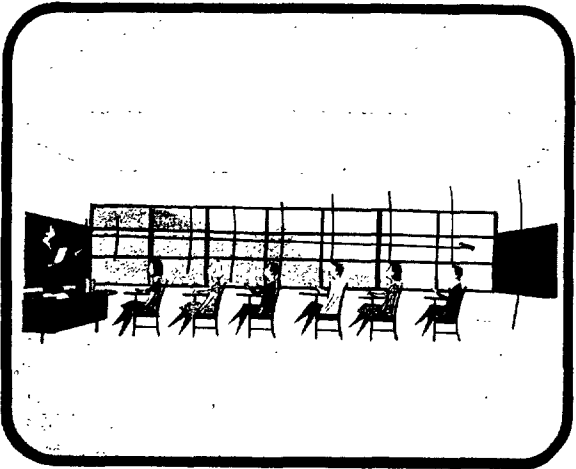
CAFETERIA ACOUSTICAL ENVIRONMENT. The school or office cafeteria should have a **medium** room environment. Usually a highly sound-absorptive ceiling will be satisfactory without supplemental treatment. □ The design of a good acoustical environment encompasses many details. For example, when selecting furniture for a cafeteria, examine the chair and table legs. They should be equipped with smooth glides that permit chair movement without causing stick-slip chatter. Dish trays should be padded with soft rubber to reduce impact noise when the trays are stacked or placed on tables.



GYMNASIUM ENVIRONMENT. When gymnasiums are used for active sports such as basketball and volley ball, it is conceivable that excessive noise is not too disturbing to the players. It must be remembered, however, that the gymnasium is also a classroom used for instruction by the teacher. □ It is therefore necessary to provide the gymnasium with sufficient acoustical treatment in order to obtain a classroom-type environment. This usually means application of acoustical tile or board over the entire ceiling. Environment — **medium**.



HIGH-SCHOOL CLASSROOMS. In the high-school classroom, we reach a level where the student has self-control and the background levels are reduced to normal activity noise. □ The mechanically suspended acoustical ceiling will provide the optimum acoustical environment — **medium** — without additional treatment. While teachers may frequently instruct groups at close distances, their normal speech will also be intelligible over the entire seating area.

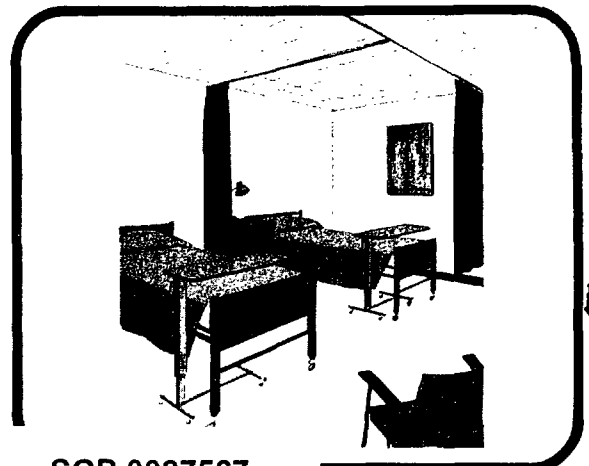


COLLEGE CLASSROOMS. Like high-school classes, the college class presupposes a reasonably quiet, attentive, self-controlled student body. □ The mechanically suspended acoustical ceiling offers the required sound absorption to achieve the necessary **medium** environment.

RESTAURANT ENVIRONMENT. A quiet environment in a restaurant is important for reasons of digestion and health, and also because conversation at the dining table should be encouraged and not drowned out by dish clatter, kitchen noise, and speech noise from the adjoining tables. □ It is essential that the dining area have an efficient acoustical tile or lay-in board ceiling to reduce noise levels and control reverberation in the dining room. Required acoustical environment — **medium**.



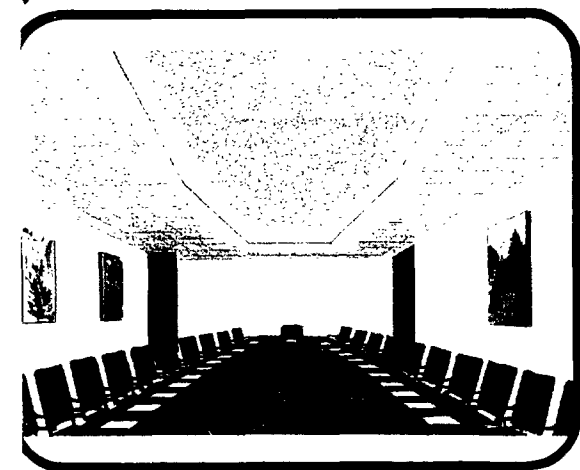
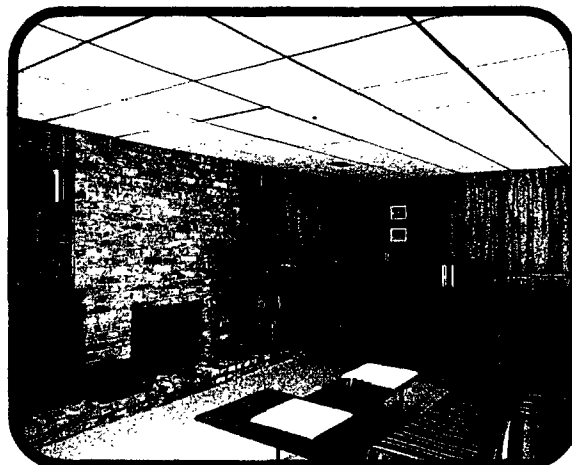
HOSPITAL ENVIRONMENT. A quiet, restful **medium** acoustical environment is essential to a sick person. Acoustical ceilings in wards, semiprivate and private rooms aid in obtaining a quiet atmosphere by localizing and reducing noise from radios and TV sets. The noise of a sick and restless patient is also reduced and is less likely to annoy other patients in the same room.



STORE ENVIRONMENT. Acoustical ceilings lend themselves to the efficiency of store areas not only as a means of reducing noise but also as an aid to the changes of light locations, access to ceiling plenums, and other needs of store-interior adaptability.

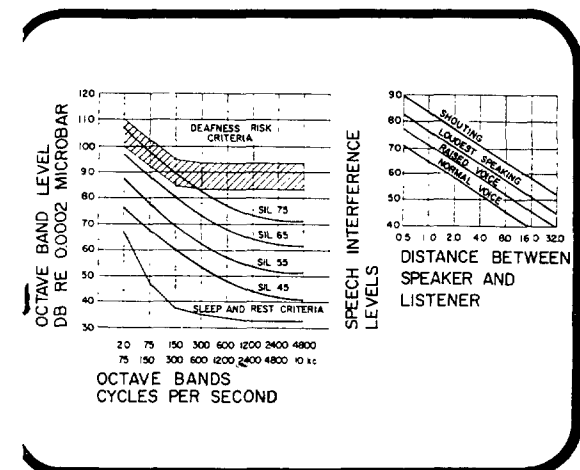


QUIET IN THE HOME. Quiet is becoming the one luxury most difficult to obtain at home. Numerous radios, record players, and television sets have made our homes places of distraction rather than rest. Sound absorption will not return us to a preradio era, but the addition of acoustical ceilings in living areas, play areas, dining rooms, and kitchens will at least localize some of the noise and provide the required **medium** room environment.



SPEECH INTELLIGIBILITY — CONFERENCE ROOMS. Board rooms and conference rooms require that the normal speech signal be intelligible over relatively long distances — occasionally 30 or 35 ft. This acoustical environment may be achieved by allowing the ceiling to act as a sound reflector. Some control of noise is required, however, to maintain the required signal-to-noise ratio. This noise control may be obtained by the application of acoustical treatment to the ceiling periphery or to wall surfaces supplemented with upholstered furniture and carpeting. □ The addition of an acoustical ceiling achieves little added noise reduction once two walls of the room are treated. If the ceiling were made sound-absorptive, however, we would lose a needed sound-reflective surface. Required acoustical environment — **medium live**.

Ref: The Use of Architectural Acoustical Materials. Theory and Practice, p. 16.

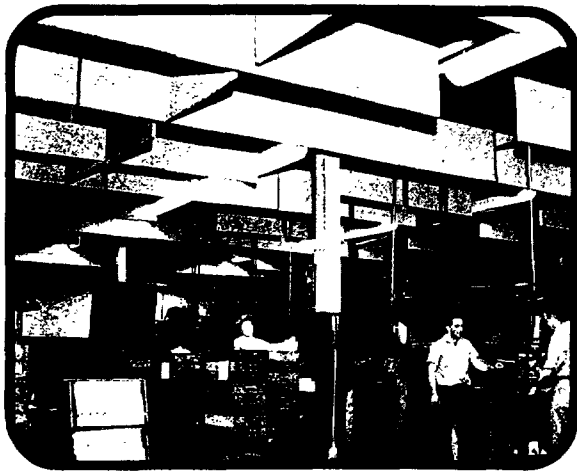


NOISE AND HEARING DAMAGE. While comfort and quiet working conditions are the basis for the majority of noise criteria, the two main problems involving noise in factories are damage to hearing and loss of communication owing to noise. □ Many states have incorporated hearing-damage criteria into their workmen's compensation laws. Hearing damage or loss resulting from a noise exposure in excess of these criteria may result in the award of workmen's injury compensation. □ Noise levels in industrial buildings may be reduced by the installation of highly efficient acoustical ceilings. The amount of noise reduction that can be expected is:

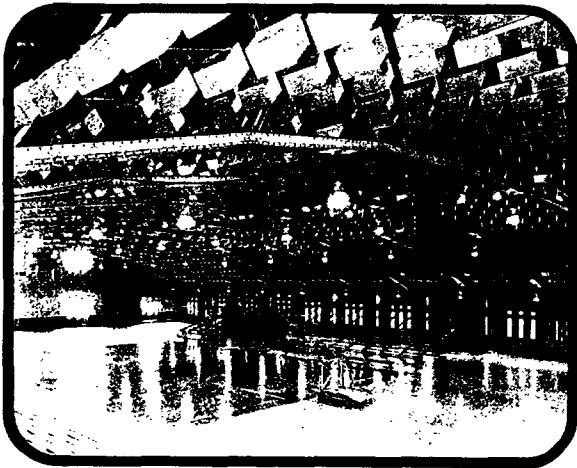
$$\text{NOISE REDUCTION} = 10 \log_{10} \frac{A_2}{A_1} \text{ dB,}$$

where A_1 is the total absorption (sabins) in the room before the application of the acoustical treatment, and A_2 the total absorption (sabins) after the application of acoustical treatment.

Ref: The Use of Architectural Acoustical Materials. Theory and Practice, p. 19.



ACOUSTICAL TREATMENT OF FACTORIES. The overhead conditions of factory spaces may not permit the installation of a conventional acoustical ceiling. Overhead services, belts, power lines, lights, and production equipment often leave little or no room for a continuous suspended acoustical ceiling. In these cases, functional sound absorbers have the equivalent acoustical absorption of 6 to 12 sq ft of acoustical ceiling per unit and may be installed among the various obstructions. □ Functional sound absorbers usually consist of suspended baffles, cylinders, or boxes made of sound-absorptive materials. They are hung vertically in rows across the space and have certain advantages in the form of ease of installation and maintenance. They may be moved and reused when required.



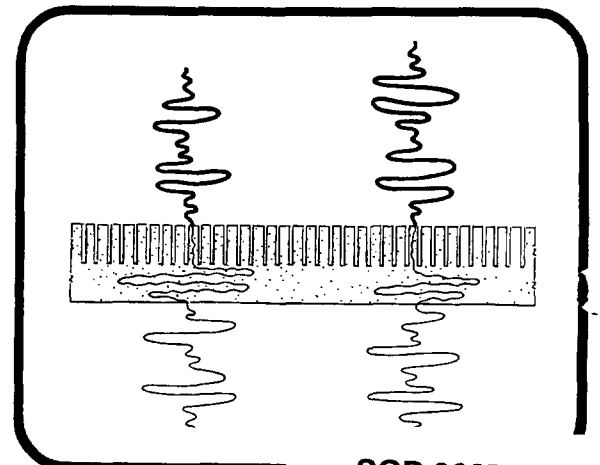
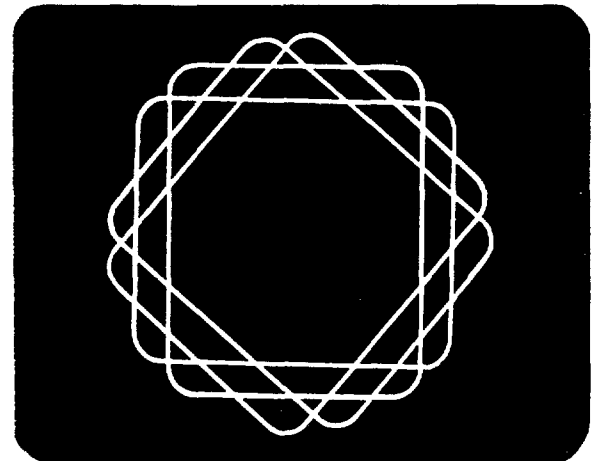
ACOUSTICAL TREATMENT OF ARENAS. Functional sound absorbers may also be used to reduce the reverberation time in large arenas or armories where the structure does not permit the installation of a conventional acoustical ceiling. □ In calculating the absorption provided by the sound absorbers, consideration must be given to the fact that the absorption per unit increases as the space between the units increases. □ Manufacturers of these devices generally provide absorption data giving both the absorption per unit at a stated spacing and also the absorption per square foot of ceiling area at the same spacing.

SLIDES 301-303

PROPERTIES OF ACOUSTICAL MATERIALS

PROPERTIES OF ACOUSTICAL MATERIALS. Sound-absorbing materials such as acoustical tile, boards, and blankets should be used to reduce sound in a room. When so applied, the amount of sound available for transmission through a partition is also reduced, thereby indirectly affecting the noise reduction between two adjacent rooms. □ The application of a sound-absorbing material to a partition, door, or other sound barrier, however, will not substantially improve the sound-transmission loss of the sound barrier.

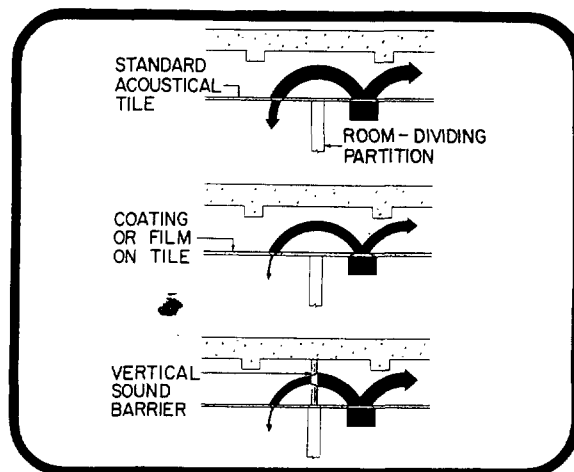
Ref: The Use of Architectural Acoustical Materials. Theory and Practice, p. 25.



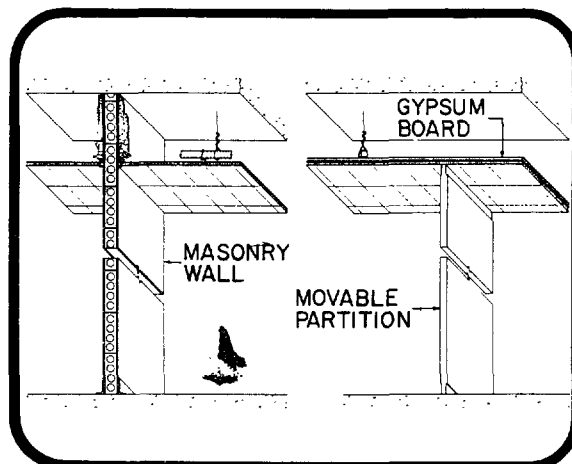
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PROPERTIES OF ACOUSTICAL MATERIALS (continued). The modern practice of installing mechanically suspended acoustical ceilings over large office areas has many advantages. Partitions may be erected to the underside of the suspended ceiling and may be easily relocated as desired without disturbing the ceiling. □ The normal porosity of the acoustical ceiling may permit undesirable sounds to flow up through the ceiling, over the top of the partition, and down on the other side. Thus the effectiveness of the partition as a sound barrier may be bypassed. □ The acoustical-materials industry has made available several solutions to this problem. They include acoustical tile or boards manufactured with impervious back coatings or applied films, and special sound-barrier blankets that may be installed vertically to close the plenum space above the partition.

Ref: The Use of Architectural Acoustical Materials. Theory and Practice, p. 28.

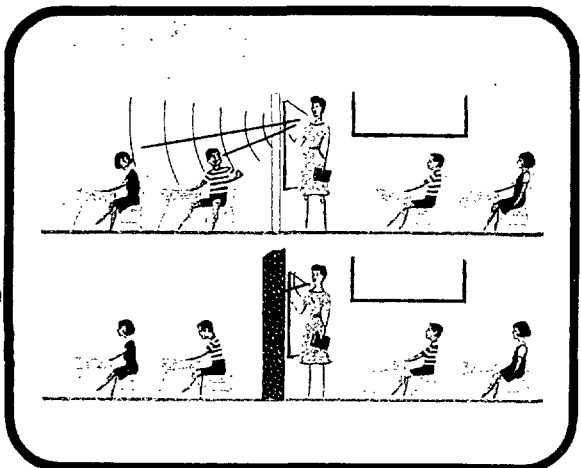
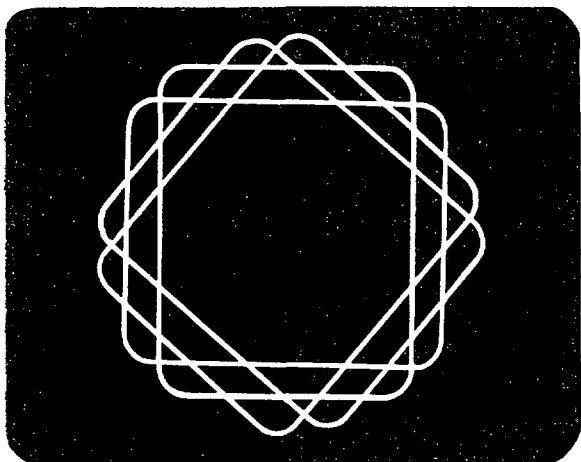


PROPERTIES OF ACOUSTICAL MATERIALS (continued). In addition to these solutions, additional constructions can be used. These may consist of – (a) Extending a masonry wall past the ceiling to the concrete structure above; (b) Installing a suspended gypsum-board ceiling and applying acoustical tile cemented to the gypsum board.



SLIDES 304-321

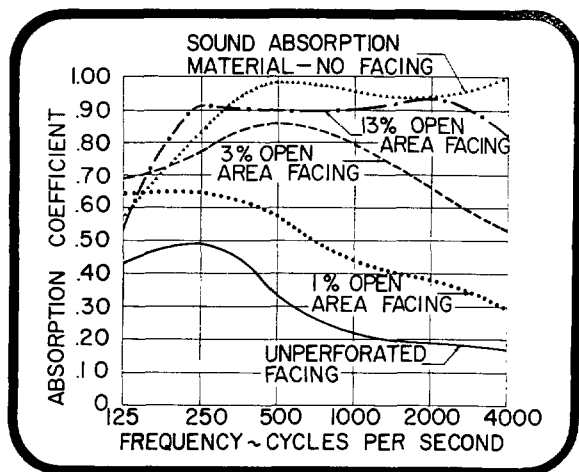
SOUND TRANSMISSION AND ITS CONTROL



SOUND TRANSMISSION. Sound travels through nonporous mediums such as plaster, dense masonry partitions, and concrete slabs by setting up vibrations in the medium. □ A partition between two rooms, for example, when set into vibration by sound on one side, transmits a portion of these vibrations by setting up vibration in the air on the other side. □ The degree to which this sound transmission is acceptable depends upon the quantity and source of the sound and the use of the adjacent space. □ The speech signal of the teacher must be confined to each classroom if we expect the student to study or learn. Picture the effort required by a student sitting at the rear of a classroom trying to listen to his instructor while simultaneously being exposed to the lecture of the teacher in the adjoining classroom. Partitions having a minimum sound-transmission class of 38 are essential between classrooms. (Sound Transmission Class is explained in another slide.) □ In a similar manner, but not necessarily to an equal degree, noise must be confined to avoid disturbance to sleepers, workers in offices, and so on.

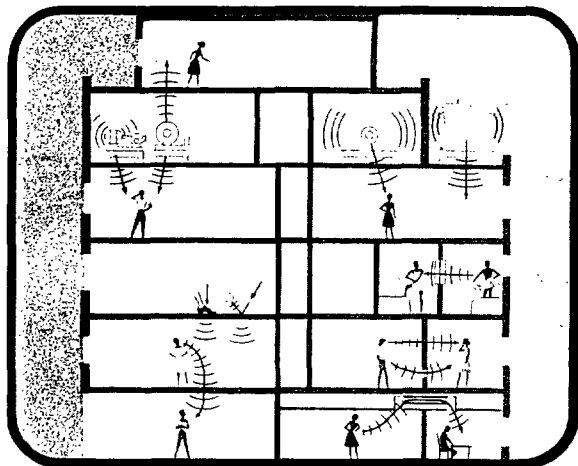
Ref: The Use of Architectural Acoustical Materials. Theory and Practice, p. 25.

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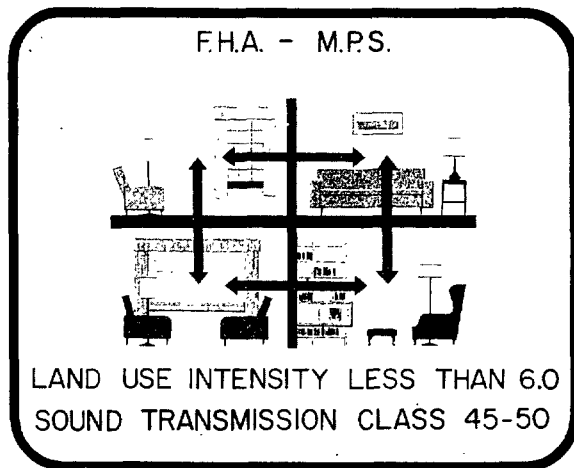
SOUND-TRANSMISSION CLASS. In the ASTM Designation E90-61T, "Tentative Recommended Practice for the Laboratory Measurement of Airborne Sound Transmission Loss of Building Floors and Walls," provision is made for rating walls and other partitions by a single number called the "sound-transmission class." This is a rating system which, in modified forms, has been used successfully in Europe and Great Britain for a number of years. □ The sound-transmission class will likely supersede the nine-frequency average sound-transmission loss, which has been the customary single-figure rating in the past. □ The advantage of the sound-transmission class over the nine-frequency average is shown dramatically by the two sound-transmission-loss curves on this slide, each of which is derived from an actual test. Curve (1) shows the sound-transmission loss of a partition whose sound-transmission class and nine-frequency average are both 30 dB. □ The partition whose transmission loss is given by Curve (2) has a nine-frequency average of 30 dB, but its sound-transmission class is 19 dB. Speech can easily be heard through it. When the architect specifies in terms of the sound-transmission class, he is assured that at no frequency will the sound-transmission loss be lower than the curve that he has in mind.

Ref: The Use of Architectural Acoustical Materials. Theory and Practice, p. 28.



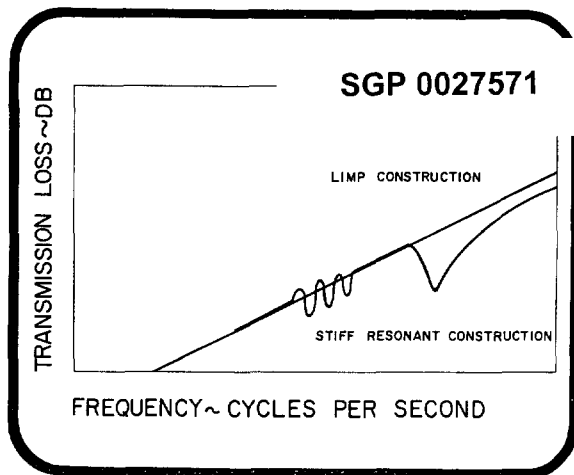
SOUND TRANSMISSION — APARTMENTS. In multifamily dwellings, the sound-transmission loss of partitions, floors, and even doors become extremely important because of the effect of noise on sleep, rest, and health. □ The noise generated by neighbors talking, radios, and TV is transmitted through air before reaching the separating partition or floor. It is therefore designated as airborne sound transmission.

FHA — MPS. The Federal Housing Administration Minimum Property Standards for Multifamily Housing (FHA No. 2600) contains airborne-transmission-loss standards to provide a high degree of acoustic separation and privacy between living units and similar spaces. □ This slide shows the FHA standards for separation of dwelling units. □ The **Land-Use-Intensity** (of less or higher than 6.0) is a reference to potential background noise. A Land-Use Intensity Index of 6.0 or higher can be assumed to have density and traffic-noise levels that will provide a substantial degree of acoustical masking and thus permit poorer sound-transmission-loss values to be used.



STL — MASS LAW. When we say a material has a high sound-transmission loss (STL), we mean that it is efficient in stopping sound, it is a good sound barrier. □ The sound-transmission loss of a construction is dependent upon its mass or unit weight and its limpness. □ Just as sound absorption varies with frequency, the sound-transmission loss also changes with frequency, increasing 5 dB for each doubling of frequency. But this is strictly true only for "limp" or nonresonant materials. Those which are stiff and ring when struck will have a lower transmission loss at their resonant frequencies. □ As might be expected, the transmission loss is greater for heavy structures than for light-weight ones. On the average, the sound-transmission loss increases 5 dB for each doubling of the weight (or doubling of thickness of a homogenous construction). This 5-dB increase for each doubling of weight is the **Mass Law** performance to which you will see frequent reference.

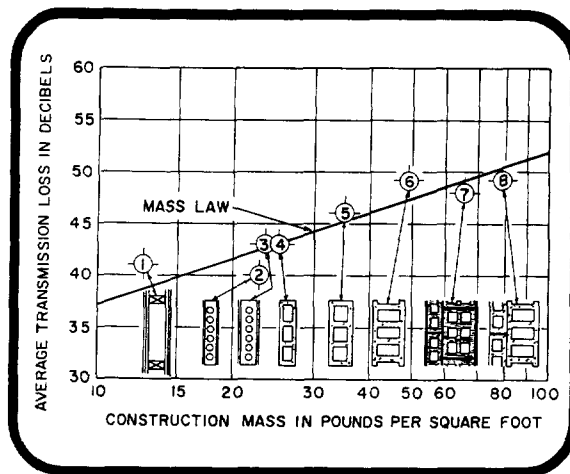
Ref: The Use of Architectural Acoustical Materials. Theory and Practice, p. 26.



MASS LAW (continued). Many standard partition constructions in general use depend upon weight or mass for adequate sound insulation. □ Massive constructions are very useful to a point. For example, a partition having a density of 10 lb per sq ft may have a sound-transmission loss of about 37 dB. If we need better sound-transmission loss and we double the mass, we gain about 5 dB for each doubling: 20 lb, 42 dB; 40 lb, 47 dB. However, we soon run out of weights that are permissible in a building.

Construction

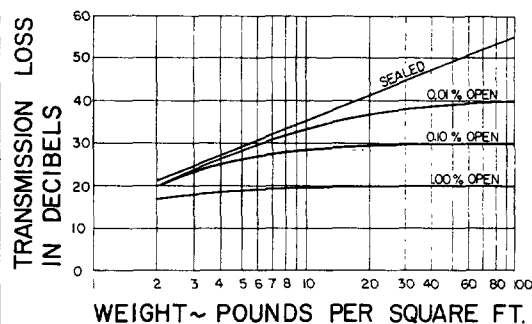
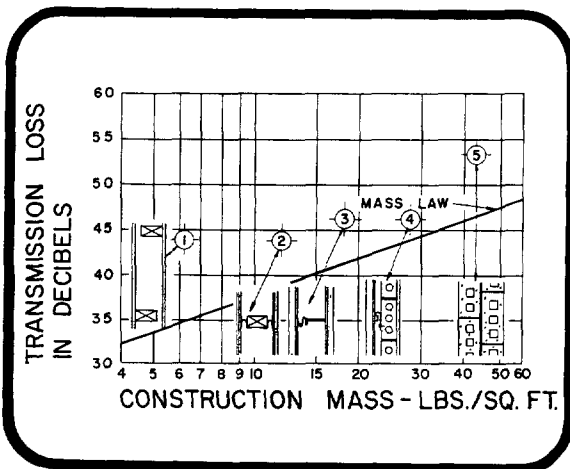
1. 2"x4" wood studs, 16" o.c.; 2 layers of gypsum board; joints cemented and taped;
2. 3" hollow gypsum blocks; ½" sanded gypsum plaster both sides;
3. 4" hollow gypsum blocks, ½" sanded gypsum plaster both sides;
4. 4" hollow dense block – unpainted;
5. 6" hollow dense block – unpainted;
6. 8" hollow dense block – unpainted;
7. 4" and 8" hollow clay tile blocks; ⅝" gypsum plaster both sides;
8. 12"-thick wall; 8" and 4" hollow concrete blocks.



STL – COMPLEX CONSTRUCTIONS. A solution to problems requiring better sound-transmission loss than can be achieved by weight is to use double- or even triple-wall constructions with resilient coupling and maximum air space between the component walls. □ Typical partition constructions of this type include drywall or plaster skins resiliently connected to steel or wood studs, or masonry block with resiliently fastened plaster skins on one or both sides.

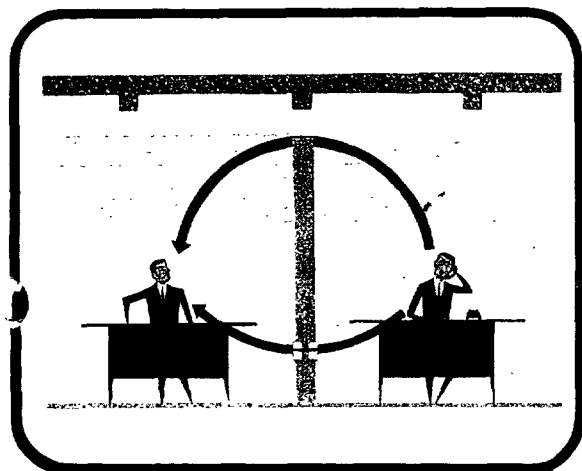
Construction:

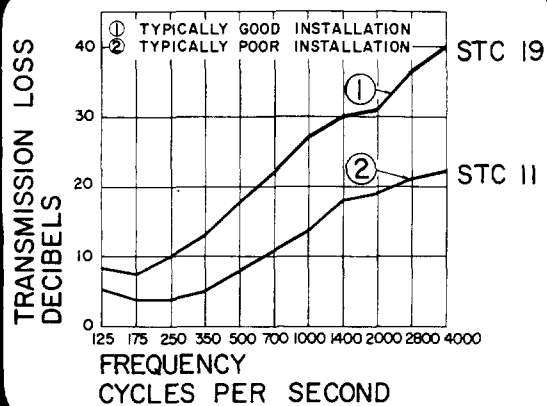
1. 2"x3" wood studs, 16" o.c., staggered; ½" gypsum board; joints cemented and taped.
2. 2"x4" wood studs, 16" o.c.; spring clips, ⅜" gypsum lath; ½" gypsum plaster each side.
3. 1½" steel truss studs, 16" o.c.; one side metal lath and ⅝" gypsum plaster; other side, resilient clips, metal lath, ⅝" gypsum plaster.
4. 3" hollow gypsum blocks; one side ½" gypsum plaster; other side, resilient clips, expanded metal lath, ⅝" gypsum plaster.
5. 4" hollow cinder and 4" hollow stone-sand blocks; ⅜" cavity.



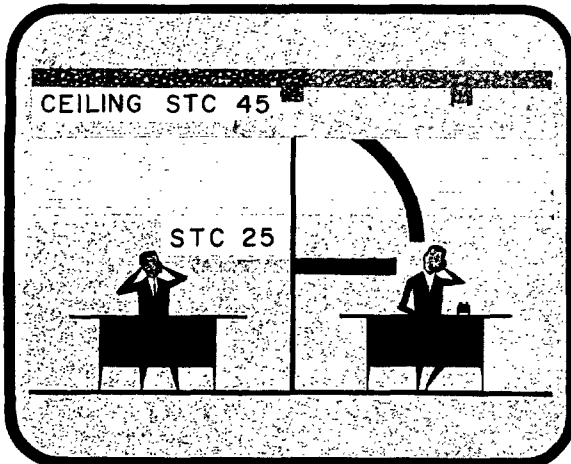
OPENINGS IN SOUND BARRIERS. Any opening in a partition or floor, however small, will increase the sound transmission of the entire partition. □ Between apartments the openings or reduction in sound insulation will usually occur at piping holes, electrical conduits, back-to-back medicine cabinets. □ These leaks should be caulked, plastered, or otherwise packed to avoid compromising the partition or floor isolation effectiveness.

SOUND LEAKS – OFFICE PARTITIONS. Weakness in partitions between offices usually turns up in the form of a crack between the movable partition and the acoustical ceiling, or through back-to-back electrical boxes, or at window mullion closures. □ Details of these potential sound paths should be checked on the drawings before the work is installed.





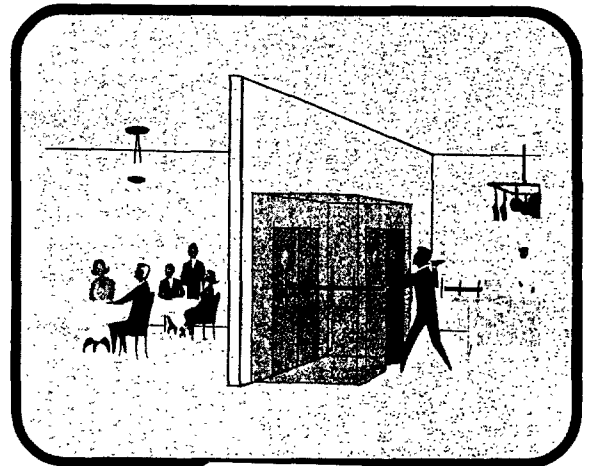
TRANSMISSION LOSS AND WORKMANSHIP. The variation in sound insulation between a good and a poor installation of the same partition can be substantial. □ This slide shows data obtained on two partitions constructed of the same materials. One of these partitions was installed with meticulous attention given to joints at the floor, ceiling, and walls. It had a sound-transmission class of 19. □ The other partition construction was not supervised and had numerous cracks that were not too noticeable but nevertheless provided sound-transmission paths. The poorer workmanship resulted in a partition which had a sound-transmission class of 11. □ Supervision is necessary to obtain results in the field that will duplicate or approach the laboratory rating of the construction.



SOUND BARRIERS — OFFICES. It is poor practice to select a ceiling with a 45-dB sound-attenuation factor and a partition with a sound-transmission class of 25. □ Functionally, the construction will be inadequate for speech privacy. □ Economically, the high ceiling attenuation, by itself, will not provide speech privacy.

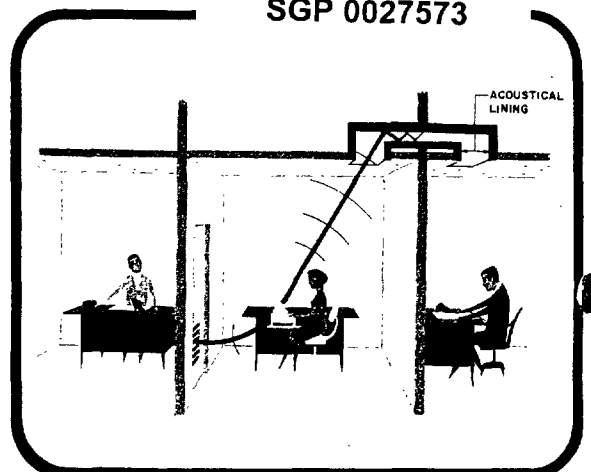
SOUND BARRIERS — RESTAURANTS. Notice how kitchen noise must be controlled with a door-vestibule-door connection to the dining room. This is necessary to prevent bursts of noise from intruding into the dining room when a waiter opens one of the kitchen doors. □ Where operating conditions impose problems that cannot be solved with solid constructions, alternate solutions must be devised. The acoustically treated vestibule has been used as a sound lock in many broadcasting and recording studios. It can also be used in other applications.

Ref: The Use of Architectural Acoustical Materials. Theory and Practice, p. 16.

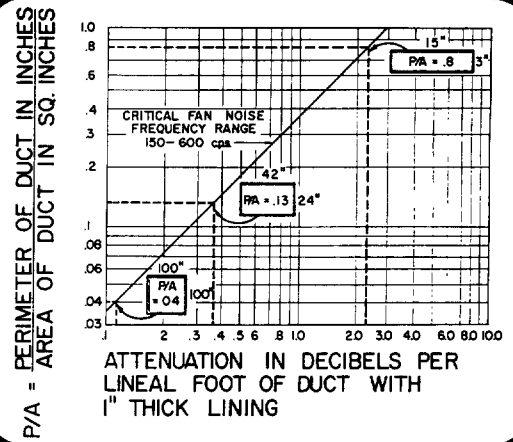


SOUND BARRIERS — VENTILATION. A louver or undercut door can almost completely nullify the sound insulation between two offices. □ If air transfer between offices is required, use a duct lined with sound-absorbing material.

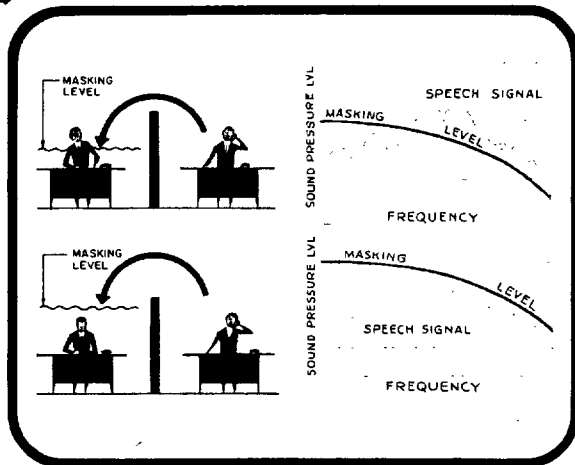
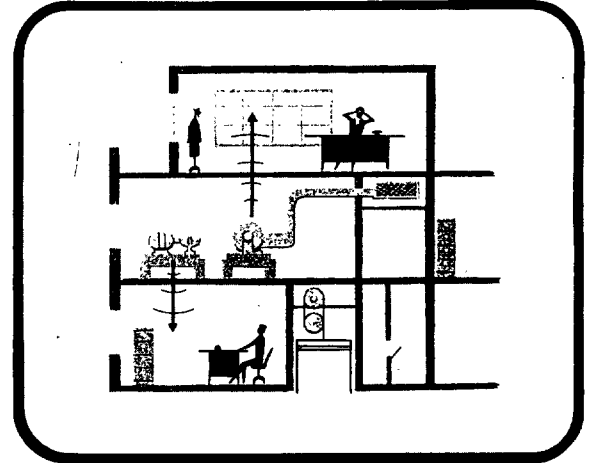
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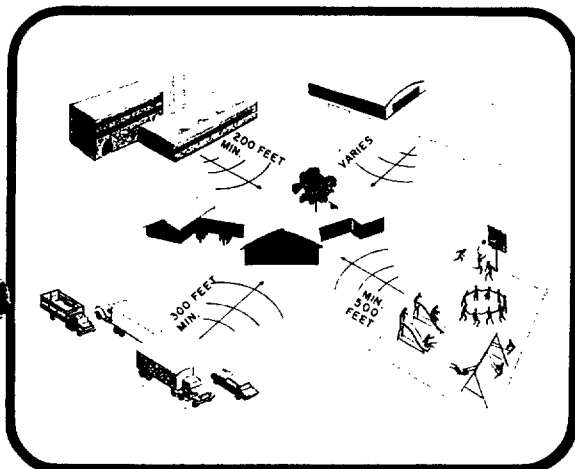
SOUND BARRIERS — DUCTWORK. Many AMA companies manufacture acoustical lining materials for ductwork. □ Use duct lining in small- and medium-sized ducts for adequate fan-noise silencing. 1"-thick lining is more efficient than ½"-thick lining. The larger the perimeter of the duct as related to the cross section, the greater the noise reduction through the duct. □ Ducts of short length but relatively large cross section may require specially constructed silencers to provide adequate sound insulation.



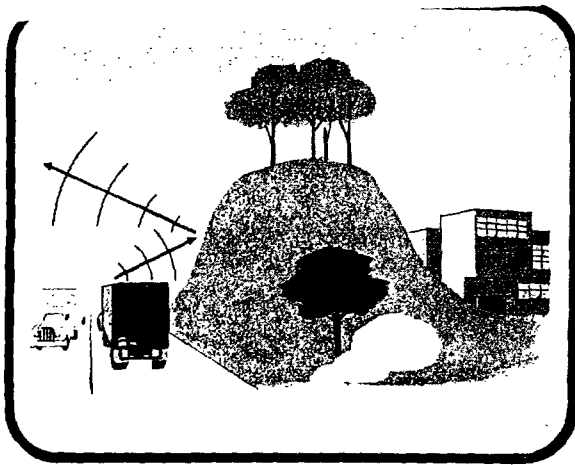
SOUND BARRIERS — MECHANICAL EQUIPMENT. Don't locate a conference room or private office vertically or horizontally adjacent to a noisy mechanical equipment room — you may be expecting too much from the floor or partition construction in the way of sound-transmission loss. □ Other spaces that require segregation for acoustical reasons are bookkeeping-machinery spaces, pneumatic-tube rooms, toilets, boiler rooms, music rooms.



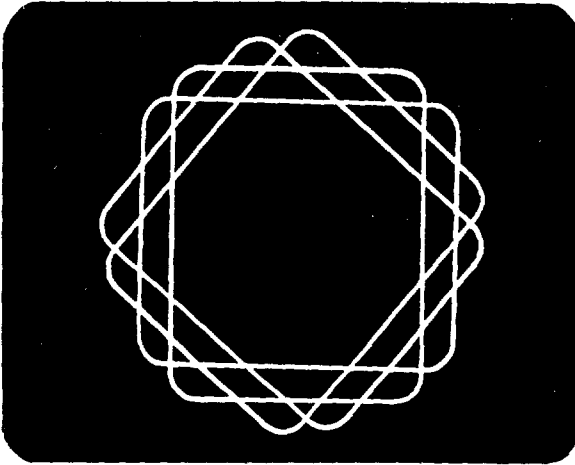
SOUND BARRIERS — MASKING SOUND. The ability to understand speech is related to the degree that the speech signal is louder than the background noise. For example, I must raise my voice above the noise generated by the occupants of this room and the noise of the slide projector. The relationship of the speech signal to the background noise is called the signal-to-noise ratio. □ While we want a large signal-to-noise ratio in an auditorium, conference room, or classroom where it is important that we understand the speaker, the reverse is true when we encounter a problem where it becomes important to **not** understand the speaker. □ One such case is shown on this slide where a free-standing partition separates two persons conducting tasks requiring thought or telephone use. In this instance, the designer may consider developing an increase in background-noise level to "mask" the speech signals passing over the partitions. □ Masking noise can be increased until it reaches the threshold of annoyance. □ The masking level may be increased by ventilating or air-conditioning diffuser noise or by electronically generated sound.



SOUND BARRIERS — DISTANCE. Avoid building sites that neighbor noisy airfields, main truck routes, or railroad switching yards if you are designing a building that needs quiet. □ The construction costs of preventing transportation noise from intruding will be very high. At such locations, special precautions such as double-glazing, double entrances, special roof constructions, and ventilating systems with sound traps will be required to maintain acceptable noise levels inside the building.



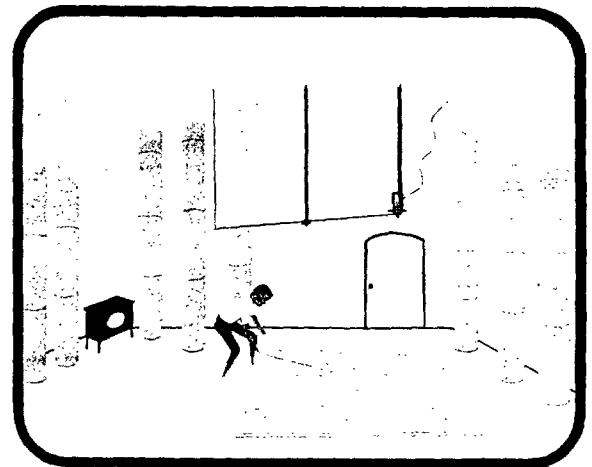
SOUND BARRIERS — TOPOGRAPHY. The natural topography of the building site may be used to shield a building from a noise source. The shield must be substantial in height to provide any worthwhile attenuation. The maximum attenuation that may be expected is on the order of 25 dB. □ Woods and shrubbery will also attenuate sound, but only if they are dense, high, and deep, so deep as to preclude general consideration of this means of control. Usually, fences or hedges do not provide sufficient noise control to be considered as a solution to a noise problem.



SLIDES 401-412

TEST METHODS

TEST METHOD — SOUND ABSORPTION. The Acoustical Materials Association publishes a yearly bulletin entitled "Performance Data — Architectural Acoustical Materials." The sound-absorption data contained in this publication are obtained in accordance with the American Society for Testing and Materials Designation C423-60T, "Tentative Method of Test for Sound Absorption of Acoustical Materials in Reverberation Rooms." The test room is shown on this slide. A bandwidth of sound of the frequency of interest is generated in the room with and without the acoustical material in place. The decay time of the sound after it has been abruptly cut off is measured and the efficiency of the tile is rated as a function of the time that it takes the sound to fade away. The shorter the decay time, the more efficient the material.



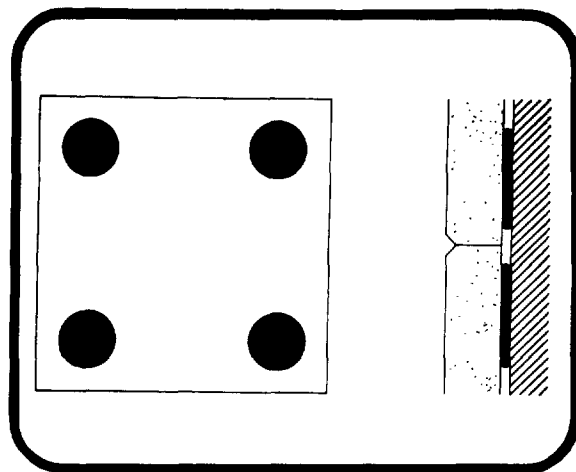
NOISE-REDUCTION COEFFICIENT. Specifications for acoustical tile or board ceilings are usually written using a single figure called the "noise-reduction coefficient." The noise-reduction coefficient (NRC) of an acoustical material is the arithmetic average of its absorption coefficients at 250, 500, 1000, and 2000 cps. This NRC is expressed in catalogs to the nearest multiple of 0.05 and should be chosen in 10-point ranges because a difference of less than 10 points is not detectable in a completed installation.

FREQUENCY CPS	SOUND ABSORPTION COEFFICIENT
125	.55 OMIT
250	.59
500	.66
1000	.88
2000	.92
4000	.82 OMIT
4 FREQ. TOTAL 3.05	
NOISE REDUCTION COEFFICIENT	
$NRC = \frac{3.05}{4} = .75$	

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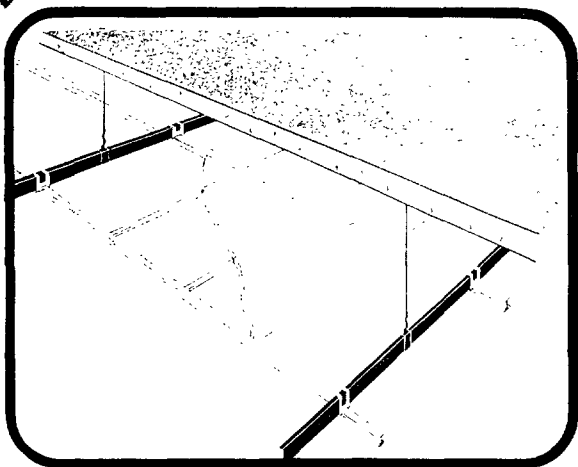
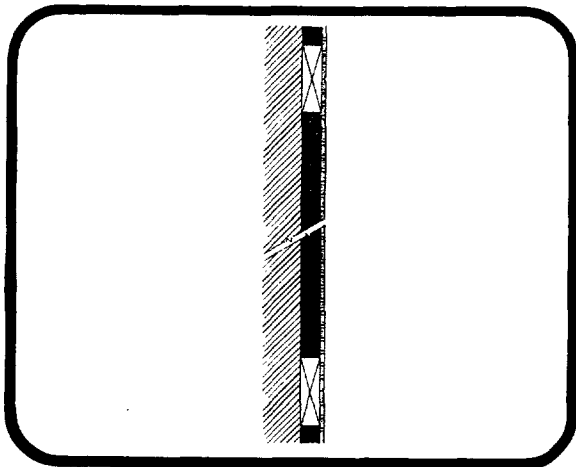
ACOUSTICAL-MATERIAL INSTALLATION MOUNTING NO. 1. When tested in the laboratory, products are installed on mountings that simulate field conditions of application. Several different mountings are used since the sound absorption varies with the **mounting depth**, the distance from the exposed face of the material to the structure behind it. Mounting Number 1, shown on this slide, duplicates the application of acoustical tile cemented to gypsum board, plaster, concrete, or other dense surfaces.

Ref: Acoustical Materials Association Bulletin.



ACOUSTICAL-MATERIAL INSTALLATION MOUNTING NO. 5. An acoustical treatment commonly used on wall surfaces consists of wood furring with sound-absorbing blanket or pad inserted between the furring. The furring and blanket are then covered with a perforated facing, usually perforated asbestos cement board, perforated hardboard, or perforated metal. □ This construction is called Mounting No. 5.

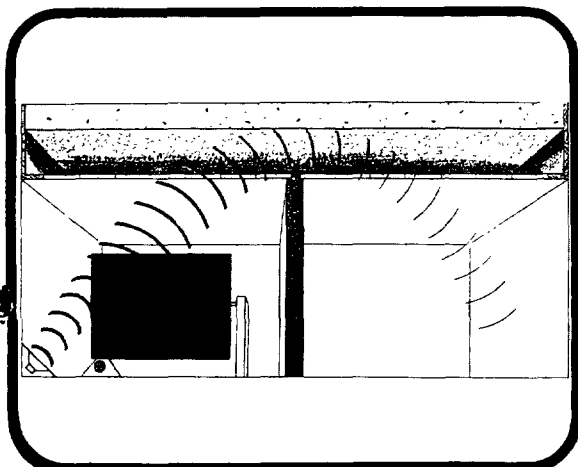
Ref: Acoustical Materials Association Bulletin.



ACOUSTICAL-MATERIAL INSTALLATION MOUNTING NO. 7. Tests at a 16" mounting depth have been found to provide sound-absorption coefficients that are representative of the performance attained with plenum depths found with most suspended ceilings. This test condition is designated Mounting No. 7.

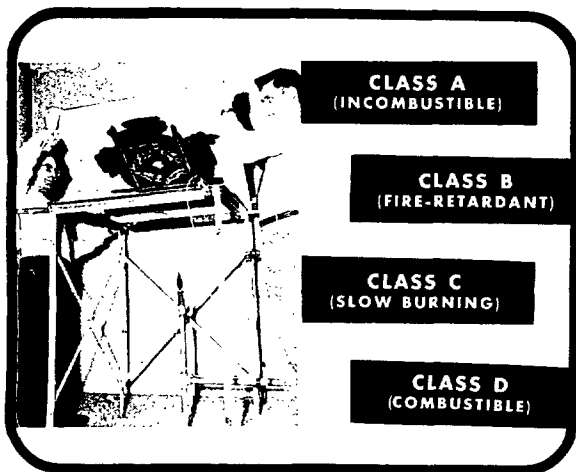
Ref: Acoustical Materials Association Bulletin.

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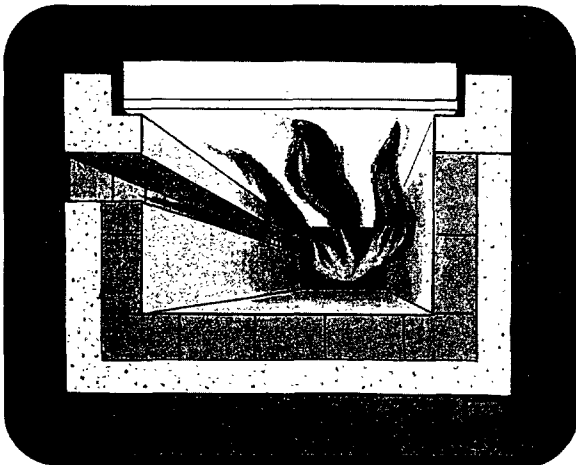
TEST METHOD—ATTENUATION FACTOR. Another important characteristic of acoustical tile and boards is the sound transparency of these materials. Practically all sound-absorptive materials consist of a structure of interconnecting pores, and sound will transmit through the acoustical material with varying degrees of efficiency, depending upon its density, how the tile or board is backed, and how it is installed. When acoustical tile or board is installed on a mechanical suspension system, a certain amount of sound is transmitted through the acoustical ceiling to the air space or plenum space above the ceiling. If partitions are erected to the underside of the acoustical ceiling, the sound in the plenum can transmit down through the acoustical ceiling on the other side of the partition. □ The Acoustical Materials Association test method AMA-1-II evaluates the resistance to sound transmission of the over-the-partition sound path. The data are reported as "ceiling attenuation factors," and these too, are listed in the Acoustical Materials Association Bulletin. □ This slide shows a section through the two-room test chamber used in the AMA-1-II test. Eleven 1/3-octave bands of noise are generated in one room and are measured in the source room and also in the receiving room at 10 microphone locations. After these 110 measurements are made, the microphones are switched and the process is repeated for a total of 220 measurements. The data are averaged and published for the 11 frequencies of interest over the frequency range of 125 to 4000 cps.

Ref: Acoustical Materials Association Bulletin.



TEST METHOD – FLAME RESISTANCE. The flame-resistance test is intended to rate the susceptibility of a surface to ignite when exposed to heat or flame and also to measure the relative rate at which flame will then advance along that surface. □ This test method is also referred to as the flame-resistance test as a result of the use of this description in the Federal Specification SS-A-118b.

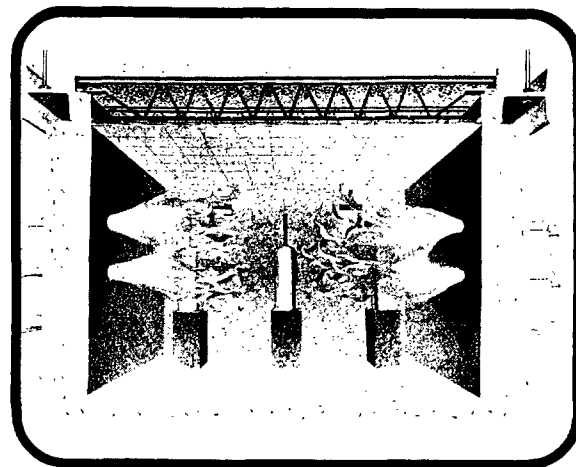
Ref: Acoustical Materials Association paper entitled "Combustibility Tests Applied to Interior Finishes."



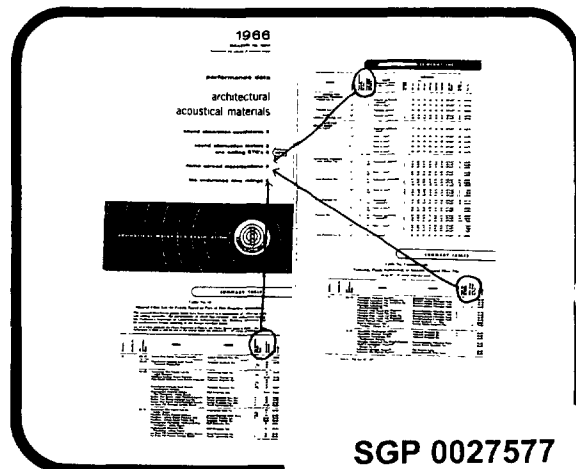
TEST METHOD – FLAME-SPREAD TUNNEL TEST. ASTM E84-61, Test for "Surface Burning Characteristics of Building Materials," frequently referred to as the "tunnel test," also rates the spread of flame. This test, however, compares the surface flame spread to that of wood: specifically, red oak. □ The product specimen is installed as the top side of a horizontal tunnel, 17½" wide by 12" high by 25' long. A flame at one end of the tunnel is in contact with the sample and a fan on the exhaust end provides a standard draft. In addition to the red oak, a control specimen of cement-asbestos board is used to determine zero flame-spread index. The red-oak flame-spread index is 100.

TEST METHOD – FIRE RESISTANCE. Time-rated fire tests of building constructions and materials are conducted in accordance with ASTM E119-61. □ Whereas the flame-resistance and flame-spread tests are primarily studies of surface phenomena, the fire-resistance test is a study of structural integrity and the construction's ability to limit transmission of heat and prevent penetration of flame. □ Acoustical tile and lay-in panel ceilings can provide fire protection equal to plaster. However, it must be remembered that tests conducted under this test standard apply to a composite construction including a ceiling and not a ceiling by itself. □ Fire resistance is measured in hours or fractions of hours.

Ref: Acoustical Materials Association paper entitled "Combustibility Tests Applied to Interior Finishes."

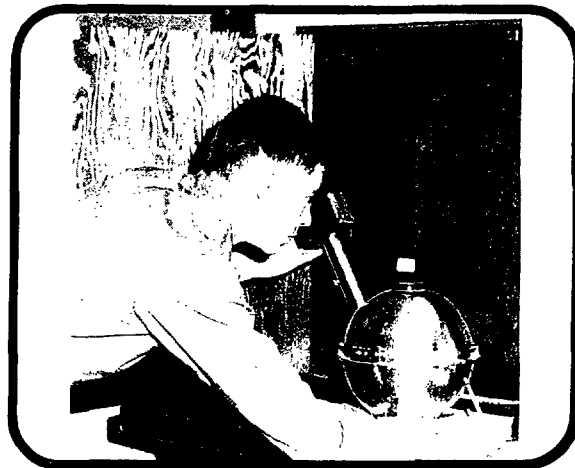


ACOUSTICAL MATERIALS ASSOCIATION BULLETIN. Acoustical Materials Association members publish flame-spread classifications (both SS-A-118b and ASTM E84-61) and fire-resistance time ratings (ASTM E119-61) in the AMA annual bulletin for their acoustical-ceiling products and for composite constructions that include acoustical ceilings.



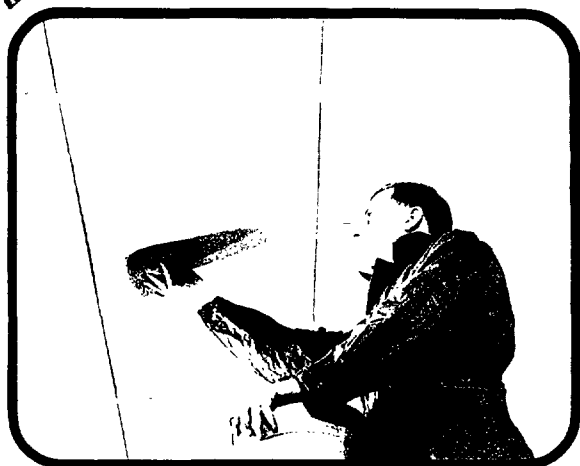
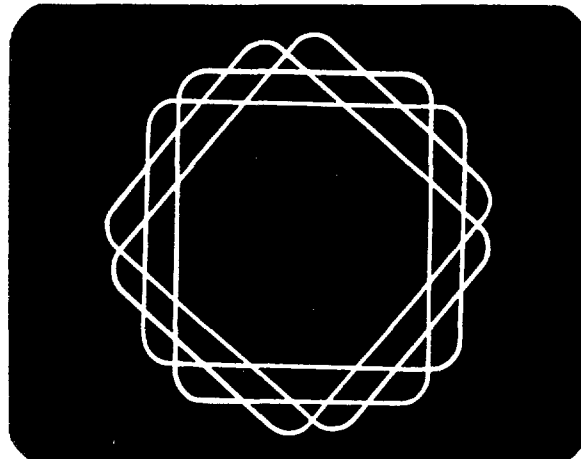
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TEST METHOD — LIGHT REFLECTANCE. Good lighting involves not only electricity and daylight, but the whole design and furnishing of a room as well. □ The largest plane light source in a room is usually the ceiling. It is important, therefore, for the architect to be able to specify the light reflectance of the ceiling material. □ The method used to measure the light-reflectance property of acoustical tile or lay-in panels is ASTM Designation E-23-63T, "Light Reflectance of Acoustical Materials by the Integrating Sphere Reflectometer." The test instrument is shown on this slide. □ The summary tables of the Acoustical Materials Association Bulletin list the range of light reflectance values of newly manufactured materials as follows: (a) 0.75 or more; (b) 0.70 to 0.74 inclusive; (c) 0.65 to 0.69 inclusive; (d) 0.60 to 0.64 inclusive.



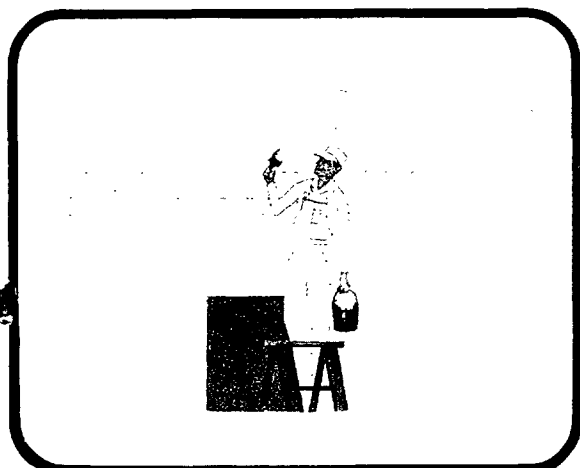
SLIDES 413-416

MAINTENANCE



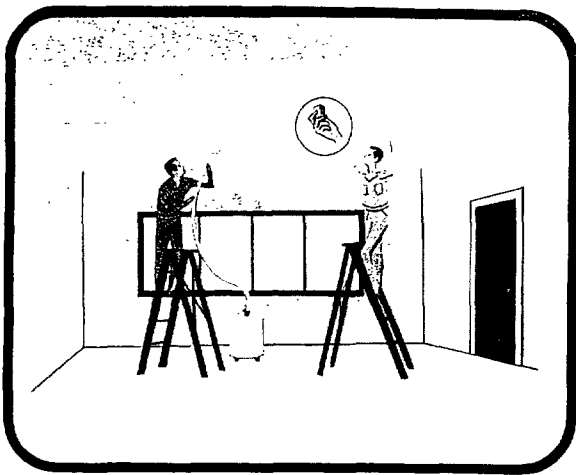
CEILING MAINTENANCE — WASHING. In addition to acoustical efficiency, sound attenuation, noncombustibility, and light reflectance, maintenance may also be a consideration in selection of a ceiling material. □ The manufacturer's literature will indicate whether a specific acoustical-ceiling material can be cleaned by washing. If the material is washable — (a) use a cloth or sponge wrung dry; (b) rinse by wiping with damp cloth or sponge dipped frequently into water.

Ref: "How to Clean and Maintain Acoustical Tile Ceilings" published by Acoustical Materials Association.

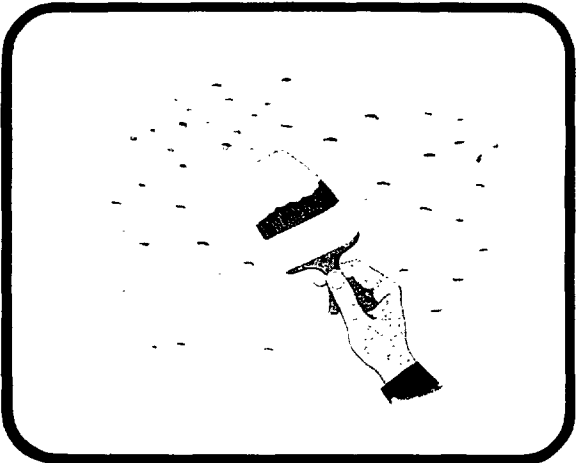


CEILING MAINTENANCE — PAINTING. When the manufacturer's literature will permit the ceiling to be painted, use the following procedures: (a) avoid clogging or bridging the holes, openings, fissures, or striations; (b) use interior paint of good quality; (c) use paint well-thinned out and apply only a small quantity at a time — do not fill brush and attempt to brush out.

Ref: The Use of Architectural Acoustical Materials. Theory and Practice, p. 24.



CEILING MAINTENANCE — DRY CLEANING. When the manufacturer's literature indicates that painting a ceiling material will reduce its efficiency, other methods of cleaning may be used. □ Acoustical ceilings will stay fresh and new looking if maintained periodically by (a) vacuuming loose dirt; (b) removing small spots and streaks with an artgum eraser or paste-type wallpaper cleaner.
Ref: "How to Clean and Maintain Acoustical Tile Ceilings" published by Acoustical Materials Association.

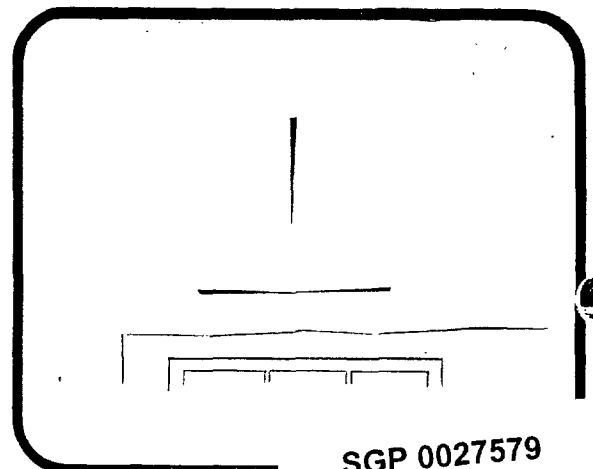
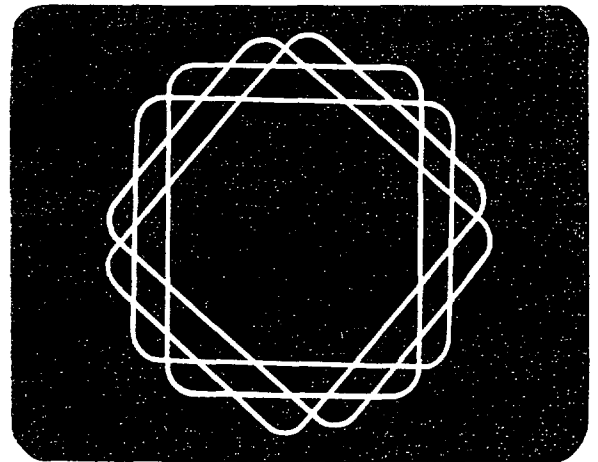


REPAINTING — A FACTOR IN CEILING SELECTION. If use or environmental conditions indicate that a ceiling will require frequent painting, specify acoustical tile with large perforations. □ Paint will not readily bridge the large holes and the acoustical efficiency of the ceiling will remain unimpaired after repeated painting.

SLIDES 417-423

INSTALLATION PRACTICES

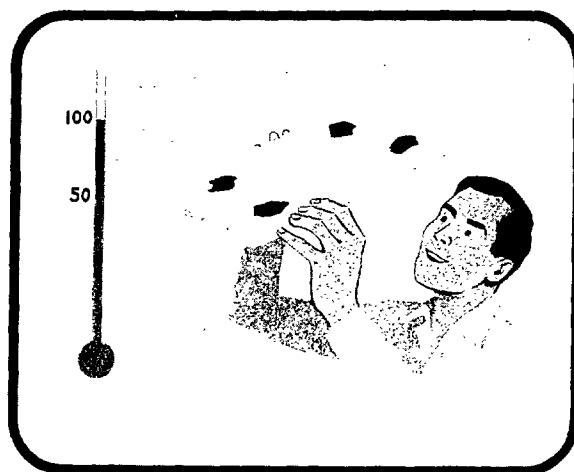
ACOUSTICAL CEILINGS — DAMPNESS. The quality of acoustical tile and lay-in boards manufactured in the United States of America is the highest of any country in the world. □ Acoustical ceilings that are unsatisfactory in appearance are usually the result of poor application or disregard of the manufacturer's instructions. □ Application of a ceiling material to damp plaster or in a damp room may cause dimensional changes in the tile and failure in the adhesive.
Ref: Acoustical Materials Association Bulletin.



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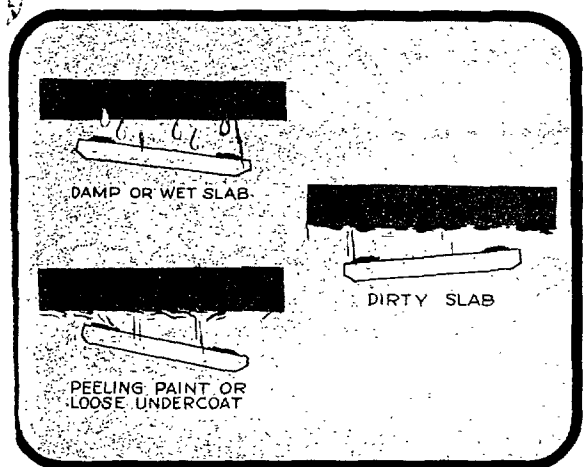
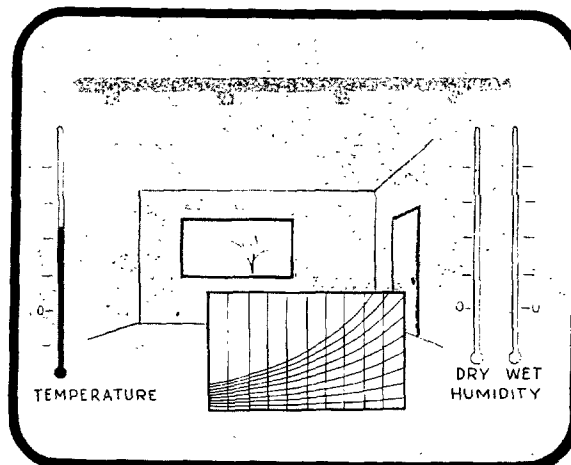
ACOUSTICAL CEILINGS — TEMPERATURES DURING INSTALLATION. The temperature of the tile cement and the surface to which tile is cemented may also cause cement failure. Do not cement acoustical tile when the room temperature exceeds 100°F or when the room or cement temperature is below 50°F.

Ref: Acoustical Materials Association Bulletin.



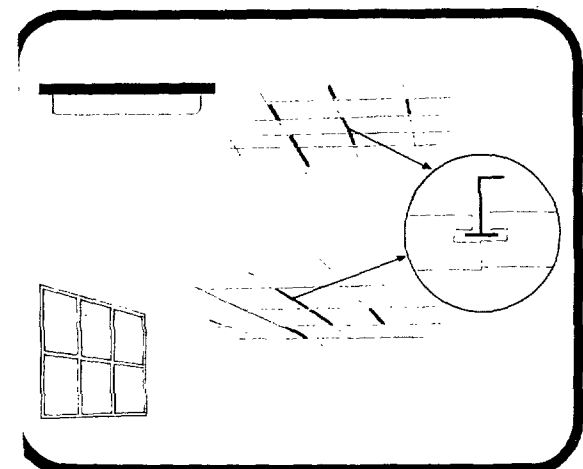
ACOUSTICAL CEILINGS — STORAGE ON JOB. Before the acoustical tile is installed, it should be permitted to reach room temperature and have a stabilized moisture content. Do not, however, install acoustical ceilings in a room where the temperature or humidity conditions vary greatly from temperatures and conditions that will be normal to the occupied room.

Ref: Acoustical Materials Association Bulletin.



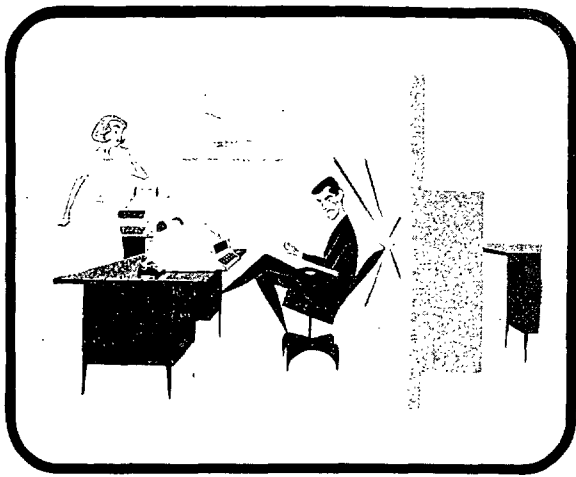
INSTALLATION PRECAUTIONS. Do not attempt to cement acoustical tile to surfaces that are not dry or clean. Tile cemented to a painted surface will fall if the paint is loose or peeling.

Ref: Acoustical Materials Association Bulletin.

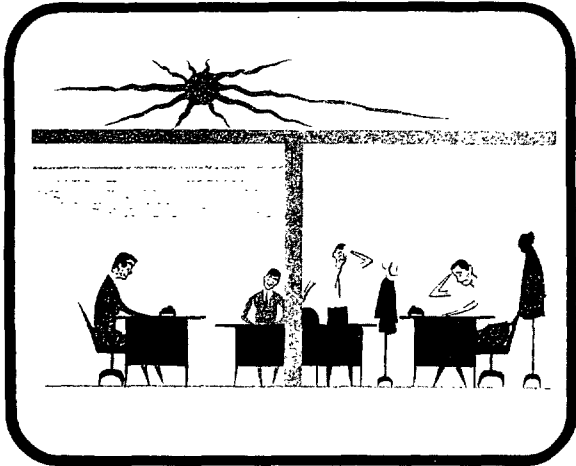


INSTALLATION PRECAUTIONS (continued). Another possible reason for the poor appearance of a ceiling installation is lighting conditions. Light from a high window or an electric light that protrudes slightly below the ceiling can cast shadows that magnify slight irregularities. Do avoid this light condition, if possible. If avoidance is not possible, make sure that the unfavorable light condition exists while the ceiling is erected so that the workmen are aware of this condition and can give special attention to the ceiling joints.

SGP 0027580



INSTALLATION PRECAUTIONS (continued). Some acoustical tile are more abuse-resistant than others. None, however, will withstand direct impact. It is not good practice to locate acoustical-ceiling tile or boards on low-wall or low-ceiling surfaces where they may be damaged. □ Instead, use sound-absorbing blankets and face the blankets with perforated facing materials that will withstand abuse.

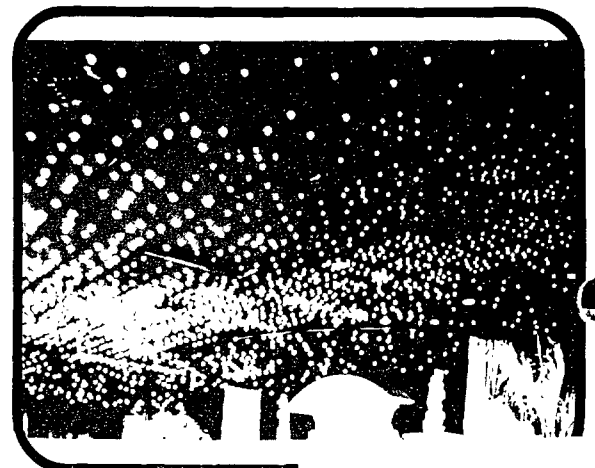
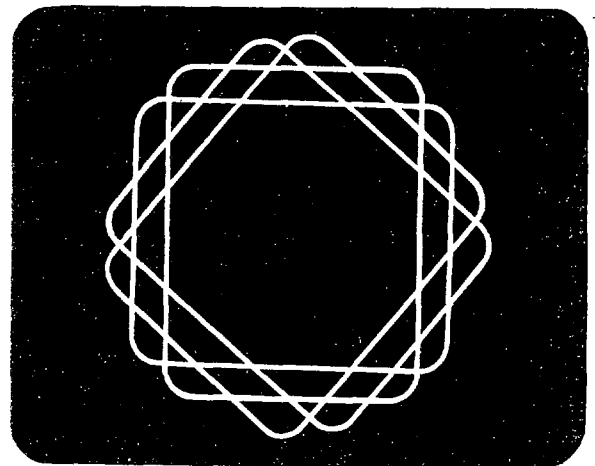


ACOUSTICAL CEILINGS – THERMAL INSULATION. Most acoustical materials are also good thermal insulators. □ Under some conditions of moderate temperature and humidity, many acoustical ceilings will provide adequate thermal insulation without supplemental insulation. □ However, in view of the wide variation of acoustical materials as a class with respect to thermal conductivity, thickness of the units, and method of application, they are more generally used in combination with thermal insulating materials primarily designed for that purpose. Their effect upon heat loss should be computed in combination with the entire assembly. □ In relatively cold climates, where the problem is one of preventing condensation on cold roof surfaces, it is common practice to protect the thermal insulation from moisture-vapor penetration by incorporating a vapor barrier on the warm side. □ Where these conditions exist, it is considered the best practice to locate the vapor-sealed insulation on top of the roof slab with the acoustical material installed in the conventional manner in the room below. If this cannot be done, the vapor seal should be located between the thermal insulation and the acoustical material. This method of erection usually places the barrier in the proper place and the acoustical material contributes appreciably to the over-all thermal resistance of the structure.

SLIDES 501-516

DESIGN ELEMENTS

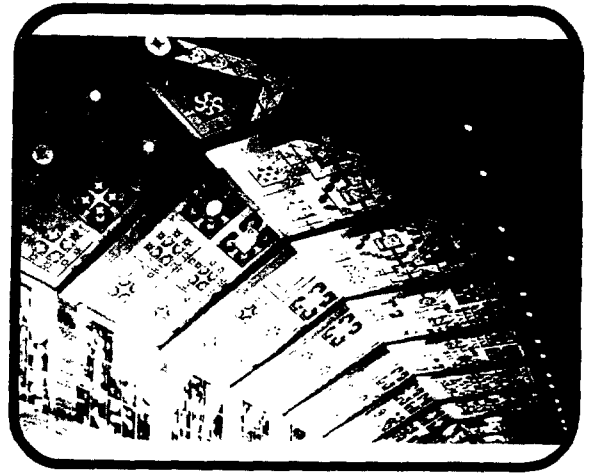
MECHANICALLY SUSPENDED ACOUSTICAL CEILINGS. The purpose of this 5th slide series is to give examples of the versatility of acoustical ceilings in design as well as functions other than acoustical. □ This slide shows a ceiling that is the focal design feature of the dining room. The mechanically suspended ceiling employs perforated tile to permit the lights above the ceiling to penetrate through the ceiling for the special effect desired.



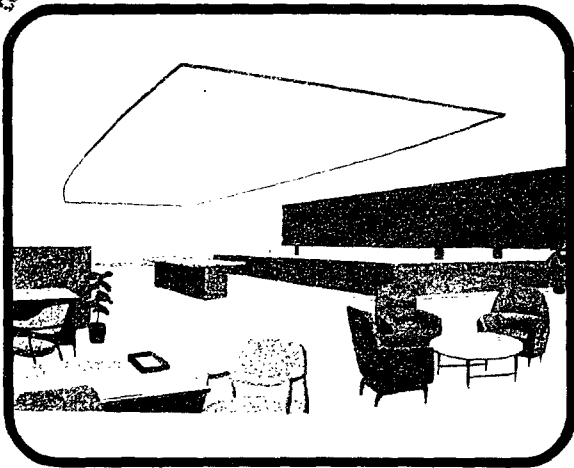
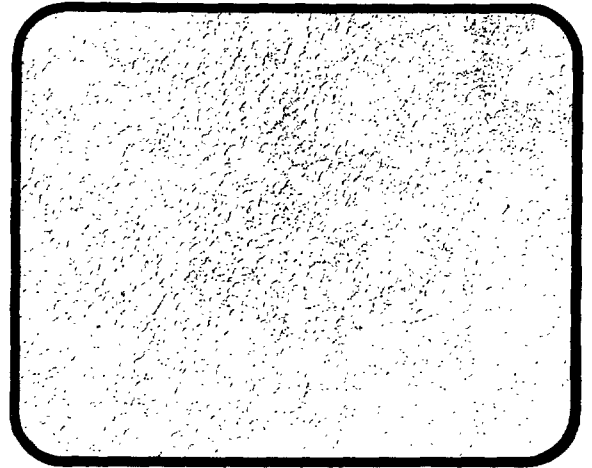
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PREPAINTED ACOUSTICAL TILE. Acoustical tile may be painted before installation to obtain a design that will conform to any room interior. □ The usual precautions that relate to the painting of sound absorptive surfaces should be taken. 1. Avoid clogging or bridging of holes. 2. Do not paint membrane-faced tile. 3. Apply the minimum quantity of good quality paint to achieve a fresh appearance. 4. Use a paint of good hiding power. Try the paint on a sample piece of material and allow it to dry before proceeding.

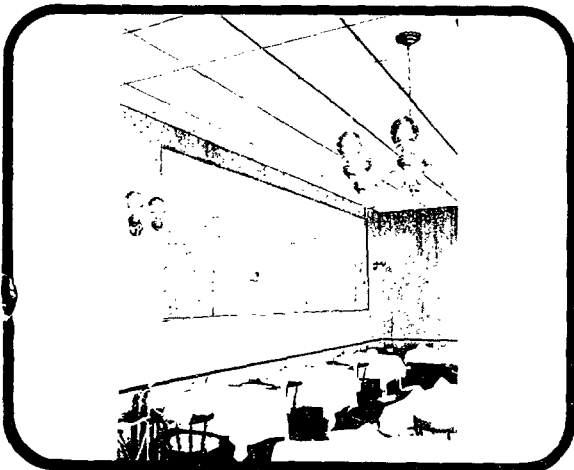
□ "How to Clean and Maintain Acoustical Tile Ceilings" published by Acoustical Materials Association.



EMBOSSED FINISH – ACOUSTICAL TILE. Many acoustical tiles, when applied, provide surface features that disguise and conceal the small modular joint lines. □ This slide shows the effective modular line hiding properties obtained from the embossed finish of the acoustical tile. □ Sculptured tiles are made that provide similar nonmodular effects.

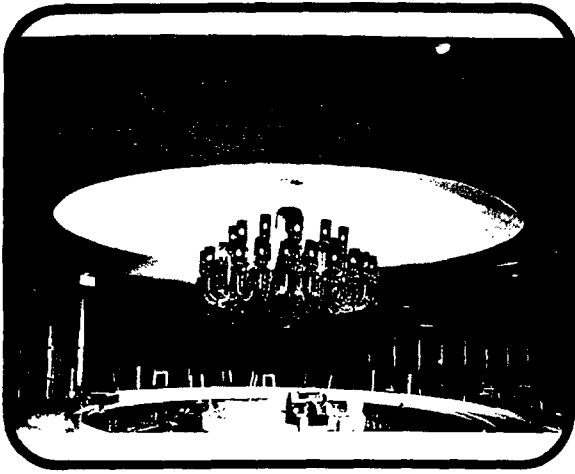


ACOUSTICAL AND LUMINOUS CEILINGS. The combination of a central luminous ceiling area with a periphery of acoustical tile provides both the lighting and noise-reduction requirements for this bank. Result — a well-lighted and acoustically designed interior. □ Multipurpose acoustical ceilings can be installed by one contractor under one manufacturer's responsibility. These ceilings can include noise control, lighting, and conditioned-air distribution.

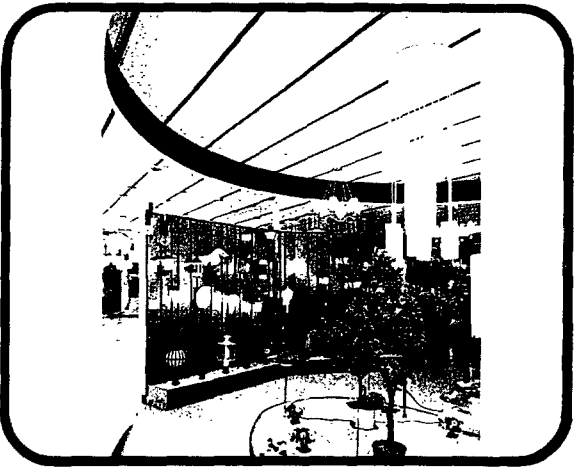


RECESSED GRID SYSTEM. In this restaurant, the ceiling suspension grid is recessed rather than sitting slightly below the acoustically lay-in panels. Result — an effective departure from the conventional. □ Many other suspension system combinations can be used to develop individual designs for room interiors.

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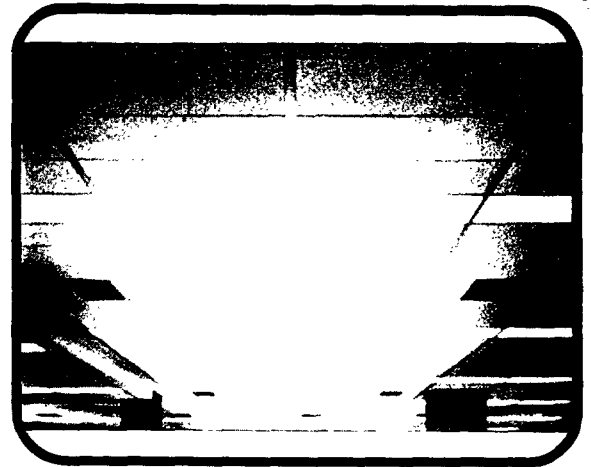
COLOR DESIGNS AND ACOUSTICAL CEILINGS. When the acoustical ceiling is painted in accordance with the manufacturer's instructions, no substantial change is made in the acoustical properties of the tile or board. □ Any color may be used to meet the architect's design.



SPECIAL EFFECTS WITH ACOUSTICAL PANELS. Room dimensions can be made to appear longer, shorter, and even higher or lower by emphasizing certain components of the ceiling. □ The dark lines that run in one direction only, in this slide, consist of ceiling suspension members that have been painted a dark color to obtain a desired effect.

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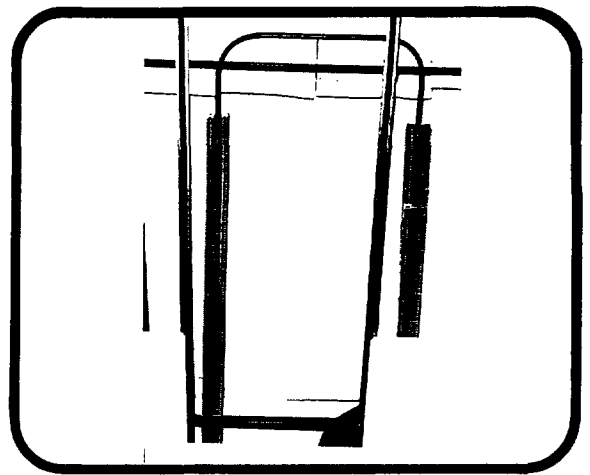
LIGHTING FIXTURES AND ACOUSTICAL CEILINGS. Lighting fixtures are manufactured specifically for flush installation into suspended acoustical-ceiling systems.



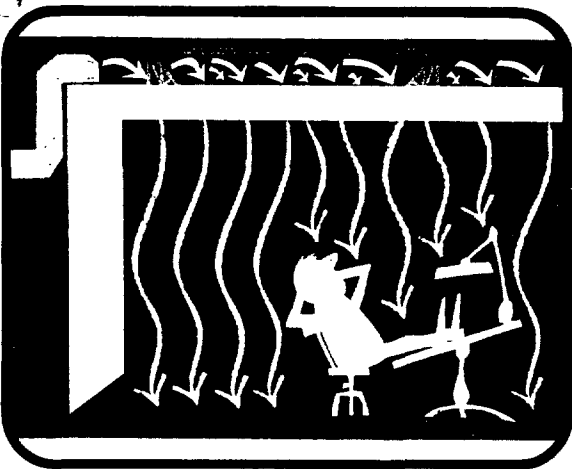
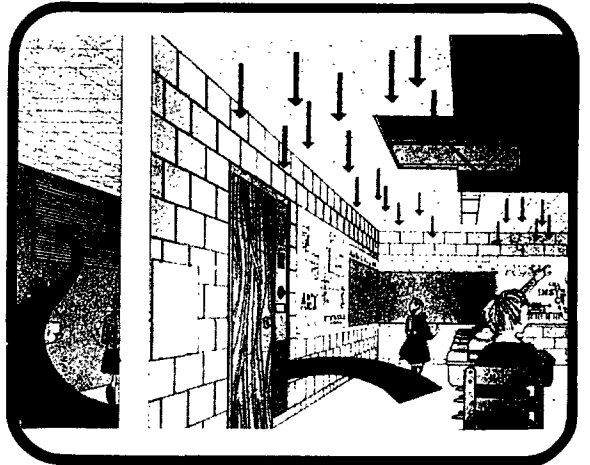
SIZES OF ACOUSTICAL TILES AND PANELS. Acoustical-material suspension systems are available for almost every conceivable ceiling layout or pattern. □ Tiles and lay-in panels are manufactured in sizes including 12"x12", 12"x24", 12"x36", 12"x48", 24"x24", 24"x48". Special sizes can be made to meet with building modules.



RADIANT HEATING WITH ACOUSTICAL CEILINGS. Heating, cooling, and sound control are combined in a perforated-metal-panel ceiling through the use of the radiant heating and cooling principle. □ The radiant tubing, when located in the ceiling, radiates heat downward. The heat loss to the room occupants is controlled and the surfaces around the occupants are warmed. In winter floors are warmer, though air temperatures may be lower. Comfort is improved, and drafts practically eliminated. □ Cooling is accomplished in a similar manner. □ Sound-absorptive blankets are installed above the radiant tubing for noise control.



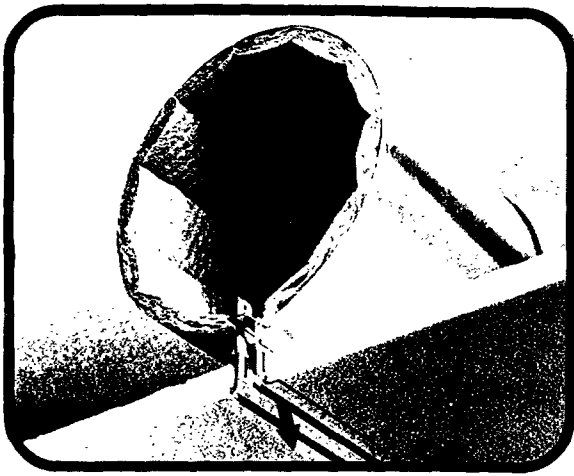
AIR DISTRIBUTION WITH ACOUSTICAL CEILINGS. The acoustical ceiling can perform many functions simultaneously including – (a) decoration; (b) noise control; (c) lighting; (d) fire protection; (e) air distribution. □ In air distribution, the space above the ceiling is used as a pressurized supply plenum. The acoustical ceiling is manufactured with numerous small through perforations that permit air transfer from the plenum to the room below without drafts. □ The entire ceiling thus functions as an invisible diffuser.



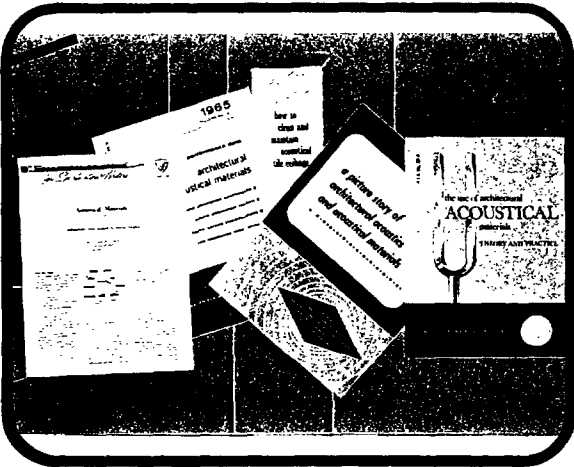
AIR DISTRIBUTION WITH ACOUSTICAL CEILINGS (continued). All of the pressurized plenum systems have one thing in common. Air is supplied through ductwork that ends in the space above the acoustical ceiling – the ceiling plenum. The ventilating system provides a condition of static pressure in the plenum that forces the air through holes in the ceiling tile or ceiling system to the occupied space below. □ The variations among the systems of the various manufacturers are primarily in appearance and in whether or not the ceiling orifices can be adjusted. □ Regardless of the ventilating ceiling selected, however, the architect gains in freedom of ceiling design as it relates to the location of air-distribution devices.



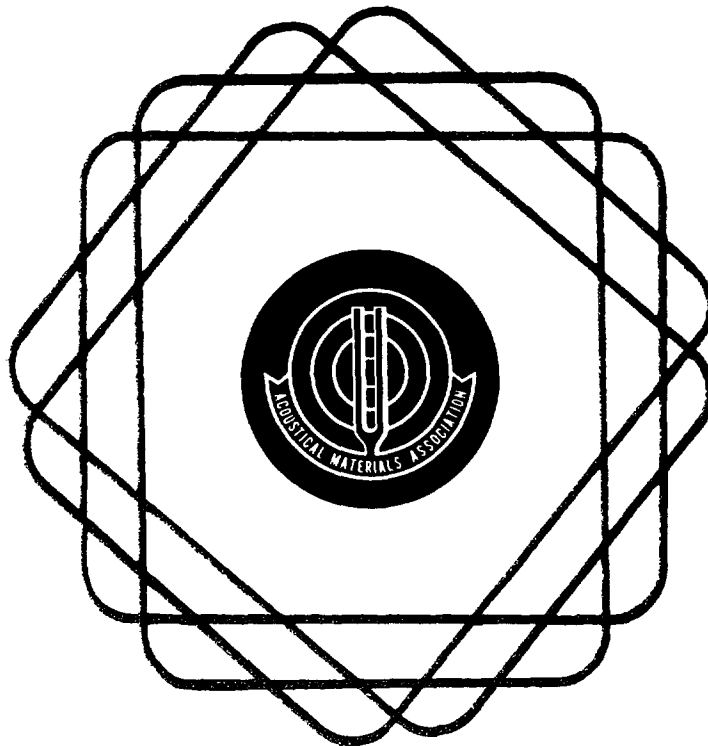
AIR DISTRIBUTION WITH ACOUSTICAL CEILINGS (continued). The ceiling orifices may be in the acoustical tile, in the lay-in panel, or in the ceiling suspension members, as shown on this slide. □ Regardless of the location of the orifices, the pressurized plenum air-distribution system offers several major advantages in air distribution – (a) reduction in ducts; (b) reduction in height of space required above the ceiling; (c) improvement in uniformity of air distribution.



DUCTED AIR-DISTRIBUTION CEILINGS. In addition to pressurized plenum systems, ducted systems are also manufactured for use with suspended acoustical ceilings. □ Ducted ventilating systems introduce, instead of a pressurized ceiling plenum, a small duct for each ventilating grid suspension member, as is shown on this slide. □ The air is transferred to these small cylindrical ducts by means of a main supply header at one side of the room.



ACOUSTICAL MATERIALS ASSOCIATION. The Acoustical Materials Association is an organization formed by producers of architectural acoustical materials for the purpose of furnishing architects and others with reliable technical data on sound-absorbing materials and their uses. □ The Association publishes this information in the form of bulletins, pamphlets, and papers, as is shown on this slide. □ The architect is urged to keep up-to-date copies of this literature in his files to aid him in his specification of acoustical materials.



GEORGIA-PACIFIC CORPORATION
BESTWALL GYPSUM DIVISION

March 1, 1967

TO: ALL DISTRICT SALES MANAGERS
ALL REGIONAL SALES MANAGERS
ALL SALESMEN

General Sales Bulletin #15-67

SUBJECT: MINERAL WOOL INSULATIONS DIVISION

CC: R. I. Fredericks, Paoli
K. A. McCaskill, Paoli
M. M. Powers, Paoli

RE: Sound Values of Floor and Ceilings
and Walls

BY: G. C. Moore:jw

Attached is one copy of an A.I.A. File No. 37C Engineering Data Sheet as published by the Mineral Wool Insulations describing sound characteristics of two floor and ceiling construction assemblies and two wall assemblies. The floor and ceiling assemblies consist of wood framing and have been sound tested for airborne sound characteristics (STC) and impact noise values (INR). One of the floor and ceiling assemblies have been fire tested and covered under UL Design #53, 1-hour (combustible). The two partition assemblies have been sound tested for airborne sound characteristics.

The two floor and ceiling assemblies consist of 2" x 12" wood joists with the area between the joists filled with blowing mineral wool with a density of 3.4 lb./cu.ft. and held in place with a nylon or wire mesh. Resilient channels were attached perpendicular to the 2" x 12" wood joists and one layer of 1/2" GP/Bestwall Firestop was screw attached to the resilient channels.

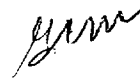
The floor and ceiling assemblies were sound tested with various types of sub-floor and finished floor construction consisting of 5/8" plywood sheathing and the second assembly consisted of 5/8" wood sheathing with one layer of 1/2" sound deadening board (B) rated with a finished layer of 3/8" particle board or plywood. Both assemblies were tested with the bare floor and with a carpet pad and please note the STC ratings of 50 to 57 with INR ratings of -2 to +16.

The two wall partition assemblies consisted of 2" x 4" staggered wood studs with 2" x 6" wood plates at the top and the bottom. One assembly was filled with blowing mineral wool and held in place one side with nylon mesh and the second assembly consisted of two full thick mineral wool batts. Both partition assemblies were finished with one layer of 1/2" gypsum wallboard each side. Please refer to the STC ratings of the 7" and 8" thick partitions with an STC of 53 and 56.

This information is brought to your attention for additional reference material when talking to builders of new construction and builders of rehabilitation construction work that is presently contemplated throughout the country. This information will be incorporated in new literature when printed. For additional information regarding the above, contact General Sales Office.

G. C. Moore

GCM:jw
Att (1)



SGP 0027586



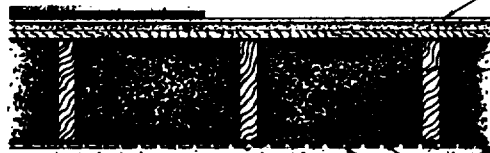
ENGINEERING DATA

PREMIUM QUIET SOUND CONTROL SYSTEMS

send for complete detailed sound control brochure

FLOOR-CEILING

CARPET & PAD BASE FLOOR



- 5/8" PARTICLE BOARD OR PLYWOOD
- 1/2" SOUND DEADENING BOARD ISI RATED
- 5/8" WOOD SHEATHING
- 2x12 JOISTS @ 16" O.C.
- PREMIUM QUIET SOUND CONTROL WOOL FILLED VOIDS @ 3-4 LB./CU. FT.
- 1/4" PRESTITE # 579.63 L CAULKING BEAD AROUND PERIMETER
- NYLON MESH FABRIC **
- RESILIENT CHANNELS
- 1/2" GYPSUM WALLBOARD

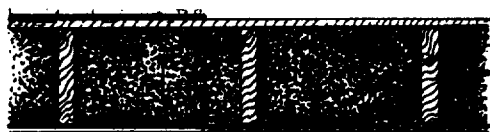
SOUND RATING

* STC 57

* INR + 2
BASE FLOOR

* INR + 13
CARPET & PAD

CARPET & PAD BASE FLOOR



- 5/8" PLYWOOD SHEATHING
- 2x12 JOISTS @ 16" O.C.
- PREMIUM QUIET SOUND CONTROL WOOL FILLED VOIDS @ 3-4 LB./CU. FT.
- NYLON MESH FABRIC **
- 1/4" PRESTITE # 579.63 L CAULKING BEAD AROUND PERIMETER
- RESILIENT CHANNELS @ BASE FLOOR AREA ONLY
- 1/2" GYPSUM WALLBOARD

* STC 50
BASE FLOOR

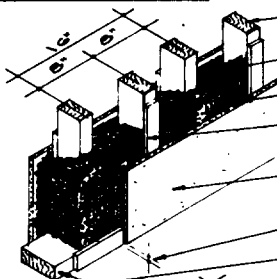
* STC 51
CARPET & PAD

* INR - 2
BASE FLOOR

* INR + 16
CARPET & PAD

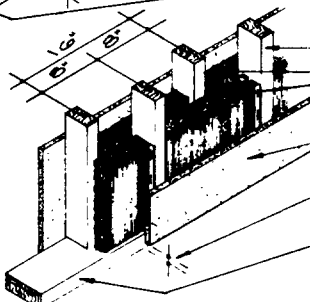
** Underwriters Laboratories listing # 53 - 1 hour (combustible) - when 1 hour fire rating required substitute 14x16 screen wire & 1/2" gypsum board must be SUPER-X

WALLS



- 2x4 STAGGERED STUDS @ 8" O.C.
- PREMIUM QUIET SOUND CONTROL WOOL FILLED VOIDS @ 3-4 LB./CU. FT.
- NYLON MESH FABRIC ON BOTH SIDES IF ONE SIDE NOT BOARDED
- 1/2" x 2" SOUND DEADENING BOARD FURRING STRIPS @ EACH STUD & PLATE
- 1/2" GYPSUM WALLBOARD EACH SIDE
- 1/4" CAULKING JOINT @ JUNCTION OF ALL WALLS, CEILINGS & FLOORS (PRESTITE # 579.63 L)
- 2x6 PLATE TOP & BOTTOM

* STC 56



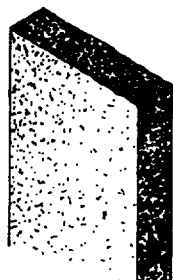
- 2x4 STAGGERED STUDS @ 8" O.C.
- FULL THICK 16" x 96" PREMIUM BRAND MINERAL WOOL BATTS
- 1/2" GYPSUM BOARD BOTH SIDES
- 1/4" CAULKING JOINT @ JUNCTION OF ALL WALLS, CEILINGS & FLOORS (PRESTITE # 579.63 L)
- 2x6 PLATE TOP & BOTTOM

STC 53

SGP 0027587

* sound ratings determined by DANIEL FITZROY consulting acoustical engineer box 462 San Rafael, Calif. Aug. 17 & 27, 1963

PREMIUM QUIET SOUND BLANKET



DESCRIPTION

UNPAPERED - SEMI-RIGID - 2 1/2 LB./CU. FT. HIGH DENSITY MINERAL WOOL BLANKET

SIZES

2" & 3" THICKNESS
FULL 16" & 24" WIDTHS - 48" LENGTHS

USES

USED BY MANY NATIONAL GYPSUM PRODUCTS MANUFACTURERS IN THEIR VARIOUS WOOD OR STEEL STUD & GYPSUM BOARD CAVITY SYSTEMS; REFER TO INDIVIDUAL MANUFACTURERS.
-SUBSTANTIALLY INCREASES STC RATINGS-

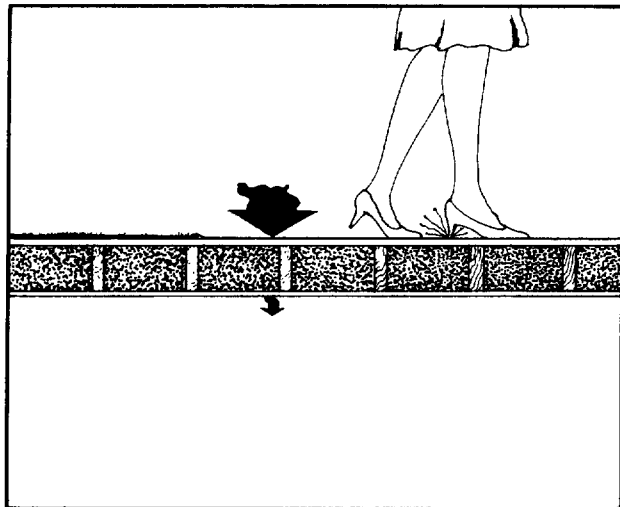


HIGH IMPACT NOISE RATING (INR)
HIGH SOUND TRANSMISSION CLASS (STC)

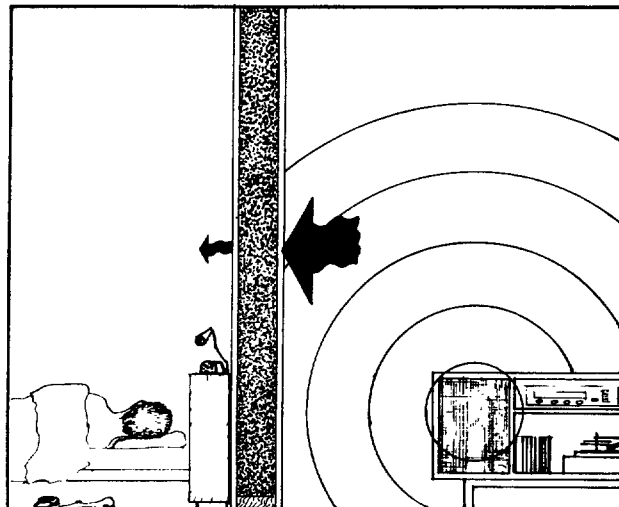
PREMIUM QUIET
SOUND CONTROL SYSTEMS

EFFECTIVELY CURTAILS IMPACT (INR) & AIRBORNE (STC) SOUND
THROUGH

FLOORS



WALLS



NEW CONCEPT

- RECENTLY DEVELOPED METHODS ———— USES INEXPENSIVE PREMIUM BRAND MINERAL WOOL AT CONTROLLED HIGH DENSITIES
- RATINGS BY ACOUSTICAL ENGINEERS ———— SEE * ON REVERSE PAGE
- FIRE RATING ———— UNDERWRITERS LABORATORIES DESIGN NO. 53 1 HOUR (COMBUSTABLE)
- LOW WEIGHT ———— BASIC SYSTEM ADDS APPROXIMATELY 3 LB./SQ. FT. DEAD LOAD
- LOW COST ———— WITH FIRE RATED DESIGN BASIC SYSTEM ADDS VERY LITTLE TO COST OF STRUCTURE
- ASSURED INSTALLATION ———— FRANCHISED INSULATION CONTRACTORS & FACTORY TRAINED MECHANICS
- NO FRAMING EXTRAS ———— REQUIRES NO SPECIAL FRAMING OFTEN NEEDED WITH OTHER SYSTEMS
- NO CONSTRUCTION DELAYS ———— SCHEDULES AT SAME TIME AS REGULAR THERMAL INSULATION
- BETTER ECONOMICS ———— TENANT SATISFACTION ~ ONE MONTH VACANCY COULD PAY FOR SYSTEM

ARCHITECTURAL SPECIFICATIONS

SGP 0027588

SECTION 6 — THERMAL & SOUND INSULATION —

SOUND INSULATION SHALL BE SPECIFIC PREMIUM QUIET SOUND CONTROL SYSTEMS DETAILED IN THE CONSTRUCTION DRAWINGS AND INSTALLED IN THE AREAS INDICATED THERE-ON. INSTALLATION SHALL BE BY AN AUTHORIZED PREMIUM BRAND SUB-CONTRACTOR AND SHALL CONFORM TO THE REQUIREMENTS AS SET BY PREMIUM BRAND.

PREMIUM BRAND INSULATION GROUP

Worlds Largest Independent Rock Wool Manufacturers

TEXAS ROCK WOOL DIVISION *

ROCK WOOL INSULATING DIVISION *

MINERAL WOOL INSULATIONS DIVISION *

P.O. BOX 184 BELTON, TEXAS PHONE Webster 9-3775

P.O. BOX 914, PUEBLO, COLO. PHONE Lincoln 4-0435

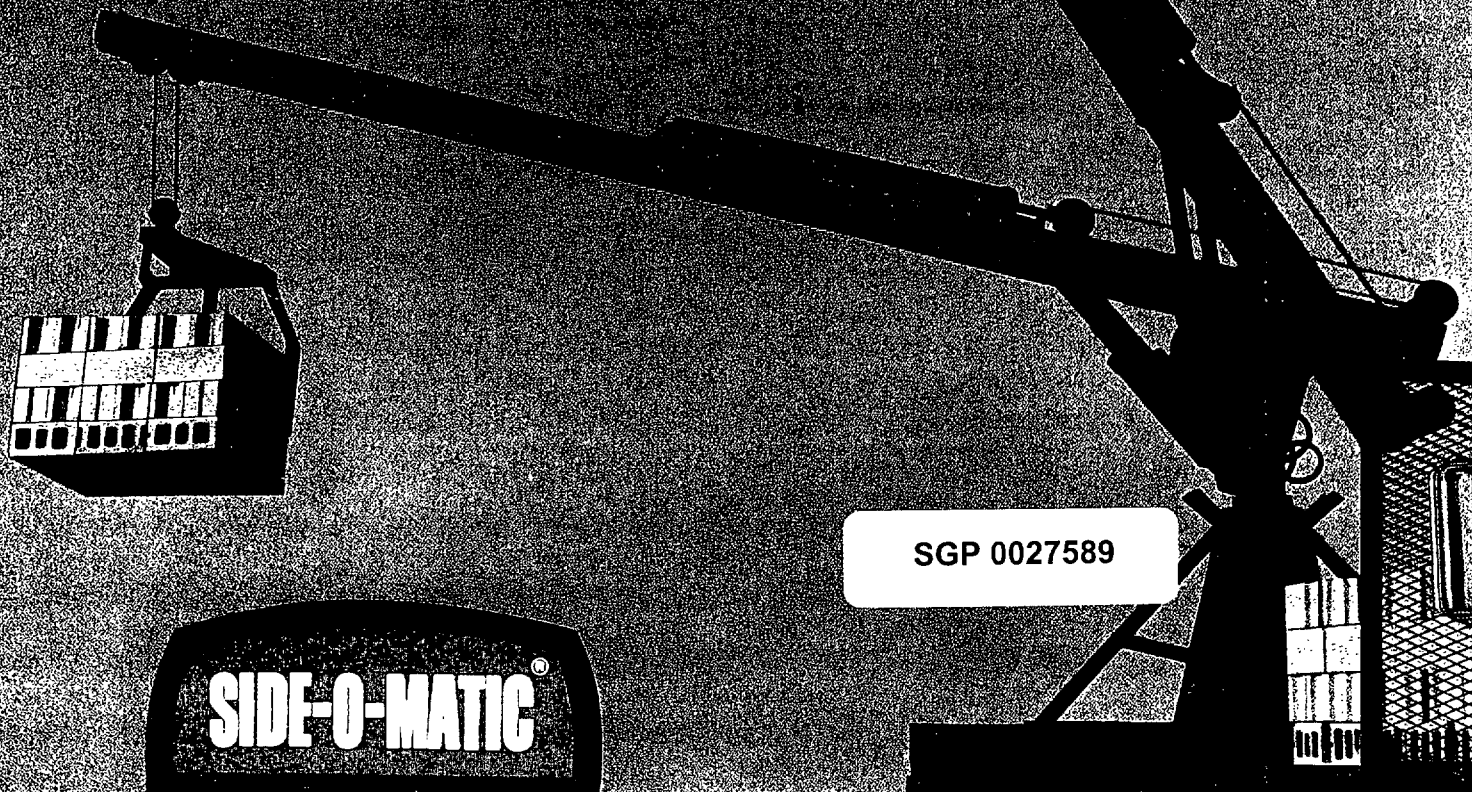
P.O. BOX 96 FONTANA, CALIF. PHONE Valley 2-8061

* DIVISION OF SUSQUEHANNA CORPORATION

The World's Most Versatile
Boom Unloader Line . . .

TITAN SERIES H-LO

Combining the advantages of an aerial
work platform with the flexibility of a
boom loader, the Titan Series H-LO boom
unloader is completely
powered by the
truck engine.

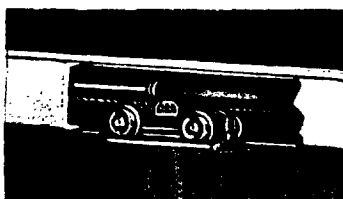


SGP 0027589

SIDE-O-MATIC®

EXCLUSIVE DESIGN FEATURES OF **TITAN SERIES**

1 ROLLER-BEARING BOOM TROLLEY



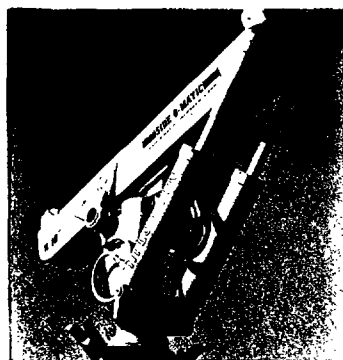
- Powered in both directions hydraulically
- Equipped with flow-control valves for speed regulation and safety
- Cylinder bottoms at end of travel to eliminate excess strain on trolley cables
- Swivel trolley assures longer cable life.

2 SELF-BALANCING FORK (OPTIONAL)



- All-welded, high-strength steel construction
- Six tines easily hand adjusted. (Heavy duty two-tine adjustable fork also available.)
- Forged Steel tine tips
- Improved roller-bearing fork trolley arrangement.

3 TWIN-LIFT CYLINDERS



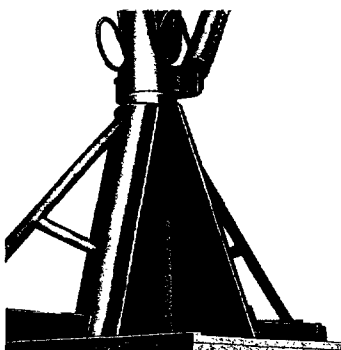
- Engineered to provide maximum lifting power
- Assure proper distribution of power to boom.

4 SMOOTH-ACTION HOIST



- Hoist is operated by heavy, double-action cylinder
- Check valve controls lowering speed
- Direct-lift multiple sheave arrangement assures smooth, positive operation.

5 IMPROVED RUGGED PEDESTAL



- Fully enclosed for efficiency, neatness and strength
- Single brace permits maximum useable bed space
- Pedestal welded to bed at all points for greatest stability.

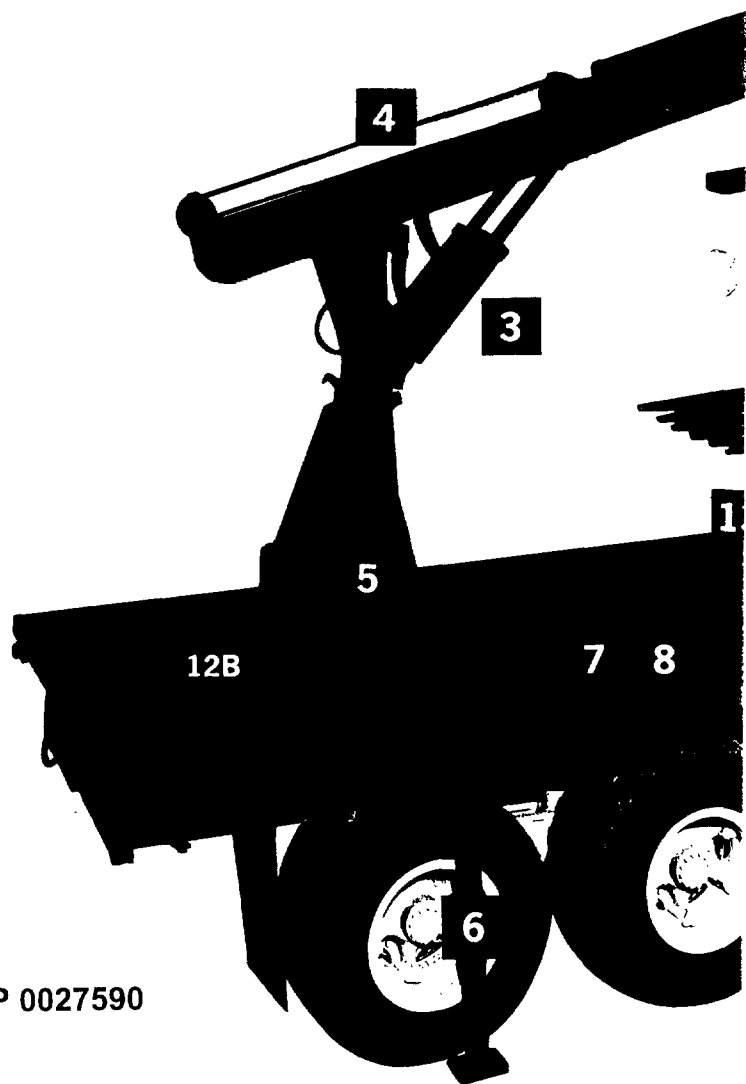
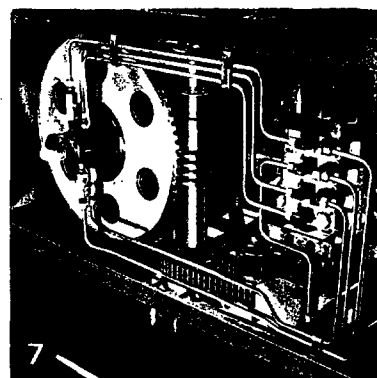
6 SAFETY STABILIZERS (OPTIONAL)



- Prevent injurious bed twist when loading or unloading
- All steel, heavily braced
- Adjustable to uneven terrain
- Easily racked for transit
- Hydraulic stabilizers also available.

7 CONTINUOUS TURNING BOOM

- Rotates continuously in either direction
- Operated by heavy-duty gear-type oil motor turning steel worm and semi-steel worm gears
- Equipped with double-row roller chain and double sprockets with hardened teeth
- Self-aligning bearings used on worm shaft and jack shaft
- Semi-steel worm wheel has over-size hub for extra load capacity.



SGP 0027590

TITAN SERIES HI-LO UNLOADERS are built in four sizes (see specification lengths, boom capacities, heights and depth of lifts, etc.) The complete includes the unloader, steel or wood bed, fork, body lights, mud flaps, pu automatic throttle control. The complete unit is mounted and painted in col chassis. Side-O-Matic backs their unloaders with this money-back guaranter loader on your truck for 30 days. If you are not satisfied, your money wi

TRUCK AND TRAILER SPECIFICATIONS

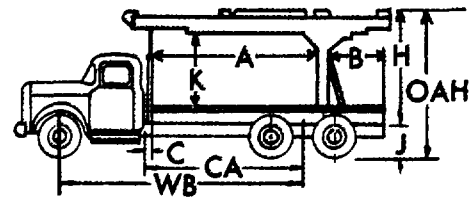
	TRUCK					TRAILER	
Bed Length	13'3"	17'4"	19'3"	21'5"	23'11"	26' to 32'	
Number of Cubes	6	8	8	10	10	12 to 14	
Block Size (Length)	16"	16"	18"	16"	18"	16"	18"
Cube Size (Length & Depth)	48" x 48"	48" x 48"	54" x 48"	48" x 48"	54" x 48"	48" x 48"	54" x 48"
Cab to Axle CA*	120"	135"	150"	150"	165"	—	—
Bed Length-Front of Mast A	101"	150"	168"	150"	168"	150"	168"
Bed Length-Rear of Mast B	48"	48"	54"	97"	109"	152"	170"
Bed Weight (Steel Deck) Lbs.	1580	1980	2160	2390	2630	—	—
Bed Weight (Wood Deck) Lbs.	1200	1550	1700	1900	2120	—	—
Weight of Miscellaneous Tie Downs, Spacers, etc. for Bed Lbs.	200	200	200	200	200	200	200

*Based on truck with conventional cab and Penna. State weight laws. See truck or Side-O-Matic dealer for exact requirements.

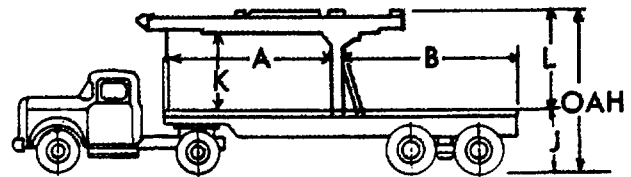
TITAN SERIES HI-LO SPECIFICATIONS

MODEL NUMBER	40-24	45-17	45-21	60-17
*Boom Capacity (Lbs.)	4000	4500	4500	6000
Reach from Center of Mast	24'	17'5"	21'5"	17'5"
Overall Height with Bed (OAH)	H & J	H & J	H & J	H & J
Overall Height for Trailers (OAH)	L & J	L & J	L & J	L & J
Height incl. SOM Bed (H)	100"	100"	100"	101"
Height above Bed (L)	89"	89"	89"	90"
Clearance Height (K)	70"	70"	70"	70"
Elevation of Boom	60°	60°	60°	60°
Depth of excavation fork will reach	16'	15'	16'	15'
Clearance fork to ground (Full Boom UP)	25'	20'	23'	20'
Side-O-Matic Weight (Lbs.)				
Unit Only	4200	3620	3950	3750
Standard 6-Tine Fork	390	390	390	390
Special 2-Tine Fork	325	325	325	325
Mechanical Stabilizer	460	460	460	460
Hydraulic Stabilizer	500	500	500	500
Hydraulic Oil	170	170	170	170

*Weight of Fork or other Lifting Device must be subtracted from this rating to determine maximum payload per lift.



CONVENTIONAL THREE-AXLE CHASSIS



TANDEM AXLE TRAILER

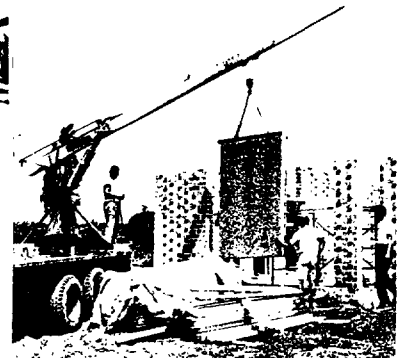
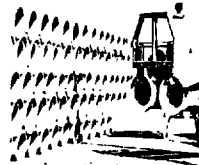
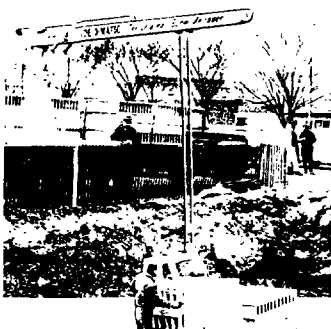
DEALERS THROUGHOUT
UNITED STATES AND CANADA



SIDE-O-MATIC UNLOADER CORP.

P.O. BOX 1561 / YORK, PA. 17405 / PHONE 717-845-1655

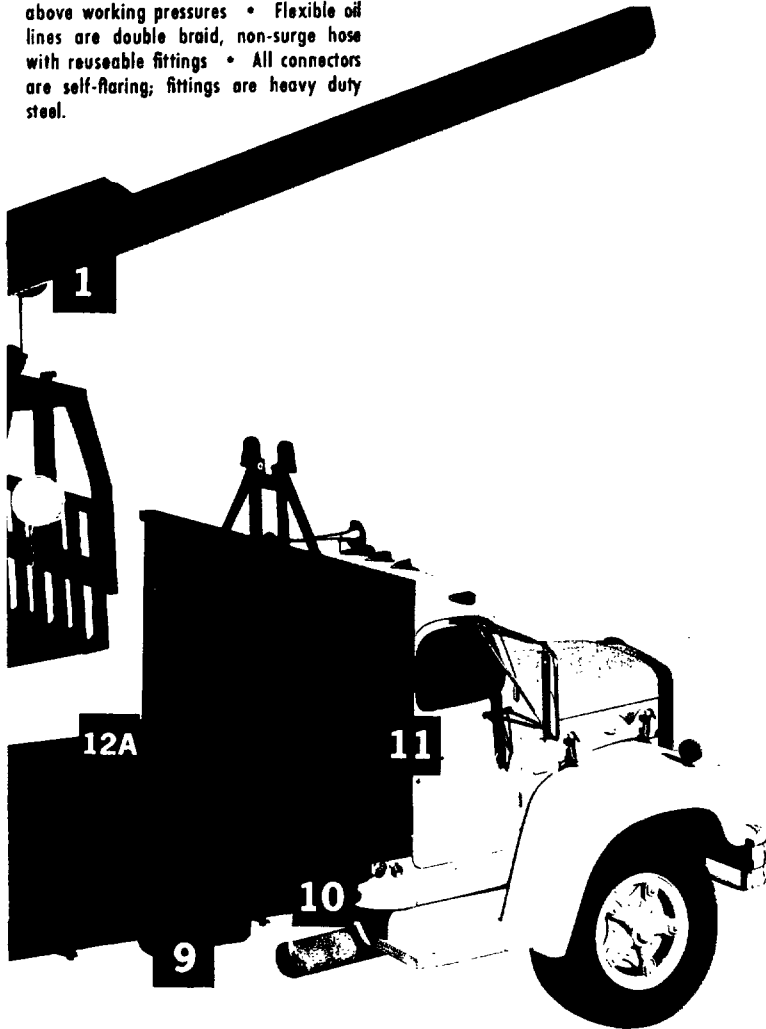
SGP 0027592



SIDE-O-MATIC UNLOADERS MODELS 40-24, 45-17, 45-21, 60-17

8 NON-SURGE OIL LINES

- Stack type hydraulic control valves, pilot operated, carry oil flow to hoist, trolley, twin boom cylinders and swing motor
- All stationary oil lines are J. I. C. Standard Welded Steel hydraulic tubing to eliminate surging and are rated more than 300% above working pressures
- Flexible oil lines are double braid, non-surge hose with reusable fittings
- All connectors are self-flaring; fittings are heavy duty steel.

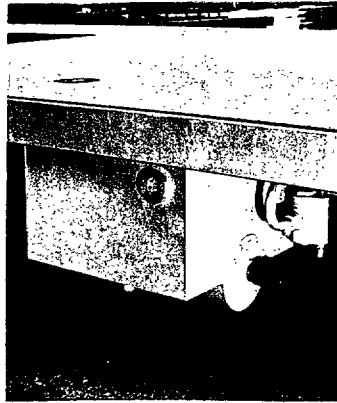


MAINTENANCE

- All moving parts equipped with either ball or roller bearings and Zerk type grease fittings, easily reached for lubrication.
- Swing drive accessible from trap doors in bed.
- SIDE-O-MATIC Service Centers are located throughout the United States, equipped with all tools, spare parts and factory trained personnel, for fast economical service.

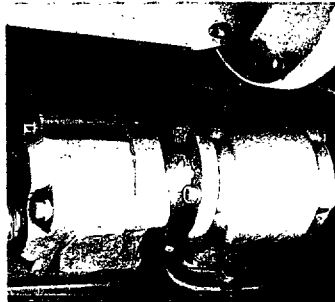
See page for boom
matic installation
er take-off, and
ir choice on your
Side-O-Matic Un-
arfully refunded.

9 TOP-FILLING OIL TANK



- Assures quick, convenient oil replacement
- Has built-in reusable filter and visual oil-level gauge.

10 POWER TAKE-OFF

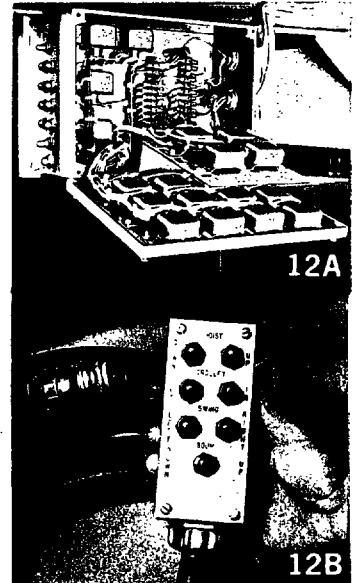


- PTO is mounted on truck transmission which drives heavy-duty gear-type oil pump
- Automatic throttle control regulates speed of engine during unloading, permitting engine to idle whenever unloader is not working, but brings it to proper speed whenever unloader is activated
- PTO is controlled from inside truck cab.

11 HEAVY-DUTY DASH ASSEMBLY

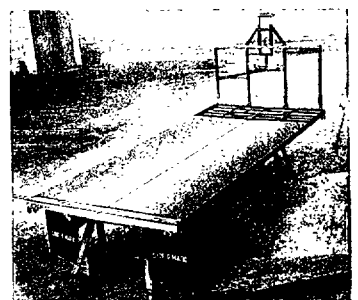
- Fully reinforced for extra strength and long life
- Recessed for lift-truck clearance and better rear vision
- Improved pin-and-ring fork rack
- New steel boom rest for safe road travel.

12 SELECT-O-MATIC CONTROL



- Features two separate control systems
- Stationary control (12A), mounted under truck bed, houses relays which operate solenoids and, in turn, actuate oil-flow hydraulic valves
- Push-button control (12B), on 25-foot cable enables operator to reach any place fork can reach
- Unloader can also be operated from stationary control which also includes emergency button to stop all operations
- Operator may control up to three operations at one time with one button.

13 CENTER-PITCHED BED

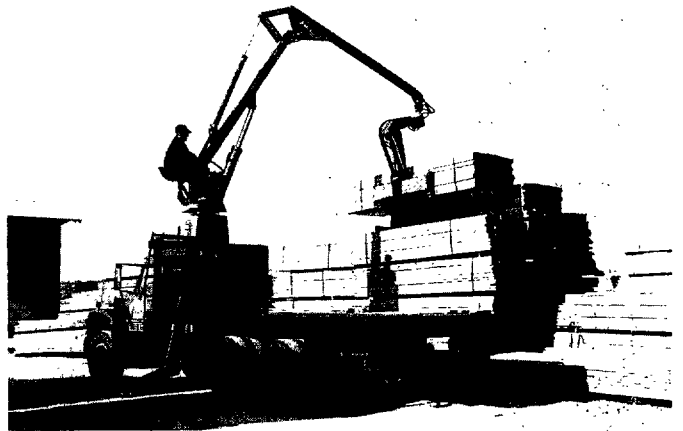
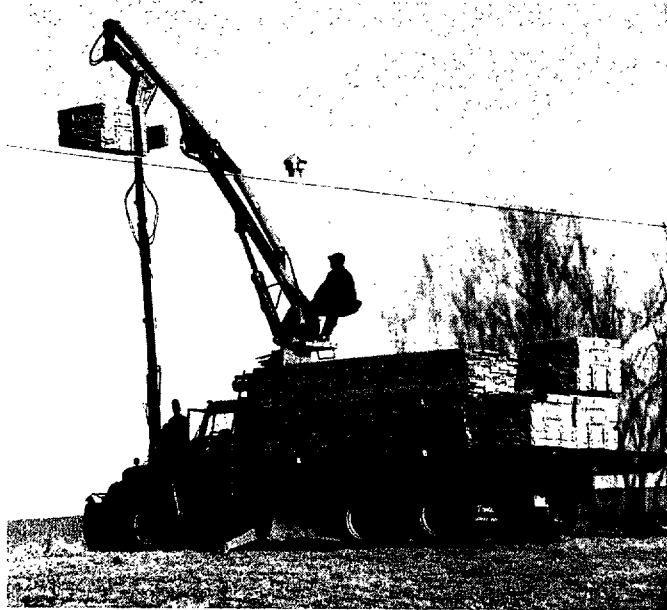


- Bed has one inch pitch to center to keep loads tight, prevent breakage in transit
- Available with steel or wood decking
- Heavy-duty, all-steel main frame fully reinforced
- Unitized clearance lights, mud flaps, etc.

SGP 0027591

PRENTICE Model GOBC-SR Hydraulic Loader

CUTS THE COST OF HANDLING BUILDING MATERIALS



This PRENTICE Model GOBC-SR Hydraulic Loader with specially designed multi-use fork permits faster, more efficient yard and job-site handling of gypsum wallboard, plywood, lumber, roofing and most palletized materials. Lets your operator cut unloading time by 50%.

Sheet material can be picked up off a truck bed flat -- turned on edge, rotated to any position and quickly elevated up to second or third story openings -- all in one smooth hydraulically power controlled motion. Saves you time, eliminates labor, prevents costly damage to materials. Mounts behind the cab on any truck, permits full platform usage. Has its own hydraulic stabilizers. Boom rotates 400 degrees -- fork rotates 450 degrees -- all hydraulically. Handle your mixed loads of "rock", lumber and roofing with one man at any job-site.

Two (2) forged tines, 36" long w/protective tip rollers.

Teflon slide bars.

Adjustable fork spacing, 16" to 60".

Tilt is powered by 4" bore dia. double action cylinder.

Hy-torque orbit motor for full circle rotation of fork.

Hi-strength steel construction.

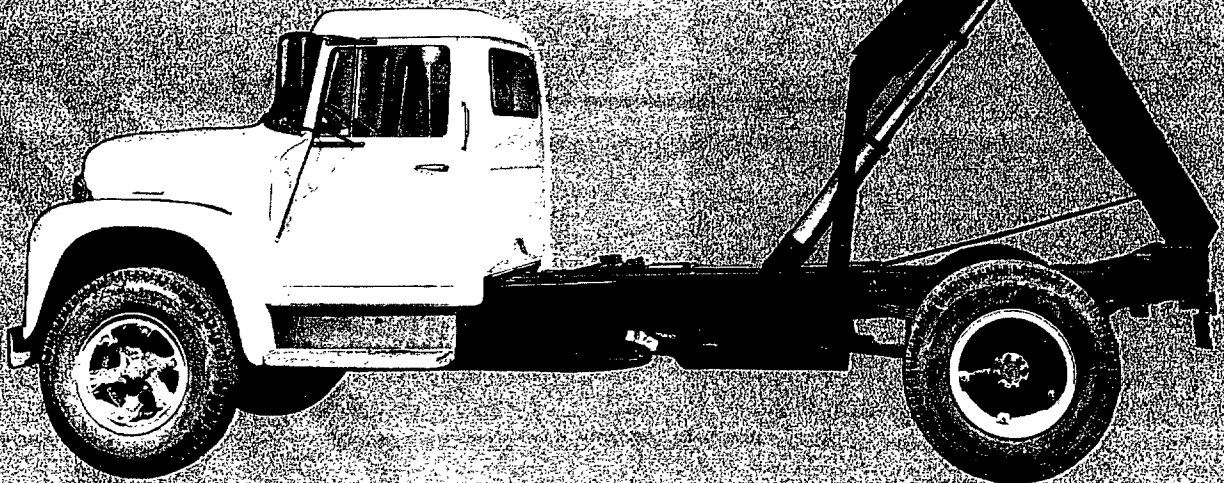
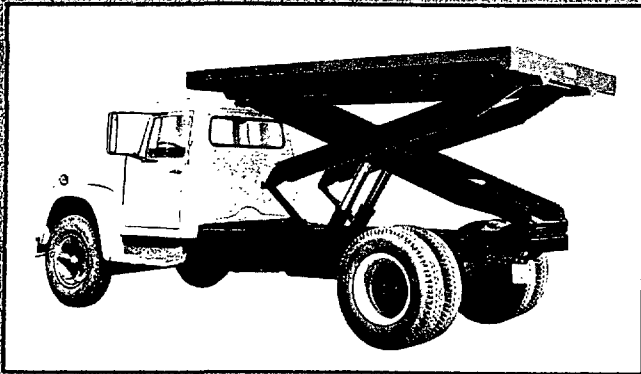
Self-adjusting automatic brake in knuckle joint to prevent excessive free swing of fork.

52" throat depth.

Manufactured by
PRENTICE HYDRAULICS, INC.
Prentice, Wisconsin

SGP 0027593

MODEL 6T HEILIFT

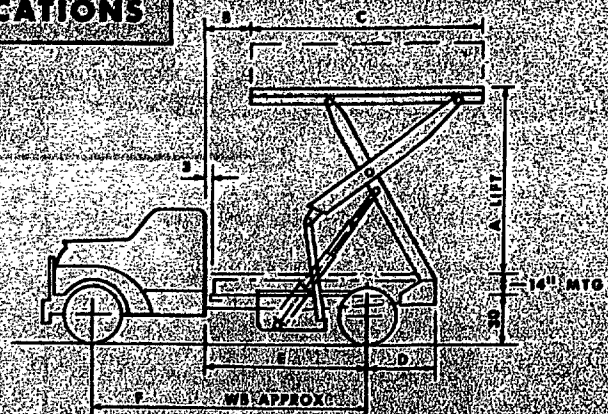


The Model 6T HEILIFT is equally efficient at its fully-raised position as shown above, or at any intermediate position, as shown in the inset. Check its possibilities for YOUR applications!

6T HEILIFT SPECIFICATIONS

Net Capacity	12,000 lbs.
Type of Cylinder	Twin Telescopic
Size of Cylinder	5" dia. x 74" stroke
Displacement	1895 cu. in.
Mounting Height	14"
Approximate Weight	*2000 lbs.
Dimension A	118"
Dimension B	193 1/4"
Body Length C	144" to 168"
Dimension D	38"
Cab to Axle E	102" to 120"
Approximate Wheel Base F	175" to 193"

*Inc. 50 lbs. Oil



THE HEIL CO.

FACTORIES: MILWAUKEE, WIS. • LANCASTER, PA. • WOODBRIDGE, N. J. • CLEVELAND, OHIO • MODesto, CALIF.
 Sales Offices: Woodbridge, New Jersey; Lancaster, Pa.; Atlanta, Ga.; Meridian, Miss.; Cleveland, Ohio; Chicago, Ill.; Milwaukee, Wis.;
 Kansas City, Mo.; Denver, Colo.; Dallas, Texas; Los Angeles, Calif.; Seattle, Wash.; and Toronto, Ontario. Distributors in all principal cities.

The company reserves the right under its product improvement policy to change construction or design details and furnish equipment when so altered without references to illustrations or specifications used herein.

SGP 0027594

EXTREMELY VERSATILE UNIT OF RUGGED, EFFICIENT DESIGN . . . IDEAL FOR AIRPORT OPERATIONS—BUILDING CONTRACTORS—FOR STOCKPILING BY BUILDING MATERIAL SUPPLIERS—ICING RAILROAD CARS—OVERHEAD MAINTENANCE WORK BY MUNICIPALITIES — AND NUMEROUS ADDITIONAL OPERATIONS

(SINGLE-AXLE APPLICATIONS)*

HEIL

CAPACITY UP TO 6 TONS

MODEL 6T HEILIFT HOIST

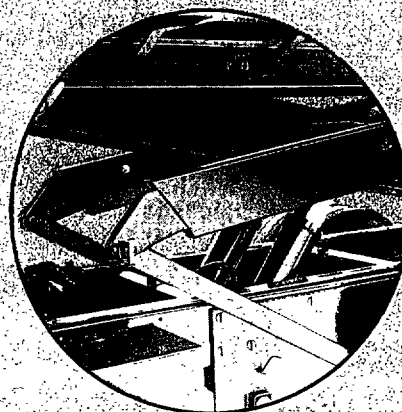
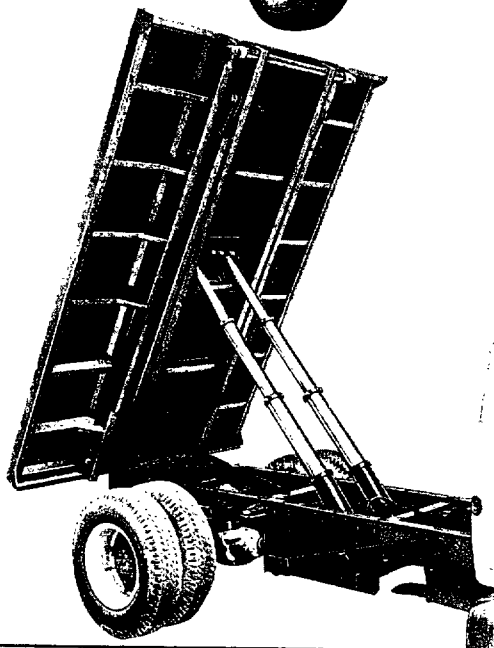
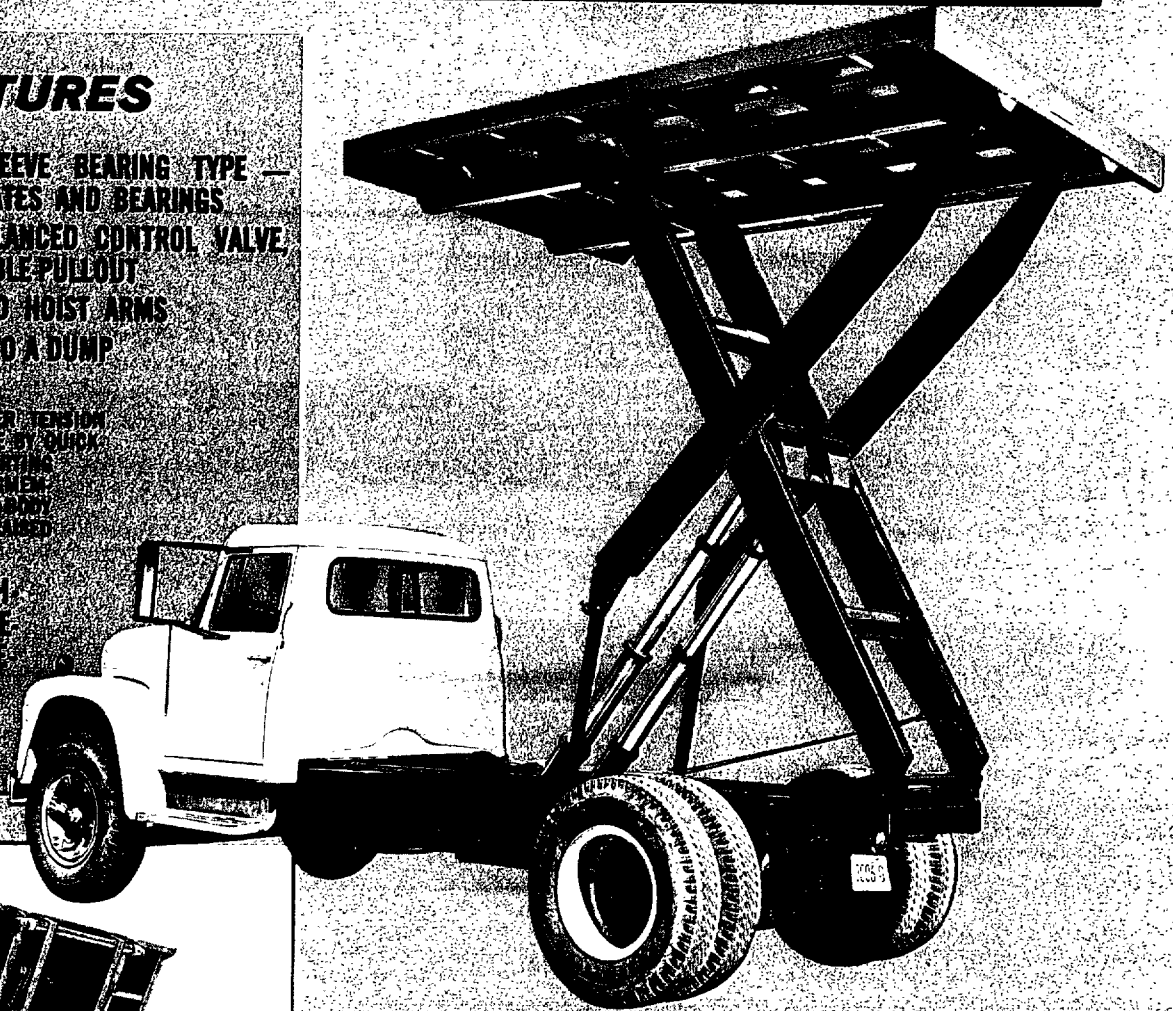
• FOR VERTICAL ELEVATION • FOR HAULING • FOR DUMPING

FEATURES

- GEAR PUMP — SLEEVE BEARING TYPE — INTEGRAL WEAR PLATES AND BEARINGS
- HYDRAULICALLY BALANCED CONTROL VALVE, EQUIPPED WITH CABLE PULLOUT
- HEAVILY REINFORCED HOIST ARMS
- EASILY CONVERTED TO A DUMP UNIT

BY REMOVING THE UPPER TENSION LINK PIN, HEILIFT CAN BE BY QUICK RELEASE PIN, AND INSERTING THEM IN THE BODY LIGNMENT BARS AND ARM, THE BODY CAN THEN BE QUICKLY RAISED TO A DUMP POSITION.

- POWERFUL, HIGH PRESSURE, TWIN CYCLE, STROKED HEIL PRE DISBURSED HOIST 2" DIAMETER, 4-SLEEVE, 7 1/2" STROKE



SGP 0027595

Spring loaded, quick release pin is easily removed from upper tension link pin, to adapt unit for dumping.

*NOTE: Proper chassis selection for mounting of Model 6T HEILIFTS is extremely important. Check with The Heil Co. or your local Heil Distributor for G.V.W. spring and frame requirements to suit your particular application.

CONSULT YOUR

BESTWALL

SYSTEMS ENGINEER

BESTWALL FIRESTOP GYPSUM WALLBOARD

TWO HOUR NON-LOAD BEARING STUDLESS WALL

REPRODUCTION FROM UNDERWRITERS' LABORATORIES, INC. GUIDE NO. 40 U18.23.

Guide No. 40 U18.23
Wallboard.

August 26, 1957

File R2717

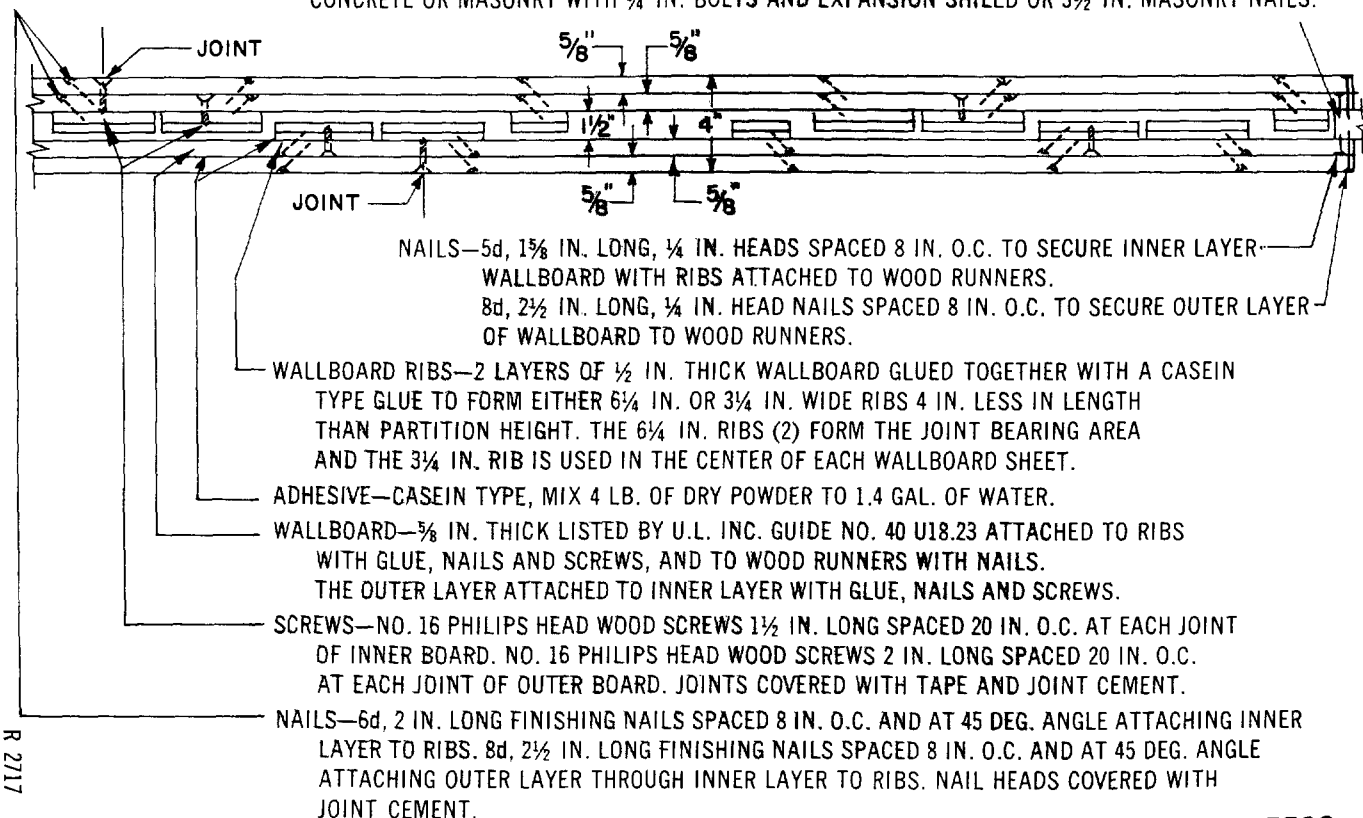
Bestwall Gypsum Co., Ardmore, Pa.

For Wall and Partition Design No. 7-2 hr and 5-3 hr

GUIDE NO. 40 U18
GENERAL INFORMATION (CONT'D)
WALLS AND PARTITIONS

CLASS D-2 DESIGN
DESIGN NO. 7—2HR (NON-BEARING PARTITION)

WOOD RUNNER— $1\frac{1}{2}$ X $1\frac{1}{8}$ IN. YELLOW PINE, USED ON SILL, LINTEL AND SIDES, FASTENED TO CONCRETE OR MASONRY WITH $\frac{1}{4}$ IN. BOLTS AND EXPANSION SHIELD OR $3\frac{1}{2}$ IN. MASONRY NAILS.



SGP 0027596

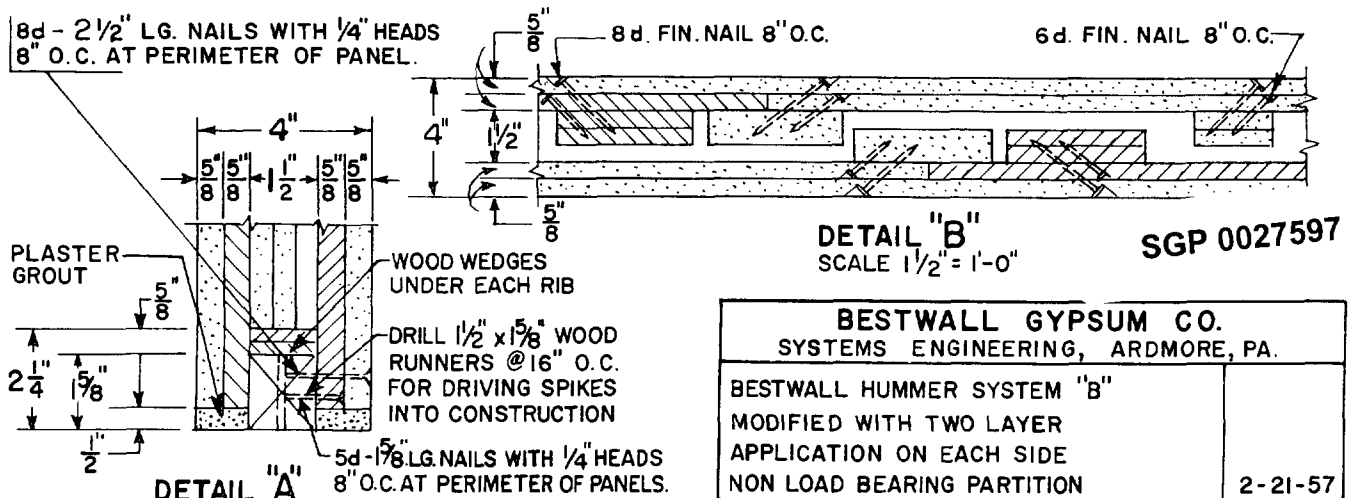
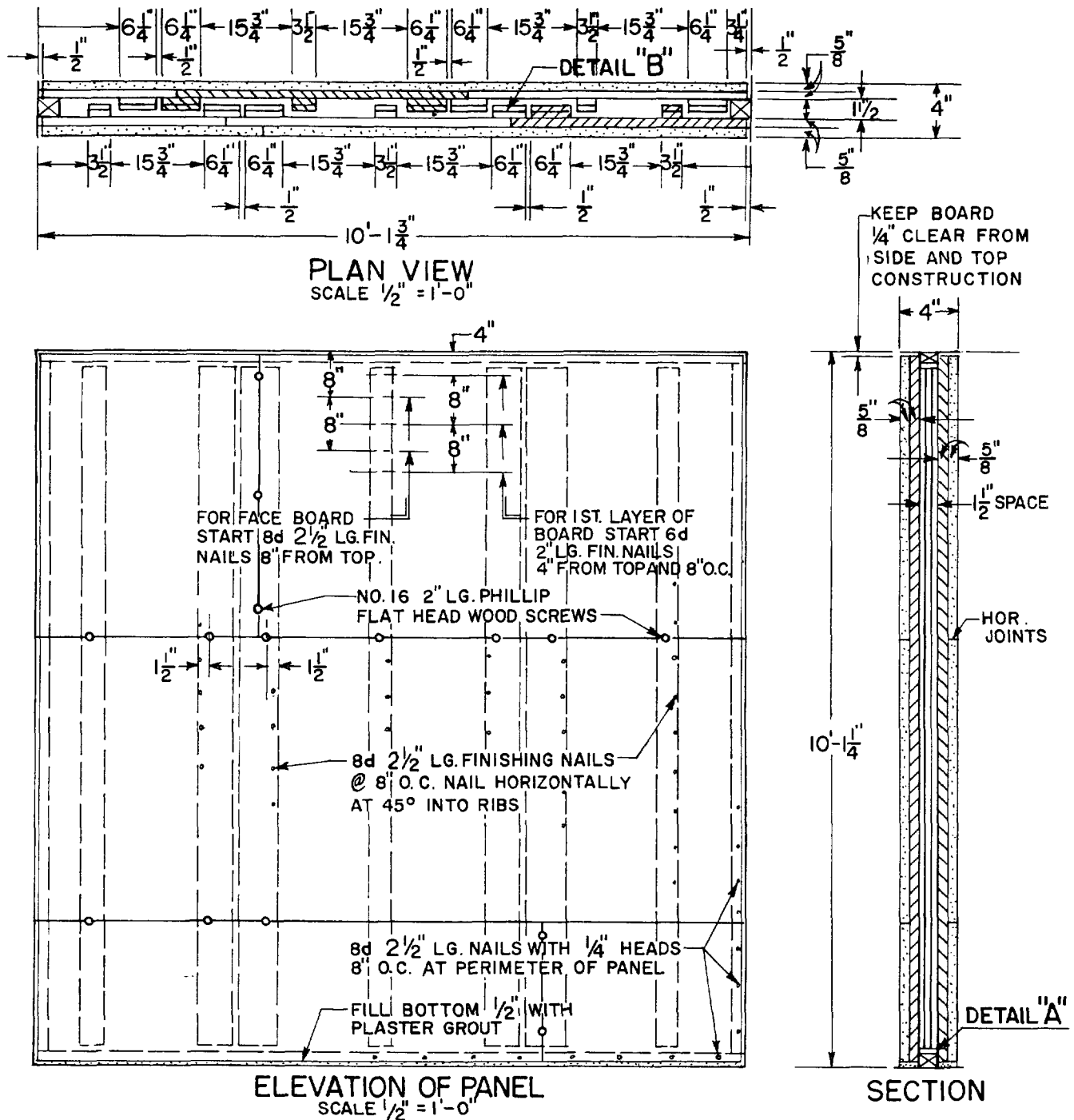


FIG. 2
R 2717-20

CONSULT YOUR

BESTWALL

SYSTEMS ENGINEER

BESTWALL FIRESTOP GYPSUM WALLBOARD

THREE HOUR NON-LOAD BEARING STUDLESS WALL

REPRODUCTION FROM UNDERWRITERS' LABORATORIES, INC. GUIDE NO. 40 U18.23.

Guide No. 40 U18.23
Wallboard.

August 26, 1957

File R2717

Bestwall Gypsum Co., Ardmore, Pa.

For Wall and Partition Design No. 7-2 hr and 5-3 hr

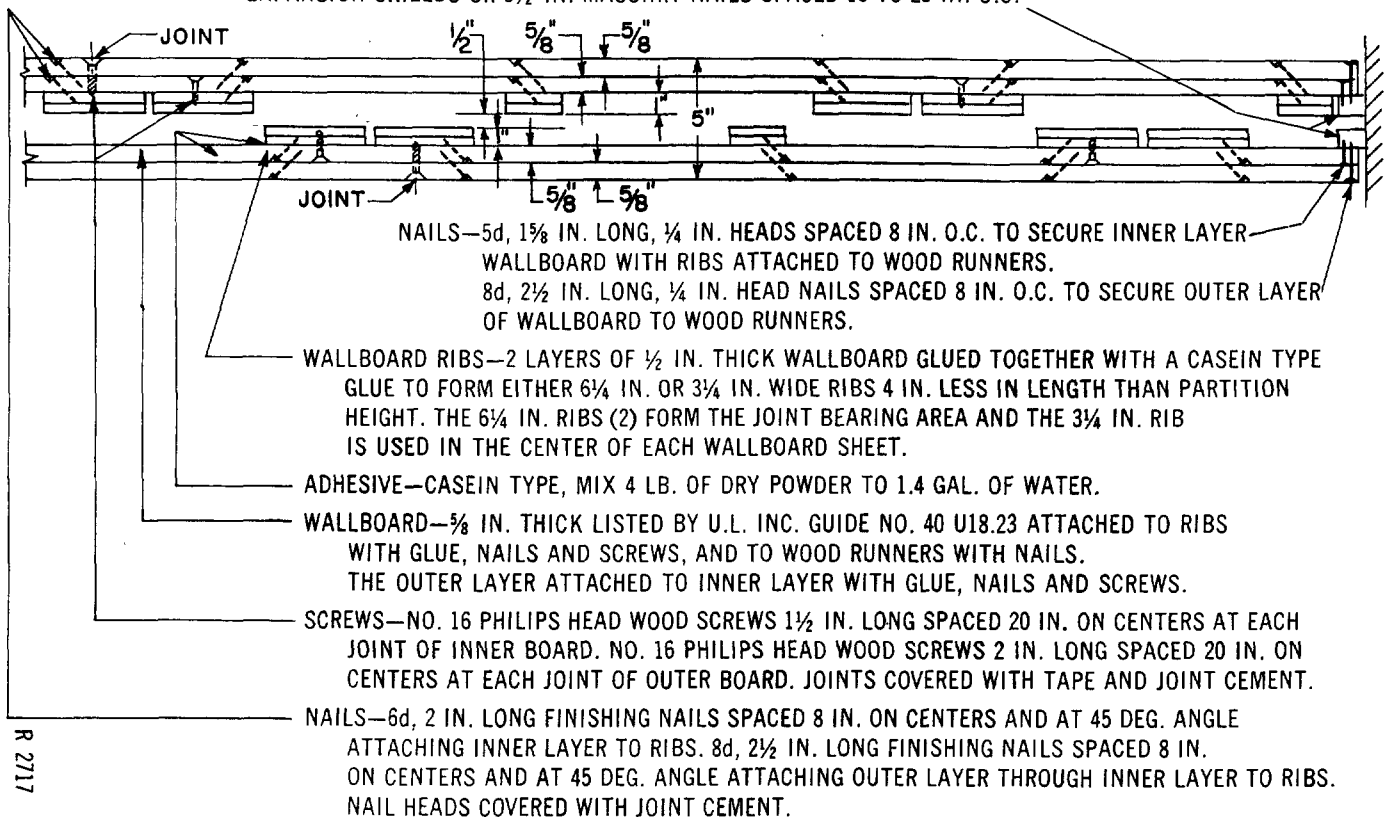
GUIDE NO. 40 U18

GENERAL INFORMATION (CONT'D)
WALLS AND PARTITIONS

CLASS C-3 DESIGNS

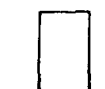
DESIGN NO. 5-3 HR (NON-BEARING WALL)

TWO WOOD RUNNERS*—1 X 1½ IN. YELLOW PINE, SPACED ½ IN. APART USED ON SILL LINTEL AND SIDES, FASTENED TO CONCRETE OR MASONRY WITH ¼ IN. BOLTS 3 IN. LONG AND EXPANSION SHIELDS OR 3½ IN. MASONRY NAILS SPACED 16 TO 20 IN. O.C.



R 2717

*NOTE: For incombustible construction and rating use 24 gauge sheet metal hat section.



SGP 0027598

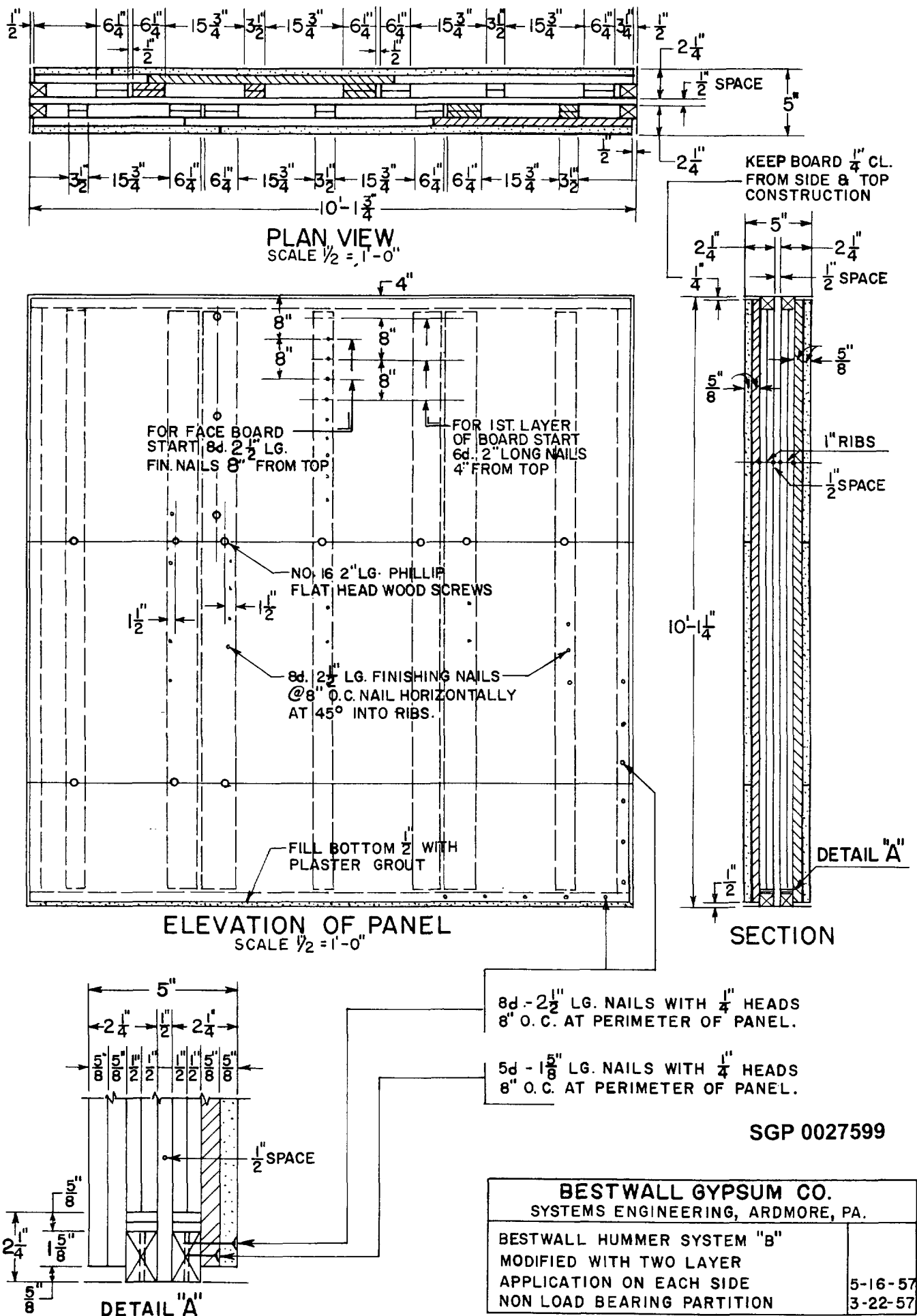
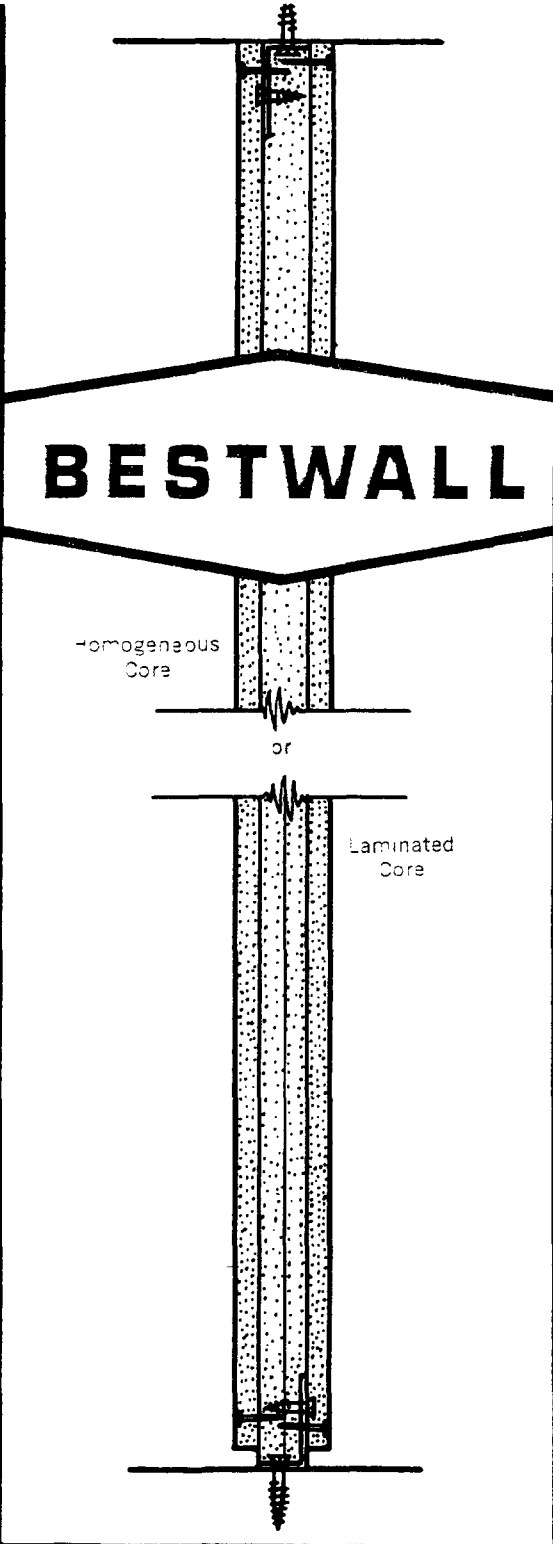


FIG. 3
R 2717-22



BESTWALL

Homogeneous
Core

or

Laminated
Core

HUMMER SYSTEMS

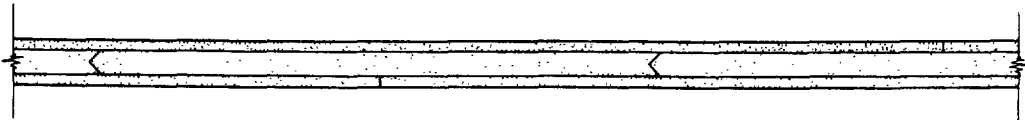
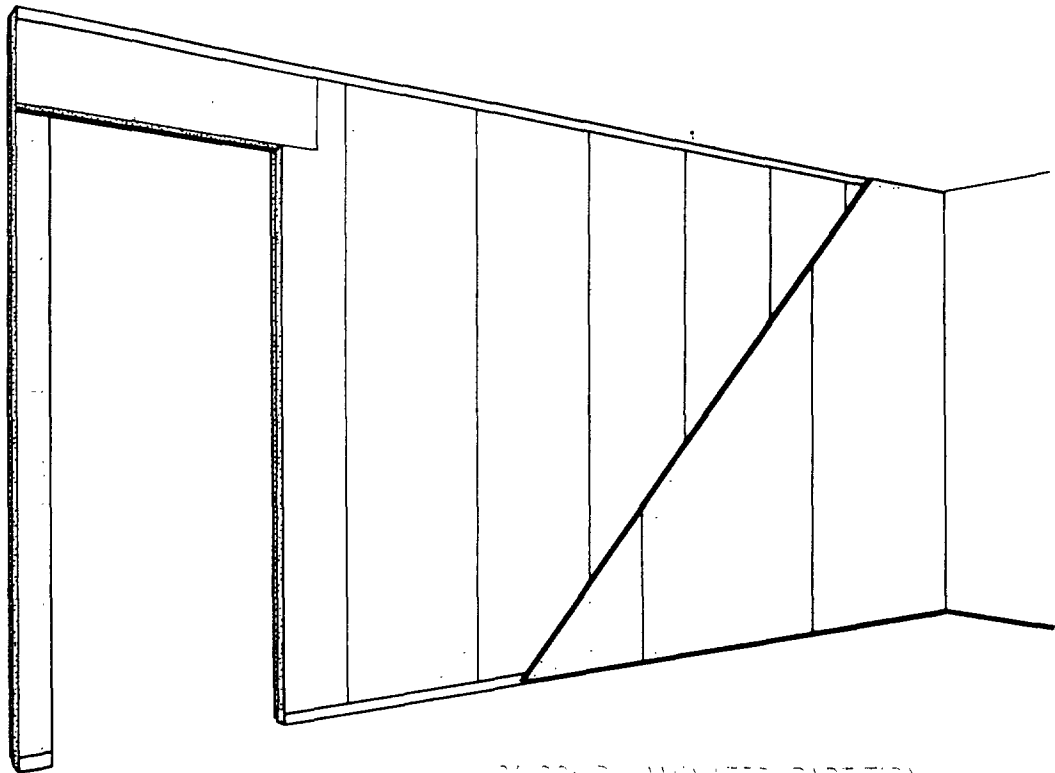
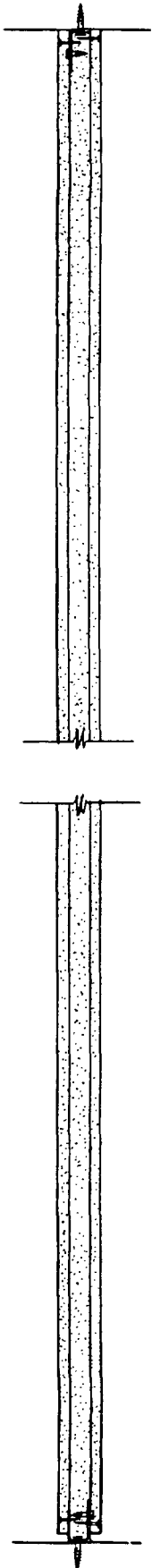
GP

SGP 0027600

2" SOLID

This laminated non-load bearing Gypsum partition system consists of 1" homogeneous core board with face plies of 1/2" Bestwall Gypsum Wallboard.

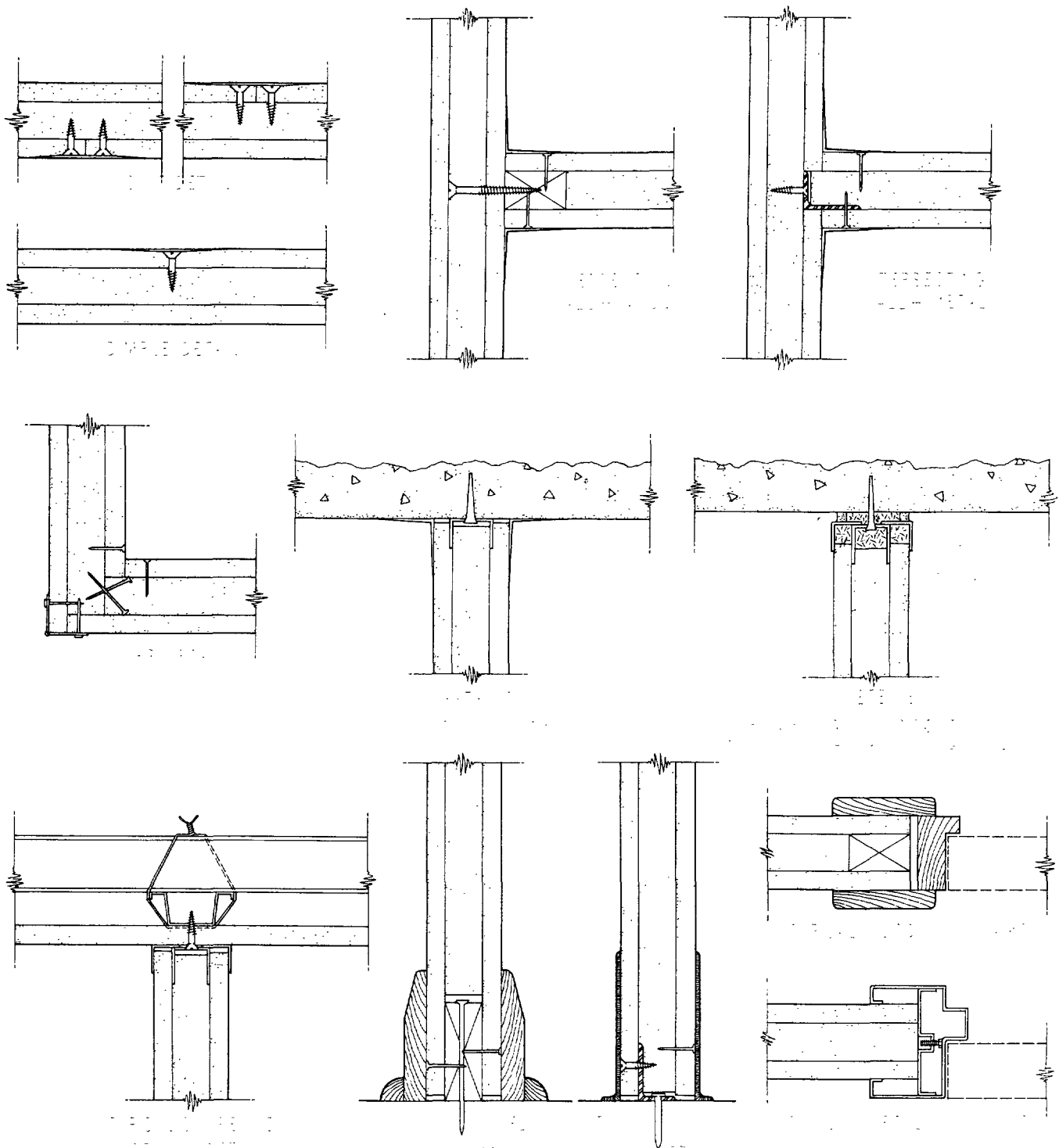
- FIRE RESISTANCE—Two hours with Bestwall Gypsum Wallboard.
- SOUND TRANSMISSION CLASS—36 db (Tested 1958).
- STRENGTH—Standard "Bump" tests show partition equal to 1/2" gypsum board over 2" x 4" wood studs 16" o.c.
- LAMINATED CONSTRUCTION — Smooth monolithic walls created by unitized lamination of multi-ply of Gypsum Wallboard.
- EXTRA USABLE FLOOR SPACE—26 sq. ft. more than 2" x 4" stud wall construction for every 100 lin. ft. of partition.



HORIZONTAL SECTION OF WALL

SCALE 1/4" = 1'

SGP 0027601



SGP 0027602

SYSTEMS ENGINEERING

Bestwall research and engineering combine Bestwall Glass Fiber Reinforced Gypsum Wallboard with the most comprehensive and advanced techniques in gypsum drywall construction. These include single ply, laminated plies, metal studs, screw application and movable partitions with and without metal framing. Each system tailors space to your requirements with substantial savings on material and labor.

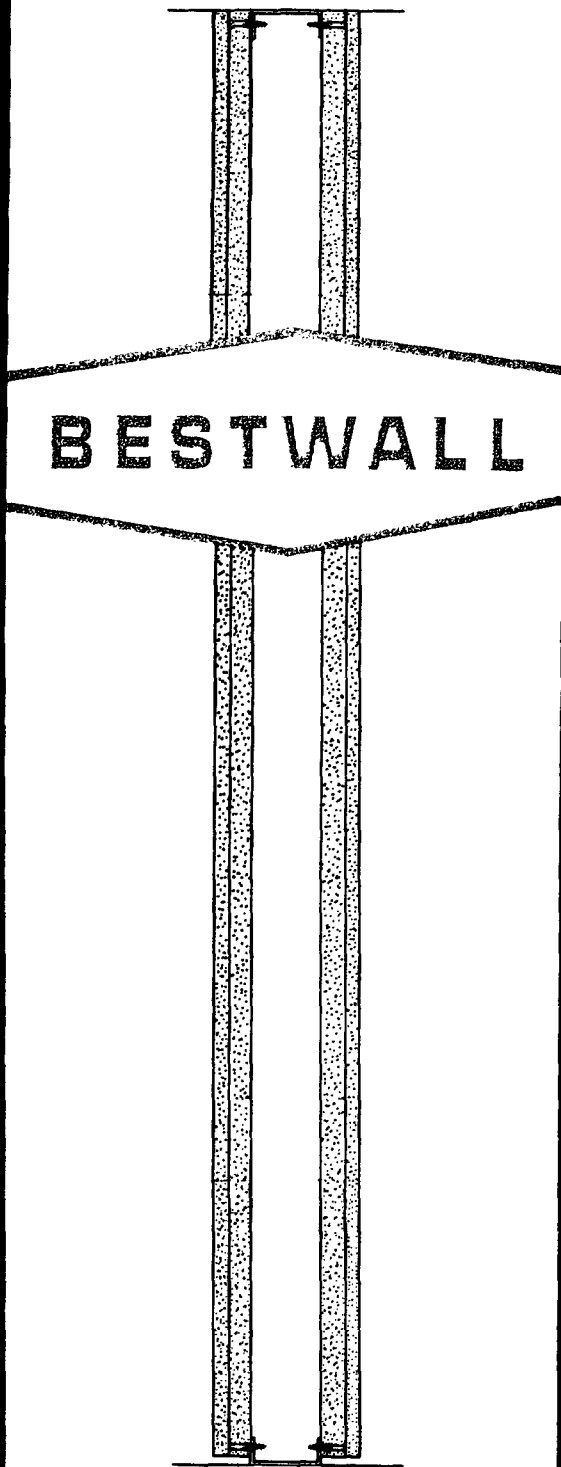
A staff of Bestwall Systems Engineers is available from coast-to-coast to assist you in quantity survey, detailing and installation of drywall systems to help you meet your requirements.

For detailed data, check your Sweet's File or write directly to Georgia-Pacific Corporation, Bestwall Gypsum Division.

BESTWALL HUMMER SYSTEMS

1. Fire Resistance Two hours with Bestwall Gypsum Wallboard.
2. Sound Transmission Loss . . 36 Decibels (Tested 1958)
3. Strength Will withstand abuse as determined by ASTM E-72-55 Impact.
4. Laminated Construction . . . Smooth monolithic walls created by unitized lamination of multi-ply of Gypsum Wallboard.
5. Extra Usable Floor Space . . 20 sq. ft. more floor space compared with 2" x 4" stud wall construction for every 100 lin. feet of partition.

**B. Double Solid
Partitions**



HUMMER SYSTEMS

DOUBLE SOLID GYPSUM PARTITION

Non-load bearing, limited height
wallboard partition with space for
mechanical accessories.

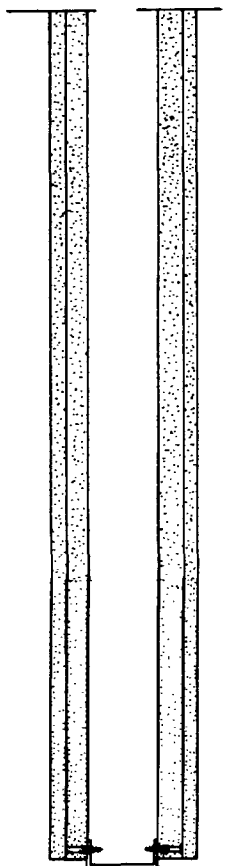
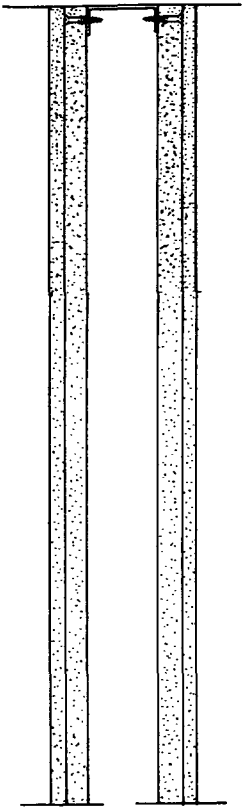
GP

SGP 0027605

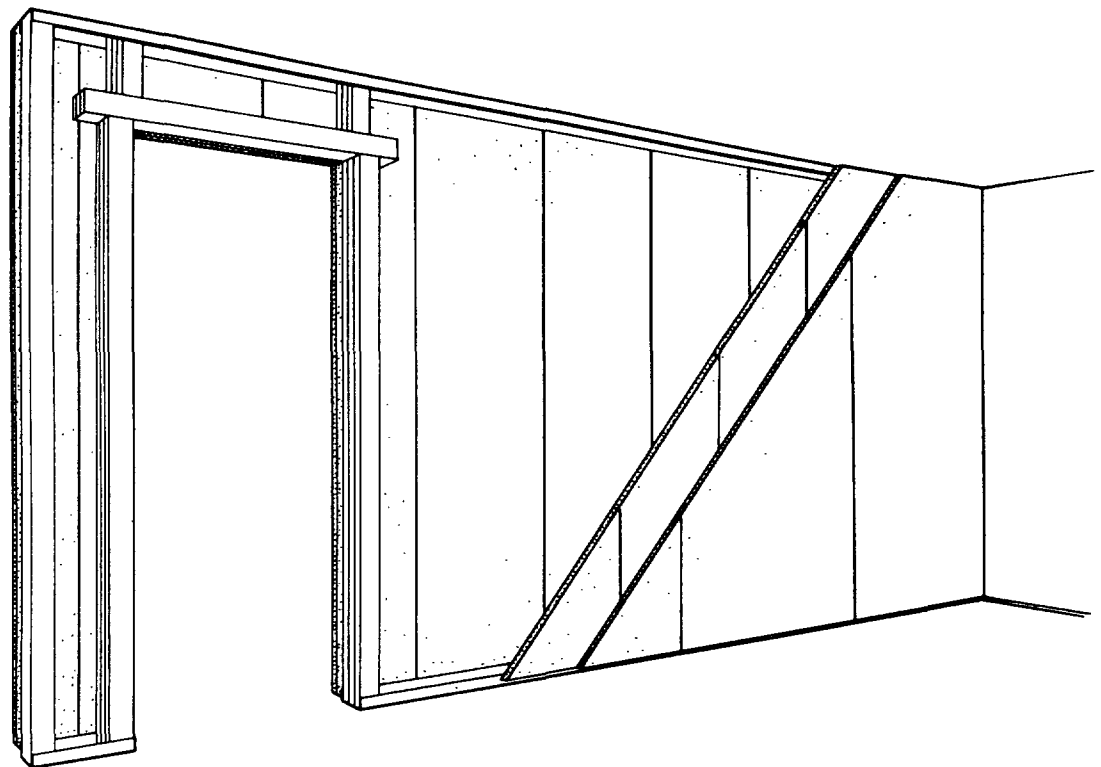
6" DOUBLE SOLID

This non-load bearing Gypsum partition system is erected by laminating $\frac{1}{2}$ " ply to 1" homogeneous board each side of a 3" void. It is recommended for party walls in high rise, residential construction.

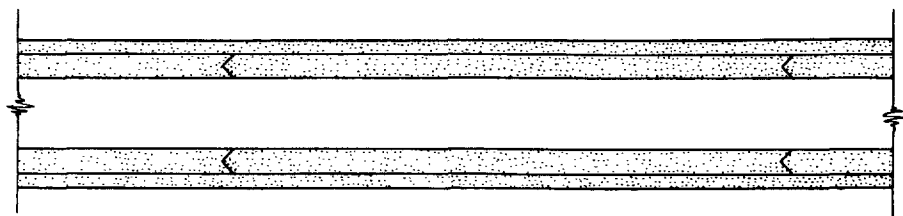
- FIRE RESISTANCE—Two hours.
- SOUND TRANSMISSION CLASS—47 db (Tested 1964).
- STRENGTH—Proven in ASTM "Bump" tests and performance to have greater resistance to deflection and cracking than a standard frame or thin solid wall.
- LAMINATED CONSTRUCTION — Smooth monolithic walls created by unitized lamination of multi-ply of Gypsum Wallboard.
- CENTER AIR SPACE—3" space for piping—conduit—fixture framing—for additional sound transmission loss.



WALL SECTION



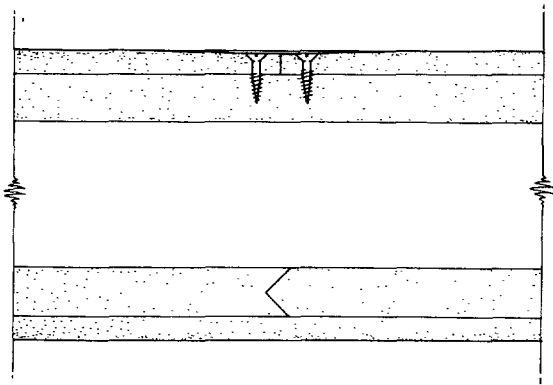
6" DOUBLE SOLID LAMINATED PARTITION



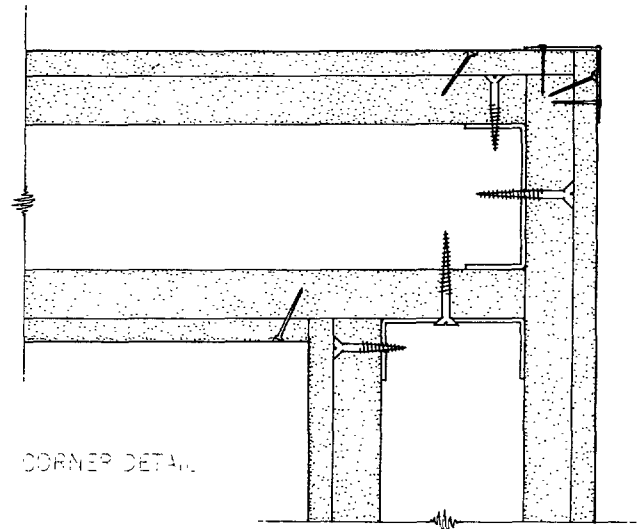
HORIZONTAL SECTION OF WALL

SCALE: $1\frac{1}{2}" = 1'0"$

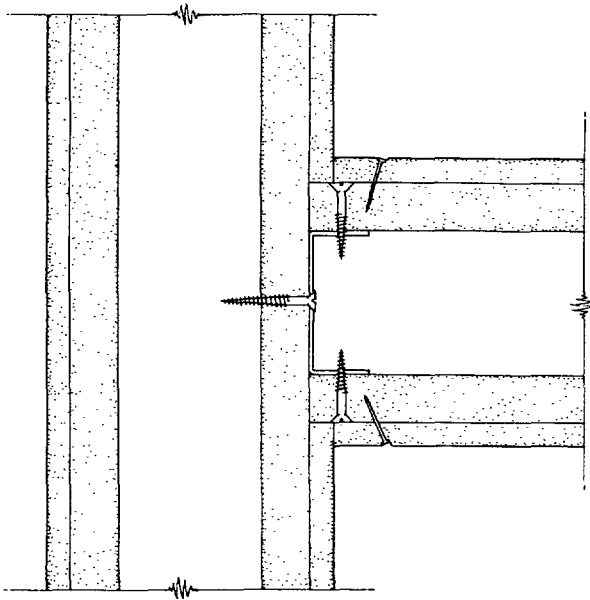
SGP 0027606



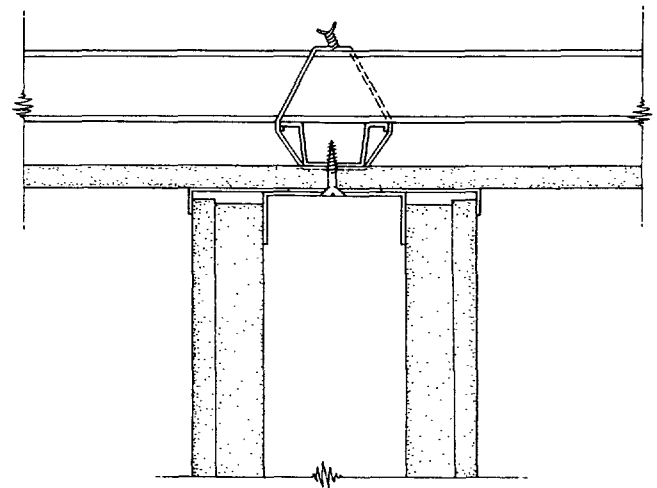
JOINT DETAIL



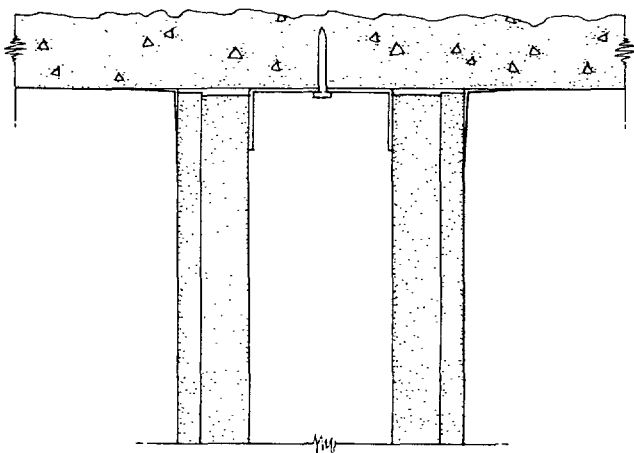
CORNER DETAIL



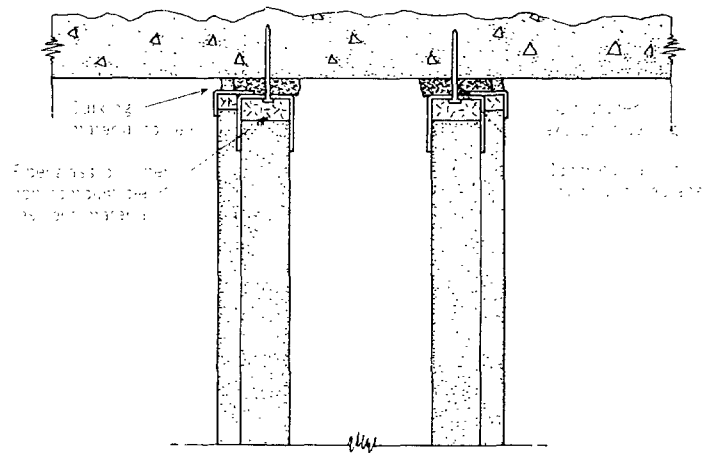
INTERSECTING WALL METAL



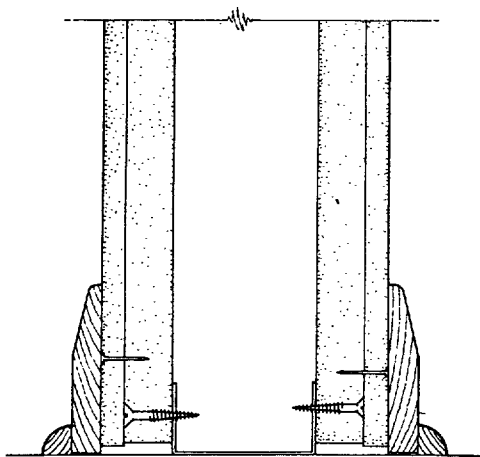
TYPICAL SUSPENDED CEILING DETAIL



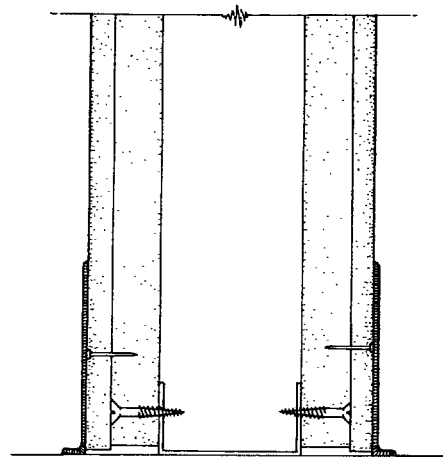
CONCRETE CEILING
WITH TAPE AND CEMENT



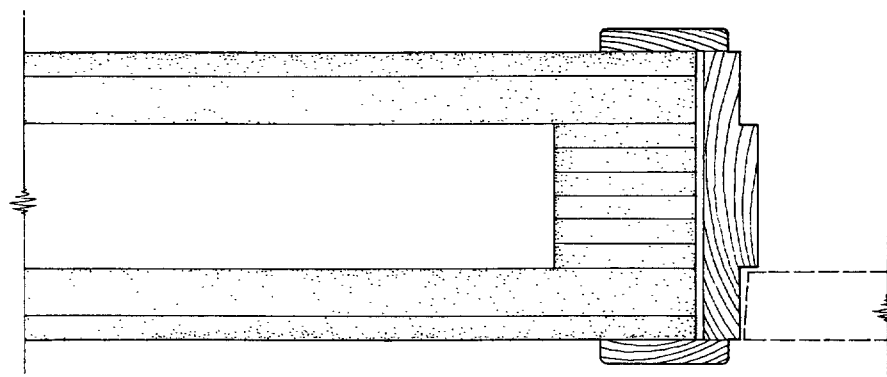
CONCRETE CEILING
Alternate method: plastering over joint
to accommodate ceiling grid and lights, etc.



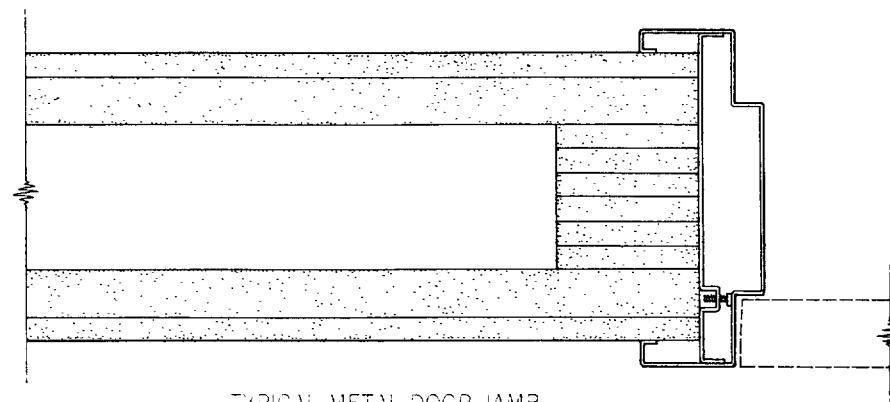
FLOOR DETAIL — WOOD TRIM



FLOOR DETAIL — VINYL TRIM



TYPICAL WOOD DOOR JAMB



TYPICAL METAL DOOR JAMB

SGP 0027608

SYSTEMS ENGINEERING

Bestwall research and engineering combine Bestwall Glass Fiber Reinforced Gypsum Wallboard with the most comprehensive and advanced techniques in gypsum drywall construction. These include single ply, laminated plies, metal studs, screw application and movable partitions with and without metal framing. Each system tailors space to your requirements with substantial savings on material and labor.

A staff of Bestwall Systems Engineers is available from coast-to-coast to assist you in quantity survey, detailing and installation of drywall systems to help you meet your requirements.

For detailed data, check your Sweet's File or write directly to Georgia-Pacific Corporation, Bestwall Gypsum Division.

BESTWALL HUMMER SYSTEMS

6" DOUBLE SOLID LAMINATED GYPSUM WALLBOARD PARTITIONS

FEATURES:

1. Fire Resistance: Two hours with Bestwall Gypsum Wallboard.
2. Sound Transmission Class: 47 db (Tested 1964).
3. Strength: Proven in ASTM E-72-55 Impact Test to have greater resistance to abuse than a standard frame or thin solid wall.
4. Laminated Construction: Smooth monolithic walls created by unitized lamination of multi-ply of gypsum wallboard.
5. Center Air Space: 3" space for piping, conduit, fixture framing, additional sound transmission loss.

SPECIFICATIONS:

All gypsum wallboard and joint system materials used, including laminating compound, shall be manufactured by Georgia-Pacific Corporation Bestwall Gypsum Division and shall be installed by a Bestwall Hummer licensed contractor in a first class manner.

Floor and Ceiling Runners: 1½" x 3' wood runners or special shaped metal runners.

Bestwall Gypsum Coreboard (may be Tongue & Groove Coreboard or lamination of two ½" boards with ship lapped edges): 1" thick, 24" wide. Laminated boards should set at least 24 hours before using.

Bestwall Taper Edge Gypsum Wallboard (Face Board): ½" thick, 4' wide, floor to ceiling length (12' max.).

Bestwall Laminating Compound: Use either a comb type spreader, a mechanical tool designed for applying laminating compound, or equivalent. The comb type spreader should have triangular notches ⅜" wide by ⅜" deep, spaced ¾" on centers. Other spreaders should have the same size and pattern of ridges as the comb type spreader.

Nails: 8d box nails and 8d finishing nails.

Screws: 1⅜" — 2¼" long, Bestwall Drywall Screws.

Openings: Door and borrowed light openings shall be left accurately located in coreboard and face board for two (or three) part frames to be set.

Single piece door frames shall be accurately set (by others) before coreboard, which must then be started from door frame.

Joint Treatment and Decorating: See Bestwall Product Sheet BW-6510

APPLICATION DETAILS

1. Secure floor and ceiling runners in place with appropriate fasteners spaced a maximum of 2' on centers.
2. Attach coreboard to floor and ceiling runners with nails or screws 8" o.c. (Do not dimple).
3. Apply Bestwall Laminating Compound to the coreboard or to the back of the faceboard with a mechanical or comb type spreader.
4. Apply face layer of ½" Bestwall Gypsum Wallboard vertically to each side of the partition. Joints should be staggered and fall a minimum of 6" off those in coreboard.

Note: In buildings where movement may occur of sufficient magnitude to load the partitions, a relief joint should be provided at the ceiling line, and also where the partitions are erected between building columns at the intersection with the columns. An illustration would be the upper floors of concrete flat slab constructions.

The wallboard system covered in this Georgia-Pacific/Bestwall Gypsum Division folder has been developed with due regard to practical construction methods. However, since the Bestwall Gypsum Division does not have any prior knowledge of building design and construction on a specific job, or methods of application and use of their products, no warranty of performance is made. All of the test results shown have been obtained under laboratory testing conditions where controlled environment reduces variables to a minimum. In the field, such laboratory conditions are not always met, since many other variables are introduced. Laboratory results will generally exceed results of field tests, but the tests under controlled conditions are the only logical way to compare the performance of different assemblies. The Bestwall Gypsum Division of the Georgia-Pacific Corporation makes no warranty as to the performance of assemblies in the field having a performance equal to or better than that developed in the test.

SALES OFFICES

ATLANTA

301 Peachtree East Building
1720 Peachtree, N.W.
Atlanta, Georgia 30309

BROOKLYN

Room 41 Union Street
Brooklyn, New York 11201

CHICAGO

5501 W. 31st Street
Chicago, Illinois 60642

CLEVELAND

3330 Wardenville Center Road
Shaker Heights
Cleveland, Ohio 44122

DALLAS

300 East Texas Bank Building
Dallas, Texas 75202

DETROIT

Suite 2215 Comer Building
Detroit, Michigan 48226

DULUTH

Bayview Building
3822 Peachtree Avenue
Duluth, Georgia 30090

KANSAS CITY

1230 Olive Street
Kansas City, Missouri 64105

NEW ORLEANS

2000 Magazine Street
New Orleans, Louisiana 70113

SAN FRANCISCO

301 E. Gough Street
San Francisco, California 94132

WESTERN

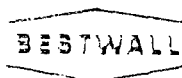
Room 201 Empire Building
419 S. Main Street
Salt Lake City, Utah 84111

WILMINGTON

Wilmington Marine Terminal
Wilmington, Delaware 19809



GEORGIA-PACIFIC



SALES DIVISION

2101 E. 10th Avenue, Fort Collins, CO 80521

SGP 0027610

C. Ceiling
Systems

GEORGIA-PACIFIC CORPORATION
BESTWALL GYPSUM DIVISION
January 25, 1967

General Sales Bulletin #11-67

TO: ALL REGIONAL SALES MANAGERS
ALL DISTRICT SALES MANAGERS
ALL SALESMEN

CC: R. I. Fredericks, Paoli
K. A. McCaskill, Paoli
M. M. Powers, Paoli

SUBJECT: STEEL BEAM FIREPROOFING
WITH
GYPSUM WALLBOARD

By: G. C. Moore:jw

GCM

FILE: GYPSUM WALLBOARD PRODUCTS MANUAL - 7C

Attached are two copies of descriptive literature that describes two construction applications for fireproofing steel beams for a 2-Hour fire resistance rating with two layers of Type "X" Gypsum Wallboard.

These construction assemblies were fire tested at the Underwriters' Laboratories for the Gypsum Association. The assemblies are covered under UL Design Nos. 254-2 Hours, and 255-2Hours.

Two methods were employed to frame in the three sides of the steel beams. In UL Design 254, 1" x 2" - 24 gauge L shaped metal runners were applied and in UL Design 255, 1-5/8" x 1" - 25 gauge metal runners were used. Two layers of 5/8" Type "X" Gypsum Wallboard were screw attached to the metal framing and finished in the conventional manner.

The Gypsum Association will continue to fire test similar assemblies in an effort to get three and four hours fire resistance ratings. Georgia-Pacific/Bestwall's Firestop labels will show the two described design numbers as new tapes are printed.

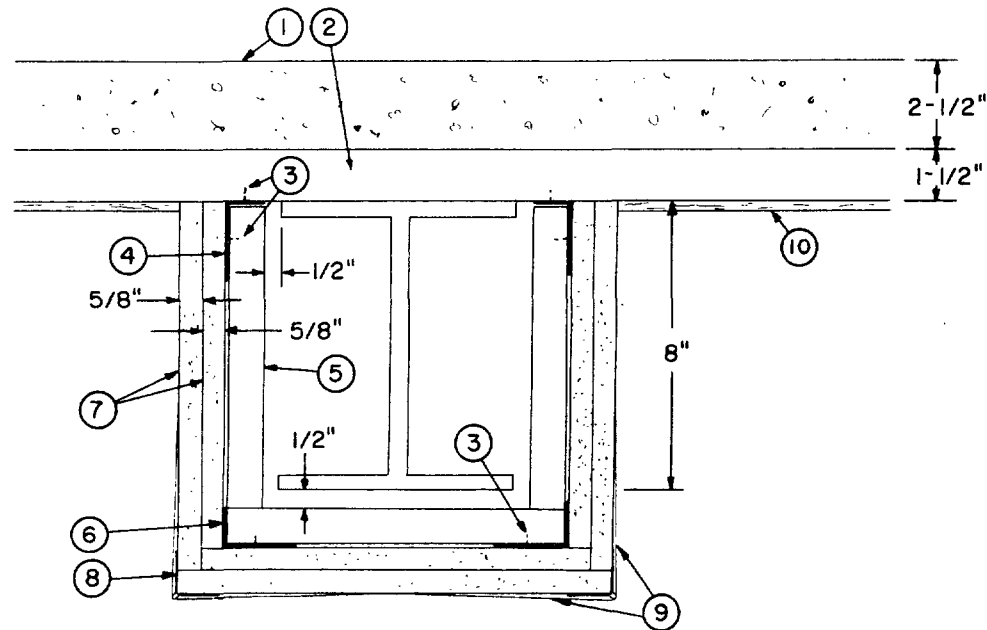
Promote and sell Georgia-Pacific/Bestwall Gypsum products with the new methods of fire resistant applications

ATT(2)

SGP 0027612

Class D-2 Designs
Design No. 254—2 Hr. (Beam Only)[†]

F



September 14, 1966

Part 2 - Description of Numbered Items

Class D-2 Designs

Design No. 254 - 2 Hr. (Beam only)[†]

[†] - When used with floor and ceiling similar to that shown having at least a 2-hr classification.

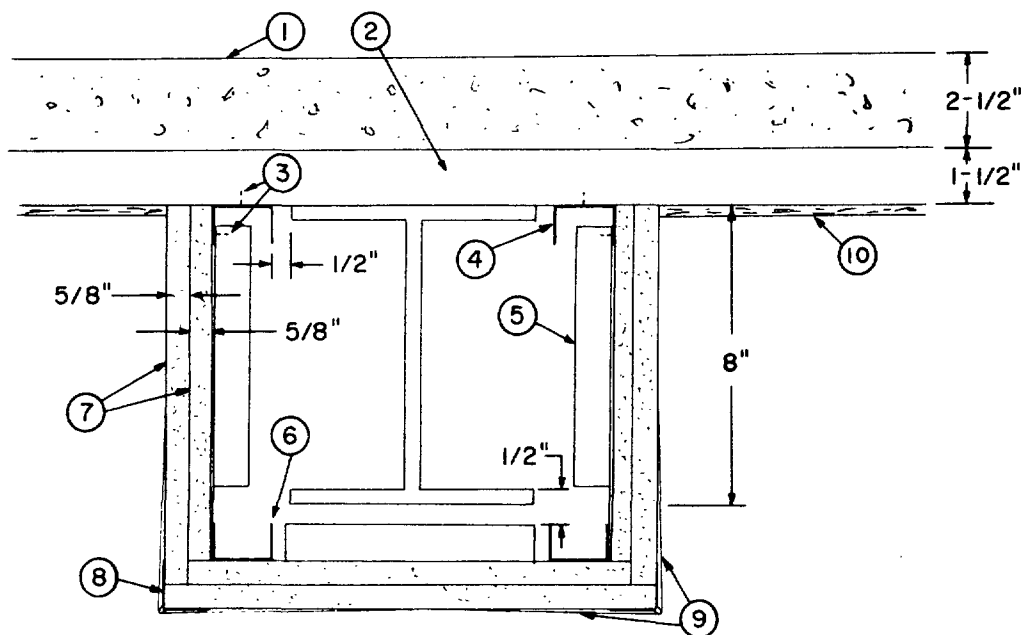
1. Sand-Gravel Concrete.
2. Fluted Steel Floor Units - Welded to beam.
3. Drill Screw - No. 8-18 by 1/2-in. long Phillips pan-head drill screws, self-drilling and tapping, made of case-hardened steel.
4. Runner Angle - No. 24 gauge galvanized steel with 1 and 2-in. legs. Fastened to steel deck 12 in. O.C. with Item 3.
5. Channel Bracket - Fabricated from No. 25 gauge galvanized steel, 1-11/16 in. deep with 1-in. legs and spaced 24 in. O.C. Fastened to the runner angles with Item 3.
6. Corner Angle - Same material as Item 4, fastened to channel brackets with Item 3.
7. Wallboard - 5/8 in. thick, listed by Und. Lab., Inc. (Building Materials List, Guide No. 40 U18.23). First layer fastened with 1-1/4-in. long, 0.150-in. diameter screws spaced 16 in. O.C. Second layer attached with 1-3/4-in. long, 0.150-in. diameter screws spaced 8 in. O.C. Screws are self-drilling and self-tapping Phillips head made of case-hardened steel.
8. Corner Bead - Fabricated from No. 20 gauge galvanized steel to form an angle with 1-1/4-in. legs. Legs perforated with 1/4-in. diameter holes approx 1 in. O.C. Attached to wallboard with special crimping tool approx. 6 in. O.C. As an alternate, the bead may be nailed to the wallboard.
9. Joint Compound - 1/32 in. thick on bottom and sides of wallboard from corner beads and feathered out. Paper tape imbedded in joint compound over joints with edges of compound feathered out.
10. Protective Material.

SGP 0027613

Floor or Roof and Ceiling Construction and Beam Protection **Part 1 - See Part 2 for Description of Numbered Items**

Class D-2 Designs
Design No 255—2 Hr. (Beam Only)[†]

F



September 14, 1966

Part 2 - Description of Numbered Items

Class D-2 Designs

Design No. 255 - 2 Hr. (Beam only)[†]

† - When used with floor and ceiling similar to that shown having at least a 2-hr classification.

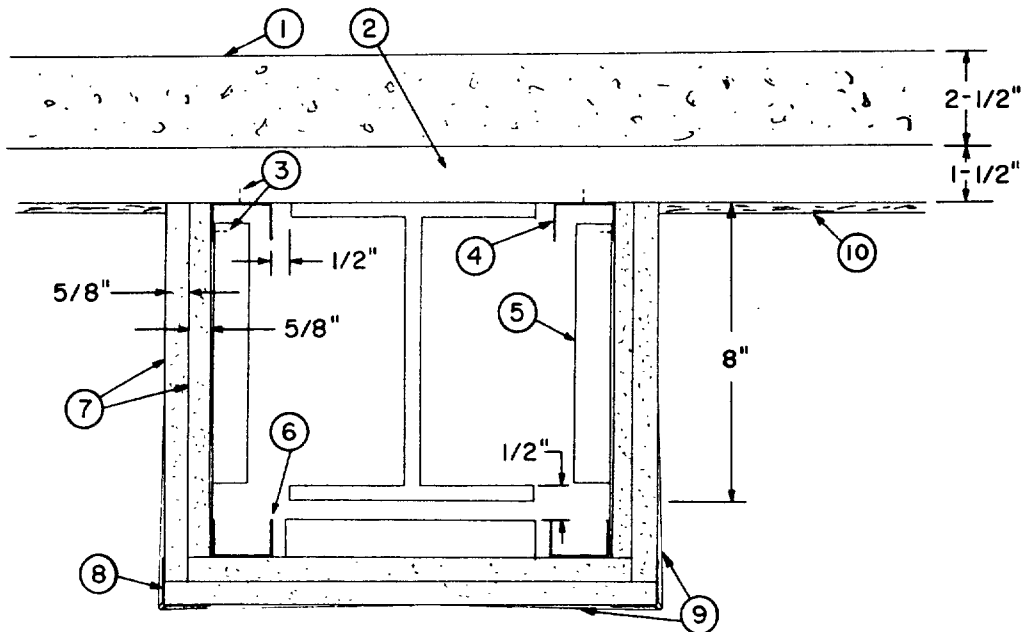
1. Sand-Gravel Concrete.
2. Fluted Steel Floor Units - Welded to beam.
3. Drill Screw - No. 8-18 by 1/2-in. long Phillips pan-head drill screws, self-drilling and tapping, made of case-hardened steel.
4. Runner Channel - Fabricated from No. 25 gauge galvanized steel, 1-11/16 in. deep with 1-in. legs. Fastened to steel deck with Item 3, 12 in. O.C.
5. Channel Bracket - Same material as Item 4 and fastened to runner channels with Item 3. Brackets spaced 24 in. O.C.
6. Corner Channel - Same material as Item 4. Placed in cutouts of channel brackets without attachment.
7. Wallboard - 5/8 in. thick, listed by Und. Lab., Inc. (Building Materials List, Guide No. 40 U18.23). First layer fastened with 1-1/4-in. long, 0.150-in. diameter screws and spaced 16 in. O.C. Second layer attached with 1-3/4-in. long, 0.150-in. diameter screws spaced 8 in. O.C. Screws are self-drilling and self-tapping Phillips head made of case-hardened steel.
8. Corner Bead - Fabricated from No. 20 gauge galvanized steel to form an angle with 1-1/4-in. legs. Legs perforated with 1/4-in. diameter holes approx 1 in. O.C. Attached to wallboard with special crimping tool approx. 6 in. O.C. As an alternate, the bead may be nailed to the wallboard.
9. Joint Compound - 1/32 in. thick on bottom and sides of wallboard from corner beads and feathered out. Paper tape imbedded in joint compound over joints with edges of compound feathered out.
10. Protective Material.

SGP 0027614

Floor or Roof and Ceiling Construction Part 1 - See Part 2 for Description of Numbered Items and Beam Protection

Class D-2 Designs
Design No. 255—2 Hr. (Beam Only)[†]

F



September 14, 1966

Part 2 - Description of Numbered Items

Class D-2 Designs

Design No. 255 - 2 Hr. (Beam only)[†]

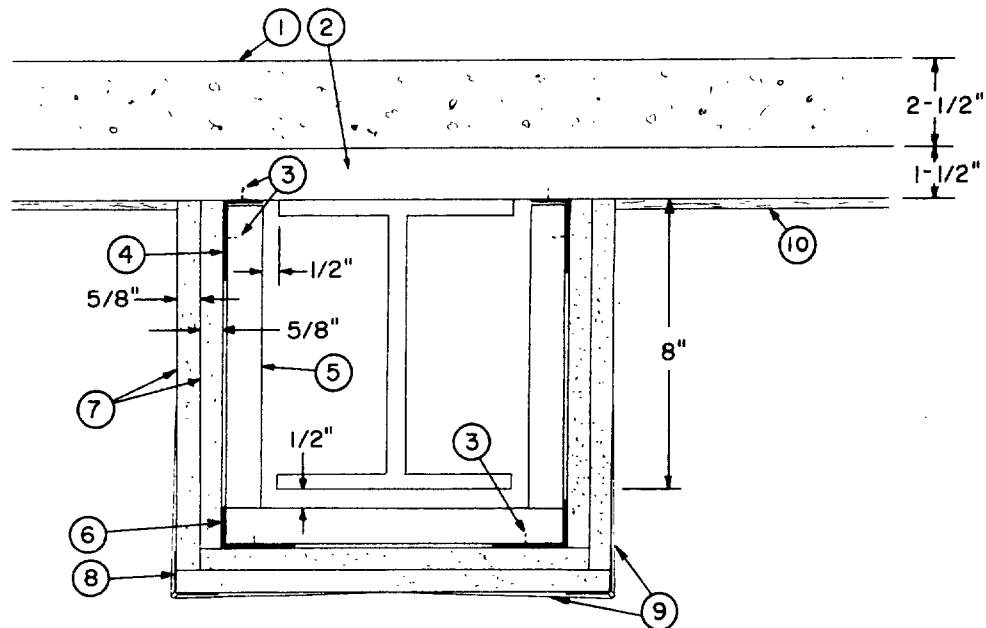
[†] - When used with floor and ceiling similar to that shown having at least a 2-hr classification.

1. Sand-Gravel Concrete.
2. Fluted Steel Floor Units - Welded to beam.
3. Drill Screw - No. 8-18 by 1/2-in. long Phillips pan-head drill screws, self-drilling and tapping, made of case-hardened steel.
4. Runner Channel - Fabricated from No. 25 gauge galvanized steel, 1-11/16 in. deep with 1-in. legs. Fastened to steel deck with Item 3, 12 in. O.C.
5. Channel Bracket - Same material as Item 4 and fastened to runner channels with Item 3. Brackets spaced 24 in. O.C.
6. Corner Channel - Same material as Item 4. Placed in cutouts of channel brackets without attachment.
7. Wallboard - 5/8 in. thick, listed by Und. Lab., Inc. (Building Materials List, Guide No. 40 U18.23). First layer fastened with 1-1/4-in. long, 0.150-in. diameter screws and spaced 16 in. O.C. Second layer attached with 1-3/4-in. long, 0.150-in. diameter screws spaced 8 in. O.C. Screws are self-drilling and self-tapping Phillips head made of case-hardened steel.
8. Corner Bead - Fabricated from No. 20 gauge galvanized steel to form an angle with 1-1/4-in. legs. Legs perforated with 1/4-in. diameter holes approx 1 in. O.C. Attached to wallboard with special crimping tool approx. 6 in. O.C. As an alternate, the bead may be nailed to the wallboard.
9. Joint Compound - 1/32 in. thick on bottom and sides of wallboard from corner beads and feathered out. Paper tape imbedded in joint compound over joints with edges of compound feathered out.
10. Protective Material.

SGP 0027615

Class D-2 Designs
Design No. 254 - 2 Hr. (Beam Only)[†]

F



September 14, 1966

Part 2 - Description of Numbered Items

Class D-2 Designs

Design No. 254 - 2 Hr. (Beam only)[†]

† - When used with floor and ceiling similar to that shown having at least a 2-hr classification.

1. Sand-Gravel Concrete.
2. Fluted Steel Floor Units - Welded to beam.
3. Drill Screw - No. 8-18 by 1/2-in. long Phillips pan-head drill screws, self-drilling and tapping, made of case-hardened steel.
4. Runner Angle - No. 24 gauge galvanized steel with 1 and 2-in. legs. Fastened to steel deck 12 in. O.C. with Item 3.
5. Channel Bracket - Fabricated from No. 25 gauge galvanized steel, 1-11/16 in. deep with 1-in. legs and spaced 24 in. O.C. Fastened to the runner angles with Item 3.
6. Corner Angle - Same material as Item 4, fastened to channel brackets with Item 3.
7. Wallboard - 5/8 in. thick, listed by Und. Lab., Inc. (Building Materials List, Guide No. 40 U18.23). First layer fastened with 1-1/4-in. long, 0.150-in. diameter screws spaced 16 in. O.C. Second layer attached with 1-3/4-in. long, 0.150-in. diameter screws spaced 8 in. O.C. Screws are self-drilling and self-tapping Phillips head made of case-hardened steel.
8. Corner Bead - Fabricated from No. 20 gauge galvanized steel to form an angle with 1-1/4-in. legs. Legs perforated with 1/4-in. diameter holes approx 1 in. O.C. Attached to wallboard with special crimping tool approx. 6 in. O.C. As an alternate, the bead may be nailed to the wallboard.
9. Joint Compound - 1/32 in. thick on bottom and sides of wallboard from corner beads and feathered out. Paper tape imbedded in joint compound over joints with edges of compound feathered out.
10. Protective Material.

SGP 0027616

PAOLI, PENNSYLVANIA

21 September 1965

To: All Regional Sales Managers
All Area Sales Managers
All Salesmen
Distribution Division

General Sales Bulletin #87-65

Subject: AMERICAN PLYWOOD INSTITUTE

Cc: Mr. R.I. Fredericks Paoli
Mr. K.A. McCaskill Paoli

Re: Combustible Floor & Ceiling
Assemblies-Plywood Subfloors

By: G.C. Moore /ghp

File - Wallboard Gypsum Product Manual #2 - Section 7-C
--

The American Plywood Institute have conducted fire tests at the Underwriters' Laboratories on combustible (floor and ceiling) construction assemblies using various thicknesses of plywood in lieu of using the conventional 1" x 4" or 1" x 6" sub-flooring which is presently used over wood joists for sub-flooring.

Underwriters' have approved the use of 5/8" plywood (underlayment grade T8.6) over building paper over 1/2" structural interior plywood (with exterior glue, grade - CD).

This type construction applies to floor and ceiling assemblies with a 45 minute and 1 hour fire rating (not over 1 hour).

The Underwriters' Laboratories are presently changing their literature and when reprinted, UL literature will show this alternate method of construction under the already approved design numbers using plywood for underlayment in 45 minute and 1 hour floor and ceiling construction assemblies.

This alternate method will allow contractors to use plywood in lieu of the conventional wood flooring over wood joists in combustible ceiling assemblies.

Please note and file - Bestwall 1966 Sweet's will show this approval.

SGP 0027617

Paoli, Pennsylvania

March 31, 1965

General Sales Bulletin #23-65

TO: All Regional Sales Managers
All Area Sales Managers
All Salesmen

Subject: 5/8" BESTWALL FIRESTOP

CC: Mr. R. I. Fredericks Paoli
Mr. K. A. McCaskill Paoli

Re: 2 Hour Combustible
Floor and Ceiling Assembly
Commonwealth of Pennsylvania
Certificate of Approval 2467

By: Gordon C. Moore /my

FILE - Wallboard Manual - Section 7-C Replaces Single Sheet Approval

Attached are two copies each of (1) Drawing No. T-122 describing the 2 Hour floor and ceiling assembly and, (2) Certificate of Approval No. 2467 from The Industrial Board of the Department of Labor & Industry, Commonwealth of Penna.

This floor and ceiling assembly involving a combustible frame and floor in which a 2 hour fire resistance was proven in an official fire test. There is no combination of gypsum lath and plaster, metal lath and plaster or other wallboard assembly which has been tested and so proven. This is important in several areas of the Country where the Building Code Regulations permit wood framed construction but require a 2 hour floor and ceiling assembly; generally occurring in construction of apartment houses, garden type apartments and buildings of mixed occupancy where there is some commercial occupancy on the first floor and living quarters on the second floor. In a great many such instances, the 2 hour floor and ceiling assembly is required over the garage area, over the basement area with heating equipment or over the commercial occupancy.

When we first presented the material to the Industrial Board of the State of Pennsylvania, they were very enthusiastic about the UL Design No. 217 - 2 hours and, previous to this test, architects and contractors were forced to pour a concrete slab over the first floor in a wood framed assembly and plaster the ceiling below in order to meet the 2 hour requirement for the State of Penna.

Destroy all single copies of this Certificate of Approval with the Drawing on the back. The Legal Department for the Commonwealth of Pennsylvania have notified the Bestwall Gypsum Company to CEASE AND DESIST the practice of defacing the Certificates of Approval of the Commonwealth.

SGP 0027618

No. 2467

OCTOBER 15, 1964

COMMONWEALTH OF PENNSYLVANIA



CERTIFICATE OF APPROVAL

THIS IS TO CERTIFY THAT

*The Industrial Board of the Pennsylvania Department
of Labor and Industry has examined*

and approved

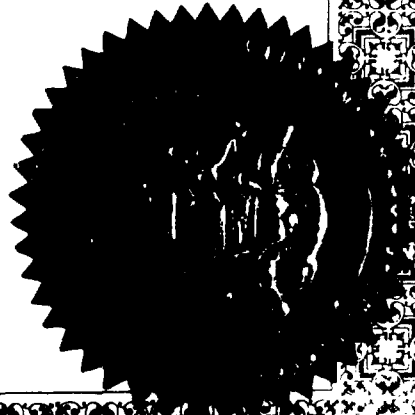
"FLOOR AND CEILING DESIGN" WITH A 2 HR. FIRE RESISTIVE RATING. THE
ASSEMBLY WILL CONSIST OF CEILING AND FLOOR CONSTRUCTION ON WOOD JOISTS
WITH TWO LAYERS OF 5/8" BESTWALL FIRE STOP WITH RESILIENT CHANNEL.

The
of the

BESTWALL GYPSUM COMPANY

PAOLI, PENNSYLVANIA

R. Paul Lessy Secretary
R. PAUL LESSY



SGP 0027619

BESTWALL'S

IMPROVED

FIRESTOP

1/2" THICK

All Its

1- and 2-HOUR RATINGS

plus the old

45-MINUTE

on walls or ceilings

for BOCA requirements

PROVEN BY OFFICIAL FIRE TESTS

at

**OHIO STATE UNIVERSITY
ENGINEERING EXPERIMENT STATION**

and

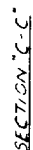
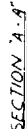
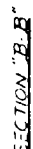
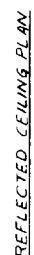
UNDERWRITERS' LABORATORY

SGP 0027621

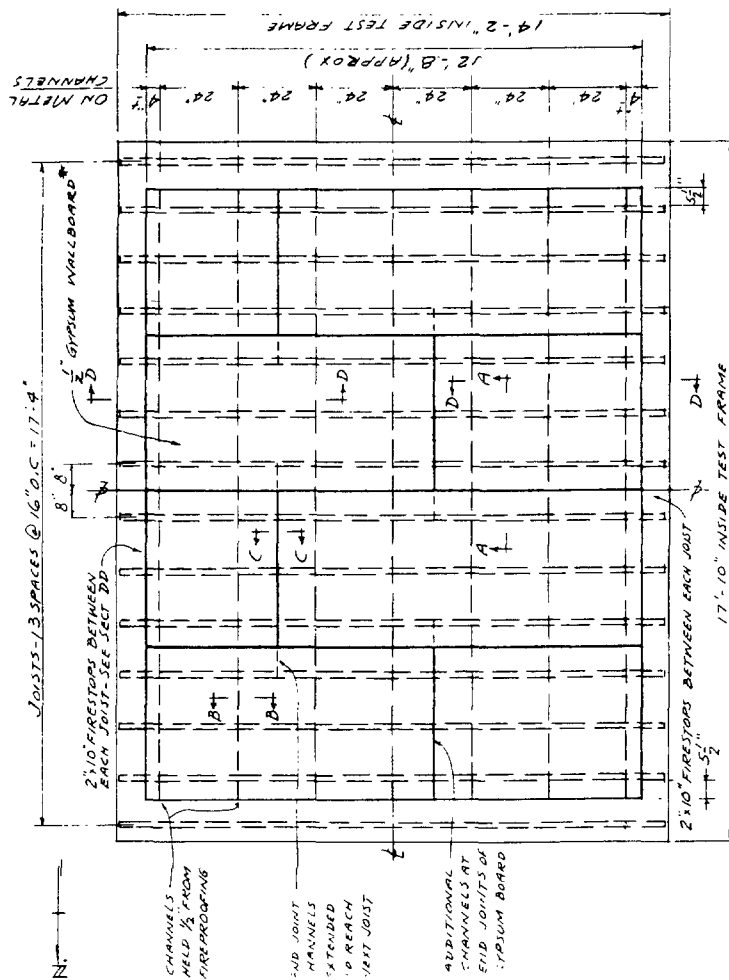


GEORGIA-PACIFIC / GYPSUM DIVISION

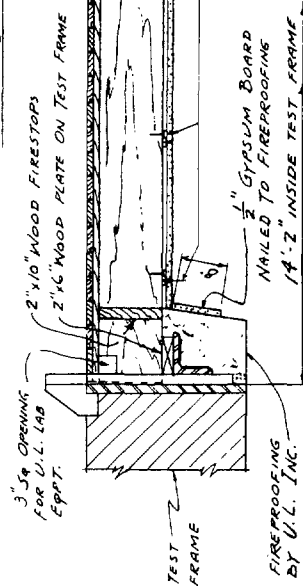
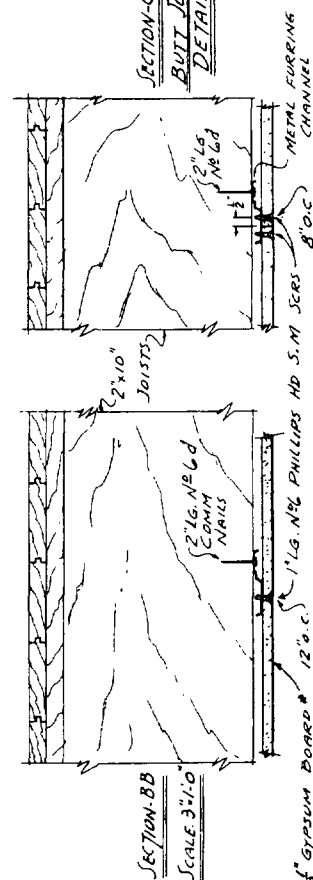
COMMONWEALTH BUILDING, PORTLAND, OREGON 97204



DATE	2-26-68	SCALE	Dwg. No T-130-1
DRN	CND		
TR			



REFLECTED CEILING PLAN
SCALE $\frac{1}{2}'' = 1'-0''$

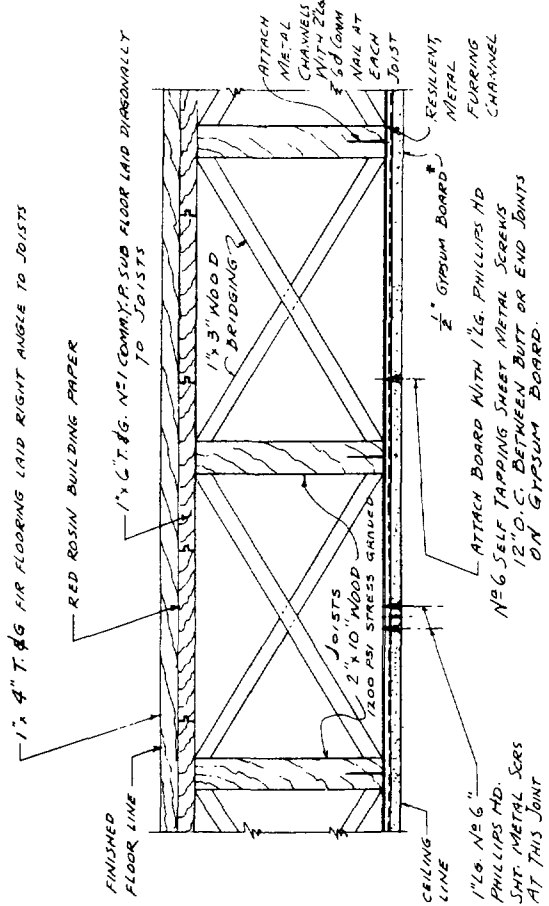


SECTION-CC
BUTT JOINT
DETAIL

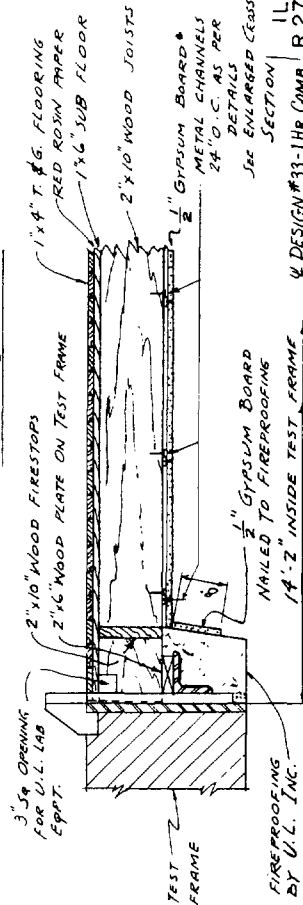
SECTION- DD
SCALE: 1"=1'-0"

3 1/2" LG. SLITS APPEAR IN BENDS
INDICATED AT 48" INTERVALS
STAGGERED BETWEEN BENDS

* LISTED BY UNDERWRITERS' LABORATORIES, INC.



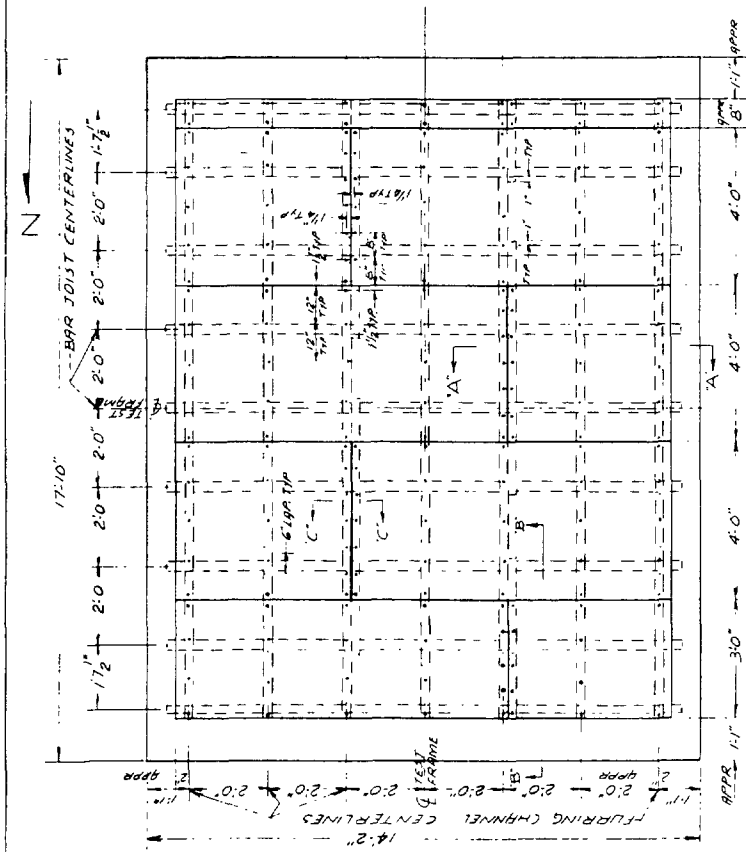
CROSS SECTION THRU STRUCTURE AT-AA
SCALE: 3" = 1'-0"



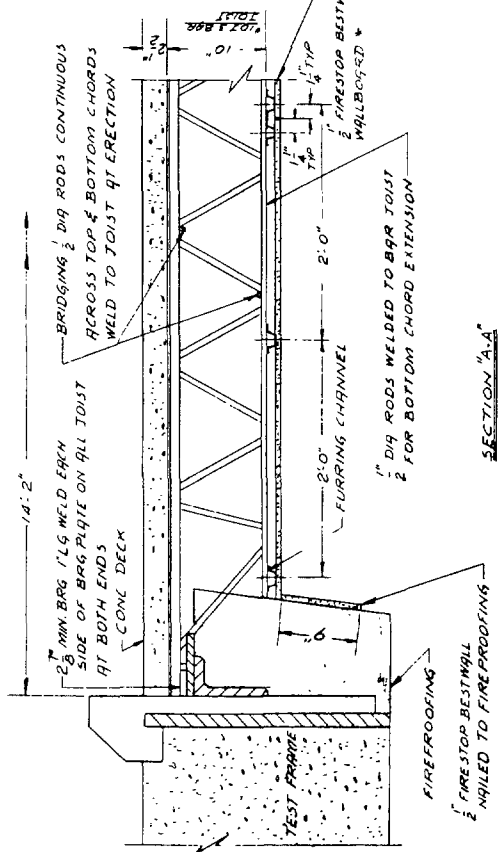
SECTION 111.1

BESTWALL GYPSUM COMPANY ENGINEERING DEPT	<i>WOOD FLOOR CONSTRUCTION WITH FIRESTOP BESTWALL GYPSUM BOARD CEILING ON METAL FURRING CHANNELS</i>	DWG. No. T-113 SCALE NOTED DATE 02-28-63 TUN BY J.H.A. 02/28/63 J.E.M.	SHEET NO. <i>1 of 1</i>
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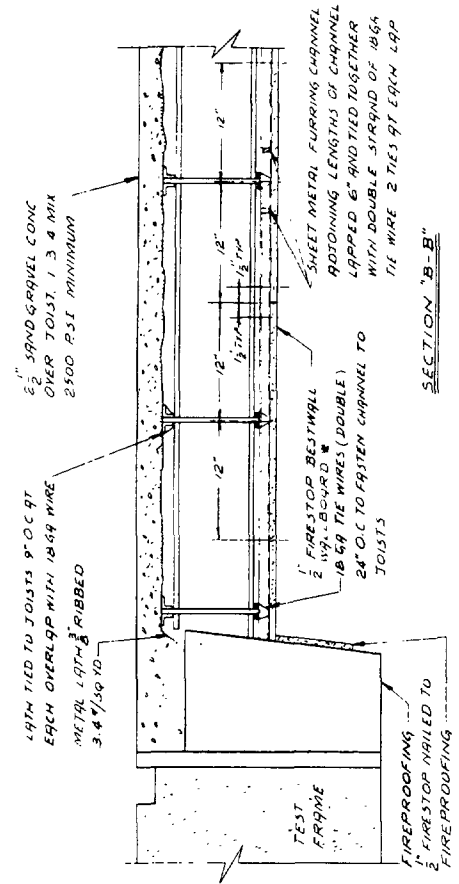
UL DESIGN No. 33 — 1 HOUR COMBUSTIBLE



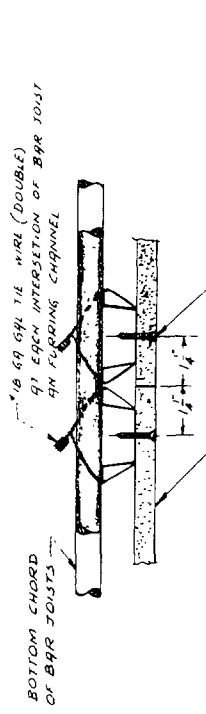
REFLECTED CEILING PLAN



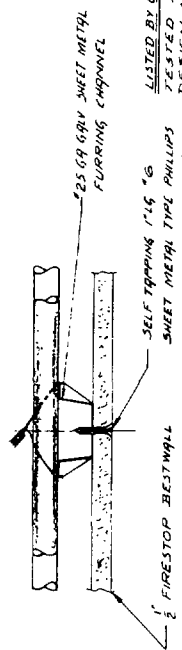
SECTION "A-A"



SECTION "B-B"



SECTION "C-C"

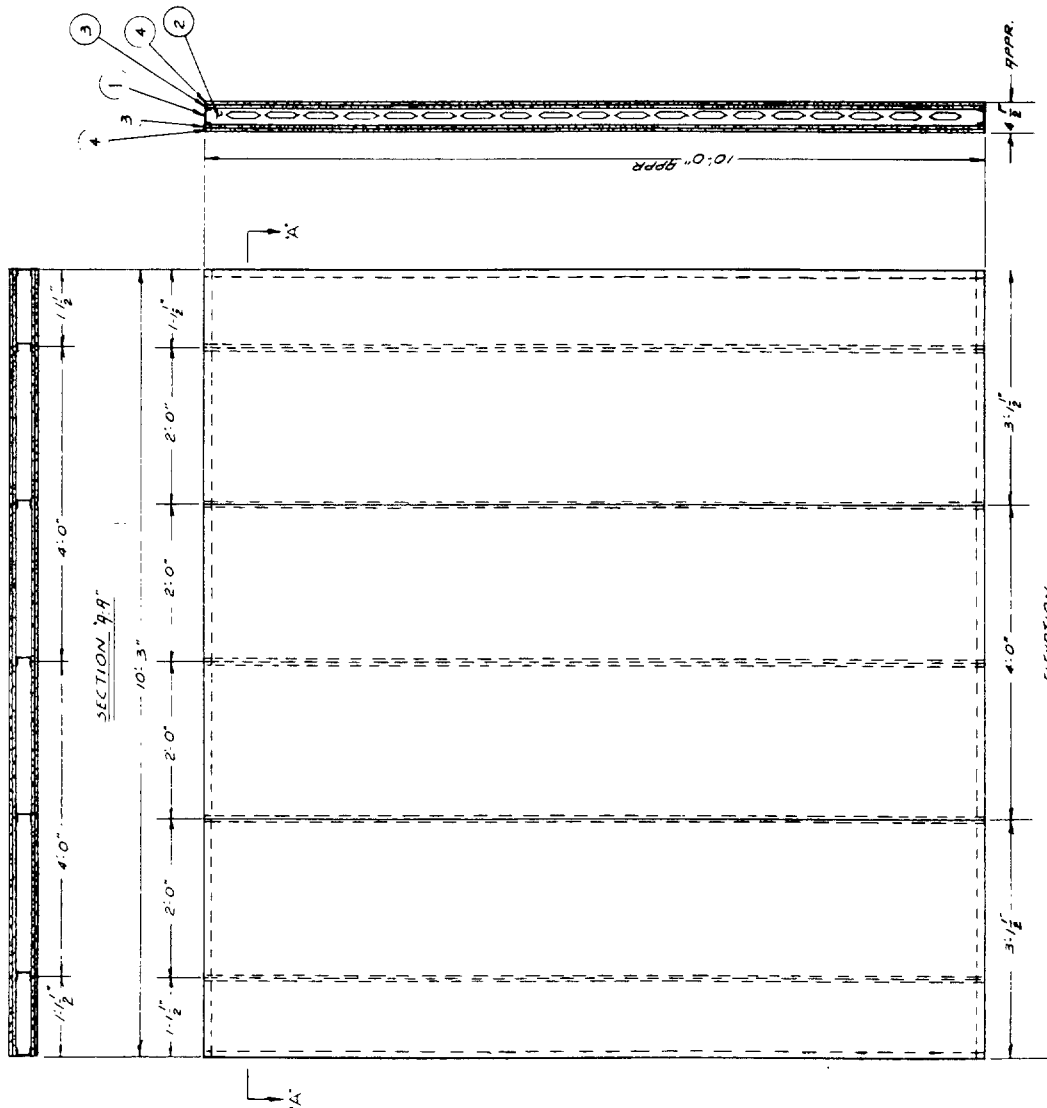


SECTION "D-D"

LISTED BY UNDERWATERS LAB. INC. ■
TESTED 5-11-65
DESIGN NO. 237-2 HOURS
BESTWALL GYPSUM COMPANY
PAOLI, PA.

CONCRETE SLAB ON STEEL BAR
JOISTS WITH 1/2" FIRESTOP BESTWALL
GYPSUM BOARD.

DATE	3-1-67	SCALE	RED 279
DRAWN	CHO	DWG NO.	T-129



- ① STUD
- ② TRACK
- ③ BOARD
- ④ BOARD

DOWN DW 40 (3/8") STEEL STUDS 24" O C
 DOWN DS 400 (1/8") STEEL STUD TRACK
 1/2" FIRESTOP BESTWALL GYP BD (VERTICAL)
 1 1/4" G DRYWALL SCREWS 12" O C 9/16 TIGHT
 AND TRACK, AND FIBER PLS IN CENTER STUD.
 1/2" FIRESTOP BESTWALL GYP BD (VERTICAL)
 1 1/4" G DRYWALL SCREWS 12" O C 9/16 TIGHT
 AND TRACK, AND 16" O C CENTER STUD AND
 LAMINATED WITH 4" STRIPS, 2" FROM EDGES
 AND 4" O C CENTER WITH BESTWALL LAMINATING
 CAP, JOINTS TAPED & FINISHED WITH BESTWALL
 JOINT SYSTEM

SGP 0027626

O.S.U. NO. T-3218 5-13-65
 2 HR INCOMBUSTIBLE

Georgia-Pacific Corporation
 Portland, Oregon

NON-BEARING, STEEL STUD ASSEMBLY
 TWO LAYERS 1/2" FIRE STOP
 BESTWALL GYP BOARD

RD 200

DATE:	5-13-65	BY:	WJH
DATE:	5-13-65	BY:	WJH
TP			

DWG NO T-134

2 HOURS INCOMBUSTIBLE NON-LOAD BEARING



NEW IMPROVED BESTWALL FIRESTOP

The Lowest Cost 2-Hour Fire Resistive Floor And Ceiling In Single Layer Application

Now from the Bestwall Gypsum Company and available only through the Bestwall Certain-teed Sales Corporation comes New Improved Bestwall Firestop. What's new about it? Plenty! There's substantially greater glass fiber reinforcement . . . more than ever before. This means increased fire ratings providing increased protection . . . possibly reduced fire insurance premiums . . . additional strength minimizing breakage in handling and installation . . . better nailing qualities . . . all available to the customer at no increase in price.

The Original $\frac{5}{8}$ " fire rated gypsum wallboard (Type "X") had a one-hour fire resistance in single layer application over wood or steel framing in walls and ceilings. Now through greater glass fiber reinforcement, its fire resistance has been increased to permit two hours when used in a single layer application in incombustible floor and ceiling assemblies.

In an Official Fire Test at Underwriters' Laboratories a single layer of $\frac{5}{8}$ " thick New Improved Bestwall Firestop was used as the ceiling beneath a concrete floor on steel bar joists (see reverse side for details) with sheet metal furring channels 24" on center, **NOT** 12", and drywall screws 12" on center, **NOT** 8".

The result: The lowest cost two-hour fire resistive incombustible floor and ceiling assembly available today! This construction with New Improved Bestwall Firestop passed the hose stream and double overloading tests, as well as the fire resistance test, which actually ran two hours and twenty minutes, with no joint finishing treatment.

All Bestwall Firestop, including the $\frac{5}{8}$ " and $\frac{1}{2}$ " thicknesses and Firestop Backer, is being manufactured with this improved glass fiber reinforcement . . . all Bestwall Firestop users will benefit from this improvement at no increase in price. Improved Bestwall Firestop is available only from the Bestwall Certain-teed Sales Corporation.

For additional information, including news about future tests to be conducted on New Improved Bestwall Firestop, contact the nearest sales office, located in principal cities throughout the United States. A staff of Bestwall Systems Engineers is available from coast-to-coast to assist in quantity survey, detailing and installation of Firestop floor, ceiling and wall systems.

**D. Steel Column
Fireproofing**

SGP 0027629

BESTWALL GYPSUM COMPANY

GYPSUM WALLBOARD MANUAL

Section 7

1965 EDITION

Sub-Section D

STEEL COLUMN FIREPROTECTING

The system for applying 5/8" Bestwall Firestop around a steel column will be listed by Underwriters' Laboratories under "Column Protection".

Designs

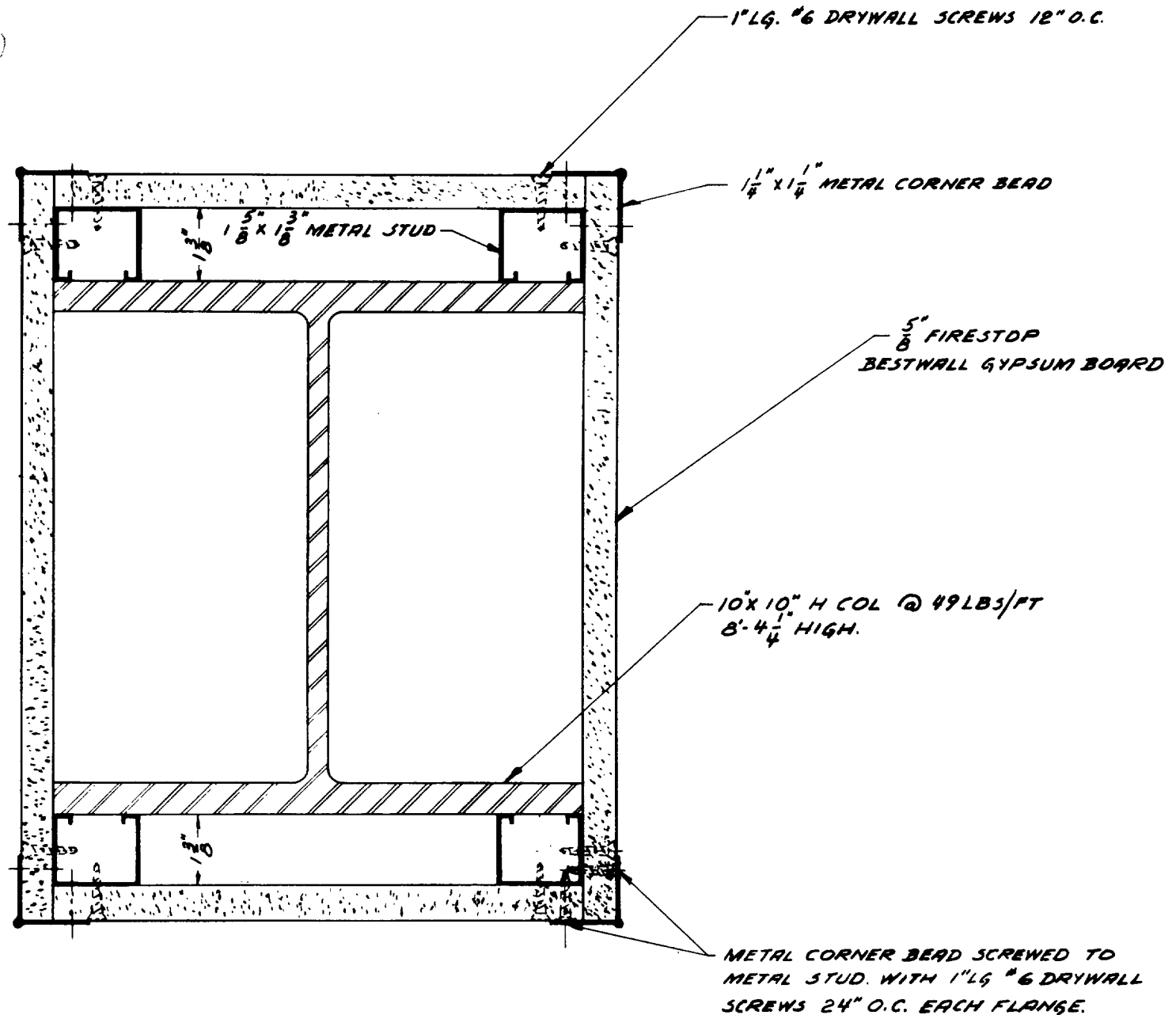
- 1 - (1-Hour) not tested - estimated - 1 layer 5/8" Firestop
- 2 - (2-Hour) U. L. Tested Design No. 8 - 2 layers 5/8" Firestop
- 3 - (3-Hour) U. L. Tested Design No. 18 - 3 layers 5/8" Firestop
- 4 - (4-Hour) Not tested - Estimated - 4 layers 5/8" Firestop

Application

- 1 - One layer or the base layer is screwed to two 1-5/8" x 1-3/8" metal screw stud. 1" lg #6 drywall screw 24" O. C.
- 2 - First or base layer may be completed on the floor. Stood up.
- 3 - Opposite sides are then screwed to the 1-5/8" x 1-3/8" metal screw stud. 1" lg #6 Drywall Screws, 24" O.C.
- 4 - 2nd, 3rd or 4th layers of 5/8" Firestop are screwed to the metal studs with the various length drywall screws.
- 5 - Corner bead is nailed to the four outside corners only. 6d nails - 12" o.c.

Advantages

- 1 - Simplicity of erection
- 2 - The sides are independent of the column and might be held out further if necessary so that piping may be placed in the web sections or on the face of the column.
- 3 - No wire ties.
- 4 - Corner beads on the outside corners only.
- 5 - Less screws on single or first layer of gypsum wallboard (24" O.C.)

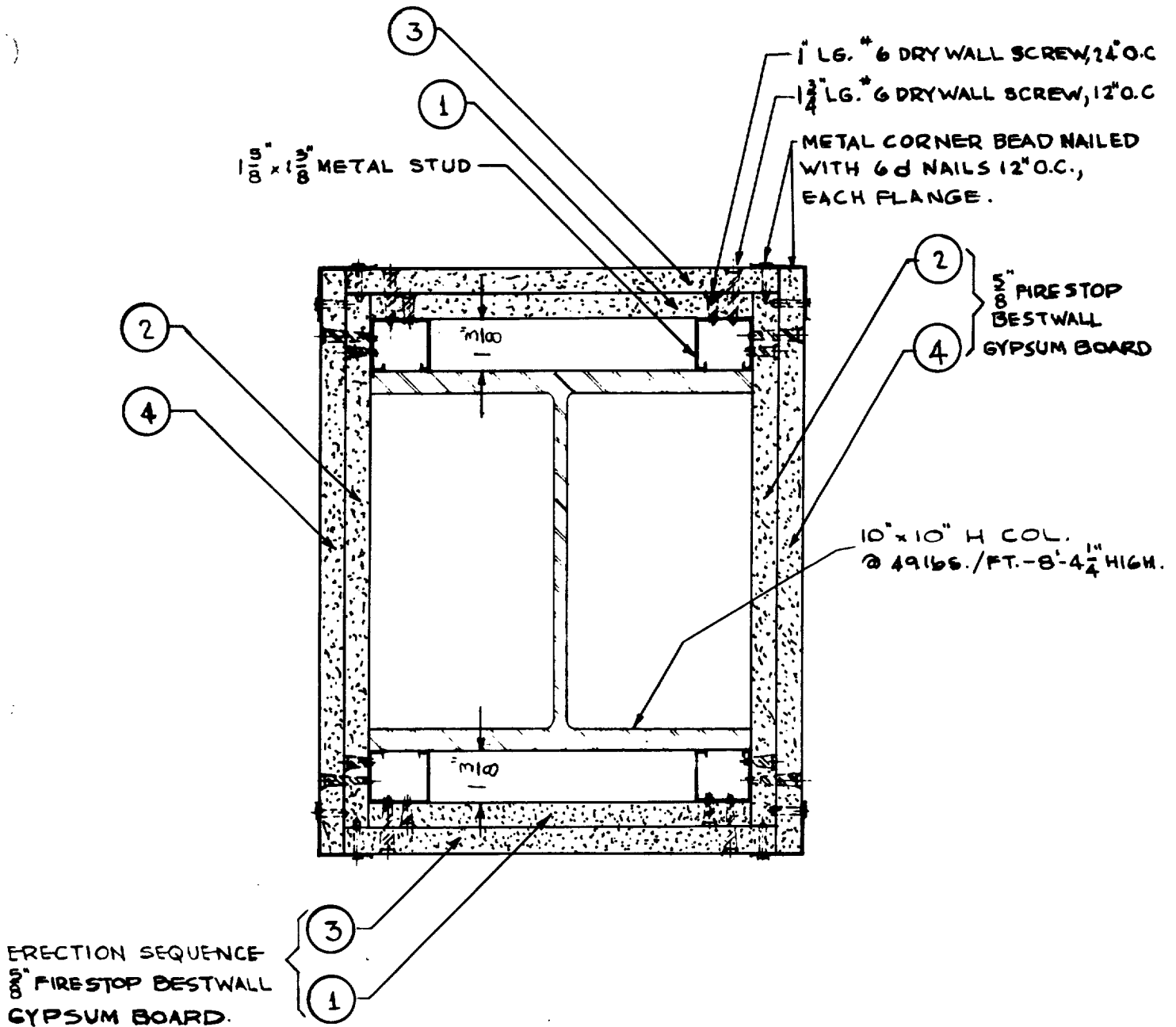


SGP 0027631

ESTIMATED - 1 HR.

SECTION THRU FIREPROOFING COLUMN

BESTWALL GYPSUM COMPANY PAOLI PA.			
5" FIRESTOP BESTWALL GYPSUM BOARD. SINGLE LAYER FIREPROOFING ENCASMENT ON STEEL COLUMN			
DATE: 4-17-64		SCALE: 6"=12"	
DRN. BY T.P.	CHKD BY	DWG NO. T-120	SHEET NO 1 OF 1



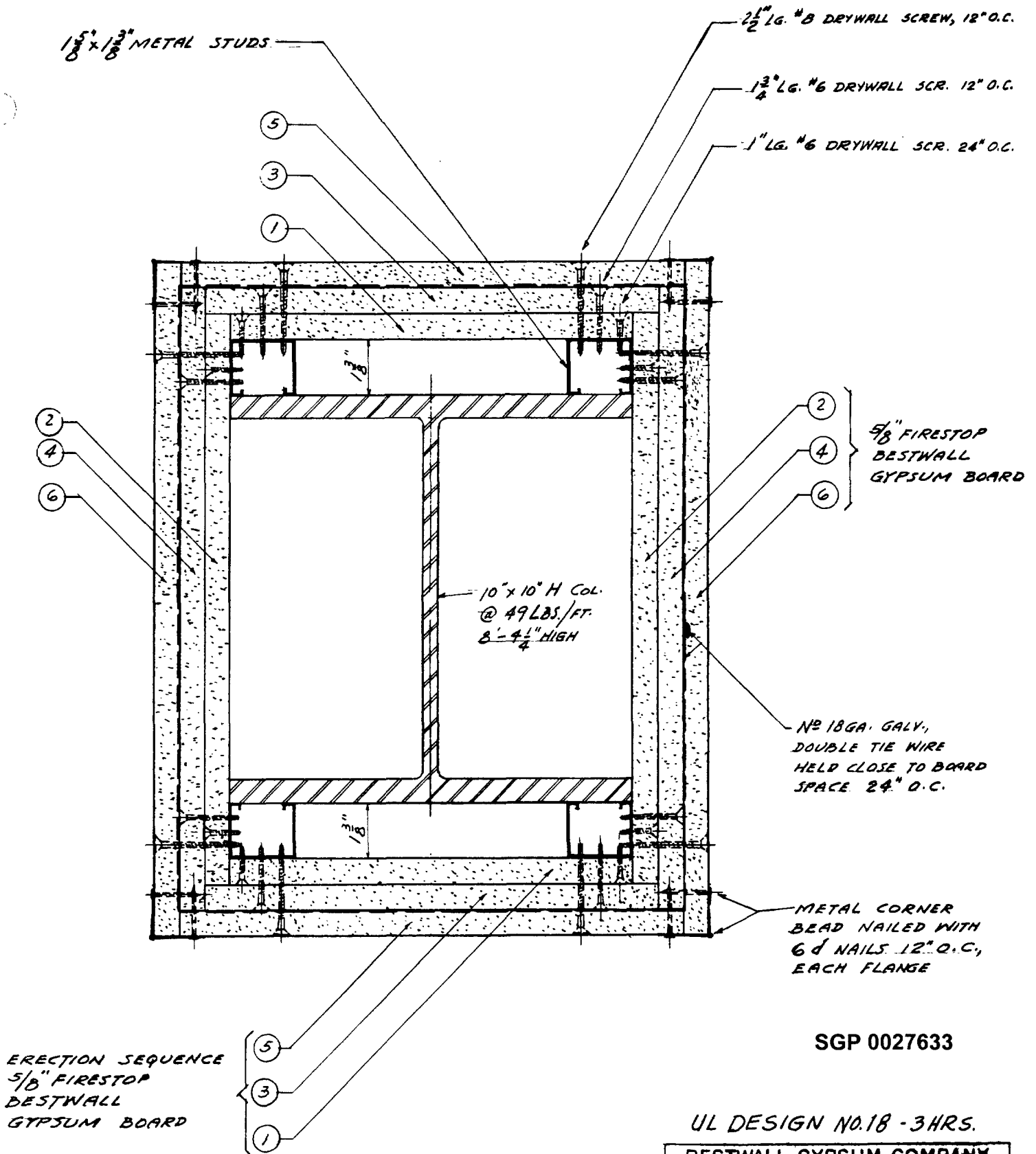
SGP 0027632

UL DESIGN NO. 8 - 2 HRS.

SECTION THRU FIREPROOFING & COL.

SCALE 3" = 12"

BESTWALL GYPSUM COMPANY PAOLI PA.			
5/8 FIRE STOP BESTWALL GYPSUM BOARD FIREPROOFING ENCASEMENT ON STEEL COLUMN			
DATE: 2-3-64		SCALE: AS NOTED	
DRN. BY H.K.K.	CHK'D BY	DWG. NO. T-118	SHEET NO 1 OF 1



SECTION THRU FIREPROOFING & COLUMN

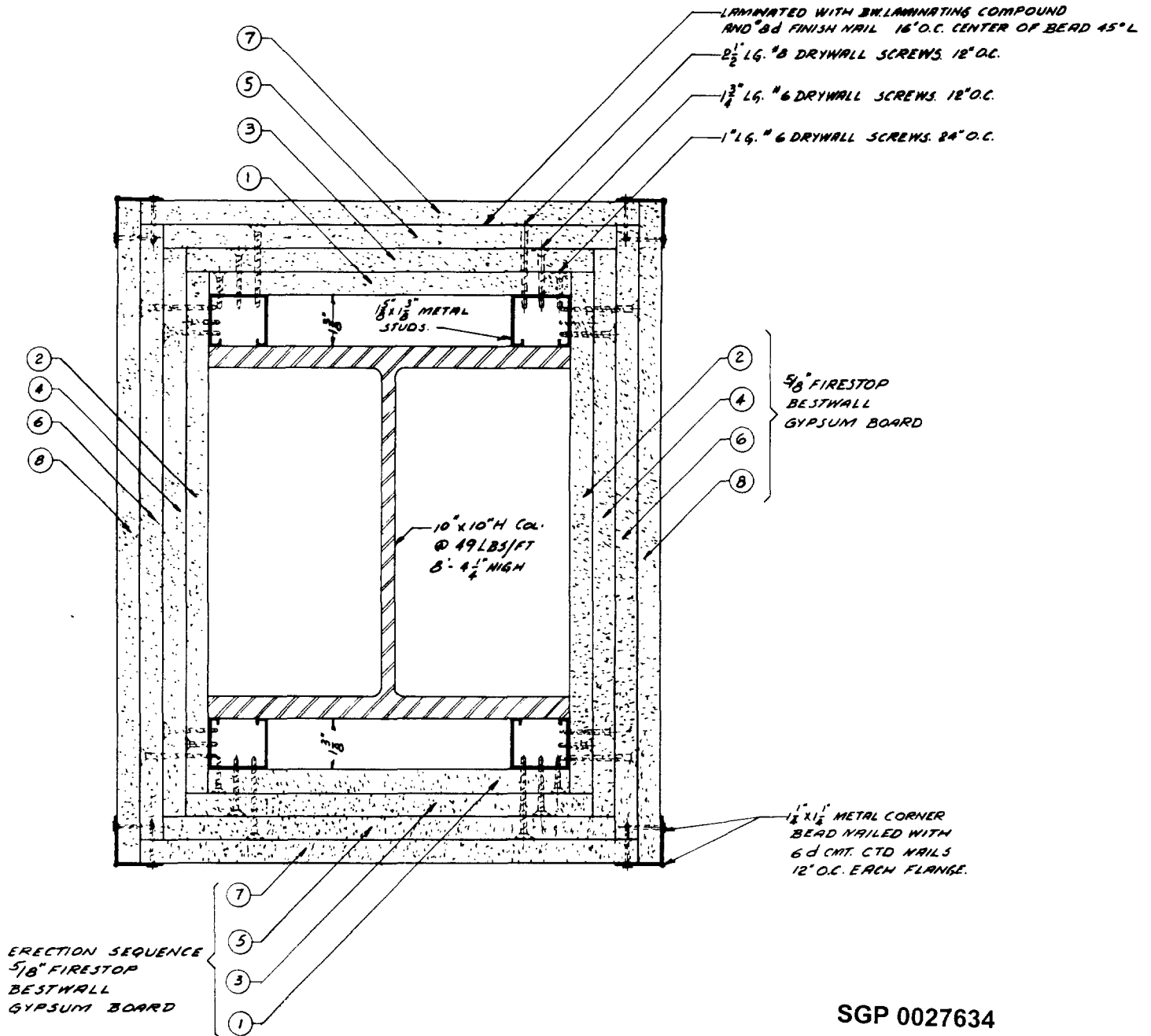
SCALE: 6" = 1'-0"

UL DESIGN NO. 18 - 3 HRS.

BESTWALL GYPSUM COMPANY
ENGINEERING DEPT.

5/8" FIRESTOP BESTWALL GYPSUM BOARD
FIREPROOFING ENCASUREMENT
ON STEEL COLUMN

DATE: 11-5-63	SCALE: 6" = 1'-0"
DWN. BY: J.R.M.	CHK'D BY: DWG. No. T-114
SHEET NO. 1 of 1	



SGP 0027634

ESTIMATED - 4 HRS.

SECTION THRU FIREPROOFING & COLUMN

BESTWALL GYPSUM COMPANY PAOLI PA.			
5/8" FIRESTOP BESTWALL GYPSUM BOARD. FIREPROOFING ENCASUREMENT ON STEEL COLUMN			
DATE: 4-16-64		SCALE: 6"=12"	
DRN. BY T.P.	CHK'D BY	DWG NO. T-119	SHEET NO 1 OF 1

E. Metal and
Accessories

SGP 0027635

PAOLI, PENNSYLVANIA
February 9, 1966

TO: All Regional Managers
All Salesmanagers
All Salesmen
Distribution Division Sales Personnel

General Sales Bulletin #12-66

Subject: ETERNAWALL-DECORATOR LIN

Re: MATCHING MOLDINGS
3/8" - 1/2" - 5/8"

By: G. C. Moore - jw

BW - Gypsum Manual #2-Section 7-E
FILE: GP - Gypsum Manual- Section 2-A

This is a repeat of information originally sent to the Bestwall sales force in General Sales Bulletin #45-62. Those who still refer to General Sales Bulletin #45-62 should destroy it and use this new bulletin for correct current information.

Matching Moldings (four aluminum shapes) prefinished with Eternawall or the Decorator Line Eternawall Vinyl to be used as a trim for finishing joints and angles with the application of Bestwall Eternawall Gypsum Wallboard is available directly from the manufacturer.

Your customers' orders for matching molding shapes should be sent direct to The Keller Products, Inc., 41 Union Street, Manchester, New Hampshire - Telephone 603-627-7887. Keller Products manufacture, stock and ship on order and invoice direct to the buyer (dealer or contractor) four predecorated sections. These matching moldings are designated as:

OC - Outside Corner	EC - End Cap
IC - Inside Corner	H - Divider

The attached sheet shows the four sections and indicates their use. Keller stocks a limited quantity of each of the four shapes in each of the six Eternawall colors for 1/2" Eternawall Gypsum Wallboard.

MATCHING MOLDINGS - 3/8" or 1/2"

Orders for large quantities of 3/8" or 1/2" thick matching moldings for Eternawall or Decorator Line requires a minimum of fifteen (15) days on Keller's part or receipt by them after receiving a firm order.

Note: On orders for special colors and/or large quantities,
Keller Products will confirm pricing and shipping dates.

Continued on Page 2....

SGP 0027636

MATCHING MOLDINGS - 5/8"

Orders to Keller for 5/8" thick matching moldings (Eternawall or Decorator Line) require a minimum of thirty (30) days on receipt by them of firm order.

GYP SUM PLANTS - 1/2" THICK MATCHING MOLDINGS

The Bestwall Gypsum Plants stock limited quantities of Matching Moldings for three shapes only: OC - IC - EC - for 1/2" Eternawall.

- NOTE: a. Refer to price schedule for delivered prices of 1/2" Matching Moldings
- b. Refer to price schedule for delivered prices of matching colored nails.

PRICES - MATCHING MOLDINGS

From

KELLER PRODUCTS, INC., MANCHESTER, NEW HAMPSHIRE

All prices are F.O.B. Manchester, New Hampshire

	<u>3/8" Per Ft.</u>		<u>1/2" Per Ft.</u>		<u>5/8" Per Ft.</u>	
	<u>Dealer</u>	<u>Contractor</u>	<u>Dealer</u>	<u>Contractor</u>	<u>Dealer</u>	<u>Contractor</u>
OC	.29	.34	.32	.37	.34	.39
IC-EC-H	.28	.33	.30	.35	.33	.38

Package - Twenty (20) pieces - Plastic Covered - In Tube

Minimum Order - The minimum order for any one shape, size and color is twenty (20) pieces or 160'. Keller Products have indicated that on the first order to a contractor they will mix items within one tube, but would require a minimum of twenty (20) pieces in the mixed order.

Samples - Samples of four (4) short sections are available through the Advertising Department with use of Order for Sample Forms. Samples are stocked at Fort Dodge Gypsum Plant.

Please be sure you follow the price differential indicated in the higher price to the contractor. The lower price is only for those dealer accounts who will stock the material for re-sale. It is our understanding this pricing is competitive to that available through other gypsum manufacturers for a comparable section and that insofar as this type of molding is concerned, there is no competition price-wise such as exists with drywall corners.

General Sales Bulletin #12-66

Page 3.

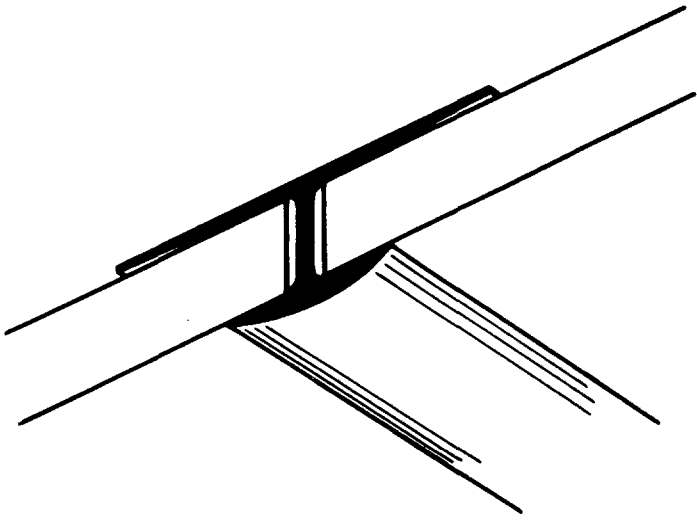
Remember that since Keller will be billing the dealers and contractors direct they will need some credit reference, particularly on large orders. Where Bestwall credit has already been established, Bestwall may be a reference.

These prices, based on information furnished by Keller Products, Inc. are subject to change by them.

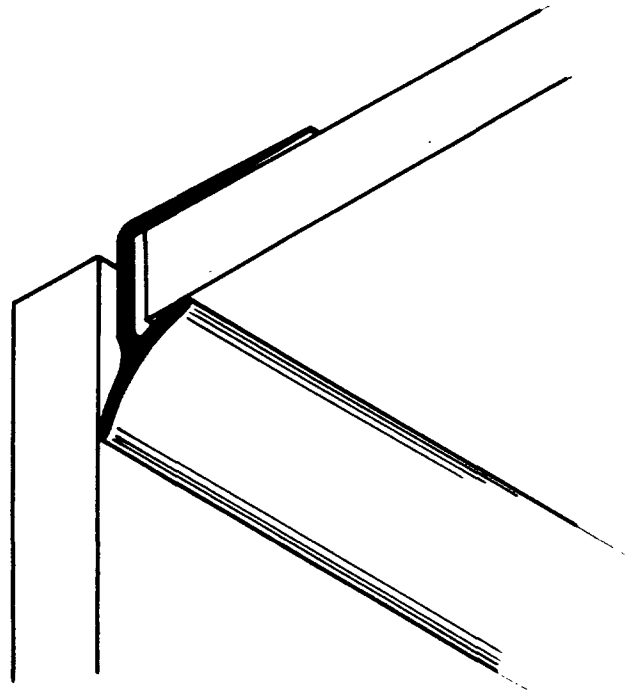
Insofar as other lengths or thicknesses, special colors, plain aluminum finish, or other special conditions, Keller's position would be to analyze each inquiry. Where the order exceeds 500 lineal feet on one specific item, they would consider making it and quote price and delivery.

SGP 0027638

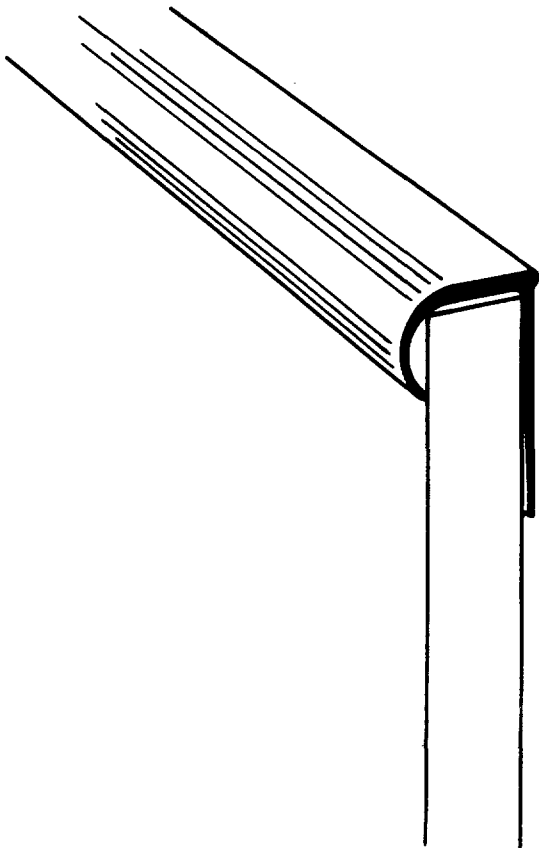
DIVIDER



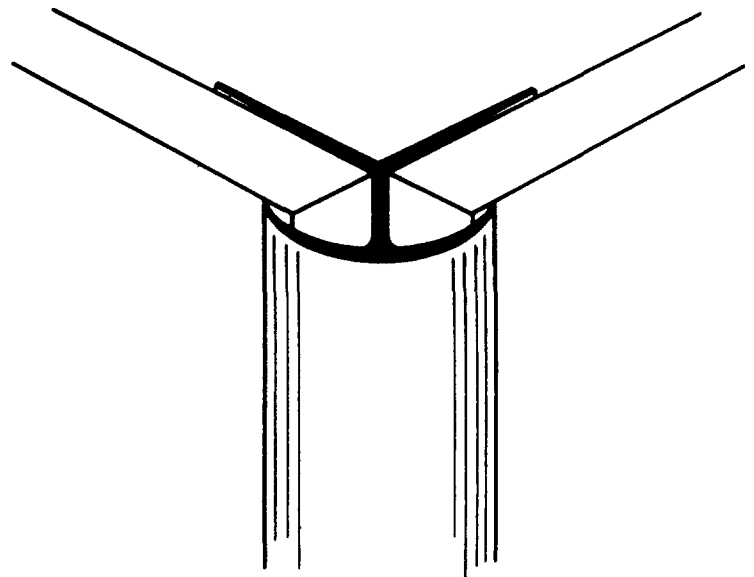
INSIDE CORNER



END CAP



OUTSIDE CORNER



PAOLI, PENNSYLVANIA

28 September 1965

To: All Regional Sales Managers General Sales Bulletin #90-65
All Area Sales Managers
All Salesmen Subject: METAL STUDS
All Distribution Divisions
Re: Surface Protection
Cc: Mr. R.I. Fredericks Paoli
Mr. K.A. McCaskill Paoli
By: C.E. Abbey /ghp

File in Gypsum Wallboard Manual #2 Section 7E
--

A technical point relative to the studs has developed which requires some explanation. Terms such as "electrogalvanized", "hot dip galvanized", and "bonderized" are used. "Hot dip galvanizing" is just what it says, the strip metal passes through hot liquid zinc to receive a protective coating on both sides against rusting. "Electrogalvanizing" means the sheet of steel has passed through a chemical solution containing zinc and the protective coating is developed on both sides by electrolytic action. Hot dip galvanizing puts a thicker application of zinc coating on the sheet than does electrogalvanizing. However, it is more extensive and requires longer processing and as a result, most fabricators of sheet steel use the electrogalvanizing process since in a majority of uses, it gives sufficient protection from rusting. The standard ASTM test to determine the extent of the protective coating is a so-called "salt-spray" cycling test in which the item is subject to a standard salt solution spray for a specific period of time and allow to dry and the process repeated and notes made as to when rust first appears. Hot dip galvanized sheets will perform better than electrogalvanized sheets in such a test.

Bear in mind however, this processing is done when the sheet is still at least 24" wide and frequently as wide as 48". Major producers of studs buy the full width sheet in large rolls, slit it into strips, and then roll the narrow strip making the shape desired, punching and crimping it through a continuous process. Thus both the hot dip galvanized and the electrogalvanized shapes have edges exposed and where there are cutouts in the items, these also expose the original raw steel sheet and rusting begins at such points.

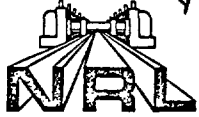
The National Gypsum Company is using hot dip galvanized sheet for their studs and currently are widely promoting this feature. All the suppliers considered by Bestwall use electrogalvanized material and Bestwall cannot get hot dip galvanized material, except at a greater cost to Bestwall and with a long delay on the part of Bestwall's supplier in getting the sheet from the mill. Extra protection from rusting is mainly a problem in some Gulf Coast areas, but it will be up to the Bestwall salesmen to sell against this feature in any event.

Neither of these sheets hot dip galvanized or electrogalvanized have a good surface for painting. When the metal used is to be painted, galvanized sheets as well as ungalvanized are chemically treated to "prime" the surface. This is referred to as "bonderizing". Generally, metal studs, tracks, furring sections are not bonderized but many of metal corner and casings are "bonderized". Be sure to read Bestwall's literature and Price Schedules which generally reflect the thickness of the metal, type protection, and finish, of the product available. Reputable companies in giving the gauge of the metal, refer to the thickness of the metal without any surface treatment. Actually the thickness of the galvanized protective coating is less than 0.001" and results in less than 0.002" added thickness of the sheet.

Several suppliers of electrogalvanized studs and track are experimenting with bonderizing and painting to be competitive with hot dip material in resistance to the salt spray test. Hot dip galvanized sheets are considerably more expensive than bonderized sheets and less available.

In selling against the hot dip galvanized stud, bear in mind that millions of feet of electrogalvanized studs and track have been sold and used satisfactorily. It is only where there is extreme water or moisture to contend with that the hot dip galvanized section would be justified or needed. The automobile industry because of many considerations, has moved to electrogalvanized sheets for auto bodies and where needed, give additional protection by painting.

A separate Bulletin for the Western Sales region only will be sent out shortly on metal studs from a West Coast supplier.



V/R TO A/M - R. Min

NATIONAL STEEL STUD SYSTEM FOR DRYWALL CONSTRUCTION

PRICE LIST

<u>CATALOG NUMBER</u>	<u>PACKING</u>	<u>WEIGHT</u>	<u>PRICE</u>
SS-158 Stud 1-5/8"	12 pcs. per bundle	356 lbs. M/ft.	
SS-250 Stud 2-1/2"	12 pcs. per bundle	455 lbs. M/ft.	
SS-358 Stud 3-5/8"	12 pcs. per bundle	510 lbs. M/ft.	

.021 Electro-Galvanized Steel.
Available in any length within 1/8" tolerances.
Stud notched for conduit on one end only.

SS-15 Track 1-5/8"	192 ft. per bundle	300 lbs. M/ft.
SS-25 Track 2-1/2"	192 ft. per bundle	375 lbs. M/ft.
SS-35 Track 3-5/8"	192 ft. per bundle	470 lbs. M/ft.

.021 Electro-Galvanized Steel Floor and Ceiling Track.

SS-10 Furring Member 1-3/8" x 7/8"	360 ft. per bundle	277 lbs. M/ft.
---------------------------------------	--------------------	----------------

.021 Electro-Galvanized Steel.
12 foot lengths.

SS-2 Splice	500 pcs. per carton	50 lbs. carton
-------------	---------------------	----------------

TERMS: 1% 10 days, net 30 days.

F.O.B. Malvern, Pennsylvania

SGP 0027642

GF

GEORGIA-PACIFIC

BRITWALL GYPSUM DIVISION

METAL STUD
PARTITIONS

SGP 0027643

BESTWALL FOR FUNCTION AND ECONOMY

1

Installation of floor
and ceiling track

2

Metal
Stud
Partition

3

Installation of Bestwall Gypsum
Wallboard with Bestwall 1" Type S
Drywall Screw with power tool

BESTWALL GYPSUM WALLBOARD

*The availability of various Bestwall gypsum boards used
in any number of combinations makes Bestwall Partitions ideal
for dividing space beautifully.*

*Bestwall Eternawall, for example, offers a textured vinyl
surface in Woodmere Walnut and Five decorator colors:
Seafoam Blue ■ Snowdrift White ■ Spring Green ■ Shadow Gray and Sand.*

SGP 0027644

BESTWALL METAL STUD AND GYPSUM PARTITIONS

GENERAL DESCRIPTION — A complete system that integrates lightweight Bestwall framing with Bestwall *original* glass fibered gypsum wallboard. It is designed and engineered for the most economical, non-load bearing fire-rated partitions adaptable to all construction. This coordination of materials offers accurate and speedy installation with savings in material and labor. It provides a varied range of functional and decorative space design for new and remodeling work in commercial, industrial, institutional and residential buildings.

FINISHES — Bestwall Regular Gypsum Wallboard forms a smooth, durable base for any decorative scheme. It can be painted or papered. Bestwall pre-decorated panels are ready for immediate use when installed, serving to create harmonious interiors or special "accent" walls.

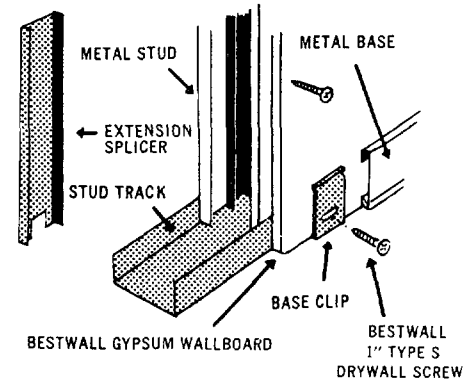
VERSATILITY — System components may be combined with a variety of board thicknesses for individual requirements. The System can be easily taken down to accommodate remodeling.

LIGHT WEIGHT — Light weight can result in savings in structural design requirements. A Bestwall partition, erected with 3 $\frac{5}{8}$ " studs, with a single layer of $\frac{5}{8}$ " wallboard and screws applied to each side, weighs approximately 7.2 lbs. per sq. ft.

WORKABILITY — Design simplicity assures minimum on-site construction delays. Steel studs are tailored for all size requirements. Glass fibered Bestwall Wallboard can be easily scored and snapped.

FIRE RESISTANCE — Entirely composed of incombustible framing members and panels, the Bestwall System, as a combined assembly, is capable of one-and-two-hour fire ratings. This depends on the screw spacing described in the specifications and joint treatment and the thicknesses of wallboard used. A $\frac{1}{2}$ " thick Bestwall Regular Gypsum Wallboard provides 40 minutes fire rating in single application, and a single layer of $\frac{5}{8}$ " Bestwall Gypsum Wallboard on both faces gives a one-hour fire rating. Two-hour fire rating is achieved with a double layer of $\frac{5}{8}$ " Bestwall Firestop on both faces with the base layer being screw attached and face layer laminated. $\frac{5}{8}$ " Bestwall Firestop meets building code acceptance in all the constructions listed in the table on Page 6.

SYSTEMS ENGINEERING — A staff of Bestwall Systems Engineers is available from coast to coast for on-the-job consultation, advice and installation details. These specialists can help you create functional space design to meet your requirements and to realize all the benefits and economies inherent in these Systems.



BESTWALL GYPSUM WALLBOARD consists of a *glass fiber reinforced* core of incombustible gypsum rock enclosed between two layers of tough paper. Gypsum won't burn or transfer heat in excess of 212° until all its water of crystallization has been driven off in the form of steam. The durable cream face paper is folded around the long edges to reinforce and protect the core. The ends are square cut and smooth finished. A strong gray paper is on the back side.

FIRESTOP — Bestwall Firestop, recommended where extra fire resistance is required, is the *original* drywall material providing up to one-hour fire resistant load bearing walls and ceilings with one layer application over both combustible and incombustible framing. It was also first to provide two-hour fire resistant load bearing walls in two layer application and a two-hour floor-ceiling assembly in single layer application. This extra fire protection is the result of incombustible glass fibers and unexpanded vermiculite added to the gypsum core — an exclusive Bestwall manufacturing process.

GLASS FIBER REINFORCEMENT — Literally miles of glass fiber filaments of uniform strength and length are dispersed in the core of Bestwall Gypsum Wallboard for greater resilience, strength and handling ease. Bestwall resists flexural stresses. It will not crack or sag when applied in the specified manner.

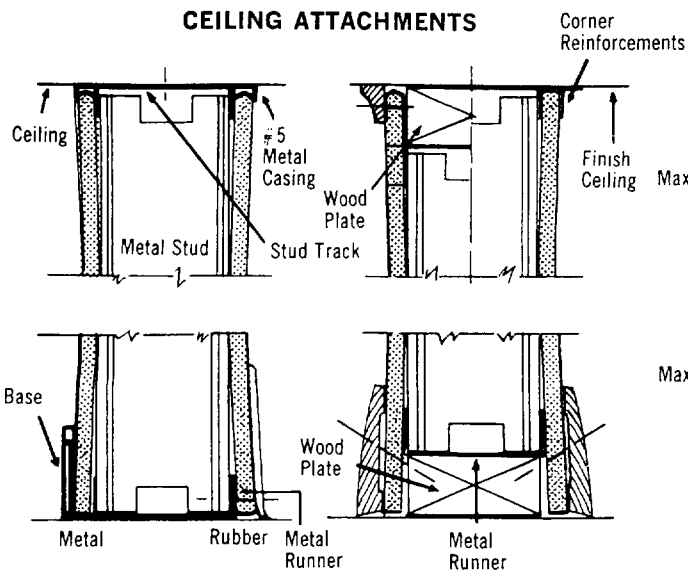


GEORGIA-PACIFIC

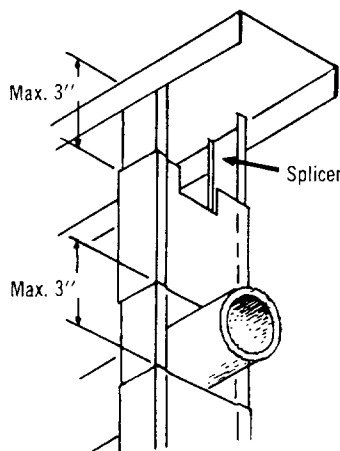
BESTWALL

GYPSUM DIVISION

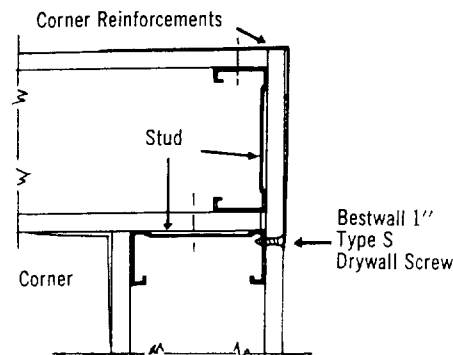
CEILING ATTACHMENTS



STUD EXTENSION AND SPLICER

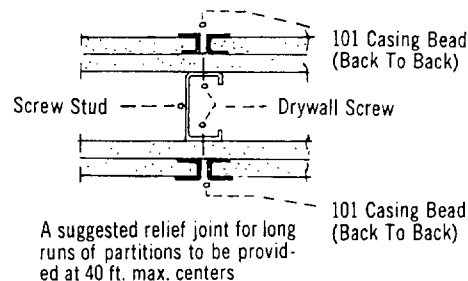


TYPICAL WALL PLAN SECTIONS



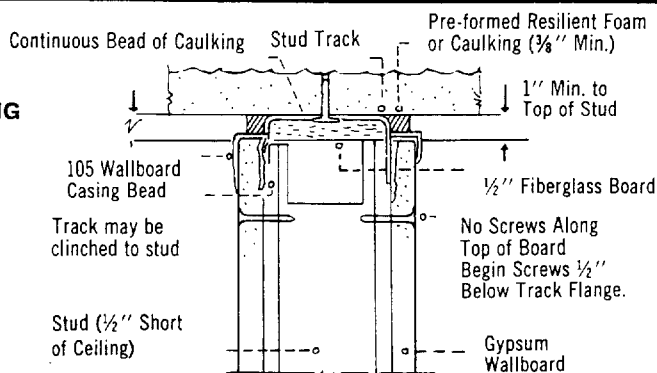
ALTERNATE SECTION AA

Finish with Tape and Cement onto Board

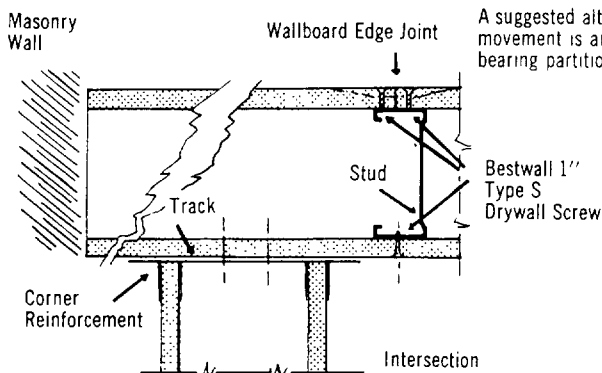


FLOOR ATTACHMENTS

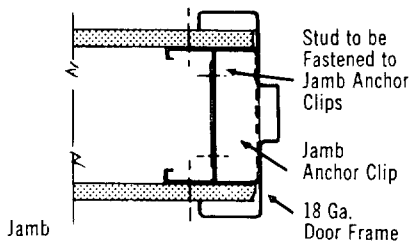
SECTION AT CEILING



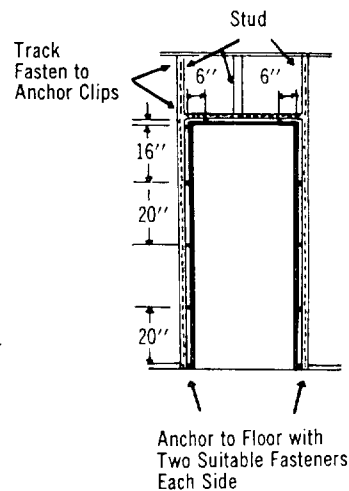
TYPICAL WALL PLAN SECTIONS



A suggested alternate detail to be used where building movement is anticipated to the extent that the non-load bearing partition will be loaded and relief is needed.

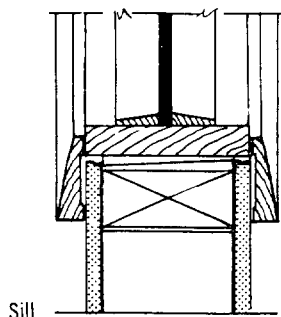


DOOR DETAILS

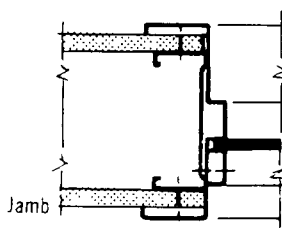


ELEVATION

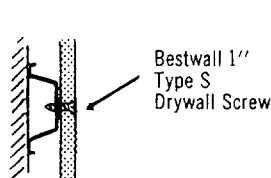
WOOD BORROW LIGHT



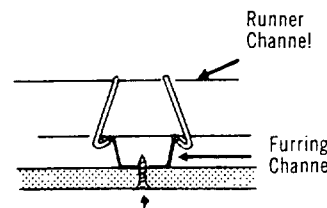
METAL BORROW LIGHT



SGP 0027646

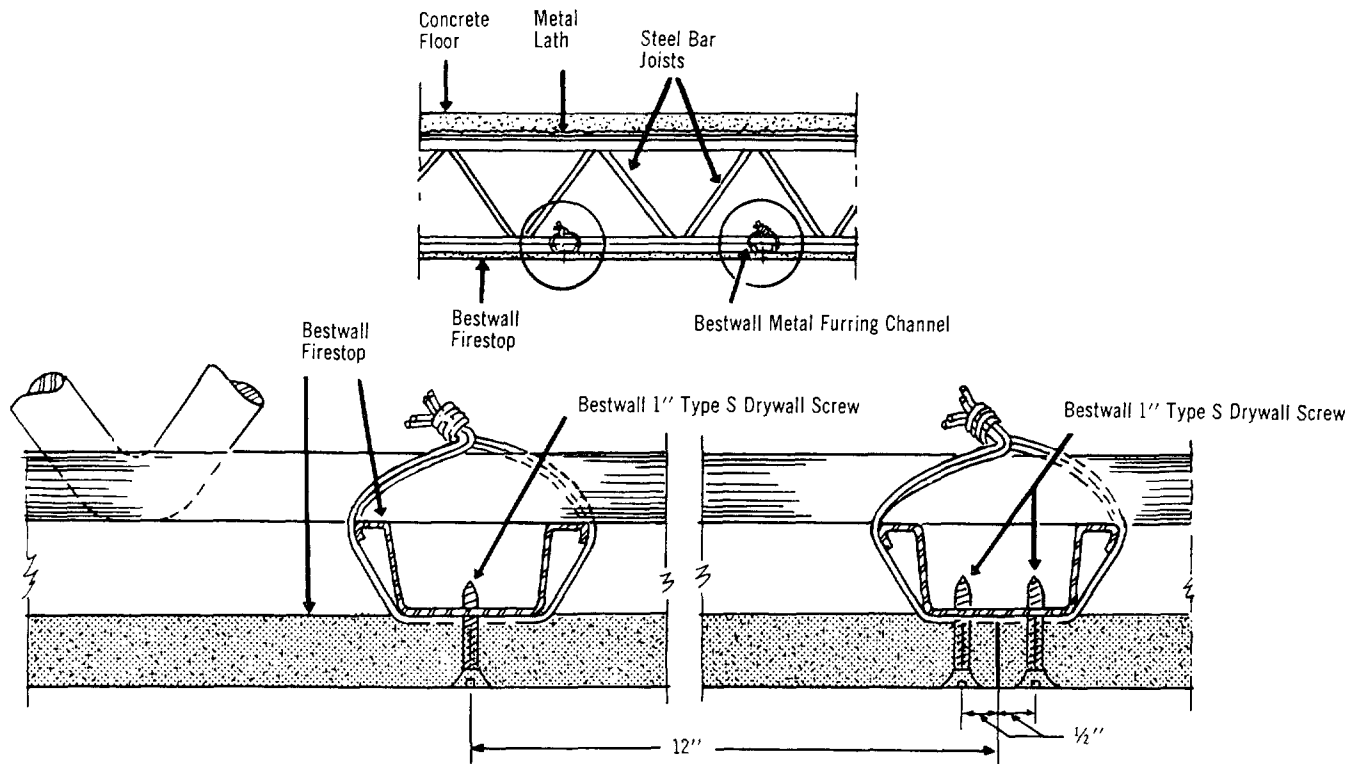


WALL FURRING DETAIL



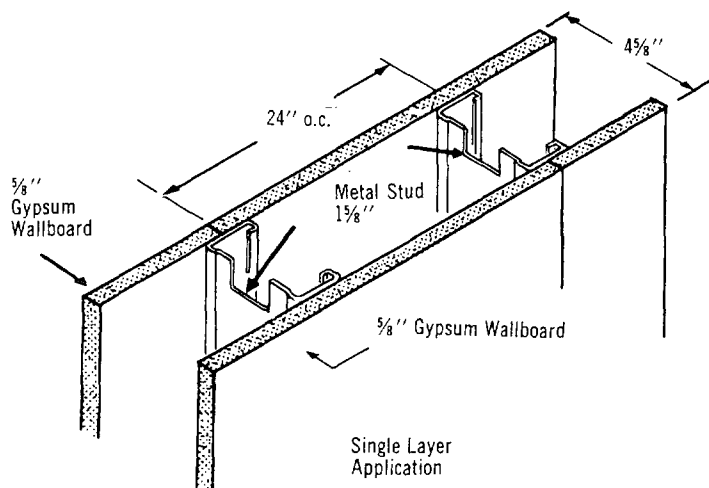
CEILING FURRING DETAIL

CEILING AND FLOOR CONSTRUCTION

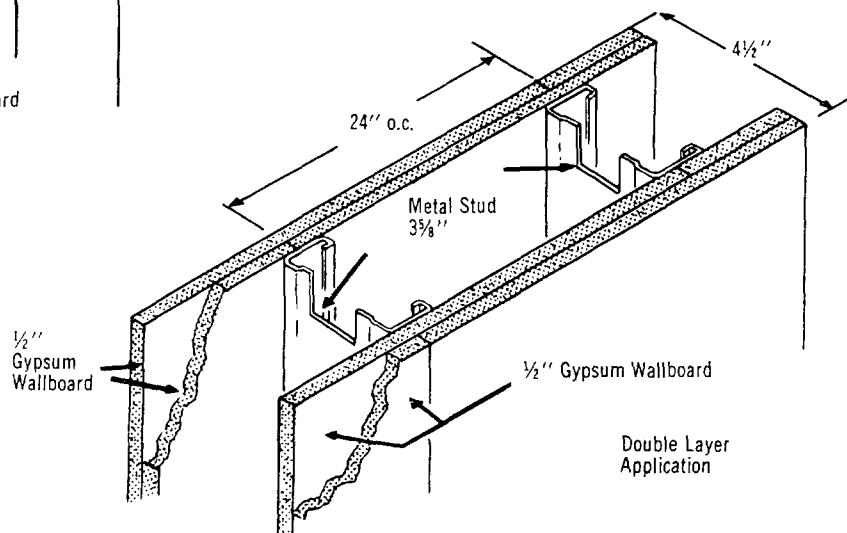


Furring Channels are 24" o.c. everywhere except adjacent to the end joint as shown.

METAL STUD PARTITIONS



SGP 0027647



GEORGIA-PACIFIC



GYP SUM DIVISION

TECHNICAL DATA

Application	Gypsum Wallboard	Frame Spacing	Fire Rating*	Test Reference	Weight Per Sq. Ft.
PARTITIONS	1/2" REGULAR BESTWALL	24" o.c.	40 min.	Est.	4.0
Both Sides same application	1/2" BESTWALL FIRESTOP-1 Layer	24" o.c.	1 hour	Est.	4.0
	1/2" BESTWALL FIRESTOP-2 Layers	24" o.c.	2 hours	T-3218	8.1
	5/8" BESTWALL FIRESTOP-1 Layer	24" o.c.	1 hour	T-2316	5.2
	5/8" BESTWALL FIRESTOP-2 Layers	24" o.c.	2 hours	T-2557	10.4
CEILINGS	5/8" BESTWALL FIRESTOP OR 5/8" BESTWALL FIRESTOP BACKER BOARD	16" o.c.	1 hour	U.L. #2	34.2
2" Concrete Floor on Metal Lath over Steel Bar Joists	5/8" BESTWALL FIRESTOP	24" o.c.	1 hour	U.L. #19	32
	1/2" BESTWALL FIRESTOP	24" o.c.	1 1/2 hours	U.L. #17	33.9
	5/8" BESTWALL FIRESTOP	24" o.c.	1 1/2 hours	U.L. #13	34.1
	1/2" BESTWALL FIRESTOP (2 1/2" Concrete Floor)	24" o.c.	2 hours	U.L. #237	38.5
	5/8" BESTWALL FIRESTOP (2 1/2" Concrete Floor)	24" o.c.	2 hours	U.L. #69	39.5
STEEL COLUMN	1/2" REGULAR BESTWALL-2 Layers		1 hour	G.A.	
Fire Proofing	1/2" REGULAR BESTWALL-3 Layers		1 1/2 hours	G.A.	
	5/8" BESTWALL FIRESTOP-1 Layer		1 hour	Est.	
	5/8" BESTWALL FIRESTOP-2 Layers		2 hours	U.L. #8	
	5/8" BESTWALL FIRESTOP-3 Layers		3 hours	U.L. #18	
	5/8" BESTWALL FIRESTOP-4 Layers		4 hours	Est.	

* All ratings are incombustible with Bestwall Gypsum Wallboard or Bestwall Firestop over metal studs.

NOTE: For additional fire resistive ratings and sound transmission characteristics, see latest Bestwall Sweet's catalog.

Above tabulations have some interpellative results based on tests by Underwriters Laboratories, National Bureau of Standards and/or Ohio State University sponsored by Georgia-Pacific, Bestwall Gypsum Division, Gypsum Association and/or others. Fire rating, weight and sound characteristics are based on combination of details covered in official publications of U.L., N.B. of S., Ohio State University and/or the Bestwall Gypsum Division. Details of construction, transmission ratings and flexural strength sent on request.

The wallboard systems covered above have been developed with due regard to practical construction methods. However, since the Bestwall Gypsum Division does not have any

prior knowledge of a specific building design and construction or methods of application and use of their products, no warranty of performance is made. All of the test results have been obtained under laboratory testing conditions where controlled environment reduces variables to a minimum. In the field, such conditions are not always met, since many other variables are introduced. Laboratory results will generally exceed results of field tests, but the tests under controlled conditions are the only logical way to compare the performance of different assemblies. The Bestwall Gypsum Division of the Georgia-Pacific Corporation makes no warranty as to the performance of assemblies in the field having a performance equal to or better than that developed in the test.

LABEL SERVICE SYMBOL FOR 5/8" BESTWALL FIRESTOP

FIRE HAZARD CLASSIFICATION
 Flame Spread 10-15
 Fuel Contributed 5-15
 Smoke Developed 0.45



FIRE RESISTANCE CLASSIFICATION

Floor and Ceiling	Column Protection	Walls and Partitions
Design No. 69 — 2 hr.	Design No. 18 — 3 hr.	Design No. 5 — 3 hr.
Design No. 217 — 2 hr.	Design No. 8 — 2 hr.	Design No. 7 — 2 hr.
Design No. 13 — 1 1/2 hr.		Design No. 5 — 1 hr.
Design No. 2 — 1 hr.		Design No. 10 — 1 hr.
Design No. 1 — 1 hr.		

LABEL SERVICE SYMBOL FOR 5/8" BESTWALL FIRESTOP — The Label Service symbol of Underwriters' Laboratories, Inc., which appears on the twin mounting tape binding each bundle of two pieces, is the method provided by Underwriters' Laboratories, Inc., to identify gypsum wallboard which has been produced under the Label Service. And especially important to architects and building inspectors, the front of each sheet is marked with "5/8" Bestwall Firestop Type X" so that it's easy to identify when in place.

BESTWALL METAL STUD SELECTION

STUD SIZE NOMINAL DIMENSION	MAXIMUM HEIGHT SPAN
1 5/8"	9' — 0
2 1/2"	12' — 0
3"	14' — 0
3 3/4"	15' — 0
3 5/8"	16' — 0

BOARD SIZE vs MEMBER SPACING

Board Size	Member Spacing
1/2"	24" c. to c.
5/8"	24" c. to c.

SGP 0027648

SPECIFICATIONS

BESTWALL ENGINEERED SYSTEMS

MATERIALS

Gypsum Wallboard—All Gypsum Wallboard and joint system materials used, including laminating compound, shall be as manufactured by the Bestwall Gypsum Division, Georgia-Pacific Corporation.

Metal Studs—All metal studs, tracks, furring and other metal accessories used shall be as manufactured for the Bestwall Gypsum Division.

Studs— $1\frac{5}{8}$ "; $2\frac{1}{2}$ "; 3"; $3\frac{3}{8}$ "; $3\frac{5}{8}$ ". Studs shall be roll formed channels of 25 gauge (0.22") galvanized (electro or hot dipped) sheet steel with conduit or electrical wiring holes and notches provided at each end.

Metal Floor and Ceiling Track— $1\frac{5}{8}$ "; $2\frac{1}{2}$ "; 3"; $3\frac{3}{8}$ "; $3\frac{5}{8}$ ". The track shall be roll formed channel of 25 gauge (0.22") galvanized (electro or hot dipped) sheet steel with width dimensions suitable to corresponding size of Steel Stud.

Extension Splicer—Snap-in splicers shall be formed of 25 gauge (0.22") galvanized (electro or hot dipped) sheet steel used in compensating for floor to ceiling variations up to 3" and/or splicing the stud around horizontal obstructions.

Metal Screw Fasteners—Bestwall 1" Type S Drywall, self-drilling, sheet-metal type screw for use with a power-driven tool.

Base Clip—Base clip shall be of 16 gauge galvanized (electro or hot dipped) sheet steel which is screwed to the floor track.

Snap-On Metal Base—Snap-on metal base shall be of 20 gauge paint-lock galvanized (electro or hot dipped) sheet steel that provides for an attractive, functional base trim. A vinyl base may be used as an option.

Furring Member—25 gauge (0.22") galvanized (electro or hot dipped) sheet steel; $\frac{7}{8}$ " depth.

Furring Member Clip—11 gauge hot-dipped galvanized wire.

STUD SYSTEM

Materials: Bestwall Gypsum Wallboard; Studs; Metal Floor and Ceiling Track; Extension Splicer; Metal Screw Fastener; Base Clip; Snap-On Metal Base.

INSTALLATION

Ceiling and floor track shall be aligned and anchored securely with suitable fasteners at a maximum of 24" o.c.

Steel Studs shall be positioned vertically in ceiling and floor tracks spaced not over 24" o.c. Screws shall be installed at all intersections of stud and track. All studs located adjacent to window and door frames, partition intersections and corners shall be screwed through the stud and track flanges. Studs shall be installed not over 2" from abutting partitions, partition corners and all door frames. Studs shall be anchored by bolt or screw attachment to jamb and head anchor clips of door or borrow light frames. A stud of required length shall be positioned at vertical joints over door headers.

Use Extension Splicers where required.

Screws shall be power-driven and seated with screw heads being slightly below surface of Bestwall Gypsum Wallboard. Screws shall not be closer than $\frac{3}{8}$ " from all ends and edges.

Base clips shall be screwed to floor track after installation of Bestwall Gypsum Wallboard at a maximum of 24" o.c. and at start and termination of base runs. Use Snap-On Metal Base and Clips. Vinyl base may be used as an option.

CEILING SYSTEM

Materials: Extension Splicer; Metal Screw Fastener; Furring Member; Furring Member Clip.

INSTALLATION

Hangers shall be anchored securely to structural frame. Spacing of hangers should not exceed 4' on $1\frac{1}{2}$ " furring channels. The spacing of $1\frac{1}{2}$ " channels to be determined by the furring member selected.

Furring members shall be attached at right angles and securely fastened at no greater distance than 24" c. to c.

End joints of Bestwall Gypsum Wallboard shall be centered and staggered over furring member and board shall be applied with long dimension at right angles to furring members.

Power-driven screw shall be spaced at a maximum of 8" o.c. around the perimeter of each sheet and 12" o.c. in the field of the board. Screws shall not be located closer than $\frac{3}{8}$ " from ends of edges of board.

FURRING SYSTEM

Materials: Bestwall Gypsum Wallboard; Metal Floor and Ceiling Track; Metal Screw Fastener; Base Clip; Snap-On Metal Base; Furring Member.

Furring members may be anchored vertically or horizontally to concrete or masonry surfaces. Fastened at a maximum of 24" o.c., staggered through alternate flanges, Bestwall Gypsum Wallboard shall be applied vertically or horizontally to furring member. All ends shall be staggered and shall abut over furring members. Power-driven screws shall be spaced 12" o.c. along furring member and no closer than $\frac{3}{8}$ " from ends of board.

JOINT SYSTEM PRODUCTS

Bestwall Joint System Products are designed to conceal joints and screw heads. All have easy working characteristics and very low shrinkage.

MATERIALS:

1. **One—Material Treatment** — Bestwall Wallboard Joint Compound, Bestwall Triple Duty Joint Compound or Bestwall Ready Mix Joint Compound. All are used for bedding and spotting screw heads.
2. **Two—Material Treatment**—Bestwall Bedding Compound or Bestwall 1-Day Wallboard Joint Compound and Bestwall Topping Compound. Specially designed for large projects.
3. **Bestwall Metal Corners and Metal Casings**—A Bestwall Metal Corner shall be used at all outside corners. For uncased door and window openings and at intersections of wall and ceilings, Bestwall Metal Casings may be used.

FOR LAMINATING LAYERS

Laminating Compound: Bestwall Laminating Compound is a casein base dry powder product requiring addition of water only. Add 25 lbs. of Laminating Compound to $9\frac{1}{4}$ gal. of water ($2\frac{3}{4}$ lbs. per one gal.). Consistency of the mixed material should be such that when spread over gypsum board with a 12" serrated sheet metal blade having notches $\frac{3}{16}$ " wide, $\frac{3}{16}$ " high, $\frac{1}{2}$ " o.c., it will not self-level. Ribbons of glue may be applied with serrated knife or mechanical glue spreader. Coverage is approximately 16 lbs. per one thousand sq. ft.

Note: When laminating predecorated gypsum wallboard, which forms a vapor barrier, to backer board, one of the following adhesives may be used as per manufacturer's direction: General Adhesives & Chemical Co., Nashville, Tenn.; Acorn Adhesives Co., Inc., Los Angeles, Calif.; Borden Chemical Co., No. ELP-75-74; Armstrong Cork Co., Industrial Adhesive No. 10073; Permalistic Products Inc., Detroit, Mich.

SGP 0027650

Printed on G-P Hopper offset

8W-65210

GEORGIA-PACIFIC CORPORATION
BESTWALL GYPSUM DIVISION
January 24, 1967

General Sales Bulletin #10-67

TO: ALL REGIONAL SALES MANAGERS
ALL DISTRICT SALES MANAGERS
ALL SALESMEN

CC: R. I. Fredericks, Paoli
K. A. McCaskill, Paoli
M. M. Powers, Paoli

SUBJECT: BESTWALL METAL CORNERS
AND
METAL CASINGS

BY: C. E. Abbey:jw

RE: General Information Sheet

Forwarded herewith for your information is a revised copy of the Bestwall Metal Corners and Metal Casings packaging information sheet. This has been completely revised to rearrange the material and to show information as to weight and packaging which formerly was gotten from two different places.

The same form number has been used, GP-6605-E. Please notice that the Paoli address has been dropped and the logo around the tradename "Bestwall" has been dropped. Be sure you destroy all the other copies, since they have material that is not correct.

One of the important reasons for getting this revised sheet into your hands is the problem that has developed in small shipments where the weights are not sufficient to warrant the price shown on the invoice.

Notice the difference of weights for the same items when used with different thicknesses of board. Be sure to use the right weight for the size board involved in the order you are placing. Be sure you order sufficient to meet the minimums as stipulated in the price schedules.

On this new sheet if you will draw a line through the next to last line which reads "D-100, DL-100, DLL-100 available as electrogalvanized .0157" steel ", the notes will then be correct. Also, in the line describing the number of pieces for the "Positive Water Stop" there is a typographical error and the first item showing "5 Ft.-70Pcs." should read 5 Ft.-20 Pcs "

Note that the sheet covering the material available from Casings, Inc. in West Middlesex, Pennsylvania is blue. This material should be ordered and used in much of the country outside of the limited West Coast. The West Coast proper is furnished by Angeles Metal Trim and is covered on a green sheet having similar information. There are less individual items available through the West Coast supplier than through the Eastern supplier. Be sure you consult the proper list for the supplier furnishing your accounts. You should have a copy of this and use it in conjunction with Price Schedule 6, Pages 1,2,3,4,5,6. The green sheet for the western area of the country should be used in conjunction with Price Schedule 6, Pages 7,8,9. The western sheet is identified as GP-6605-W. Additional copies of either the eastern or western sheets are available from the Advertising Department in Paoli

ATT(2)

C. E. A. *lob*

SGP 0027651

CONSULT YOUR

BESTWALL

SYSTEMS ENGINEER

PACKAGING INFORMATION

BESTWALL METAL CORNERS AND METAL CASINGS

Quantity Per Carton

Bestwall Number	Eastern Supplier's Number	Product Description	Section	Approx. Weight #/M Ft.	Grounds or Flange Width	7 Ft.—72 Pcs.		8 Ft.—63 Pcs.		8 Ft.—25 Pcs.		10 Ft.—50 Pcs.	
						Ft. Per Ctn.	Wt. Per Ctn.	Ft. Per Ctn.	Wt. Per Ctn.	Ft. Per Ctn.	Wt. Per Ctn.	Ft. Per Ctn.	Wt. Per Ctn.
CORNER GUARD													
100	220	metal corner		95#	Standard 15/16x15/16	504'	48#	504'	48#	200'	20#	500'	48#
DL-100	220			120#	1"x1 1/4" 1 1/8"x1 1/8"	504'	60#	504'	60#	200'	24#	500'	60#
DLL-100	220			130#	1 1/4"x1 1/4"	504'	66#	504'	66#	200'	26#	500'	66#
100-S	240	metal corner		100#	1"x1"	504'	50#	504'	50#	200'	20#	500'	50#
DL-100-S	240			120#	1"x1 1/4" 1 1/8"x1 1/8"	504'	60#	504'	60#	200'	24#	500'	60#
DLL-100-S	240			130#	1 1/4"x1 1/4"	504'	66#	504'	66#	200'	26#	500'	66#
EDGE GUARD													
						7 Ft.—86 Pcs.		8 Ft.—75 Pcs.		10 Ft.—60 Pcs.			
104	101	round nose metal casing		160#	3/8"	602'	96#	600'	100#	600'	100#	600'	96#
				166#	1/2"	602'	105#	600'	100#	600'	100#	600'	100#
				175#	5/8"	602'	105#	600'	110#	600'	110#	600'	105#
105	102	square nose metal casing		157#	3/8"	602'	94#	600'	92#	600'	92#	600'	95#
				170#	1/2"	602'	103#	600'	102#	600'	102#	600'	101#
				182#	5/8"	602'	108#	600'	107#	600'	107#	600'	106#
				224#	3/4"	602'	134#	600'	134#	600'	134#	600'	134#
102	106	angle edge metal casing		85#	3/8"	602'	50#	600'	52#	600'	52#	600'	52#
				84#	1/2"	602'	51#	600'	49#	600'	52#	600'	52#
				98#	5/8"	602'	60#	600'	57#	600'	61#	600'	61#
102-S	133			85#	3/8"	602'	50#	600'	51#	600'	51#	600'	51#
				93#	1/2"	602'	55#	600'	56#	600'	58#	600'	58#
				96#	5/8"	602'	58#	600'	59#	600'	60#	600'	60#
103	107	recessed edge metal casing		105#	3/4"	602'	62#	600'	64#	600'	64#	600'	67#
103-S	134			112#	3/4"	602'	66#	600'	68#	600'	70#	600'	70#
101	108	channel edge metal casing		110#	3/8"	602'	66#	600'	64#	600'	64#	600'	64#
				103#	1/2"	602'	62#	600'	62#	600'	62#	600'	62#
				106#	5/8"	602'	66#	600'	66#	600'	66#	600'	64#
POSITIVE WATER STOP													
						5 Ft.—70 Pcs.		5'6"—20 Pcs.					
WATER STOP	103 GAL.	sheet metal section		286#	1/2"	100'	20#	110'	26#				
				250#	3/4"	100'	20#	110'	23#				
				209#	5/8"	100'	20#	110'	26#				
WATER STOP	103 ZINC	zinc section		191#	1/2"	100'	19#	110'	25#				
				191#	3/4"	100'	19#	110'	22#				
				191#	5/8"	100'	19#	110'	24#				
THIN WALL BEAD													
						7 Ft.—86 Pcs.		8 Ft.—75 Pcs.		10 Ft.—60 Pcs.			
DC-130	233	thin plaster casing		72#	3/8"	602'	52#	600'	46#	600'	46#	600'	47#
				79#	1/2"	602'	56#	600'	50#	600'	52#	600'	52#
				89#	5/8"	602'	63#	600'	56#	600'	63#	600'	63#
DC-120	230	thin plaster metal corner		96#	1 1/4"x1 1/4"	7 Ft.—72 Pcs.		8 Ft.—63 Pcs.		10 Ft.—50 Pcs.			
						504'	50#	504'	50#	500'	47#		

All casing items made of Hot Galvanized .0157" steel, except 104 and 105 which are .020" steel and Water Stop Sections available in .018" galvanized or .022" zinc.

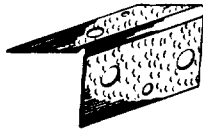
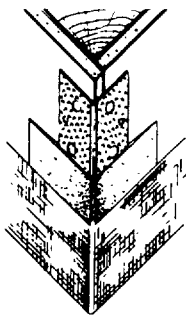
D-100, DL-100, DLL-100 available as electrogalvanized .0157" steel. On special order basis to meet Government specifications, .0172" steel available.

*Some items available in tubes with smaller quantity. Consult price list.

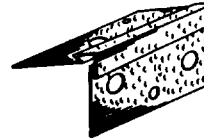
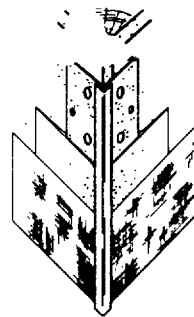
SGP 0027652


GEORGIA-PACIFIC / BESTWALL GYPSUM DIVISION

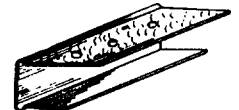
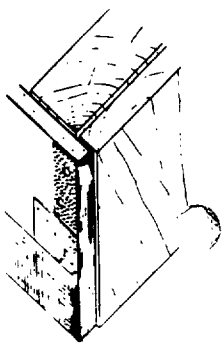
100, DL-100 and DLL-100 METAL CORNER—Stronger, more accurate external wallboard corners. Easy to apply by nailing through board to stud. Provides proper grounds and precise screed for cement application. Knurled and perforated for maximum cement and paint adhesion. Regular 100 has 15/16" x 15/16" flanges; DL-100, 1 1/4" x 1"; DLL-100, 1 1/4" x 1 1/4".



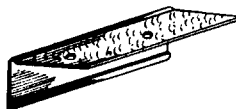
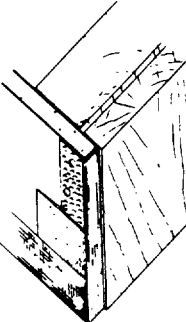
100-S, DL-100-S and DLL-100-S—Similar to No. 100, DL-100 and DLL-100 except for square corner, as illustrated.



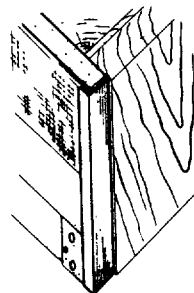
101 CHANNEL EDGE METAL CASING—Slips readily over edge of wallboard at door or window opening to give functional square trim. Nails are driven through knurled flange and wallboard into jamb or header. Beaded nose affords accurate screed for proper thickness of cement and adds strength without taping. No mitering is required.



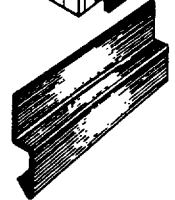
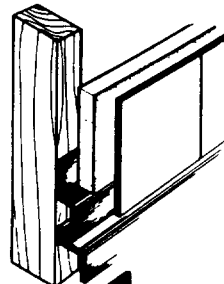
102 ANGLE EDGE METAL CASING—Similar to 101, except it eliminates the back flange. This means that the wallboard may be completely nailed in all areas—even around door and window openings—before angle edge trim is applied. This permits independent trimming savings in time and money.



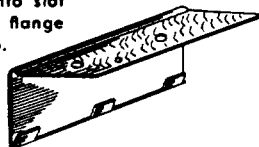
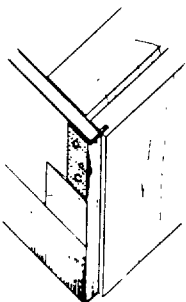
102-S METAL CASING—Similar to No. 102 except for square edge as illustrated.



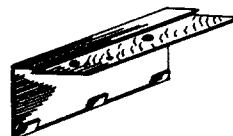
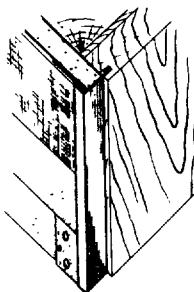
WATER STOP—Raises gypsum wall board one full inch above tub rim. Pure zinc or hot dipped galvanized steel available.



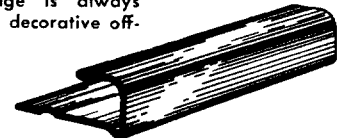
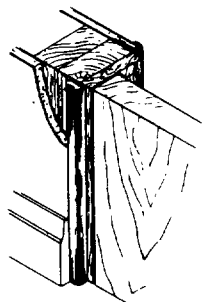
103 RECESSED EDGE METAL CASING—A further refinement of 101. Jamb and headers for all door and window openings are slotted 3/8" deep, back approximately 3/16" to 3/8" from face. Wallboard is completely erected, leaving slot exposed beyond wallboard edge. Recessed edge trim is then installed by inserting angle hemmed leg into slot and nailing through flange and board into jamb.



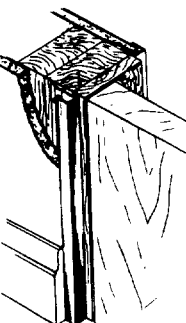
103-S METAL CASING—Similar to No. 103 except for square edge as illustrated.



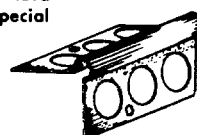
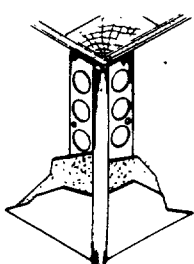
104 ROUND-NOSE METAL CASING—Extra rigid traditional type casing for wallboard construction with streamlined quarter round returns. May either be nailed in place first—and board inserted into nose as shown—or slid over wallboard edge at openings, nailed right through board and flange into door buck. Hemmed edge is always untreated as decorative off-set trim.



105 SQUARE-NOSE METAL CASING—Same as 104 except for square nose as illustrated. Special use of section to close edges of Bestwall Hummer "C" panels at ceiling and wall intersections, as illustrated.

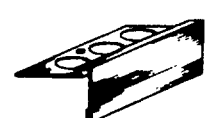
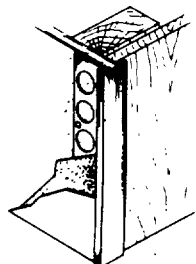


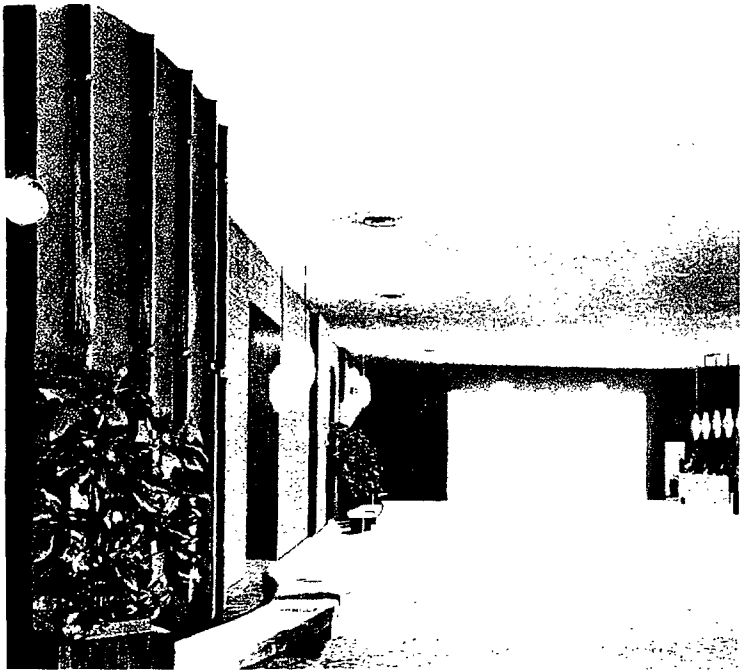
DC-120 METAL CORNER—Designed especially for the rapidly growing thin wall plastering systems. Now available with a special combination of large holes plus surface roughening. Provides a ground size of 3-32" to 1-8". Designed for one or two coat thin plaster applications. Requires very little follow-up work. Produced from hot dipped galvanized steel in standard and special lengths.



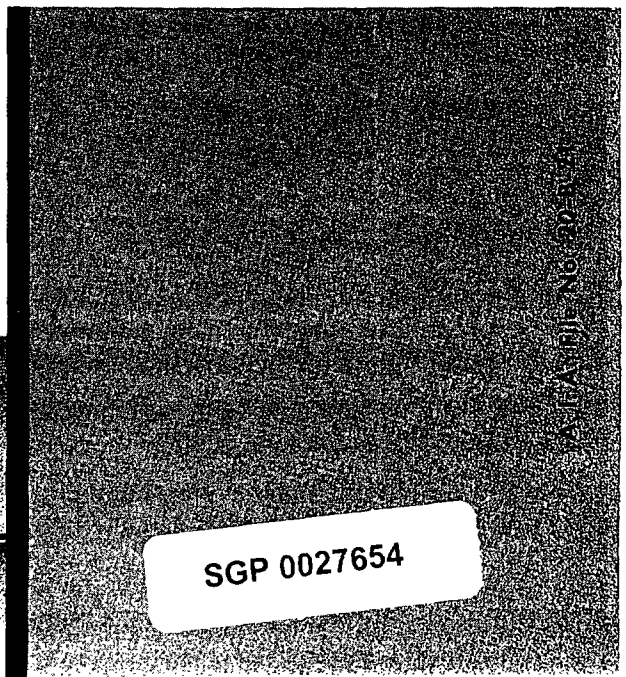
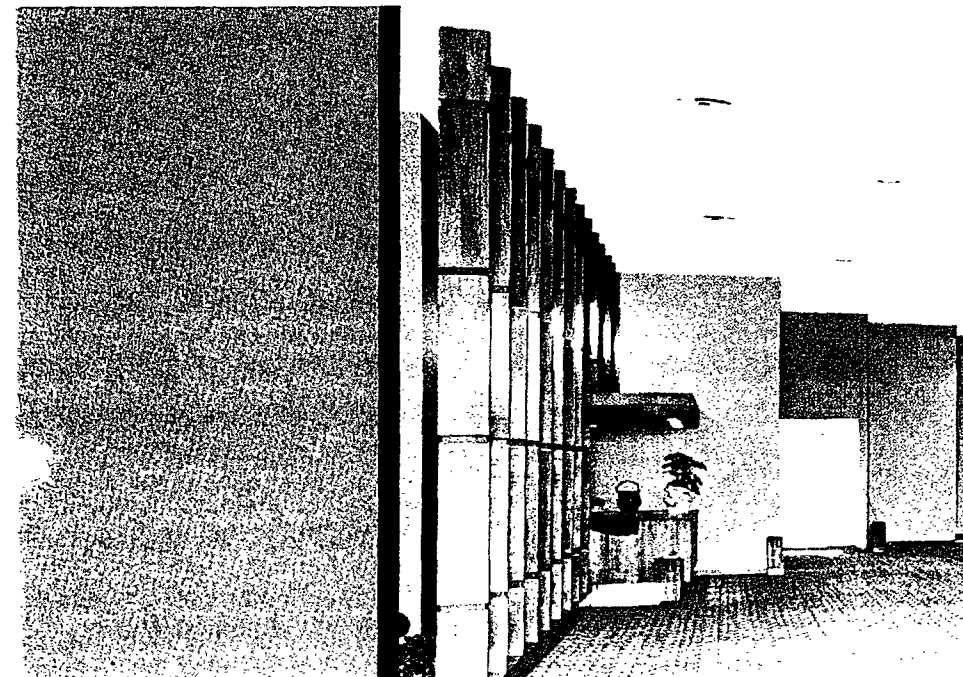
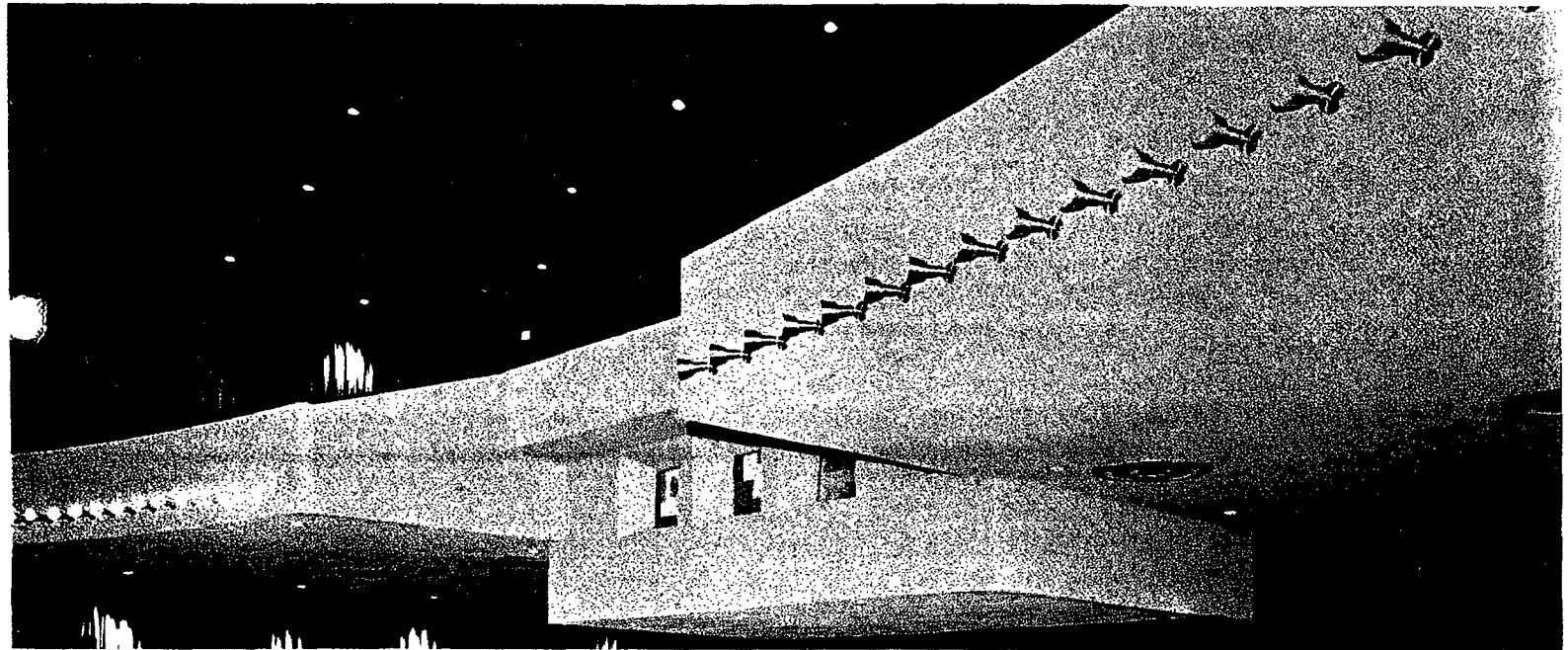
SGP 0027653

DC-130 THIN WALL CASING—Similar to DC-120 except for square edge as illustrated. Designed for one or two coat thin plaster applications.





DONN DRYWALL PARTITION *Systems*



SGP 0027654

WPA File No. 20-51-1

GRENADIER

D-G Series



The DONN® GRENADIER STEEL STUD DRYWALL PARTITION SYSTEM is a most unique concept for constructing lightweight non-load-bearing gypsum wallboard partitions. The steel stud has integral positive locking tabs on one face into which the wallboard is secured without the requirement for other fasteners and on the opposite face a flat surface to receive power-driven screws. This design feature eliminates 75% of the screws yet assures a more rigid wall than conventional screw stud systems. This system makes it practical to erect one complete side of a partition without any fasteners whatever. The wallboard automatically modulates the stud at 2'-0" on centers thus eliminating time consuming layout. Holes are punched the entire length of the stud at 18" on centers to allow for ease of installing horizontal utilities.

SOUND TRANSMISSION LOSS TESTS				
Construction		Nine Freq. Av'g.	Sound Trans. Class	Interference Speech Zone
TL 63-219	DG-404 Studs 24" o.c., 1/2" gypsum wallboard each side.	37	38	43
DG 110.1	DG-585 Studs @ 24" o.c., 5/8" gypsum wallboard, each side.	39	43	47
DG 110.2	Same as above with 1/2" fiberglass applied one side, DG-8 Resilient Channel horizontal, 24" o.c., 5/8" gypsum wallboard over DG-8.	46	45	55
64-1	DG-585 Studs @ 24" o.c., 5/8" gypsum wallboard, each side.	39	39	44
64-2	Same as above with 1/2", 1/2 lb. density fiberglass stapled to face, one side, DG-8 Resilient Channel horizontal, 24" o.c., 5/8" gypsum wallboard over DG-8.	46	49	54
64-3	Same as above with 5/8" gypsum wallboard laminated to non-resilient side.	48	53	55
64-6	DG-585 studs @ 24" o.c., two layers 5/8" gypsum wallboard each side.	41	43	46

Specifications

MATERIALS

Studs: DG-264 (1 5/8" x 1/2"); DG-265 (1 5/8" x 5/8"); DG-404 (2 1/2" x 1/2"); DG-405 (2 1/2" x 5/8"); DG-484 (3" x 1/2"); DG-485 (3" x 5/8"); DG-584 (3 5/8" x 1/2"); DG-585 (3 5/8" x 5/8"); DG-644 (4" x 1/2"); DG-645 (4" x 5/8"). The studs are roll-formed channels of 25 gauge steel tabbed to receive 1/2" or 5/8" tapered gypsum wallboard as indicated above. Conduit or electrical wiring holes are provided on 18" centers.

Metal Floor and Ceiling Track: DS-260 (1-5/8"); DS-400 (2 1/2"); DS-480 (3"); DS-580 (3 5/8"); DS-640 (4"). The tracks are roll-formed channels of 25 gauge steel in width dimensions suitable to corresponding sizes of D-G studs.

Metal Screw Fasteners: W-616 Flange-head, Phillips, self-drilling, sheet-metal-type screw for use with a power-driven tool.

Ceiling Trim: Various methods of treating the juncture of walls to ceilings are available as illustrated.

Snap-On Metal Base: DW-408 (2 1/2"); DW-648 (4"). Formed of 20 gauge steel providing for an attractive, functional base trim.

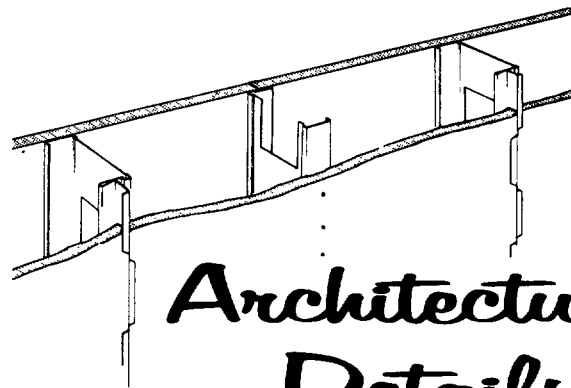
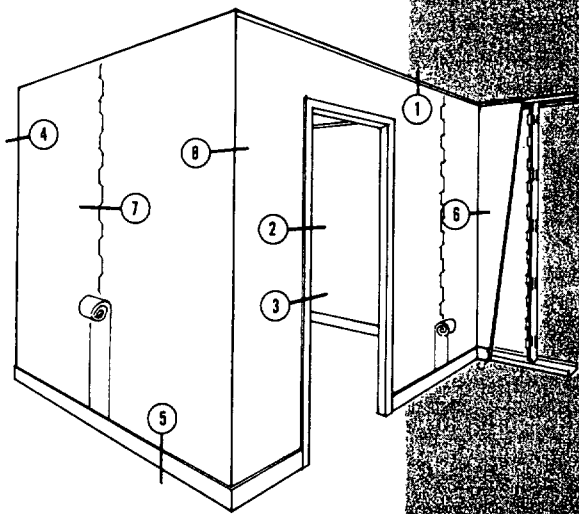
INSTALLATION

Ceiling and floor track shall be aligned and anchored securely with suitable fasteners at a maximum of 24" on centers. A 2'-0" starter board shall be fastened to a vertical track at the start of each individual run. The stud is positioned and then a 4'-0" board inserted on the opposite side or on the same side depending on whether it is desired to install one side only or both sides simultaneously.

Self-tapping, self-drilling screws shall be power driven at 18" on centers into the flat side of the stud, slightly below the surface of the wallboard, also into the floor and ceiling tracks in the centers of the wallboards. Screw heads and face joints to receive joint treatment.

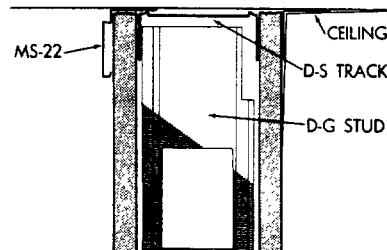
Corner and door frame openings shall be constructed as per manufacturer's recommendations. (See details.)

Base clips shall be screwed to floor track at a maximum of 24" on centers and at the start and termination of base runs. Use Snap-On Metal Base with base clips or omit clips and use set-on type base.



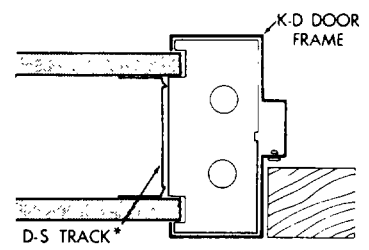
Architectural Details

SCALE 3" = 1'0"



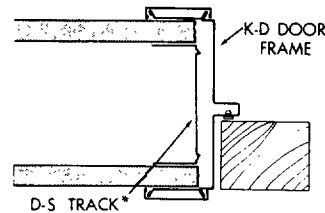
CEILING

①



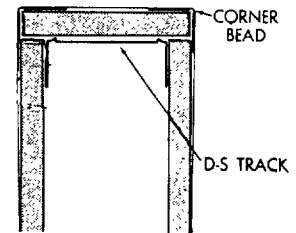
DOOR JAMB

②



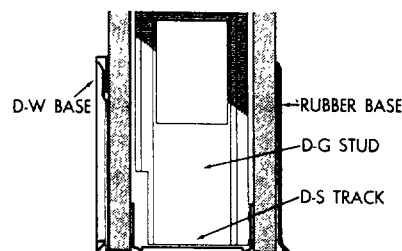
DOOR JAMB

③



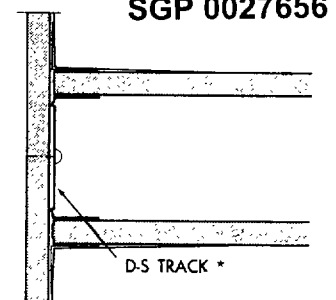
TERMINATION

④



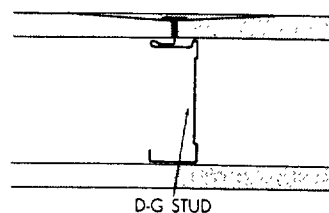
BASE

⑤



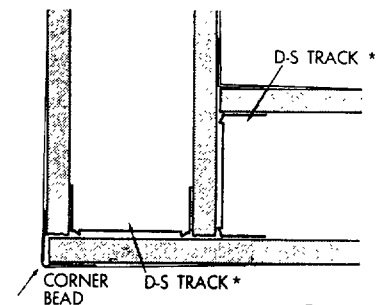
INTERSECTION

⑥



VERTICAL STUD

⑦



CORNER

⑧

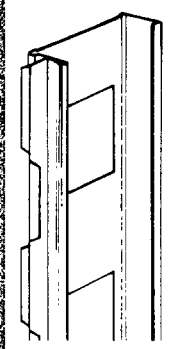
Frequency —cps.	125	175	250	350	500	700	1000	1400	2000	2800	4000
TL 63-219	25	26	34	36	40	42	46	47	46	36	41
DG 110.1	21	24	34	36	44	50	54	53	42	40	44
DG-110.2	23	28	44	48	54	58	59	56	52	51	52
64-1	25	28	34	38	42	46	50	49	39	38	45
64-2	29	31	40	47	52	56	57	59	52	49	55
64-3	33	36	44	48	52	56	58	59	55	51	57
64-6	25	31	37	42	47	49	48	43	42	47	52

FIRE TESTS

Construction — DG-110.1 — DG-585
Studs @ 24" o.c., 5/8" gypsum wall-
board, each side.

Type of Test — Fire Endurance and
Fire and Hose Stream.

Rating — 1 hour, 1 minute.



STUD SELECTION

Stud Size Nominal Dimension	Maximum Height Span
DG-264 1 1/8"	9'-0"
DG-404 2 1/2"	12'-0"
DG-484 3"	14'-0"
DG-584 3 5/8"	16'-0"
DG-644 4"	18'-0"

*NOTE: D-W Stud may be substituted for D-S Track.

WARRIOR

D-W Series



The DONN® WARRIOR STEEL STUD PARTITION SYSTEM is a non-load bearing partition system that consists of light weight steel channel studs set into metal floor and ceiling tracks and faced on both sides with gypsum wallboard. A unique power-driven, self-tapping, self-drilling screw with radius-contoured head is used to apply the wallboard to the system. The gypsum wallboard may be applied either horizontally or vertically—in single or double layers—depending on the requirements of fire and sound for the particular partition.

Two outstanding features of the stud are the stud extension splicer and the holes punched 6" on centers through the entire length of the stud. The extension splicer compensates for floor to ceiling variations up to 3" and also can be used to splice the stud to accommodate large horizontal utility lines. The punched holes line exactly from stud to stud and permit horizontal utilities to be installed with ease, an important time saving factor. These holes are dimensioned to receive either 3/4" or 1 1/2" channels which are positively locked in place to stiffen the system should unusual conditions require this application.

SOUND TRANSMISSION LOSS TESTS CONSTRUCTION

	Nine Freq. Av'g.	Sound Trans. Class	Speech Inter- ference Zone
OR 63-1—DW-40 Studs 24" o.c., 5/8" gypsum wallboard both sides	36	39	43
OR 63-10—DW-58 Studs 24" o.c., 5/8" gypsum wallboard both sides, DG-8 attached horizontally, 24" o.c., over 1/2" fiberglass, 5/8" gypsum wallboard to DG-8	45	46	53
OR 63-11—DW-58 Studs 24" o.c., 5/8" gypsum wallboard both sides	38	42	45
OR 64-24—DW-58 Studs 24" o.c., 5/8" Fi-Rok® gypsum wallboard one side; 1/2" sound deadening board DG-8 horizontal 24" o.c., 5/8" Fi-Rok® gypsum wallboard one side. 5/8" Fi-Rok® gypsum	43	45	53
OR 64-25—DW-58 Studs 24" o.c., 5/8" Fi-Rok® gypsum wallboard one side. 5/8" Fi-Rok® gypsum wallboard laminated to 1/2" sound deadening board other side	42	44	50
OR 64-26—DW-58 Studs 24" o.c., 1/2" sound deadening board, 5/8" Fi-Rok® gypsum wallboard laminated over, both sides	47	49	56
OR 64-28—DW-40 Studs 24" o.c., 1/2" gypsum wallboard both sides	34	36	43
OR 64-29—DW-58 Studs 24" o.c., 1/2" gypsum wallboard both sides, 1/2" fiberglass, DG-8 horizontal 24" o.c., 1/2" gypsum wallboard over DG-8	43	40	54
OR 64-33—DW-58 Studs 24" o.c., 1/2" sound deadening board, DG-8 resilient channel horizontal 24" o.c., 5/8" Firestop® gypsum wallboard over one side. Two layers, 5/8" Firestop® gypsum wallboard, other side	49	48	57
OR 64-34—DW-58, 24" o.c., 1/2" sound deadening board, 5/8" Firestop® gypsum wallboard over, one side. Double layer 5/8" Firestop® gypsum wallboard, other side	46	48	53
TL 62-72—DW-26 Studs 24" o.c., 5/8" gypsum wallboard each side	36	35	39
TL 62-18—DW-48 Studs 24" o.c., 1/2" gypsum wallboard each side	38	42	46
TL 61-208—DW-58 Studs 16" o.c., 5/8" gypsum wallboard each side	42	44	46
TL 62-19—DW-58 Studs 16" o.c., 5/8" gypsum wallboard one side, double layer 5/8" gypsum wallboard other side	42	45	45
TL 61-237—DW-58 Studs 16" o.c., double layer 5/8" gypsum wallboard, both sides	43	40	45

Specifications

MATERIALS

Studs: DW-26 (1 5/8"); DW-28 (1 3/4"); DW-40 (2 1/2"); DW-48 (3"); DW-54 (3 3/8"); DW-58 (3 5/8"); DW-64 (4"). The studs are roll-formed channels of 25 gauge steel. Conduit or electrical wiring holes are provided 6" on centers.

Metal Floor and Ceiling Track: DS-260 (1 5/8"); DS-280 (1 3/4"); DS-400 (2 1/2"); DS-480 (3"); DS-540 (3 3/8"); DS-580 (3 5/8"); DS-640 (4"). The tracks are roll-formed channels of 25 gauge steel with width dimensions suitable to corresponding sizes of D-W studs.

Extension Splicer: W-1 Snap-In splicers are of 25 gauge steel, used in compensating for floor to ceiling variations.

Metal Screw Fasteners: W-616 Flange-head, Phillips, self-drilling, sheet-metal-type screw for use with a power-driven tool.

Base Clip: W-2 (2 1/2") and W-4 (4") Base Clips of 16 gauge steel which are screwed to the floor track.

Snap-On Metal Base: DW-408 (2 1/2") or DW-648 (4") Snap-On Metal Bases are of 20 gauge steel.

Single unit responsibility is assured by utilizing gypsum wallboard as manufactured by Bestwall Gypsum Company and The Celotex Corporation. Single unit responsibility with various other wallboard manufacturers available on request.

INSTALLATION

Ceiling and floor track shall be aligned and anchored securely with suitable fasteners at a maximum of 24" on centers.

Studs shall be positioned vertically into ceiling and floor tracks spaced not over 16" or 24" on centers depending upon the thickness of gypsum wallboard used. Screws shall be spaced 12" on centers in the field and 8" on centers, staggered, at vertical joints of board, 3/8" from all ends and edges. Screw heads and face joints to receive joint treatment.

Use Extension Splicers where required.

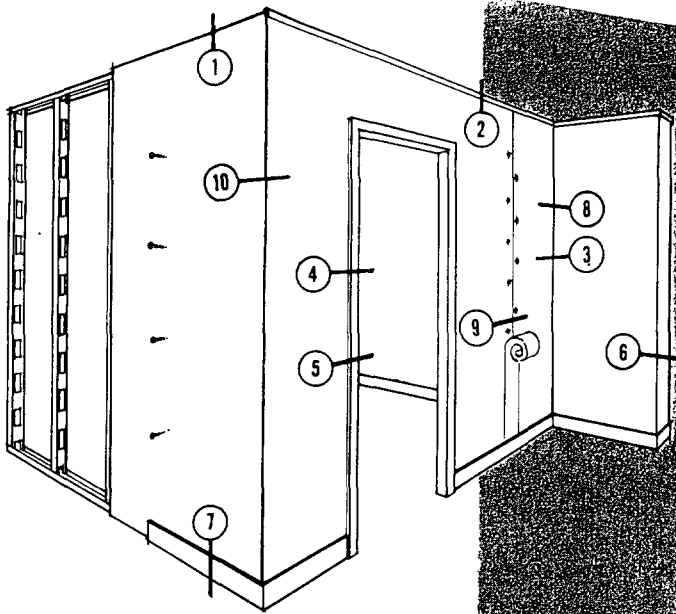
Base Clips shall be screwed to floor track at a maximum of 24" on centers and at start and termination of base runs.

Use Snap-On Metal Base or set-on type (omitting base clips).



Architectural Details

SCALE 3" = 1'0"



Frequency—cps.	125	175	250	350	500	700	1000	1400	2000	2800	4000
OR 63-1	24	22.5	28	33.5	40	44	49	48.5	40	39	45
OR 63-10	23.5	29.5	37	45	49.5	53	57	59.5	52	49	57
OR 63-11	20.5	26	31	37	41.5	46	50	50.5	42	40	48
OR 64-24	25	26.5	34	40.5	47	52.5	57	58	52	49.5	56
OR 64-25	24	26	34	40.5	47	50.2	55	54.5	48	47	53
OR 64-26	28	32	39	46	52	56.5	57	59.5	55	55	59
OR 64-28	17	19	27	30.5	37	42	47	50	48	36	37
OR 64-29	21	21	33	38	47	54	57	59	59	49	51
OR 64-33	25	35	44	52	54	57.5	59	59	56	55	58
OR 64-34	25	33	41	47	52	54	56	55	50	51	55
TL 62-72	25	29	35	35	40	41	44	43	33	36	44
TL 62-18	26	27	33	37	40	44	47	48	50	42	40
TL 61-208	32	32	38	40	43	44	49	51	46	45	51
TL 62-19	34	35	39	41	43	45	45	45	46	46	53
TL 61-237	32	34	41	42	44	46	40	45	45	50	59

Fi-Rok®: registered trademark of The Celotex Corp.

Firestop®: registered trademark of Bestwall Gypsum Co.

FIRE TESTS

CONSTRUCTION: T-2316—DW-26 Studs set into DS-260 Track @ 24" o.c., 5/8" Firestop® gypsum wallboard each side.

TYPE OF TEST: Fire Endurance and Fire and Hose Stream.

RATING: 1 hr., 5 min.

CONSTRUCTION: T-2016—DW-58 Studs set into DS-580 Track @ 24" o.c., 5/8" Firestop® gypsum wallboard each side.

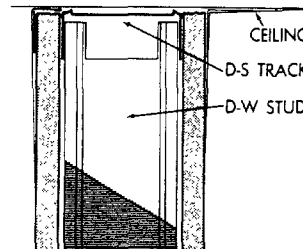
TYPE OF TEST: Fire Endurance and Fire and Hose Stream.

RATING: 1 hr., 8 min.

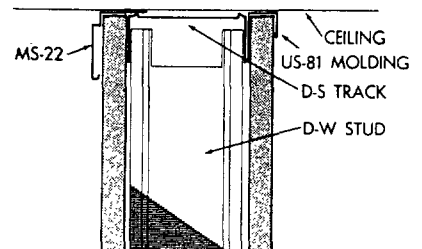
STUD SELECTION

Stud Size	Nominal Dimension	Maximum Height Span
DW-26	1 1/8"	9'-0"
DW-28	1 3/8"	9'-0"
DW-40	2 1/2"	12'-0"
DW-48	3"	14'-0"
DW-54	3 3/8"	15'-0"
DW-58	3 5/8"	16'-0"
DW-64	4"	18'-0"

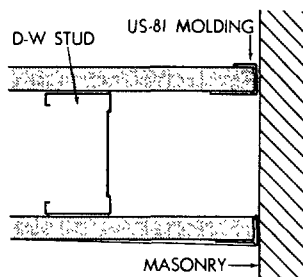
BOARD SIZE	MEMBER SPACING
3/8"	16" c. to c.
1/2"	24" c. to c.
5/8"	24" c. to c.



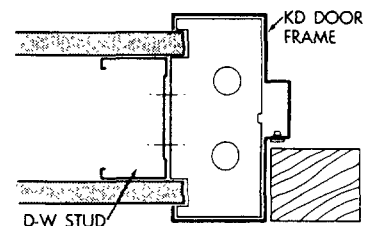
CEILING ①



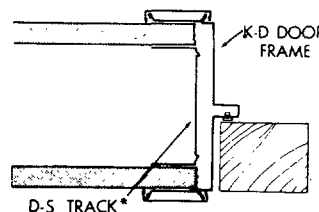
CEILING ②



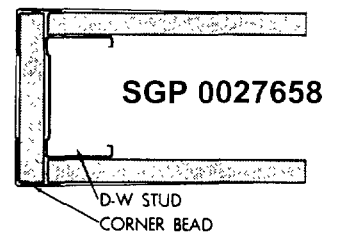
INTERSECTION ③



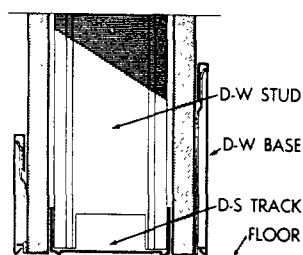
DOOR JAMB ④



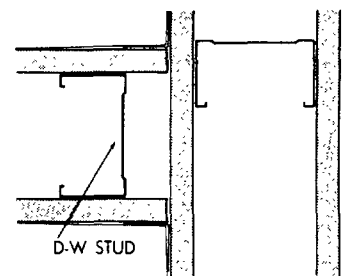
DOOR JAMB ⑤



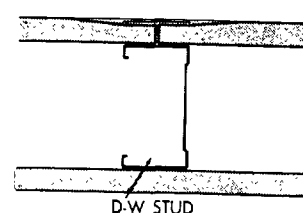
TERMINATION ⑥



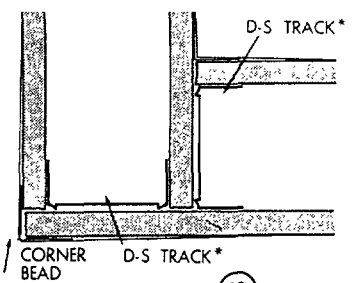
BASE ⑦



INTERSECTION ⑧



VERTICAL STUD ⑨



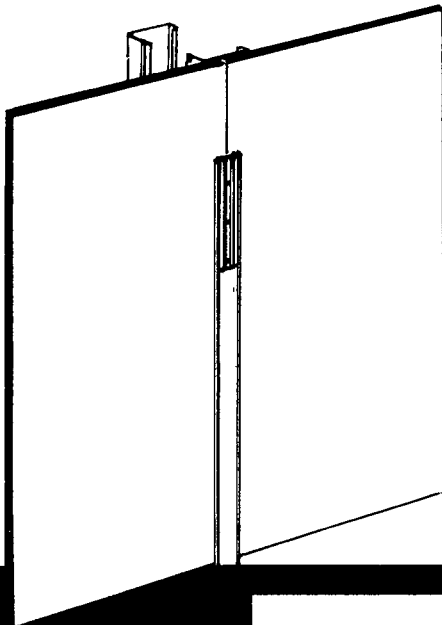
CORNER ⑩

*NOTE: D-W Stud may be substituted for D-S Track.

MODU MAKER

DEMOUNTABLE PARTITION

A-W Series



THE DONN® MODU MAKER SYSTEM is a completely new and versatile method of applying gypsum wallboard to a Warrior stud system. The components are used where inexpensive movable floor to ceiling partitions are required. All the steel and aluminum components are virtually 100% demountable and reusable. The aluminum batten strips of this attractive system can be either on a two or four foot module. To enhance the decor of the wall the vinyl insert for the batten is available in five decorator colors which match or compliment a variety of vinyl covered gypsum panels. The system consists entirely of incombustible materials. When increased fire resistance is desired, a $\frac{5}{8}$ " rated gypsum panel is screw attached to the framing members at 12" on centers in the field and 8" on centers, staggered, at the joints, and the wider batten strip applied to conceal these screws. (This type of application on Warrior studs has been assigned a one-hour fire rating.) The battens, ceiling trim, base and corners, are all satin finished anodized aluminum.

SOUND TRANSMISSION LOSS TESTS

	CONSTRUCTION	Nine Freq. Av'g.	Sound Trans. Loss	Speech Interference Zone
OR 64-65	DW-40 Studs, 24" o.c., $\frac{1}{2}$ " vinyl covered gypsum wallboard, both sides, AW-14 aluminum batten 24" o.c., with vinyl inserted.	33	35	41
OR 64-67	Same as above with $1\frac{1}{2}$ " fiberglass insulation inserted into cavity.	38	40	47
OR 64-68	DW-40 Studs, 24" o.c., $\frac{5}{8}$ " vinyl covered gypsum wallboard, both sides, AW-14 aluminum batten, 24" o.c., with vinyl insert.	33	37	39

Specifications

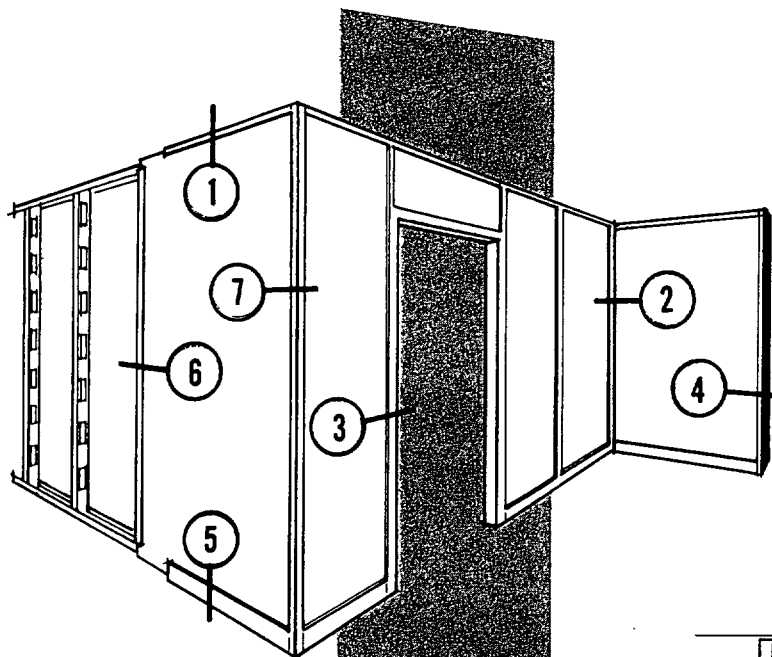
MATERIALS

Studs: (Same as Warrior System)
Metal Floor and Ceiling Track: (Same as Warrior System)
Metal Screw Fasteners: W-620 (1 $\frac{1}{4}$ ") Flange-head, Phillips, self-drilling, sheet-metal-type screw for use with a power-driven tool.
Aluminum Batten: AW-14 ($\frac{3}{4}$ "); AW-16 (1").
Vinyl Insert: AW-15 ($\frac{3}{4}$ "); AW-17 (1"). Colors shall be: Ebony, Hawaiian Tan, Autumn Brown, Spring Green or Alaskan Gray.
Aluminum Ceiling Molding: AW-8 ($\frac{1}{2}$ " panels); AW-10 ($\frac{5}{8}$ " panels).
Aluminum Base: AW-40 (2 $\frac{1}{2}$ "); AW-64 (4").
Aluminum Corner: "F" type molding, AF-8 ($\frac{1}{2}$ " panels); AF-10 ($\frac{5}{8}$ " panels).
Base Clips: W-2 (2 $\frac{1}{2}$ "); W-4 (4").
 All aluminum components are extruded of 6063T-5 aluminum, satin finish, etched and anodized.

INSTALLATION

Ceiling track, floor track and studs shall be installed in the same manner as the Warrior system. Aluminum Ceiling Trim shall be slid on the panel and this assembly positioned so the ceiling trim is trapped between the panel and ceiling track.
 Tack panels to metal studs set 24" on centers.
 Apply base clips at 24" on centers maximum. Attach aluminum base.
 Apply batten with screws at 12" on centers using power tool to tap through batten and also the steel stud. Insert vinyl cover.
 Corner and door frame openings shall be constructed as per manufacturer's recommendations. (See details).
 When aluminum battens are to be spaced 48" on centers a drywall adhesive recommended by the manufacturer shall be applied on alternate studs.

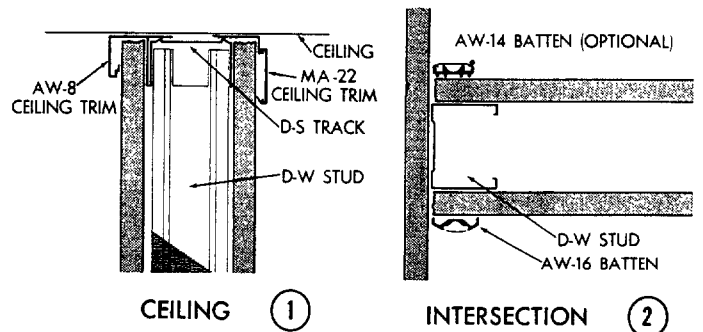
SGP 0027659



MODU-MAKER

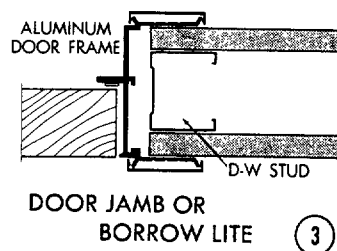
Architectural Details

SCALE 3" = 1'0"

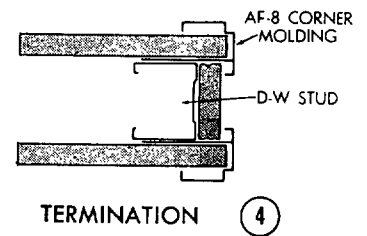


CEILING ①

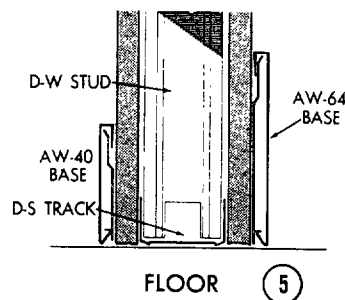
INTERSECTION ②



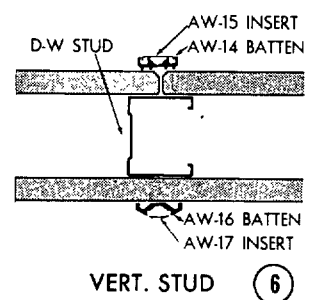
DOOR JAMB OR
BORROW LITE ③



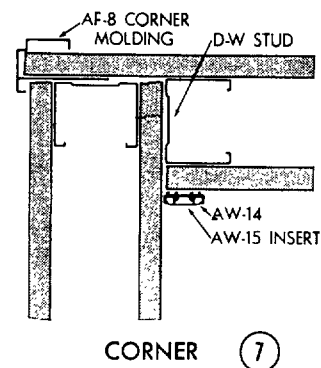
TERMINATION ④



FLOOR ⑤



VERT. STUD ⑥



CORNER ⑦

SGP 0027660

Frequency cps	125	175	250	350	500	700	1000	1400	2000	2800	4000
OR 64-65	14	19	23	30	33	39	45	45	45	40	42
OR 64-67	19	24	30	38	42	47	48	49	47	46	45
OR 64-68	19	22	27	31	36	40	41	37	37	40	45

Eternawall®: registered trademark of Bestwall Gypsum Co.

FIRE TESTS

Construction—DW-40 Studs, 24" o.c., 5/8" type "X" Eternawall® vinyl covered gypsum wallboard, attached vertically; AW-14 and AW-16 aluminum battens 24" o.c. with AW-15 and AW-17 inserts. AW-40 base applied with H-2 clips 24" o.c., MA-22 ceiling trim locked to ceiling track each side.

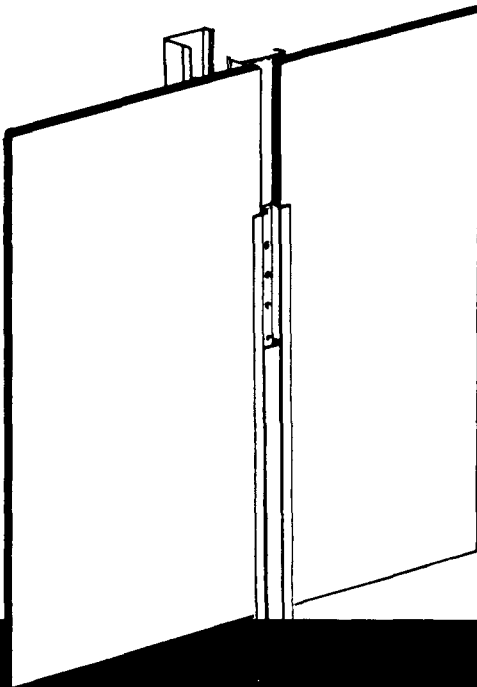
Type of Test—Fire Endurance and Fire and Hose Stream.

Rating—1 hour, 13 minutes.

SPACELINE

DEMOUNTABLE PARTITION

S-W Series



The DONN® SPACELINE SYSTEM is an entirely new concept for low cost demountable partition systems. The hat-shaped steel batten strips and steel inserts can be placed on a two or four foot module employing the various Warrior framing systems to hold the gypsum wallboard in place. This system eliminates joint or screwhead treatment with conventional joint compounds and thus is a time saver when erecting and a money saver where movability is a factor. When plain gypsum wallboard is used the entire wall surface can be painted after complete erection. Aluminum or steel base and ceiling trim items are available to enhance the system. All components of the system are made of non-combustible materials.

Specifications

MATERIALS

Studs: (Same as Warrior System)

Metal Floor and Ceiling Track: (Same as Warrior System)

Metal Screw Fasteners: W-616 (1") Flange-head, Phillips, self-drilling, sheet-metal-type screw for use with a power-driven tool.

Steel Batten: SW-8; is a roll-formed section of 25 gauge steel with holes punched 1" on centers to accommodate fasteners. Fasteners are to be placed 12" on centers.

Steel Insert: SW-9; is a roll-formed section of 25 gauge steel and positively locks into the batten to conceal the screws.

Ceiling Molding: Steel or aluminum.

Base: Steel or aluminum.

INSTALLATION

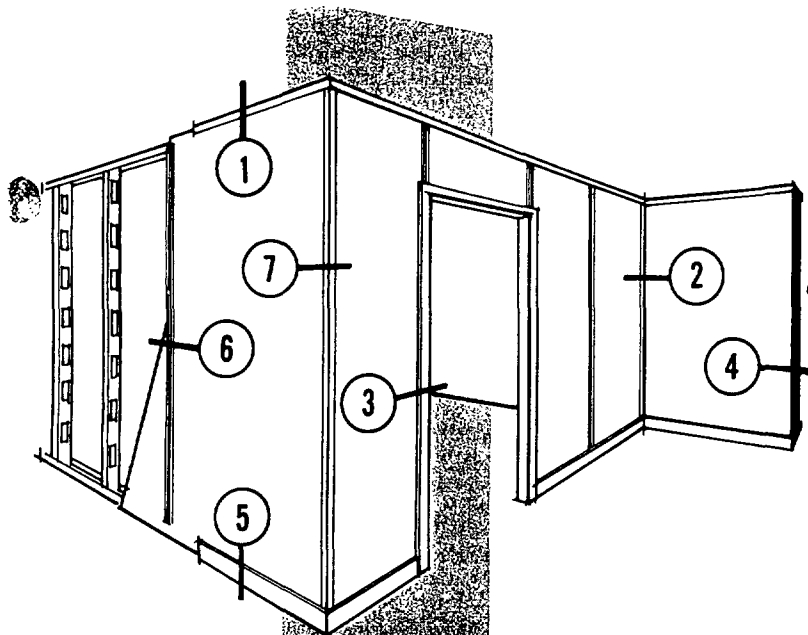
Ceiling track, floor track and studs shall be installed in the same manner as the Warrior System.

Apply batten with fasteners 12" on centers using power tool to screw through steel stud.

The battens can be spaced 24" on centers. When the battens are to be spaced 48" on centers a drywall adhesive recommended by the manufacturer shall be applied to alternate studs.

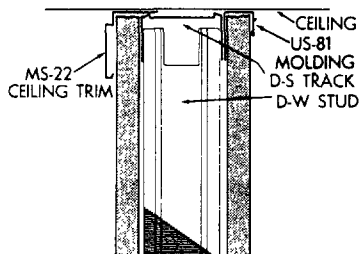
Corner and door frame openings shall be constructed as per manufacturer's recommendations. (See details).

SGP 0027661

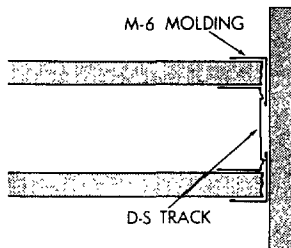


Architectural Details

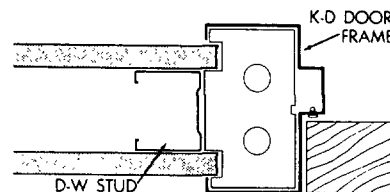
SCALE 3" = 1'0"



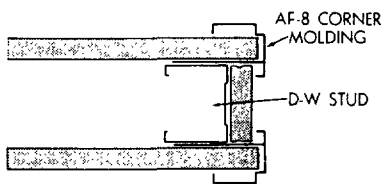
CEILING ①



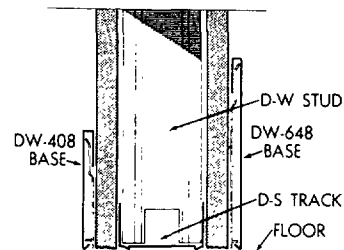
INTERSECTION ②



DOOR JAMBS ③

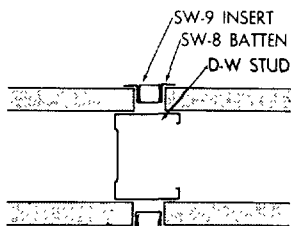


TERMINATION ④

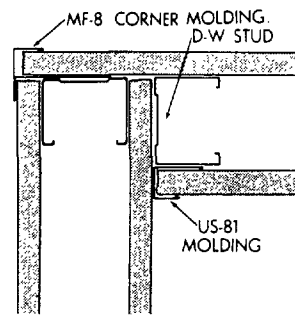


BASE ⑤

SGP 0027662



VERTICAL STUD ⑥

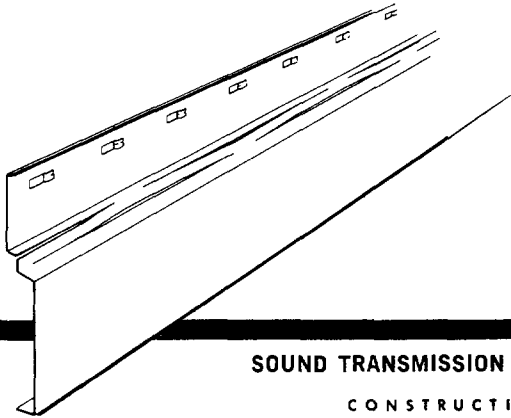


CORNER ⑦

RESILIENT FURRING

D-G Series

WOOD STUDS • METAL STUDS



The DONN® GRENADIER RESILIENT FURRING SYSTEM is designed for resilient application of gypsum wallboard to wood, steel framing of partitions or existing construction and ceilings, to acquire above average sound transmission loss. The steel channel is a 25 gauge roll-formed shape and is applied at right angles to framing members and fastened with

SOUND TRANSMISSION LOSS TESTS

CONSTRUCTION

	Nine Freq. Av'g.	Sound Trans. Class	Speech Interference Zone
OR 64-41 1½" wallboard gypsum core; ½# density fiberglass, DG-8 resilient channel 24" o.c., horizontal, ⅝" gypsum wallboard over.	41	42	48
OR 64-43 1½" gypsum wallboard core; ½# density fiberglass, DG-8 horizontal, 24" o.c., ⅝" gypsum, over, one side. ½# density fiberglass, DG-8 horizontal, 24" o.c., double layer ⅝" gypsum wallboard over, other side. (Listed below is sound test data as applied to wood framing studs, 2" x 4" wood studs 16" o.c. faced as indicated.)	49	47	57
OR 64-8 ⅝" gypsum wallboard, each side.	32	34	38
OR 64-20 ½" Firestop® gypsum wallboard one side; DG-8 direct to studs, one side @ 24" o.c., horizontally with ½" Firestop® gypsum wallboard over, other side.	37	39	47
OR 64-7 Same as above with ⅝" gypsum wallboard.	40	43	46
OR 64-16 Same as above with 1½" fiberglass economy blanket on resilient side.	48	50	53
OR 64-21 Two layers ½" Firestop® gypsum wallboard one side; DG-8 @ 24" o.c. horizontally with ½" Firestop® gypsum wallboard over, other side.	43	46	51
OR 64-15 Two layers ⅝" gypsum wallboard one side; DG-8 @ 24" o.c. horizontally, with ⅝" gypsum wallboard over, other side.	45	48	51
OR 64-9 ⅝" gypsum wallboard both sides; ½", ½# fiberglass over one face, DG-8, 24" o.c., horizontal, with ⅝" gypsum wallboard over.	41	39	51

Firestop®: registered trademark of Bestwall Gypsum Co.

FIRE TESTS

Construction—Floor-ceiling assembly using 2 x 10 wood joists 16" o.c., 1 x 6 T & G subfloor, building paper, 1 x 4 T & G finish floor; DG-8 channel 24" o.c., ½" Firestop® gypsum wallboard attached 12" o.c. with 1" screws.

Rating—1 hour—U.L. Design No. 33-1.

MATERIAL

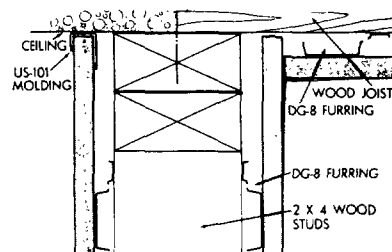
Resilient Channel: DG-8 Resilient Channels roll-formed of 25 gauge steel with holes 1" on centers to accommodate fasteners.

INSTALLATION

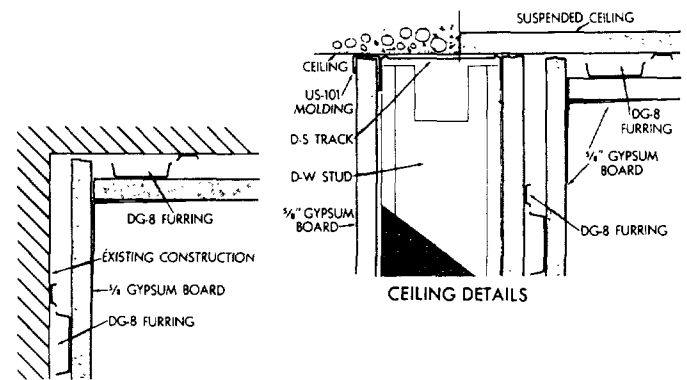
Partitions: Attach DG-8 Resilient Channels horizontally to partition studs, 24" on centers. Use W-620 (1 ¼") drywall screws or 5d common nails through prepunched holes in channel flange. Channels shall be located 6" below ceiling and 24" above floor. A 3" wide strip of gypsum is fastened to the studs along the floor.

Ceilings: Attach DG-8 Resilient Channels at right angles to ceiling joists with suitable fasteners 24" on centers. Extend channels to partition top plates. If channels run parallel to partitions, locate channels at least 1" from partitions.

Architectural



CEILING DETAILS



CEILING DETAILS

SGP 0027663

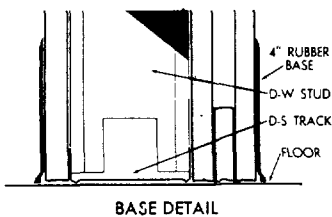
FURRING

• EXISTING CONSTRUCTION

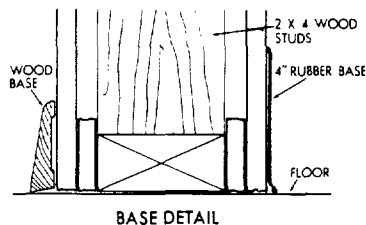
screws or nails. The gypsum wallboard is fastened to the channel with power-driven drywall screws. The panel may be applied either horizontally or vertically with respect to the channels, in single or double layers. The outstanding feature of this member is its resilience even when attached to solid existing walls where better sound attenuation is required.

Freq. cps	125	175	250	350	500	700	1000	1400	2000	2800	4000
OR 64-41	23	24	34	42	48	48	48	48	47	49	54
OR 64-43	26	30	46	53	57	58	58	57	57	55	59
OR 64-8	22	16	29	31	33	38	41	41.5	36	36.5	45
OR 64-20	21.5	21.5	27	36.5	39	46	49	53	52	43	42
OR 64-7	29.5	28	33	41	45	48.5	52	52.5	44	41	51
OR 64-16	33.5	35	43	50.5	51	54	55	55	54	47.5	53
OR 64-21	29.5	28	35	42	45	51	53	56.5	54	46	49
OR 64-15	32.5	32	38	44.5	49	52.5	55	56.5	49	45	54
OR 64-9	18.5	22	34	41.5	46	53	57	56.5	48	54	

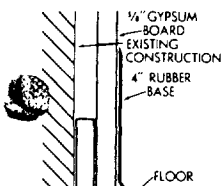
Details



BASE DETAIL



BASE DETAIL



BASE DETAIL

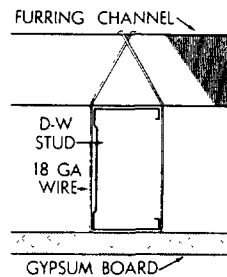
D-G & D-W Series

DONN® GRENADIER AND WARRIOR FURRING SYSTEMS.

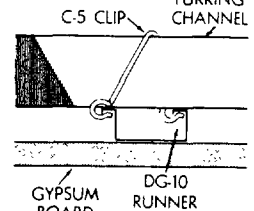
Description: A variety of components can be used for either ceiling or wall furring. The limiting factors for ceiling furring are individual spanning characteristics; the chart below lists these. The same components are employed as wall furring members, however, economy and ease of installation are prime considerations in the selection of the proper shape.

CEILING FURRING SELECTION			
TYPE CEILING MEMBER NOMINAL SIZE		FURR. CHNL. c. to c.	HANGERS c. to c.
DG-10	5/8"	4'-0"	4'-0"
DW-14	7/8"	4'-0"	4'-0"
DW-26	1 1/8"	5'-0"	4'-0"
DW-28	1 3/4"	5'-0"	4'-0"
DW-40	2 1/2"	6'-0"	4'-0"
DW-48	3"	7'-0"	4'-0"
DW-54	3 3/8"	7'-0"	4'-0"
DW-58	3 5/8"	8'-0"	4'-0"
DW-64	4"	8'-0"	4'-0"

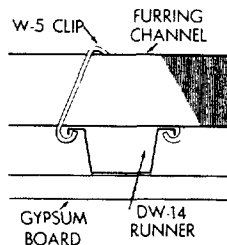
Architectural Details



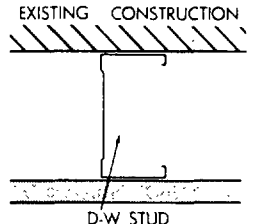
GYPSUM BOARD



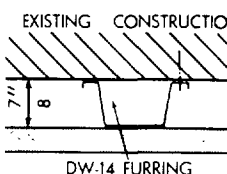
GYPSUM BOARD



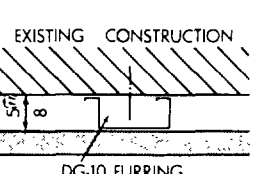
GYPSUM BOARD



D-W STUD



DW-14 FURRING



DG-10 FURRING

DRYWALL

DONN

CORNER EDGE BEADS



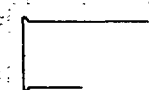
The most economical answer for stronger, more accurate external wallboard corners. Simply applied by nailing through board into stud. Provides proper ground and precise screed for cement application. Knurled and perforated for maximum cement and paint adhesion. Formed from electro-galvanized steel to protect the weakest spot in wallboard construction.

D-1000 has 1" x 1" flanges
DL-1000 has 1" x 1 1/4" flanges

DLS-1000 has 1 1/8" x 1 1/8" flanges
DLL-1000 has 1 1/4" x 1 1/4" flanges

All Corner Edge Beads available in 8'-0", 9'-0" and 10'-0" lengths. The wide range of flange widths provides a selection from the lowest cost to the easiest nailing dependent on individual requirements for protection from knocks, bumps and abuse.

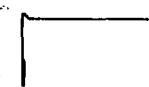
CHANNEL EDGE CASING



Slips readily over edge of wallboard at door or window opening to form functional square trim. Nailed through knurled and perforated flange and through wallboard into header or jamb. Beaded nose provides accurate screed for proper thickness of cement and gives strength where most needed without taping. Fast because no mitering is required.

D-1001 is fabricated for 3/8", 1/2", 5/8" or 3/4" wallboard and in 7'-0", 7'-3" and 10'-0" lengths.

ANGLE EDGE CASING



Similar to Channel Edge Casing but simplified by eliminating the back flange. This allows the wallboard to be completely nailed in all areas—even around door and window openings—before Angle Edge Casing is applied. This permits completely independent trimming crews if desired.

D-1002 is fabricated for 1/2" or 5/8" wallboard and in 7'-0", 7'-3" and 10'-0" lengths.

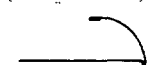
RECESSED EDGE CASING



This represents a further refinement on Angle Edge Casing. To use this trim, jambs and headers for all door and window openings are slotted 1/2" deep, back approximately 3/16" to 3/8" from face of jambs and headers. Wallboard is completely erected, leaving slot exposed beyond wallboard edge. Recessed Edge Casing is then installed by inserting offset leg into slot and nailing through other flange and through wallboard into jamb or header. This application assures a clean juncture plus true alignment of casing and framing without time-consuming precision fitting.

DS-1003 is fabricated in one single dimension which accommodates 3/8", 1/2" or 5/8" wallboard, thereby reducing inventories to a minimum and is available in 7'-0", 7'-3" and 10'-0" lengths.

BULLNOSE EDGE CASING



Provides extra rigid, traditional type casing for wallboard construction with streamlined quarter round returns. May either be nailed in place first—and board inserted into nose—or slid over wallboard edge at openings, nailing right through board and flange into jambs or headers. Hemmed edge may be left untreated as decorative offset trim.

D-1004 is fabricated for 3/8" or 1/2" wallboard and in 7'-0", 8'-0" and 10'-0" lengths.

SQUARENOSE EDGE CASING



Sturdy, conventional type square nose casing which is more rugged than others for maximum protection. Nail casing around wall openings so that wallboard may be readily slipped into nose of casing. Alternate method is to cut back wallboard slightly from opening, slip casing over edge, then nail both to jambs or headers. If desired, surface may be brought flush to trim thickness by feathering back onto wallboard surface with cement.

D-1005 is fabricated for 3/8", 1/2", 5/8" or 3/4" wallboard and in 7'-0", 8'-0" and 10'-0" lengths.

DONN

PRODUCTS, INC.

700 BASSETT ROAD • WESTLAKE, OHIO 44091

Telephone: (216) 871-1000

SGP 0027665

BEST WALL GYPSUM COMPANY

GYPSUM WALLBOARD MANUAL

1965 EDITION

Section 7
Sub-Section E

LIST OF MANUFACTURERS OF METAL COMPONENTS FOR
PERMANENT AND MOVABLE PARTITIONS

1. Curtis Partition Corp., 722 Liberty Ave., North Bergen, N. J.
2. Donn Products, 700 Bassett Road, Westlake, Ohio
3. Henges Company, 2814 Locust Street, St. Louis 3, Mo.
4. National Rolling Mills, P. O. Box 205, Malvern, Penna.
5. Neslo Partitions, P. O. Box 427, Doylestown, Penna.
6. Penn Metal Co., P. O. Box 1468, Parkersburg, W. Va.
7. White Partitions Co. 56 Glenwood Ave., Boston 36, Mass.

MOVABLE PARTITION TAX CREDIT

The new 7% investment tax credit on investments in business equipment and other depreciable personal property is an important sales aid for movable partitions.

Permanent interior walls are considered structural components and therefore do not qualify for the 7% tax credit. Movable partitions are considered depreciable business property and will qualify for the credit. This pertains to partitions used in office buildings or any type of business structure.

Assuming that the cost of movable partitions for a typical office building is \$50,000 and that their useful life is 10 years (that is, it is expected that they will be used for 10 years), the amount of \$3,500 ($7\% \times \$50,000$) can be deducted from the 1964 tax bill, regardless of when during the year of 1964 the purchase is made.

In addition to the 7% tax credit, you are also entitled to depreciate the movable partitions at 20% of their cost for the first year of their purchase, no matter when during the year the purchase is made. Thus, for the movable partitions costing \$50,000, depreciation in the amount of \$10,000, for the year of purchase, can be deducted.

Further, if it is expected that the partitions will be used for 10 years, they can be depreciated at 10% for the year of purchase and thereafter until the cost, less salvage value, is recovered. In figuring the 10% depreciation, however, the amount allowed is prorated according to the month of the year in which the purchase is made.

The tax credit and depreciation picture for the first year, with respect to the movable partitions, would look something like this:

Movable Partitions, purchased 1/1/64	\$50,000.00	
Tax Credit @ 7%	\$ 3,500.00	
First Year Depreciation		
@ 20%	10,000.00	13,500.00
Basis for Yearly Depreciation		\$36,500.00
Regular Depreciation @ 10%		\$ 3,650.00

SGP 0027667

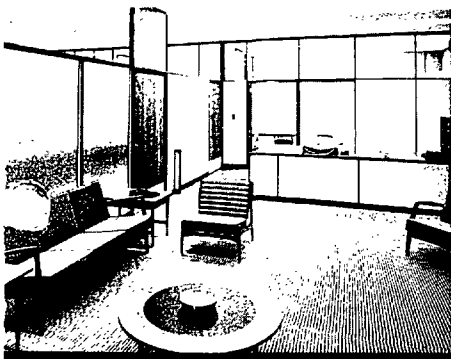
Thus: First, the taxable income is reduced by \$13,650 (depreciation of \$10,000 and \$3,650.00). Second, the tax itself is reduced by \$3,500.00 (7% tax credit).

Obviously, the purchase of movable partitions involves very substantial tax savings. This is particularly important in the case of speculative building. (Some legal opinion even indicates that this can be applied to apartment buildings as well as commercial structures. This would have to be verified on a local basis for each particular instance.)

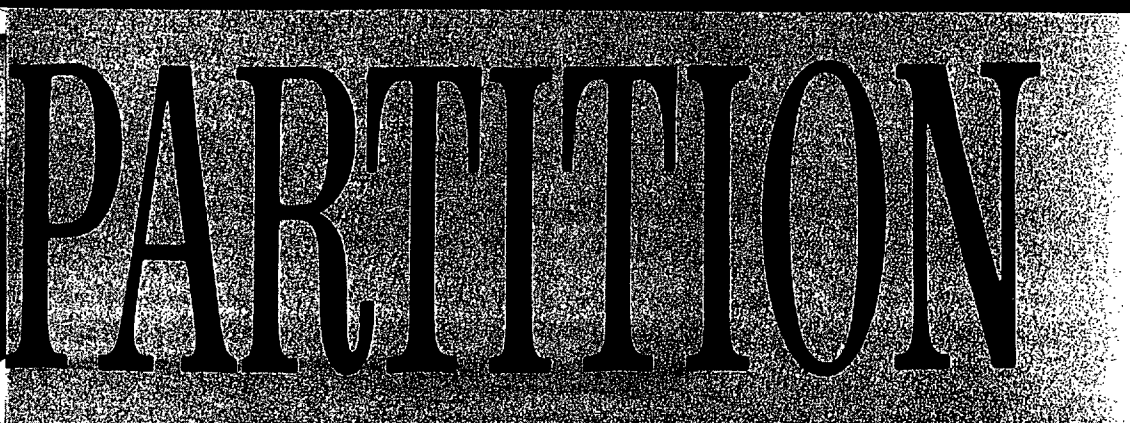
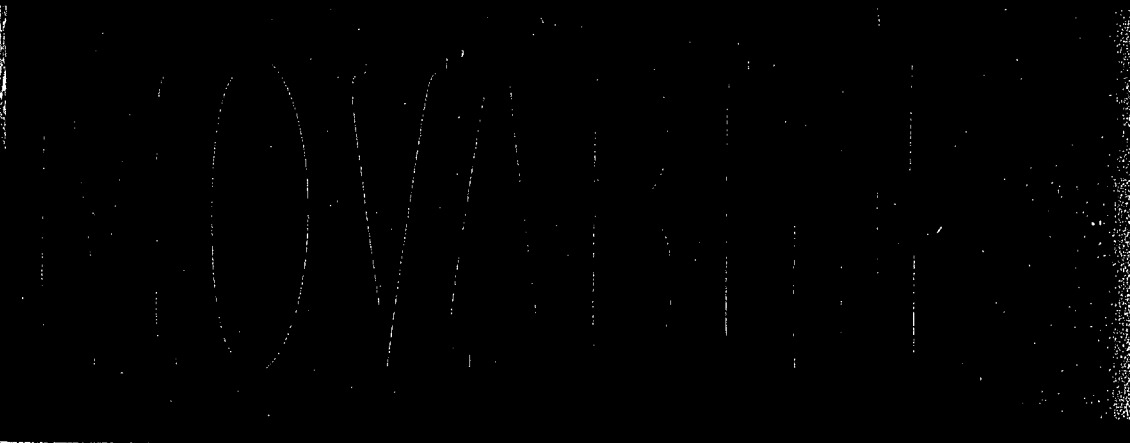
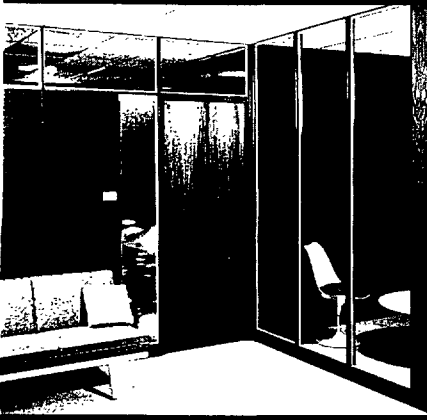
The principal argument for the use of permanent wall construction is the lower initial cost. It is now apparent that any additional cost for movable partitions over fixed walls might well be offset by the tax advantages.

It is important to remember that, in order to receive proper tax credit, the movable partitions must be billed separately to the owner. If the price is buried in the general contract, it may be difficult to prove the cost.

(NOTE: Please verify this tax information with your local tax consultant)



HIGHLANDER



SGP 0027668

D O N N

PRODUCTS, INC.

700 Bassett Road • Westlake, Ohio 44091

Area Code 216 Phone: 871-1000

HIGHLANDER

AIA FILE NO. 35-H-6



DONN HIGHLANDER

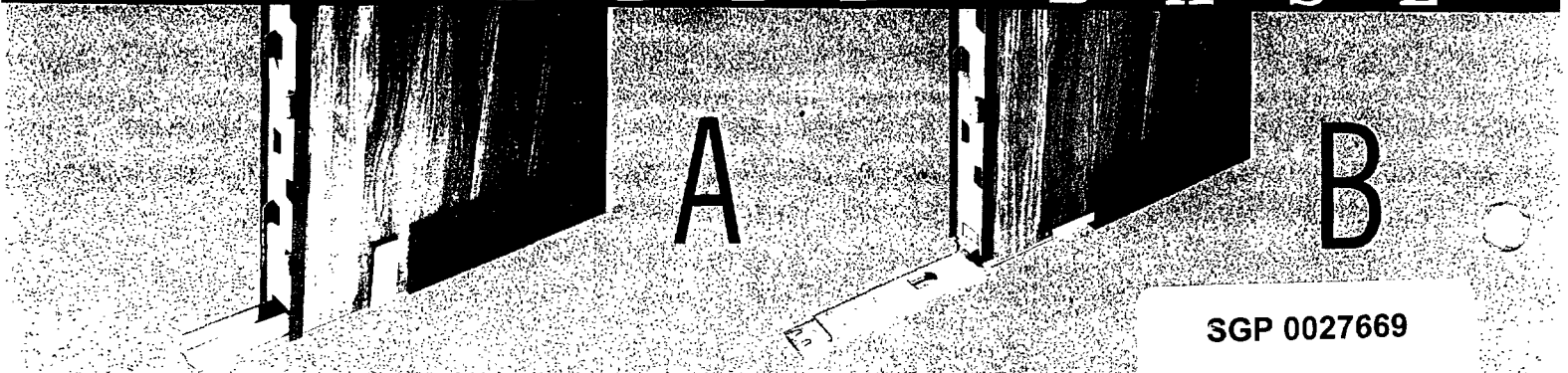
Series of

Movable Partition Systems

Floor to Ceiling – Cornice High – Rail High – Full or
Half Glazed – Infinite Variables



V A R I A B L E B A S E



SGP 0027669

The Highlander Movable Partition is a new concept of simplicity and economy, designed and engineered for those concerned with both function and beauty for interior space.

Created to allow limitless selection of module, panel size or thickness, color or texture yet allowing complete electrical accessibility through hollow construction and varied base designs.

Radically few parts function uniquely to form the structural framework and permit disassembly, relocation, interchangeability or accessibility of individual sections or panels with ease and efficiency.

The Highlander Steel Stud, the basis of the system, gives more strength at lower cost, due to its shape, than any other building material. It is a new tool for freedom of expression, long term economy, fast erection time and lifelong beauty.



C O N D I T I O N S

C

D

SGP 0027670

DESIGN DATA

When stud tracks are positioned any modular panel sections can be individually slid into place. These panels can be removed and replaced in minutes without distorting adjacent framework and assembled parts.

In contrast to ordinary sandwich panel-type partitions, the Highlander System is of hollow construction allowing ease of accessibility to mechanical and electrical devices which run free vertically between panels or horizontally in the base.

There is no one size or one type of panel that is required in the system. Panel selection in colors and textures of materials such as gypsum board or plywood in a variety of patterns and colors of the following thicknesses can be used: $\frac{1}{4}$ " , $\frac{3}{8}$ " , $\frac{1}{2}$ " , or $\frac{5}{8}$ ". Sections can be glazed with glass from $\frac{1}{8}$ " to $\frac{1}{4}$ " thickness. Panels can be varied in height and length with a maximum height of 16' and a maximum width of 4'; width restrictions depend upon panel material selected. With the 4' module an intermediate concealed structural stud is employed.

SOUND ATTENUATION

Employing a $\frac{5}{8}$ " thick gypsum board panel on a 24" module.

System "A" sound transmission class 36

System "B" sound transmission class 33

System "C" sound transmission class 28

In accordance with ASTM E90-61T and ASA designation: Z 24.19-1957. By a nationally recognized testing facility. Copies of tests available.

(The addition of a fiberglass sound blanket increases the average sound transmission loss by an average of 5 to 6 DB.)

HIGHLANDER SYSTEMS

A System "A" is both assembled and disassembled in progressive sequence. This progressive installation has proven to be the most economical manner of erection. Anchoring of the floor and ceiling tracks completely secures the partition. No separate fastening is required for panels and studs since all components interlock automatically in the system. A $2\frac{1}{2}$ " or 4" snap-on metal base or if desired rubber base may be used.

B System "B" is also assembled in economical progressive sequence and has the additional feature of complete accessibility and reinstallation of any two adjoining panels without disturbing adjacent panels. This is accomplished without damage to any components. A $2\frac{1}{2}$ " or 4" snap-on metal base or if desired rubber base may be used.

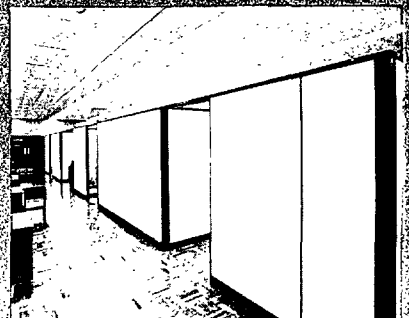
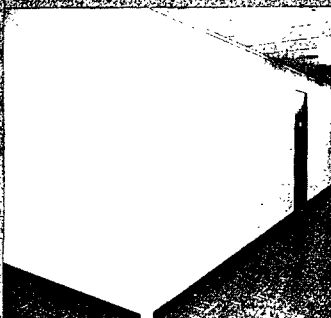
C System "C" provides the same complete accessibility as System "B". However, the entire system is raised three inches to provide an integrated and unrestricted electrical raceway in the base. The raceway is accessible through a 4" snap-on metal base which is easily removed.

D System "D" is rail high or rail high glazed. Available with open or closed base. The components are similar to System "A".

Floor anchors are adjustable to one inch for leveling.

This system is aesthetically harmonious and completely compatible in appearance with the other systems.

SGP 0027671



SPECIFICATIONS

Scope of Work: Furnish and install Donn Highlander series of partitions as manufactured by Donn Products, Inc., as indicated on plans and/or elevations as follows:

Shop Drawings: Submit in triplicate drawings showing the complete floor plan with typical details, elevations, special conditions, glass type, panel materials, and color of finish. Shop drawings shall be approved by architects before proceeding with the work.

General: Partitions shall be skeletal-type roll formed steel structural frame with inserted panels or glass. Net thickness shall be $2\frac{3}{4}$ " with hollow core.

Module: The partition module is a function of the spanning characteristics of the panel material selected. Longer modules shall be achieved with interior concealed studs. The maximum module recommended is $48\frac{1}{8}$ ", with a standard 48" panel.

STEEL SYSTEM

Studs: The exposed steel stud shall be a minimum metal thickness of .030". The exposed flange shall be $\frac{3}{4}$ " wide. The stud shall be provided with tabs punched from the web at a distance from the flange of ($\frac{1}{4}$ ", $\frac{3}{8}$ ", $\frac{1}{2}$ " or $\frac{5}{8}$ " depending on the panel thickness). Tab support behind the panel shall be 8" on center.

Stud Track System "A": Shall be minimum steel thickness of .021". Provide suitable anchorage at a minimum of 2' on center.

Stud Track System "B" and "C": Shall be minimum steel thickness of .059". The track shall be punched with a depressed tongue shape to allow for anchorage to floor and ceiling, insuring the installation of anchors below the surface of the track and providing a smooth surface for the movement of the panel.

Corner Posts all systems: Shall be formed from .030" steel and shall be flanked on each side by a stud secured by bending the stud tabs.

Snap-In Glazing Mold all systems: Shall have a minimum thickness of .021" steel. The molding shall be installed flush with the flange edge of the stud into which it snaps. The molding shall surround all four sides of the opening to be glazed.

Glazing: Standard glazing mold shall be gray rigid vinyl to accommodate $\frac{1}{8}$ " to $\frac{1}{4}$ " glass or panel material. Molding shall fit in the recess provided by the glazing mold herein before specified.

Electrical Raceway System "C" only: Shall be formed by two parallel tracks held apart by spacers. This raceway shall form an accessible raceway for wiring.

Door Frames: 16 or 18 gauge cold rolled steel flush design $2\frac{3}{4}$ " width, available in all sizes. Specify hinge and strike preparation requirements.

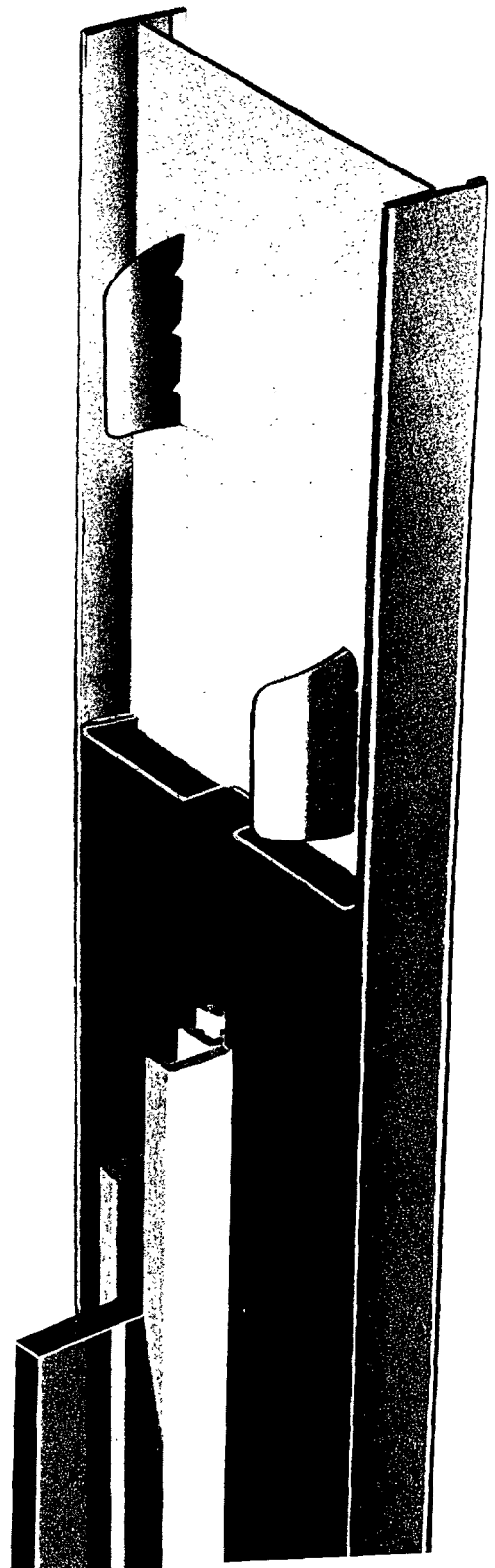
Paint Finish: All exposed surfaces shall be primed and finished with a hard oven baked synthetic enamel of manufacturer's standard color. (See color chart)

ALUMINUM SYSTEM

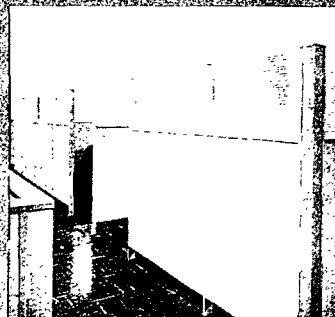
The following components are available to provide a complete "A" type system in Aluminum. These components are 6063-T5 aluminum etched and anodized.

- Snap on trim for steel studs
- Ceiling trim for full height partitions
- Cornice cap for cornice high partitions
- Base available in $2\frac{1}{2}$ " or 4" height
- "F" corner molding

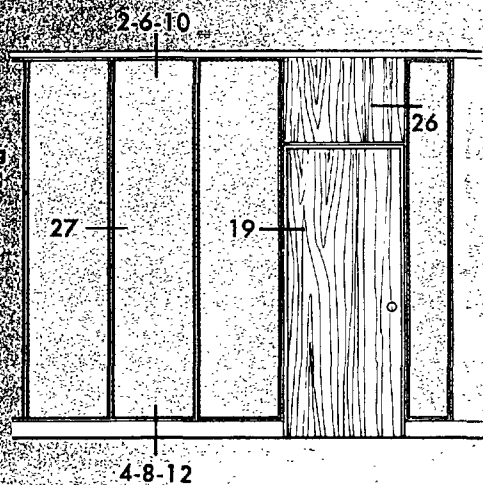
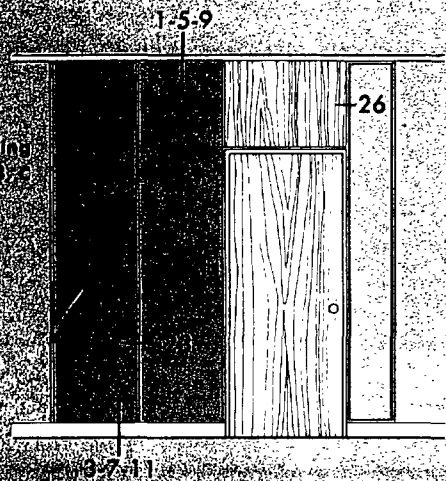
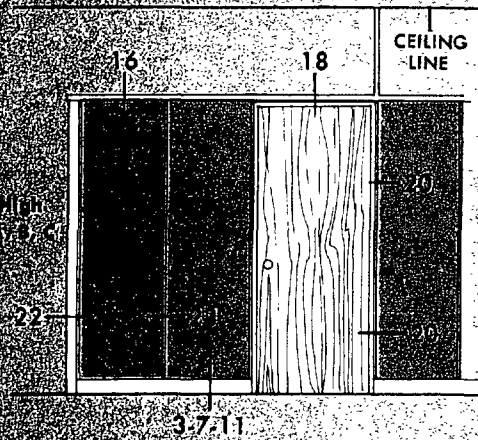
Erection: Partitions shall be installed in a workmanlike manner. Joints between joining members or adjoining members shall be perfectly aligned and close fitting with all vertical members. All work shall be guaranteed for a period of one year against defective materials and workmanship.



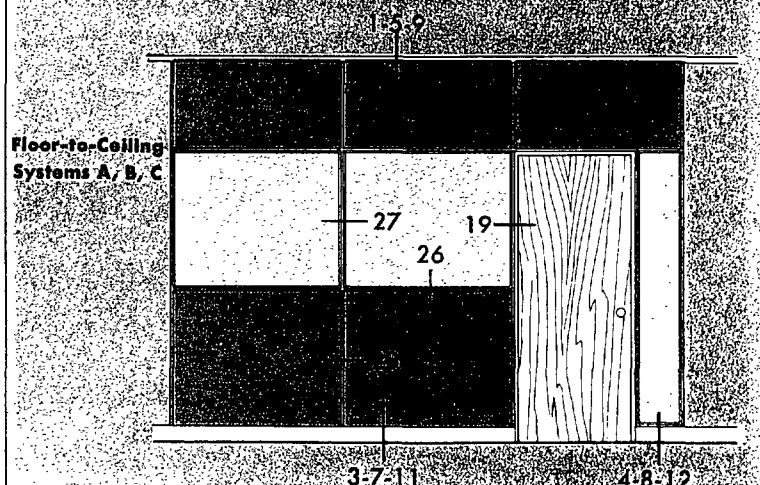
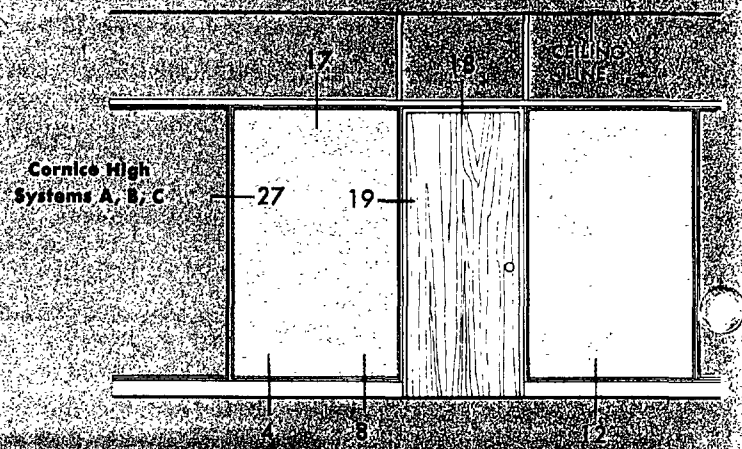
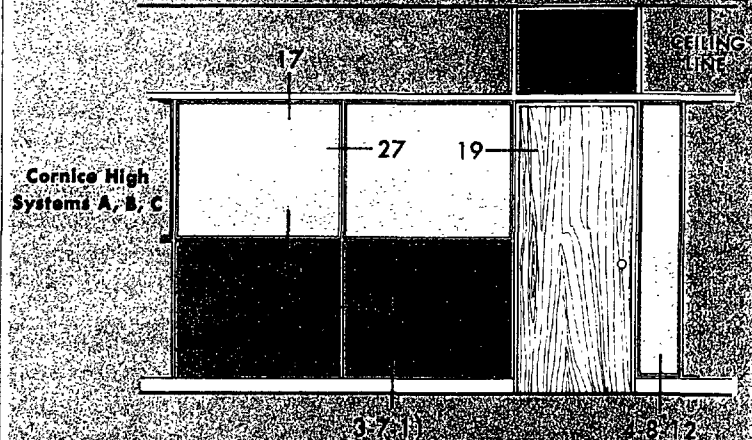
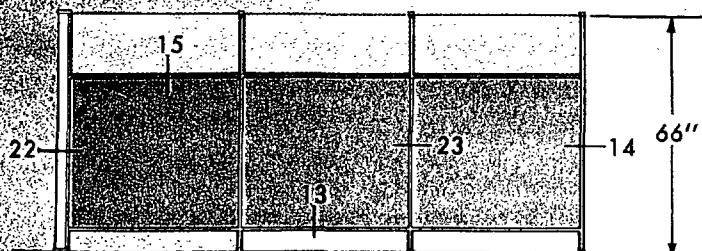
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INFINITE VARIABLES



Glazed Rail System D

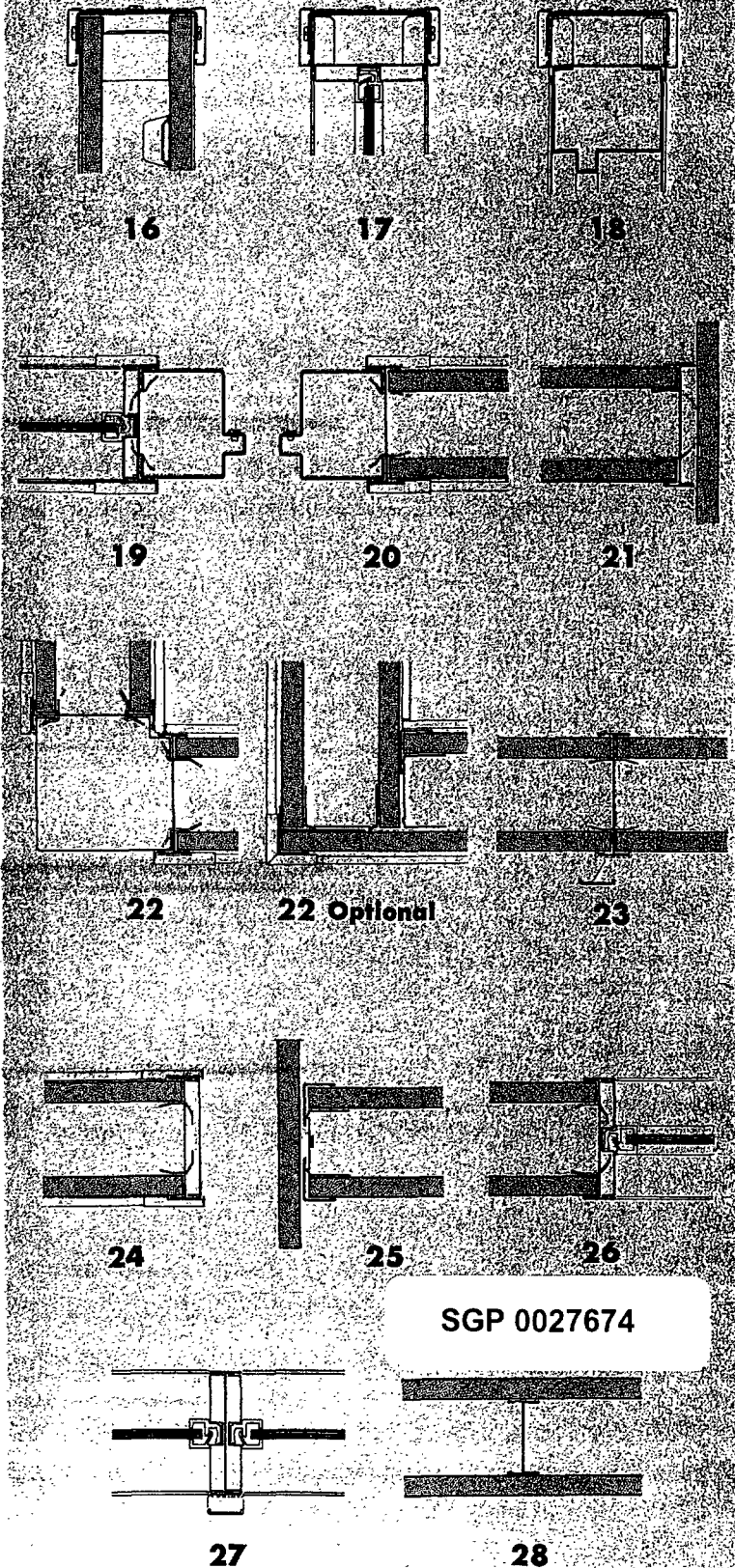
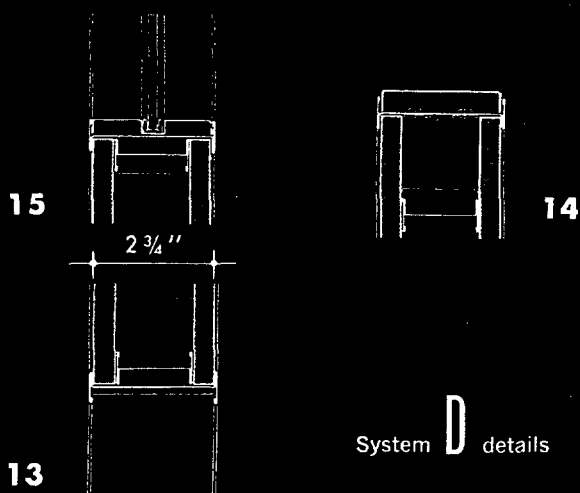
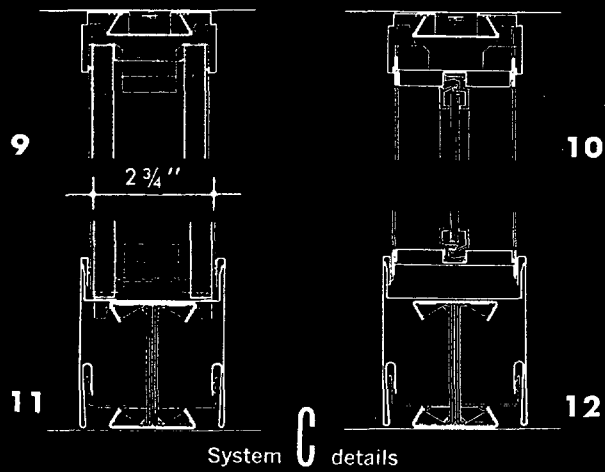
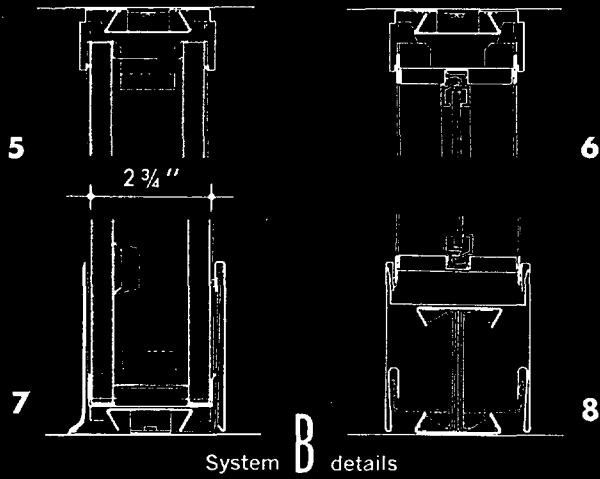
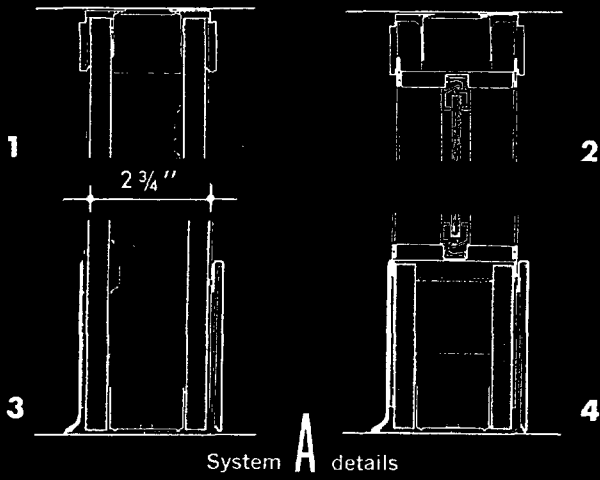


Rail High System D



SGP 0027673

*Additional details
common to all
systems.*



Single unit responsibility is assured by utilizing gypsum wallboard as manufactured by Bestwall Gypsum Company.



SUSPENSION SYSTEMS

SCREW-TYPE STEEL STUDS

PLASTER
AVAILABLE STEEL STUDS

CEILINGS AND WALLS

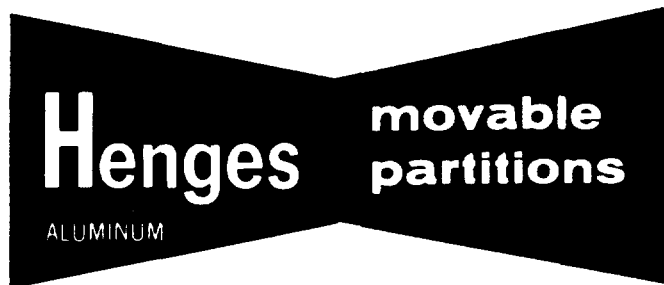
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DONN
PRODUCTS, INC.

700 Bassett Road • Westlake, Ohio 44091

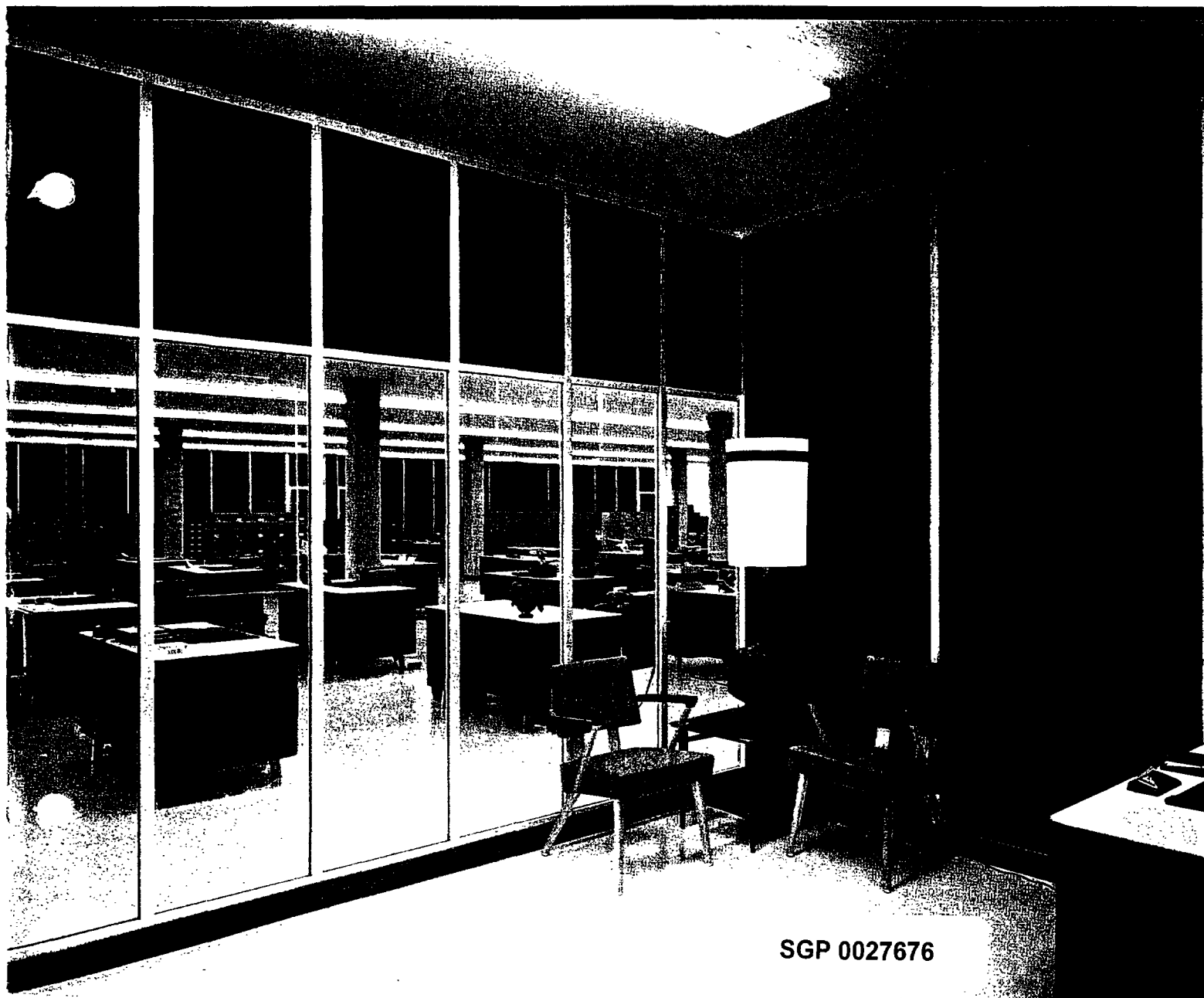
Area Code 216 Phone: 871-1000

VERSATILE



PARTITION WALLS

MANUFACTURED BY  HENGES COMPANY, INC., ST. LOUIS, MISSOURI 63103



SGP 0027676



HENGES COMPANY, INC.

ADVANTAGES

ATTRACTIVE—Styled to fit any decor. Blend or contrast by selecting from the widest range of colors, textures and materials.

LOW COST—Unique construction makes this completely movable and reusable partition the most economical wall available.

MOVABLE—Easily moved and reused. Henges Movable Partitions can be relocated quickly and often with few or no additional parts.

FUNCTIONAL—Improves office efficiency and morale by creating private and semi-private work areas. Organizes floor space for maximum effectiveness.

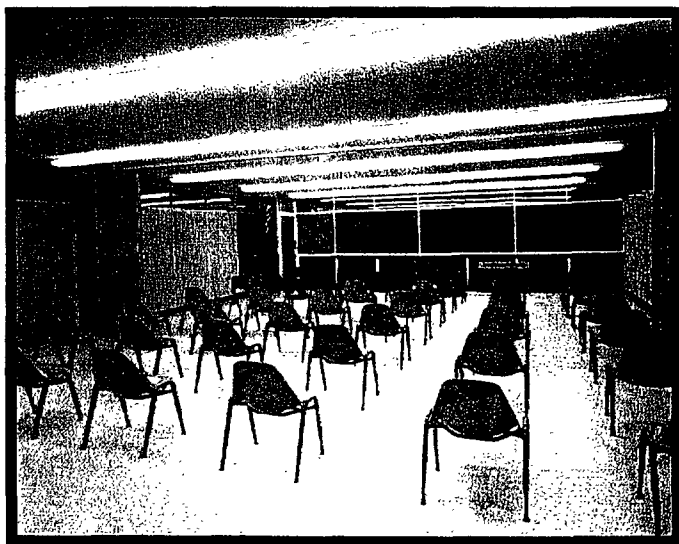
VERSATILE—Unlimited choice. Modules, colors, materials, glazing and heights can all be selected with complete freedom of design.

EASE OF INSTALLATION—The usual clutter and disturbance is eliminated, providing earlier occupancy. In existing buildings, installations are often made during normal office hours without upsetting routine.

IMMEDIATE DELIVERY—Generally the only partition stocked by local distributors and available for prompt installation. Local warehousing is supported by a large factory inventory.

LOCAL SALES & SERVICE—There are more than 90 distributors who sell and install these versatile partitions. These responsible, well known local companies are factory trained. Write for the name of the Representative in your area.

EXPERIENCE—Since 1932, the Henges Company has served the building industry and maintained a reputation of quality and integrity.



STEEL



Steel partition members are manufactured of high strength electrolytic zinc coated steel by the latest precision roll forming processes.

ALUMINUM



Functional design—accurate fabrication—satin anodizing . . . All are part of the natural beauty and workability of this new system utilizing architectural grade 6063-T5 aluminum alloy.

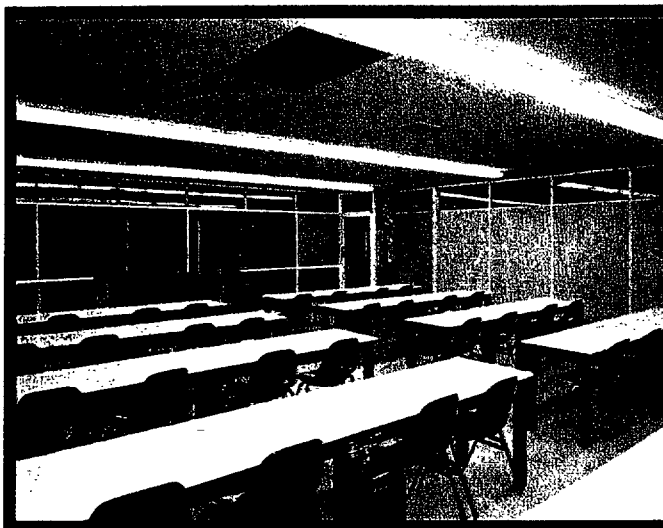
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VERSATILE

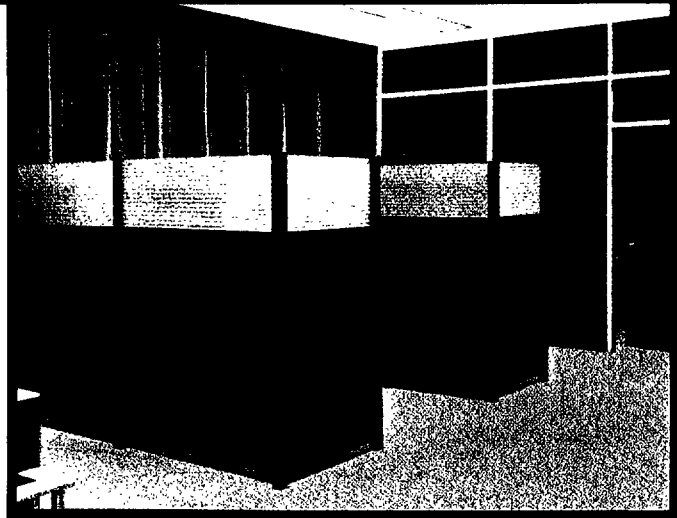
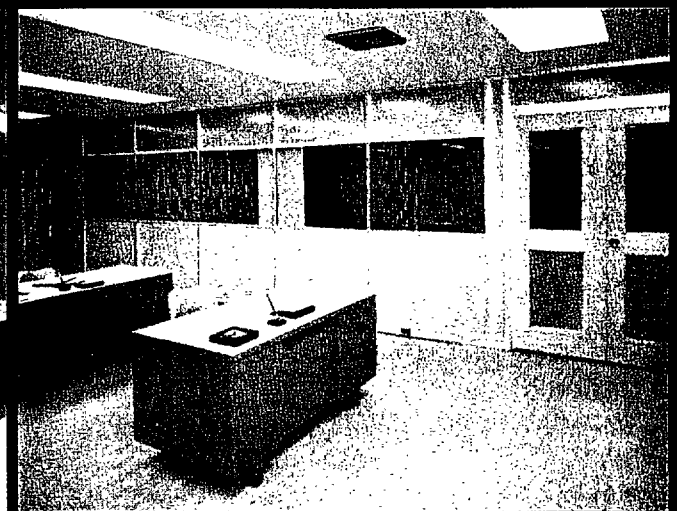
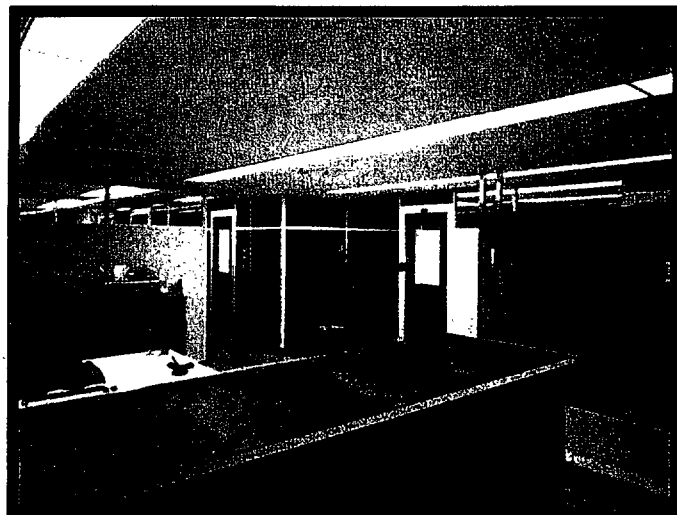
Henges
ALUMINUMmovable
partitions

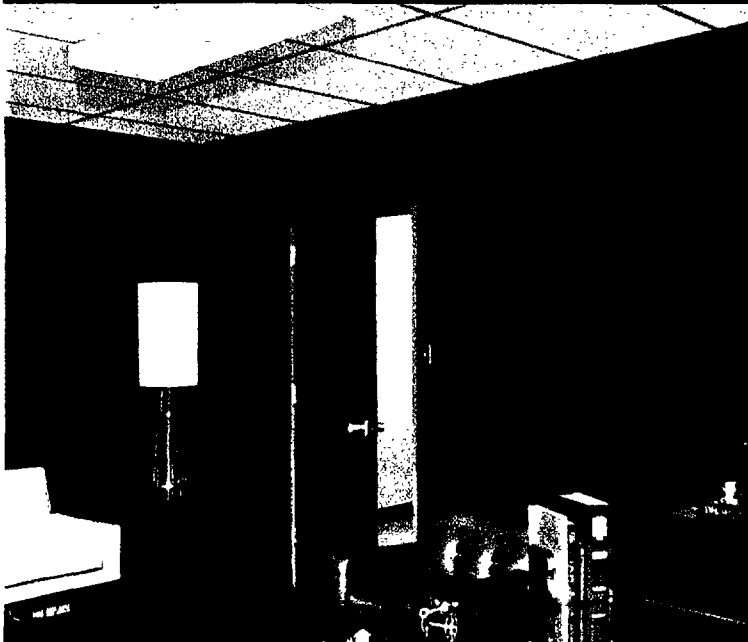
PARTITION WALLS

Versatility . . . the key word in Henges Movable Partitions. Changeable, movable walls with an unlimited choice of materials, finishes and dimensions.



Known for years by the trade mark, Mova-Wall, Henges Movable Partitions are now more versatile than ever. The same fine quality and engineering found in our traditional steel system is also available in our aluminum system.





PANEL MATERIALS

Almost any material can be selected as a panel skin. Included are wood veneers, steel, gypsum board, cement asbestos, high-pressure laminates, hardboard, aluminum, plywood and fiberglass. A wide choice of panel cores is also available with honeycomb and gypsum board being used most often.

FINISHES

Pre-finished materials, such as vinyl covered gypsum board, melamine faced hardboard and plastic finished cement asbestos board, are recommended. In addition, trim and panels can be furnished in any color factory applied baked enamel. Partition trim, as well as panels, are available in five different wood grains of cherry, oak, walnut, and maple. Partitions can also be supplied ready for field painting on the job.

PANEL CONSTRUCTION

A. A specially designed perforated pattern ($\frac{3}{32}$ " holes on $\frac{1}{4}$ " staggered centers) is used on one or both sides. Glass fibre blanket absorbs sound and when perforated on both sides, a gypsum board baffle is used to stop transmission.

B. 20 ga. stretcher leveled steel, with welded perimeter channels and honeycomb core, makes exceptionally strong, light weight panels.

C. Melamine faced hardboard is laminated to honeycomb core for low cost, light weight panels, ideal for most wall conditions.

D. Extremely economical and incombustible, $\frac{1}{2}$ " thick gypsum board (plain or vinyl covered) is bonded to a center core of gypsum strips. Sound attenuation is 41 db. in speech privacy range.

E. Custom panels, such as cork board, chalk board or peg board, are often made up for special use in schools, offices and government installations.

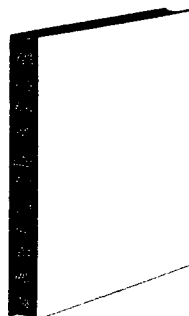
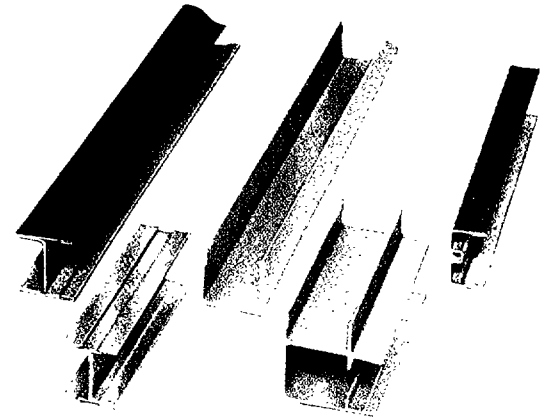
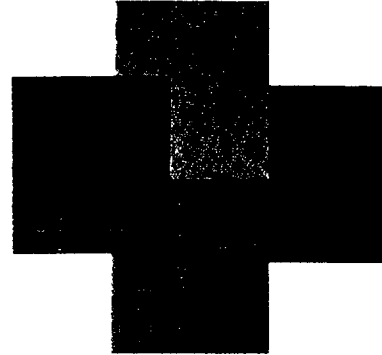
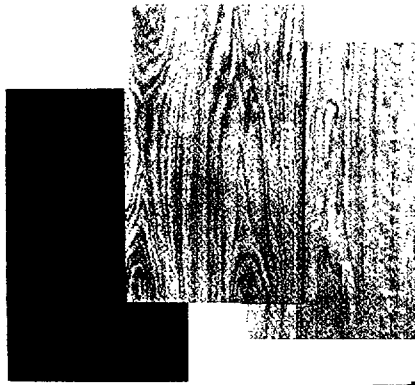
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VERSATILE



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PARTITION WALLS

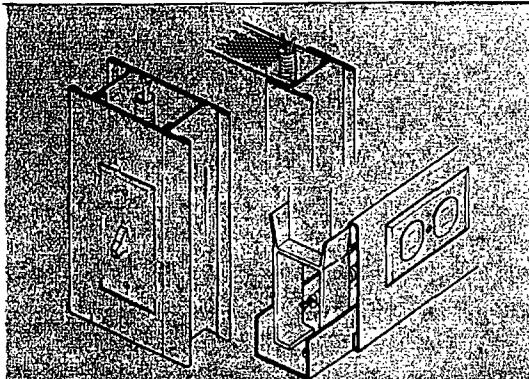


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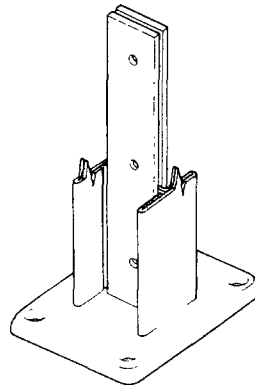
HENGES COMPANY, INC.

SPECIFIC DETAILS



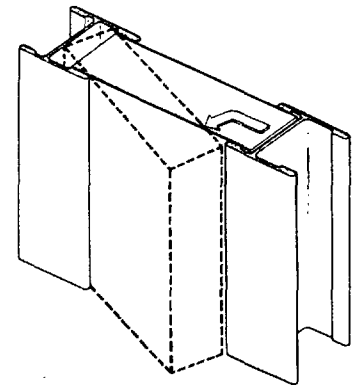
WIRING

Outlets easily installed in base.
Vertical wiring installed in panels,
or in "wiring stud."



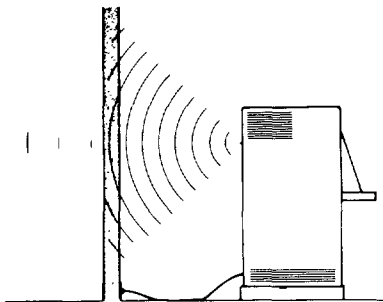
RAILING ANCHOR PLATE

Heavy duty, unobtrusive; Permits
unlimited runs of otherwise unbraced
railing.



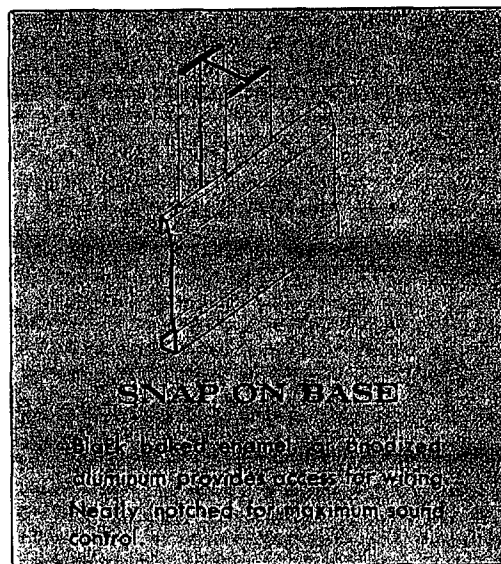
OFFSET STUD

Allows removal of individual panel,
without moving adjacent panels.



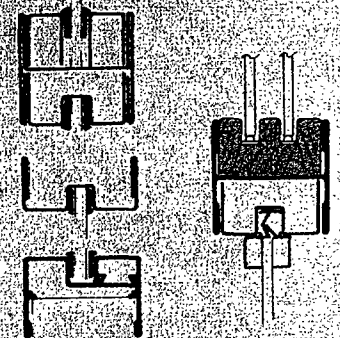
SOUND

Designed and engineered for best
possible acoustical benefit. Inde-
pendent laboratory tests furnished.



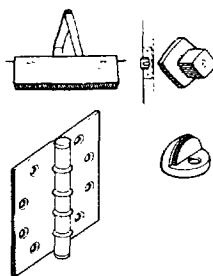
SNAP ON BASE

Black painted aluminum provides access for wiring.
Neatly notched for maximum sound
control.



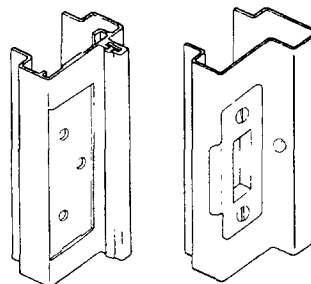
GLAZING

Depends on requirements. Flush
narrow mullions, or snap in type of
rigid vinyl or aluminum.



HARDWARE

Most styles and types available in
industry standards. "Furnished by
others" if desired.



DOORS AND FRAMES

Fully factory mortised frames for
wood or hollow metal doors.

SGP 0027681



SHADOWLINE STUD

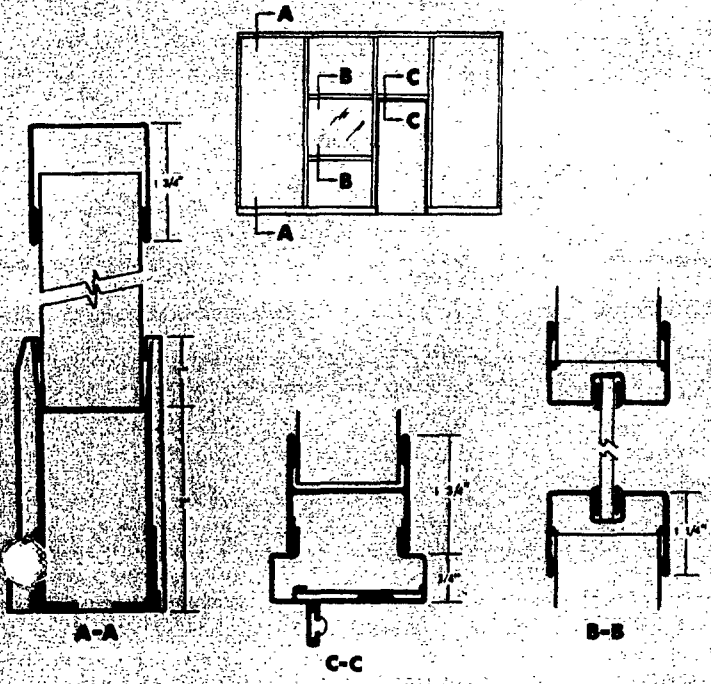
Decorative vinyl insert accentuates
color scheme. Any color available.

VERSATILE



GENERAL DETAILS

CEILING HIGH

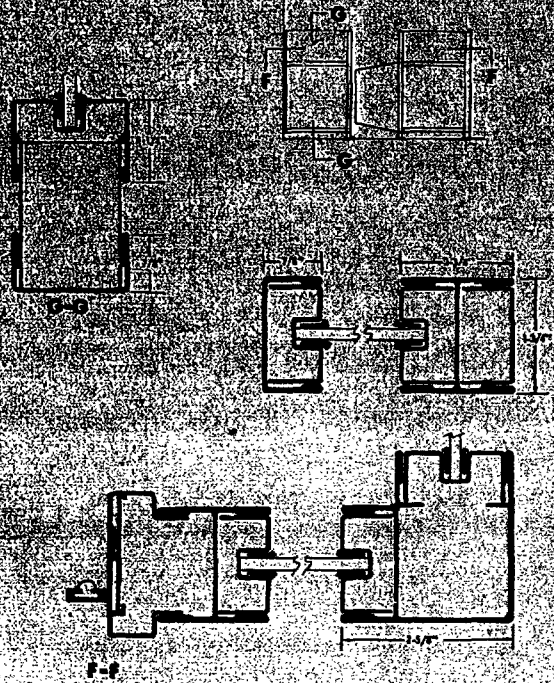


ALUMINUM DETAILS

CORNICE HIGH

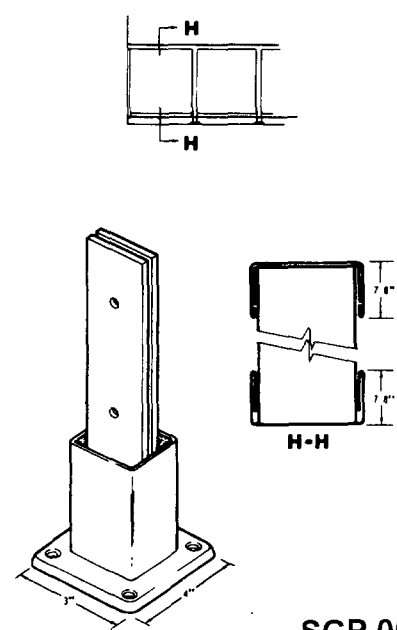


GLAZED RAIL



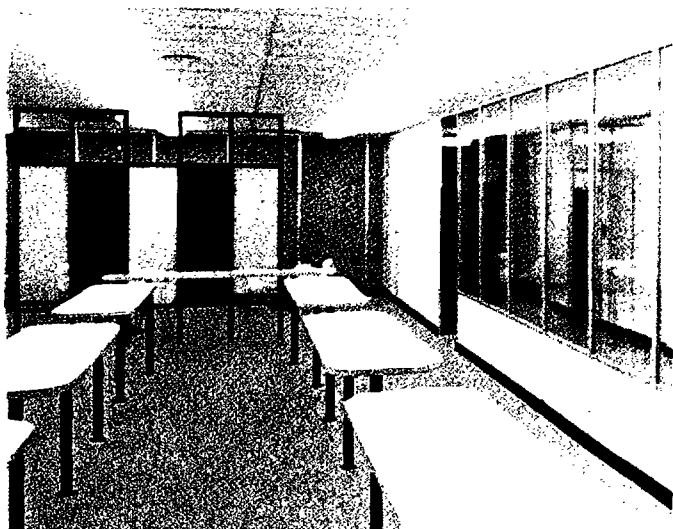
ALUMINUM DETAILS

PLAIN RAIL



STEEL DETAILS

SGP 0027682



RECENT INSTALLATIONS

Veterans Hospitals	Colgate-Palmolive Co.
Martin Aircraft	Monsanto Chemical Co.
General Services Administration	McDonnell Aircraft Corp.
Southwestern Bell Telephone	National Biscuit Company
United States Army	United States Air Force
General Dynamics	International Paper Co.
Delta Air Lines	Olin-Mathieson Chemical Corp.
University of Georgia	Eastern Air Lines
Coca-Cola	Remington Rand, Inc.
Sun Oil Company	Mead Corp.
American Red Cross	B & O Railroad
Pacific Telephone Co.	Proctor and Gamble
American Can Company	University of Missouri
Allegheny Ludlum Steel Corp.	Corps of Engineers
General Electric Co.	

DISTRIBUTORS IN PRINCIPAL CITIES

SPECIFICATIONS

ALUMINUM SYSTEM

GENERAL—Furnish and install movable aluminum partitions as manufactured by Henges Company, Inc., St. Louis, Missouri. Partitions shall be of the flush panel type with panels $1\frac{1}{16}$ " thick. Trim shall not protrude more than $\frac{1}{8}$ " from panel.

MATERIALS—Partition trim shall be Type 6063-T5 extruded aluminum. Base shall be flat, snap-on, with no exposed screws, and neatly notched at all posts.

PANELS—Panels shall be $1\frac{1}{16}$ " thick and constructed as follows: (select type from page 4). Independent laboratory sound transmission tests shall be furnished.

DOORS & FRAMES—Frames for $1\frac{3}{8}$ " doors shall have 1 pair $3\frac{1}{2}$ x $3\frac{1}{2}$ butts. Frames for $1\frac{3}{4}$ " doors shall have $1\frac{1}{2}$ pair $4\frac{1}{2}$ x $4\frac{1}{2}$ butts. All butts and hardware to be fully mortised. Doors shall be (wood, hollow steel).

GLASS—Glass shall be (type and thickness) and vinyl gasketed both sides. Stops will have no exposed screws.

FINISHING—Exposed aluminum shall be satin anodized. Panel finish is specified in panels section.

STEEL SYSTEM

GENERAL—Furnish and install movable partitions as manufactured by Henges Company, Inc., St. Louis, Missouri. Partitions shall be of the flush panel type with panels $1\frac{1}{16}$ " thick. Trim shall not protrude more than $\frac{1}{8}$ " from panel surface.

MATERIALS—Partition trim shall be minimum 20 gauge. Structural members, such as stud, corner post, cornice, shall be minimum 18 gauge. All steel parts shall be roll formed of electrolytic zinc coated steel. Base shall be prefinished black baked enamel and neatly notched at all posts.

PANELS—Panels shall be $1\frac{1}{16}$ " thick and constructed as follows: (Select type from page 4). Independent laboratory sound transmission test shall be furnished.

DOORS & FRAMES—Frames for $1\frac{3}{8}$ " doors shall be flush with other trim, 16 gauge, and have 1 pair $3\frac{1}{2}$ x $3\frac{1}{2}$ butts. Frames for $1\frac{3}{4}$ " doors shall have $1\frac{1}{2}$ pair $4\frac{1}{2}$ x $4\frac{1}{2}$ butts. All butts and hardware to be fully mortised. Doors shall be (wood, hollow steel).

GLASS—Glass shall be (type and thickness) and vinyl gasketed both sides. Stops will have no exposed screws.

FINISHING—Partition trim shall be (field painted, baked enameled, wood grained to match panels). Panel finish is specified in panels section.

SGP 0027683



NESLO CLIP-GRIP

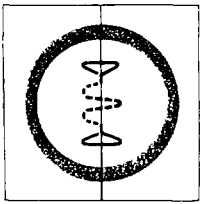
MOVABLE
PARTITION
SYSTEMS

decorative ■ flexible ■ economical ■ durable

BESTWALL

NESLO MANUFACTURING CORP. DOVER, PENNSYLVANIA

SGP 0027684



You can space divide economically with

CLIP-GRIP Movable

...the functional approach to partitioning!

THE BEAUTY of prefinished HARDBOARD products, WOOD GRAINED plywoods, prefinished GYPSUM BOARD products are only a few of the many facing materials which combine to afford the functional and aesthetic qualities of the FLUSH and PANEL Movable Systems. You select the materials which best suit your requirements.

NO WAITING for pre-engineered parts or panels. Clip-Grip Partitions are designed to be functional and interchangeable without special tools.

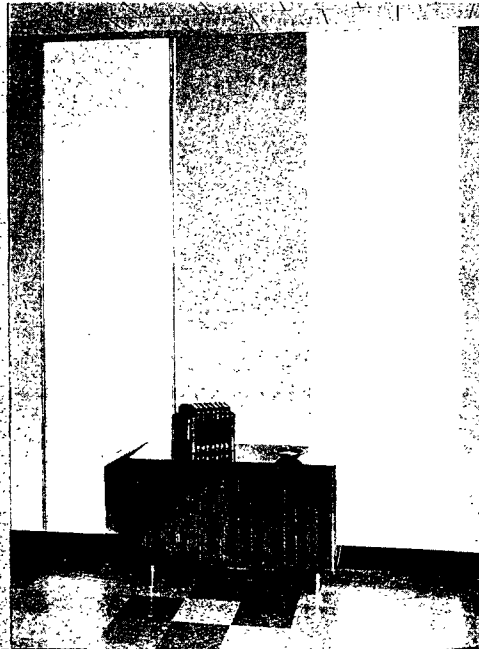
COMPLETE ACCESS to any point within the partition without the necessity of demounting adjoining panels.

flush movable

The slim TIFFANY design of the Flush Movable system permits distinctive partitioning. The combination of satin finished anodized aluminum or prepainted baked enamelled mouldings together with your selected facing materials, combine to establish the great popularity of this system.

ALL FRAMING COMPONENTS ARE INTERCHANGEABLE WITH BOTH THE PANEL AND MONOLITHIC SYSTEMS.

A CLIP-ABLE SYSTEM



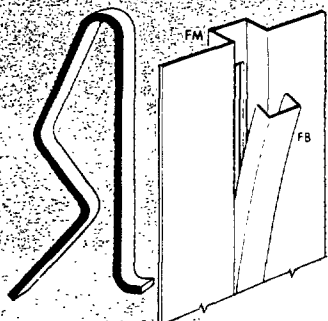
panel movable

A CONTEMPORARY panelled look is the attractive appearance of this completely salvable system. Economy is the result of simple design and a minimum of parts creating ease of construction as well as re-use. Prepainted as well as aluminum mouldings are available for Panel Movable System.

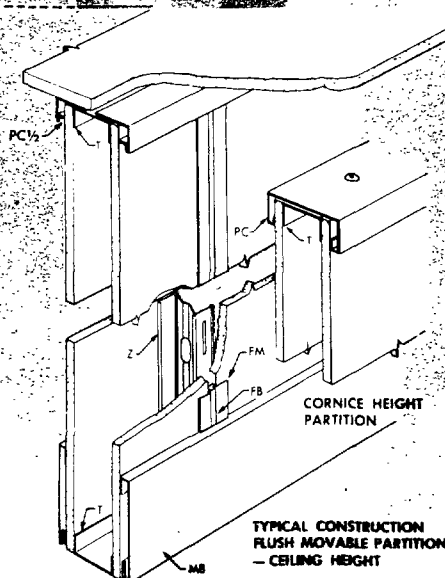
ALL FRAMING COMPONENTS ARE INTERCHANGEABLE WITH BOTH THE FLUSH AND MONOLITHIC SYSTEMS.

A CLIP-ABLE SYSTEM

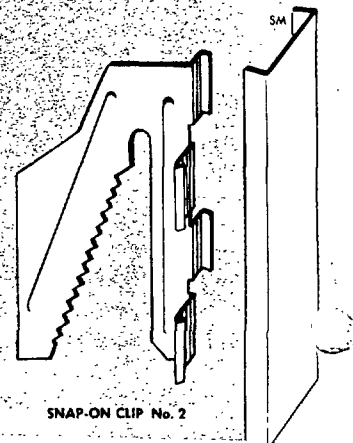
Tiffany



FLUSH CLIP No. 3



Contemporary



SNAP-ON CLIP No. 2

SGP 0027685

Partitions

NESLO "Q-Z" (Quiet Zone) PARTITION – **THE HIGHEST SOUND TRANSMISSION LOSS** in movable partitioning. Available to you at an extremely low cost. A sound attenuation of 45 dbs. Conclusive test data available. Tests based on a complete 9' x 14' partition, from a recognized Testing Laboratory.

NO WAITING FOR SPECIALISTS. Partition costs for labor and materials are fixed. Take-down and re-erect is accomplished quickly and economically with components designed for inter-changeability.

- **CLIP-ABLE, SIMPLE AND EFFECTIVE**
- **DESIGNED STRENGTH** (for partitions to 24'-0")
- **REQUIRES NO TOP FILLER CONSTRUCTION**
- **TRULY MOVABLE** (for offices, schools, labs, industrial plants)
- **CAVITY WALL CONSTRUCTION** (to accommodate all services economically)
- **NON-PROGRESSIVE CONSTRUCTION**
- **BEST REDUCTION IN SOUND TRANSMISSION** (45 dbs.)
- **SALVABLE AND RE-USABLE**
- **WALL FURRING SYSTEM** (wall linings to match or contrast partition decor)

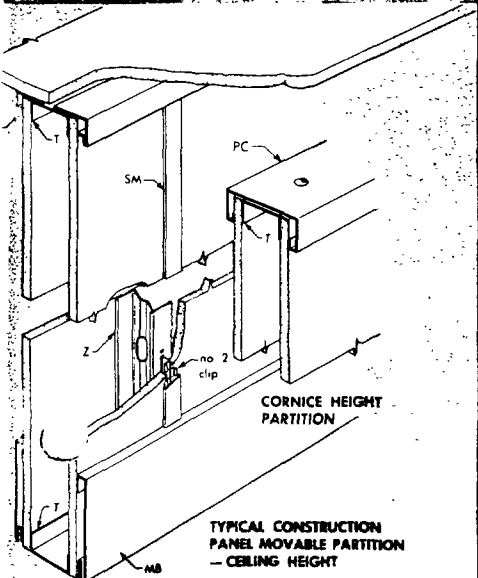
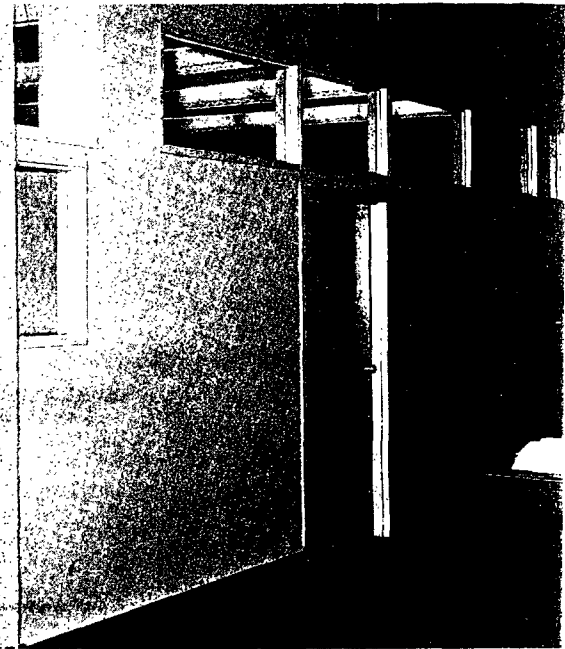


monolithic construction

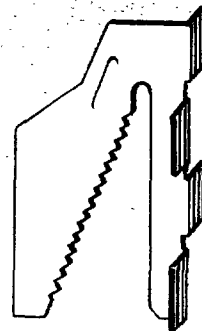
The finest in drywall construction. Elimination of the ever present problem of nail pops and cracking through the use of finely engineered studs and clips. A truly monolithic surface through positive attachment.

ALL FRAMING COMPONENTS ARE INTERCHANGEABLE WITH BOTH THE FLUSH AND PANEL SYSTEMS.

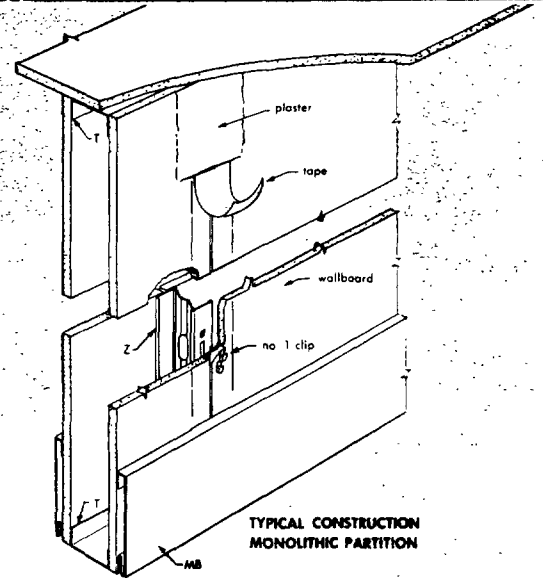
A CLIP-ABLE SYSTEM



Greclan

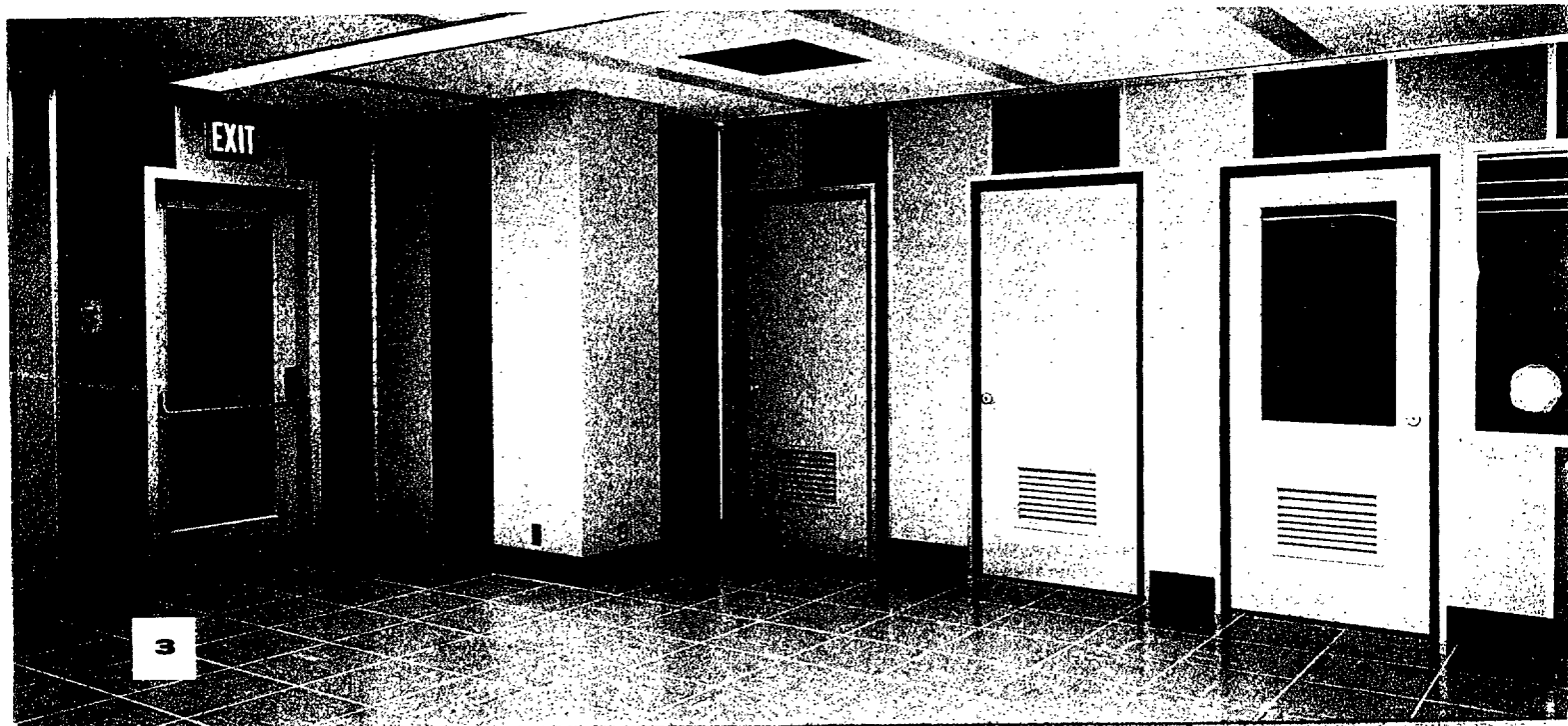
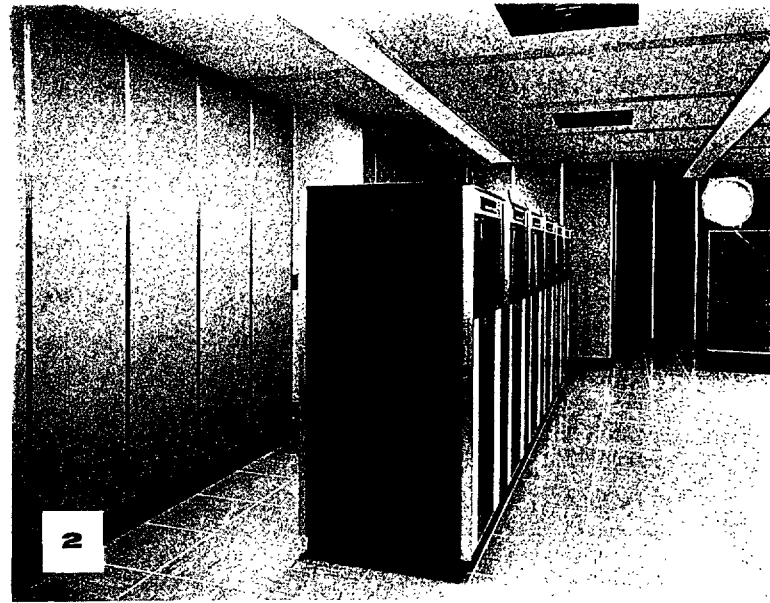
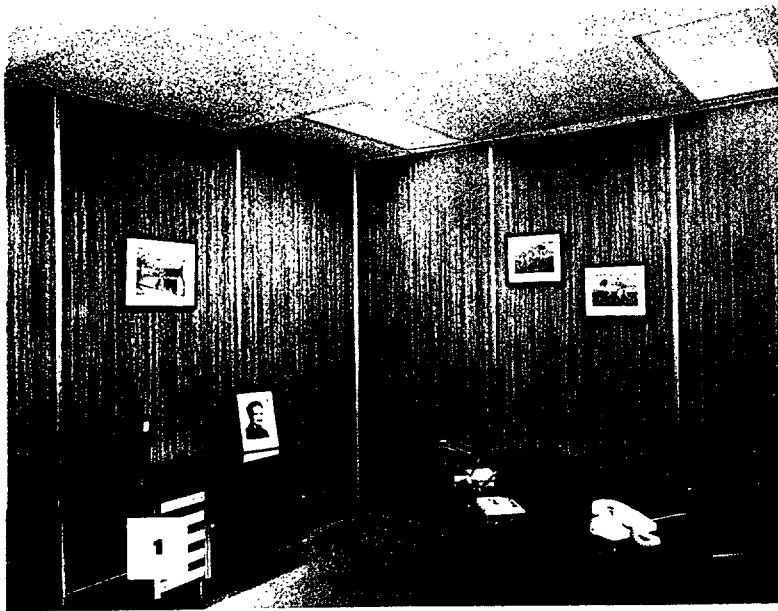


DRYWALL CLIP No. 1



SGP 0027686

NESLO MANUFACTURING CORP.



typical installations:

- 1.** Executive Office
- 2.** Computer Lab
- 3.** Lobby

CLIP-GRIP MOVABLE PARTITIONS are engineered to afford complete design freedom for offices, industrial plants, schools, hospitals, banks, motels and hotels.

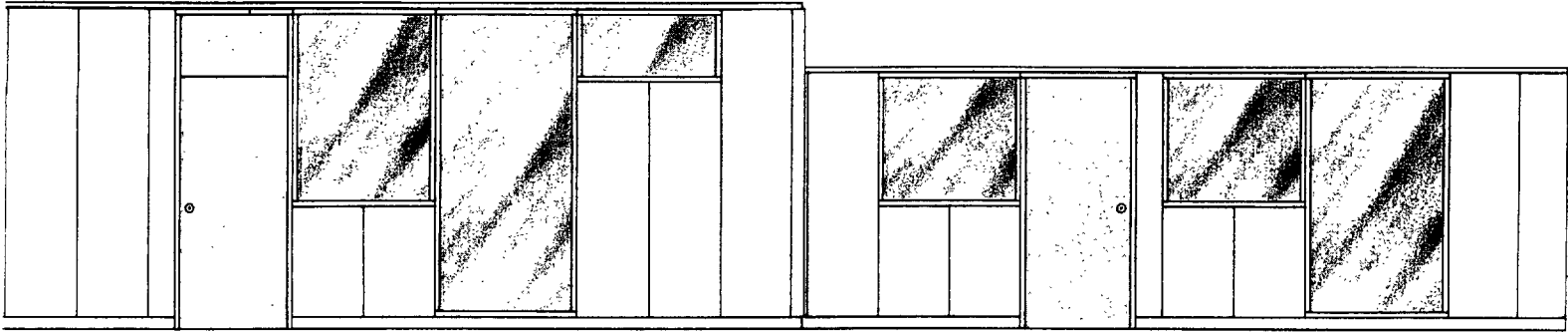
Also available: Bank Rail, Bank Screen, Wall Furring and ALL Glass Screen

For more information, contact:

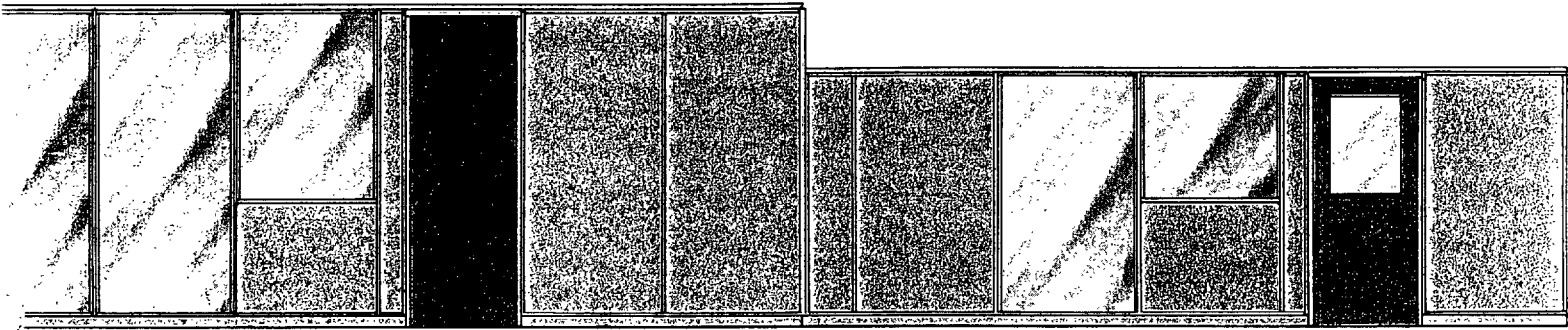
SGP 0027687

your local franchised Distributor-Applicator

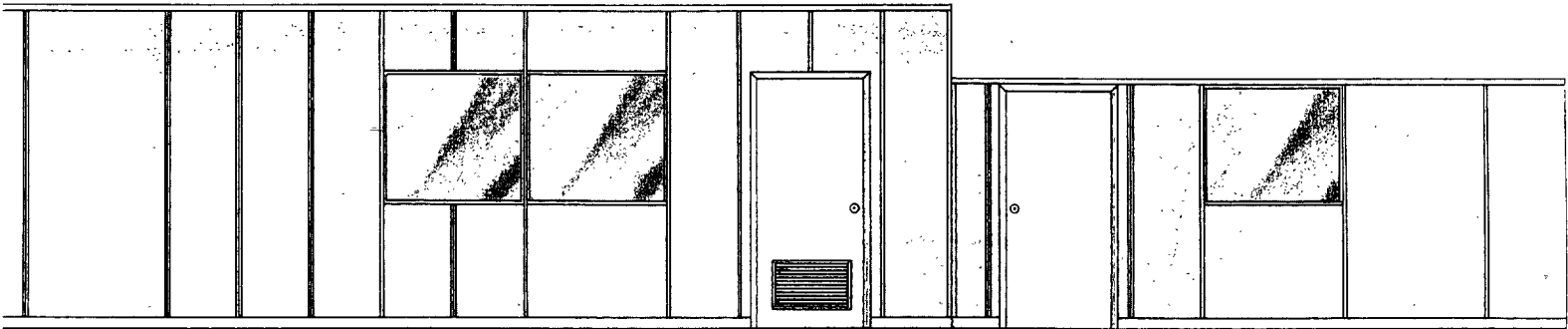
Penmetal movable partitions



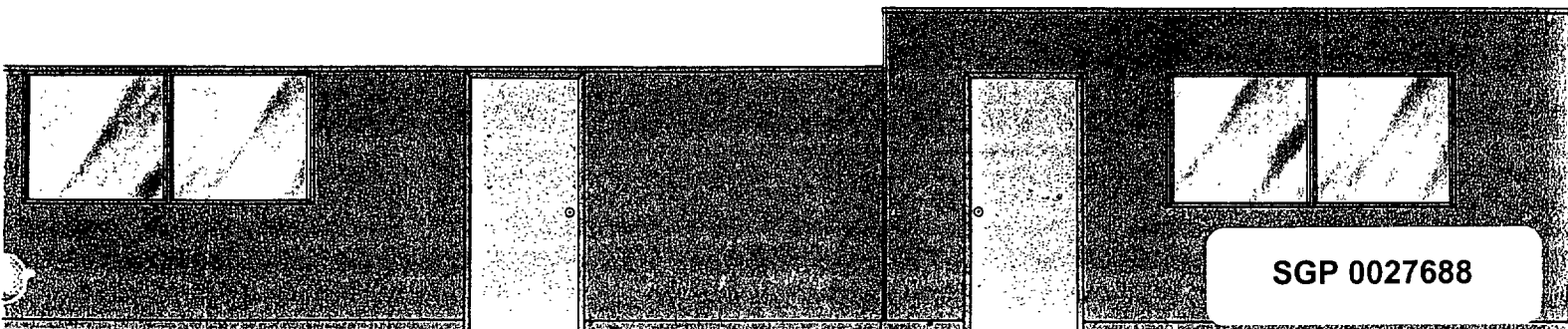
FOUR OUTSTANDING WALL SYSTEMS



OFFERING FULL FREEDOM OF DESIGN



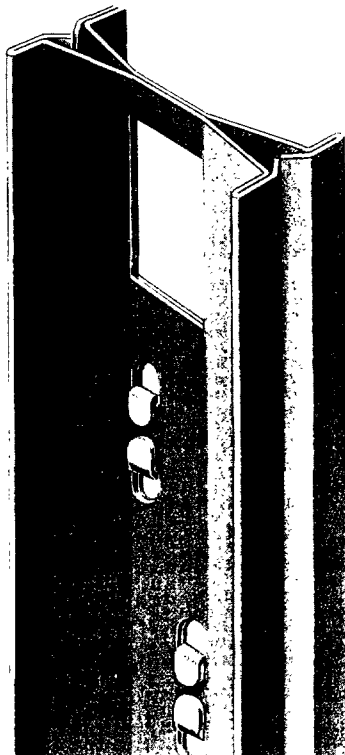
IN FOUR DIFFERENT PRICE RANGES



SGP 0027688

PENN METAL COMPANY, INC., PARKERSBURG, W. VA.

The Penmetal concept of total movability



Maybe you've noticed how complex movable partitions have become over the years; to the point where most of the movability has been over-designed right out of the systems. The carefully engineered simplicity behind Penmetal movable partitions is no accident. It is *built in* to effect substantial savings in both time and money during initial installation and all subsequent relocations as well.

All Penmetal partitions are designed around a Mono-Modular panel dimension. Penciline® steel partitions employ a panel width of 24" throughout. Penwall, Mark II and Kwik-Zip† utilize panels of 24" or 48" in width. All door units are 48" wide (regardless of actual door width within the unit) to provide complete interchangeability. Three-way and four-way intersections may be at any point without regard to joint locations.

As a result, virtually no odd-size panels are required. Future moves can generally be accomplished with the materials at hand, and changes can be made easily—even during the course of erection—without the necessity for new, special panels.

ONLY PENMETAL OFFERS

- Four proven partition systems.
- Four distinct price ranges.
- Unlimited choice of panel materials.
- Most effective sound control in the industry.
- Instant accessibility to wiring and utilities.
- Relocation with absolutely no material loss, through use of unique Mono-Modular design.
- 25% faster installation than competitive systems.
- The ultimate in simplicity—only 7 basic parts.
- And, all systems are compatible and interchangeable.

HOW?

The patented Perma Lock* stud shown here is the answer. It is the heart of all four Penmetal partition systems.

To make the stud, two members of galvanized 24-gage steel are roll-formed, clinched together in perfect alignment, and punched accurately for horizontal support members and wiring passageways. The result is a stud capable of supporting the partition systems to a height of 22 feet.

The continuous precision groove in the face of the stud tightly grips the flanges of the steel panels used in Penciline partitions or the batten strips of steel or aluminum used in the other three systems. No screws, bolts or other fastenings are required.

†Patent applied for

*Trade mark registered; patented

Copyright 1964, Penn Metal Company, Inc.

SGP 0027689

THE FOUR PENMETAL SYSTEMS

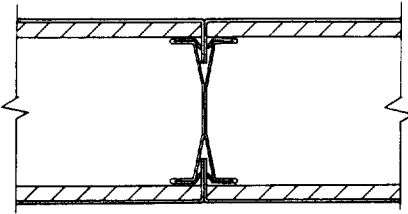
Partition

Description

For
details,
see page

For
specifications
see page

PENCILINE

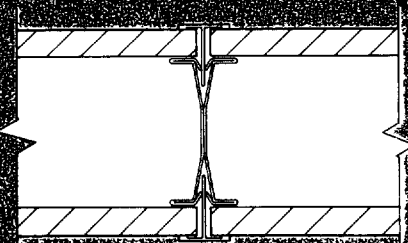


All-steel partition system with hairline joint treatment. Slim, trim recessed base and ceiling channel. Panels independently removable from either side without disturbing those on the opposite side. Different colors each side if desired. Lifetime baked-enamel finish. Fully flush walls with no overlapping parts. Absolute privacy assured with phenomenal sound control.

4

12

MARK II

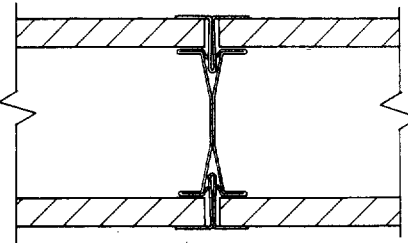


All the appearance and design features of Penciline at less cost. Instead of steel panels, Mark II utilizes vinyl-covered gypsum board, prefinished plywood or, in fact, any panel material from 1/4" through 5/8" in thickness. Base and ceiling channel are recessed. Panels are held in place with square-edge aluminum battens which snap into the studs. Panels are edged top and bottom with matching aluminum cap to provide protective frame. Door frames are flush, full height.

6

13

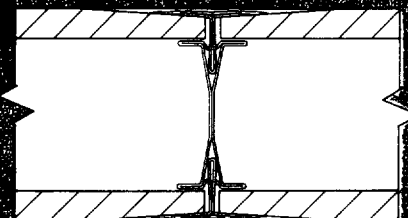
PENWALL



Lowest cost, truly movable system on the market. Uses 1/4", 1/2" or 5/8" gypsum panels which are attached to the Perma Lock studs by snap-in steel or aluminum battens. No time-consuming drilling; no screws. Every single part reusable. Will also accommodate vinyl-covered gypsum panels, plywood, prefinished hardboard or cement asbestos board. Overlapping steel door frames and aluminum window frames.

8

14

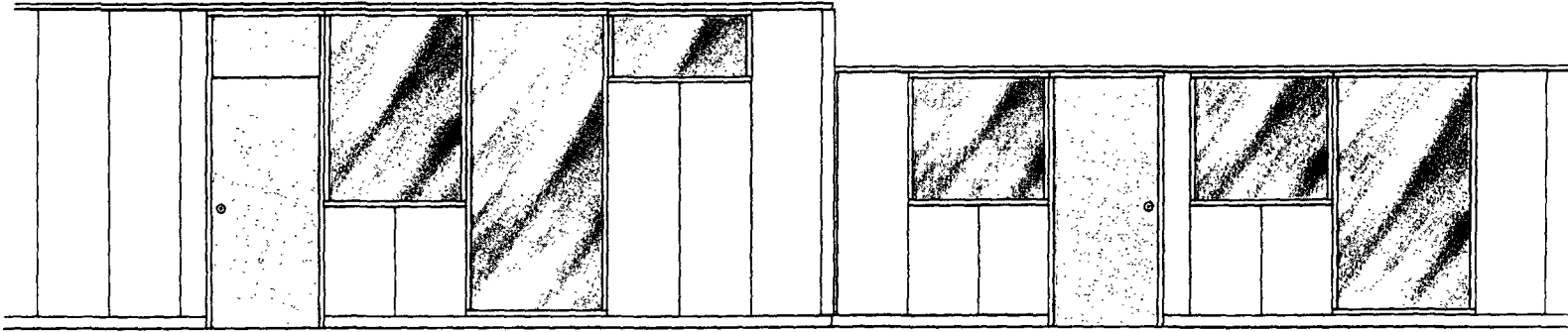


The only movable wall with no exposed seams or joints. Absolutely monolithic in appearance; yet, a panel can be removed in as little as 12 seconds, and the entire partition can be relocated at any time with no material loss. Price compares favorably with fixed-wall construction. Panels are 1/2" or 5/8" tapered-edge gypsum board. The first movable wall designed to be used in apartments and residences as well as commercial structures.

10

15

Penciline



DESIGN SIMPLICITY

Penciline has a Mono-Modular framing system designed for easy, instantaneous "snap-in" of flanged steel panels. Surfaces are absolutely flush. There are no clumsy posts or post caps. Add to this the beauty of a 4" recessed base, a recessed head member as shallow as 1 3/4" and a fully flush full-height door frame.

All units are of a standard size and are interchangeable. Further, panels may be removed from either side of the partition without disturbing those on the opposite side. It is also possible to use steel panels on one side and plywood panels, for example, on the other.

WIRING FACILITIES

Penciline provides 2 1/2" of clear space within the partition to accommodate electrical wiring, piping and other utilities. Snap out a panel on one side and the entire partition is wirable—vertically and horizontally. Any standard box, switch or receptacle may be used.

PHENOMENAL SOUND CONTROL

Sound attenuation is, without qualification, the best in the industry. Average sound-transmission loss, over the entire frequency range of 125 through 4,000 cycles per second, is

—43 db. In the critical speech privacy range of 250 through 4,000 cycles, the loss is an amazing —47 db.

FIRE SAFETY

Penciline can be supplied as a one-hour fire wall, if desired. With minor internal modifications, Penciline has successfully passed the one-hour fire test and hose-stream test in conformance with latest A.S.T.M. testing procedures. (Details available upon request.)

FINISH

Penciline panels are made of 20-gage roller-leveled steel sheet with 1/4" sound-deadening insulation board bonded to the inside. Baked-enamel finishes are applied at the factory over a rust-resistant base. The surfaces will not crack, chip or craze and never need repainting. All concealed parts are electro-galvanized.

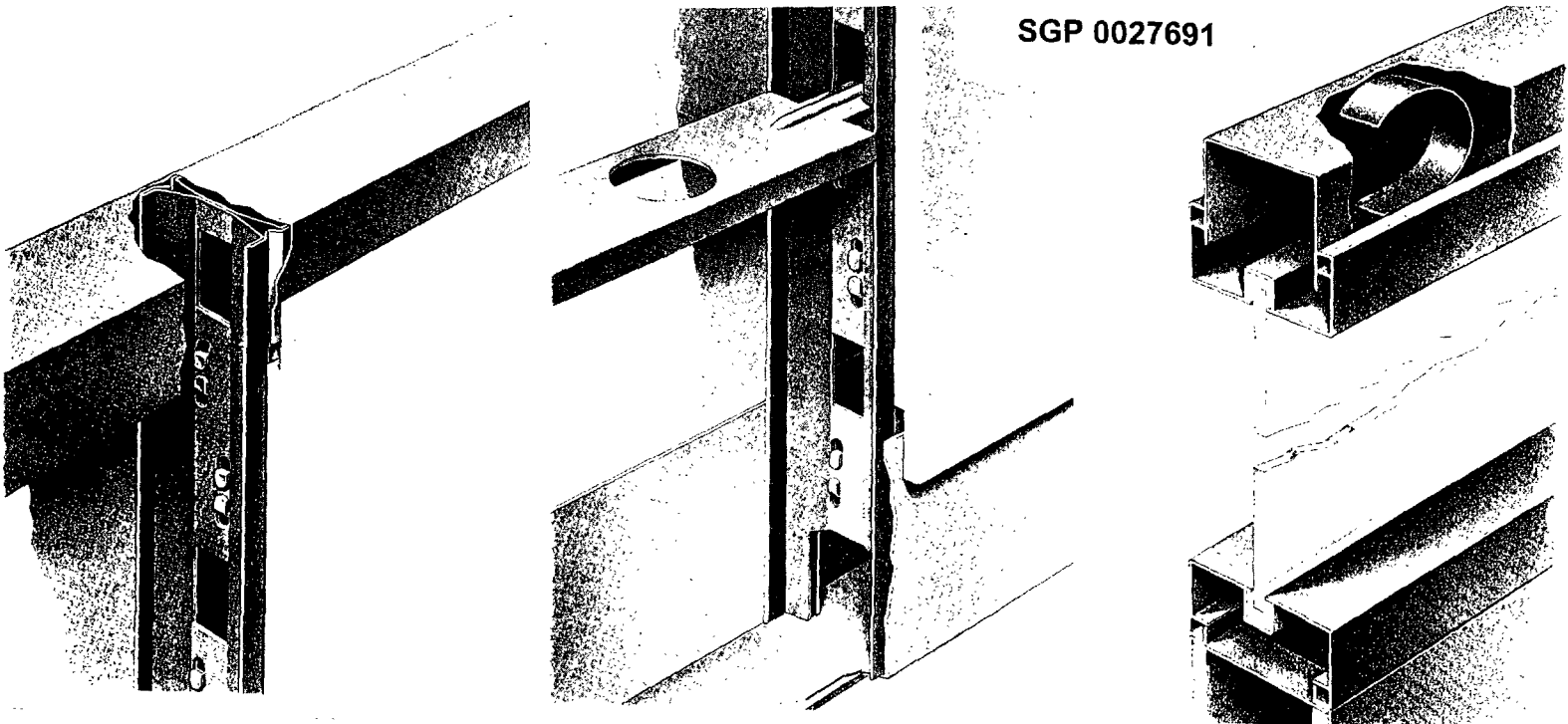
SERVICE

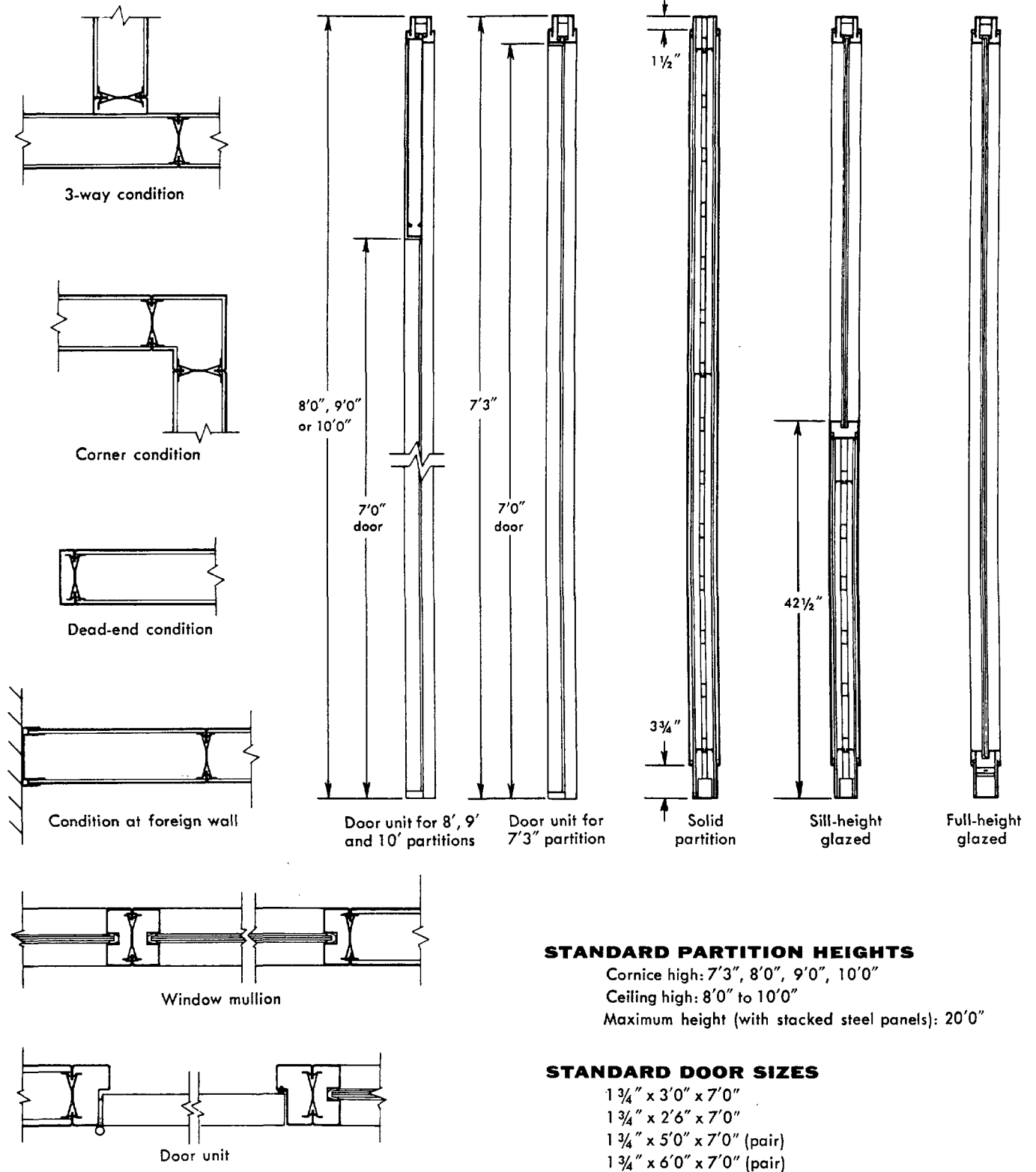
Penciline is sold and erected by over 80 distributors throughout the United States and Canada. Stock panels and parts may be shipped from the factory in less than two weeks!

For additional details, send for catalog MP-13.

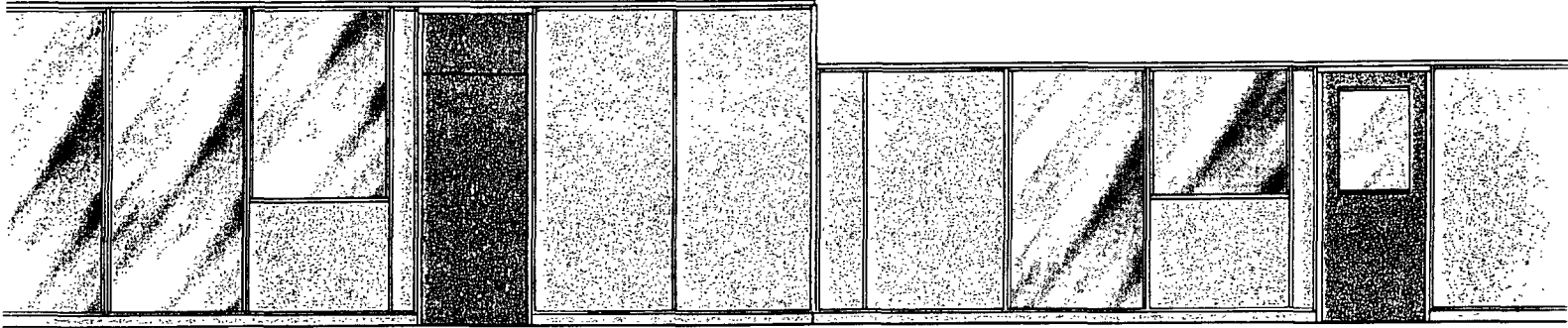
Refer to page 12 for specifications.

SGP 0027691





Mark II



DESIGN FEATURES

Mark II is a designer's delight . . . at low cost. It possesses all of the unique Penciline advantages, plus the freedom of permitting the use of any desired panel material. When used with prefinished or vinyl-covered gypsum panels, Mark II provides all the appearance and maintenance benefits of steel partitions at far less cost.

No restriction on choice of panel materials, colors or texture. Different materials and different colors may be used on opposite sides of the same partition. Panel widths may be 24" or 48".

Baked-enamel steel base is 4" high recessed. Ceiling member is similar with a depth of 1 3/4".

Panels are attached to Perma Lock studs by square-edge aluminum batten strips which merely snap into place. No screws or other fastenings are required.

Panels are framed top and bottom with aluminum edge cap to enhance appearance and provide protection to panel edges. Panel edging and batten strips are identical thickness to fall into same plane.

Door frames are full-height and recessed from partition face. Header panel over door gives appearance of full-height door, when door is closed.

Clean, slim-line aluminum window unit. Available in any height: chair rail to ceiling or floor to ceiling. Snap-in glazing beads for fast installation of glass.

SOUND CONTROL

With 5/8" panel material, Mark II will produce an average sound-transmission-loss rating of -38 db. through a frequency range of 125 to 4,000 cycles . . . without internal packing. Packing the partition will better this reduction by approximately -3 db.

UTILITY ACCOMMODATIONS

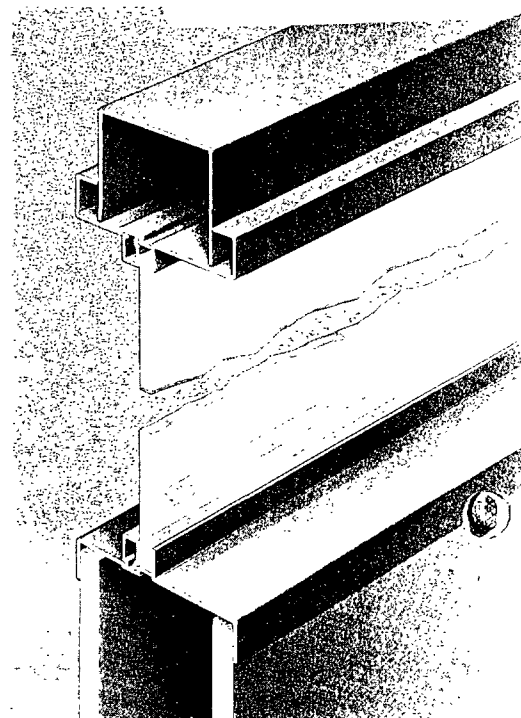
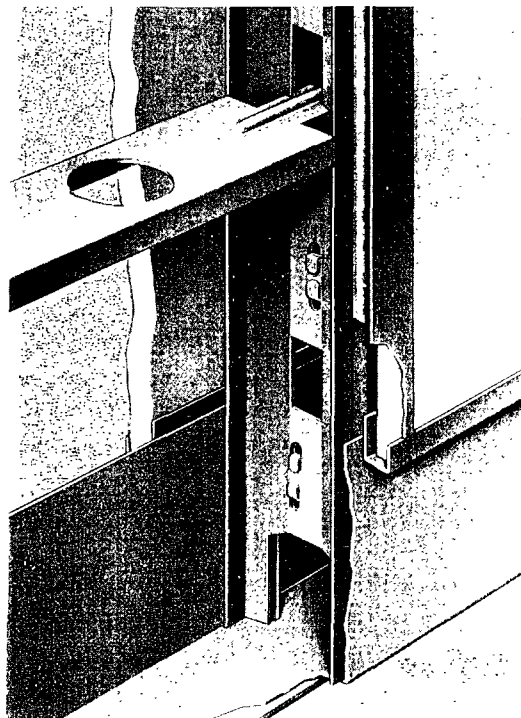
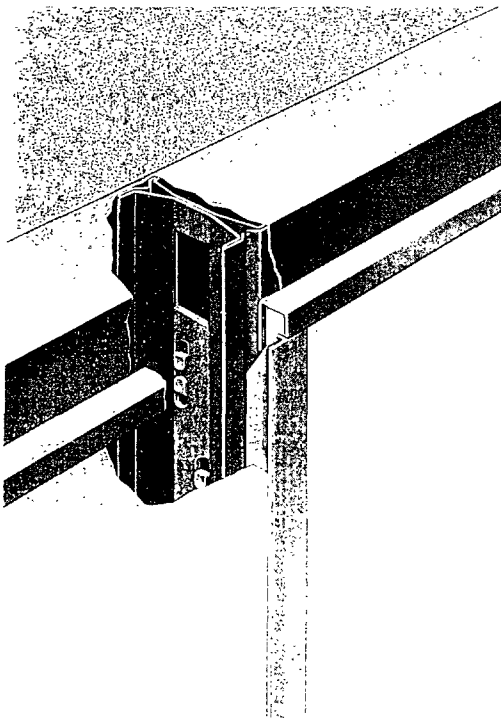
Identical to those provided by Penciline. 2 1/2" of clear internal space for wiring and piping—vertically and horizontally. Any standard electrical fittings may be used.

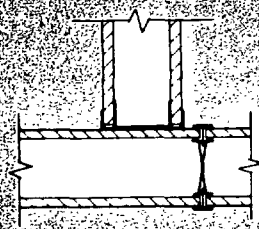
SERVICE

Mark II is sold and erected by 80 distributors throughout the country, most of whom carry stock components in inventory. Items which must be obtained from the factory are normally shipped in 10 days to provide the kind of service you need and expect from Penn Metal Company, Inc.

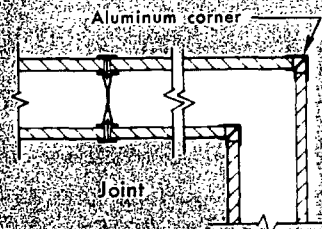
*For additional details, send for catalog MP-22.
Refer to page 13 for specifications.*

SGP 0027693



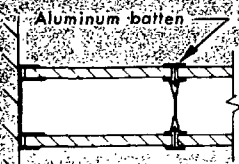


3-way condition



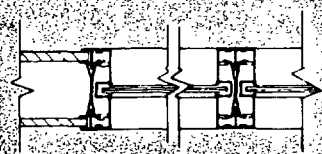
Aluminum corner

Joint

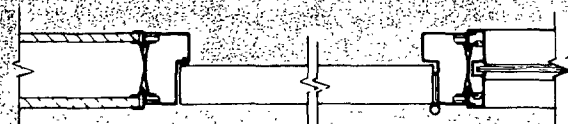


Aluminum batten

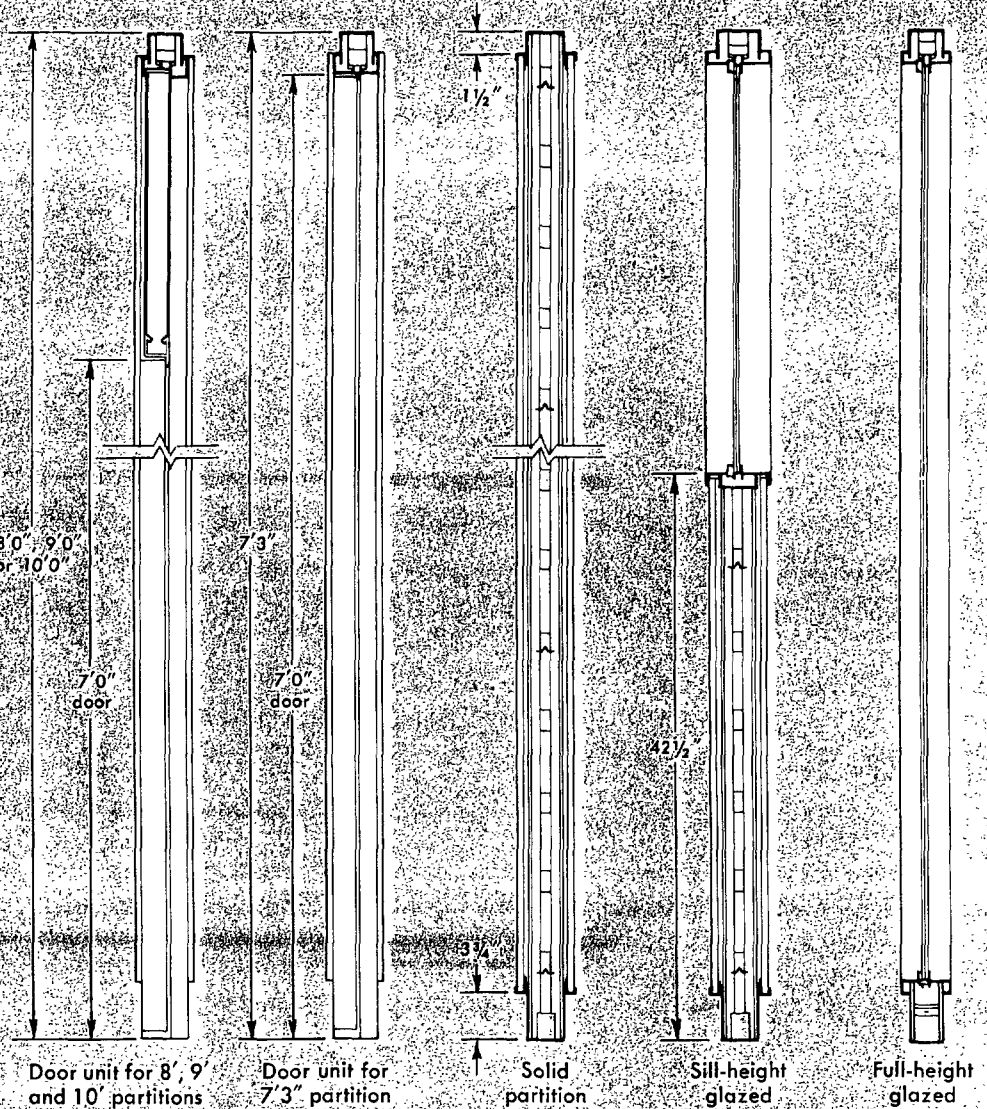
Condition at foreign wall



Window mullion



Door unit



Door unit for 8', 9' and 10' partitions

Door unit for 7'3" partition

Solid partition

Sill-height glazed

Full-height glazed

STANDARD PARTITION HEIGHTS

Cornice high: 7'3", 8'0", 9'0", 10'0"

Ceiling high: 8'0" to 10'0"

Maximum height (with stacked panels): 20'0"

STANDARD DOOR SIZES

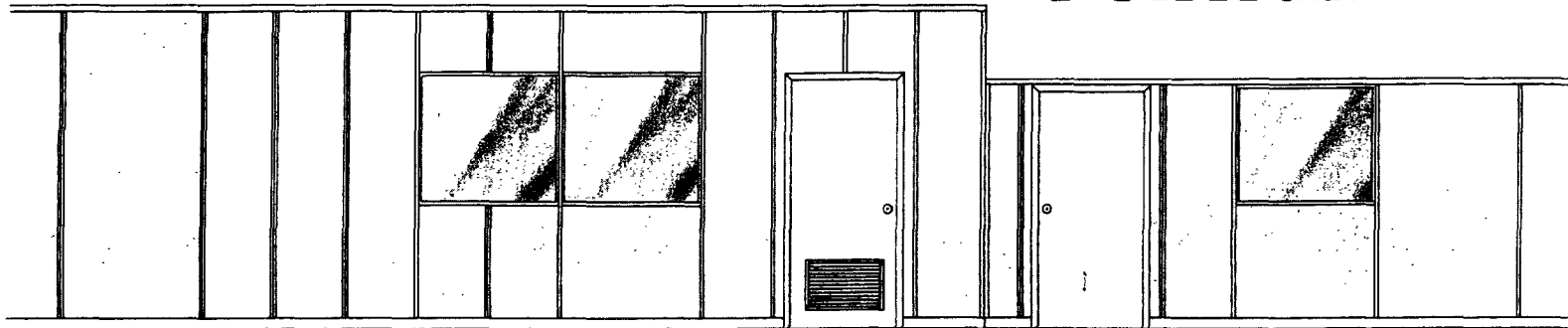
1 1/4" x 3'0" x 7'0"

1 1/4" x 2'6" x 7'0"

1 1/4" x 5'0" x 7'0" (pair)

1 1/4" x 6'0" x 7'0" (pair)

Penwall



DESIGNED TO SAVE YOU MONEY

1. *Lowest cost* of any complete non-progressive system on the market.
2. *True movability.* Every single part reusable, move after move. Doors, windows and panels may be relocated at any time without disturbing adjacent panels.
3. *Least expensive to relocate*—no screws, no leveling, no time-consuming labor factors.
4. *Unrestricted choice* of inexpensive, maintenance-free panel materials with unlimited range of colors and textures.
5. *Standard electrical outlets* and switches can be located anywhere in the partition, initially or at any future time. 2½" of clear internal space for wiring and utilities.
6. *One-hour fire rating.* When assembled with ⅝" fire-code gypsum board panels, Penwall carries a one-hour fire rating.

FEATURES

Penwall has only seven basic parts, plus door and window frames. Yet, flexibility of design is practically unlimited.

Panels may be ¼" plywood or hardboard, ½" or ⅝" gypsum board, vinyl-covered board or virtually anything you desire. Different materials may readily be used on opposite sides of the partition.

Panels are attached to the Perma Lock studs by means of "snap-in" batten strips without the use of screws, nails or adhesives. Three types of battens are available: steel, flat-face aluminum or rounded-face aluminum.

Base may be removable overlapping steel or applied vinyl or rubber.

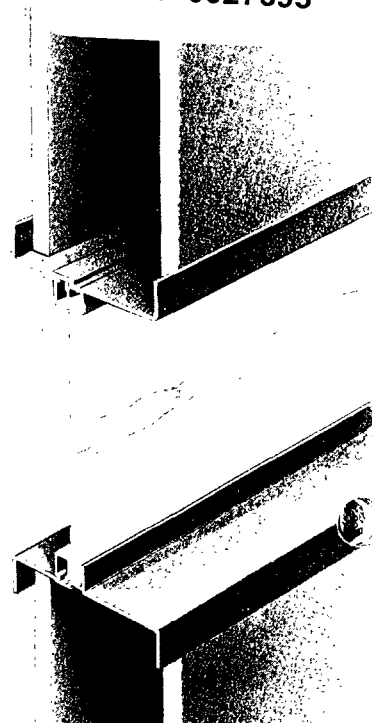
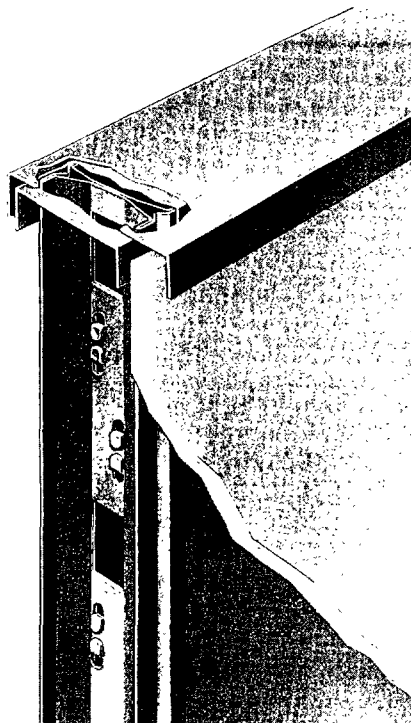
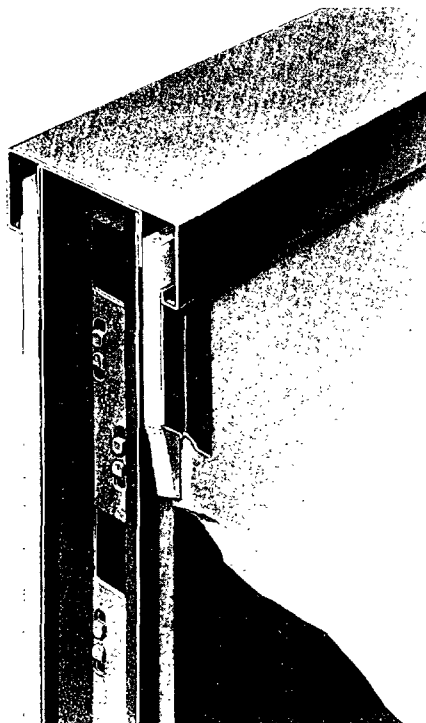
Door frames are steel overlapping-type equipped for 1½ pair of hinge butts. Doors are 1¾" thick and are available in steel or wood.

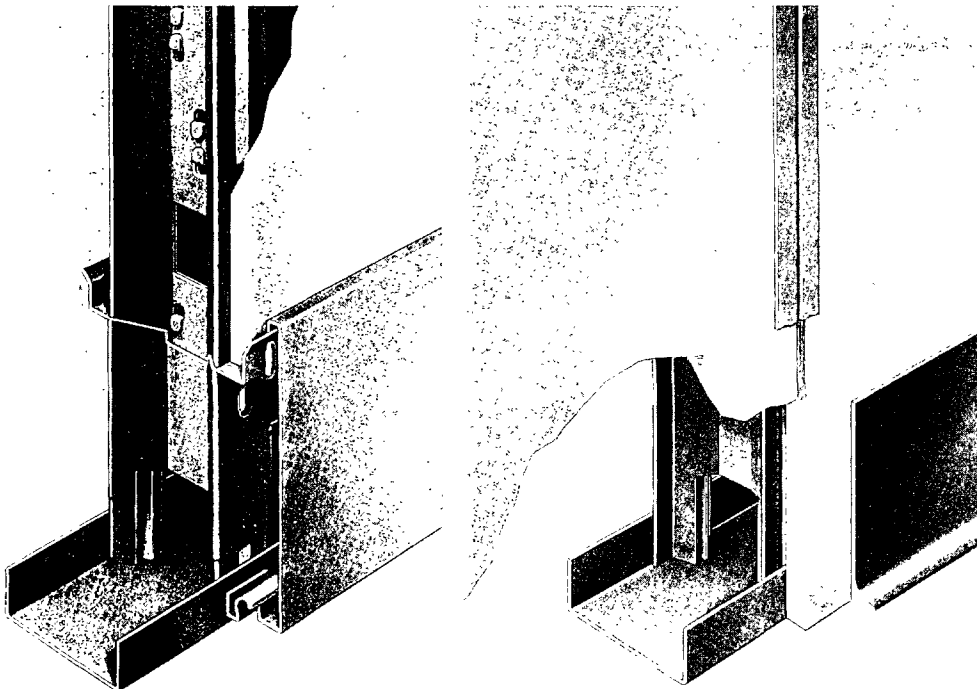
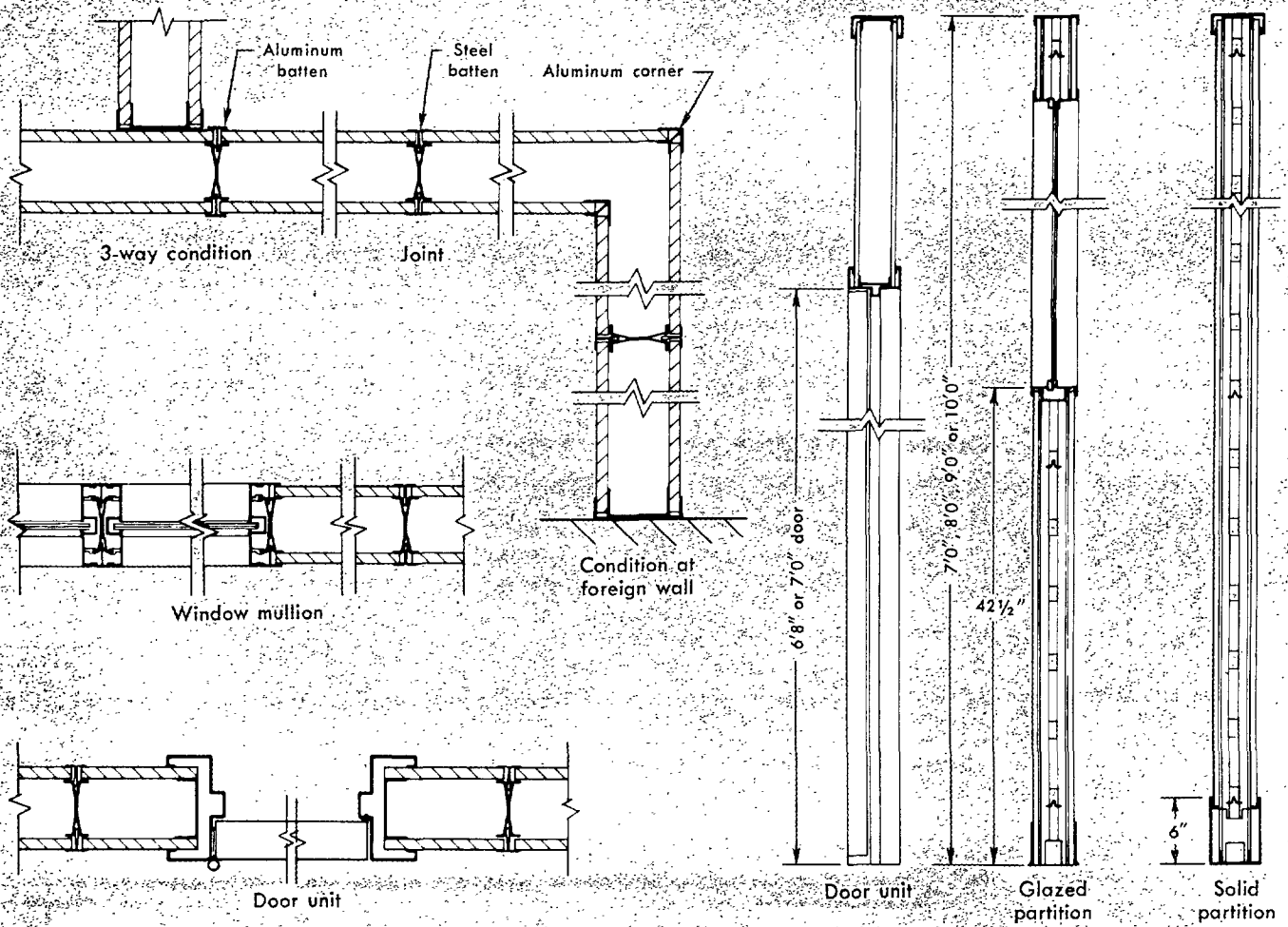
Glazing of partitions is accomplished with anodized aluminum window frames of the overlapping-type. Glazing beads "snap-in" for easy glazing.

For additional details, send for catalog MP-22.

Refer to page 14 for specifications.

SGP 0027695





STANDARD PARTITION HEIGHTS

Cornice high: 7'0", 8'0", 9'0", 10'0"

Ceiling high: 8'0" to 12'0"

Maximum height (with stacked panels): 20'0"

STANDARD DOOR SIZES

1 3/4" x 3'0" x 6'8"

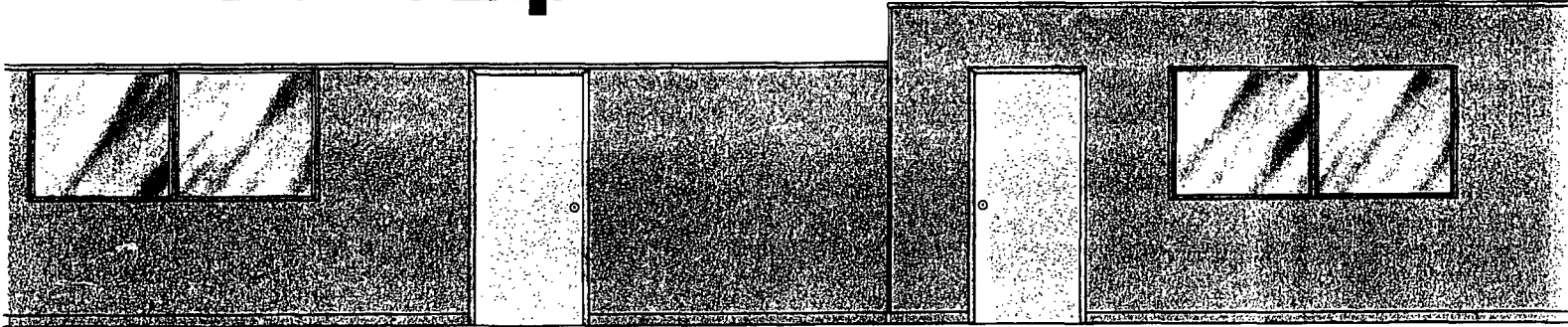
1 3/4" x 2'6" x 6'8"

1 3/4" x 5'0" x 6'8" (pair)

1 3/4" x 6'0" x 6'8" (pair)

7'0" doors may be used as alternate, except in 7'0" partitions.

Kwik-Zip



THE FIRST SEAMLESS, MOVABLE WALL

1. *Fully flush walls* . . . no exposed joints . . . no visible seams.
2. *True movability* . . . every part reusable.
3. *Quick erection* . . . faster than either wallboard or plaster.
4. *No unsightly screw heads* or nail heads showing through.
5. *Plenty of room* . . . 2½" of it . . . for concealed wiring and piping.
6. *Standard electrical outlets* can be located anywhere in the partition.
7. *One-hour fire rating*, if required.
8. *Excellent sound control*.
9. *Low, low cost*.

TRUE MOVABILITY

An original Penmetal development, Kwik-Zip provides all the beauty of a permanent, seamless wall . . . yet it is truly movable. Design of the framework—studs, track and bridging—is similar to Penwall, and is just as easy to erect and relocate. Panels are attached to the Perma Lock studs with a special, lighter modification of the famous Kwik-Klip* drive-in batten strip. Finished walls are fully flush with no exposed joints.

LOW, LOW COST

The cost of Kwik-Zip walls compares favorably with fixed-wall installations. Furthermore, like furniture and fixtures, they can be depreciated, and may qualify for the 7% investment tax credit. These are important points to consider.

**Trademark registered, patented.*

Refer to page 15 for specifications.

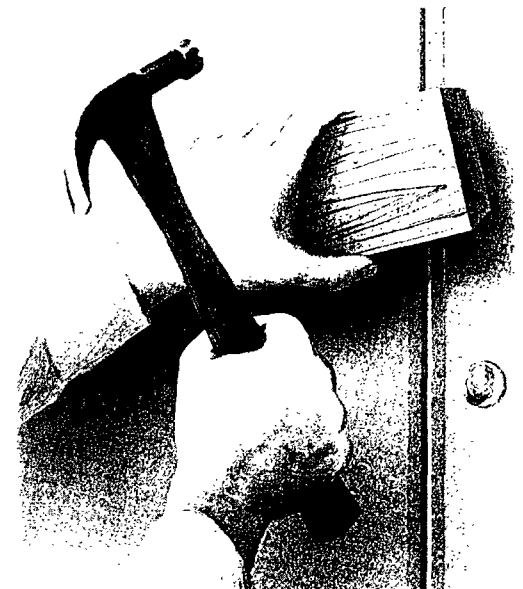
½" or ⅝" tapered-edge gypsum panels are attached quickly and easily to the Perma Lock studs.

The drive-in batten strip insures a tight, strong, recessed fit.

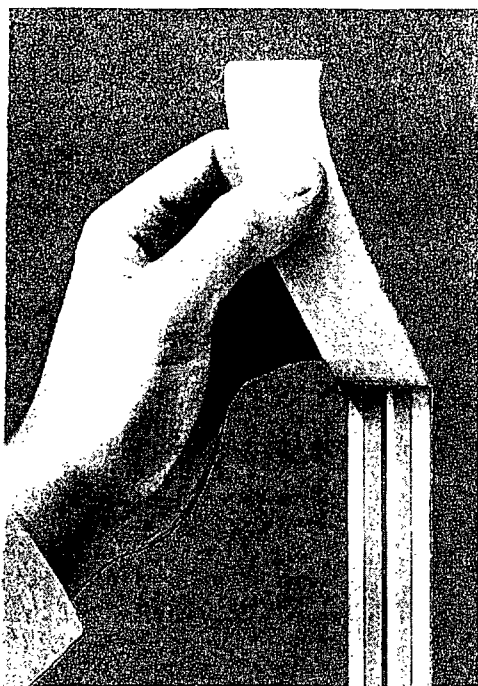
five
simple
steps
and it's
seamless



SGP 0027697



down
in
12
seconds



To remove any single panel, just take off the base, grasp the exposed bottom edge of the tape and "zip" it off with a single pull. This reveals the clean batten strip for easy removal. An entire panel can be taken off, intact, in only 12 seconds! Nothing is discarded except the tape. With panels removed, the framework can be readily dismantled and relocated. All parts are reusable.

STANDARD PARTITION HEIGHTS

Cornice high: 7'0", 8'0",
9'0", 10'0"
Ceiling high: 8'0" to 12'0"
Maximum height (with stacked panels): 20'0"

STANDARD DOOR SIZES

1 3/4" x 3'0" x 6'8"
1 3/4" x 2'6" x 6'8"
1 3/4" x 5'0" x 6'8" (pair)
1 3/4" x 6'0" x 6'8" (pair)

7'0" doors may be used as alternate,
except in 7'0" partitions.

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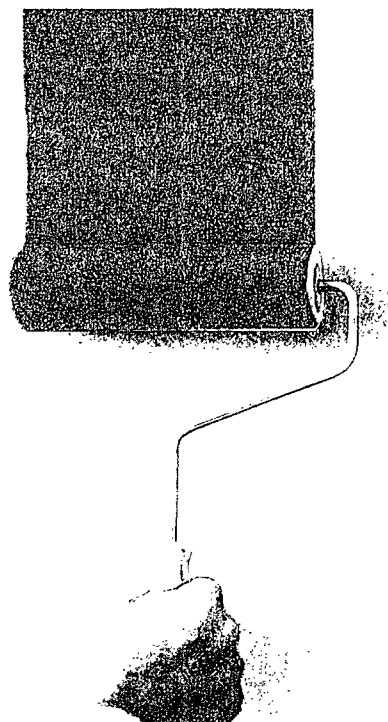
A special self adhesive tape is used to cover the batten and completely hide the seam.



Two coats of topping compound are applied and then lightly sanded.



Now the fully flush, seamless wall is ready for painting, producing a beautiful fixed-wall look.



Penciline

SPECIFICATIONS

I. CEILING HIGH AND/OR CORNICE HIGH PARTITIONS

A. GENERAL: Furnish and erect complete, **Penciline** Movable Steel Partitions, fully flush, 3" thick, ceiling high (or cornice high), complete with doors, glass and approved standard hardware, as manufactured by the Penn Metal Company, Inc., Parkersburg, West Virginia.

B. SHOP DRAWINGS, when required, shall illustrate plan layout and details of construction.

C. MATERIALS: Concealed structural and framing members shall consist of Penmetal 2½" Perma Lock Studs with 1⅝" minimum facing, set in 4" high, prepainted, recessed steel base at floor and 2¼" deep, prepainted recessed ceiling trim at ceiling or cornice and accurately spaced with 24" Penmetal bridging members. Studs shall have continuous groove designed to receive flanged edges of steel panels. Studs shall be punched 6" o.c. for passage of concealed wiring so that electrical outlets and switches may be placed anywhere at random.

D. CONSTRUCTION:

1. Partition shall be so designed as to be readily erected, demounted and relocated without damage to partition or adjacent walls. Three-way and four-way intersections shall be created at any point without regard to module and without necessity for odd-size panels. Panels shall be removable individually without disturbing either adjacent panels or those on the opposite side.
2. 4" high, one-piece, 20-gage recessed base and 2¼" deep, one-piece, 20-gage, ceiling trim shall be firmly anchored in place and shall incorporate a polyurethane light-and-sound seal. Studs shall be 24" on centers and spaced by three to four rows of Penmetal bridging members.
3. Panels shall be 20-gage roller-leveled sheet steel with ¼" sound-deadening insulation board bonded to the inside of the panel sheet after painting. Panels shall be so designed as to snap into the steel studs and shall be flanged on the vertical edges for this purpose. Top and bottom edges shall be flanged to provide proper seal at base and head. Corners of vertical flanges to be notched to permit leveling of panels.
4. (Alternate for overlapping cornice, if desired.) Overlapping cornice shall be of 18-gage steel, 2" high with a ⅜" overlapping projection. Field joints shall be spliced and all corner conditions welded. An additional track to accommodate top-filler panels (if required) shall be provided.
5. Doors shall be manufacturer's standard, flush (or with provision for glass in upper panel), 20-gage steel faces with welded internal reinforcements. All doors to be 1¾" thick, 7' in height, premortised for 1¼ pair of 4½" x 4½" butts and 160-161 lockset or latchset. Header panel over door to cornice or ceiling trim shall match door in appearance and thickness. (Alternate: 1¾" wood doors 7' high with matching wood header panels.)
6. Door frames to be 18-gage steel flush with panel faces and shall be full-height to cornice or ceiling line. Frame shall have accompanying side panel to maintain 48" module for interchangeability.
7. Glazed panels (full-glazed, floor to ceiling or 42" chair rail height to ceiling) shall be of 4-piece type to snap over studs and shall be fully flush with panel faces. Glazing shall be accomplished by means of a spring-loaded head member and shall require no loose stops or exposed screws or fastenings.
8. Hardware design and construction shall be as regularly supplied with the partitions. Locksets of different operations shall be interchangeable. All to fit Federal Specifications 160-161 mortise with A.S.A. strike. Doors to be hung on 1½ pair of 4½" x 4½" plain bearing butts.
9. Electrical Provisions. Entire interior of partitions shall be designed to accommodate electrical wiring, both horizontally and vertically. Switches and receptacles shall be mounted at any desired location. No special size or type electrical boxes or fixtures shall be necessary. Design shall permit the use of grounded outlets if desired. All wiring and connections by others.

II. FINISH: All concealed steel members to be galvanized. All exposed steel surfaces to be bonderized or otherwise treated with a rust-preventative prior to painting. Finish coat to be selected color baked enamel and shall have a hard, durable surface for ease of maintenance. (Finish performance data upon request.)

III. WORKMANSHIP: Finished partition shall be plumb, neat in appearance, free from defects and with horizontal lines leveled. Hardware shall be adjusted and left in proper working conditions. Job shall be left broom clean.

Mark II

SPECIFICATIONS

I. CEILING HIGH AND/OR CORNICE HIGH PARTITIONS

A. GENERAL: Furnish and erect complete, **Penwall Mark II**, Movable Partitions (Series 2, 3 or 4*) as manufactured by the Penn Metal Company, Inc., Parkersburg, West Virginia, complete with doors, glass and approved standard hardware.

*Series 2 accommodates $\frac{1}{4}$ " thick panels, Series 3 accommodates $\frac{1}{2}$ " and Series 4 accommodates $\frac{3}{8}$ ".

B. SHOP DRAWINGS, when required, shall illustrate plan layout and details of construction.

C. MATERIALS: Concealed structural and framing members shall consist of Penmetal $2\frac{1}{2}$ " Perma Lock studs with $1\frac{3}{16}$ " minimum facing, set in 4" high, prepainted, recessed steel base at floor and $2\frac{1}{4}$ " deep, prepainted recessed ceiling trim at ceiling or cornice and braced with 24" Penmetal bridging members. Studs shall have continuous groove designed to receive Penmetal (steel or aluminum) batten strips for attaching panels. Bottom edge of panels to be supported and protected by $\frac{3}{8}$ " deep adjustable support channel. Top edge of panels to be protected and framed by $\frac{3}{8}$ " deep drive-on cap. Studs shall be punched 6" o.c. for passage of concealed wiring so that electrical outlets and switches may be placed anywhere at random.

D. CONSTRUCTION:

1. Partition shall be so designed as to be readily erected, demounted and relocated without damage to partition or adjacent walls. Three-way and four-way intersections shall be created at any point without regard to module and without necessity for odd-size panels. Panels shall be removable individually without disturbing either adjacent panels or those on the opposite side.
2. 4" high recessed base and $2\frac{1}{4}$ " deep recessed ceiling trim shall be firmly anchored in place and shall incorporate a polyurethane light-and-sound seal. Studs shall be spaced 24" on centers and spaced by

three to four rows of Penmetal bridging. Panels shall be applied vertically in 24" or 48" width increments and supported at the bottom edge by $\frac{3}{8}$ " deep adjustable support channel, leveled and fastened to studs every 48". Top edge of panels to be framed by $\frac{3}{8}$ " deep drive-on cap. Panels shall be held securely in place by Penmetal steel batten strips (or #2-77, 6063-T5 alloy aluminum batten strips with clear anodized finish). All connections to floors, walls and ceilings shall be concealed. Base to be one piece, 4" high, 20-gage steel, recessed and prefinished in baked enamel. Ceiling trim or cornice to be one piece $2\frac{1}{4}$ " deep, 20-gage steel, recessed and prefinished in baked enamel. Inside and outside corners to be of 20-gage steel. Partition shall be so designed that a door unit may be interchanged with any two 24" panel units or with any one 48" panel unit. There shall be no exposed screws or fastenings in the surface of the partition.

3. **Window Frames** shall be knock-down type of extruded and clear anodized aluminum. Frames shall incorporate spring-loaded floating head member for telescoping glazing.
4. **Door Frames** to be 18-gage steel, flush or recessed from panel faces and full height to cornice or ceiling line. Frame shall have accompanying side panel to maintain 48" module for interchangeability.
5. **Doors** shall be $1\frac{3}{4}$ " flush steel, 7' high, properly welded and reinforced. Doors shall be premortised for $1\frac{1}{2}$ pair of $4\frac{1}{2}$ " x $4\frac{1}{2}$ " butts and 160-161 lock-set. Header panel over door to cornice or ceiling trim shall match door in appearance, thickness and construction. (Alternate: $1\frac{3}{4}$ " wood doors 7' high with matching wood header panels.)

II. FINISH: All concealed steel members to be galvanized. All exposed steel members to have baked enamel finish in color selected from manufacturer's standard colors.

III. WORKMANSHIP: Finished partition shall be plumb, neat in appearance, free from defects and with horizontal lines leveled. Hardware shall be adjusted and left in proper working condition. Job shall be left broom clean.

Penwall

SPECIFICATIONS

I. CEILING HIGH AND/OR CORNICE HIGH PARTITIONS

A. GENERAL: Furnish and erect complete, **Penwall** Movable Partitions (Series 2, 3 or 4*), as manufactured by the Penn Metal Company, Inc., Parkersburg, West Virginia, complete with doors, glass, and approved standard hardware.

*Series 2 accommodates $\frac{1}{4}$ " thick panels, Series 3 accommodates $\frac{1}{2}$ " and Series 4 accommodates $\frac{3}{8}$ ".

B. SHOP DRAWINGS, when required, shall illustrate plan layout and details of construction.

C. MATERIALS: Concealed structural and framing members shall consist of Penmetal $2\frac{1}{2}$ " Perma Lock studs with $1\frac{3}{16}$ " minimum facing, set in Perma Lock single track at floor and double track at ceiling (or overlapping cornice, if cornice high), and braced with 24" Penmetal bridging members. Studs shall have continuous groove designed to receive Penmetal (steel or aluminum) batten strips for attaching panels. Studs shall be punched 6" o.c. for passage of concealed wiring so that electrical outlets and switches may be placed anywhere at random.

D. CONSTRUCTION:

1. Partition shall be so designed as to be readily erected, demounted and relocated without damage to partition or adjacent walls. Three-way and four-way intersections shall be created at any point without regard to module and without necessity for odd-size panels. Panels shall be removable individually without disturbing either adjacent panels or those on the opposite side.

2. Floor and ceiling channels shall be firmly anchored in place and (if specified) shall incorporate a polyurethane light-and-sound seal. Studs shall be set 24" on center and spaced by three or four rows of Penmetal bridging. Panels shall be applied vertically in 24" width increments and shall be held securely in place by Penmetal steel batten strips (or Penmetal aluminum batten strips #2-77, 6063-T5 alloy with clear anodized finish). All connections to floors, walls and ceilings shall be concealed. Base shall be vinyl or rubber, field applied. (Alternate: Base to be Penmetal 6" high overlapping removable base.) All inside and outside corners shall be of 20-gage steel. Partition shall be so designed that a door unit may be interchanged with any two panel units. There shall be no exposed screws or fastenings in the surface of the partition.

3. **Window Frames** shall be knock-down type, of aluminum with a clear anodized finish, with lock-in glass retainers to accommodate $\frac{7}{32}$ " glass.

4. **Door Frames** to be 18-gage steel, overlapping type to cover exposed edges of panel material. All frames premortised for $1\frac{1}{2}$ pair of $4\frac{1}{2}$ " x $4\frac{1}{2}$ " butts and A.S.A. strike.

5. **Doors** to be manufacturer's standard $1\frac{3}{4}$ " flush steel properly welded and reinforced. Doors shall be premortised for $1\frac{1}{2}$ pairs of $4\frac{1}{2}$ " x $4\frac{1}{2}$ " butts and 160 or 161 lockset. (Alternate: $1\frac{3}{4}$ " wood doors.)

- ### II. FINISH:
- All concealed steel members to be galvanized. All exposed steel members to be field-painted. (Alternate: Exposed steel members to have baked enamel finish in color selected from manufacturer's standard colors.)

- ### III. WORKMANSHIP:
- Finish partition shall be plumb, neat in appearance, free from defects and with horizontal lines leveled. Hardware shall be adjusted and left in proper working condition. Job shall be left broom clean.

Kwik-Zip

SPECIFICATIONS

I. CEILING HIGH AND/OR CORNICE HIGH PARTITIONS

A. GENERAL: Furnish and erect complete, **Penwall Kwik-Zip** Movable Partitions (Series 3 or 4*), as manufactured by the Penn Metal Company, Inc., Parkersburg, West Virginia, complete with doors, glass and approved standard hardware.

*Series 3 accommodates 1/2" thick panels and Series 4 accommodates 3/8".

B. SHOP DRAWINGS, when required, shall illustrate plan layout and details of construction.

C. MATERIALS: Concealed structural and framing members shall consist of Penmetal 2 1/2" Perma Lock studs with 7/8" minimum facing, set in Perma Lock single track at floor and double track at ceiling, (or overlapping cornice, if cornice high), and braced with 24 1/8" Penmetal bridging members. Studs shall have continuous groove designed to receive Penmetal Kwik-Zip batten strips for attaching panels. Studs shall be punched 6" o.c. for passage of concealed wiring so that electrical outlets and switches may be placed anywhere at random.

D. CONSTRUCTION:

1. Partition shall be so designed as to be readily erected, demounted and relocated without damage to partition or adjacent walls. Three-way and four-way intersections shall be created at any point without regard to module and without necessity for odd-size panels. Panels shall be removable individually without disturbing either adjacent panels or those on the opposite side.

2. Floor and ceiling channels shall be firmly anchored and (if specified) shall incorporate a polyurethane light-and-sound seal. Studs shall be set 24 1/8" on center and spaced by two to four rows of Penmetal bridging. Panels shall consist of 1/2" or 3/8" tapered-edge gypsum board and shall be applied vertically in 48" width increments. Panels shall be held securely in place by Penmetal Kwik-Zip batten strips. All connections to floors, walls and ceilings shall be concealed. Base shall be vinyl or rubber, field applied. (Alternate: Base to be Penmetal 6" high overlapping removable base.) Partition shall be so designed that a door unit may be interchanged with any panel unit. There shall be no exposed screws or fastenings in the surface of the partition.
 3. Kwik-Zip batten strips will be covered with Kwik-Zip self-adhesive tape, 1 1/2" in width. One coat of drywall bedding compound shall be applied over the tape and allowed to dry thoroughly. A second coat of drywall topping compound shall then be applied at the joint condition and thoroughly sanded, after drying, to a smooth flush surface. A length of the tape shall be left exposed at the bottom of the partition for a distance of approximately 2" above the floor line so as to permit future removal. This length of tape is to be concealed by the base member.
 4. **Window Frames** shall be knock-down type, of extruded aluminum with clear anodized finish.
 5. **Door Frames** to be 18-gage steel, overlapping type to cover exposed edges of panel material. All frames premortised for 1 1/2 pair of 4 1/2" x 4 1/2" butts and A.S.A. strike.
 6. **Doors** to be manufacturer's standard 1 3/4" flush steel properly welded and reinforced. Doors shall be premortised for 1 1/2 pair of 4 1/2" x 4 1/2" butts and 160 or 161 lockset. (Alternate: 1 3/4" wood doors.)
- II. FINISH:** All concealed steel members to be galvanized. All exposed steel members to be field-painted.
- III. WORKMANSHIP:** Finished partition shall be plumb, neat in appearance, free from defects and with horizontal lines leveled. Hardware shall be adjusted and left in proper working condition. Job shall be left broom clean.

NATION-WIDE SERVICE



- Sales Offices and Representatives
- Distributors

PENN METAL COMPANY, INC.

Movable Partitions Sales Office: P. O. Box 1468, Parkersburg, W. Va. 26101

Telephone: 295-4521 (Area Code 304); TWX: 304-760-3988

Executive Offices: 40 Central Street, Boston, Mass. 02109

Plant: Parkersburg, W. Va.



a name to remember

DISTRICT SALES OFFICES AND REPRESENTATIVES

ATLANTA, GA., Watson-Smith Company, 1018 Monroe Drive, N.E., 875-8726 (Area Code 404)*

BOSTON, MASS., 02109, 40 Central St., CApital 7-1935 (Area Code 617)

CHICAGO, ILL., 60648, 8456 No. Olcott Ave., 966-9070 (Area Code 312)

CLEVELAND, OHIO, J. A. McMahan Company, 1900 Euclid Bldg., 241-0317 (Area Code 216)*

DALLAS, TEXAS, 75206, 5635 Yale St., EMerson 3-2448 (Area Code 214)

DENVER, COLO., A. H. Rahn, 1031 15th St., 534-3090 (Area Code 303)*

DETROIT, MICH., 48221, 18450 Livernois, UNiversity 3-3340 (Area Code 313)

GREENSBORO, N. C., Harry Wicker, 3703 Madison Ave., 299-7589 (Area Code 919)*

HOUSTON, TEXAS, 77019, 1964 West Gray, JAckson 3-1252 (Area Code 713)

LITTLE ROCK, ARK., 72205, 7115 Amherst Drive, P. O. Box 113, MOhawk 6-6886 (Area Code 501)

LOS ANGELES, CAL., 90058, 4309 District Boulevard, LUDlow 3-6501 (Area Code 213)

NEW YORK, N. Y., 10017, 205 East 42nd St., MUrray Hill 4-1986 (Area Code 212)

PARKERSBURG, W. VA., 26101, P. O. Box 1468, 295-4521 (Area Code 304)

PHILADELPHIA, PA., 19127, 131 Old Belmont Ave., Belmont Hills, TE 9-3777 (Area Code 215)

PITTSBURGH, PA., 15221, 433 Ross Ave., PENhurst 1-6703 (Area Code 412)

ST. LOUIS, MO., 62234, 1217 West Main St., COLLinsville, Ill., 345-1721 (Area Code 618)

SAN FRANCISCO, CAL., 94124, 745 Army St., MISSION 7-3500 (Area Code 415)

SEATTLE, WASH., MAin 4-6024 (Area Code 206) or San Francisco, MISSION 7-3500 (Area Code 415). Mailing address: 745 Army St., San Francisco, Cal. 94124.

Distributors in Other Principal Cities

*Sales Representative

UNISTRUT NORTHERN, INC.

689 PIERCE BUTLER RTE.

ST. PAUL, MINNESOTA - 55104

PHONE 488-7224

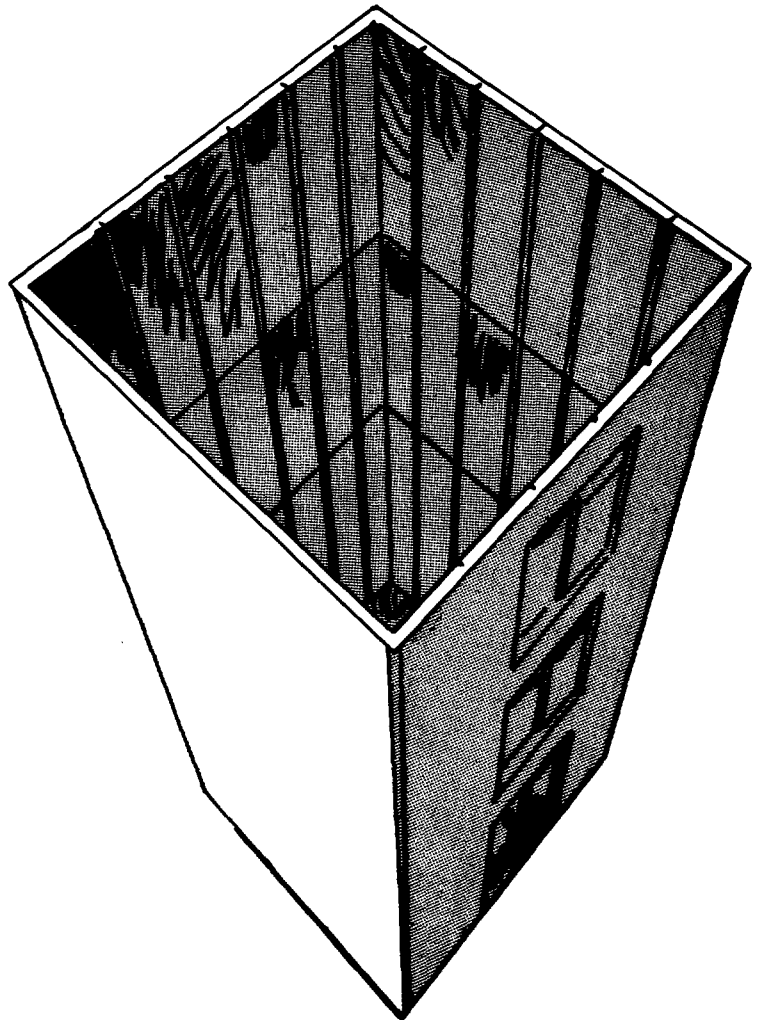
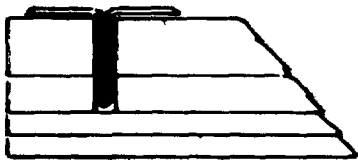
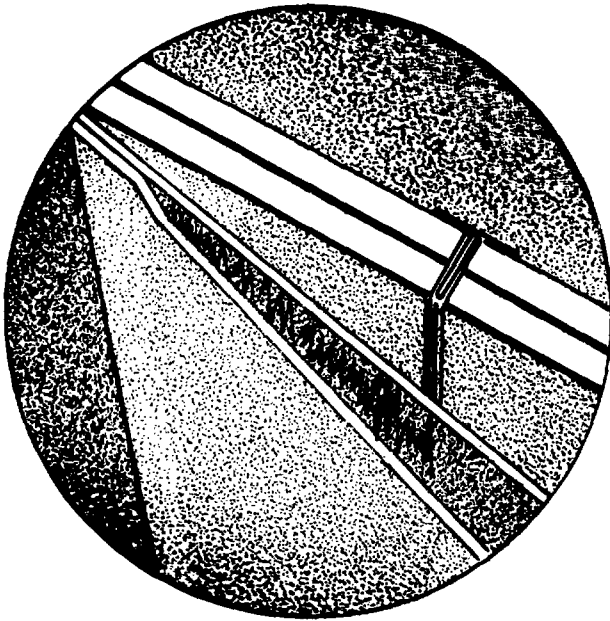
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F. Miscellaneous

SGP 0027704



SHAFT LINER™



SGP 0027705



GEORGIA-PACIFIC



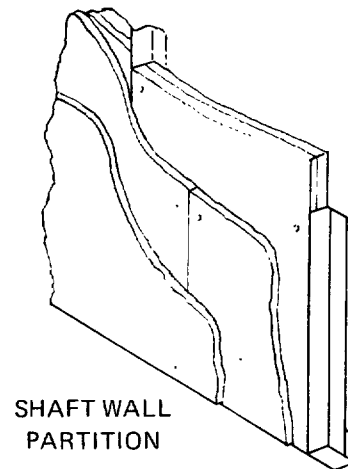
GYPSUM DIVISION

G-P SHAFT LINER

DESCRIPTION

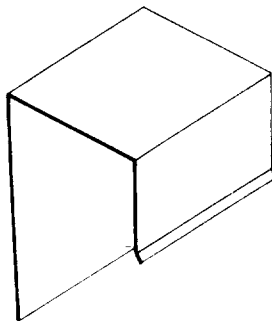
Georgia-Pacific Shaft Liner is a solid gypsum board partition for enclosing elevator shafts, stairs, smoke towers and other such shafts. It is a non-load bearing wall, designed for resistance to uniform wind loads without excess deflection. Important advantages of the system are:

1. Much lighter weight than masonry,
2. Non-combustible and economical,
3. Can be completely erected from one side,
4. Practically eliminates the need for scaffolding.

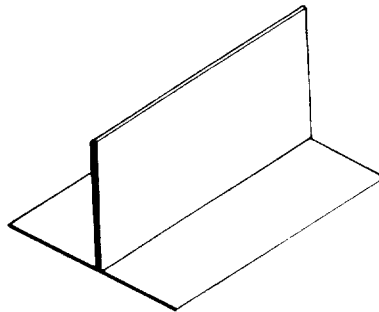


The partition consists of a basic pre-laminated core unit 1-5/8" thick by 24" wide, which fits into a top metal "J" track and bottom "L" runner. Metal "T" splines are inserted between each core unit. The core units are

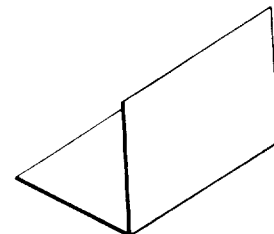
subsequently secured to the "T" splines, and top and bottom runners. Installation of the facing layers and surface finishing can be accomplished later to coincide with interior partitions.



"J" TRACK



"T" SPLINE



ANGLE
RUNNER

The facing generally consists of 2 layers of 1/2" Georgia-Pacific gypsum board. The exposed layer may be 1/2" Dens-Cote Base and Dens-Cote Veneer Plaster, or 1/2" Georgia-Pacific Tile Backer.

(Ohio State University Test T-4958, 2-Hour)

Components of the Georgia-Pacific Shaft Liner conform to the following specifications:

Wallboard, 1/2" & 5/8"	ASTM C 36
Wallboard, 1"	ASTM C 442
Dens-Cote Base, 1/2" & 5/8"	ASTM C588
Dens-Cote Veneer Plaster	ASTM C 587
Tile Backer	ASTM C 630
Metal Components	ASTM C446

This system meets the ASTM E119 requirements for a 2-Hour Fire Resistive Classification. It is also designed and tested to meet a variety of wind loads at various heights. The standard gauge of the metal components is 20 gauge. However, other than the 20 gauge may be used, as shown in the table on the following page for various wall heights, deflections and wind loads.

SGP 0027706

**RECOMMENDED "T" GAUGE FOR L/120 DEFLECTION
FOR STANDARD WALLBOARD FINISHES**

WALL HEIGHTS	L/120 DEFL.	PANEL WEIGHT	5PSF	7.5PSF	10PSF	12.5PSF	15PSF
8 ft.	0.8"	100#	22	22	22	22	22
9 ft.	0.9"	113#	22	22	22	22	22
10 ft.	1.0"	125#	22	22	22	22	20
11 ft.	1.1"	138#	22	22	20	18	16
12 ft.	1.2"	150#	22	20	18	16	14

**RECOMMENDED "T" GAUGE FOR L/240 DEFLECTION
FOR PLASTER OR PLASTER VENEER FINISHES**

WALL HEIGHTS	L/240 DEFL.	PANEL WEIGHT	5PSF	7.5PSF	10PSF	12.5PSF	15PSF
8 ft.	0.4"	100#	22	22	22	22	22
9 ft.	0.45"	113#	22	22	22	22	18
10 ft.	0.5"	125#	22	22	22	20	16
11 ft.	0.55"	138#	20	18	18	16	14
12 ft.	0.6"	150#	18	14	—	—	—

INSTALLATION

Install the perimeter framing first which consists of the top metal "J" and bottom "L" tracks. These components are to be secured with power driven fasteners, or equivalent, at 24" maximum centers. The 1-5/8" Shaft Liner core units are inserted top first into the "J" track and pushed flush against the bottom angle runner. These core units are separated by the "T" splines, which are positioned so the flat, or flange, side faces the shaft. Type S-12 drill point screws 2"—2-3/8" long are used, 24" o.c., to fasten the core to the "T" splines. At the extreme top and bottom, screw the core to the runners, at points 2" on each side of the spline, using the drill point screws. Screws will protrude slightly on the unfinished shaft side.

Two layers of 1/2" Georgia-Pacific Regular Wallboard, 4 ft. wide by partition height are applied to the face side. Each is installed parallel to the Shaft Liner panels. The first layer is offset from the "T" spline by 12", and the

second layer staggered 24" from the first. Installation is by 3/8" beads of adhesive, or full lamination. For improved sound isolation, adhesive should fill the joints at each "T" spline. The facing sheets are also secured with 1-5/8" Type G screws spaced 24" o.c. at edges and center (1st layer) and 16" o.c. at edges and center (2nd layer). Finish joints and screw heads in normal manner in preparation for the final decoration.

The Georgia-Pacific Shaft Liner System is designed for versatile performance. Ease of construction from one side makes this wall ideal for use in locations other than vertical openings (such as stairwells). The system takes much less space than masonry or stud walls. Both sides can be finished by adding a layer of regular board over the "T" flanges on the back side. However, if the back side is to be finished, the wallboard should be applied first before screw attaching the Shaft Liner panels to the metal components.

SGP 0027707

LIMITATIONS

1. Georgia-Pacific Shaft Liner walls are non-load bearing.
2. Do not use in areas of unusually high moisture conditions.
3. For heights exceeding 12 ft. some form of auxiliary bracing may be desirable.
4. Electrical or mechanical piping, wiring, etc. should not be incorporated unless furred construction is used.
5. Adhere to gauges and heights shown in table.
6. Provide control joints at maximum 30 ft. intervals.
7. When hand rails or other heavy items are anchored to the Shaft Liner System, install 22 gauge metal strip between the Shaft Liner panels and facing layers.

GENERAL WORKING CONDITIONS

During cold weather, temperatures in the building should be maintained at not less than 50°F during application of adhesives or joint treatment. There should be adequate ventilation to dispose of excessive moisture during these periods.

For steel frame construction, installation of top "J" track should be completed before application of any spray-on fireproofing.

The poured concrete floor should be reasonably smooth in the area where the "L" track is to be installed. If the "L" track is installed close to the edge, the concrete may spall unless a fastening plate is set into the concrete to which the track can then be applied.

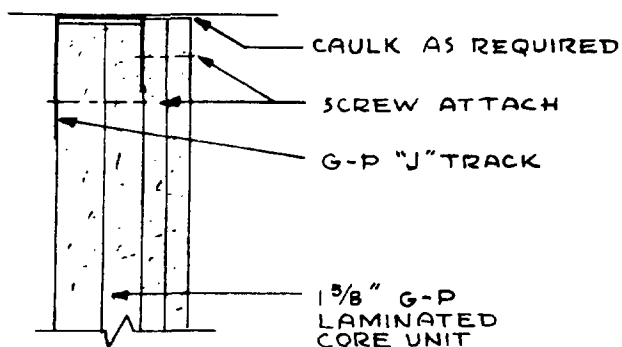
The "T" spline and Shaft Liner panels should be no shorter than 3/4" less than height of the shaft opening.

G-P SHAFT LINER

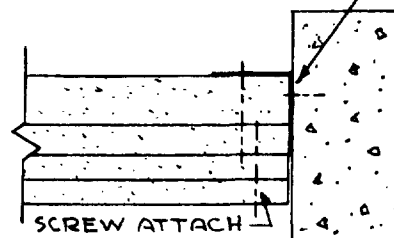
DETAILS

2 HR. FIRE RATED WALL

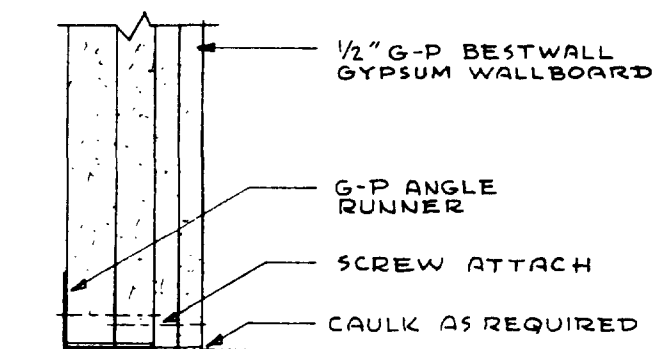
TOP



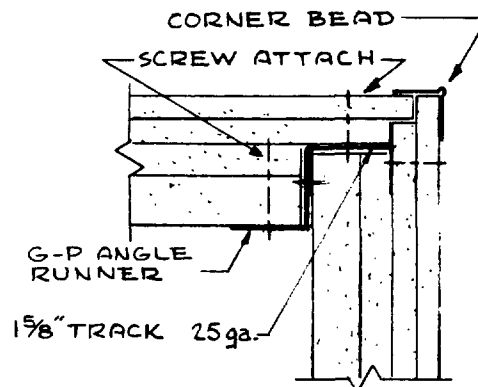
G-P ANGLE RUNNER



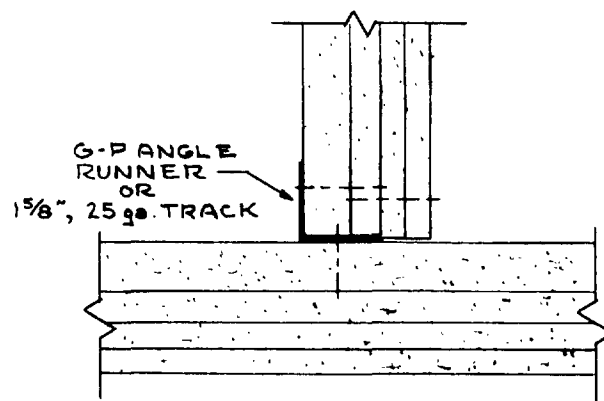
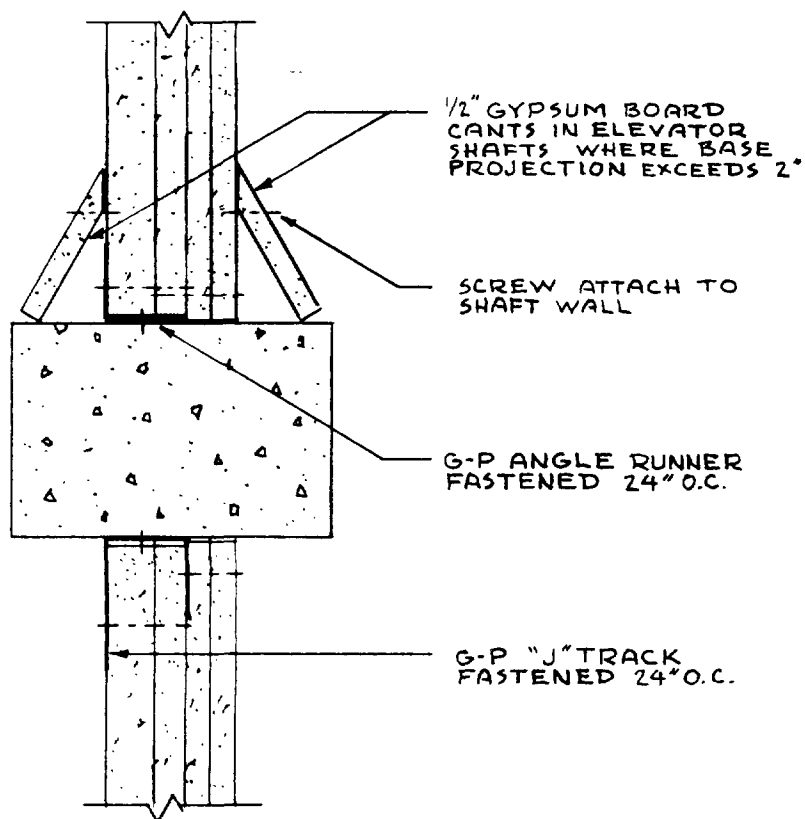
END



BOTTOM



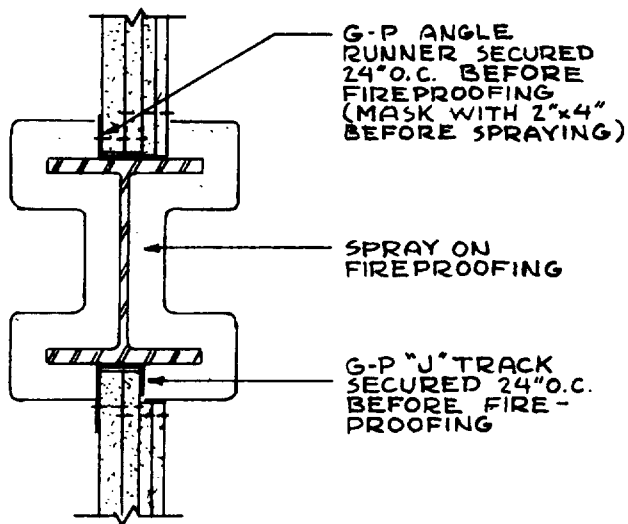
CORNER



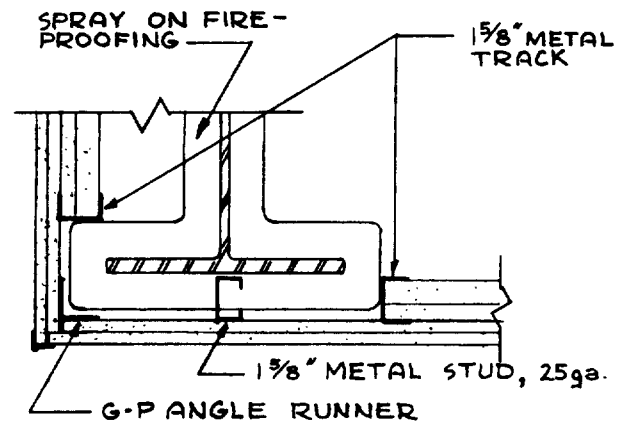
WALL INTERSECTION

CONCRETE BEAM

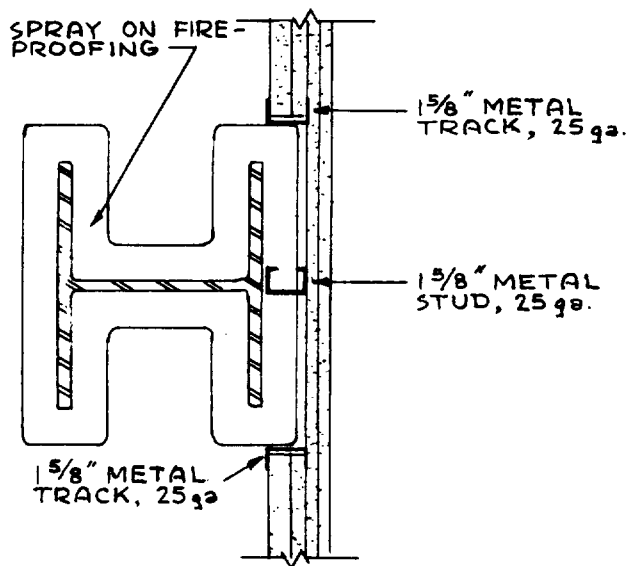
SGP 0027709



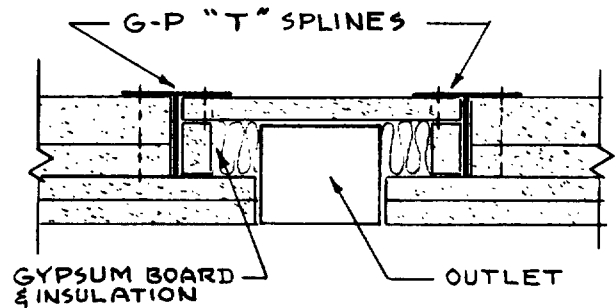
STEEL BEAM



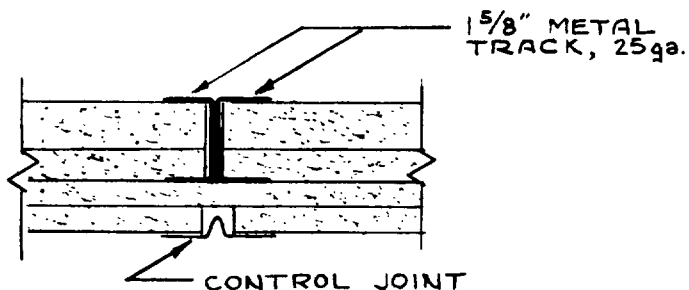
CORNER COLUMN



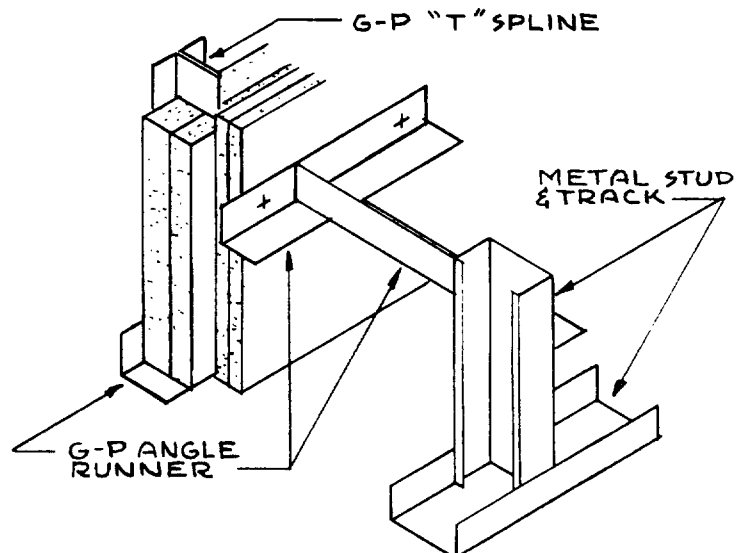
COLUMN BYPASS



OUTLET BOX

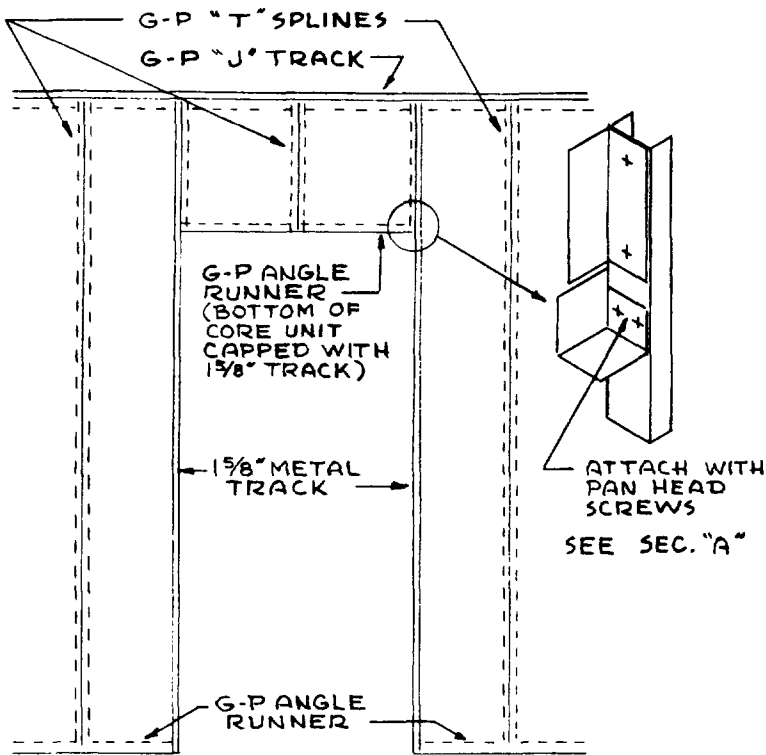


EXPANSION JOINT

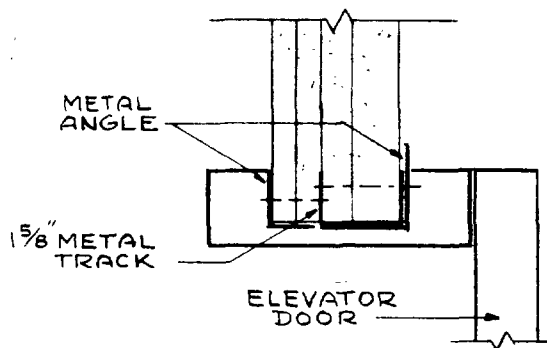


CHASE WALL

SGP 0027710

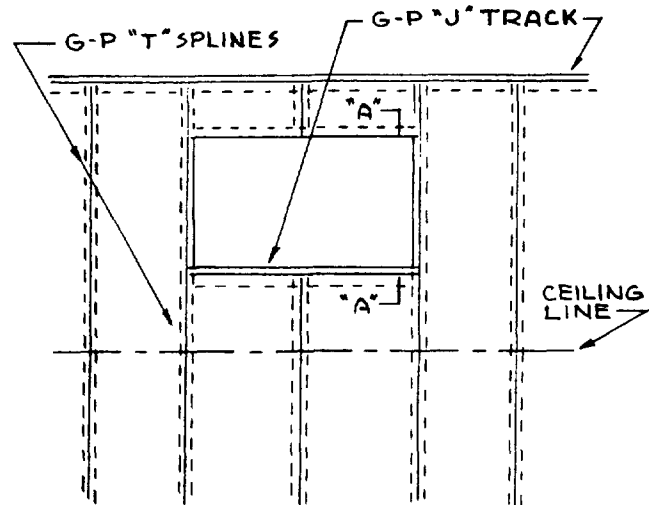


ROUGH DOOR OPENING

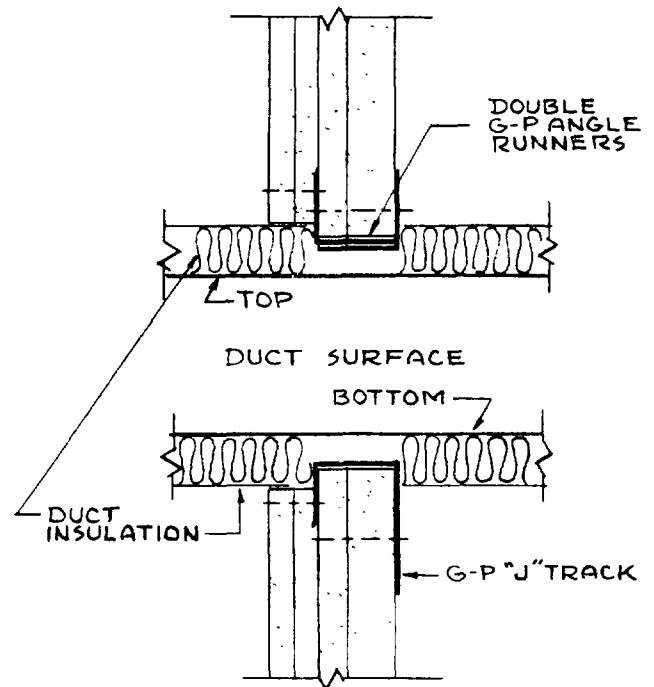


NOTE: ELEVATOR FRAME, DOORS, & OPERATING ACCESSORIES TO BE SUPPORTED SEPARATELY

**SECTION "A"
ELEVATOR DOOR HEAD**



DUCT OPENING



**SECTION "A-A"
DUCT OPENING**

SGP 0027711

HIAB

TRADEMARK

Hi-TILT



SGP 0027712

Designed expressly for the delivery of dry wall material and similar products, the new HIAB Hi-Tilt gives building material distributors savings in time and dollars impossible only a short time ago.

Hi-Tilt loads or unloads up to 30 pieces of 12-ft. wallboard at a time. It picks up the entire bundle, raises it more than 20 feet in the air, tilts it vertically and places it in upper story openings.

One operator, standing on the ground, can unload from either side of the truck.

Extendable hydraulic stabilizers relieve the truck frame of dangerous stresses. And, when in travelling position, the Hi-Tilt nestles snugly over the cab, allowing complete use of the entire truck body for the dry wall or other material.

"The Only Practical Way to Deliver Wallboard"

So said a high official of one of the country's largest gypsum manufacturers after seeing the new HIAB Hi-Tilt in operation. "It makes all other methods seem old fashioned."

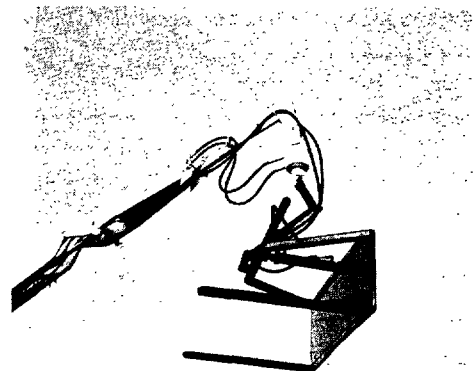
HIAB Engineers designed and developed the Hi-Tilt to do the job safely, efficiently and economically. All the know-how that has made HIAB Speedloaders the most popular hydraulic loading equipment in the world has been incorporated into the new Hi-Tilt. HIAB by-pass valves that prevent overloading, constant flow valves that reduce shock--- these and all the other exclusive HIAB Safeguard Engineering Features-- are found only in the Hi-Tilt.

HIAB Hi-Tilts are made to the most rigid specifications in the industry. They are manufactured to give long years of trouble free service. Ask for a Hi-Tilt demonstration. Check its many features against any other method and you'll know why more than 50,000 customers have made HIAB their choice throughout the world.



SPECIFICATIONS.

Boom Length.....18 ft.
Vertical Reach...21 1/2 ft.
Weight.....2500 lbs.
Stabilizer Span...8 - 12 ft.
Mounting Space.....15 in.
Rotation.....375°



HIAB HYDRAULICS, INC.

(Area Code 302) 994-0997 998-4632
3410 Lancaster Pike, Wilmington, Delaware 19805

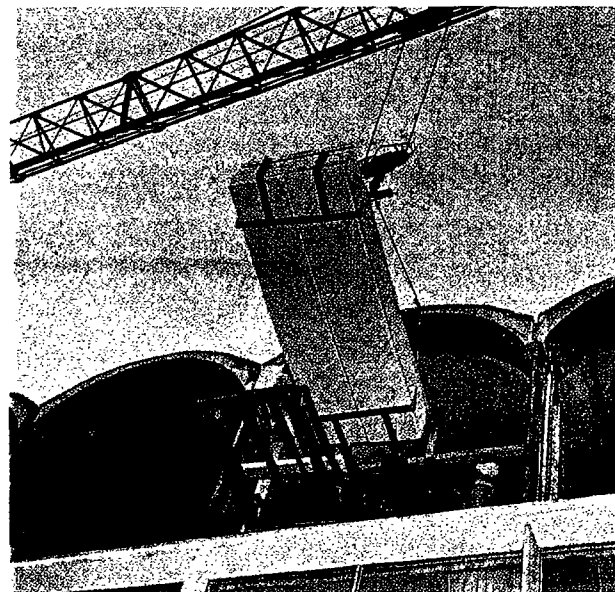
SGP 0027713

HOISTING EQUIPMENT SUGGESTIONS FROM

BESTWALL

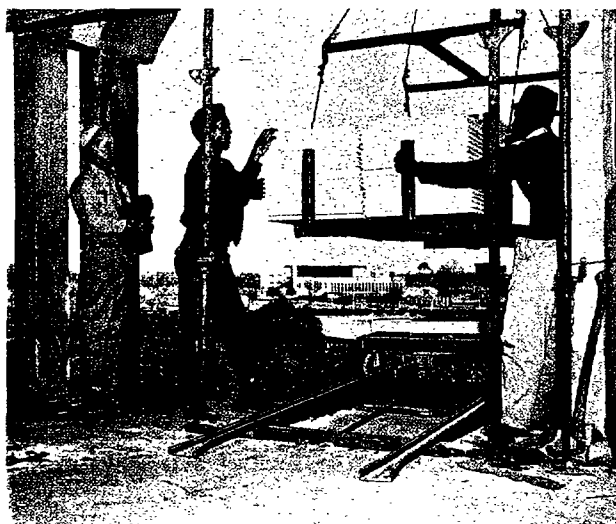


SPEED OF TRANSFER



VERSATILITY (2,000 to 5,000 LB. LOADS)

SIMPLICITY IN DESIGN



ECONOMY IN OPERATION



Details for a Lift and accessories for hoisting and distributing
Gypsum Wallboard, Backer Board, Gypsum Lath or
Gypsum Form Board into High Rise Buildings.



GEORGIA-PACIFIC

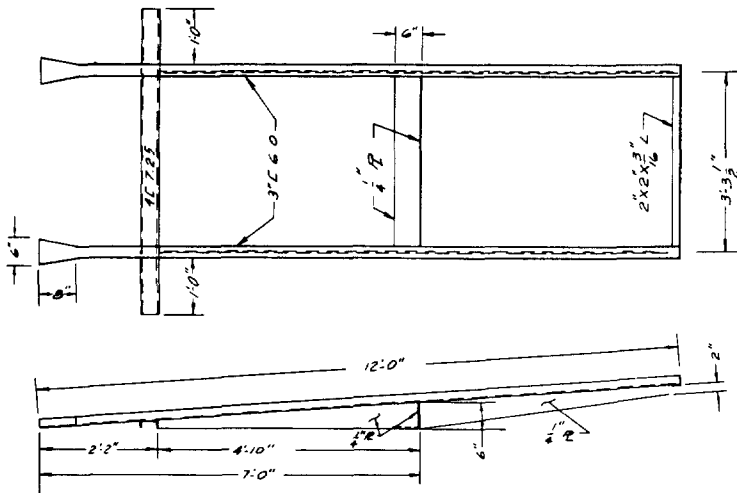
BESTWALL

GYPSUM DIVISION

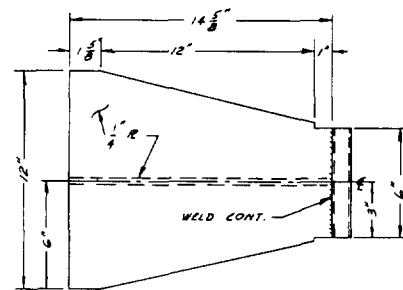
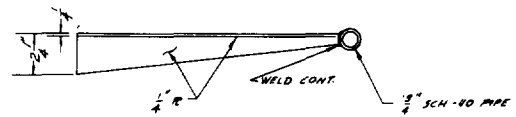
SGP 0027714

Assembly and detail of suggested wallboard handling equipment (Dolly cart and track)

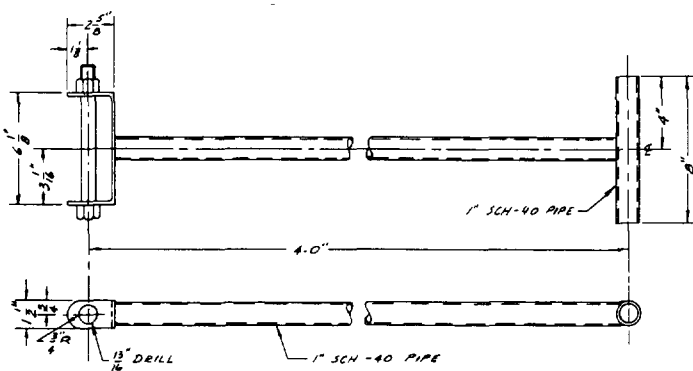
Track



TRACK
SCALE 1" = 1'0"

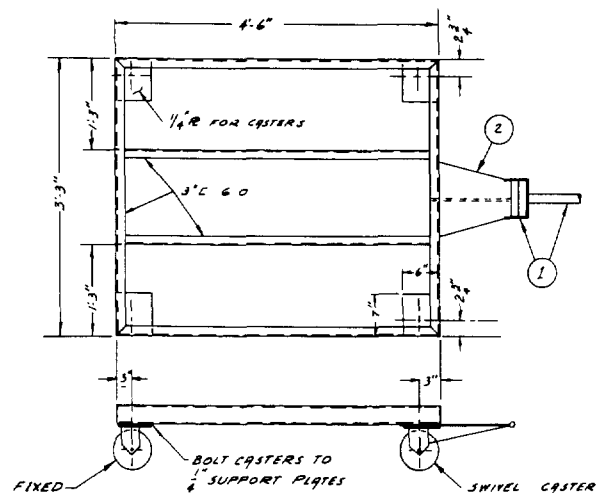


ITEM #1
SCALE 1" = 1'0"



ITEM 2

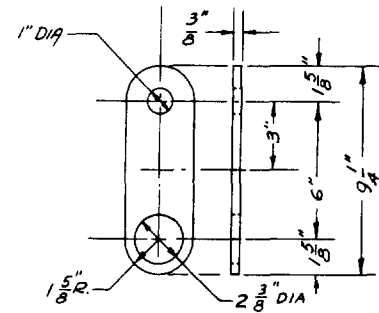
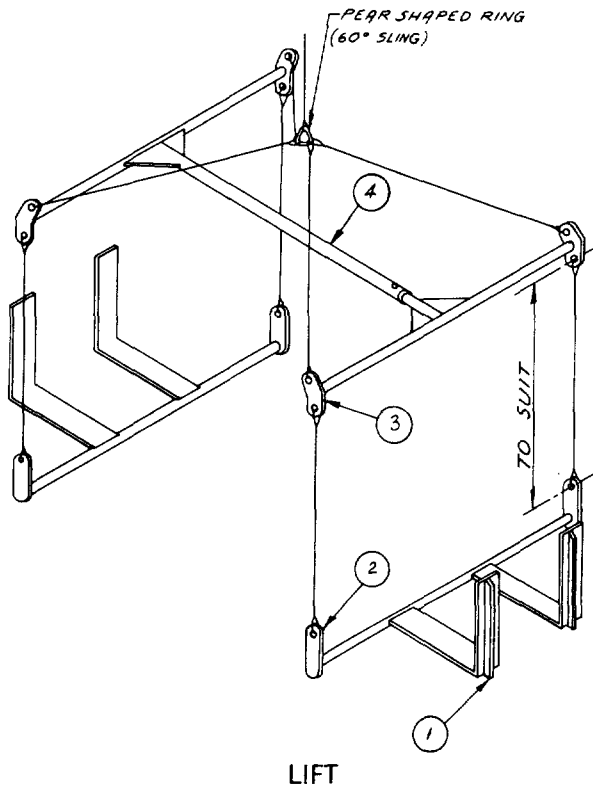
Dolly Cart



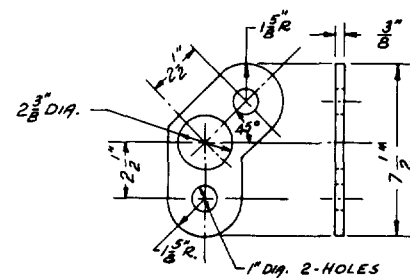
DOLLY CART
SCALE 1" = 1'0"

SGP 0027715

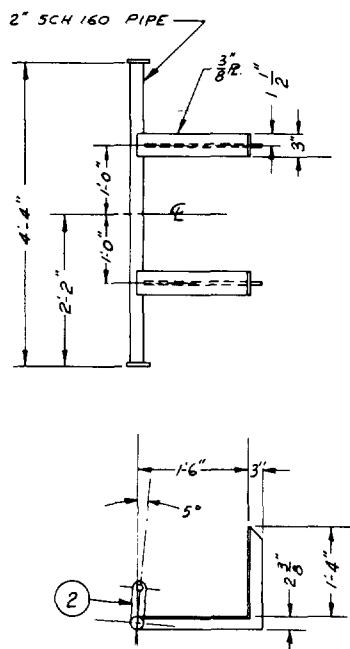
Detail of suggested wallboard "lift" (Lift)



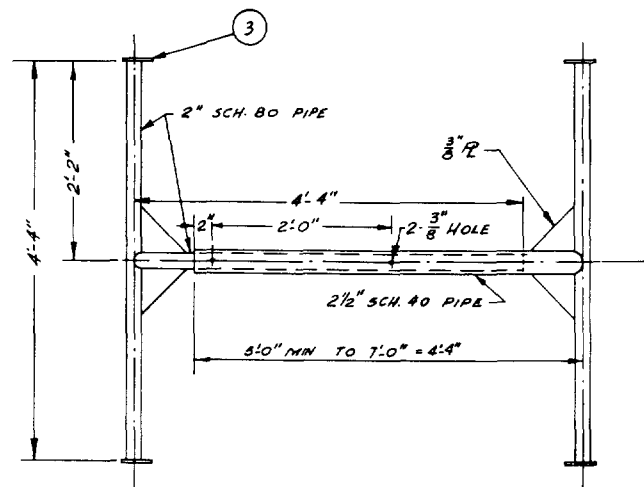
ITEM #2 MAT'L C.R.S.
4 REQ'D



ITEM #2 MAT'L C.R.S. 4 REQ'D
SCALE 3" = 12"



ITEM #1 MAT'L AS NOTED
SCALE 3/4" = 1'0" 2-REQ'D



ITEM #4 1-REQ'D
MAT'L AS NOTED

SGP 0027716

DESCRIPTION

The details for the suggested design for a "LIFT" —"DOLLY CART" and "TRACK" has been used in the Texas area by many sub-contractors for lifting gypsum wallboard and distributing gypsum wallboard in high rise buildings.

DRAWINGS

Drawings No. G.S. SK-1 and No. G.S. SK-2 give **suggested details** for your engineers to work out specific details for each and every assembly in all areas for specific design and for your weight load requirements.

The "LIFT" may be used with the various types of **Boom Cranes** and/or the top mounted **Linden Type Crane**, etc.

COMPLETE LIFT AND CART ASSEMBLY

- 1)—LIFT—(1)
- 2)—DOLLY CARTS—(3)
- 3)—TRACK—(1)

Note: The complete assembly is manufactured in some areas, and painted for approximately (\$70.00 to \$100.00 per unit).

SPEED

Organization in the delivery, lifting and distribution of various lengths of gypsum wallboard in a high rise building is an important factor the sub-contractor must consider when pricing partition assemblies in high rise building. Many sub-contractors have delivered, stocked and distributed over 96,000 sq. ft. of gypsum wallboard throughout a high rise building in less than 6 hours with the described assembly.

Pre-Pallatized bundles of gypsum wallboard of pre-arranged lengths and weights are delivered to a job and lifted and set on the Dolly Carts that have been pre-positioned on the extended track and the Dolly Carts are pulled throughout the building. The wallboard may be hand unloaded or unloaded with various types of small fork lifts (Hydraulic or Electric).

PALLATIZED BUNDLES OF GYPSUM WALLBOARD—WEIGHTS

SALES OFFICES

Consult the Bestwall Sales Office for
The Original Glass Fibered Reinforced Gypsum Wallboard.

ATLANTA

125 Otterly Drive, N.E.
Atlanta, Georgia 30324

CHICAGO

5544 W. St. Charles Road
Berkeley, Illinois 60162

CLEVELAND

3530 Warrensville Center Road
Shaker Heights
Cleveland, Ohio 44122

DETROIT

Suite 227, Officenter Building
Detroit, Michigan 48235

KANSAS CITY

4233 Blue Ridge Boulevard
Kansas City, Missouri 64133

NEW ORLEANS

7800 Alamonaster Drive
New Orleans, Louisiana 70126

SAN FRANCISCO

301 El Cerito Plaza
El Cerito, California 94532

SOUTHWEST

600 Exchange Bank Building
Dallas, Texas 75235

WESTERN

Room 404, Tribune Building
143 S. Main Street
Salt Lake City, Utah 84101

WILMINGTON

Wilmington Marine Terminal
Wilmington, Delaware 19899

SGP 0027717



GEORGIA-PACIFIC / BESTWALL GYPSUM DIVISION

2 INDUSTRIAL BOULEVARD • PAOLI, PENNSYLVANIA 19301

BESTWALL GYPSUM COMPANY

GYPSUM WALLBOARD MANUAL

1965 EDITION

Section 9

Sub-Section B

SOUND TESTS OF WALL and CEILING ASSEMBLIES

This table is a summary only, based on sound characteristics of assemblies with specific details as covered in Official Test Reports and/or publications of the National Bureau of Standards, Ohio Research Corporation, Geiger and Hamme, Riverbank Laboratories and/or the Bestwall Gypsum Company.

Official Test Reports for sound tests sponsored by the Bestwall Gypsum Company are available from the Bestwall Gypsum Company, Paoli, Pennsylvania.

The table is not meant as a complete listing of all sound tests in the Industry, but you will find some of the latest sound tests reported by the Industry and the Bestwall Gypsum Company.

- | | | | |
|-----|--------------------------------|-----|------------------------------------|
| 1. | Partition - Gypsum Wallboard | -- | Wood Framing |
| 2. | Partition - Gypsum Wallboard | -- | Nailable Metal Stud |
| 3. | Partition - Gypsum Wallboard | -- | Clips & Metal Stud |
| 4. | Partition - Gypsum Wallboard | -- | Metal Screw Stud |
| 5. | Partition - Gypsum Wallboard | -- | Donn Movable Metal Stud |
| 6. | Partition - Gypsum Wallboard | -- | Semi-Solid Lamination |
| 7. | Partition - Gypsum Wallboard | -- | Solid Lamination |
| 8. | Partition - Gypsum Wallboard | -- | Double Solid Lamination |
| 9. | Floor and Ceiling Construction | -- | Gypsum Wallboard Wood Joists |
| 10. | Partition - Plaster | --- | Wood Framing |
| 11. | Partition - Plaster | --- | Nailable Metal Stud |
| 12. | Partition - Plaster | --- | Solid (Gypsum LATH and METAL LATH) |

SGP 0027718

PARTITION CONSTRUCTION S.(1)	WOOD FRAMING	STUD SPACE O.C.	PANEL THICK- NESS	TEST REF.	YEAR OF TEST	WT. LB. SQ.FT.	WALL SURFACE
WOOD STUDS	1" X 3"	16"	3-1/8"	BS-211	1943	2.5	1/4"-PLYWOOD - GLUED - BOTH SIDES
WOOD STUDS STAGGERED	1" X 3"	8" 16"	4-1/8"	BS-214	1943	2.9	1/4" PLYWOOD - GLUED - BOTH SIDES
WOOD STUDS	2" X 4"	16"	4-5/8"	---		6.0	1/2" BWG - BOTH SIDES NAILED W/MINERAL WOOL IN STUD SPACE
WOOD STUDS	2" X 4"	16"	4-5/8"	BS-234	1953	5.6	1/2" BWG - BOTH SIDES - NAILED
WOOD STUDS STAGGERED	2" X 4"	8" 16"	4-5/8" 4-5/8"	BS-242	1957	6.2	1/2" BWG - BOTH SIDES - NAILED
BWG - RIB	- - - -	24"	4"	RVB	1957	4.1	1/2" BWG - BOTH SIDES - SCREWED
WOOD STUDS	2" X 4"	16"	4-7/8"	OR-64-8		7.0	5/8" F/S - BOTH SIDES - NAILED
WOOD STUDS STAGGERED	2" X 3"	8" 16"	4-7/8" 4-7/8"	BS-243 TR56-14	1957 1956	7.7 8.7	5/8" BWG - BOTH SIDES - NAILED
WOOD STUDS	2" X 4"	16"	5-1/2"	OR 64-11		9.5	5/8" F/S - 1 LAYER ONE SIDE - 2 LAYERS OTHER SIDE
WOOD STUDS	2" X 4"	16"	5-1/8"	BS-225	1948	8.2	2 LAYERS - 3/8" BWG. - NAILED EACH SIDE - HUMMER SYSTEM "A"
WOOD STUDS STAGGERED	2" X 3"	8" 16"	5-5/8"	BS-235	1953	11.0	2 LAYERS - 1/2" BWG - EACH SIDE NAILED
WOOD STUDS	2" X 4"	16"	6-1/8"	OR-64-12		12.0	2 LAYERS - 5/8" F/S - EACH SIDE NAILED
WOOD STUDS	2" X 3"	8"	6-1/8"	BS-244	1957	13.4	2 LAYERS - 5/8" BWG - EACH SIDE NAILED
STAGGERED		16"	"	"	"	"	" " " " " " "
WOOD STUDS	2" X 4"	16"	9"	BS-244		13.4	2 LAYERS 5/8" F/S - EACH SIDE NAILED
WOOD STUDS	2" X 4"	16"	5-7/8"	OR-64-67		13.4	5/8" F/S - 1/2" SOUND DEADENING BOARD - BOTH SIDES
WOOD STUDS	2" X 4"	16"	5-3/8"	OR-64-19		7.1	1 LAYER - 5/8" F/S - NAILED - 1 LAYER SCREWED TO RESILIENT CHANNEL OTHER SIDE
WOOD STUDS	2" X 4"	16"	5-3/8"	OR-64-16		7.2	1 LAYER - 5/8" F/S - NAILED - 1 LAYER - SCREWED TO RESILIENT CHANNEL OTHER SIDE - PLUS FIBERGLASS INSULATION IN STUD SPACE
WOOD STUDS	2" X 4"	16"	6"	OR-64-15		9.6	2 LAYERS - 5/8" F/S - NAILED ONE SIDE - 1 LAYER 5/8" F/S - SCREWED TO RESILIENT CHANNEL OTHER SIDE
WOOD STUDS	2" X 4"	16"	5-5/8"	-----		9.9	2 LAYERS - 1/2" BWG - BOTH SIDES
WOOD STUDS STAGGERED	2" X 4"	16"	5-5/8"	-----		11.0	2 LAYERS - 1/2" BWG - BOTH SIDES
WOOD STUDS	2" X 4"	16"	5-1/4"	TR 59-9	1958	8.2	1 LAYER - 3/8" BACKER BD. WITH RL CLIPS - 1 LAYER 3/8" BWG - BOTH SIDES

** BWG - BESTWALL GYPSUM
F/S - BESTWALL FIRESTOP
BS - BUREAU OF STANDARDS
OR - OHIO RESEARCH

TN - - - - -
TR - - - - -
TL - - - - - RIVERBANK

SGP 0027719

s.(1)

SOUND TRANSMISSION CHARACTERISTICS INDIVIDUAL FREQUENCIES-CPS											STC	D. B. AVER. 128 TO 4096	SPEECH PRIV. RANGE 6	AVER. PLUS 5	LOAD BEAR- ING	NON LOAD BEARING
125	175	250	350	500	700	1000	1400	2000	2800	4000	5					
128	192	256	384	512	768	1024	1536	2048	2828	4096						
16	16	18	20	26	27	28	-	37	-	33	-	24	-	-	-	X
14	17	20	23	28	30	33	-	40	-	30	-	29	-	-	-	X
-	-	-	-	-	-	-	-	-	-	-	-	40	-	-	-	-
22	23	28	32	33	41	44	-	46	-	39	-	34	-	-	-	-
36	31	36	40	40	46	47	-	52	-	45	-	42	-	47	-	-
26	27	33	37	40	44	41	48	50	42	40	-	38	-	-	-	-
22	16	29	31	33	38	41	41.5	36	36.5	-	34	32	38	-	-	-
43	44	37	38	40	46	48	-	41	-	50	-	43	-	46	-	X
-	-	-	-	-	-	-	-	-	-	-	-	43	-	-	-	-
23.5	19.5	33	34.5	36	40	43	45	40	40	47	37	35	41	-	-	-
27	24	31	35	40	42	46	-	53	-	48	-	38	-	-	-	-
42	40	39	40	45	42	45	-	41	-	53	-	43	-	-	-	-
26.5	22	36	37	42	43.5	48	49.5	45	44.5	51	41	39	46	-	-	-
41	41	41	43	46	48	49	-	41	-	54	-	45	-	50	-	-
-	-	-	-	-	-	-	-	-	-	-	-	45	-	-	-	X
-	-	-	-	-	-	-	-	-	-	-	-	45	-	-	-	X
25	30	38	43	47	52	57	58	55	54	59	46	45	51	-	-	X
27.5	26	33	41	43	49	51	51	42	41.5	51	43	40	46	-	-	-
33.5	35	43	50.5	51	54	55	53	44	47.5	53	50	48	53	-	-	-
32.5	32	38	44.5	49	52.5	55	56.5	49	45	54	48	45	51	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	39	-	-	-	-
42	40	39	40	45	42	45	-	41	-	53	-	43	-	-	-	X
34	36	40	44	44	44	46	-	48.5	-	46	-	42	-	47	-	-

PARTITION CONSTRUCTION	WOOD FRAMING	STUD SPACE O.C.	PANEL THICK- NESS	TEST REF.	YEAR OF TEST	WT. LB. SQ.FT.	WALL SURFACE
WOOD STUDS DOWN - DG - 8 RESIL.CHANNEL	2" X 4"	16"	--	--	--	---	1/2" F/S - NAILED - ONE SIDE DG - 8 @ 24" O.C. - HORIZONTALLY - 1/2" F/S - SCREWED TO DG - 8 -
WOOD STUDS DOWN - DG - 8 RESIL.CHANNEL	2" X 4"	16"	--	--	---	---	5/8" F/S - NAILED - ONE SIDE DG - 8 @ 24" O.C. - HORIZONTALLY - 5/8" F/S - SCREWED TO DG - 8
WOOD STUD DOWN - DG - 8 RESIL.CHANNEL	2" X 4"	16"	--	--	---	---	5/8" F/S - NAILED - ONE SIDE DG - 8 @ 24" O.C. HORIZ. - 5/8" F/S - SCREWED TO - DG - 8 - 1-1/2" FIBERGLAS - ECCM. BLANKET IN STUD SPACE
WOOD STUD DOWN - DG - 8 RESIL.CHANNEL	2" X 4"	16"	--	--	---	---	2 LAYER - 1/2" F/S - ONE SIDE DG - 8 @ 24" O.C. HORIZ. - 1 LAYER SCREWED TO OTHER SIDE
WOOD STUD DOWN - DG - 8 RESIL.CHANNEL	2" X 4"	16"	--	--	---	---	2 LAYER - 5/8" F/S - ONE SIDE DG - 8 @ 24" O.C. - HORIZ. - 1 LAYER 5/8" F/S - SCREWED TO - R. CHANNEL OTHER SIDE
DENS-COTE BASE OVER WOOD STUDS 2" X 4" W.STUDS	1/2"	16"	--	--	---	---	1/2" DENS-COTE BASE WITH 3/32" - DENS-COTE EACH SIDE
(2) WALLBOARD NAILING STUD	METAL FRAMING						
F & H NAILING STUDS	3-1/4"	24"	4-3/4"	TR 56-43	1956	6.1	5/8" BWG - EACH SIDE
NAILING STUD	3-5/8"	24"	4-7/8"	----	--	6.5	5/8" F/S - EACH SIDE
NAILING STUD	3-5/8"	24"	6-1/8"	----	--	11.5	2 LAYERS 5/8" F/S EACH SIDE
FGH NAILING STUD (STAGGERED)	3-1/2"	12" 24"	5-1/2"	TR-56-44	1956	6.6	5/8" BWG - EACH SIDE
PENN METAL NAILING STUD (STAGGERED)		24" 24"	5-5/8" 5-5/8"	TR 55-50 TR 55-51	1955 1955	12.8 12.8	5/8" BWG - PLUS 3/8" BWG - EACH SIDE (SAME)
PENN METAL NAILING STUD	3-5/8"	24"	4-7/8"	TN-F103 -655	1960	6.1	5/8" F/S - FINISHED
DONN DS-40 STUD RESILIENT		16"	4-3/8"	DON-1 FT.	9/22 1961	5	1/2" BWG
DONN - DS - 40 STUD RESILIENT		16"	4-3/8"	OC 53 FT.	9/23 1961	5	1/2" BWG - 2 LAYERS OCF - SOUND BLANKET
DONN - DS - 40 - STUD RESILIENT		16"	5-5/8"	TL 59-68	4/9 1959	12	5/8" BWG - 2 LAYERS EACH SIDE
(3) WALLBOARD CLIP & STUD	METAL FRAMING						
PENN METAL CLIP STUD	2-1/2"	24"	3-3/4"	TN-F103 -656	1960	6.4	5/8" F/S paneled
PENN METAL CLIP STUD	2-1/2"	24"	3-3/4"	TL-61 -144	1961	7.0	5/8" F/S - ETERNAWALL

SOUND TRANSMISSION CHARACTERISTICS INDIVIDUAL FREQUENCIES-CPS											STC 5	D. B. AVER. 128 TO 4096	SPEECH PRIV. RANGE 6	AVER. PLUS 5	LOAD BEAR- ING	NON- LOAD BEARING
125 128	175 192	250 256	350 384	500 512	700 768	1000 1024	1400 1414	2000 2048	2800 2828	4000 4096						
-	-	-	-	-	-	-	-	-	-	-	39	37	47	-	-	-
-	-	-	-	-	-	-	-	-	-	-	43	40	46	-	-	-
-	-	-	-	-	-	-	-	-	-	-	50	48	53	-	-	-
-	-	-	-	-	-	-	-	-	-	-	46	43	51	-	-	-
-	-	-	-	-	-	-	-	-	-	-	48	45	51	-	-	-
-	-	-	-	-	-	-	-	-	-	-	41	39	45	-	-	-
(2) WALLBOARD NAILING STUD																
28	38.5	44.5	44.5	47	49.5	53.5	51	53.5	45	48.5	-	45	-	-	-	X
-	-	-	-	-	-	-	-	-	-	-	42	38	-	-	-	X
-	-	-	-	-	-	-	-	-	-	-	47	44	-	-	-	X
30.5	36	41.5	47.5	50	50	52	-	53.5	-	51.5	-	45	-	-	-	X
31.5	33.5	41	47	47.5	46.5	51	-	55	-	51.5	-	45	-	-	-	X
33	35	42	47	48.5	47.5	51	-	58	-	52	-	46	-	-	-	X
25	30	27	30	34	37	39	-	36	-	41	-	34	-	39	-	X
-	-	-	-	-	-	-	-	-	-	-	50	37	-	-	-	X
-	-	-	-	-	-	-	-	-	-	-	45	45	-	-	-	X
-	-	-	-	-	-	-	-	-	-	-	49	45	-	-	-	X
(3) WALLBOARD CLIP & STUD																
24	28	36	28	32	38	42	-	36	-	42	-	34	-	39	-	X
26	29	35	38	42	43	45	-	35	-	47	-	38	-	43	-	X

SGP 0027722

PARTITION CONSTRUCTION	METAL FRAMING	STUD SPACE O.C.	PANEL THICK- NESS	TEST REF.	YEAR OF TEST	WT. LB. SQ.FT.	WALL SURFACE
<u>WALLBOARD CLIP & STUD</u>							
CLIP	3-1/4"	16"	5"	BS-247		7.5	3/8" GYP. BACKER BD. - CLIPPED TO STUD - PLUS 3/8" BWG LAMINATED
MOLDED IRON	3-1/4"	16"	6-1/4"	G - H	1961	8.5	3/8" GYP. LATH - CLIPPED TO STUD - 1/2" F/S LAMINATED
HOLLOW STUD	3-1/4"	16"	6-1/8"	G - H NES-1 FT.	1961	8.1	5/8" BWG - LAMINATED TO 3/8" GYPSUM LATH
OLSEN CLIP - Z - STUD	3-5/8"	24"	4-7/8"	G - H NES-2 FT.	1961	7.0	5/8" ETERNAWALL - 4"
OLSEN CLIP - Z - STUD	3-5/8"	24"	4-7/8"	G - H NES-4 FT.	1961	7.0	5/8" ETERNAWALL - 4" G/F - Z STUD - STAGGERED JOINTS & 3" G/F INSUL.
OLSEN CLIP - Z - STUD	3-5/8"	24"	4-7/8"	G - H NES-5 FT.	1961	7.0	5/8" ETERNAWALL - 2" Z STUDS - 3" G/F INSUL.
(4) <u>WALLBOARD SCREW STUD</u>							
SCREW STUD	1-5/8"	24"	2-7/8"	TL-62-72		5.7	5/8" F/S - EACH SIDE
SCREW STUD	3-5/8"	24"	4-5/8"	OR-63-11		6.0	5/8" F/S - EACH SIDE
SCREW STUD	3-5/8"	24"	5-1/2"	OR-64-32		8.5	5/8" F/S - 1 LAYER ONE SIDE - 2 LAYERS OTHER SIDE
SCREW STUD	3-5/8"	24"	5-1/2"	OR-64-51		8.6	5/8" F/S - 1 LAYER ONE SIDE 2 LAYERS OTHER SIDE - FIBERGLASS - INSUL. IN STUD SPACE
SCREW STUD	1-5/8"	24"	3-7/8"	OR-64-61		8.4	5/8" F/S - 1 LAYER ONE SIDE - FIBERGLASS INSULATION IN STUD SPACE - 1 LAYER 5/8" F/S OVER - 1" COREBD. - OTHER SIDE
SCREW STUD	3-5/8"	24"	6-1/8"	OR-64-52		11.0	5/8" F/S - 2 LAYERS EACH SIDE
SCREW STUD	3-5/8"	24"	6"	OR-64-34		8.8	5/8" F/S - 2 LAYERS ONE SIDE 1 LAYER OVER 1/2" FIBER- GLASS BOARD - OTHER SIDE
SCREW STUD	3-5/8"	24"	6-1/8"	OR-64-50		11.1	5/8" F/S - 2 LAYERS EACH SIDE - FIBERGLASS IN STUD SPACE
DG - 40 METAL STUD	2-1/2"	24"	---	DG-404 TL		--	1/2" BWG - EACH SIDE
DONN D-W-26 METAL STUD	1-5/8"	24"	2-7/8"	TL 62-72	12/13 1961	5.6	5/8" BWG - EACH SIDE
DONN D-W-48 METAL STUD	3"	24"	4"	TL 62-18	9/22 1961	4.55	1/2" BWG - EACH SIDE
DONN D-W-58 METAL STUD	3-5/8"	16"	4-7/8"	TL 61 -208	6/30 1961	7.0	5/8" BWG - EACH SIDE
DONN D-W-58 METAL STUD	3-5/8"	16"	5-1/2"	TL 62-19	10/5 1961	8.9	2 LAYERS - 5/8" BWG - ONE SIDE 1 LAYER 5/8" BWG - OTHER SIDE
DONN D-W-58 METAL STUD	3-5/8"	16"	6-1/8"	TL 61 -237	7/26 1961	11.9	2 LAYERS - 5/8" BWG - LAMIN. BOTH SIDES
(5) <u>WALLBOARD MOVABLE PARTITION</u>							
DONN D-H-945 METAL STUDS		22"	2-3/4"	TL 61 -177	1961	6.25	5/8" BWG - DONN D-H-945 - M. STUD - SYS. "A" MOVABLE

SGP 0027723

SOUND TRANSMISSION CHARACTERISTICS INDIVIDUAL FREQUENCIES-CPS											STC	D. B. AVER. 128 TO 4096	SPEECH PRIV. RANGE 6	AVER. PLUS 5	LOAD BEAR- ING	NON LOAD BEARING
125	175	250	350	500	700	1000	1400	2000	2800	4000	5					
128	192	256	384	512	768	1024	1414	2048	2828	4096						
35	34	39	43	44	49	50	-	50	-	51	-	45	-	-	-	X
27	31	34	40	44	54	55	59	58	58	61	-	47.2	-	-	-	X
27	31	34	40	44	54	55	57	58	58	61	-	47.1	-	-	-	X
30	34	41	45	46	44	43	43	51	47	49	-	43.0	-	-	-	X
31	35	42	46	49	44	46	47	53	51	50	-	45.0	-	-	-	X
32	36	38	43	46	45	46	47	53	58	49	-	43.8	-	-	-	X
(4) WALL BOARD SCREW STUD																
25	29	35	35	40	41	44	43	33	36	44	35	36	-	-	-	X
-	-	-	-	-	-	-	-	-	-	-	42	38	45	-	-	X
24	25	33	40	46	49	52	51	44	45	50	43	40	48	-	-	X
31	37	45	49	52	55	57	55	50	48	51	50	47	53	-	-	X
30	38	43	49	51	54	55	54	51	50	53	52	47	53	-	-	X
28	29	36	44	48	52	55	53	47	51	55	47	44	51	-	-	X
25	33	41	47	52	54	56	55	50	51	55	48	46	53	-	-	X
36	41	49	51	55	55	56	55	50	52	55	52	50	54	-	-	X
25	26	34	36	40	42	46	47	46	36	41	38	37	-	-	-	X
-	-	-	-	-	-	-	-	-	-	-	35	36	-	-	-	X
26	27	33	37	40	44	47	48	50	42	40	42	39.4	-	-	-	X
32	32	38	40	43	44	49	51	46	45	51	44	42	-	-	-	X
-	-	-	-	-	-	-	-	-	-	-	45	42	-	-	-	X
32	34	41	42	44	46	46	40	45	50	59	40	43	-	-	-	X
(5) WALL BOARD MOVABLE PARTITION																
25	26	29	32	35	38	40	41	36	37	41	-	34.5	-	-	-	X

SGP 0027724

PARTITION CONSTRUCTION	METAL FRAMING	STUD SPACE O.C.	PANEL THICK- NESS	TEST REF.	YEAR OF TEST	WT. LB. SQ.FT.	WALL SURFACE
<u>WALLBOARD</u> <u>MOVABLE PARTITION</u> (CONTINUED)							
DONN - DH-326 STUD TRACKS	"	22"	2-3/4"	TL 61 -211	1961	6.70	5/8" BWG - DONN - DH-326 STUD TRACKS - SYSTEM "B"
DONN - DH-326 STUD TRACKS	"	22"	2-3/4"	TL 61 -212	1961	6.4	5/8" BWG - DONN - DH-326 STUD TRACKS - SYSTEM "C"
DONN - DH-445 METAL STUDS	"	22"	4-5/32"	TL 61 -238	1961	12.0	2 LAYERS 5/8" BWG - LAMINATED- - BOTH SIDES
DONN - DH-444 METAL STUD (STAGGERED)	"	24"	3-1/2"	TL 62 -174	3/8 1962	4.8	1/2" BWG - DONN - DH-444 EACH SIDE
(6) <u>WALLBOARD</u> <u>SEMI-SOLID</u>							
SEMI-SOLID	2-1/4"	--	2-1/4"	BW-8 FT.	--	7.2	BESTWALL HUMMER SYSTEM "B" 5/8" F/S - EACH SIDE OF 1" X 6" GYPSUM RIB.
SEMI-SOLID	4-3/4"	--	4-3/4"	OR-64-57	--	10.0	BESTWALL HUMMER SYSTEM "B" 5/8" F/S - OVER 1/2" SOUND DEADENING BOARD - EACH SIDE OF 2-1/2" X 3" GYPSUM RIB.
SEMI-SOLID	2-1/4"	---	2-1/4"	TL-60 -131	1960	7.8	BESTWALL HUMMER SYSTEM "C"
SEMI-SOLID 2' PREFAB. PARTITION	2-1/4"	---	2-1/4"	GH- BW-9 FT.	1962	7.3	5/8" BWG - EACH SIDE - OVER 1" GYPSUM RIB - FACE 2' MODULE.
SEMI-SOLID 4' PREFAB. PARTITION	2-1/4"	---	2-1/4"	GH- BW-8 FT.	1962	6.4	BESTWALL HUMMER SYSTEM "B" 5/8" F/S - EACH SIDE OVER 1" GYPSUM RIB - FACE 4' MODULE.
SEMI-SOLID		---	4"	TR 57 -42	1957	15.0	BESTWALL HUMMER SYSTEM "B" (2 LAYERS)
SEMI-SOLID		---	5"	TR 57 -43	1957	15.5	BESTWALL HUMMER SYSTEM "B" (2 LAYERS)
(7) <u>WALLBOARD</u> <u>SOLID LAMINATED</u>							
2" SOLID PARTITIONS		---	2"	---	---	8.1	1/2" BWG - EACH SIDE OF 1" CORE BOARD- LAMINATED.
2-1/4" SOLID PARTITION		---	2-1/4"	---	---	9.1	5/8" F/S - EACH SIDE OF 1" CORE BOARD- LAMINATED.
2 LAYERS 1/2" BWG GLUED		---	1"	BS-528	1942	4.5	-----
4 LAYERS 1/2" BWG GLUED		---	2"	BS-522	1949	8.9	-----
4 LAYERS 1/2" BWG GLUED		---	2"	TR 56-15	1956	8.8	-----
2-1/4" SOLID PARTITION		---	2-1/4"	TR 59 -38	1959	10.6	1" GYPSUM CORE - 5/8" BWG EACH SIDE (VAUGHN PARTITIONS)

SOUND TRANSMISSION CHARACTERISTICS INDIVIDUAL FREQUENCIES-CPS												STC	D. B. AVER. 128 TO 4096	SPEECH PRIV. RANGE 6	AVER. PLUS 5	LOAD BEAR- ING	NON LOAD BEARING
125	175	250	350	500	700	1000	1400	2000	2800	4000		5					
128	192	256	384	512	768	1024	1414	2048	2828	4096							
WALLBOARD MOVABLE PARTITION (CONTINUED)																	
26	23	27	28	31	33	35	36	35	34	40		-	31.6	-	33	-	X
22	20	23	22	25	27	29	30	31	31	37		-	27.0	-	28	-	X
32	34	39	39	43	43	44	42	41	46	52		-	41.0	-	41	-	X
-	-	-	-	-	-	-	-	-	-	-		38	34	-	-	-	-
(6) WALLBOARD SEMI-SOLID																	
21	17	27	34	36	40	39	43	36	36	39		35	32	37	-	-	X
28	36	43	46	50	54	58	59	58	57	59		51	48	56	-	-	X
23	23	31	36	36	38	39	39	36	36	41		37	34	37	-	-	X
27	24	20	29	34	33	37	40	35	37	39		-	32.4	-	-	-	X
21	17	27	34	36	40	39	43	36	36	39		-	33.5	-	-	-	X
29.5	31.0	34.5	37.0	38.0	36.5	35.0	-	42.0	-	51.5		-	37	-	42	-	X
32.0	34.0	37.5	39.5	39.5	38.0	38.5	-	46.5	-	54.0		-	40	-	45	-	-
(7) WALLBOARD SOLID LAMINATED																	
-	-	-	-	-	-	-	-	-	-	-		-	37	-	-	-	X
-	-	-	-	-	-	-	-	-	-	-		-	36	-	-	-	X
24	25	29	32	31	33	32	-	30	-	34		-	30	-	-	-	X
28	35	32	37	34	36	40	-	38	-	49		-	37	-	-	-	X
33.5	37.5	39	38	39.5	37.5	40	-	44	-	41		-	39	-	-	-	X
34.5	35	36	37.5	36	34	33.5	-	36	-	39		-	36	-	41	-	X

PARTITION CONSTRUCTION	FRAMING	STUD SPACE O.C.	PANEL THICK- NESS	TEST REF.	YEAR OF TEST	WT. LB. SQ.FT.	WALL SURFACE
(8) WALLBOARD DOUBLE SOLID							
4" DOUBLE SOLID		---	4"	TR-57 -42	---	13.4	5/8" F/S - 2 LAYERS EACH SIDE 1" GYPSUM RIB
5" DOUBLE SOLID		---	5"	TR-57-43	---	13.4	5/8" F/S - 2 LAYERS EACH SIDE - 1" RIB
6" DOUBLE SOLID		---	6"	OR-64-39	---	13	1/2" BWG OVER 1" CORE BOARD EACH SIDE OF 3" AIR SPACE
6" DOUBLE SOLID		---	6"	OR-64-58	---	17	1/2" BWG - 1 LAYER OVER 1" CORE BOARD EACH SIDE 3" AIR SPACE WITH 1" CORE BD. CENTERED IN AIR SPACE
6" DOUBLE SOLID		---	6"	OR-64-59	---	17.2	1/2" BWG - 1 LAYER OVER 1" CORE BOARD EACH SIDE OF 3" AIR SPACE WITH - 1" CORE BOARD CENTERED IN AIR SPACE AND FIBERGLASS INSULATION IN SPACE - 1 SIDE.
(9) WALLBOARD FLOOR & CEILING FRAMING							
WOOD JOISTS	WOOD	16"	---	EST.	---	14.6	2 LAYERS 5/8" F/S - WITH RESILIENT CHANNEL BETWEEN LAYERS - @ 24" O.C.
WOOD JOISTS	"	16"	---	TL-64 -155	---	11.5	1/2" F/S - SCREWED TO RESILIENT CHANNEL @ 24" O.C.
(10) LATH & PLASTER PARTITIONS							
2" X 1/4"	"	16"	---	-----	---	15	TOTAL THICKNESS - 5-3/8" 3/8" B/W PINHOLATH 1/2" SANDED PLASTER THIN WHITE FINISH.
2" X 1/4"	"	16"	---	-----	---	14.7	TOTAL THICKNESS - 5-3/8" 3/8" PLAIN GYPSUM LATH 1/2" SANDED PLASTER THIN WHITE FINISH.
2" X 1/4"	"	16"	---	-----	---	18.1	TOTAL THICKNESS - 5-3/8" METAL LATH - 3/4" SANDED PLASTER - THIN WHITE FINISH.
PLASTER PARTITIONS							
2" X 1/4"	"	16"	5-3/8"	BS-420	1949	13.1	3/8" GYPSUM LATH WITH CLIP PLUS 1/2" SANDED PLASTER
2" X 1/4"	"	16"	5-1/8"	BS-148	1937	15.2	1/2" SANDED PLASTER OVER 3/8" GYPSUM LATH
2" X 1/4"	"	16"	5-1/8"	BS-239	1956	14.2	1/2" SANDED PLASTER OVER 3/8" GYPSUM LATH
2" X 1/4"	"	16"	5-1/8"	TR 56 -12	1956	13.2	1/2" SANDED PLASTER OVER 3/8" GYPSUM LATH
2" X 3"	"	8"	5-1/8"	BS-245	1957	15.6	1/2" SANDED PLASTER OVER 3/8" GYPSUM LATH
STAGGERED		16"					

SOUND TRANSMISSION CHARACTERISTICS INDIVIDUAL FREQUENCIES-CPS												STC 5	D. B. AVER. 128 TO 4096	SPEECH PRIV. RANGE 6	AVER. FLU8 5	LOAD BEAR- ING	NON LOAD BEARING
125	175	250	350	500	700	1000	1400	2000	2800	4000							
128	192	256	384	512	768	1024	1414	2048	2828	4096							
(8) WALL BOARD DOUBLE SOLID																	
29.5	31	34.5	37	38	36.5	35	-	42	-	51.5		-	37	-	-	-	X
32	34	37.5	39.5	39.5	38	38.5	-	46.5	-	54		-	40	-	-	-	"
31	36	41	47	49	49	49	47	51	56	60		47	46	52	-	-	-
29	34	40	45	47	50	54	55	59	60	60		51	46	54	-	-	-
36	45	49	53	55	56	56	58	60	62	63		58	53	58	-	-	-
(9) WALL BOARD FLOOR & CEILING																	
-	-	-	-	-	-	-	-	-	-	-		-	EST. 50	-	-	-	-
34	35	37	44	48	45	49	49	51	50	54		47	44	49	-	-	-
(10) LATH & PLASTER PARTITIONS																	
-	-	-	-	-	-	-	-	-	-	-		-	35 TO 45	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-		-	35 TO 45	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-		-	39	-	-	-	-
PLASTER PARTITIONS																	
46	44	46	56	54	57	57	-	50	-	62		-	52	-	-	-	-
33	28	31	35	39	44	46	-	49	-	66		-	41	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-		-	45	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-		-	44	-	-	-	-
48	48	46	47	48	47	48	-	48	-	59		-	49	-	54	-	-

SGP 0027728

PARTITION CONSTRUCTION	FRAMING	STUD SPACE O.C.	PANEL THICK- NESS	TEST REF.	YEAR OF TEST	WT. LB. SQ.FT.	WALL SURFACE
s(11)							
NAILABLE PARTITION STUD PLASTER							
DS NAILABLE STUD		24"	4-3/8"	TL 64 -45	10/14 1963	10.4	DS - 40 - STUD @ 24" O.C. - 3/8" GYPSUM LATH - 1/2" PLASTER
2-1/2" DS NAILABLE STUD		16"	4-3/8"	TR-57 -38	1957	12.8	1/2" SANDED PLASTER OVER GYPSUM LATH & THIN WHITE COAT.
3-5/8" DS NAILABLE PART. STUD		16"	5-3/8"	TR-57 -40	1957	12.5	1/2" SANDED PLASTER OVER 3/8" GYPSUM LATH & FINISHED THIN WHITE COAT.
3-1/4" DS NAILABLE PART. STUD DONN		16"	5.0"	TR-57 -39	1957	12.4	1/2" SANDED PLASTER OVER 3/8" GYPSUM LATH - FINISHED THIN WHITE COAT.
2-1/2" DS NAILABLE PART. STUD DONN		16"	6"	TL-59 -90 DONN	1959	22.4	3/4" SANDED PLASTER OVER 3/8" - 3.4 LB. EXPAND.D- METAL LATH - FINISHED - THIN WHITE COAT.
GYPSUM LATH STAPLED TO M STUDS		16"	6"	TL-91 DONN	1959	13.0	1/2" SANDED PLASTER OVER 3/8" GYPSUM LATH - STAPLED TO STUDS - FINISHED THIN WHITE COAT.
GYPSUM LATH STAPLED TO M STUDS		---	5-1/4"	TL-60-2 DONN	1959	17.9	5/8" SANDED PLASTER OVER 3/8" GYPSUM LATH - STAPLED TO STUDS - FINISHED THIN WHITE COAT.
(12) LATH & PLASTER SOLID PARTITION							
2" SOLID PARTITION		SOLID	2"	----	---	16.5	1/2" L. L. GYPSUM LATH. 3/4" SANDED PLASTER - THIN WHITE FINISH
2" SOLID PARTITION		SOLID	2"	----	---	10.9	1/2" L. L. GYPSUM LATH 3/4" PERLITE PLASTER - THIN WHITE FINISH
2" SOLID PARTITION		SOLID	2"	----	---	18.1	METAL LATH - THIN WHITE FINISH
DENS-COTE SYSTEM							
3-5/8" METAL STUD		6-5/16"		----	----	12.8	2 LAYER 5/8" F/S DENS-COTE BASE - EACH SIDE - 3/32" DENS-COTE BASE

SOUND TRANSMISSION CHARACTERISTICS INDIVIDUAL FREQUENCIES-CPS											STC 5	D. B. AVER. 128 TO 4096	SPEECH PRIV. RANGE 6	AVER. PLUS 5	LOAD BEAR- ING	NON LOAD BEARING
125	175	250	350	500	700	1000	1400	2000	2800	4000						
128	192	256	384	512	768	1024	1414	2048	2828	4096						
(11) AVAILABLE PARTITION STUD																
-	-	-	-	-	-	-	-	-	-	-	38	41	-	-	-	-
20.5	26.5	34.5	37.0	37.5	39.5	40.0	-	39.5	-	49.0	-	36	-	-	-	-
21.5	29.0	36.0	38.5	38.0	40.5	42.5	-	39.5	-	49.5	-	37	-	-	-	-
19.0	26.0	33.5	35.5	36.5	38.5	40.5	-	39.5	-	52.5	-	36	-	-	-	-
39.5	39.5	43.5	49.0	48.5	48.0	43.0	43.5	49.0	54.5	56.0	-	46	-	-	-	-
36.0	39.0	43.0	48.5	49.0	49.5	50.0	48.0	45.5	52.0	55.0	-	46	-	-	-	-
37.5	39.0	43.0	47.5	49.0	48.5	44.0	45.0	49.0	54.0	57.5	-	46	-	-	-	-
(12) LATH & PLASTER SOLID PARTITION																
-	-	-	-	-	-	-	-	-	-	-	-	38	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	37	-	-	-	-
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DENS-COTE SYSTEM																
-	-	-	-	-	-	-	-	-	-	-	-	45	-	-	-	-

Theory and Use of ARCHITECTURAL ACOUSTICAL MATERIALS

Paul E. Sabine, Ph.D.



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The Acoustical Materials Association

The Acoustical Materials Association is an organization formed by manufacturers of architectural acoustical materials for the purpose of furnishing architects and others with reliable technical data on sound absorbing materials and their uses.

All manufacturers of such materials are invited to apply for membership in the Association.

In addition to the information contained in this publication, a separate bulletin entitled "Sound Absorption Coefficients of Architectural Acoustical Materials" is available. It provides up-to-date technical data on products manufactured by Association members.

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Theory and Use of Acoustical Materials

Paul E. Sabine, Ph. D.

(SECOND EDITION)

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Foreword

The control of sound in building has come in recent years to be a problem with which architects and engineers have increasingly to deal. Generally, the science of acoustics has not hitherto been a part of the technical training for these professions. As a result, many men who have the job of designing and constructing buildings find themselves confronted with problems in a field of physical science with which they have barely more than a speaking acquaintance. Moreover, the very rapid advance made in recent years in our knowledge of the quantitative aspects of sound in its relation to buildings and building construction has led to the development of a terminology which is quite unintelligible to any but the expert in acoustics. The material presented herein is intended to serve as a basis for an intelligent appreciation of the problem of sound control in buildings, to explain the meaning of the terms used in the discussion of these problems, and to indicate the practical methods that have been found for their solution.

P.E.S. Riverbank 1947

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Meaning and Use of Acoustical Terms

1 FREQUENCY, VELOCITY AND WAVE LENGTH

Sound may be defined in two ways—either as the sensation produced by stimulation of the auditory nerve or as the physical cause of that stimulation. We shall be more concerned with sound in the latter sense, confining our use of the term to sound in air and to such sounds as produce the sensation of hearing.

A vibrating body will impart a portion of its energy to the air surrounding it, *i. e.* it will generate **SOUND WAVES**. The frequency of vibration—the number of complete round trip excursions per second—is expressed as so many **CYCLES PER SECOND** cps, or more briefly **CYCLES**. Consider one to and fro movement of the surface of a vibrating body. Its forward motion compresses the layer of air adjacent to it, causing an increase of the pressure above the normal atmospheric pressure. The return movement will cause a decrease of pressure below the normal. This fluctuation of the air pressure above and below the normal will be transmitted with a definite velocity to successive layers. The transfer of energy through the air by successive pressure variations in it is called a **SOUND WAVE**. The frequency with which the pressure changes occur at any point in the path of the wave is the same as that of the vibrating body which generates the wave and is spoken of as the **FREQUENCY OF SOUND**. Experiment shows that the velocity of sound of all frequencies is approximately 1120 feet per second or 763 miles per hour. It varies slightly with temperature increasing about 1.1 ft. per second for 1 degree Fahrenheit from 1099 ft. per second at 32° F. to 1130 ft. per second at 70° F.

The distance which sound of a given frequency travels during the time of a single vibration is called the **WAVE LENGTH**. If, for example, the source of sound makes 200 vibrations per second and the wave travels 1120 feet in that time, then the distance travelled in the time of one vibration is 1/200 of 1100 feet or 5.6 feet. Generalizing, we have

$$\begin{aligned} \text{Velocity} &= \text{Wave length} \times \text{frequency} \\ \text{or} \\ \text{Wave length} &= \frac{\text{Velocity}}{\text{Frequency}} \end{aligned}$$

2 FREQUENCY AND PITCH

The difference in the sensation produced by a change in the frequency of vibration of the sound source is spoken of as the **DIFFERENCE IN PITCH**.

Frequency is expressed in cycles per second. Pitch is expressed in tones of the musical scale. Doubling the frequency of vibration raises the pitch by one octave. Thus, the frequency of the A above middle C on a piano tuned to concert pitch is, by definition, 440 cps. The A in the next higher octave is 880 cps, and in the octave below 220 cps. The range of frequencies that will produce audible sound is ordinarily given as 20 to 20,000 cps corresponding to a range in pitch of slightly less than 10 octaves. The frequency range and the range of wave lengths in air, assuming a velocity of 1120 ft. per second, for the tones of various musical instruments is shown in Table 1.

INSTRUMENT	FREQUENCY RANGE (cps)	RANGE OF WAVE LENGTH (ft.)
Piano	27 — 4186	41.5 — 0.27
Bass Viol	41 — 246	27.4 — 4.55
Cello	65 — 659	17.2 — 1.70
Violin	196 — 2093	5.7 — 0.54
Flute	261 — 2093	4.3 — 0.54
Oboe	233 — 1568	4.8 — 0.72
Bb Clarinet	73 — 698	15.4 — 1.61
Singing Voice—		
Male	82 — 466	13.7 — 2.40
Female	196 — 1046	5.7 — 1.07

Table 1

3 MUSICAL SOUNDS AND NOISE

It is not easy to draw a sharp line of distinction between a musical sound and a noise. To her dotting mama, the sound of Arabella's voice practicing scales is musical. To the long suffering neighbors, it rates as noise. Psychologically defined, a musical sound is pleasing. A noise is not. Physically, a musical sound consists of a single definite frequency or a combination of simply and definitely related frequencies. Sound of a single frequency is spoken of as a pure or **SIMPLE TONE** and is produced by a body vibrating in a single mode. The sound of a tuning fork is a common example. A string of the piano or violin vibrates as a whole and at the same time in segments producing a **COMPLEX MUSICAL TONE**. The simple components of a complex tone have frequencies which are exact multiples of the **LOWEST OR FUNDAMENTAL** frequency.

The higher frequency components are called **HARMONICS** when they are exact multiples of the

fundamental frequency or more generally **OVERTONES**. The distribution and relative intensity of the overtones of a musical sound determines the **QUALITY** or **TIMBRE** of the sound. The difference which the ear recognizes between the tones of the same pitch and loudness from different musical instruments is a difference in **QUALITY**. The frequencies given in Table 1 are those of the fundamental components of the tones produced by instruments listed. Ordinarily it is the fundamental frequency which determines the pitch of a complex musical tone.

Physically, a **NOISE** differs from a musical sound in not having a definite frequency, or a series of simply related frequencies. A noise may produce a pitch sensation depending upon the particular part of the frequency range in which the vibrational energy is concentrated. A frequency analysis of the roar of a train crossing a trestle would show a peak of energy in the low frequency region. The screech of automobile brakes is in the high portion of the frequency spectrum. Complete knowledge of the nature of a particular noise involves an analysis that determines the distribution of the total acoustic energy over the range of audible frequencies.

4 SPEECH

Acoustically, speech consists of a succession of mixed musical sounds and noises. **VOWEL** sounds are essentially musical sounds. Each vowel has a characteristic set of overtones given by the shape of the mouth cavities in producing it. The overtones that distinguish the various vowels lie in the frequency range from 200 to 3000 cps. **CONSONANT** sounds are characteristic noises produced by the positioning and movements of the lips and tongue in speaking. The fundamental tone of the speaking voice is determined by the rate of vibration of the vocal cords and normally has a frequency in the neighborhood of 125 cps for men's and 250 cps for women's voices.

5 PRESSURE VARIATIONS IN A SOUND WAVE

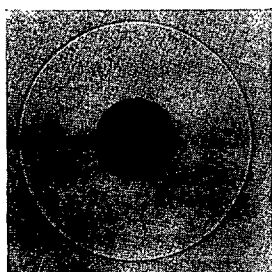


Fig. 1

Figure 1 is an instantaneous photograph of the pressure pulse in the air produced by the sharp snap of a heavy electric discharge between two electrodes shown as the dark disc at the center of the picture. The sudden expansion of the air due to the heat generated by the discharge produced a single pulse of condensation followed by a resultant rarefaction. If it were possible to produce a continuous sound intense enough to produce pressure changes that could be photographed, then a

series of condensations and rarefactions as suggested by Figure 2 would be shown.

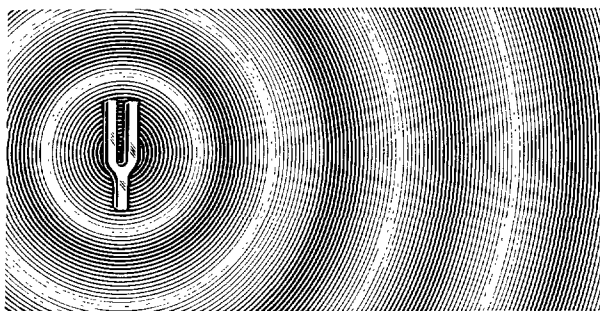


Fig. 2

A cathode ray oscilloscope is a device by which rapidly varying voltages or currents in an electric circuit may be shown graphically on a fluorescent screen. There are now certain types of microphones or transmitters built so that the instantaneous voltage generated by the movement of the diaphragm is proportional to the unbalanced pressure exerted on it. If the electrical output of such a microphone sufficiently amplified is fed into an oscilloscope, the variation with time of the pressure on the microphone diaphragm is shown by a trace on the screen of the oscilloscope.

Horizontal distances on the screen correspond to time differences, while vertical distances are proportional to the instantaneous values of the pressure. The period of the horizontal sweep can be adjusted to coincide with the period of a single pressure cycle or a small multiple thereof, so that the trace on the screen is a plot of the pressure variation at the face of the diaphragm over one cycle or a small number of cycles. Such a trace is spoken of as a **WAVE FORM** of the sound pressure.

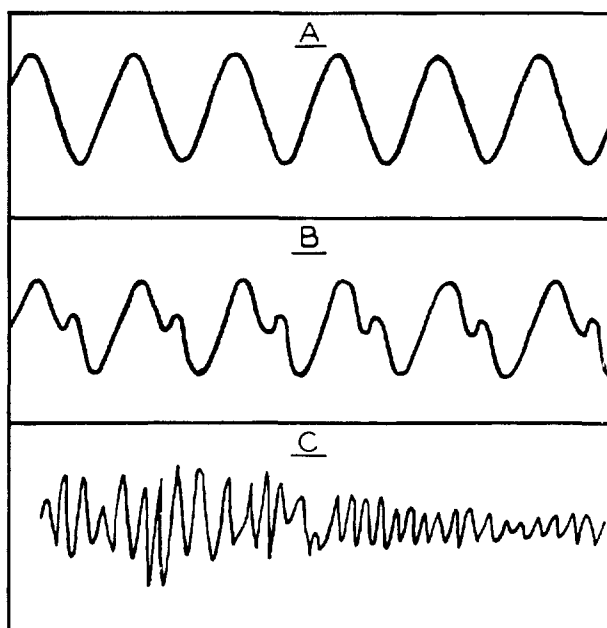


Fig. 3

In Figure 3 are shown the wave forms of a simple or pure tone—a so-called SIMPLE HARMONIC VIBRATION, a complex tone and a noise. The first two are periodic, the form repeating itself at regular intervals, whereas the wave form of the noise is quite non-descript.

6 SOUND PRESSURE AND INTENSITY OF SOUND

Every boy who has ever used a hand pump on a bicycle tire knows that it takes WORK to move the pump piston against the air pressure in the tire. ENERGY is the capacity to do work. POWER is the RATE of DOING WORK, i. e. the rate at which energy is transferred from one body to another. If the boy who pumps up the bicycle tire happens also to play tuba in the High School band, he can testify that it takes work to set up the alternating pressures in the horn, the energy of which is transmitted as sound waves in the air. In the process, each layer of air in a progressive wave transmits energy to the succeeding layer. The INTENSITY of a sound, independently of its frequency, is proportional to the average of the square of the pressure taken over a complete pressure cycle. Intensity is defined as the power in watts that is transmitted across one square centimeter of the wave front perpendicular to the direction in which the sound is travelling. The power of even the most intense sound expressed in watts is extremely small. The unit of acoustical intensity is 10^{-16} watts per square centimeter. (10^{-16} is the physicist's way of writing the fraction 1 over 10 followed by 15 ciphers.) There should be a name for this unit, but there isn't. This intensity is slightly less than the least intensity of a 1000 cycle tone which is audible to the human ear. Even a painfully intense sound has an intensity of only 1/1000 of a watt per square centimeter. The square root of the average square ("root-mean-square") of the sound pressure that corresponds to 10^{-16} watts per square centimeter is .0002 dynes per square centimeter. A DYNE is a force equal to 1/980 of the weight of a gram so that a r.m.s. sound pressure of .0002 dynes per square centimeter is equal to about two millionths of a gram weight per square centimeter. Intensity of sound is usually expressed in 10^{-16} watt units, and sound pressure in .0002 dyne units per square centimeter.

7 INTENSITY, INTENSITY LEVEL, DECIBEL SCALE

The range of intensities in the sounds of every day experience is truly enormous. In terms of the unit just discussed, the intensity of the faintest

sound which a normally acute ear can hear is slightly more than 1. The intensity of the sound of the voice speaking in a confidential tone is of the order of 10,000, ordinary conversation is 100,000 to 1,000,000, street noise 10,000,000 to 1,000,000,000, and a painfully loud sound is from one to ten trillions of these units. As an acoustical device, the ear is unsurpassed in the vast range of intensities to which it will respond without being damaged, as well as in its extreme sensitivity to faint signals. It is, however, relatively insensitive to CHANGES of intensity. Roughly speaking, the intensity of sound has to be increased by about 26 per cent in order for the ear to register a change in the loudness sensation produced.

Because of the awkwardness of handling numbers of such magnitudes and because of the roughly logarithmic response of the ear, the practice has been adopted of expressing sound intensities on a logarithmic scale. A simple slide rule is a device for adding and subtracting the logarithms of numbers. The linear distance on the scale is proportional to the logarithm of the ratio of the number markings on the scale at the two ends of the distance. In Fig. 4, the spacings between the integral ratios shown on the bottom scale are proportional to the differences between the logarithms of these

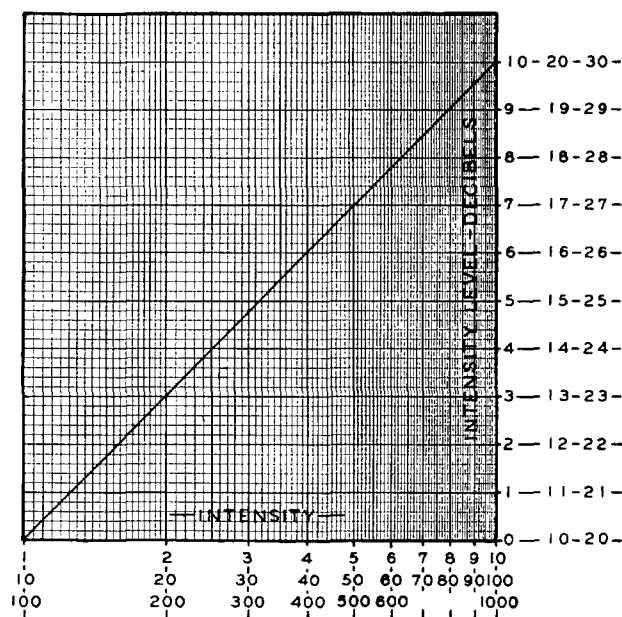


Fig. 5

ratios as shown on the linear scale directly above it. Thus the logarithm of the ratio 2:1 is a trifle more than 0.3, of 4:1 is a trifle more than 0.6, and of 8:1 somewhat more than 0.9. The logarithm of

10 LOG RATIO (DB.)	0	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	
LOG RATIO	0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	
RATIO	1:1	2:1		3:1		4:1	5:1	6:1	7:1	8:1	9:1	10:1

Fig. 4

a 10 to 1 ratio is 1.0. Thus, multiplying a number by 2 increases its logarithm by 0.3, by 4 increases its logarithm by 0.6, and by 10 increases its logarithm by 1.0. The graduations on the top scale are indicated as 10 times the logarithms of the ratios of the bottom scale. The upper scale may be called a DECIBEL LEVEL SCALE, and is the scale which is used in acoustical jargon to indicate the relative intensities of different sounds. Thus if one sound has twice the intensity of another, it is said to be at a 3 decibel (db.) higher level. Increasing the intensity 10 fold raises the level 10 db., 100 fold 20 db., 1000 fold 30 db., and so on.

Figure 5 shows the relation between intensities and intensity levels in decibels in conventional graph form. The horizontal scale is logarithmic and corresponds to the scale on an ordinary slide rule. The ordinates of the points on the straight line graph are 10 times the logarithms of the numbers shown on the horizontal scale. In other words, the INTENSITY LEVEL in decibels is plotted against the intensity. The first vertical scale corresponds to the levels of intensities from 1 to 10, the second from 10 to 100, and the third from 100 to 1000, and so on. The graph can be extended to give the intensity level of any intensity by remembering that multiplying the intensity by 10 raises the intensity level by 10 db. Thus the intensity level for 2.5 is 4 decibels, 25 is 14 db., 250, 24 db., 2,500, 000, 64 db.

8 SOUND LEVEL METER

A sound level meter is a device for measuring the sound intensity level of sound. It consists essentially of a microphone or transmitter, whose vibration under the action of the alternating pressure of the sound generates minute electrical voltages in the microphone circuit, a vacuum tube amplifier, an electrical network designed to make the frequency response conform to the frequency

response of the ear, a variable attenuator and a meter calibrated to read the intensity level of the sound in decibels above the reference level of 10^{-16} watts per square centimeter. The components of such an instrument are shown schematically in Figure 6 and widely used instruments of this type are shown in Figure 7.

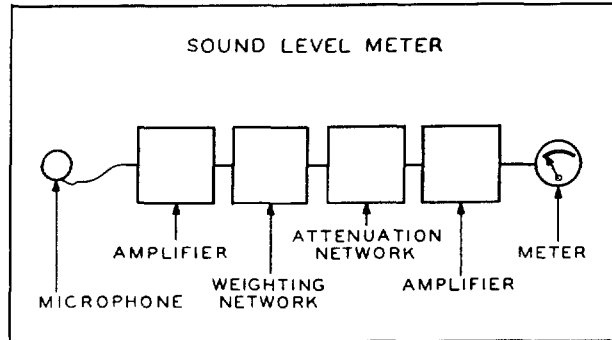
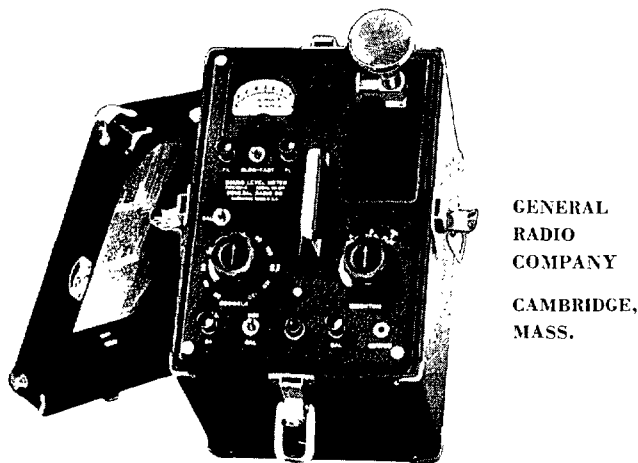


Fig. 6

An idea of the meaning of sound intensity levels expressed in decibels can be gained from Figure 8. Remembering that a 10-db. INCREASE in intensity level corresponds to a 10-fold increase in intensity, it is apparent that the intensity of a sound that begins to be painfully loud is one trillion times the minimum audible intensity.

9 LOUDNESS AND INTENSITY

The loudness of sound (sensation) depends upon the intensity, but it also depends upon the frequency of the sound and the characteristics of the human ear. The intensity of sound is a purely physical quantity, whereas, the loudness depends also upon the characteristics of the ear. Thus, the intensity of a given sound striking the ear of a normal hearing person and of a hard-of-hearing person might be the same, but the loudness sensa-



GENERAL
RADIO
COMPANY
CAMBRIDGE,
MASS.



HERMON
HOSMER
SCOTT
CAMBRIDGE,
MASS.

Fig. 7

tion would be quite different. Again, a 100 cycle tone that is barely audible has about 5000 times the intensity of a 1000 cycle tone that is equally

DECIBELS		
120	THRESHOLD OF FEELING	
110	THUNDER, ARTILLERY NEARBY RIVETER ELEVATED TRAIN BOILER FACTORY	DEAFENING
100	LOUD STREET NOISE NOISY FACTORY TRUCK UNMUFFLED POLICE WHISTLE	VERY LOUD
90		
80	NOISY OFFICE AVERAGE STREET NOISE AVERAGE RADIO AVERAGE FACTORY	LOUD
70		
60	NOISY HOME AVERAGE OFFICE AVERAGE CONVERSATION QUIET RADIO	MODERATE
50		
40	QUIET HOME OR PRIVATE OFFICE	
30	AVERAGE AUDITORIUM QUIET CONVERSATION	FAINT
20		
10	RUSTLE OF LEAVES WHISPER SOUND PROOF ROOM	VERY FAINT
0	THRESHOLD OF AUDIBILITY	

Fig. 8

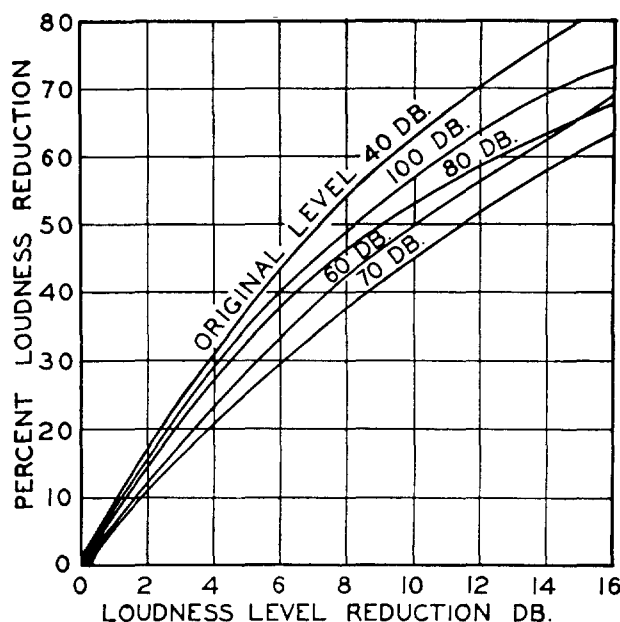


Fig. 9

loud, i. e. barely audible, whereas 100 cycle and 1000 cycle tones would sound equally loud at a 100 db. level. The relationship between frequency, intensity and loudness is quite involved. We do have, however, a sense of RELATIVE LOUDNESS so that there is a fair measure of agreement among trained observers in their judgments as to when one sound is one-half, one-third and so on as loud as another. The question is often asked, "Suppose we reduce the intensity level of a noise by 10 decibels, what percentage reduction in LOUDNESS have we obtained?" The answer is that it depends on what the initial level was. The chart of Figure 9 can be used to give an approximate answer for different values of the original level. From the chart we obtain the values as shown in Table 2 for the per cent loudness reduction for different initial levels and 6 and 10 db. reduction in loudness level:

ORIGINAL LOUDNESS LEVEL (DB)	REDUCTION IN DECIBELS	PER CENT LOUDNESS REDUCTION
40	10	62
	6	43
60	10	50
	6	33
70	10	44
	6	29
80	10	53
	6	38
100	10	56
	6	40

Table 2

Speaking generally, one may say that the quantitative evaluation of the magnitude of sensations is a psychological rather than a physical problem, so that the acoustical engineer prefers to deal with those aspects of sound that are subject to physical measurements. The foregoing is presented simply for the benefit of those who *insist* on expressing things on a percentage basis.

For intensities and frequencies of sound ordinarily encountered, a difference of at least 1 decibel in the intensity level is required to produce a perceptible difference in loudness under the most favorable listening conditions. If this relation were exact and held over the entire range of audible intensities, there would be 120 to 130 degrees of perceptible loudness difference between the least audible sound and a painfully loud sound.

Reflection and Absorption of Sound

Whenever sound strikes a solid barrier a part of its energy is reflected, part is absorbed and part is transmitted to the space beyond. If the sound originates inside a room, the portions absorbed and transmitted by the walls are not returned so we may take the two together under the single heading absorption. We call the fraction that is returned to the room, the REFLECTION COEFFICIENT. The fraction not returned is the ABSORPTION COEFFICIENT.

In Figure 10A, a sound pulse incident upon a hard highly REFLECTING surface is shown. A similar pulse striking a highly absorbing surface is shown at Figure 10B. On the photographic evidence, the latter would indicate an absorption coefficient of 1.00, or complete absorption, but as a matter of fact all that can be inferred is that the intensity of the reflected portion is too small to be recorded on the photographic plate. It is extremely difficult in practice to secure PERFECT absorption for sounds of all frequencies.

1 SOUND ABSORBENT MATERIALS

Absorption of sound involves the dissipation in the form of heat of the vibrational energy of sound waves. Speaking generally, materials that are absorbent in any considerable degree are either POROUS, inelastically FLEXIBLE or inelastically COMPRESSIBLE, or they may possess two or more of these

properties in varying degrees. In porous absorbent materials the pores are inter-communicating and penetrate the surface. The alternating pressure in the sound wave forces the air particles into the narrow channels of the pore structure where their vibrational energy is dissipated by the viscosity of the air and friction against the walls of the channels. Sealing the surface of such a material may decrease in considerable degree its sound absorbing efficiency. Felts, fabrics and fibrous materials of vegetable and mineral fibre absorb sound largely by virtue of their porosity and to a certain extent because of their inelastic flexibility and compressibility. Hard, non-yielding absorbents owe their absorption properties entirely to their porosity. Fibrous wall boards with an impervious surface and plywood owe what absorbent properties they have to their forced, inelastic flexural vibration under the alternating pressure of the sound waves at their surface.

Various means have been found of increasing the absorption coefficients of commercial absorbents, as by slotting, perforating, fissuring, or otherwise providing small apertures into the body of the materials. The mechanics of this effect is not completely understood. Depth, diameter and distribution of the holes over the surface of the material have been found to have an important effect on the sound absorbing efficiency. An important property of absorbents of this type is that

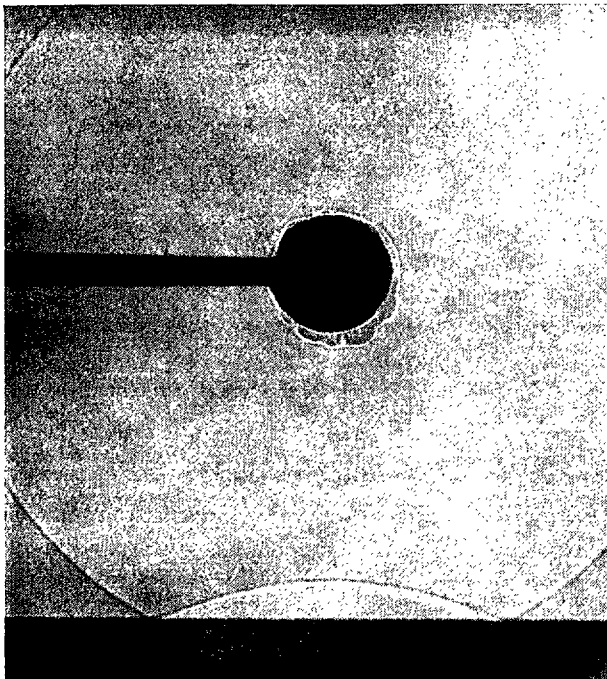


Fig. 10A

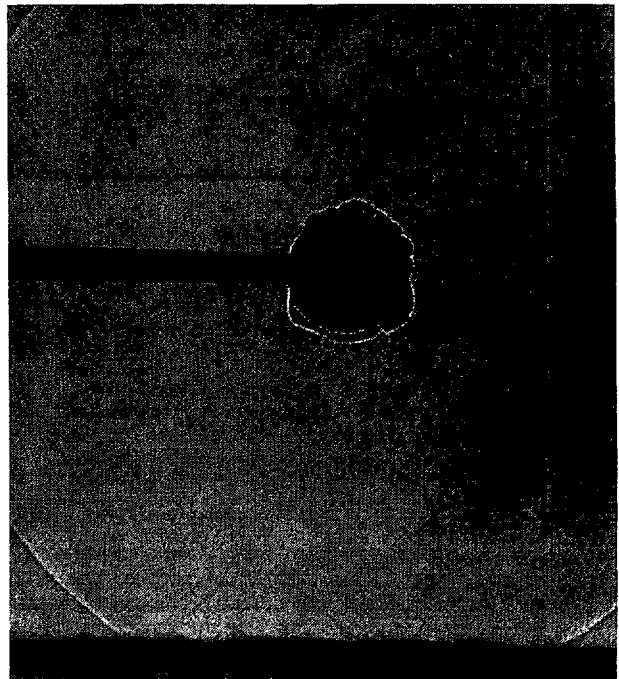


Fig. 10B

painting does not, to any measurable degree, decrease their absorbing efficiency so long as the paint does not clog the holes.

It has also been found that covering the surface of a porous material with a thin perforated screen of metal or other hard material produces a negligible effect on its sound absorbing efficiency. The explanation lies in the fact that a thin membrane of this type in which the perforated area may be as small as 10 per cent of the total area transmits practically 100 per cent of the sound energy to the absorbent back of it. At high frequencies, say above 2000 cps, the effect of the perforated screen is measurable.

2 ECHO, MULTIPLE ECHO, REVERBERATION

When an observer is so placed with reference to a sound reflecting surface that the reflected sound comes to him as a distinct repetition of the direct sound, the phenomenon is called an ECHO. The reflected sound will not be perceived as an echo unless the time interval between the arrival of the direct and reflected sound is at least $1/20$ of a second, corresponding to a path difference of about 56 feet. For a path difference less than this, the reflected sound will not be perceived as a repetition of the direct sound, but may serve to reinforce it. This fact is of considerable importance in the design of auditoriums.

MULTIPLE ECHO results from successive reflections of sound from two or more surfaces that arrive at the ear of an observer with intervening time intervals long enough to produce a series of distinct repetitions of the original sound. Multiple echoes, sometimes called "flutter echoes" are apt to be observed between reflecting parallel walls of otherwise highly damped rooms.

REVERBERATION is the persistence of sound within an enclosed space after the source of sound has been cut off. We may consider reverberation either as a series of multiple echoes of decreasing intensity so closely spaced in time as to merge into a continuous sound, or as the gradual diminution of the vibrational energy of the whole body of air within the enclosure due to absorption at the boundaries and, in a very slight degree, to the dissipation of energy in the air itself. Reverberation theory as it applies to the acoustic properties of rooms neglects the latter factor and assumes that the decrease in intensity is due to surface absorption.

3 BUILDING UP AND DECAY OF SOUND IN ROOMS

Suppose a source of sound, a loud speaker for example, starts producing a steady tone within a room. Starting from the source, the wave train spreads in all directions. Striking the boundaries of the room, it is partially absorbed and partially reflected, not once but many times. The average

intensity of sound in the room thus builds up to a steady state in which the rate of emission of sound energy at the source just equals the rate of absorption at the boundaries. In other words, time is required to set the whole body of air in the room into vibration. Suppose now the source is cut off. The sound in the room does not immediately cease, but gradually dies away, the average intensity at any instant decreasing at a rate which is proportional to the average intensity at that instant. This means that the logarithm of the average intensity is decreasing at a uniform rate, or, in other words, the drop in intensity level expressed in decibels is proportional to the time measured from the instant of cut off of the source. Figure 11 shows the

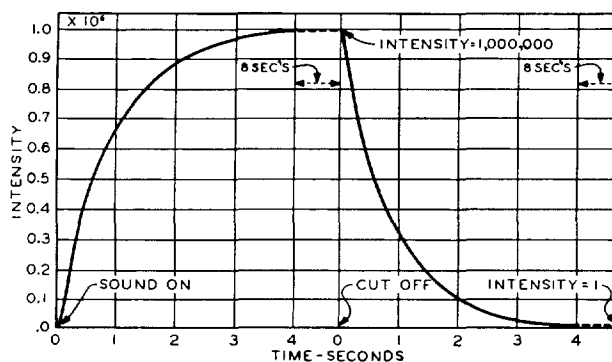


Fig. 11

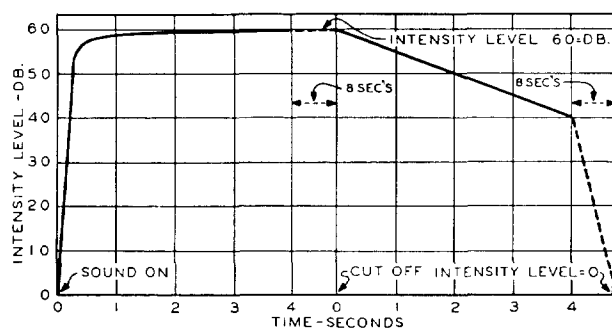


Fig. 12

idealized case of the building up and decay of sound from a steady source. Here the total time for the sound intensity to die away from an initial intensity of 1,000,000 to a final intensity of 1 is 12 seconds. A ratio of 1,000,000 to 1 in intensity corresponds to a drop of 60 db. in the intensity level. In Figure 12 intensity level is plotted against time and illustrates one advantage of the use of the decibel scale in dealing with acoustic phenomena.

As a matter of fact, the graphs of Figures 11 and 12 do not represent the phenomenon of reverberation within a room as it actually occurs. Figure 13 is an oscillograph record of the decay of the reverberation as recorded at a single position in the room. It will be noted that the decrease in amplitude with time follows roughly the average curve of the right half of Figure 11, but with large fluctuation therefrom.

The smooth curve of Figures 11 and 12 represent the statistical average of records similar to that of Figure 13 taken in a large number of positions throughout the room and is a fairly factual representation of the way in which sound intensity



Fig. 13

builds up and dies away in rooms whose dimensions are large in comparison with the wave length of the sound the reverberation of which is being considered.

4 EFFECT OF REVERBERATION ON HEARING CONDITIONS

If one listens to a speaker close at hand speaking in a quiet tone of voice, the successive syllables arrive at the ear of the listener distinct and free from each other. The speech is easily intelligible. If, however, a speaker raises his voice in a large room, each syllable is prolonged, running more or less into succeeding syllables with resultant confusion and loss of intelligibility. Similarly, the individual notes in music are prolonged by reverberation, and the effect is that of a piano played with the loud pedal held down continuously. The acoustic properties of rooms therefore depend in large measure, though not wholly, upon the reverberation times.

5 EFFECT OF VOLUME AND ABSORPTION ON REVERBERATION TIME

The REVERBERATION TIME of a room is defined as the time in seconds for the average intensity of the reverberant sound of a specified frequency to decrease to $1/1,000,000$ of the initial intensity, or what is the same thing, for the intensity level to fall 60 db. The factors which affect the rate of decay and hence the Reverberation Time are (1) the volume of the room and (2) the sound absorbing properties of the bounding surfaces and of whatever objects are in the room.

The greater the volume the greater the average distance the sound will have to travel between reflections from the bounding surface and hence the greater the time required for a given decrease in intensity. Conversely, increasing the area of the surfaces at which reflection occurs and the absorption at these surfaces will increase the rate of decay of the reverberant sound. These two effects are summed up in the well known formula first given

and experimentally proven by the pioneer work in this field of W. C. Sabine, namely:

$$T = \frac{.05V}{a}$$

T is the reverberation time as just defined for a 512 cycle tone, V is the total volume of the room in cubic feet, and a is the total equivalent absorption of the boundaries and of the contents of the room. The equivalent absorption* of a surface is expressed in SABINS, and is the product of the area of the surface and its sound absorption coefficient. Thus the absorption of 50 square feet of a material whose coefficient is 0.70 is

$$50 \times .70 = 35 \text{ sabins}$$

To compute a for any room, at any frequency, the area of each surface is multiplied by its absorption coefficient at this frequency, and the sum of these plus the absorption due to objects that may be in the room, seats, furnishings, and, in the case of audience rooms, people, gives us the total absorption, the a of the formula.

Other formulas applying with greater exactness to heavily damped rooms have been proposed and are in use, but most of the data available on desirable reverberation times are based on the simple formula given above. The interested reader is referred to the more recently published texts for detailed discussion.

6 DESIRABLE REVERBERATION TIMES

The Reverberation Time that is desirable for any particular room depends upon a number of considerations. Among them are volume, the usual audience, and the contemplated use, that is, whether the room is intended for music or speech, or both, with or without public address system, or for sound motion pictures and so forth. For this reason, no very precise values of the desirable reverberation time should be given. In rooms such as concert halls or operatic theaters, where good acoustic properties are of paramount importance, careful consideration should be given to all of these factors in predetermining the planned reverberation. In Figure 14 the shaded area represents acceptable reverberation times for various room sizes, for the frequency 512 cycles per second. When treating sound film theaters or auditoriums which have a public address system, the reverberation times should fall nearer the lower limit of tolerance. In the case of churches and concert halls the times selected should fall nearer the upper limit of tolerance. The correction should be so computed that the desired reverberation time is obtained when occupied by an audience of the size that is usually present.

* The equivalent absorption of any portion of the interior surface of a room is the number of square feet of an ideal perfectly absorbing surface that would produce the same effect on the reverberation time as does the surface in question. Hereafter the simpler term "absorption" will be used with this meaning.

In computing the reverberation time of auditoriums the absorption coefficients at the single frequency 512 cps is used. In rating the effectiveness of absorbents in reducing room noise, it is common practice to use the average of the coefficients at 256, 512, 1024 and 2048 c. p. s. This average has been termed the NOISE REDUCTION COEFFICIENT.

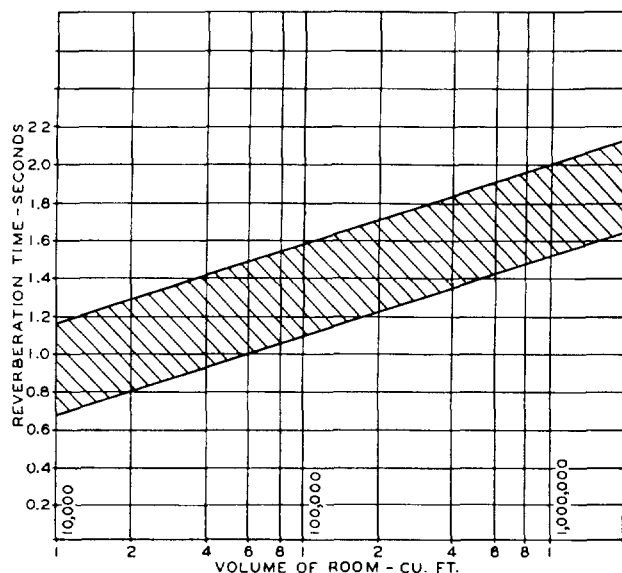


Fig. 14

7 COMPUTING REVERBERATION TIME— NUMERICAL EXAMPLE

A numerical example will serve to clarify the use of the Sabine formula in computing the reverberation time of an audience room of simple rectangular shape.

From the plans for the room and a table of absorption coefficients the necessary data are obtained and the following computations are made:

DIMENSIONS	VOLUME
112 x 56 x 28 ft.	175,000 cu. ft.

	DIMENSION	AREA	COEF.	ABSORPTION
Floor, cement	56' x 112'	6272 sq. ft.	.015	94 sabins
Walls, wood panelling	8' x 336'	2688	.06	160
Walls, plaster on tile	20' x 336'	6720	.025	168
Ceiling, plaster suspended	56' x 112'	6272	.03	188
Velour curtain	39' x 20'	780	.50	390

Total absorbing power, bare room 1000 sabins
Plus 800 upholstered seats @ .25 sabins 200 sabins

Assume that each seat when occupied has an absorption of 4.3 sabins. Then the presence of each member of the audience will increase the total absorption by $4.3 - .25 = 4.05$. We then compute the absorptions and the reverberation times under varying audience condition as shown below:

AUDIENCE	ABSORPTION	$\frac{.05V}{A}$
None	1200 sabins	7.3 seconds
200	2010	4.3
400	2820	3.1
600	3630	2.4
800	4440	2.0

From Figure 14, we note that the reverberation time even with a capacity audience is greater than is the maximum acceptable time for a room of this size. This means that because of excessive reverberation, it will be hard to understand speech in this room. The obvious remedy is to reduce the reverberation time by increasing the total absorption by the application of absorbent materials to the walls and/or ceiling.

Acoustical Defects in Auditoriums

Rooms are rendered acoustically good through the absence of defects rather than by the possession of positive virtues. The chief sources of acoustical difficulties may be grouped under two heads; namely, ANNOYING ECHOES, and EXCESSIVE REVERBERATION.

1. ECHOES

Echoes of a short sharp sound, such as a single vigorous hand slap, may be observed in almost any large room. In a highly reverberant room, an echo, as a distinct repetition of the direct sound, will be lost in the general reverberation. In a heavily

damped room, one with a short reverberation time, the echo from an extended unbroken surface is easily perceptible if the time interval between the arrival of the direct and reflected sound is more than $1/20$ of a second. If sound is reflected from a plane or a convex curved surface, its intensity will be much lower than that of the unreflected sound and in general will be acoustically innocuous. If, however, the sound wave is reflected from a concave surface, the focusing action of the reflecting surface may produce a concentration of the reflected sound in certain areas, and result in annoying echoes and loss of intelligibility of speech.

A rear wall with a uniform curvature centering at a point on the stage is apt to produce an annoying echo in the forward portion of the room. Similarly, a high curved ceiling with center or axis of curvature near the seating level is a likely source of acoustical difficulty caused by focused ceiling echo. Acoustical defects of this sort are hard to correct once the building is completed, and should be avoided in the original design.

So-called "slap back" in talking motion picture theaters is a frequent source of acoustical difficulty. Here not only the rear walls, but the curved lines of seats contribute to a concentration of reflected sound in the forward portion of the theater. The most effective remedy lies in the proper directional pattern as well as in the placement of the loud speaker.

2. EXCESSIVE REVERBERATION

As has already been indicated, excessive reverberation is a common acoustical defect and one for which an adequate and practical remedy has been found in the use of commercial sound absorbents. The use of the reverberation formula in determining the amount of acoustical treatment needed in a particular case will be given in the next section.

3. HOW MUCH ACOUSTICAL TREATMENT?

Referring to the sample calculations (page 11, Sec. 7) it will be noted that the audience of 800 persons supplied almost three-fourths of the total absorption of the fully occupied room, and that the presence of the audience reduced the reverberation time from 7.3 seconds to 2.0 secs. The amount of added absorption that will be needed will thus depend upon the size of the audience that would normally be expected. Assume in this case that the usual audience will be 400 persons, and that the desired reverberation time with an audience of this size is 1.5 seconds. Then the total absorption after acoustical correction should be

$$\alpha_{400} = \frac{.05V}{1.5} = \frac{.05 \times 175,000}{1.5} = 5830 \text{ sabins}$$

Referring to the value of an audience of 400 in the untreated room (page 12) we find the necessary increase in absorption is

$$5830 - 2820 = 3010 \text{ sabins.}$$

In Fig. 15, the reverberation times in the treated and untreated rooms are plotted against the number of people in the audience. One notes that the reverberation time for the treated room falls within the acceptable range for all audiences greater than 200 persons.

4. AREA OF TREATMENT

The area of treatment will be found by dividing the necessary added absorption by the coefficient of the material to be used. The areas needed to

give the added absorption of 3010 sabins, using coefficients of .40, .60 and .80, are as follows:

COEFFICIENT	AREA REQUIRED
.40	7525 sq. ft.
.60	5017 " "
.80	3762 " "

There may be cases where for architectural reasons the area available for treatment is limited. If in this case only 4500 feet on the ceiling were available for treatment, there would not be sufficient area for the .40 material or the .60 material. However, a correction could still be obtained for a certain range of audience sizes. The added absorption is $.40 \times 4500 = 1800$ units and $.60 \times 4500 = 2700$ and $.80 \times 4500 = 3600$.

AUDIENCE.	REVERBERATION TIME		
	.40 material	.60 material	.80 material
None	3.0 sec.	2.3 sec.	1.8 sec.
200	2.3	1.9	1.6
400	1.9	1.6	1.4
600	1.6	1.4	1.2
800	1.4	1.2	1.1

The .40 material gives satisfactory reverberation times from approximately two-thirds to capacity audience; the .60 material gives satisfactory results from approximately one-third capacity audience; and the .80 material gives results which can be considered satisfactory for any size audience, although

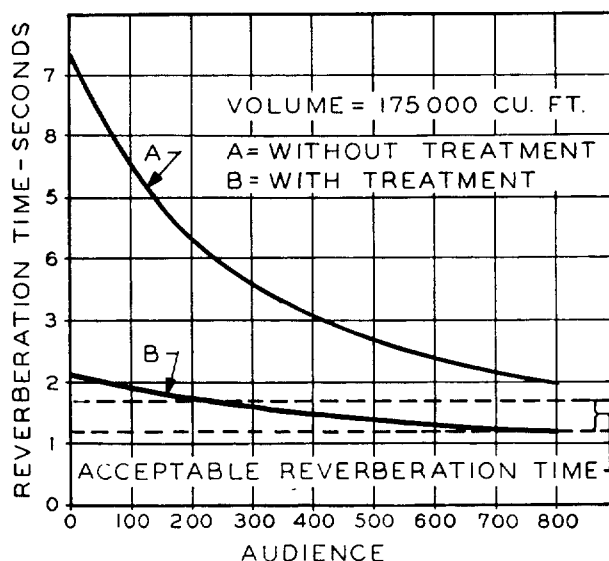


Fig. 15

the value with a full audience is a little below the acceptable reverberation range. In this connection it can be stated that values below the acceptable range are generally preferable to values above that range.

The above example shows that considerable latitude is available in the choice of the coefficient of a material. In general, this latitude is greater in

rooms having a large amount of absorption in the form of upholstered seats, carpets, draperies, etc., than in rooms with less absorbent furnishings.

If the area of treatment can be varied, then the choice of coefficient to produce a given result is obviously wider.

5. LOCATION OF ABSORBING MATERIAL

The location of absorbing materials must depend upon circumstances to a certain extent. The use of highly absorbent materials on or near the stage is not good practice. Extended rear walls, especially when curved, should be highly absorbent. Normally, ceiling areas will be found the most feasible for the installation of acoustical treatment. Treatment applied on under-balcony ceilings is undesirable and is less effective in reducing general reverberation than equal areas applied to ceilings or side walls of the main portion of an auditorium. In wide rooms with low ceilings, side wall treatment, when practicable, is preferable to ceiling treatment. Choice of materials for any case should be made on the basis of adaptability to the particular demands of the situation rather than on a few points of difference in the absorption coefficients.

6. REVERBERATION AT DIFFERENT FREQUENCIES

Since the absorption coefficients of materials are different at different frequencies, it follows that the reverberation time of a given room will depend upon the pitch of the sound, and that, theoretically at least, the variation with frequency of the absorption coefficient of any material will have an effect upon the acoustic properties of a room in which it is used. It is a common practice to consider the reverberation only at the single frequency of 512 cycles per second. No very definite criterion for reverberation times at other than 512 cycles has been established, but experience shows that in an auditorium with a large area of material having a coefficient at high frequencies several times as great as that at 128 cycles, a preponderance of low pitched sound results which is not pleasing. The importance of considering the coefficients at different frequencies is apparent, in cases such as broadcasting studios in which the artificial absorbent supplies most of the total absorption. In rooms where only a small portion of the total absorption is supplied by the acoustical material, this factor may be unimportant. This is the case in auditoriums generally. Here the absorption of the audience furnishes so large a part of the total absorption that the effect of the introduction of acoustical treatment on the reverberation frequency characteristic is negligible. In the usual case, adjustment of the latter is a refinement of quite secondary importance as compared with securing the proper reverberation time as computed from absorption coefficients at 512 c. p. s.

7. EXTRANEOUS NOISE

Disturbing sounds even at low intensity levels may seriously lower the intelligibility of speech in an auditorium. This is particularly true in cases where the intensity level of the desired sound is comparatively low. Outside traffic noise, noise from machinery outside the room, such as ventilating fans, circulating pumps, electric motors and the like, frequently cause complaints on the score of poor acoustics regarding rooms that are otherwise acoustically good. Traffic noise can be fairly well eliminated by an acoustically treated lobby between the auditorium proper and the street. Heavy machinery should preferably not be mounted on structural members that are tied in directly with the walls, floor or ceiling of the auditorium, and in any case should be mounted on properly designed resilient mounts. Ventilating air should be admitted and vented at low velocity through grilles designed to reduce grille noise and ventilating ducts should be lined for a distance of at least 16 feet from the vent openings with highly absorbent material. Projection booths in motion picture theaters should be acoustically treated and have walls with good sound insulating properties.

8. ACOUSTICS IN AUDITORIUM DESIGN

Good acoustical design consists largely in avoiding sources of acoustical defects. A few general rules to this end can be set down which will be useful in the layout of the rough plans for a proposed auditorium. However, there are many points on which experience alone can give proper guidance, so that it is strongly urged that in the design of rooms in which excellent acoustic properties are of prime consideration the services of a competent acoustical consultant be secured. What has been suggested in the sections dealing with acoustical defects may be summarized as follows:

(a) Contours of side walls and ceiling in the front of the room should reflect sound at nearly glancing angles to the sides and rear of the room. This calls for walls splayed from the stage opening and a ceiling sloping upward from the stage opening.

(b) Extended concave wall or ceiling surfaces, particularly those having curvatures in two planes, should not have centers or axes of curvature that fall either on the stage or near any portion of the audience. These almost sure-fire causes of acoustical difficulty should be avoided in the design of an auditorium.

(c) Average ceiling heights should be determined from the number of seats, so that the volume of the room in cubic feet is not greater than 200 times the number of seats.

(d) The total absorption should be such that with the average audience present, the reverberation time as computed by the Sabine formula falls within the range of acceptable values for a room

of the proposed volume as given in Fig. 14.

(e) The required absorbing material should generally be placed on those areas which might produce interfering delayed reflections of sound, such as high ceilings, rear walls, and widely separated side walls, rather than on surfaces furnishing useful reinforcing reflections, such as low ceilings and stage and proscenium surfaces.

(f) Sound amplification will not be of much use in a too reverberant room. In very large rooms in which the reverberation has been properly con-

trolled, a public address system is desirable to insure sound levels at which speech is easily intelligible. The placement and directional pattern of the loud speaker should be such that the main beam of amplified sound is not reflected from an extended non-absorbent surface directly back to the microphone. Heavily damped rear walls with the loud speaker placed so that the main beam is directed to the seating area will reduce the possibility of acoustical feed-back that is sometimes encountered with public address systems.

Sound Conditioning in Work Rooms

The earlier uses of sound absorbents were largely confined to the control of acoustics in auditoriums. A much more extensive use today is in their application to the reduction of noise levels in rooms where quiet conditions have been shown to be a definite commercial asset in the increased comfort and efficiency of workers.

Sound produced in the open air, away from any reflecting surface, travels from the source to the listener, is heard once and that is the end of it. In such a case, moreover, the intensity decreases with increasing distance from the source. In a room, however, repeated reflections prolong each sound, thus building up a general sound level, much greater than would result from the same source without reflection. It can be shown that with a given amount of noise generated in a room, the average intensity of the reflected sound varies inversely as the total absorption of the room, *i. e.*, doubling the absorption halves the physical sound intensity. The reduction in the intensity of the reflected sound is, however, only one of a number of factors which contribute to the overall effect of quieting by the use of acoustical absorbents on walls and ceiling of noisy work spaces. Its value lies in the reduction of the "annoyance factors" of noise more than in changes in physical factors which can be measured.

1 OFFICE QUIETING

The modern business practice of congregating a large number of workers and business machines within a single room results in a noise condition that has been shown by actual measurement to increase fatigue and lower the efficiency of office workers. The character of the noise in such an office without acoustical treatment is peculiarly distracting, for the following reasons:

(a) Reverberation from untreated walls and ceilings lowers the intelligibility of speech even at short distances.

(b) Due to reflection from non-absorbent wall

and ceiling surfaces, the noise from distant sources is almost as loud as that from sources near at hand.

(c) Telephone conversation is difficult due to the masking effect of the room noise.

(d) Due to the noise and loss of intelligibility persons speaking will raise their voices above the normal level, thus increasing the general noise throughout the room.

(e) The actual physical intensity level in decibels of the reverberant sound is greater than it would be from the same sources of noise in the same room, but with absorbent treatment.

2 NUMERICAL EXAMPLE OF OFFICE QUIETING

Take as an example a typical office 40 x 50 ft. with a 10-foot ceiling. The volume is 20,000 cu. ft. The total absorption with the usual office equipment and twenty occupants would be roughly 300 sabins. Suppose now that 1800 sq. ft. of absorbent material with a noise reduction coefficient of .70 is applied to the ceiling. The total absorption is now $300 + (1800 \times .70) = 1560$ sabins, which is equivalent to 5.2 times the absorption of the untreated room. The reverberation is reduced by this factor from 3.3 to 0.6 seconds. It can be shown that the reductions in the intensity of that portion of the noise due to reverberation is reduced in the same ratio, namely, 5.2. From Figure 5 this reduction corresponds to a drop of 7.2 decibels in the intensity level. If the initial noise level was that of a noisy office, say 70 db., then from the 70 db. curve of Figure 9 we get a reduction of 35 percent in the loudness of the noise. Experience in numberless cases has shown that 35 percent is a very conservative figure for the increase in the comfort and efficiency with which the work of such an office is carried on.

It is impossible to assess numerically the various elements of increased working comfort, or to lay down definite rules for the amount of added absorption required to give a desired result. Experi-

ence has shown that increasing the total absorption by a factor as small as three produces a marked quieting effect. Speaking generally, the use of absorbent treatment for quieting is not apt to be overdone. In ordinary office rooms with ceilings not more than 12 feet in height, covering the ceiling alone with a material whose NOISE REDUCTION COEFFICIENT is .60 or more will meet the requirements. In small private offices with limited ceiling areas additional treatment on walls has been found to be essential to secure the degree of quieting desired.

In loftier rooms, such as the public space in banks, wall treatment as well as ceiling treatment is desirable. In such cases, however, the surfaces that are available will probably be the limiting factor.

3 QUIETING OF INDUSTRIAL PLANTS

The principles involved in the reduction of noise in manufacturing plants are the same as for office quieting. However, the noise levels are considerably higher than those ordinarily encountered in offices, and conditions as to ceiling height, grouping of machines and the character of the noises to be controlled make it difficult to generalize.

During the war a considerable number of plants were built in which extensive acoustical treatment was installed. Noise level measurements made in some of these showed that, while factory conditions are such that the actual reduction in the noise level was, in general, less than would be expected on the simple reverberation theory, yet the workers reported that the treated areas "seemed less noisy". The explanation would appear to lie in the fact that while the directly transmitted noise originating in the workers' immediate vicinity is not reduced, yet the effect of acoustical treatment on reverberation and noise from distant sources appreciably reduces the "noisiness" of the general environment. Enlightened industrial management is coming more and more to recognize that in new plant construction acoustical treatment is worth the small increase in construction costs.

4 OTHER QUIETING APPLICATIONS

Only a few of the many uses to which sound absorbents are now being put for quieting purposes can be mentioned.

HOSPITALS. Until rather recent years sound absorbent treatment in hospitals was banned on the score of sanitation. Experimental studies have shown, however, that this objection is groundless in the case of modern acoustical materials in which surface renewals are possible by painting or otherwise. Ceiling treatment of corridors, diet kitchens, service rooms, nurseries and delivery rooms is now accepted as a desirable measure for reducing noise and improving conditions conducive to the recovery of patients in modern hospitals.

RESTAURANTS. In restaurants with uncarpeted floors, plaster or tile walls and ceilings, hard table tops without cloths, the noise of trays, rattling dishes and silverware produces anything but comfortable conditions for eating. Restaurant managers have found that quiet surroundings constitute a definite commercial asset for their establishments.

SCHOOLS. The fireproof construction of modern school buildings tends to make them extremely noisy places due to the highly sound-reflecting properties of their interior surfaces. There is scarcely any part of a modern school in which sound absorbent treatment is not desirable, or even essential. Corridors, stair halls, band or orchestra rehearsal rooms, typing classrooms, cafeterias and ordinary classrooms are all places where the normal noise-making propensities of youngsters are enhanced by the lack of sound absorption of fireproof construction. Here also sound absorbent treatment of ceilings is the obvious remedy. The school gymnasium, with its higher ceiling and long reverberation time, should have enough added absorption to reduce the empty room reverberation to a matter of 2.0 or 2.5 seconds, both for quieting and to facilitate class instruction.

5 MISCELLANEOUS NOISE PROBLEMS

Aside from the foregoing, mention may be made of libraries, waiting rooms in railroad stations and airports, ballrooms, skating rinks, and bowling alleys as locations where the reduction of noise levels obtainable by the use of acoustical absorbents is desirable.

6 MEASUREMENT OF SOUND ABSORPTION COEFFICIENTS

There are a number of different ways in which the sound absorption coefficients of materials may be measured. The reverberation method is the one most commonly used. The method is essentially as follows:

The Reverberation Time of a fairly large empty room, with highly reflecting walls, floor and ceiling (called a Reverberation Chamber) is determined by measuring the times required for reverberant sounds of different initial intensity levels to decrease to a fixed level. The relative values of the initial levels are given by the measured levels of the electrical power input to the loud speaker which generates the sound. The initial levels are plotted against the average value of a large number of observed times for each initial level, and give a straight line as shown in Figure 16. From the slope of this line the time for a 60 db. drop in intensity level can be computed. This is the T of the Sabine formula, which can now be used to compute a , the absorption of the empty Reverberation Chamber. A standard area of the material to be measured,

mounted as it would be in actual practical application, is then brought into the room. The measurements that were made in the empty room are repeated, and the absorption a , of the room and sample, computed. The difference is the added absorption due to the test sample. This, divided

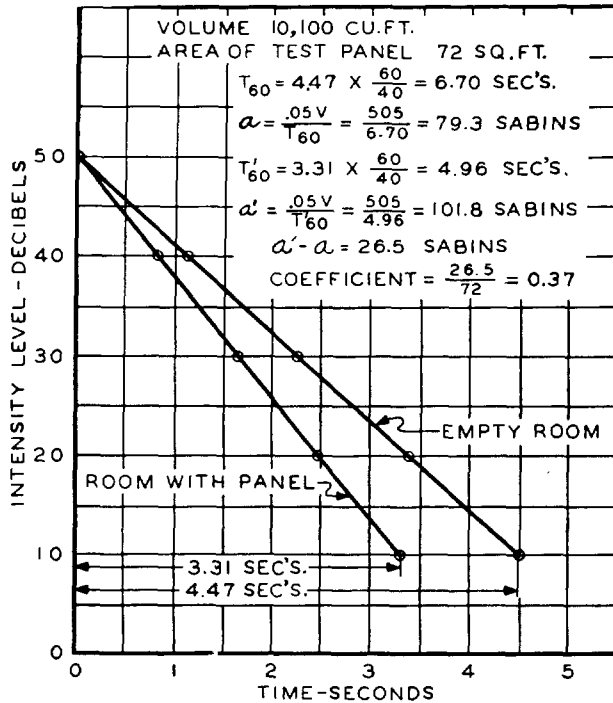


Fig. 16

Sound Insulation

The terms sound insulation and sound absorption are often confused. The former applies to the reduction of sound intensity when transmitted from room to room by way of intervening walls, floors or ceilings. The latter refers to that portion of the sound incident upon a surface that is not reflected from it. Mechanically, the two phenomena are quite different. The sound insulating value of a porous highly sound absorbent material will be relatively small in comparison with that of a solid impervious partition. Measurements have shown that 4 inches of hair felt closing an opening gives a much smaller reduction of sound intensity on the further side than does a solid wall of plaster only $1\frac{1}{2}$ inches thick.

Transmission of sound by way of a solid partition occurs as a result of the vibration set up in it by the alternating pressure of the sound waves on its surface. These vibrations set up sound waves much reduced in intensity in the space on the opposite side. Strictly speaking, there is no transmission of sound as sound THROUGH the wall. The problem of sound insulation thus becomes a matter

by the area, gives the increase of absorption per unit area. Adding to this the absorption coefficient of the room surface covered by the sample, we have the absorption coefficient of the tested material.

Measurements are made and reported in the Bulletins of the Acoustical Materials Association at the frequencies of 128, 256, 512, 1024, 2048 and 4096 cycles per second.

7 COEFFICIENTS TO BE USED FOR DIFFERENT PURPOSES

For AUDITORIUM CORRECTION it has been customary to use the single coefficient at 512 cycles alone. Since the absorption of a material may vary widely with frequency, it is important in some cases to give consideration to the coefficients at frequencies other than this. Particularly is this true in the case of sound recording and broadcasting studios where the reverberation frequency characteristics are very largely determined by the coefficients of the artificial absorbent used.

For QUIETING, the average, taken to the nearest multiple of .05, of the coefficients at 256, 512, 1024, and 2048 cycles is recommended and is used as a basis for comparison of materials. This average is called the NOISE REDUCTION COEFFICIENT. Strictly speaking, this average has no physical meaning, and has been adopted by the Acoustical Materials Association only as a means of roughly assessing the relative merits of acoustical materials when used for quieting purposes.

of reducing the diaphragmatic vibration of the wall under the alternating pressure of the sound incident upon its face, rather than of absorbing sound energy within the body of the walls. It is for this reason that the common practice of putting sound absorbing material inside hollow constructions, such as a wood stud and plaster partition, usually gives disappointing results.

1 TWO TYPES OF SOUND INSULATION PROBLEMS

It is important to distinguish between the case in which sound insulation is desired between adjoining rooms with an intervening wall, and that of reducing the sound produced by mechanical impacts, such as foot falls on a floor and ceiling construction or by vibrations of a machine in rigid connection with structural members. The first is spoken of as insulation against AIR-BORNE SOUND, and the second as insulation against IMPACT SOUND. The methods used in the two cases are quite different.

2 SOUND INSULATING METHODS

Extensive laboratory studies have shown that the sound insulating efficiency for AIR-BORNE SOUND of single walls of solid masonry, and of single stud or joist construction is largely dependent upon their weight per unit area. In constructions of this type, high insulating efficiency can be obtained only by great weight.

High efficiency without excessive weight can be obtained by the use of double-wall constructions in which there is a high degree of structural isolation between the component members. Structural bridging will materially decrease the effectiveness of a double-wall construction. A narrow air space, less than 2 inches say, gives considerable coupling between the two members. A fairly heavy wall faced with a much lighter screen wall isolated from it by means of properly designed vibration isolators has been shown to give a higher degree of insulation than a solid wall of the same weight. What has been said of walls applies also to floors in the case of air-borne sounds, such as the sounds of voices or of musical instruments which are not in solid contact with the floor.

The insulation against sound produced by impact of solid objects on floors is most effectively accomplished by reducing the noise of the impact. A solid concrete slab, which is fairly effective in reducing air-borne sound, transmits impact sound to a surprising degree. High efficiency against impact sound is principally a matter of absorbing the energy of the impact before it can get into the floor structure. Covering the floor with felt-lined carpeting helps materially. Another more elaborate means is to provide floating floor construction carried on resilient mounts. Provision of a suspended ceiling in the room below with a considerable air space between the floor slab and ceiling has been found to give good insulation against impact sounds on concrete floors.

The elimination of sound due to the vibration of a machine mounted on a floor or ceiling can only be effected by means of properly designed vibration isolators. There are various types of these devices now on the market. Their effectiveness depends upon reducing the natural frequency of the machine on its resilient mount to a point well below the frequency of the vibrations which its moving parts produce. This is an engineering rather than acoustical problem, and each case calls for individual solution.

3 SOUND TRANSMISSION LOSS

The sound insulating efficiency of walls or other structural units for air-borne sound is given by what is known as the Transmission Loss for that particular construction. Transmission Loss is expressed in decibels. It is measured by measuring the difference in intensity levels between two rooms, in one of which the sound originates and

from which it is transmitted to the other room by way of the wall or other structural unit separating the two, and making the proper corrections for the area of the transmitting surface and the total absorption of the room in which the transmitted sound is received. Transmission Loss measurements are made under certain specified conditions as to all the factors that affect the difference of intensity levels between the transmitting and receiving rooms.

4 TRANSMISSION LOSSES OF SOME TYPICAL CONSTRUCTIONS

The figures of the following table will give an idea of the Transmission Loss of various types of partitions in ordinary building construction. The values given are the averages of measurements at 25 frequencies, covering the range from 125 to 2070 cycles per second.

CONSTRUCTION	WT./SQ. FT.	TRANSMISSION LOSS
1. Solid masonry of gypsum and clay tile, plaster and brick	10 to 88 lbs.	26 to 54 db.
2. Haydite, cinder and slag concrete block, plastered	23 to 56 lbs.	43 to 53 db.
3. Lead, glass and steel sheets	1 to 10 lbs.	25 to 40 db.
4. 2 x 4 inch wood stud, metal lath and gypsum plaster	17.4 lbs.	34 db.
5. The same with lime plaster	17.4 lbs.	43 db.
6. Wood doors of various types of usual construction	—	22-30 db.
7. 6 inch wall, 2 x 4 inch staggered studs, metal lath and gypsum plaster	20 lbs.	45 db.

5 OVER-ALL SOUND INSULATION

In cases where two adjoining rooms are separated by a dividing structure composed of elements showing different values of the Transmission Loss, the over-all sound insulation is NOT the average of the transmission losses of the separate elements estimated in proportion to their respective areas. This is due to the fact that the decibel is a logarithmic unit and the average of the logarithms is not the logarithm of the average. For this reason an element showing a low transmission loss will have a disproportionate effect on the over-all sound insulation. For example, the proper computation of the over-all insulation of 150 square feet of 40 db. wall, with a 3 x 7 foot door showing a 22 db.

loss, gives an over-all reduction of only 28 db. in fact, any job of sound insulation is not apt to be much better than the least efficient element in it. Hence appears the importance of providing doors and windows with transmission losses that approximate those of the wall structure itself, and also of sealing effectively threshold and clearance cracks around door and window openings.

Double walls of solid masonry, with a minimum of structural bridging and an ample intervening air space, are the most effective means of securing a high degree of sound insulation without excessive weight. Filling the inter-wall space with

sound absorbent material does not add materially to the sound insulating value of this type of construction.

Partitions of cinder or slag cement block should be plastered on one side at least to reduce direct transmission of sound through the porous body of such materials. The insulation of existing clay or gypsum tile partitions may be materially increased by adding a furred lath and plaster screen wall with strips of $\frac{1}{2}$ inch felt inserted between the furring strips and the tile. Fiber board applied directly to an existing wall does not materially increase the degree of sound insulation.

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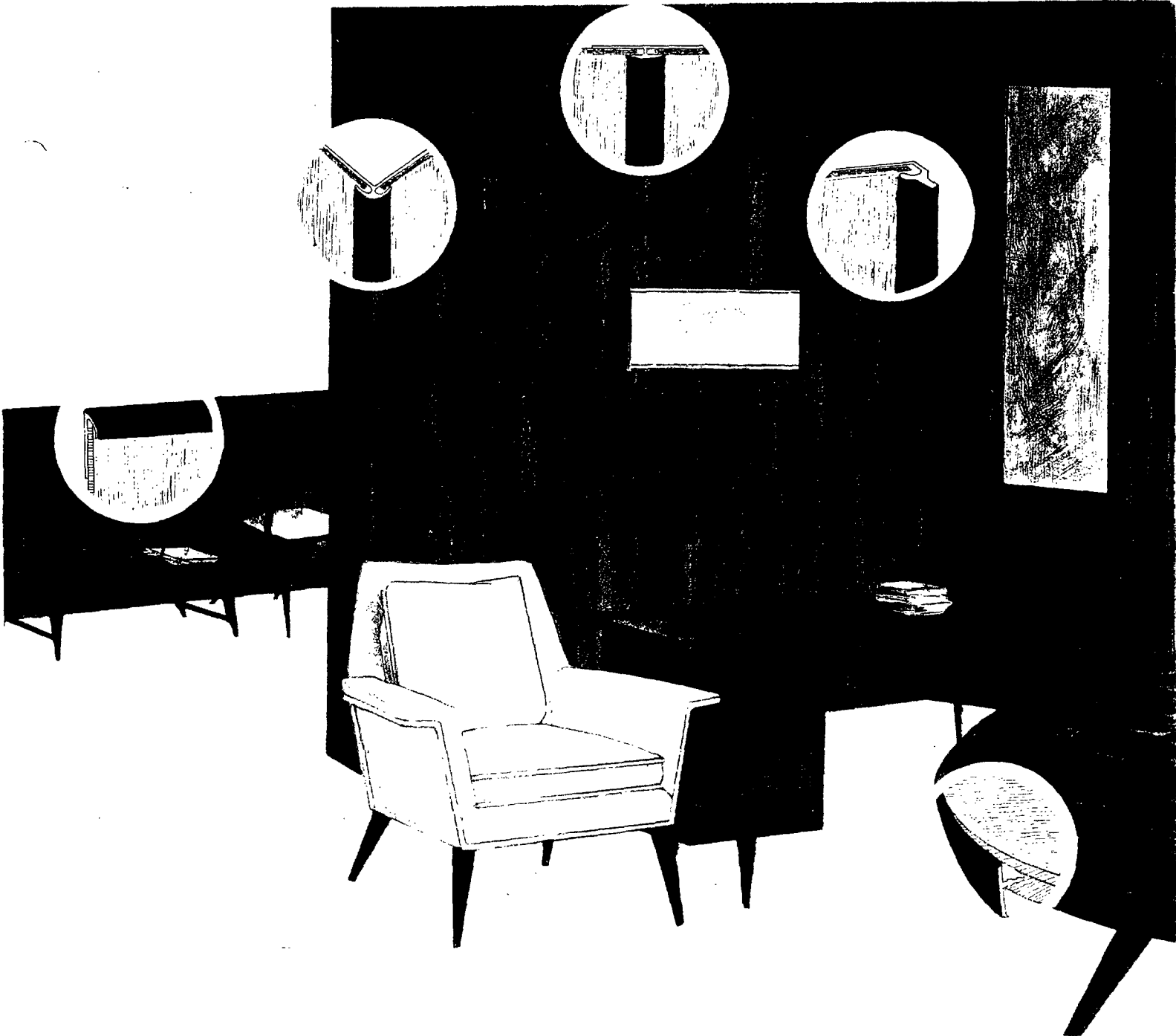
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Keller Products Inc.,
41 Union Street, Manchester, N.H.

KALWOOD MATCHING MOLDINGS

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PROVIDE PROFESSIONAL FINISH FOR PLASTIC LAMINATE, PLYWOOD, AND VINYL APPLICATIONS

Glance at any job finished with Kalwood Matching Moldings and you *don't* notice the insurance that the conscientious builder has provided for his product. You *don't* notice the insurance of edges held securely in place. You *don't* notice the insurance of joints that virtually eliminate separation or buckling due to temperature and humidity conditions. What you *do* notice is a finish with the beauty of a continuous surface pattern, free of flashy metals or contrasting lines. Kalwood Matching Moldings truly match the pattern and finish (plastic, vinyl or plywood) of all major laminate manufacturers. Precision-engineered of extruded aluminum with durable veneers permanently bonded to exposed surfaces, Kalwood Matching Moldings are available in shapes and sizes for every building need. To insure a complaint-free installation, specify Kalwood Matching Moldings.

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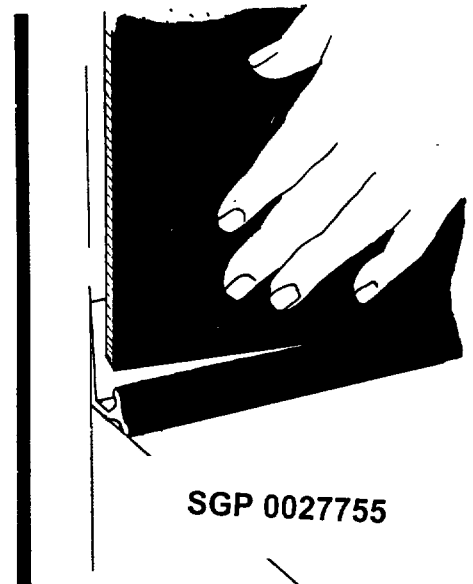
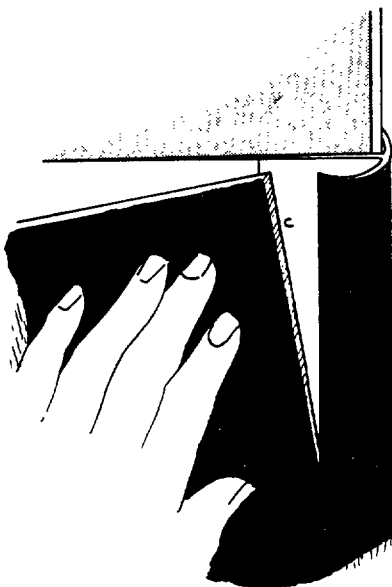
Kalwood Matching Moldings are available in a wide variety of shapes and sizes for all wall applications: outside corners, dividers, inside corners and end caps, in any pattern or color of plastic, wood, or vinyl. Easily installed, panels lie flat whatever the heat or humidity, because panels can contract or expand within the molding.

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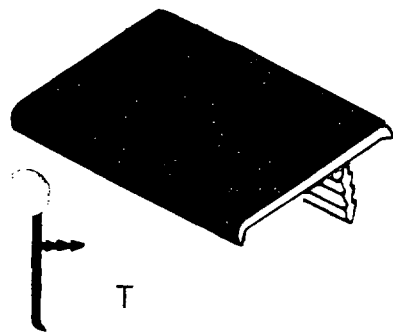
Kalwood T moldings provide a permanent edge for fine tables with a durable finish. These sturdy moldings with no exposed metal surfaces can be installed easily and rapidly, providing edges that match perfectly any material you choose.

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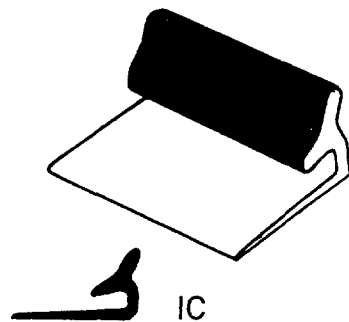
Kalwood inside corners or straight-leg coves provide a perfectly matched contoured back-splash molding for countertop construction. With Kalwood Matching Moldings, kitchen or bathroom counters can be economically and rapidly finished to provide easy cleaning and durability.



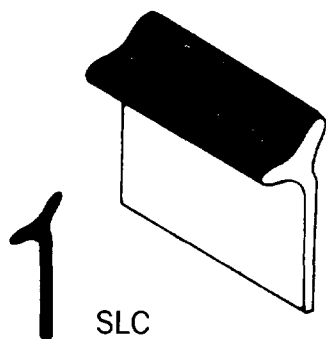
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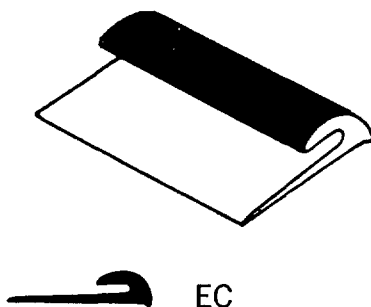
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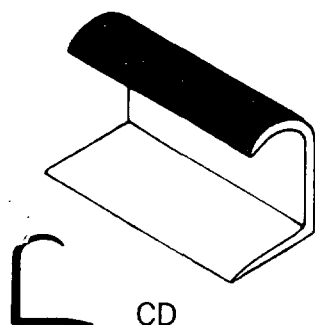
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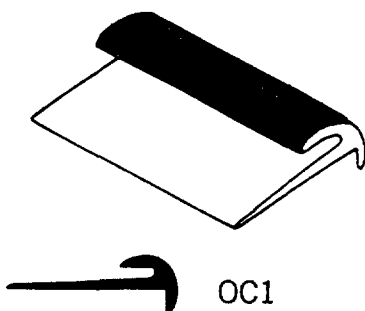
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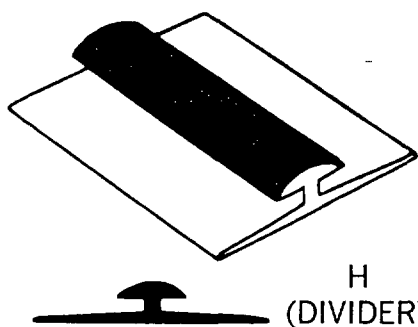
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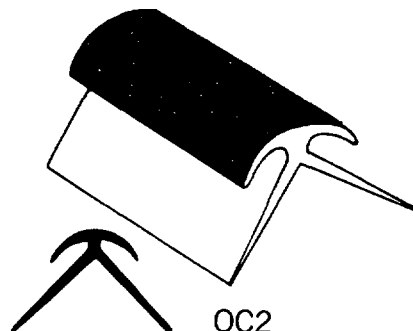
CD



OC1



H
(DIVIDER)



OC2

KALWOOD MATCHING MOLDINGS ARE EASY TO INSTALL

Ordinary tools are all that are required to complete your laminate installation with Kalwood Matching Moldings. Moldings can easily be cut to size, and placed into position, following the suggested steps below.

WALLS

Slide panels approximately half way into Kalwood Moldings, allowing room for expansion. Start installing from a corner or door, making certain that starting points are plumb or level. Kalwood Moldings should be nailed every 8 to 12 inches, using a flat head wire nail.

inside corner IC

Slide first panel into place, position molding, and nail. Insert second panel.

divider H (DIVIDER)

Place divider molding on panel before putting into position. After applying panel, nail exposed leg of divider, and then insert adjoining panel.

outside corner OC1 and OC2

Place molding into position. Insert panel and nail exposed leg. Insert adjoining corner panel.

end cap EC

When used for wainscoting, nail molding to plumb line, and insert panel.

FOR COUNTERS AND TABLE TOPS

T molding T

T moldings are available in 3/4", 13/16", 1 1/4", and 1 1/2", width.

This is a drive-in tee-type molding, which can be bent around a 4" minimum radius when the section of the leg directly behind the bend is cleared out. This will prevent crimping.

straight leg cove SLC

A perfect molding for joining a counter top with a back splash or the wall. It is installed easily by nailing the molding to the back of the counter.

clamp down CD

For non-drip edges, the clamp down molding may be snapped on to the counter edges, and nailed from beneath. For mitered corners, spread the opening to thickness of material being used, and cut to the desired angle in a miter box.

Moldings are available to accommodate materials of the following thicknesses:

1/16"	15/64"	9/16"
1/8"	1/4"	5/8"
5/32"	3/8"	3/4"
3/16"	7/16"	13/16"
	1/2"	

*1/4" natural wood veneer available in Weldwood® from U. S. Plywood.

SGP 0027756

KALWOOD MOLDINGS TRULY MATCH THE PATTERN OF VIRTUALLY ALL MANUFACTURERS:

some are listed below

LAMINATE MFGRS.

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FIBERESIN

FORMICA

LAMIDALL (Woodall Industries)

MELAMITE

MICARTA (Westinghouse)

NATIONAL PLASTIC

PROD. CO. INC.

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VINYL COVERED GYPSUMBOARD

BESTWALL GYPSUM (Eternawall)

NATIONAL GYPSUM (Durasan)

KAISER-GYPSUM

U. S. GYPSUM (Vinyl Covered Sheetrock)

Kalwood Matching Moldings are available through your sheet supplier. If not available in your area, contact Keller Products direct. Kalwood Matching Moldings are available in shapes and sizes for every building need.

HOW TO ORDER

In ordering Kalwood Matching Molding specify:

- A) SHAPE IC (inside corner); OC (outside corner) etc.
- B) SIZE The opening in the molding to receive the material with which it is being used: 1/16" laminate, 1/4" paneling, 3/8" vinyl gypsum board, etc.
- C) PATTERN The manufacturer's pattern number for the material being used: FA 342 Dark Walnut, etc.

HOW TO SPECIFY

"Molding shall be Kalwood Matching Moldings as manufactured by Keller Products, Inc. 41 Union Street, Manchester, N. H."

KELLER PRODUCTS

41 Union Street Manchester, New Hampshire
Area Code 603 — 627 - 7887

Kalwood Matching Moldings are another product of one of the world's leading manufacturers of plastic products, laminated sandwich panels, flat and molded plywood.

GYPSUM WALLBOARD PARTITIONS

STEEL DOOR FRAMES (FENESTRA)

Mr. Hummer and the Laboratory people at Paoli in the past have worked to develop details of these frames and to include features which Bestwall people thought were desirable for a good three piece metal door frame for use in the various Bestwall drywall partition systems.

There is a folder of details which all Salesmen concerned with knowing the dry-wall contractor and his problems better, should study carefully. These folders include reference to standard frames from use with a 2-1/4" thick partition up to one, 4-5/8" thick. In addition, their rolling facilities are set up such that they can make the same type door frame for thickness partitions depending, of course, on the quantity involved and a minimum price for the setup.

For further assistance, there is included a copy of personnel of this organization in various parts of the country who may be contacted for further information and availability of these frames. Many are being stocked in warehouses around the country.

This information is to guide you in assisting your Drywall Contractors obtaining such accessories that are needed in erecting gypsum wallboard partitions. It is not meant to recommend this particular door frame to the exclusion of others which may do a satisfactory job and may be used with Bestwall partitions equally well.

GYPSUM WALLBOARD MANUAL
1965 EDITION

Section 7
Sub-Section E

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Door Products Division
4040 West 20th Street
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John McKechnie
Manager of Sales
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Chicago 1, Illinois

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FEN-DRY

The new FEN-DRY Frames fit fast! They go up in minutes . . . *after* the drywall is up. And they are there to stay. The three interlocking members fit fast to the drywall and are anchored right into the wall at the base. Unique lock joints provide superior strength at the corners and guarantee perfect miters. FEN-DRY is the one frame that makes practical the expanded use of drywall in commercial construction.

SAVE TIME FEN-DRY frames are installed in minutes . . . *fifteen* minutes on the average! This means that four times as many FEN-DRY frames can be installed in a given time and that labor costs are cut by four! Eliminated is the extra time required in (1) setting to floor slab, (2) attaching frame anchors to studs, notching and fitting gypsum board into and around frame, and (3)

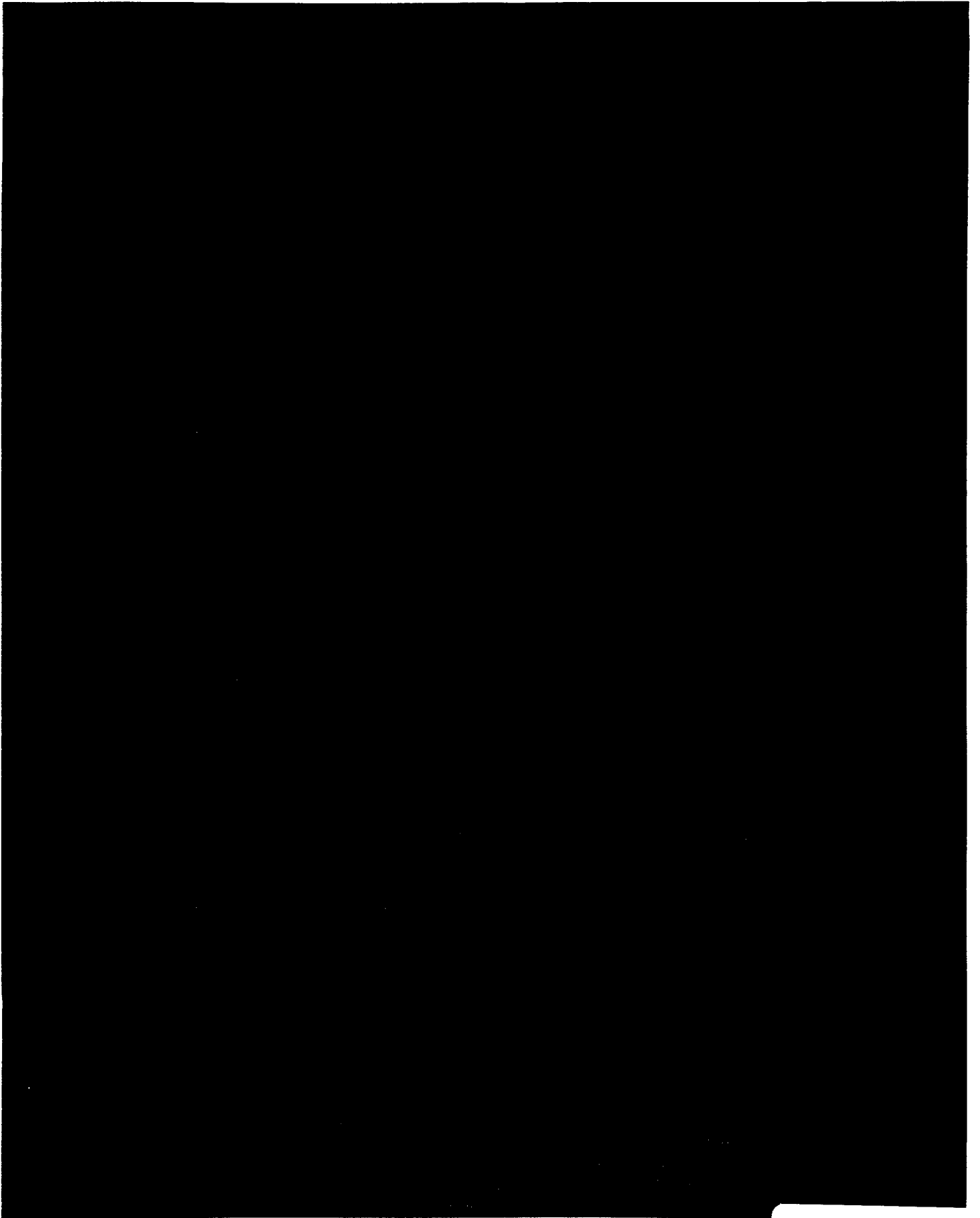
shimming and caulking the customary gap between the frame return and the finished surface of the gypsum board.

LOOK BETTER FEN-DRY Frames are made for drywall. They hold tight to the wall, eliminating unsightly gaps. An 89° frame angle and a 1/2 inch double-back bend around the complete frame provide a vice-like gripping area. Their corners are lock-tight miter joints, providing maximum strength and a continuous smooth trim line.

STAY IN PLACE FEN-DRY Frames fit fast and stay fast. They are engineered for drywall; even the weight of the door works to advantage—tension and pull function to maintain the frame in perfect locked position. Special stiffeners strengthen the frame at key points. Heavy gauge sill anchors, rigidly locked into the jamb, secure the frame to the wall at the floor runner. Pre-mortised jambs for template hinges and ASA strike further reflect the quality of the FEN-DRY Frame . . . a frame that has undergone a 500,000 cycle door-slam torture test to prove its positive anchoring.



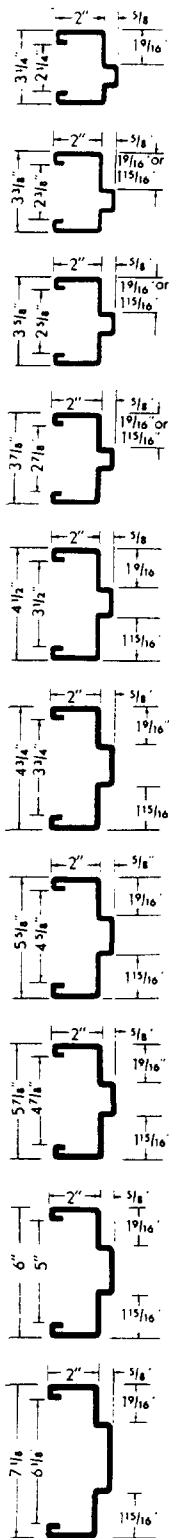
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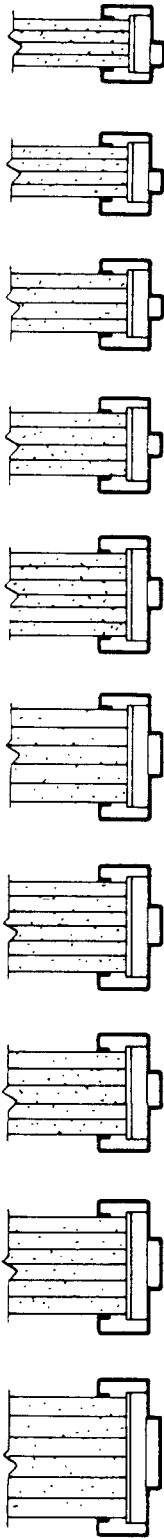
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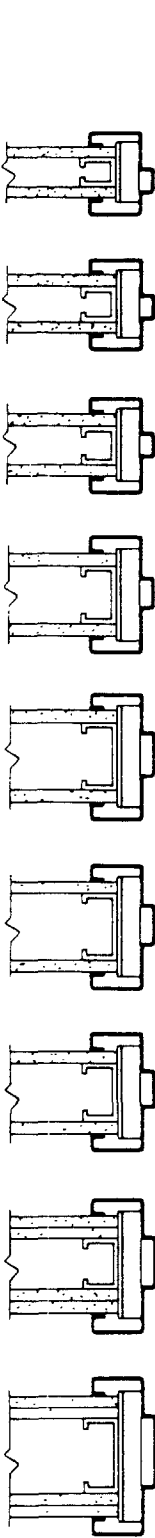
FRAMES



DRYWALL PARTITION



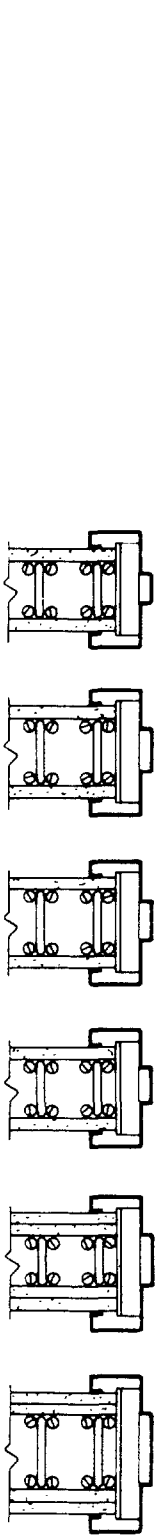
STEEL STUD PARTITION (Closed Chan)



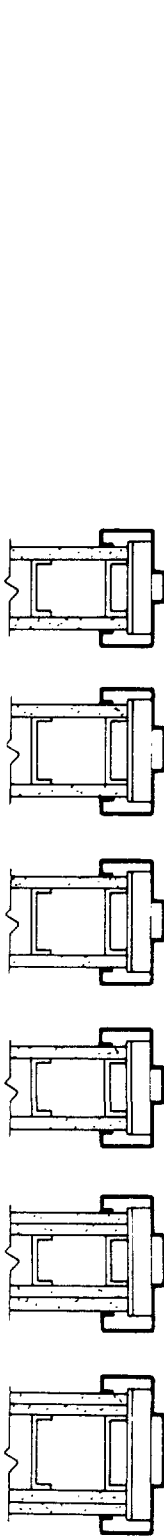
2" x 4" STUD PARTITION



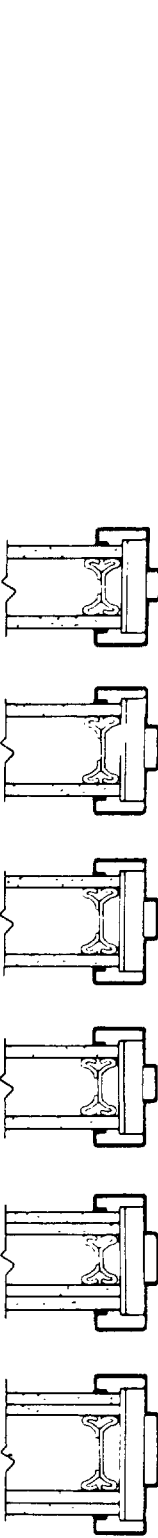
TRUSSTEEL STUD PART.



OPEN CHAN. PARTITION (i.e. Holostud)

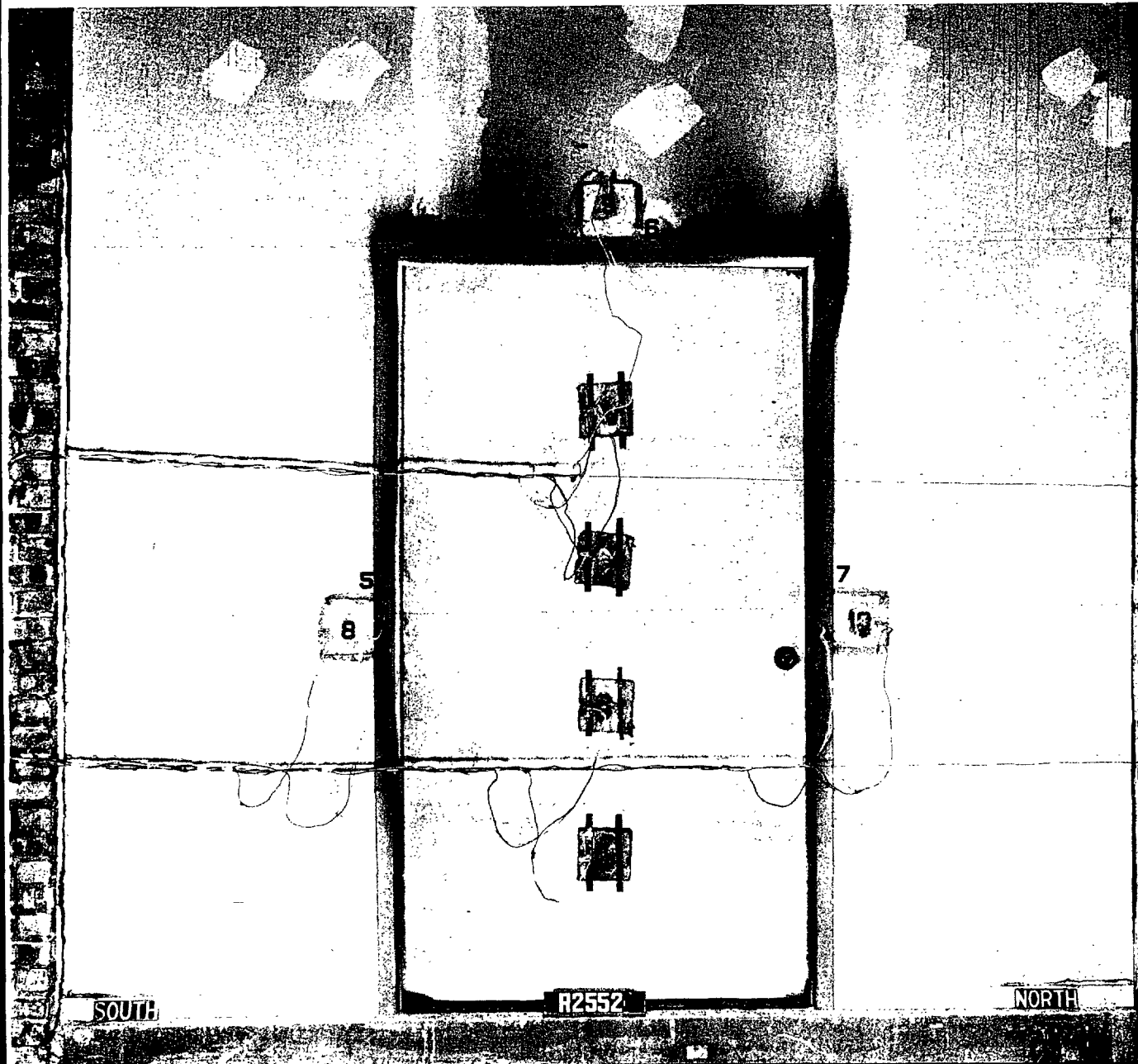


NAILABLE STUD PART.



* 1 3/8" Frame shown—1 3/4" Frame is single rabbet
All throat depth available in cased opening.

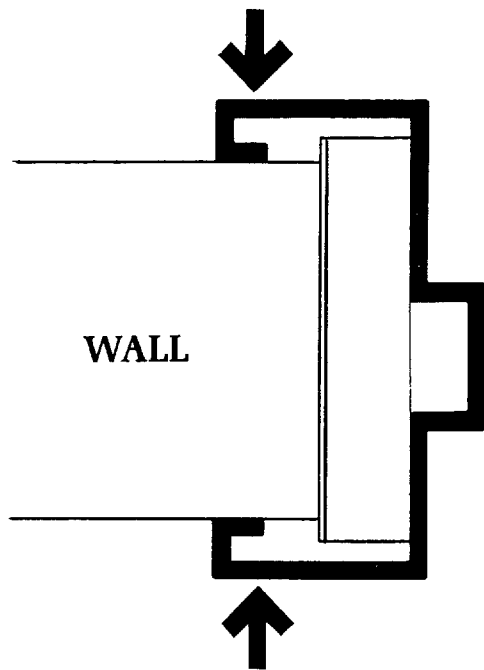
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SGP 0027763



FEN-DRY frames are designed to exert a vise-like grip to the wall around the perimeter of the frame. On a typical frame, some 34 feet of $\frac{1}{2}$ " bearing surface is squeezed inward against the wall anchoring the frame securely.

DRYWALL FRAME SPECIFICATION: Frame for drywall construction shall be of the design and construction as manufactured by Fenestra Incorporated under the trade name of "FEN-DRY."

All standard and cased opening frames shall be of 16 or 18 Ga. for $1\frac{3}{4}$ " doors (specify one) and 18 Ga. for $1\frac{3}{8}$ " doors. All frames shall have a 2" face dimension with (specify): $3\frac{1}{4}$ ", $3\frac{3}{8}$ ", $3\frac{5}{8}$ ", $3\frac{7}{8}$ ", $4\frac{1}{2}$ ", $4\frac{3}{4}$ ", $5\frac{5}{8}$ ", $5\frac{7}{8}$ ", 6" or $7\frac{1}{8}$ " frame depth with $\frac{1}{2}$ " backbends.

Jambs shall be constructed to set on finished floor. Frames shall have a double return on the back bend for erection after wall is in place. All frame members shall be formed to grip wall firmly when slipped over wall.

Frames shall be formed with integral stops and rabbets. Rubber mates shall be shipped attached to lock jambs (single doors); on head members (double doors).

Corners shall be mitered and reinforced and shall form neat, tight joints when assembled. Each corner shall be locked with sheetmetal screws on the headbar return to insure positive locking and rigid corners.

Each frame shall be fully mortised and reinforced to receive template hinges and an A. S. A. strike. No welded-on hinges shall be allowed. Strike and hinge reinforcements shall be equipped with dust covers.

Jambs shall be further strengthened by two heavy gauge stiffeners to provide proper gripping action and bearing surface against the wall.

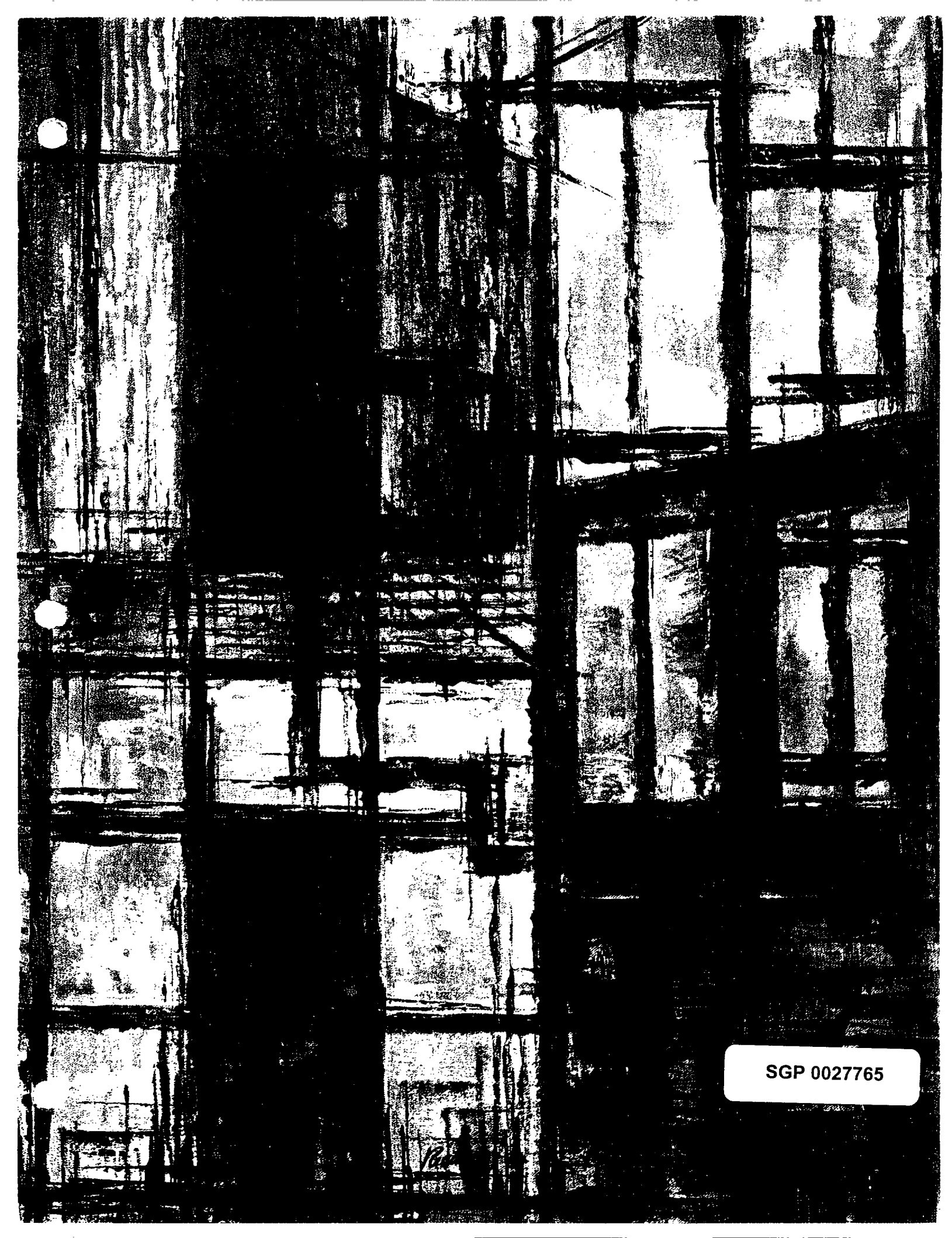
Each jamb shall be provided with snap-in sill anchors designed to be attached with no notching of wall board.

There shall be no visible fastening devices along the faces or rabbets.

All frames shall be bonderized and receive one coat of baked-on metallic primer.

UNDERWRITERS' LABELED FIRE DOOR FRAMES: All Fen-Dry frames for Underwriters' openings shall be of the construction and design as furnished by Fenestra Incorporated, having specific Underwriters' Laboratories approval according to current procedures for fire door frames.

SGP 0027764



SGP 0027765

STEEL Craft®

*finest name
in metal
doors and
frames*



Steelcraft offers tremendous flexibility and variety in the very finest and most complete line of standard doors and frames available, and they can be prepared for practically every type and function of hardware.

Steelcraft Distributors are thoroughly qualified to give complete technical assistance in preparing and coordinating hardware schedules and approval drawings at the local level for "instant", effective service.

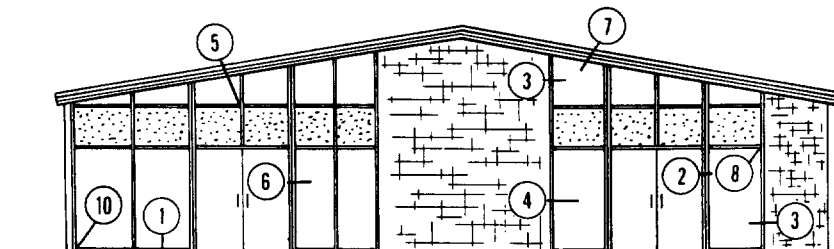
THE STEELCRAFT MANUFACTURING COMPANY

9017 BLUE ASH ROAD, CINCINNATI, OHIO, 45242, U.S.A.

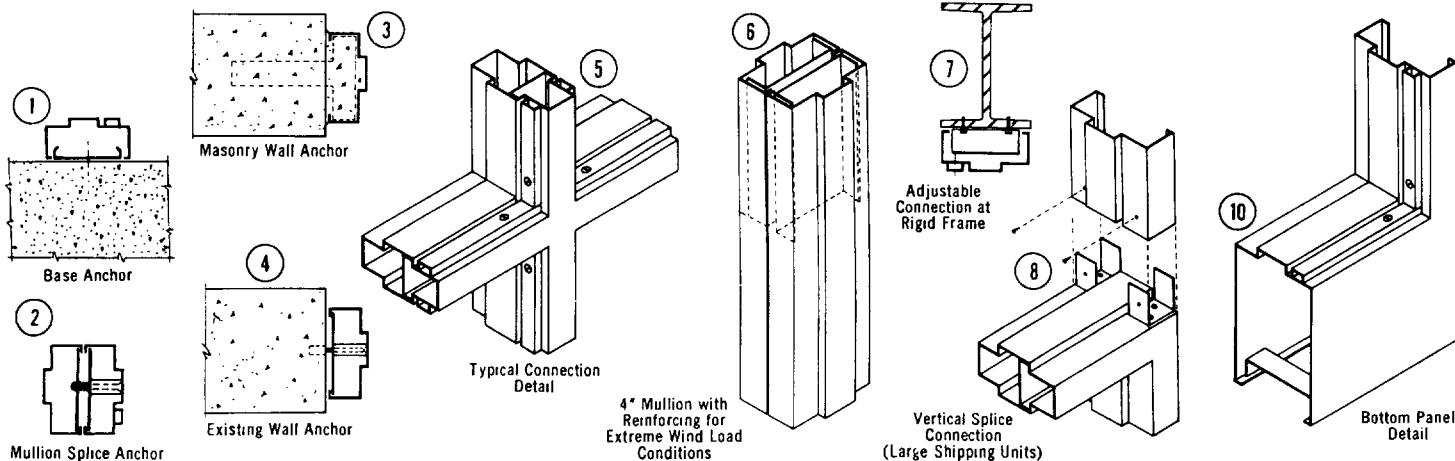
SGP 0027766



By using stock, regular door frame sections (called sticks), your Steelcraft Distributor can provide any type of frame combination . . . entrance units, transoms, sidelights, partition walls, stair enclosures, end walls. Made-to-order units are fabricated from local inventory of fabricated parts and assembled by factory-trained men.



NUMERALS IN THE ABOVE INSTALLATIONS ARE KEYED TO THE DETAILED DRAWINGS BELOW.



• FOR COMPLETE INFORMATION, WRITE FOR TECHNICAL DATA SHEET

TECHNICAL DATA

STEEL
Craft



K-18, K-16

(Primed, edge seams exposed)

H-18, H-16

(Primed, no exposed joints)

A-50

(Aluminum)

KS-20, KS-18

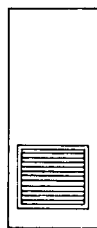
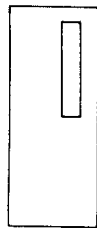
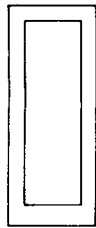
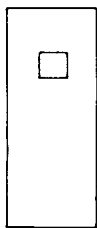
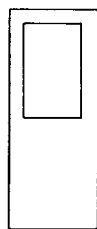
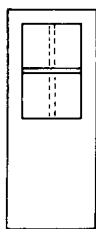
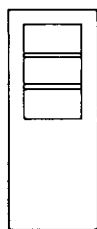
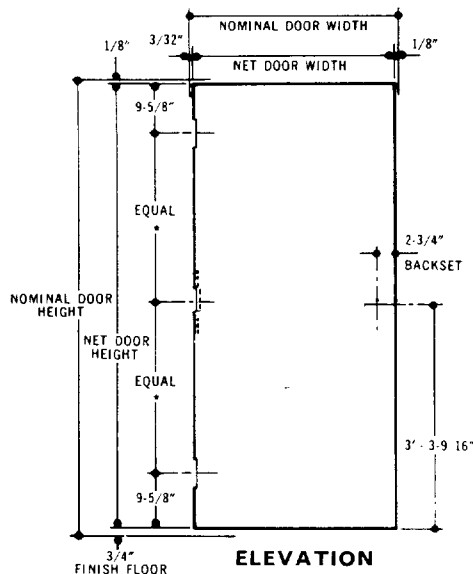
(Stainless steel)

KP-18

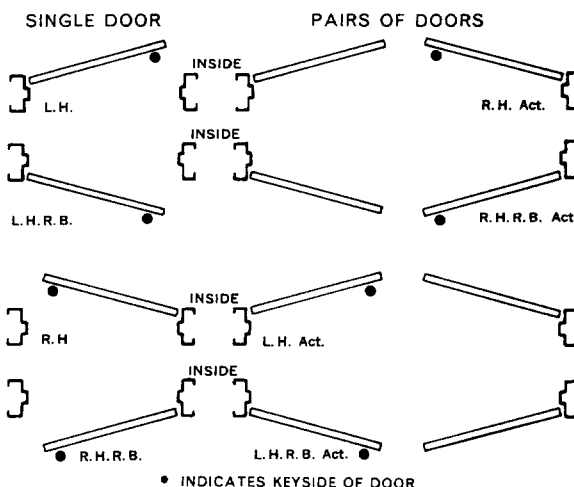
(Porcelain enamel)

SPECIFICATIONS

- Doors shall be made of (cold rolled stretcher level steel 18 gage—16 gage) (.050 aluminum #3105 H-25) (stainless steel #304 20 gage—18 gage).
- Doors shall be full flush of pan type construction.
- Doors shall be reinforced, stiffened, sound deadened and insulated with Kraft honeycomb core completely filling the inside of the doors and laminated to both inside faces of the panels.
- Doors shall be mortised and reinforced for hinges and locks. Doors shall be reinforced for closers and other surface-applied hardware when required.
- All doors shall be bonderized and receive one coat of baked-on prime paint.
- Doors shall be equal to Steelcraft (K-18), (K-16), (H-18), (H-16), (A-50), (KS-20), (KS-18), (KP-18) doors.



DOOR HANDING



STANDARD DOOR SIZES

Nominal Door Widths	
2'-0"	3'-0"
2'-4"	3'-4"
2'-6"	3'-6"
2'-8"	3'-8"
	4'-0"

Nominal Door Heights
6'-8"
7'-0"
7'-2"
8'-0"

GENERAL NOTES

LOCK PREPARATIONS—Standard Government 161 (ASA 115.2) or Government 86 (ASA 115.1) when ordered. Other lock preparations optional as specified.

HINGE PREPARATION—1½ pair of 4½ x 4½" template hinges for 6'-8", 7'-0", and 7'-2" height. 2 pair of 4½ x 4½" template hinges for 8'-0" heights.

PACKAGING—Each door is individually wrapped in corrugated cardboard with wood stripping on vertical edges of package and banded together with steel straps.

FINISHES

Because of the wide variety of finishes and colors available, these doors are ideally suited to meet every architectural requirement.

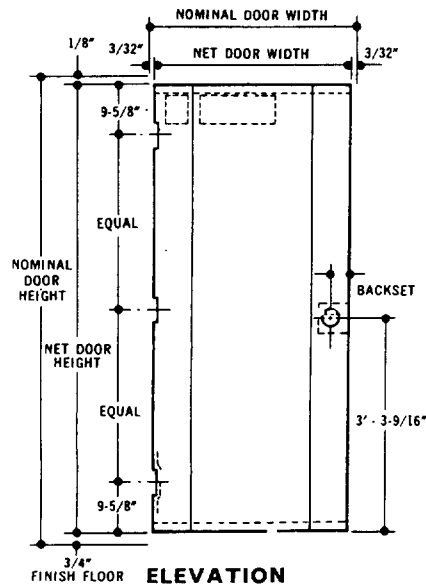
ALUMINUM DOORS—Offered in mill finish, prime finish, etched and lacquered finish, painted, anodized.

STAINLESS STEEL—For both interior and exterior use, maximum corrosion resistance, practically maintenance free.

PORCELAIN ENAMEL—Furnished in your choice of lasting fade-proof colors, including 47 widely used PEI colors.

SGP 0027767

Details for Stile and Panel Doors



S-20-8

(20 gage steel 1 3/4" thick)

S-20-4

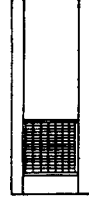
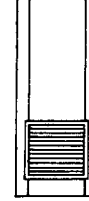
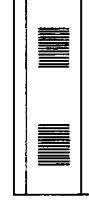
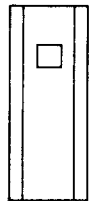
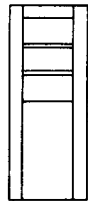
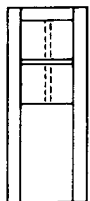
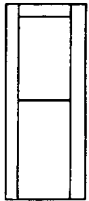
(20 gage steel 1 3/4" thick)

S-18-4

(18 gage steel 1 3/4" thick)

SPECIFICATIONS

1. Doors shall be (20 gage), (18 gage) cold rolled prime quality steel.
2. Doors shall be flush, of the three section type construction, consisting of lock and hinge stile and center panel, with tight mechanical interlocking joints. Top and bottom reinforcing channel shall be of 14 gage cold rolled steel spot-welded within the doors.
3. Doors shall be stiffened and sound deadened with Kraft honeycomb laminated to inside of center panels.
4. Doors shall be mortised and reinforced for hinges and locks. Doors shall be reinforced for closers and other surface applied hardware when required.
5. All doors shall be bonderized and receive one coat of baked-on prime paint.
6. Doors shall be equal to Steelcraft (S-20), (S-18) doors.
7. Outswinging exterior doors shall have top cap seal.



Details for Stile and Rail Doors

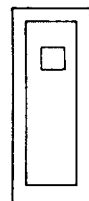
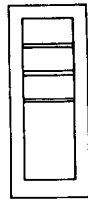
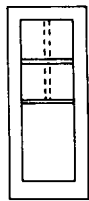
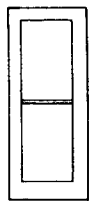
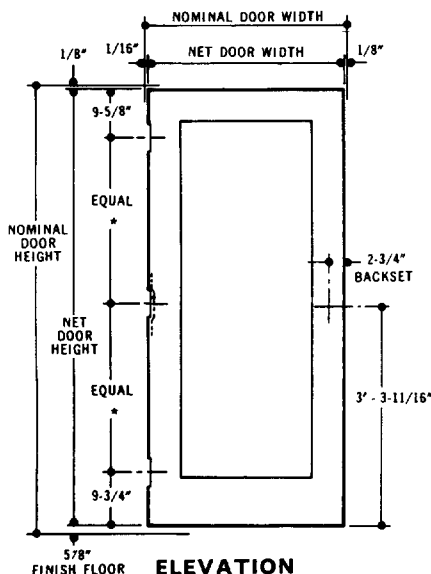
S-16-F.

(Flush panel 1 3/4" thick)

S-16-P

(Recessed panel 1 3/4" thick)

SGP 0027768

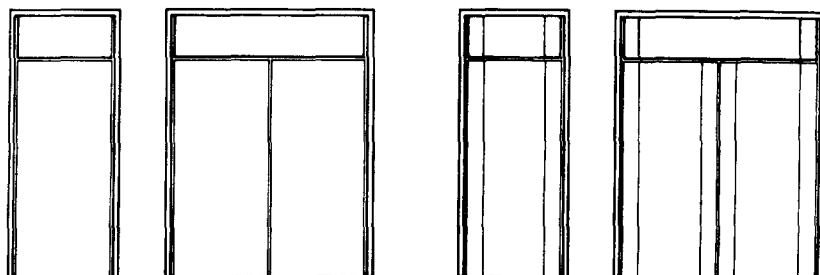


SPECIFICATIONS

1. Doors shall be of 16 gage cold rolled steel tubular stile and rail construction.
2. Stiles and rails shall be mitered at the corners, reinforced with 16 gage channels, continuously face welded and ground smooth. Doors shall be provided with 1 3/4" thick panels made of two pieces of 18 gage steel separated, stiffened and sound deadened with Kraft honeycomb laminated within the panels.
3. Doors shall be mortised and reinforced for hinges and lock. Doors shall be reinforced for closers and other surface applied hardware when required.
4. All doors shall be bonderized and receive one coat of baked-on prime paint.
5. Doors shall be equal to Steelcraft (S-16-F), (S-16-P) doors.

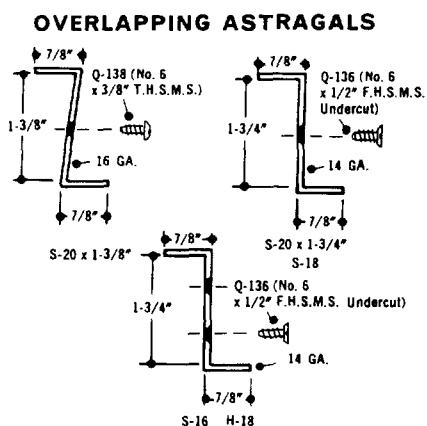
TRANSOM PANELS

Transom Panels are available for ceiling height frames in any size to allow the use of standard Steelcraft doors. The transom panels match door design in appearance and construction.

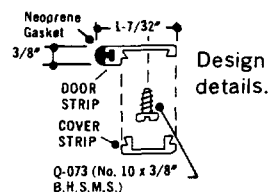


ASTRAGALS

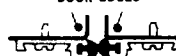
Steelcraft offers two types of astragals... split and overlapping. Both types are available in kit form for field installation.



SPLIT ASTRAGALS



ADJUSTMENT



Gaskets should touch when doors are closed. Design allows easy field adjustment.

COVER INSTALLATION

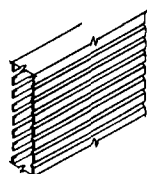
DOOR EDGES



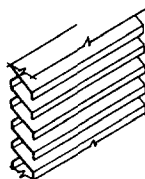
After attaching and adjusting door strips, snap cover strip into place. This design feature provides you with a neat and secure installation.

LOUVERS

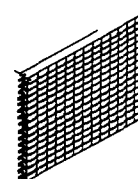
Stamped, fixed, and adjustable slat louvers along with air-conditioning grille are available in kit form or factory installed.



STAMPED LOUVER
Free air 26% of total area.



SLAT LOUVER
Fixed: free air 50% of total area. Adjustable: free air 40% of total area.

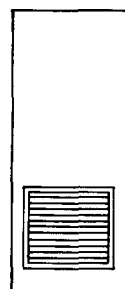


AIR-CONDITIONING GRILLE
Free air 81% of total area.



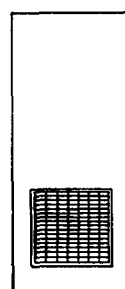
Top louver when specified.

8" L 101
2'-0" only.
12" L 102
2'-4" or over.



Louver opening width is 12 1/16" less than door width.

(Fixed)	(Adj.)
14" L201	L301
20" L202	L302
24" L203	L303

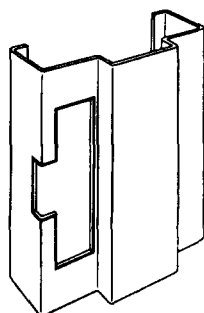


SGP 0027769

8" L401
14" L402
20" L403
24" L404

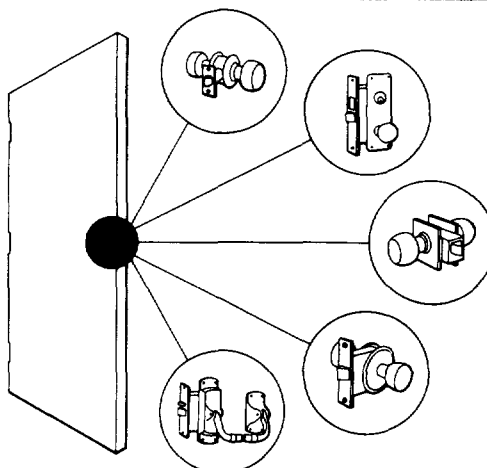
HARDWARE FLEXIBILITY

All Steelcraft doors and frames are reinforced, and prepared for a wide variety of hardware.



A.S.A. STRIKE

The use of the ASA strike will provide complete freedom of hardware since the outside dimensions of the strike are the same regardless of the type of lock.



HINGES

In addition to standard hinge preparations, Steelcraft doors and frames can be furnished with many other hinge preparations to meet various job conditions.

- Heavy-weight butt hinges.
- Half mortised hinges.
- Pivots.
- Floor checks.
- Anchor hinges.
- Spring hinges.

SPECIFICATIONS

All Steelcraft Fire Doors and Frames shall be manufactured in strict accordance with the specifications and procedures of the Underwriters' Laboratories. (Both U. S. and Canadian Label Service is available.)

LABELED DOORS

Labeled doors are identical in appearance to non-labeled doors. The construction of labeled doors varies from standard door construction to meet Underwriters' requirements. All labeled doors carry labels designating Underwriters' label classification of the door. Gage of door does not determine label classification.

LABELED FRAMES

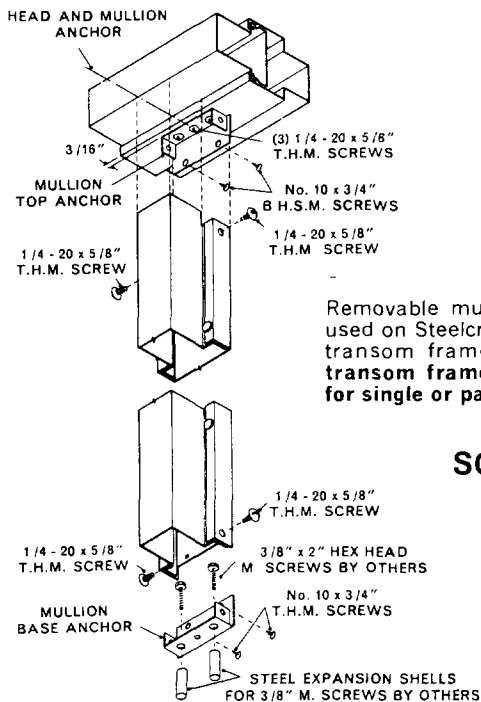
Labeled frames are identical in appearance to non-labeled frames. Underwriters' requires that labeled frames must have no less than a 3/4" stop and must be provided with welded-on masonry strap anchors.

Underwriters' labeled frames are intended for installation in masonry wall construction to establish an overall wall of fire protection.

NOTE

The information contained in this sheet is in accordance with Underwriters' Laboratories, Inc. specifications and procedures. It describes those labeled products available from Steelcraft as of August, 1963.

DETAIL OF REMOVABLE MULLION



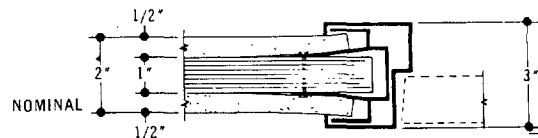
Removable mullion can be used on Steelcraft's labeled transom frames. Labeled transom frames available for single or pairs of doors.

SGP 0027770

LABEL CLASSIFICATION AND USE IN BUILDINGS	DOOR LINES AVAILABLE	DOOR TYPES AVAILABLE	MAXIMUM SIZES AVAILABLE
A 3 HOUR RATING Openings in Fire Walls and Division Walls between buildings with a rating of 3 hours.	FLUSH H-18 x 1 3/4	M	H - 18 x 1 3/4 SINGLE 3670 PAIR 7070
B 1 1/2 HOUR RATING Openings in Vertical Shafts with a rating of 1 1/2 hours.	STILE AND PANEL S-20 x 1 3/8 S-20 x 1 3/4 S-18 x 1 3/4 FLUSH H-18 x 1 3/4 STILE AND RAIL S-16 x 1 3/4 - Flush S-16 x 1 3/4 - Recessed	M V	S - 20 x 1 3/4 SINGLE 3072* PAIR - NOT AVAILABLE S - 20 x 1 3/4 SINGLE 3072* PAIR 6070
C 3/4 HOUR RATING Openings in Corridors and Room Partitions with a rating of 3/4 hour.		M G G2 G3 G4 G6 NL LG V-Lite Door Available	S - 18 x 1 3/4 SINGLE 3072* PAIR 6070
D 1 1/2 HOUR RATING Openings in Exterior Walls with a rating of 1 1/2 hours.		M	H - 18 x 1 3/4 SINGLE 3670 PAIR 7070 S - 16 x 1 3/4 SINGLE 4080 PAIR 8080
E 3/4 HOUR RATING Openings to Exterior Fire Escapes with a rating of 3/4 hour.		M G G2 G3 G4 G6 NL V-Lite Door Available	*NOTE: Single S-20 and S-18 are approved thru 7'-2" high only with honeycomb center panel and mineral wool filled stiles. Doors fully insulated with mineral wool are approved thru 7'-0" high single and pair.

FRAME FOR LAMINATED WALL

NOTE SPECIAL CONSTRUCTION, UNIQUE WITH STEELCRAFT



Frame available with 1 1/2 hour or "B" label rating and has been accepted for use in 2" walls having a 2 hour rating.

UNDERWRITERS' LABEL FRAMES

CLASSIFICATION OF LABEL FRAMES

Label frames are not classified. One label frame is used for any label classification door.

MINIMUM GAGE REQUIREMENTS

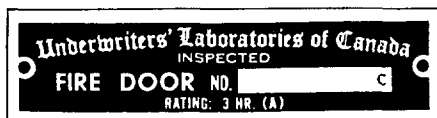
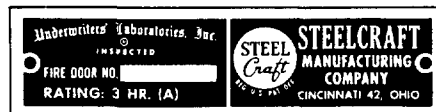
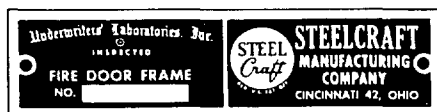
Maximum sizes allowed in 16 Ga-Single 3676, Double 5076 or 6070. Maximum sizes allowed in 14 Ga-Single 40100, Double 80100. 18 Ga. is not allowed in any label frame.

CONSTRUCTION AVAILABLE

KD (knocked down)
SUA (Set up and arc welded)
SUS (Set up and spot welded)

GENERAL NOTES

Minimum jamb depthFrame for 2" wall thickness
Maximum jamb depthUnlimited
Minimum stop allowed3/8"



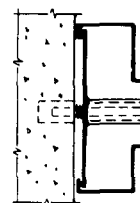
STEEL
Craft.

SPECIFICATIONS

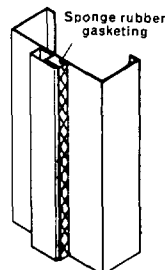
- ALTERNATE 2A**

ALTERNATE 2B

7. All frames shall be bonderized and receive one coat of baked-on prime paint.

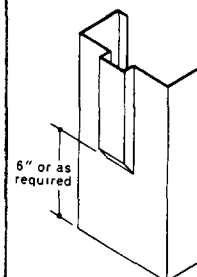


EXISTING MASONRY
Section through
jamb with strap
and tube anchor

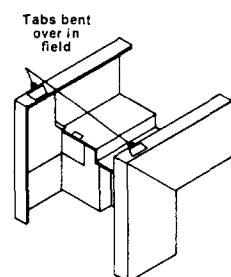


APPLIED STOP
For use as weatherstrip
or for sound deadening
purpose

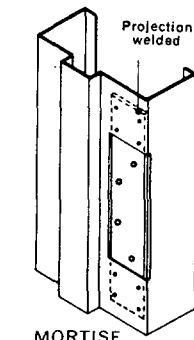
SGP 0027771



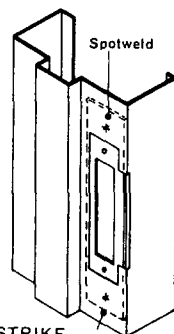
HOSPITAL STOP



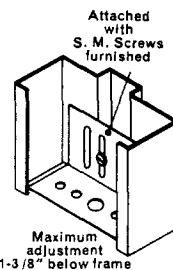
CORNER DETAILS
(KD shown)



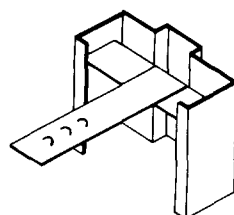
MORTISE HINGE PREPARATION



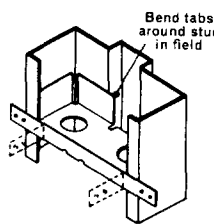
STRIKE
PREPARATION



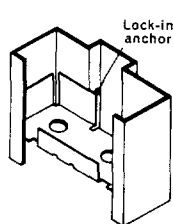
ADJUSTABLE
BASE
ANCHOR



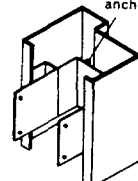
ANCHOR FOR
MASONRY WALL



WOOD STUD
BASE ANCHOR *



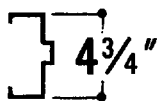
ANCHOR FOR
CLOSED STEEL
STUD PARTITION.



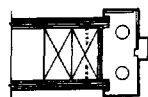
ANCHOR FOR 2"
LAMINATED GYPSUM
PARTITION
(3" Frame only
FG-18-3)

NOTE: (8) anchors are furnished with this frame. (2) anchors in head (6) anchors in jambs.

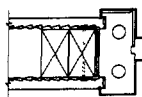
- Patented



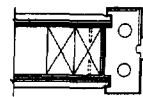
FRAMES



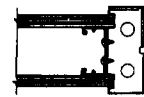
2 x 3 wood stud
with 1/2" drywall



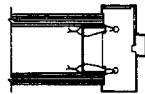
2 x 3 wood stud with
3/4" plaster on metal lath



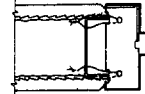
2 x 3 wood stud with
3/4" Gypsum and plaster



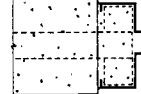
2 1/2" closed steel stud
with 3/4" Gypsum



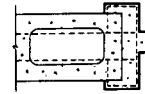
2 1/2" open steel stud
with 3/4" Gypsum



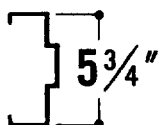
3 1/4" open steel stud
with 3/4" plaster on
metal lath



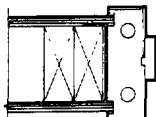
Butted masonry—
brick, concrete block,
or poured concrete



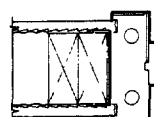
Wrap around masonry
4" block or tile



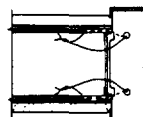
FRAMES



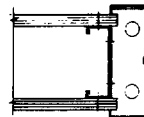
2 x 4 wood stud
with 1/2" drywall



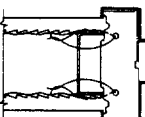
2 x 4 wood stud
with 3/4" plaster



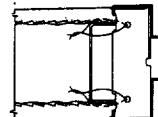
3 1/4" wire steel stud
3/4" Gypsum and plaster



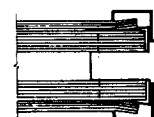
3 1/4" closed steel stud
with 1/2" drywall



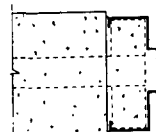
3 1/4" open steel stud
with 3/4" plaster



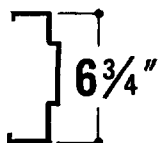
4" open steel stud
with 3/4" plaster



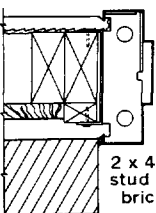
4 1/2" laminated wall



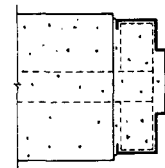
Butted masonry—
brick, concrete block,
or poured concrete



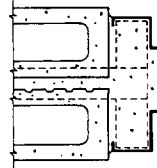
FRAMES



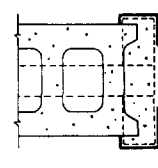
2 x 4 wood
stud with
brick
veneer



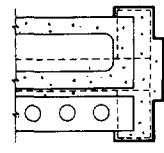
Butted masonry—
brick, concrete block,
or poured concrete



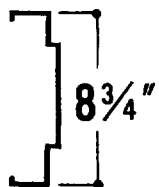
Butted masonry—
double 4" block
combination



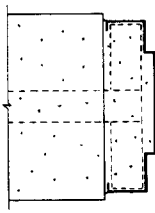
Wrap around masonry—
6" block or tile



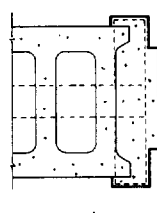
Wrap around masonry—
block and tile
combinations



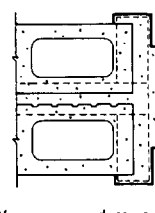
FRAMES



Butted masonry—
brick, concrete block,
or poured concrete



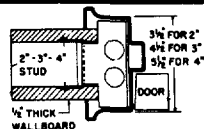
Wrap around masonry
8" block or tile



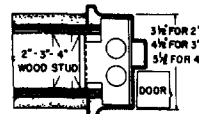
Wrap around masonry
block and tile
combination or double tile

**contour
frames**

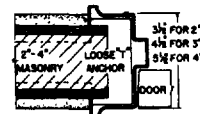
**DRY WALL
CONSTRUCTION**



**PLASTER
CONSTRUCTION**

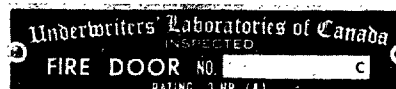


**MASONRY
WALL**



• FOR COMPLETE INFORMATION, WRITE FOR TECHNICAL DATA SHEET

UNDERWRITERS' LABEL DOORS



SPECIFICATIONS

All Underwriters' label doors shall be as manufactured by The Steelcraft Manufacturing Company and in strict accordance with the specifications and procedures of Underwriters' Laboratories.

Labeled doors shall be identical in appearance to non-labeled doors. Construction of labeled doors shall vary from standard door construction to meet Underwriters' requirements. All labeled doors shall have labels attached, designating the Underwriters' Laboratories' label classification of the door.

NOTES

1. All door lines are available in galvanized steel.
2. All labeled doors are reinforced for surface closers.
3. Gage of steel does not determine label classification.
4. Both U. S. and Canadian label service is available.

* * * * *

The information contained on this sheet is in accordance with Underwriters Laboratories, Inc. specifications and procedures. It describes those labeled products available from Steelcraft as of November, 1964.

SGP 0027773

STEELCRAFT

THE STEELCRAFT MANUFACTURING COMPANY
In U.S.A. . . Cincinnati, Ohio 45242
In Canada . . . Malton (Toronto), Ontario



*finest name
in metal
doors and
frames*

UNDERWRITERS' LABEL FRAMES



SPECIFICATIONS

All Underwriters' label frames shall be as manufactured by The Steelcraft Manufacturing Company and in strict accordance with the specifications and procedures of Underwriters' Laboratories.

Labeled frames are similar in appearance to non-labeled frames. All labeled frames shall have no less than $\frac{5}{8}$ " stops and shall be provided with welded-on anchors. All labeled frames shall have labels attached indicating conformance to Underwriters' procedures.

NOTES

1. All frames are available in galvanized steel.
2. All frames are reinforced for surface closers.
3. Both U.S. and Canadian label service is available.

* * *

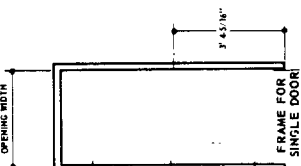
The information contained on this sheet is in accordance with Underwriters' Laboratories, Inc. specifications and procedures. It describes those labeled products available from Steelcraft as of January 1964.

SGP 0027775



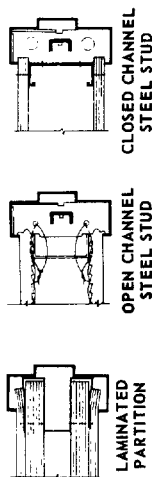
FRAMES WITH TRANSOM AND MULLION

FRAMES ARE NOT RATED AND MAY BE USED
FOR ANY LABEL CLASSIFICATION DOOR



1. Construction: KD (Knocked Down),
SUA (Set up Arc Welded) and SUS (Set up Spot Welded)
2. Jamb Anchors Premitred: 4" thick walls and greater -
Steel Stud, Laminated Partition and
Adjustable Masonry Strip.
2" to less than 4" thick walls - Laminated Partition,
plaster, Partition and Adjustable Masonry Strip.
All Anchors must be welded in.
Celling Struts must be furnished with frames for steel
stud, and plaster partitions.
3. Base anchors same as standard non-label frames.
4. Hardware preparation to match Underwriters' Label,
Doors as shown on TD107.

**TYPICAL WALL CONDITIONS ALLOWED
FRAMES, FOR WALLS 4" THICK AND GREATER**



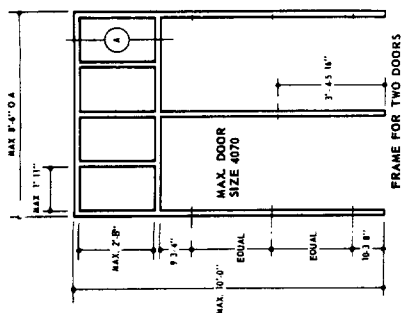
SIZE LIMITATIONS	
FRAMES FOR WALL 4" THICK AND GREATER	
JAMB DEPTHS:	Min. for 4" Thick Wall Max. unlimited
FRAME SIZES:	Max. in 16 GA Single 3676 Double 5076 or 6070 Max. in 14 GA Single 40100 Double 80100 18 GA is not permitted
STOP SIZE:	Min. 5/8"
FRAMES FOR WALLS LESS THAN 4" THICK AND AT LEAST 2" THICK	
JAMB DEPTHS:	Min. for 2" Thick Wall Max. for wall less than 4" thick
FRAME SIZES:	Max. Single 3670 * Double frames are not permitted Min. 16 GA
STOP SIZE:	Min. 5/8"



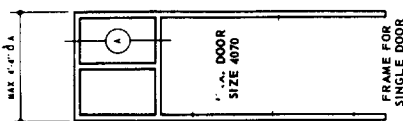
**FRAMES FOR WALLS LESS THAN 4" THICK AND
AT LEAST 2" THICK**



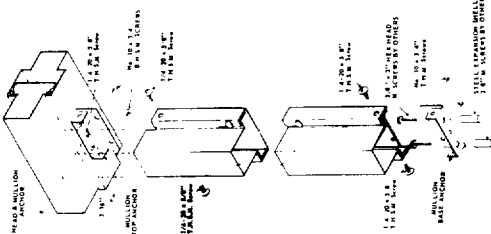
AVAILABLE FOR SINGLE OPENINGS ONLY



FRAME FOR TWO DOORS



FRAME FOR
SINGLE DOOR



DETAIL OF REMOVABLE MULLION

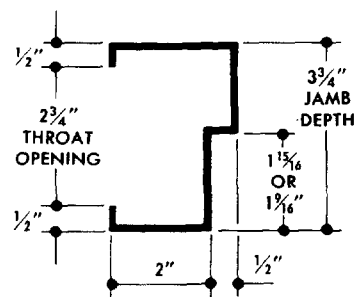
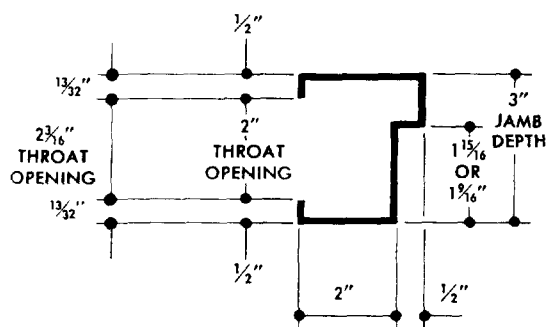
SIZE LIMITATIONS	
JAMB DEPTHS:	Min. 4-3/4" Max. 6-3/4"
FRAME SIZES:	Max. for (2) Doors 8'-6" W. x 10'-0" H. Max. for (1) Door 4'-4" W. x 10'-0" H.
TRANSOM OPENING:	Max. 1'-11" W. x 2'-8" H.
DOOR SIZE:	Max. 4070
STOP SIZE:	Min. 5/8"

GENERAL NOTES

1. Type of Frame: F16. (16 GA. C.R.S.)
2. Underwriters' Label Frames without Tronson and with Removable Mullion may be K.D. (Knocked Down) Construction.
3. Jamb Anchor Permitted: Welded in Adjustable Masonry Strip.
4. Base Anchor: Adjustable Type.



TYPICAL WALL CONDITIONS FOR STEELCRAFT STANDARD 3" & 3 $\frac{3}{4}$ " JAMB DEPTH FLUSH FRAMES



TYPICAL SECTIONS

GENERAL NOTES

3" and 3 $\frac{3}{4}$ " Jamb Depth Flush Frames are available for both 1 $\frac{3}{8}$ " and 1 $\frac{3}{4}$ " thick doors in a variety of gages and finishes as listed below.

- F-18 18 Gage C.R.S., baked on grey prime finish.
- F-16 16 Gage C.R.S., baked on grey prime finish.
- F-14 14 Gage C.R.S., baked on grey prime finish.
- FAL 60 .060 Aluminum, mill finish, anodized,
- FP-16 16 Gage Enameling Iron, Porcelain Enamel finish.
- FS-16 16 Gage Stainless Steel with No. 4 polish finish.

SGP 0027777

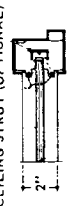
3" J. D. FRAMES

BUTTED MASONRY



POURED CONCRETE
BRICK OR TILE

PLASTER PARTITION CEILING STRUT (OPTIONAL)



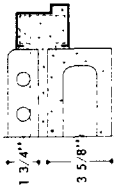
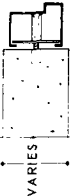
2" SOLID PLASTER
WITH 1/2" GYPSUM CORE

CEILING STRUT (OPTIONAL)

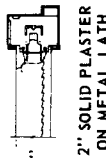


2 1/2" SOLID PLASTER
WITH 1/2" GYPSUM CORE

EXISTING WALL



2" CORNER TILE AND
4" BLOCK COMBINATION



2" SOLID PLASTER
ON METAL LATH



2 1/2" SOLID PLASTER
ON METAL LATH

NOTE:
Details shown are those most
commonly used, however this
frame profile can be used with
many other wall conditions.

STANDARD WALL ANCHORS

ANCHORS ARE AVAILABLE FOR COMMONLY USED WALL CONSTRUCTION AND CAN BE USED INTERCHANGE-
ABLE IN STANDARD 3" J.D. FRAMES. SOME OF THE ANCHORS AVAILABLE FROM STOCK ARE SHOWN HERE.



MASONRY
TEE ANCHOR
INSTALLED IN JAMBS
AS WALL IS BEING
CONSTRUCTED



ANCHOR FOR
EXISTING MASONRY
WALL
FIELD APPLIED
FOR USE WITH
STANDARD FRAME
INSTALLATION



ANCHOR FOR
PLASTER
PARTITION
LOCK-IN TYPE
FOR FIELD
INSTALLATION



ANCHOR FOR
LAMINATED
WALL
LOCK-IN TYPE
FOR FIELD
INSTALLATION



MASONRY
TEE ANCHOR
INSTALLED IN JAMBS
AS WALL IS BEING
CONSTRUCTED



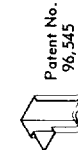
ANCHOR FOR
EXISTING MASONRY
WALL
FIELD APPLIED
FOR USE WITH
STANDARD FRAME
INSTALLATION



ANCHOR FOR
OPEN AND
CLOSED STEEL STUD
LOCK-IN TYPE
FOR FIELD
INSTALLATION



ANCHOR NOTCHED
FOR CEILING
STRUT
LOCK-IN TYPE
FOR FIELD
INSTALLATION



TYPICAL
LOCK-IN ANCHOR
INSTALLATION

TYPICAL WALL CONDITIONS FOR 3" & 3 3/4" JAMB DEPTH FLUSH FRAMES



STEELCRAFT

Drywall Frames

To be installed into a rough opening after all basic wall construction is completed.

DW-16 & DW-18

For 1 ³/₈" or 1 ³/₄" Doors

SPECIFICATIONS

1. Frames shall be made of 16 or 18 gage cold rolled prime quality steel.
2. Frames shall be knock down. Mitered corners shall be reinforced with "Snap-Lock"* corner clips to allow easy interlocking of jamb to head.
3. Each jamb shall have an adjustable jamb anchor* located 6" from top of frames.
4. Each jamb shall have a welded-in base anchor attaching plate, which will allow easy installation of loose base anchors in the field.
5. All frames shall be furnished with three rubber bumpers in each jamb and two rubber bumpers in each double door head installed
6. All frames shall be bonderized and receive one coat of baked-on prime paint.
7. Standard: All frames shall be mortised and reinforced for hinges, strikes, and all surface applied hardware as required. at the factory.

ALTERNATE: All frames shall be mortised and reinforced for strike, surface hardware, and furnished with weld-on hinges.

* PAT. PENDING

SGP 0027779

**STEPS IN THE INSTALLATION
OF THE STEELCRAFT DOOR FRAME
FOR DRYWALL PARTITIONS**



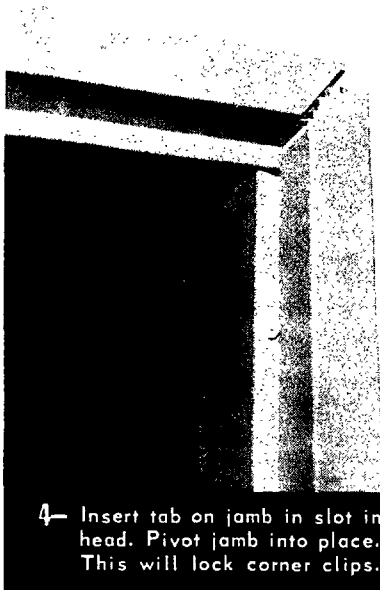
1— Attach base anchor to strap at base of jamb.



2— Notch drywall at base for attachment of base anchor.



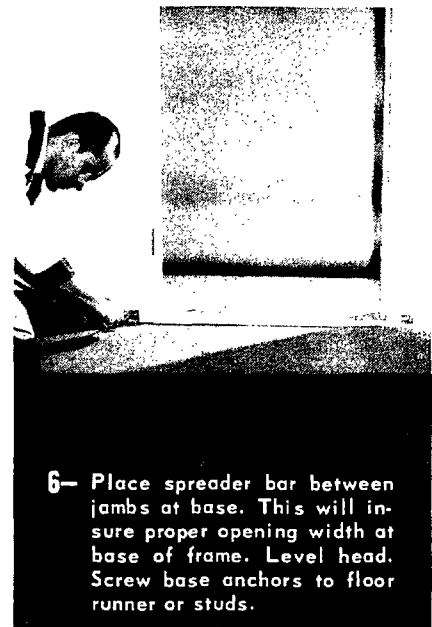
3— Install frame head. Center in rough opening.



4— Insert tab on jamb in slot in head. Pivot jamb into place. This will lock corner clips.



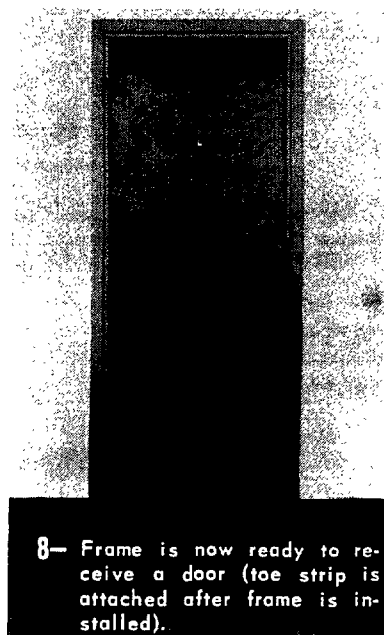
5— Repeat step No. 4 with other jamb.



6— Place spreader bar between jambs at base. This will insure proper opening width at base of frame. Level head. Screw base anchors to floor runner or studs.



7— Plumb frame by adjusting anchors at top of jambs. Make certain anchors are pressed tightly against rough opening.

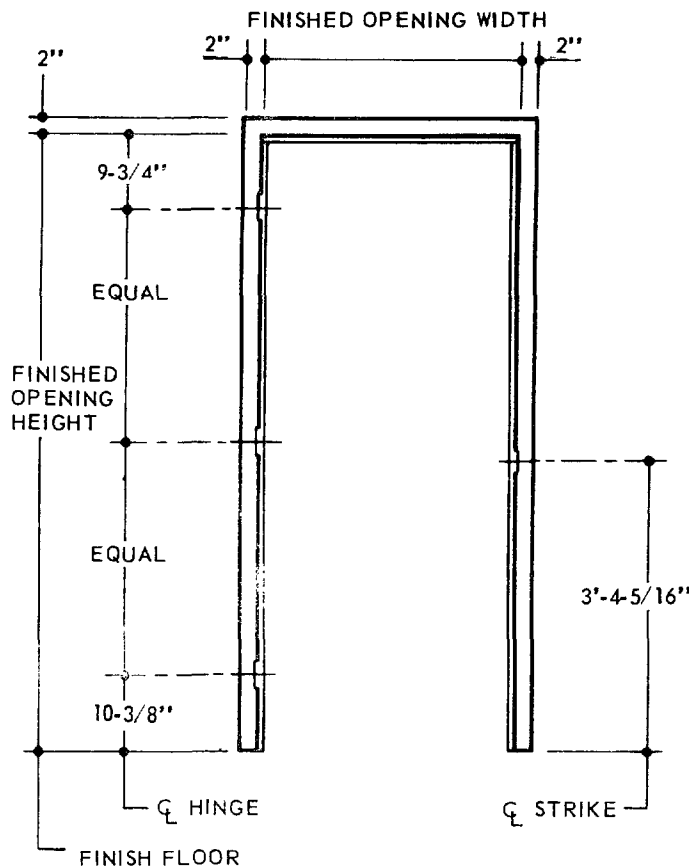


8— Frame is now ready to receive a door (toe strip is attached after frame is installed).

SGP 0027780

DRYWALL-FRAME ELEVATIONS AND SECTIONS

18 Ga. Frames For $1\frac{3}{8}$ " Doors; 16 Ga. For $1\frac{3}{8}$ " & $1\frac{3}{4}$ " Doors



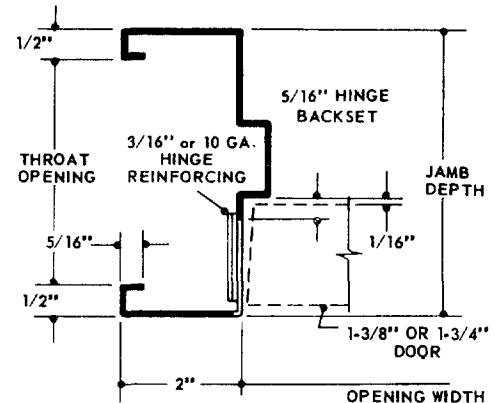
ELEVATION

NOTE:

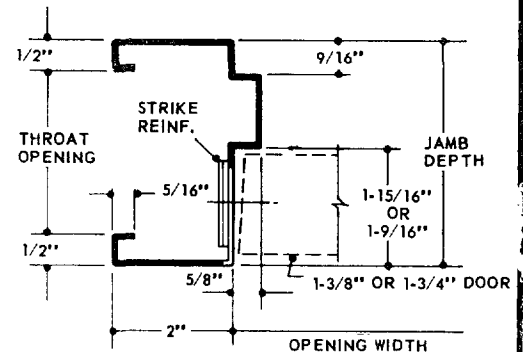
Rough opening dimensions are determined as follows:

Width of drywall opening may be a minimum of 1" and a maximum of 2" wider than finished frame opening width.

Height of drywall openings may be a minimum of 1/2" and a maximum of 1-1/2" higher than finished frame opening height.



DOUBLE RABBET
SECTION AT HINGE
THRU FRAME FOR WALLS
3-1/2" THICK AND OVER



SINGLE RABBET
SECTION AT STRIKE
THRU FRAME FOR WALLS
2-7/8" THICK AND UNDER

SIZES				
FINISHED OPENING HEIGHT	FINISHED OPENING WIDTH		FRAME DIMENSIONS	
	SINGLE	DOUBLE	JAMB DEPTH	THROAT OPENING
6'-8"	2'-0"	4'-0"	**3"	2"
	2'-4"	4'-8"	*3-1/4"	2-1/4"
	2'-6"	5'-0"	*3-5/8"	2-5/8"
	2'-8"	5'-8"		
7'-0"	3'-0"	6'-0"		
7'-2"	3'-4"	6'-8"		
8'-0"	3'-6"	7'-0"		
	3'-8"	7'-4"		
	4'-0"	8'-0"		

*Standard Steelcraft Jamb Depths.

**Available for 1-3/8" doors only.

GENERAL NOTES

Hardware Preparation - Frames for 1-3/8" Doors

Hinges - 1 pair of 3-1/2" x 3-1/2" standard weight template or non-template hinges for 6'8" height. 1-1/2 pair of 3-1/2" x 3-1/2" standard weight template or non-template hinges for 7'0" or 7'2" height.

Strike - Cylindrical Preparation ASA-115-3.

Hardware Preparation - Frames for 1-3/4" Doors

Hinges - 1-1/2 pair of 4-1/2" x 4-1/2" standard weight template hinges for 6'8", 7'0" and 7'2" height. 2 pair of 4-1/2" x 4-1/2" standard weight, template hinges for 8'0" height.

Strike - Universal Preparation ASA-115.1-2 (Standard) or Cylindrical Preparation ASA-115-3.

ANCHORS

Jamb Anchors

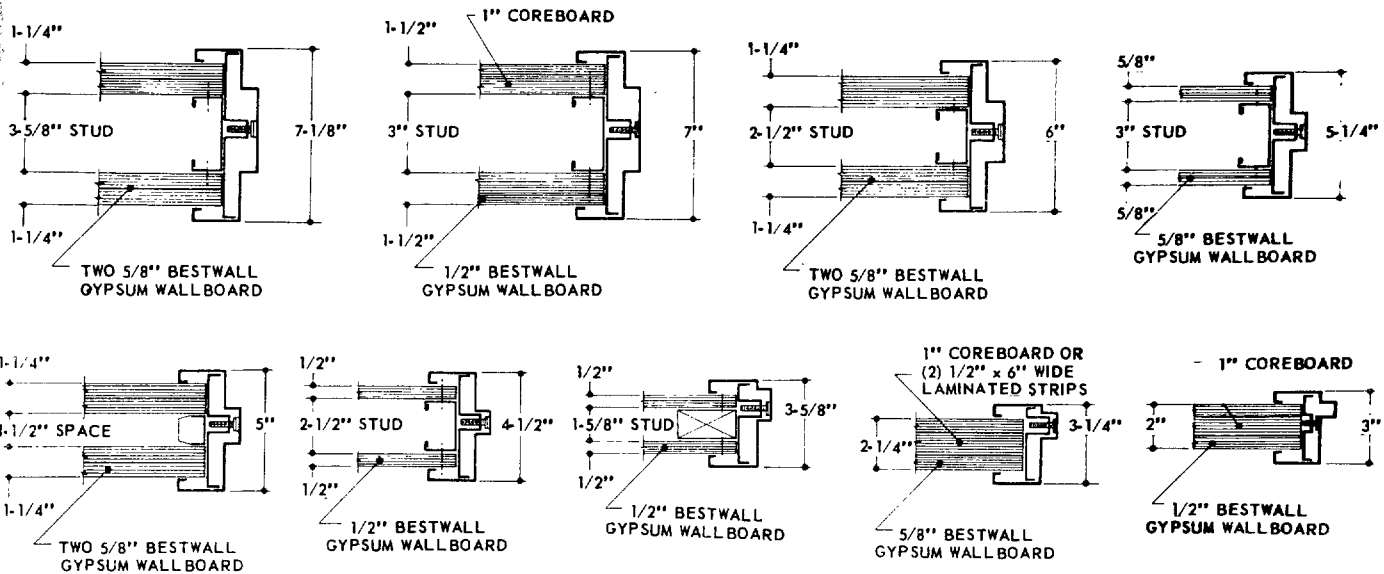
An adjustable anchor is attached to each jamb located 6" from the top of the frame.

BASE ANCHORS

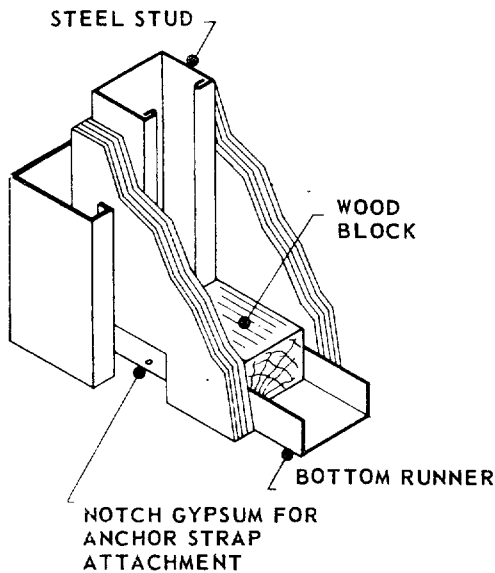
Loose Anchors

Loose base anchors are furnished with each frame. Gypsum board must be notched to allow base anchor to be fastened directly to the steel or wood studs.

TYPICAL INSTALLATIONS FOR BESTWALL PARTITION SYSTEMS



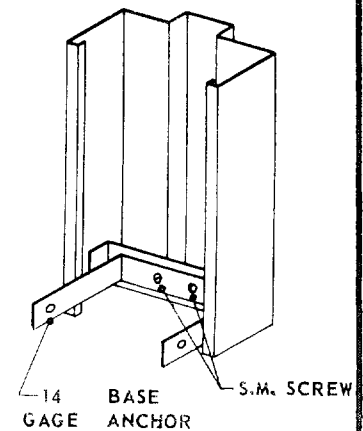
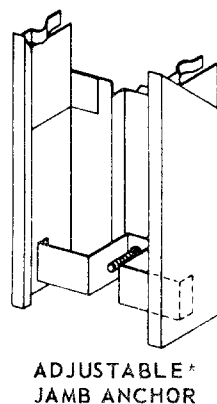
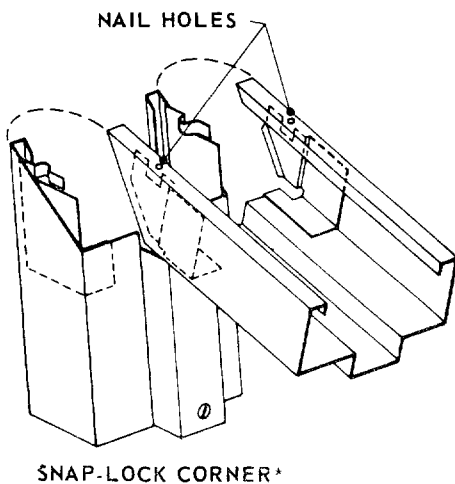
CONSTRUCTION AND INSTALLATION DETAILS



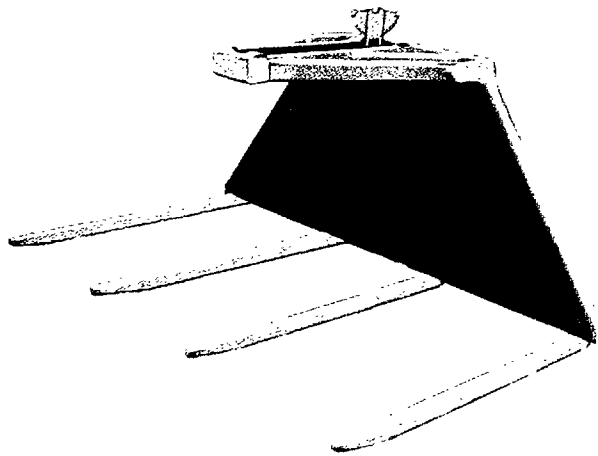
GENERAL NOTES:

1. The rough opening should be finished as square as possible.
2. It is recommended that a small wood block be installed at the bottom corner of each opening. See III. at left. This will give necessary reinforcement required for solid anchoring of the frame at the floor line.
3. If the frame must be removed from the wall, insert two 10d nails into the nail holes on both side of the head. Press down on the nails to disengage the snap-lock corner.
4. For installation instructions, see reverse side of this sheet.

SGP 0027782



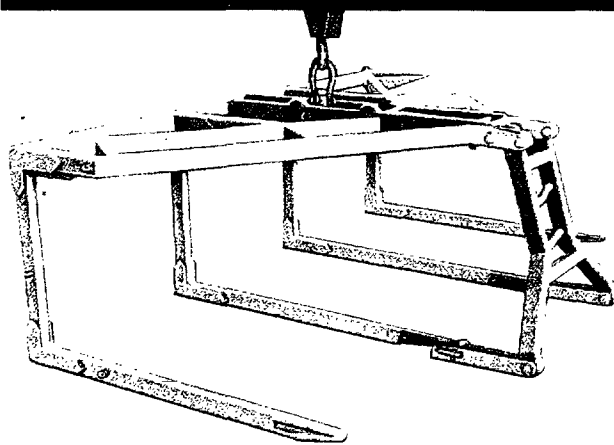
SIDE-O-MATIC FORKS



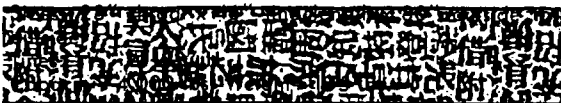
TYPE 1: 4-Tine, Solid Back Fork
 Application: Bundles of Drywall or Other Building Materials.
 Sizes: 28" throat x 42" tine x 6' outside tine center-to-center distance. Tines 1½" W x 2" H.
 Capacity—4000 lbs. Weight—375 lbs.



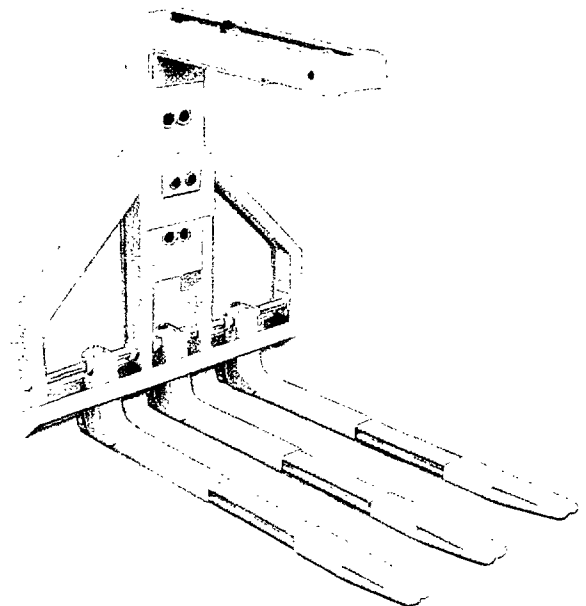
TYPE 3: Swivel Lift Hook.
 Size of Hook—1½" Throat.
 Capacity—6000 lbs. Weight—20 lbs.



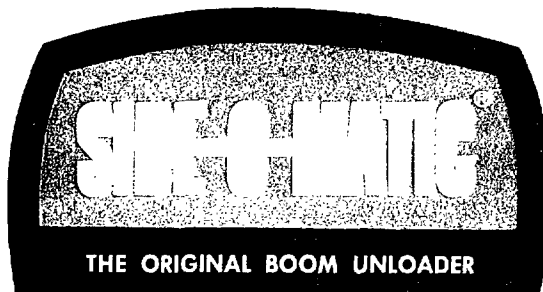
TYPE 9: Drywall Fork, Variable Angle Style
 Application: Bundles of Drywall or Other Building Materials



Sizes: 24" throat x 47" tine length x 90" outside to outside.
 Tines: 1½" W x 2" H.
 Capacity—4,000 lbs. Weight—600 lbs.



TYPE 10: 3-Way Adjustable Brick Fork.
 Application: Banded or Palletized Brick.
 Size: 36" to 50" adjustable throat height in 7" increments; 35" to 48" adjustable tine length in 2½" increments; 17" to 36" adjustable tine spread. Center tine detachable.
 Capacity—4,000 lbs. Weight—275 lbs.

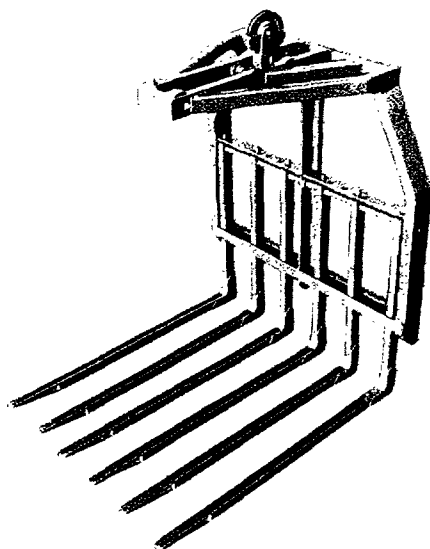


SGP 0027783

SIDE-O-MATIC UNLOADER CORP.

P.O. BOX 1561 / YORK, PA. 17405 / PHONE 717-845-1655

SIDE-O-FORKS



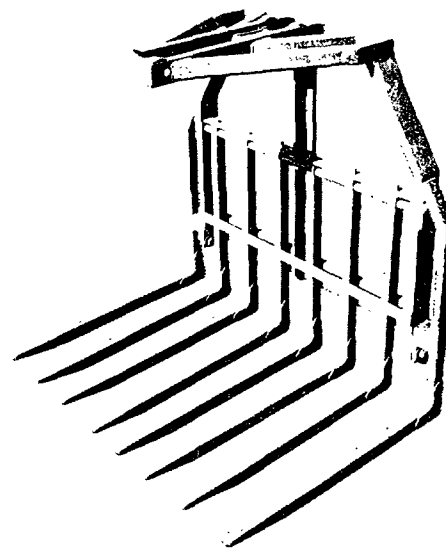
TYPE 1: Standard Six-Tine Adjustable Fork.
Application: Standard Block Cubes (40 x 48 or 48 x 48)

Type	Throat Height	Tines L x W x H	Capacity Lbs.	Weight Lbs.
1A	44"	39" x 1 1/2" x 2"	6000	390
1B	44"	47" x 1 1/2" x 2"	6000	410
1C	50"	39" x 1 1/2" x 2"	6000	410
1D	50"	47" x 1 1/2" x 2"	6000	425

Other sizes quoted on request.

TYPE 2: Small Six-Tine Adjustable Fork.
Application: Small block cubes (40 x 48—4 Blocks High).

Type	Throat Height	Tines L x W x H	Capacity Lbs.	Weight Lbs.
2	36"	39" x 1 1/2" x 2"	6000	375



TYPE 3: 2 Add-On Tines, (One per side) Used with Standard 6-Tine Fork (Type 1).

Application: 4-Block Wide Cubes or for Bundles of Lumber.

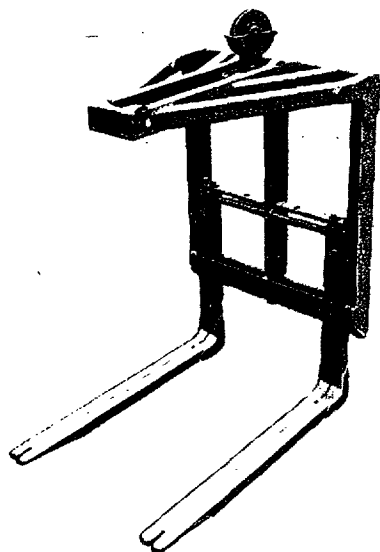
Sizes: Outside Tines center-to-center distance 72" or to fit 4-block wide cubes. Tine length same as regular fork. Capacity of complete fork—6000 lbs. Total weight—75 lbs. plus weight of Type 1 Fork.

TYPE 4: 4 Add-On Tines (2 per side). Used with Standard 6-Tine Fork (Type 1).

Application: 5-Block Wide Cube or for Extra Large Lumber Bundles.

Sizes: Outside Tines center-to-center distance 71" for removable tines and 96" for solid frames type. Tine spacing of add-on tines is fixed at time of manufacture.

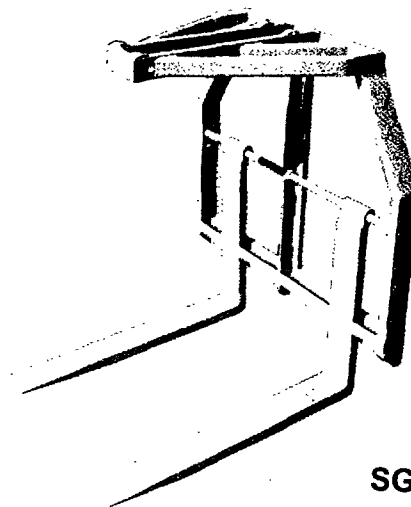
Capacity of complete fork—6000 lbs. Total weight—150 lbs. plus weight of Type 1 Fork.



TYPE 5: Two-Tine Adjustable Fork.
Application: Packaged Brick and Pallets.

Type	Throat Height	Tines L x W x H	Capacity Lbs.	Weight Lbs.
5A	44"	38" x 3 1/2" x 2"	4000	390
5B	36"	40" x 3 1/2" x 2"	4000	375

Other sizes quoted on request.



TYPE 6: Two Flat Tine Adjustable Fork.
Application: Low Clearance Pallets.

Type	Throat Height	Tines L x W x H	Capacity Lbs.	Weight Lbs.
6A	36"	30" x 3" x 1 1/4"	2000	375
6B	50"	48" x 4" x 1 3/4"	6000	390

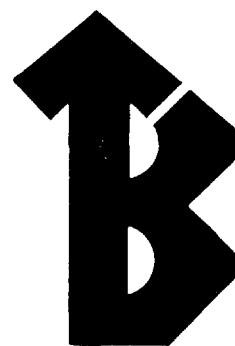
(Other sizes on request varying from 2000 to 6000 lbs. capacity, 36" to 50" throat height, 30" to 48" tine length, 3" to 6" tine width, and 1 1/4" to 1 3/4" tine height.)

SGP 0027784

BUCK

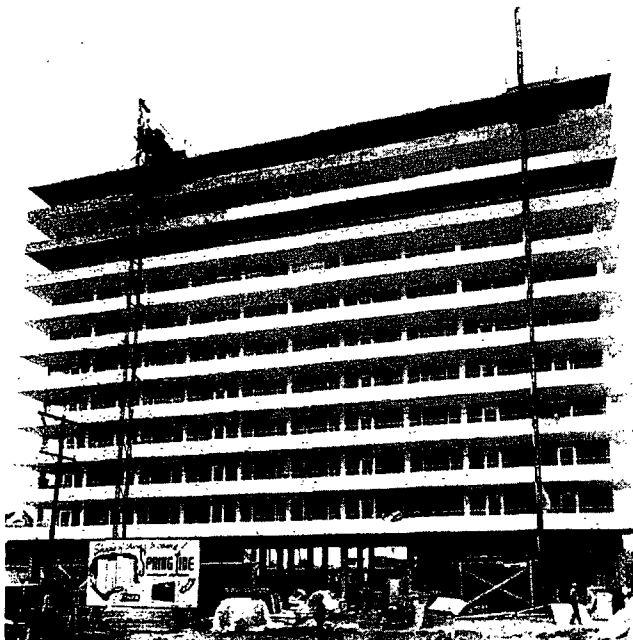
**automatic/manual
portable
medium and
heavy-duty
HOISTOWERS**

SGP 0027785

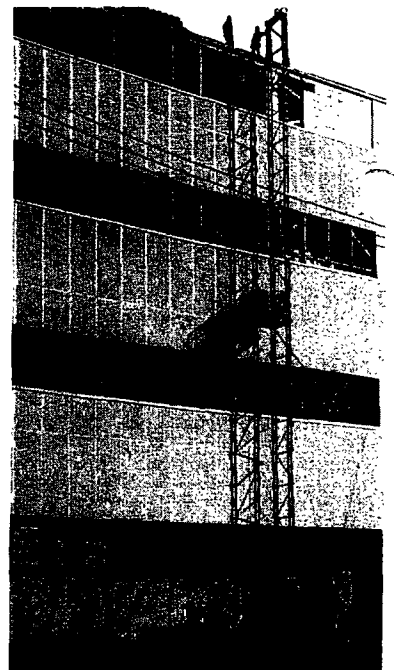


Manufactured By The
**BUCK > EQUIPMENT
CORPORATION**

*A Subsidiary of
Royal Industries, Inc.*
720 ANDERSON FERRY ROAD
CINCINNATI, OHIO 45238 • TELEPHONE: 471-8580
Cable Address: Buckhoist



Two Buck Hoisting Machines, delivering pay loads that reached up to a height of ten stories in construction of a Ft. Lauderdale, Florida apartment building.



Sheet metal and roofing contractors, on the Allis-Chalmers job in Terre Haute, Indiana. Roofing gravel, roof insulation, felt, and hot roofing pitch all went up on the Buck.

on the job with **BUCK HOISTOWERS**

**BUCK
HOISTOWERS ARE READY
TO GO ANYWHERE — FOR ANY JOB**



Trailer mounted on its own base with retractable pneumatic tired wheels. Easily towed to job site.

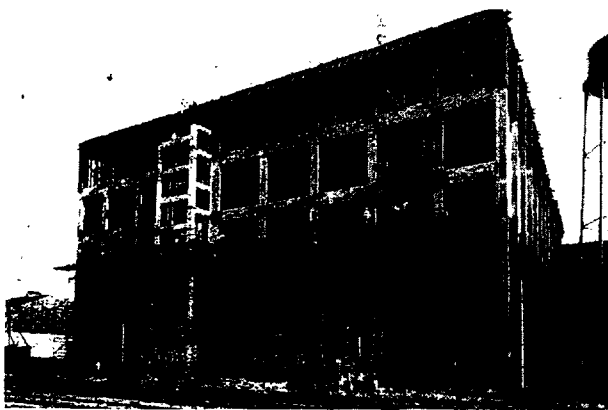
SGP 0027786



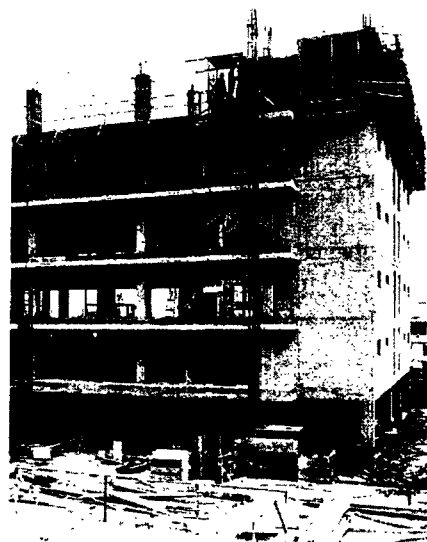
Austin Company pours 240 cubic yards slab in less than 8 hours in Dayton, Ohio.

Buck Hoistowers in pits speed construction of the operations office building for the Government Employee Insurance Company of Bethesda, Maryland.



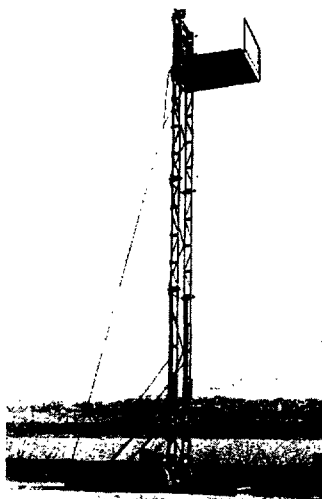


The job for Hiram Walker gets material to workmen on time and at top speed constructing a rack house for storage. The building itself, over 100 feet high and approximately 200 feet square, required a steady flow of brick and mortar to keep work moving. The tower of the hoist rose to 90 feet, servicing all completed floors rapidly.



The Buck Manhoist is particularly suited for multi story high rise buildings as the most efficient method of getting men and materials to the job.

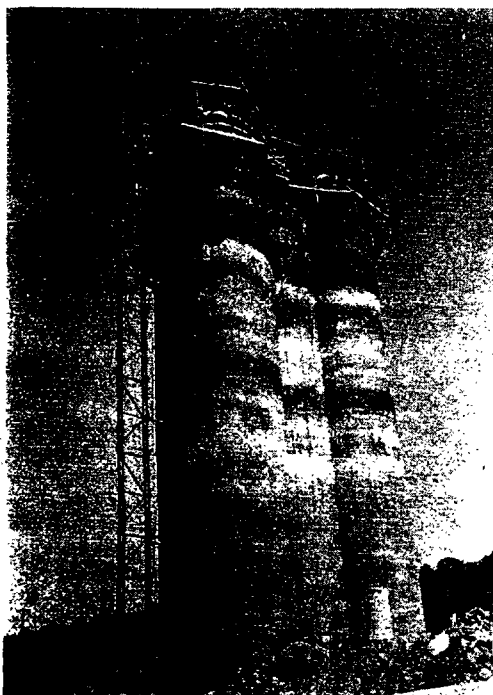
Self erecting—as tower goes up the retractable wheels automatically raise, lowering the base for operation of the Buck Hoistower—in minutes after arrival on the job.



Ready rigged—ready to go. All cables are galvanized and fitted with swaged fittings except hoisting cables.

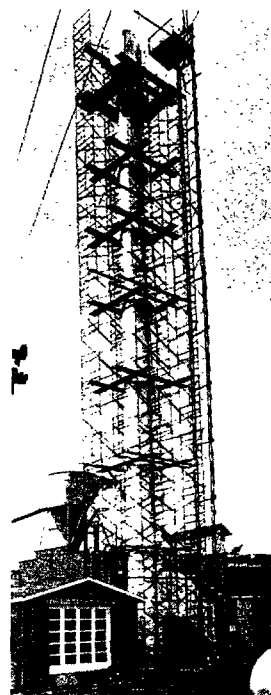
IT IS ALL DONE BY ONE MAN.

SGP 0027787



Building multiple silos is a specialty of a New York Contractor. Ranging from 14 ft. to 32 ft. in diameter. They have been erected by this company throughout North and South America and as far away as Australia.

The job was raising the top of a smoke stack the diameter of which was 6 ft. The whole 165 ft. stack was in place by the next week-end.

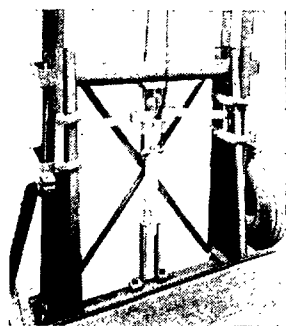


BUCK'S Line of Automatic and Manhoist

MODEL AE2M

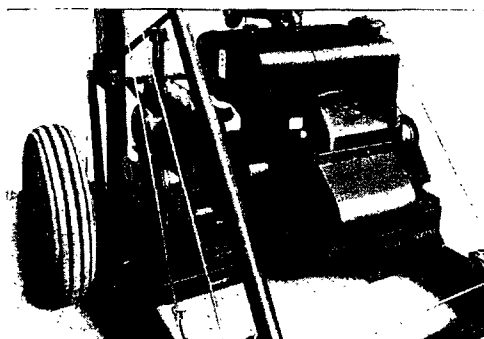


- ELECTRIC POWERED
- AUTOMATIC—ELECTRIC CONTROLLED
- 2000 TO 2500 LB. CAPACITY

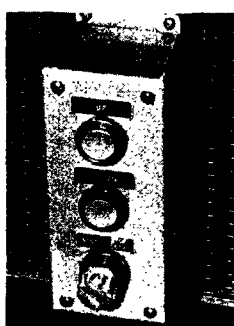


SAFETY DEVICE: Spring loaded, serrated safety shoes are activated and will stop to hold platform in case of cable failure or when ever cable becomes slack.

MODEL GA25H

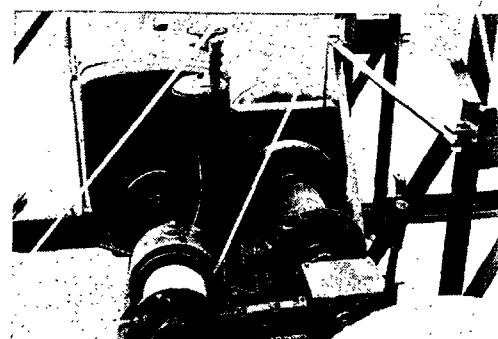


- GASOLINE POWERED
- AUTOMATIC—ELECTRIC CONTROLLED
- 2500 LB. CAPACITY

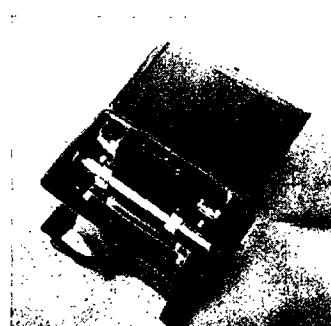


PUSH BUTTON OPERATION with stop locking switch.

MODEL GM20



- GASOLINE POWERED
- MANUALLY OPERATED
- 2000 LB. CAPACITY



FLOOR SELECTOR to and from any floor or height by simply pressing a button.

SPECIFICATIONS	AUTOMATIC		MANHOIST
	GA25H	AE2M	PC11M
MODEL	Gasoline Wisconsin VH	Electric Specify Voltage	Electric
POWER			220/440/3/60
HP	25	5, 7 1/2, or 15	15
PLATFORM CAPACITY	2500 Lbs.	2000 to 2500	8-11 Passengers 2000 Lbs.
HOISTING SPEED FPM	160	65-150	115
HOIST DRIVE	Electric Magnetic	Elec. Reversible Motor	Worm Gear
CONTROL	Automatic	Automatic	Automatic
PLATFORM SIZE	5'6" x 6'6"	5'6" x 6'6"	5' x 6'
FLOOR LOCKING DEVICE	Stop Locking Switch	Stop Locking Switch	Motor Brake - additional detailed specifications on request.
APPROX. WEIGHT WITH STD. 25' TOWER	5050	4300	7200
WHEELS	7:50 x 16	7:50 x 16	7:50 x 16 10 Ply
ROAD TRAVEL DIMENSIONS	W 6'10" x L 18' x H 12'3"	W 6'10" x L 18' x H 12'3"	W 7'2 1/2" x L 20'10 1/2" x H 12'1"
TOWER HEIGHT	Up to 200 Ft.*	Up to 200 Ft.*	Up to 300 Ft.*

SGP 0027788

GENERAL

*TOWER HEIGHT—100' and higher. Self erecting to 45' unloading height. Additional tower sections in 5' and 10' lengths.

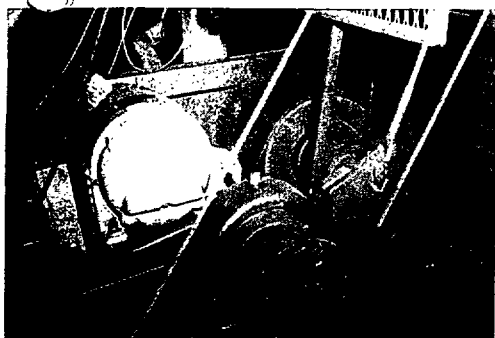
TOWER CONSTRUCTION—Constructed of steel tubing; electric steel castings. All sections electric steel welded.

READY RIGGED—All cables are in place . . . no need to re-rig . . . ready to go. All cables are galvanized and fitted with swaged fittings except material hoist cables.

Manufacturer of the World's

Manually Controlled HOIST TOWERS

MODEL E2M



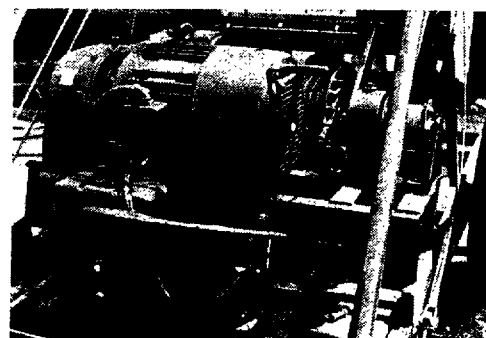
- ELECTRIC POWERED
- MANUALLY OPERATED
- 2000 TO 2500 LB. CAPACITY

MODEL V2M



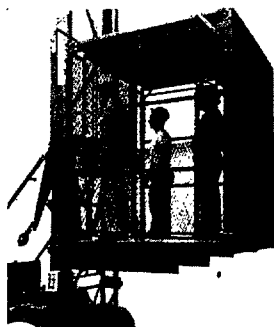
- GASOLINE POWERED
- MANUALLY OPERATED
- 2500 LB. CAPACITY

MODEL E-4M



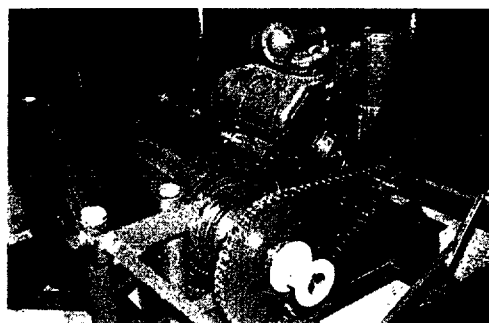
- ELECTRIC POWERED
- MANUALLY OPERATED
- 4000 LB. CAPACITY

MODEL PCI1M



THE BUCK MANHOIST saves you valuable "paid for" workers' time on the job. (Brochure on request)

MODEL V4M



THE V4M HOIST ASSEMBLY with large grooved drum, oversized brake and 35 or 60 H.P. V-4 engine offers outstanding power and reliability.

MANUAL

GM-20	V2M	E2M	V4M35	V4M60
Gasoline Wisconsin TH	Gasoline Wisconsin VH	Electric Specify Voltage	Wisconsin VG-4-D	Wisconsin V-460-D
15	25	5, 7 1/2, 10, or 15	35	60
2000 Lbs.	2500 Lbs.	2000 to 2500	4000 Lbs.	4000 Lbs.
125	170	65-150	150	240
Twin Disc Clutch	Twin Disc Clutch	Twin Disc Clutch	Twin Disc Clutch	Twin Disc Clutch
Manual	Manual	Manual	Manual	Manual
5' x 6'	5'6" x 6'6"	5'6" x 6'6"	6 1/2 x 6 1/2 Std.	6 1/2 x 6 1/2 Std.
Ratchet Lock w/Weighted Pawl	Ratchet Lock w/Weighted Pawl	Ratchet Lock w/Weighted Pawl	Ratchet Lock w/Weighted Pawl	Ratchet Lock w/Weighted Pawl
3775	4400	4200	6055	6150
6:50 x 16	7:50 x 16	7:50 x 16	7:50 x 16 10 Ply	7:50 x 16 10 Ply
W 6'6" x L 18' x H 12'3"	W 6'10" x L 18' x H 12'3"	W 6'10" x L 18' x H 12'3"	W 7'2 1/2" x L 20'10 1/2" x H 12'1"	W 7'2 1/2" x L 20'10 1/2" x H 12'1"
Up to 200 Ft.*	Up to 200 Ft.*	Up to 150 Ft.*	Up to 300 Ft.*	Up to 300 Ft.*

ALL MODELS

PORTABLE—Mounted on its own trailer with retractable heavy duty pneumatic tires and wheels.

PELICAN MODELS—Mounted on your own truck.

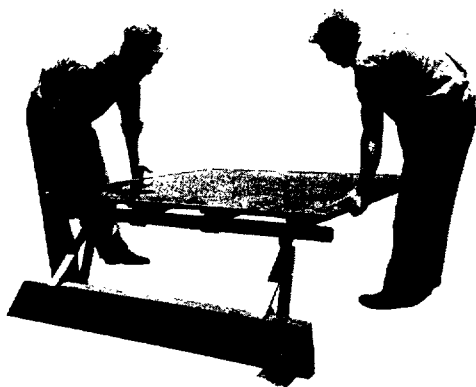
SPECIAL CHARACTERISTICS—Consult Factory for special horsepower or speed requirements and oversized platforms.

SGP 0027789

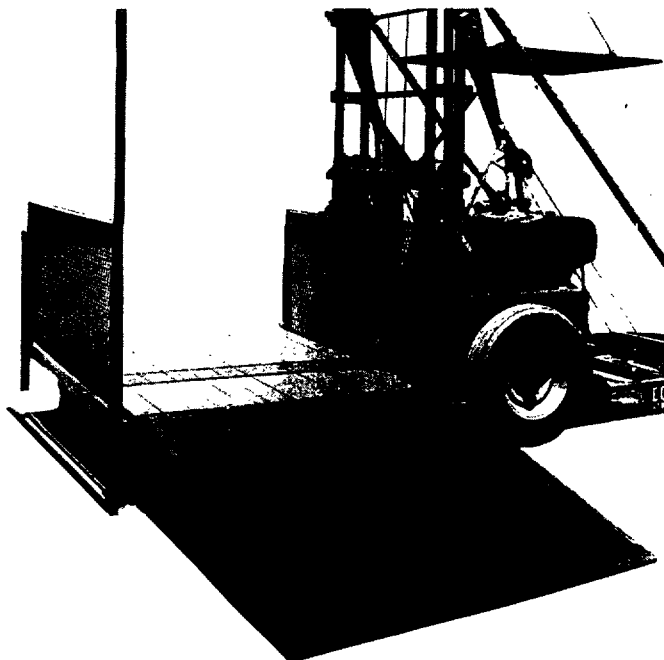
Finest Construction Equipment

**BUCK Pre-fabricated
RAMP saves Time and
Labor on the job**

Standard loading ramp fits any trailer mounted Hoistower. Facilitates and speeds up platform loading. Hooks on either side of the machine base. Can be transported right along with the Hoistower.

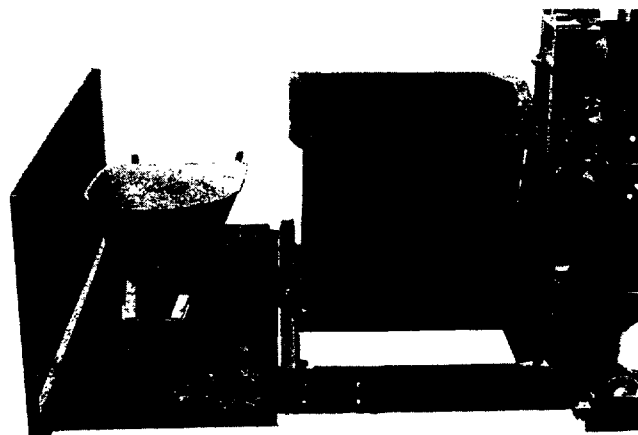


WORKS EASY Two men simply lift and hook the Ramp in place — no bolts or nuts necessary.



BUCK accessories

**Get MORE SAFE and CONVENIENT
man hours—when these job-minded
BUCK ACCESSORIES save you time,
cut your costs.**



**Doubleheader
POOP DECK**

Platform extension — easily added to the standard bucket undercarriage — forms a Poop Deck which makes the Hoistower doubly useful. The Poop Deck, built of the same top-quality materials that go into the Buck Platform, is wide enough to accommodate one wheelbarrow. Allows contractors to hoist loads of masonry and other materials between concrete loads . . . *without changing the Platform.*

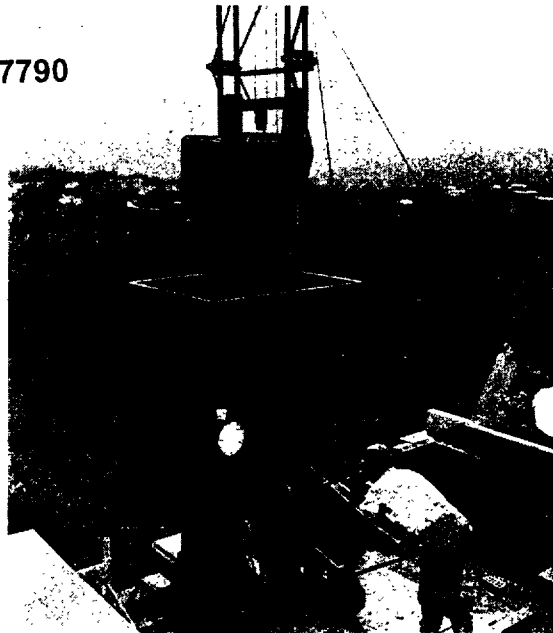
**Going up . . . 100 feet plus
. . . with the GIN POLE!**

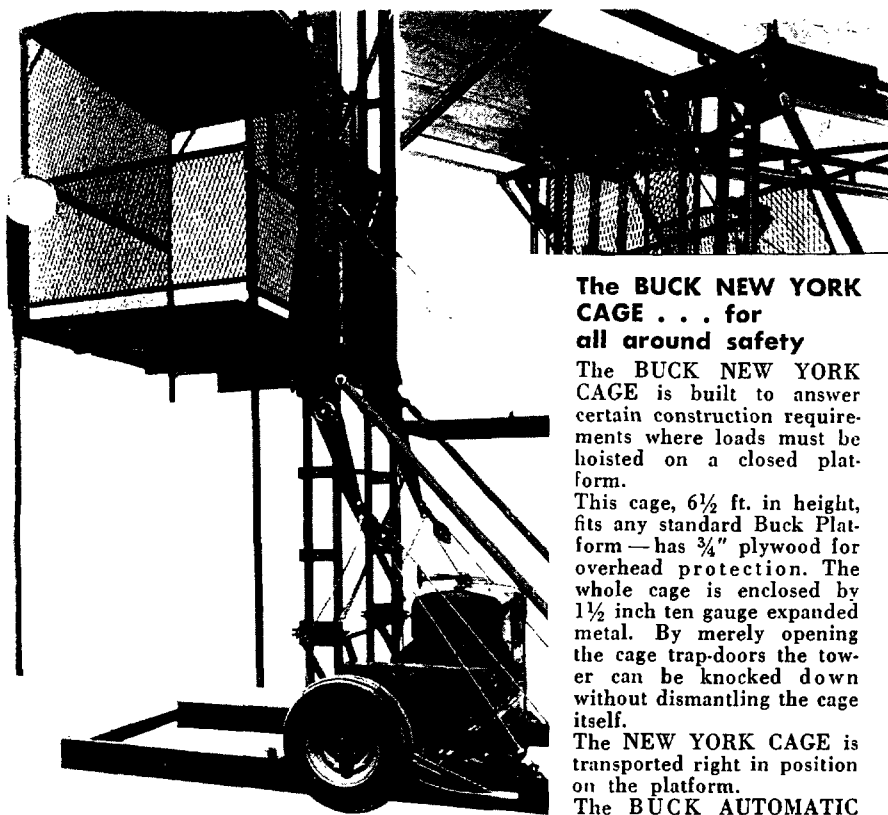
A working height of 100 ft. or more can be attained with your Buck Hoistower by adding 5 ft. or 10 ft. sections with the GIN POLE. Two men can do the job safely, efficiently. The GIN POLE slips into a platform bracket already provided.

SGP 0027790

**CONCRETE . . .
where and when
you need it . . .**

Automatic, clean-dumping CONCRETE BUCKET. The "magic-hand" makes this a self-dumping bucket . . . allows concrete to be dumped at any pre-selected height. Standard capacities: 14, 17, and 27 cu. ft.





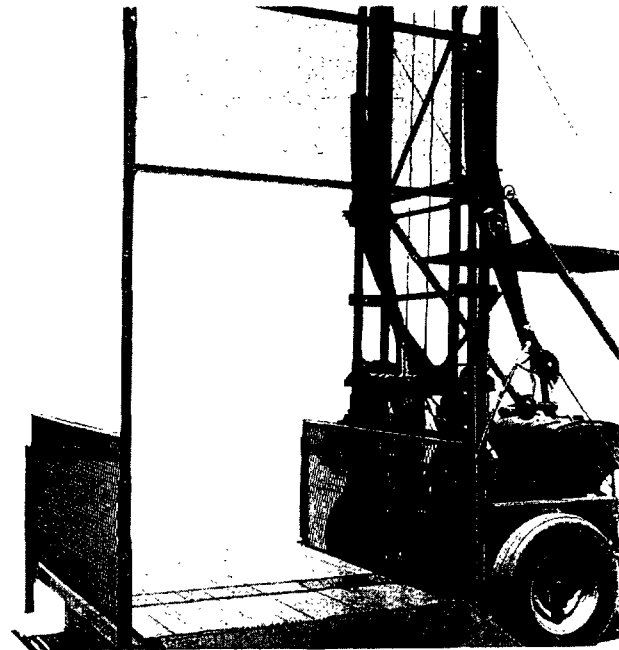
The BUCK NEW YORK CAGE . . . for all around safety

The BUCK NEW YORK CAGE is built to answer certain construction requirements where loads must be hoisted on a closed platform.

This cage, 6½ ft. in height, fits any standard Buck Platform — has ¾" plywood for overhead protection. The whole cage is enclosed by 1½ inch ten gauge expanded metal. By merely opening the cage trap-doors the tower can be knocked down without dismantling the cage itself.

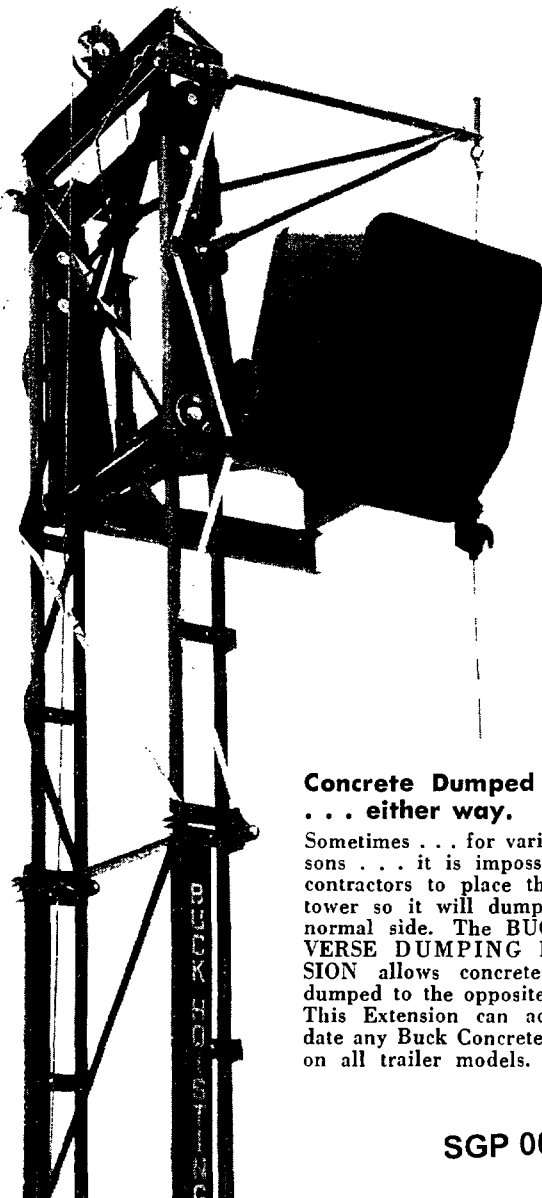
The NEW YORK CAGE is transported right in position on the platform.

The BUCK AUTOMATIC GATE also can be used with the cage.



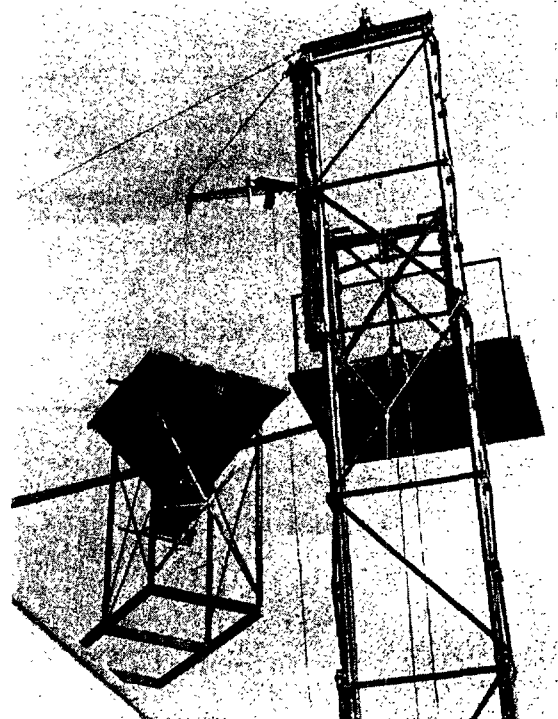
BUCK AUTOMATIC GATE . . . built for hoisting safety

Closes *automatically* when the platform rises . . . opens *automatically* when the platform lowers. Fits either side of the Buck Platform. Can be installed to fit the Buck platform you are using right now. If ordered with the purchase of a machine the gate fittings will be installed at the factory. If ordered separately for field attachment the fittings will be supplied.



Concrete Dumped . . . either way.

Sometimes . . . for various reasons . . . it is impossible for contractors to place the Hoist-tower so it will dump to the normal side. The BUCK REVERSE DUMPING EXTENSION allows concrete to be dumped to the opposite side. This Extension can accommodate any Buck Concrete Bucket on all trailer models.



The CHICAGO BOOM . . . the answer to extra-long material hoisting problems

Special loads of reinforcing rods, steel members, pipes, heating ducts and many other bulky items are easily handled with the BUCK job-tested CHICAGO BOOM. The Boom has a rated capacity of 1000# . . . will hoist materials to the height at which the machine is working.

Versatility allows the Boom to be used with the platform in place, with the bucket and/or the Poop Deck installed.

Special Applications: Boom can be used for minor below-grade excavating . . . steel setting . . . machinery setting . . . tank relining.

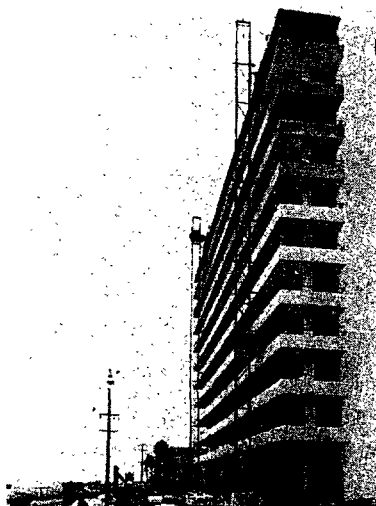
SGP 0027791

BUCK

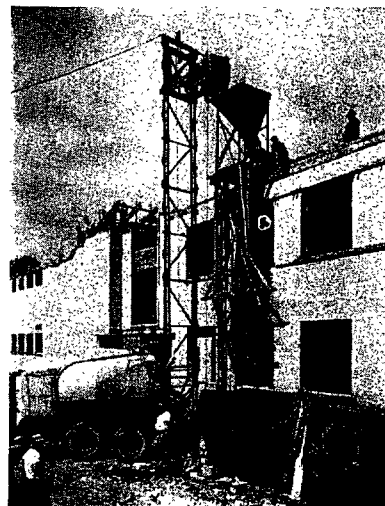
**BUCK Heavy-Duty
Hoistowers
have hundreds of uses for:**

- General Contractors
- Masonry Contractors
- Bricklayers
- Plasterers
- Flooring Contractors
- Roofing Contractors
- Salvage Companies
- Equipment Movers
- Wrecking Companies
- Ready Mix Concrete Companies
- Moving and Storage Companies

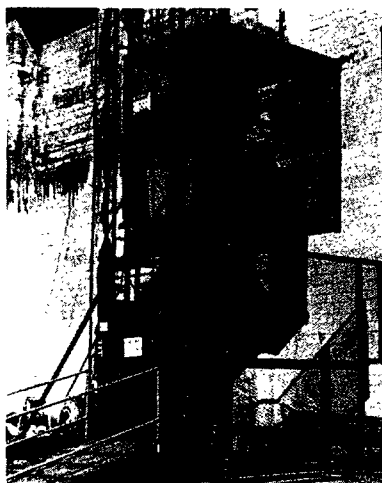
**and many other
industries where
hoisting and lifting
of men and material
is required.**



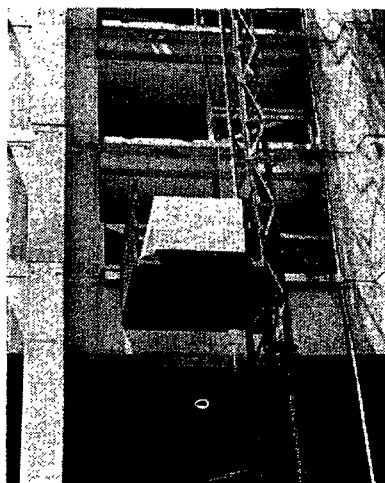
Skyscraping at the 10-story level. Self-erecting to 45 ft. Extra sections—added after tower is raised—take the loading height up to—you name it.



Concrete pouring with the 17 cu. ft. concrete bucket. Puts concrete where and when it's needed. Self dumping, it reduces manpower necessary to maintain steady flow of concrete.



Buck Manhoist descending to loading platform at a shipyard drydock installation.

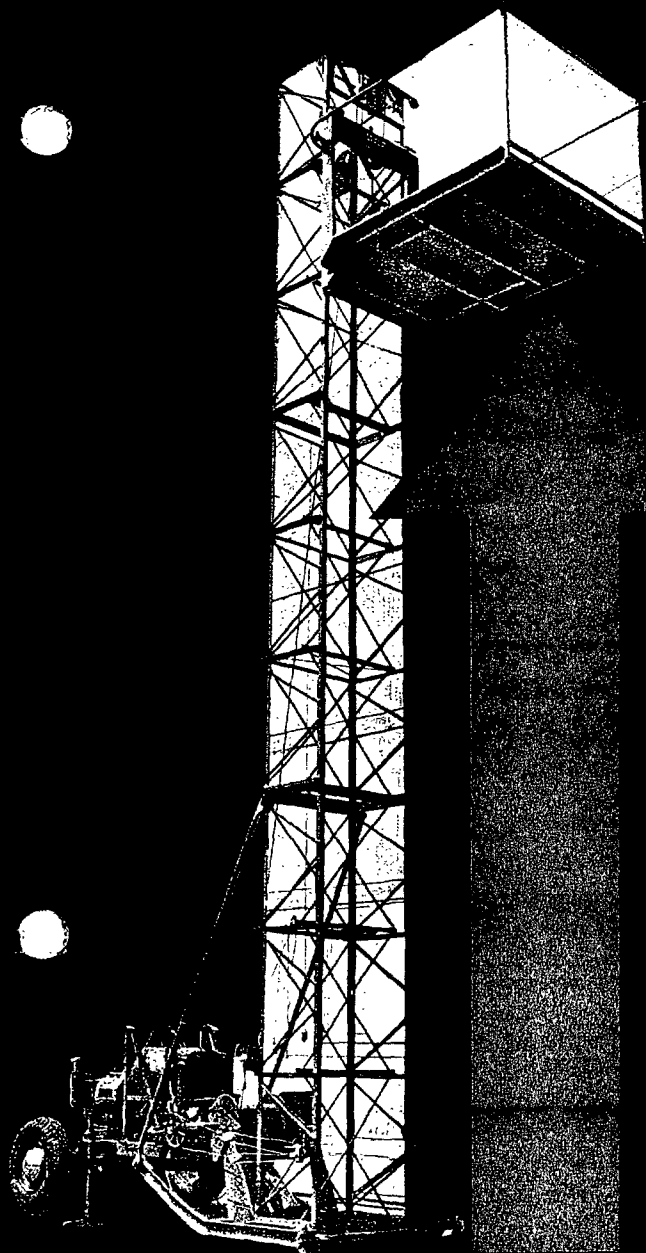


Palletized Drywall. 4000 lb. Hoistower equipped with a 5½ ft. x 8½ ft. platform. Eliminates re-handling of full pallets of drywall.

Your BUCK Hoistower distributor is

SGP 0027792

BUCK



Champion **JUMBO HOIST**

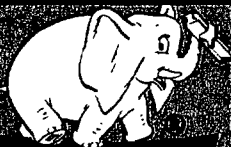
3000 lb. CAPACITY

Automatic Erection

Hydraulically Operated

Super Rigid Tower

*A portable hoist for use to
heights up to 170 feet or more*



JUMBO

Champion

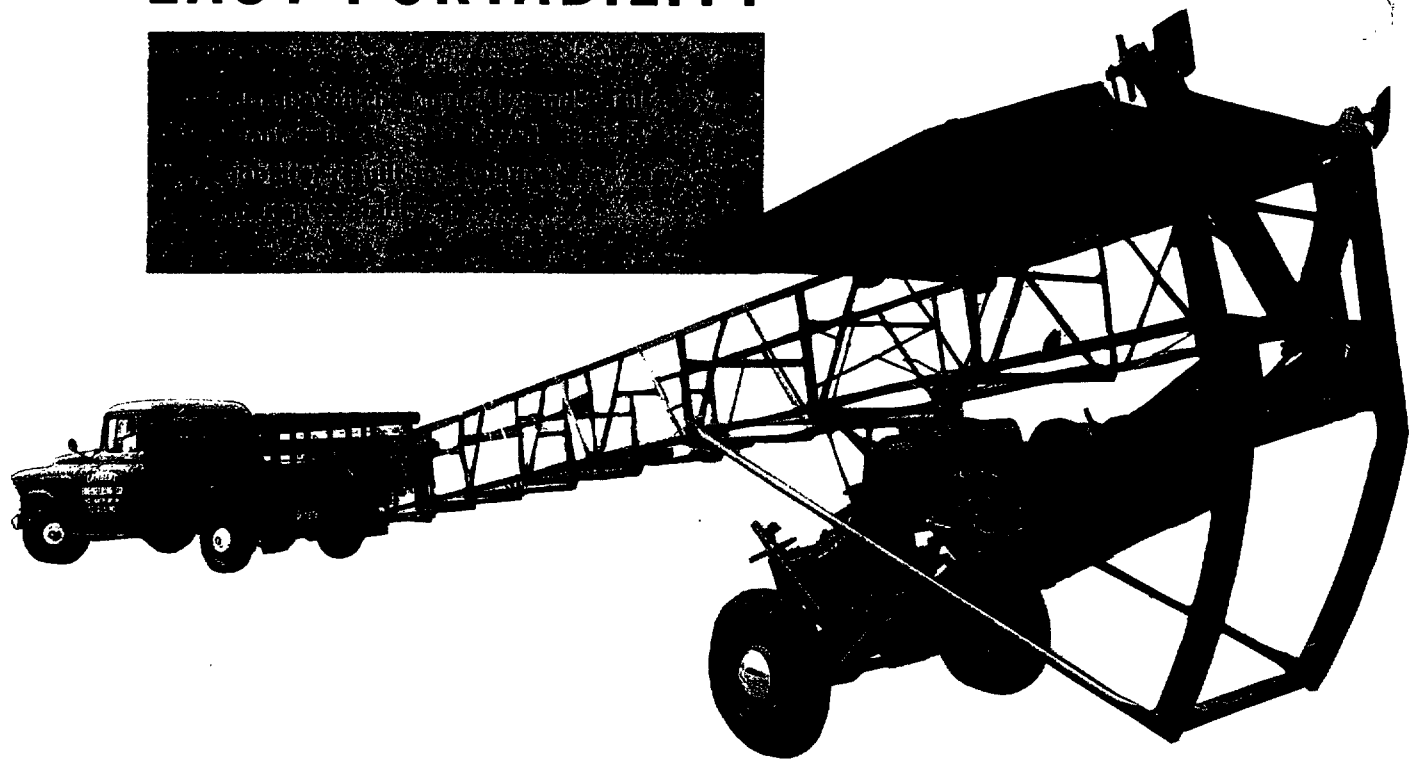
MANUFACTURING COMPANY

3700 FOREST PARK AVE. • ST. LOUIS 8, MISSOURI, U.S.A. • JEFFERSON 1-6688

A Product of Mayco Mfg.

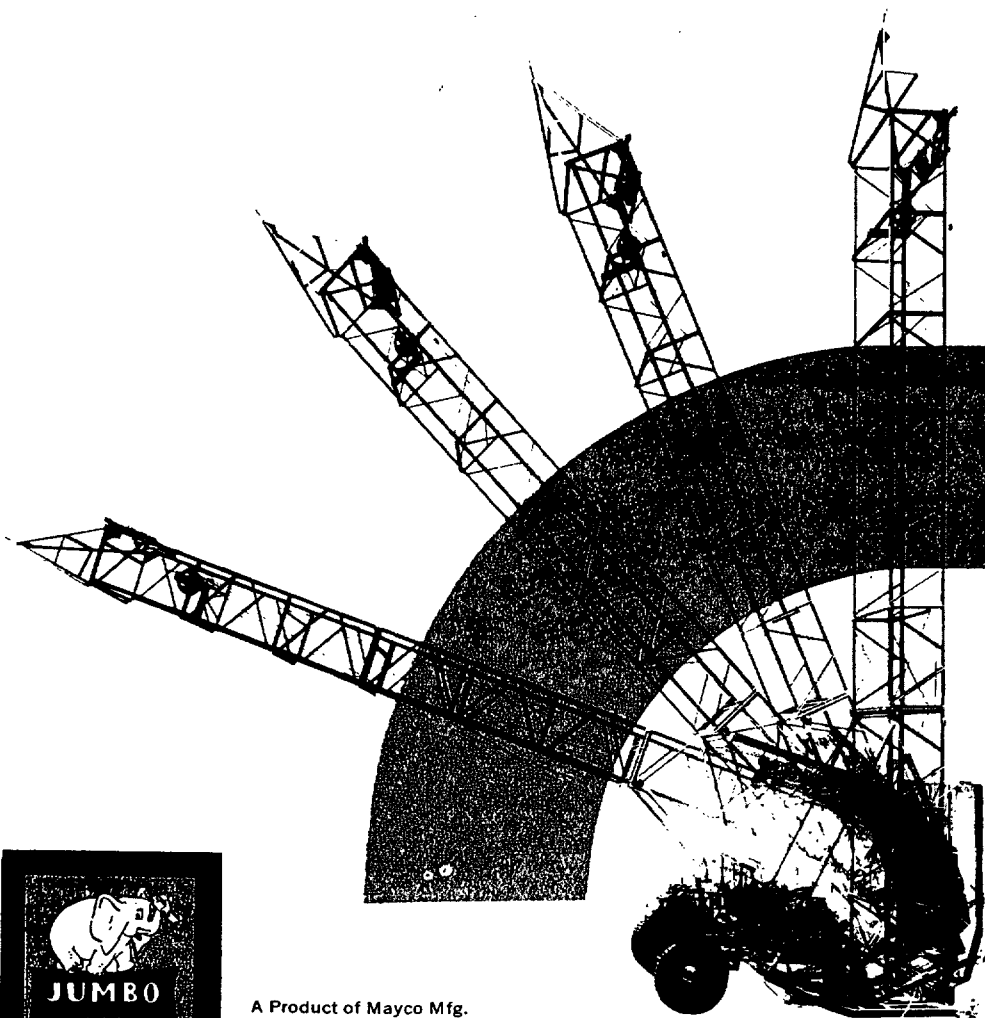
SGP 0027793

EASY PORTABILITY

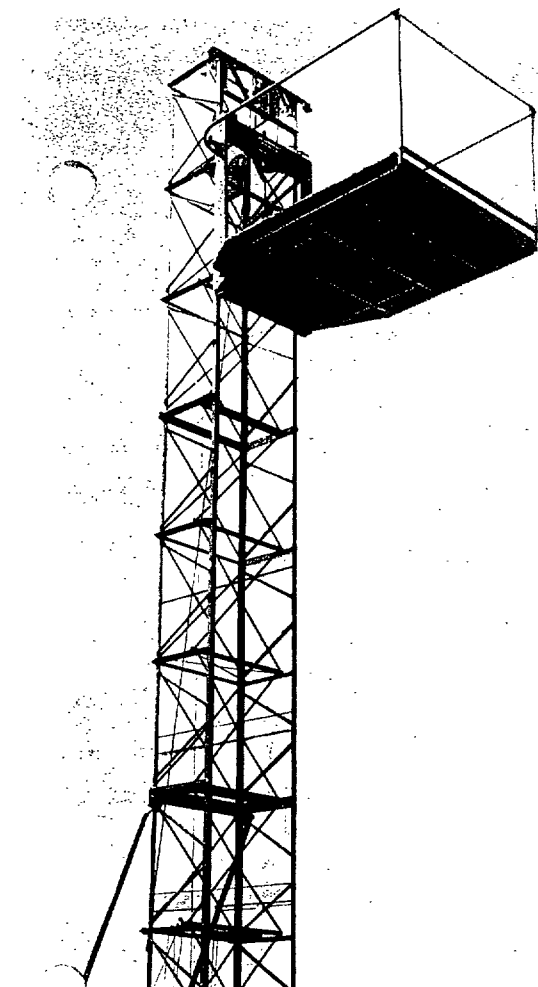


SGP 0027794

AUTOMATIC ERECTION

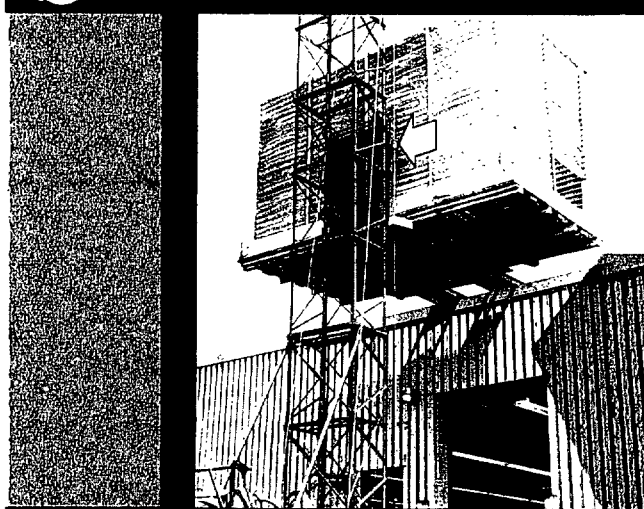


A Product of Mayco Mfg.



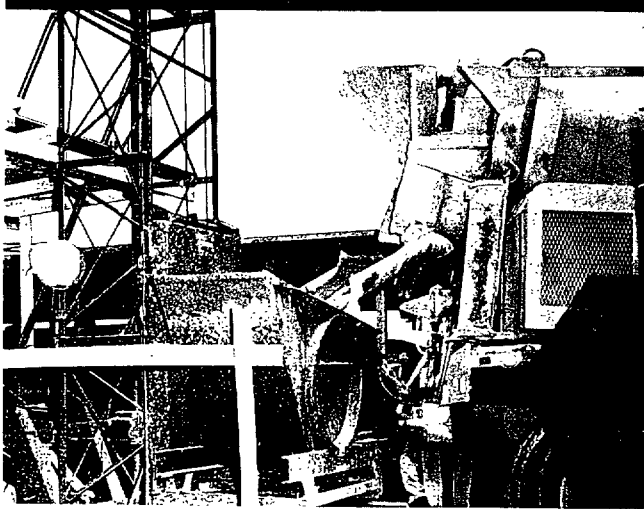
READY TO GO TO WORK

Release Jumbo's Platform from the tower. Set jacks. Put guard rails into position and Jumbo is all set to begin hoisting up to 3,000 lbs. Jumbo's 24' x 36' tower eliminates twist and sway.



STOPS AUTOMATICALLY AT PRE-SET LEVELS

Set the "stop" on Jumbo's cable at any level. Jumbo will stop there automatically. Workers on upper floors can start Jumbo's platform down by a tug of the cable.



AUTOMATIC DUMPING CONCRETE BUCKET

Replace Jumbo's platform with concrete bucket in minutes. Dumps left or right smoothly, automatically at pre-set levels.



SGP 0027795

10 FOOT SECTIONS EASILY ADDED

Jumbo's basic height is 30 feet. Extra sections can be added for use up to 170 feet or more. A 2 man crew, using an "A" frame, can erect 90 feet of hoist tower in one day. For stability, Jumbo should be "tied-in" to the building at each story (note pipes).

JUMBO - engineered for your safe, profitable operation

Jumbo was designed to meet contractors' demands for a fully automatic 3,000 lb. capacity, portable hoist. Jumbo's platform travels up at 175 feet per minute . . . down at 150. With the new Fast Down Speed Device, platform or bucket can be lowered at 500' per minute.

Easily towed by car or truck with no sway or bounce, Jumbo can be moved from your yard and be in operation at the jobsite in minutes. Once on the job, the Jumbo base unit can be lifting materials in less than 10 minutes!

Jumbo features built-in protection against overload. When overloaded, the platform just won't move. A broken cable safety device holds the platform in place in the event of cable failure.

There's no clutch to burn out . . . no down brake to drag. Jumbo is completely hydraulically operated.

No one can damage a Jumbo through an error in operation



Dry wall goes up 6 stories on a special raised extended platform.



Roofing materials are hoisted to a 174 foot high take off point.



Concrete is dumped smoothly, automatically, on the second floor.

SGP 0027796

JUMBO PAYS FOR ITSELF

*Contractor
on a single*



Jumbo is fast growing in popularity with

- general contractors
 - dry wall contractors
 - masonry contractors
 - brick layers
 - plasterers
 - flooring contractors
 - roofing contractors
 - moving companies
 - ready mix companies
 - wrecking and salvage companies
- and many others to whom economical, efficient hoisting is important.

Jumbo hoist operation



nd floor of this building.



Two wheelbarrows of plaster are being unloaded at the 8th floor of this 9 story apartment.



This 90 ft. high installation was put up by two men in one day.

report savings of from several hundred to several thousand dollars job. A number of contractors own 5 or 6 Jumbos.

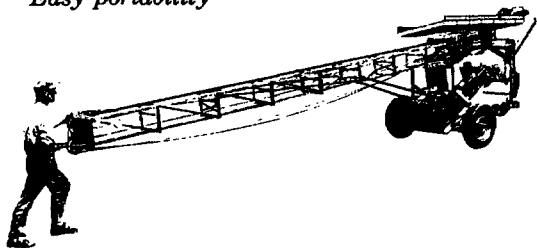
In most areas, Jumbo is available on a rental basis.

SGP 0027797

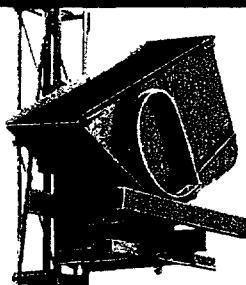
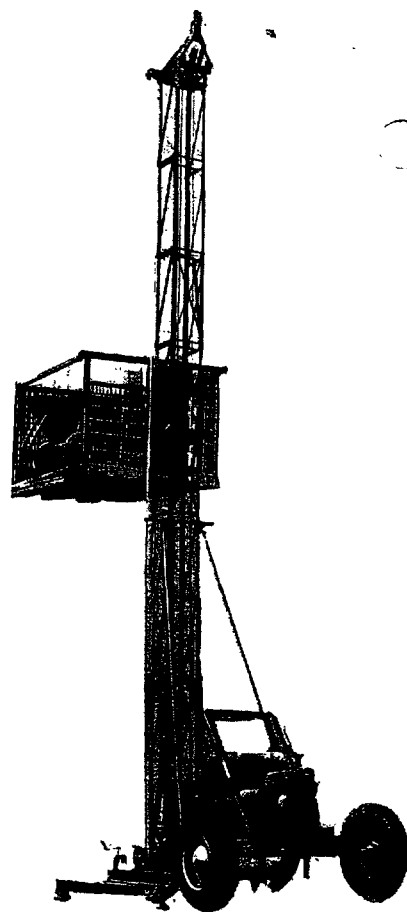
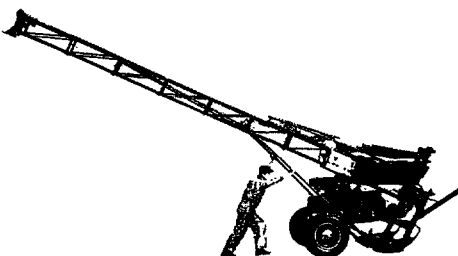
Champion's automatic TUSKY 1500-A HOIST

- 1,500 lb. capacity
- for use at heights up to 100 ft. or more
- erects in minutes
- operates by tug of cable or control handle
- lifts 2 wheelbarrows
- fully automatic with adjustable stops
- travels up at 125 ft. per minute — down at 125 ft. per minute
- hydraulic power — no clutch
- built-in emergency and slack cable brake
- overload preventer
- folding platform guard
- base unit 22' high — 11' extensions easily added
- adjustable automatic stops
- easily towed by car or truck

Easy portability



Built-in balance for easy erection



SGP 0027798

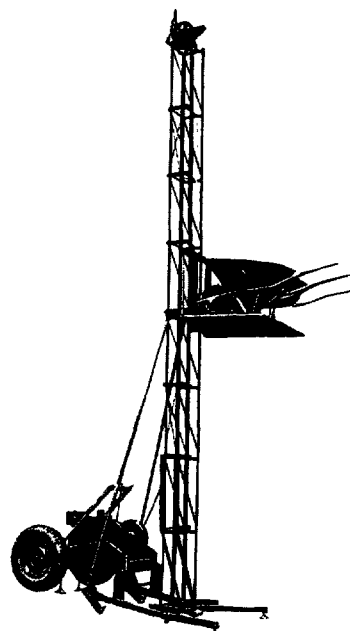
Champion's TUSKY 1000-A HOIST

fully automatic with adjustable stops

- 1,000 lb. capacity, or two wheelbarrows
- for use at heights up to 100 feet
- carefully balanced for easy erection
- slack cable safety device
- sturdy welded tower — tested to 6,000 lbs.
- base unit 22 ft. high — extra sections available in 11' and 5'6" lengths



A Product of Mavco Mfg.



Champion HOIST SPECIFICATIONS

		JUMBO 3000-A	TUSKY 1500-A	TUSKY 1000-A
Capacity		3000#	1500#	1000#
Lifting Speed		175' Per Min.	125' Per Min.	100' Per Min.
Lowering Speed	Controlled	150' Per Min.	125' Per Min.	100' Per Min.
	Fast down speed	500' Per Min.		
Base Unit Height		30'	22'	22'
Takeoff — Unloading Height		24'	17'4"	17'4"
Additional Sections		10'	11'	11'
		6'6"	5'6"	5'6"
Platform Size		6'6" x 5'6"	5' x 5'	5' x 5'
Tower Dimensions		24" x 36"	12" x 13"	12" x 13"
Engine		30 H.P.	18 H.P.	12.5 H.P.
Concrete Bucket	Capacity	16 Cu. Ft.	9 Cu. Ft.	5 Cu. Ft.
	Fluid Measurement	¾ Yd.	13 Cu. Ft.	13 Cu. Ft.
Power Erection		Hydraulic	No	No
Automatic Operation		Yes	Yes	Yes
Recommended Maximum Height		170' Plus	Up to 100'	Up to 100'
Broken Cable Safety		Yes	Yes	Yes
Base length x width in operating position		17'3" x 5'10"	13' x 5'6"	13' x 5'6"
Shipping Weight		3620	2050	2000

All Champion Hoists are shipped ready for use

SGP 0027799



Contact us for a
Champion Hoist
demonstration...
in your yard or
at a jobsite

SGP 0027800

BESTWALL GYPSUM COMPANY

GYPSUM WALLBOARD MANUAL 1965 EDITION

Section 7 Sub-Section F

GYPSUM WALLBOARD IN HIGH RISE BUILDINGS

Special Hoisting Equipment American Tubular Elevator

Here is another folder prepared by a company who developed a special tubular steel elevator designed for handling gypsum wallboard in these high rise buildings.

One of the most important problems a drywall contractor faces in going from conventional drywall in house construction and small commercial work is that of getting material onto the job and distributed to point of usage. This requires careful planning and scheduling, and most important, an economical means of getting the material up to the various floors. Those of you who have been exposed to this type of work long ago realized the conventional material hoist provided on high rise buildings was designed for smaller dimension materials and for bulk materials, but not for sheets 4' wide in 8 to 10' lengths.

The attached folder printed by the American Tubular Elevator Company, a division of the Universal Manufacturing Corporation of Zelienople, Pennsylvania, manufacturers of various types of scaffolding and elevator equipment, describes the tower that has been used on some of the jobs in Philadelphia very successfully. This type of equipment is distributed by the Equipment Corporation of America (see back of the folder).

This is sent to give additional information and assist in answering questions on this matter in the field. It in no way endorses this type or manufacturer's equipment to the exclusion of other equipment designed for the job. Applicators who are interested should contact the Universal Manufacturing Corporation in Zelienople, Pennsylvania for further information. We understand that the Equipment Corporation of America is one of the larger distributors for this organization, operating through much of the Country.

Several months ago we gave you information about the Buckhoist Elevator which is a different type having certain advantages and shortcomings. You realize, of course, that the board can be raised to the various floor levels in a high rise building by means of a long boom crane.

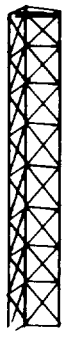
Where the drywall contractor puts such equipment as this tubular elevator on the job, he must approach other subs to use the equipment on a rental basis as this helps defray the cost of the equipment and the operator.



DRYWALL GOES HIGH RISE

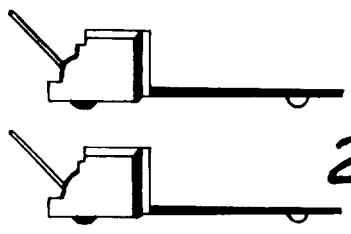
IN

AMERICAN TUBULAR ELEVATOR



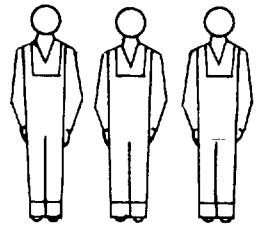
1 tower

+



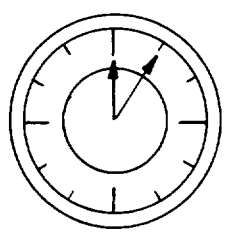
2 fork lifts

+



3 men

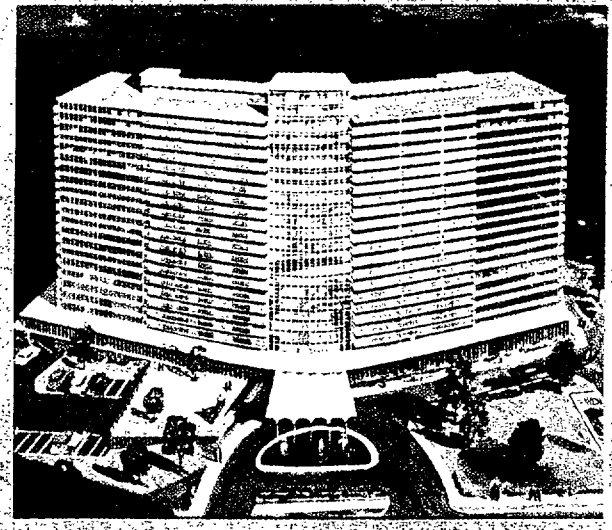
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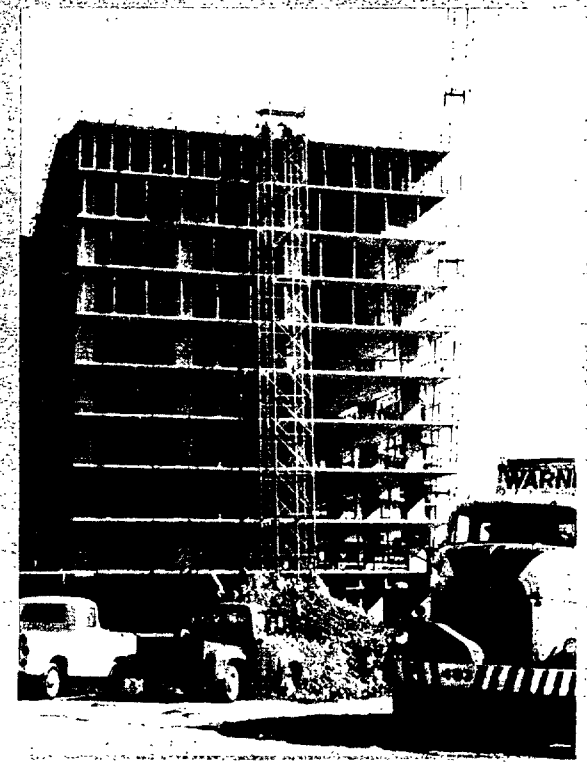
1 hour

=

1 truck load of drywall at 21st story



PARK CITY WEST
21 stories . . . 350 terraced luxury
units . . . 200 car garage
SAMUEL I. OSHIVER AND ASSOCIATES of Philadelphia
Architects and Design Engineers
ARTHUR A. KOBER CO., INC., of Bala Cynwyd
General Contractor
HOLLENBECK AND JUELL, INC., of Philadelphia
Drywall Contractor



PROBLEM AND SOLUTION

Gypsum wall board has been making history in Philadelphia. It is being incorporated in three of the world's largest high rise apartment buildings: the Philadelphian, Penn Towers, and Park City West.

This has presented dry wall contractors, such as Hollenbeck & Juell, Inc., with the unique problem of raising these large sheets of dry wall to their proper floor, economically and with minimum breakage.

Working closely with Hollenbeck & Juell, American Tubular Elevator engineers came up with a tower specifically designed to handle large palletized material. This tower utilizes an oversize cage which permits loading and unloading with a small electric fork lift unit.

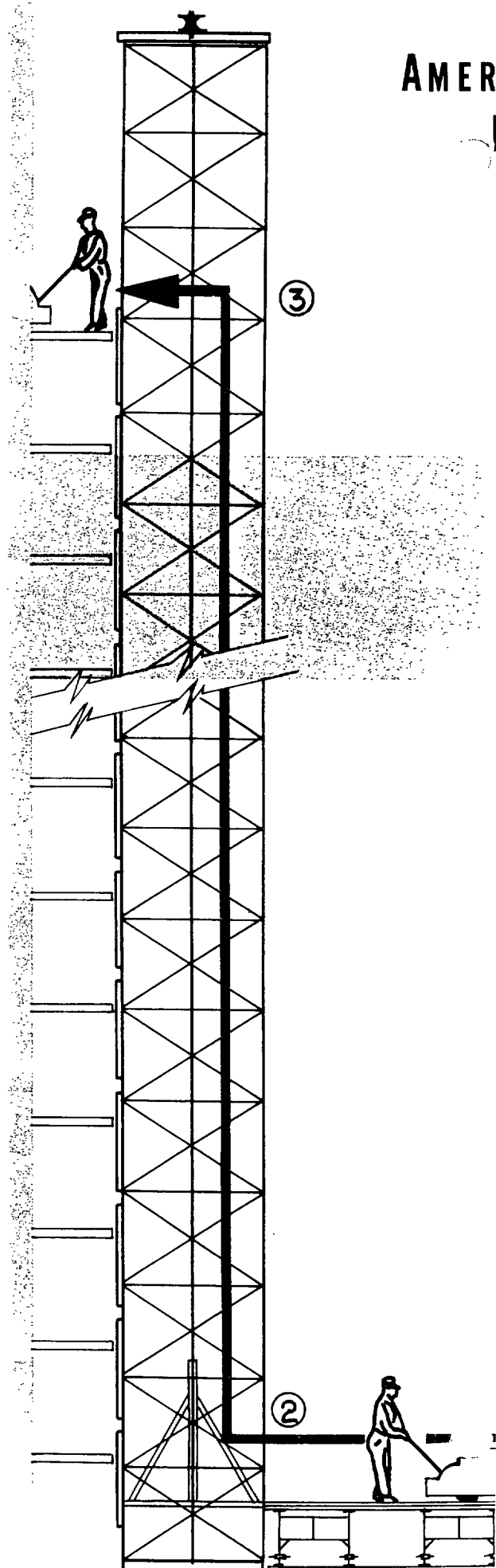
TYPICAL OPERATION

Only three men are required for this bulk handling system:

- 1 hoisting engineer
- 1 fork lift operator @ loading area
- 1 fork lift operator @ discharge area

The dry wall material is delivered on flat bed trucks in quantities of either 4 or 8 pallets depending on job conditions. The trucks are backed up to the loading ramp which is constructed of standard scaffold to a height equal to that of the truck bed. This allows the fork lift to drive directly onto the truck to pick up the pallets which are then placed in the cage to be hoisted to the desired floor. At this point, the second fork lift removes the pallet from the cage and places it in its proper position on the floor. One complete cycle; loading, unloading and placing of each pallet requires only 5 minutes which means that a truck carrying eight pallets (15,800 sq. ft. of gypsum dry wall) can be handled in about 50 to 60 minutes. The periods between truck-loads are used to distribute the pallets around the floor being charged; raise dry wall paste and fasteners; and to re-locate the loading ramps and fork lifts at the completion of each floor.

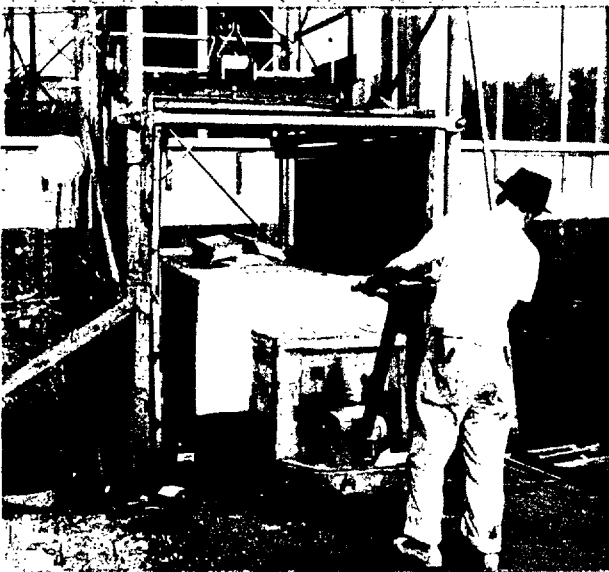
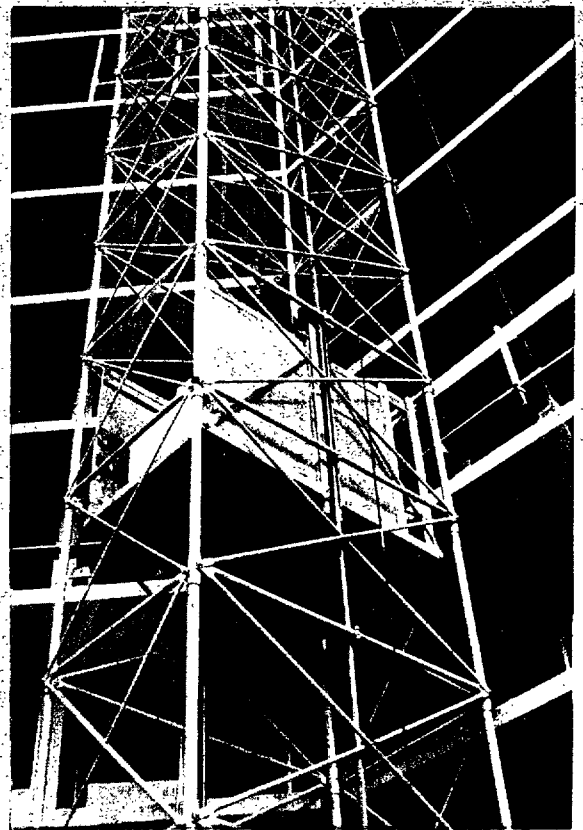
The picture story to the right illustrates how this specialized method of bulk handling can solve your hoisting problems with fantastic labor savings and maximum safety.



CAN TOWER SOLVES DRYWALL PROBLEM WITH BIG CAGE

Each pallet is then delivered to the proper floor where it is unloaded with a second fork lift unit. These towers are equipped with special landing brace frames which allow discharge at any floor without having to remove cross braces.

③



②

The huge cage easily accommodates these 4'x8' pallets containing 61 sheets of 5/8" dry wall.

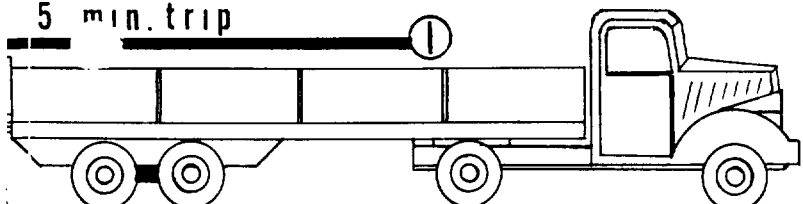


①

The 4000# dry wall pallets are delivered in quantities of 8 to the job site. The trucks are backed up to the ramp which allows the fork lift to drive directly onto the flat bed for unloading.

5 min. trip

①



SGP 0027804

DRY WALL TOWERS

SPECIFICATIONS

Maximum height—750'

Width—6'4"

Depth—10'4"

Cage Size—5'9" x 10'0" x 10'0" high

Capacity—4000# Live Load

Recommended hoist size—4000# line pull (using 2-part line)

ERECTION

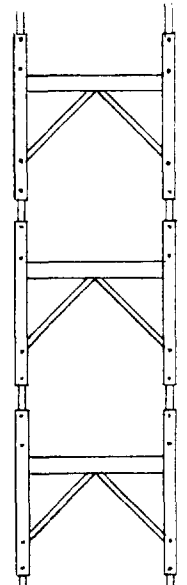
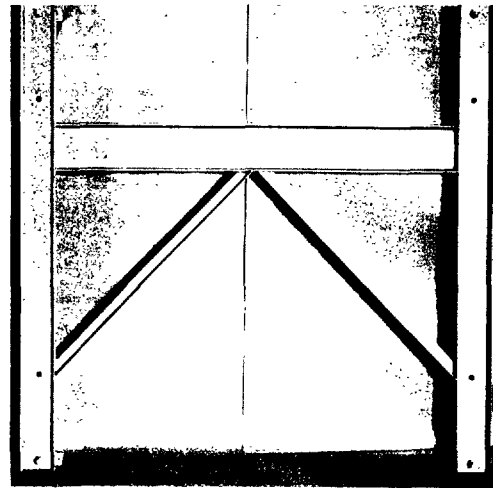
Despite its size, this tower can be erected in about the same amount of time as a standard AC Tower. Normally a 5 man crew is used which can put a 100' tower in operation in about 2 days.

PREVIOUS METHODS OF DRY WALL INSTALLATION

A stiff leg derrick was used on one job which required at least 8 men. With this method the contractor had to build fly-decks at every floor upon which the pallets were placed; then rolled on conveyors into the building. A fork lift was then used to distribute the pallets around the floor. Using the dry wall tower, the contractor immediately realized a 60% savings in labor alone. This method also provided greater all-around safety in handling and minimized breakage of panels.

AMERICAN TUBULAR EXCLUSIVE

To increase the versatility of the dry wall tower, American Tubular Elevator Co. designed a combination landing frame and tower brace. When this "K" frame is properly assembled to the tower, it replaces practically all of the normal girts and cross braces on the side adjacent to the building. Its portal design permits loading and unloading at any floor without having to remove any tower components or relocate landing panels. The photo and sketch to the right shows a typical "K" frame and assembly.



SGP 0027805

American Tubular Elevator Co.

Manufacturers of Ezebilt Scaffolding • Heviduti Scaffolding
Endlok Clamp-Type Scaffolding • Uni-Stage Maintenance
Platform • Material Handling Towers

Division of

UNIVERSAL MANUFACTURING CORP.

ZELIENOPLE, PA.

PHONE: 412-452-8300

DW-63

Litho in U.S.A.

SGP 0027806

BESTWALL GYPSUM COMPANY

Section 8

Page 1

GYPSUM WALLBOARD MANUAL

GYPSUM CEILING TILE

Bestwall Gypsum Acoustical and Ceiling Tile - made for non-residential use.

What is it? Size 2 x 2 x 3/8; 2 x 4 x 1/2" (Ceiling Board)
 2 x 2 x 5/8" Firestop - 120 with UL label.
Pattern - Full Random Acoustical Tile -
 Textured Finish Ceiling Board
Light deflection 0.78
Noise reduction coefficient .70 Acoustical only
Functional Mechanism - Acoustical
 a. Holes equal to 20% of area
 b. Membrane designed porosity to
 transform sound energy to heat
 c. Plenum - depth influences absorption
 characteristics
Core - Special Gypsum reinforced with glass
 fibers - heavier paper. Almost 10 miles
 per 2 x 2 piece.
Incombustible - Federal specifications
 SSA-118b
Installation - on suspended, exposed grid
 system

SGP 0027807

Who applies it? Approved Acoustical Contractors - A contractor who has a franchise from a Major acoustical tile manufacturer.

Where made? In Bestwall's Acoustical Tile Plant in Brunswick, Georgia

For Whom? The commercial buildings, schools, offices, shopping centers, auditoriums, recreational buildings, discount stores, lobbies, cafeterias, etc.

How is it made? A special formulated board run on our board machine is taken to tile plant where it is cut to size, drilled, painted, - (two finishes flat and textured). (Acoustical only (Membrane paper applied, inspected, packaged - 40 sq. ft. to a carton (2 x 2) - 32 sq. ft. to a carton 2 x 4 x 1/2 and then warehoused - 24 sq. ft. to a carton 2 x 4 x 5/8 Firestop-120.

Where warehoused? Brunswick, Georgia - stocked at Acme, Texas and Sigurd, Utah. This permits small orders to be top loaded in box cars of combined shipments. Also gives quick delivery to large metropolitan areas.

Trade factors? Acoustical contractors, architects, owners, general contractors, and large national chains.

How advertised? In Sound Ideas - a trade magazine,
Architectural Record, Chain Store Age,
American School and University, School
Product News, and Sweets Catalog Brochure.

Competitive Products: Glass Fibers - Owens Corning - Gustin
Bacon, Celluler Glass, Pittsburgh Corning
and others.

Mineral Fibers - U.S.G., Celotex, Armstrong,
Cork, Johns-Manville, National Gypsum, Simpson
Logging Company, Baldwin Hill, Wood Conversion.

Wood Fiber Products - Same as for Mineral
Fibers.

Gypsum Products - U.S.G., National, and
Johns-Manville,

GENERAL THEORY OF ACOUSTICS

Sound is nothing more than vibrating air!

There are places where sound is wanted - (Noise is unwanted sound)

Class rooms, music rooms, lecture halls, auditoriums,
conference rooms, and sound studios.

Here we need reinforcement and balanced distribution of clear,
intelligible words so that the speaker can be understood.

And there are places where sound is unwanted -

Swimming pools, gyms, corridors, lobbies, cafeterias, and
offices.

Here the main problem is eliminating echoes, flutters, and excessive reverberations.

Definitions:

REVERBERATION - Only a small portion of the energy from a sound source reaches the listener directly. Most of the sound is reflected back and forth between the room surfaces. In fact, small portions of succeeding bounces also reach the listener's ear.

The sound that comes directly from the source reaches the ear in the shortest time. The sound bouncing from other surfaces takes longer since it must travel a greater distance. Since the speed of sound is only 1100 feet/second, the time between successive bounces is easily measurable in an ordinary room. At each reflection, or "bounce" the sound loses some energy. The time it takes the sound to die down until its energy is reduced to one-one millionth, is called the reverberation time.

Reverberation time is a function of room geometry. It depends upon the size of the room, how absorbing the walls are and how much other absorption there is. Increased absorption in a room reduces the reverberation time because more energy is lost at each reflection.

DIFFUSION - If too much of the reflected sound reaches the listener from a single direction, the acoustics are not good. It is desirable that there be sufficient diffusion so that there is no identifiable second source of sound. Diffusion can be controlled by the distribution of absorption.

FREQUENCY - In most room acoustics we need not be concerned with anything lower than 70-100 c.p.s. (cycles per second) or anything higher than 7,000 c.p.s. Roughly, frequencies below 300 c.p.s. are referred to as low frequencies, those above 2,000 c.p.s. as high. The sound absorption of acoustical materials varies the frequency.

Measuring Acoustical Material Performance

The materials are tested in a room especially designed to have little absorption and good diffusion. The reverberation time of the untreated room is measured at a given frequency. Then a limited amount of absorption material is put into the room and the reverberation time measured again. From the difference between these two times, the absorption added to the room is calculated.

This experiment is repeated for a number of frequencies and the absorption as a function of frequency is obtained. The average of the absorption values for a specified number of standard frequencies, expressed on a square root basis is often used and is called the "Noise Reduction Coefficient".

SALES PLAN:

1. Contact all major acoustical contractors in your territory and select those with whom you feel you can work.
2. Solicit orders from these contractors for jobs, both large and small, that they control or have under contract.
3. Include ceiling tile and acoustical tile presentations on all appropriate job calls at all levels (architect, owner, contractor, sub-contractor.)
4. Ask for the order
To accomplish #1 above you must have a knowledge of who these specialty contractors are. Consult Dodge Reports and learn who is awarded acoustical contracts, consult yellow pages and other local directories to build your initial acoustical contractor prospect list.

To accomplish #2 you must qualify yourself to your prospect thru calls and demonstration of your own knowledge and integrity. Learn who your competition is, what they are promoting, their approximate pricing. Above all, you must know your local code requirements and equate them to the particular Bestwall tile needed. You will find your job easier if you go in armed with literature and samples, and as time goes on pictures of local jobs.

To implement #3 (job calls). Before going into a trade factor's office have a specific job in mind. Decide what Bestwall products could conceivably be required on the particular job, i.e., wallboard, sound deadening board, plaster, lath, roof deck, joint treatments, textures, partition systems, sheathing, and, of course, ACOUSTICAL AND CEILING TILES. You may in some cases promote all these with an architect or owner. If the trade factor is a contractor or sub-contractor your list of promotional items will obviously be tailored to his interests. Arm yourself with appropriate literature and samples and when possible demonstrations. Be prepared to discuss costs

SALES PLAN (CONT'D):

and the advantages of the Bestwall products involved, (i.e., in many sections of the country it is possible to offer a finished ceiling in storage areas with all the incidental advantages of a suspended system, access etc., at no premium over regular wallboard taped and painted. Where codes require a finished ceiling over food areas this has obvious sales appeal.)

To implement #4: Ask for the order at least three times on every call at the sub-contractor level. Don't waste some of your call time. Remember, Acoustical Contractors are prospects for other Bestwall products. Most could use at one time or another these products that you are charged with selling.

1. Acoustical tile
2. Ceiling tile
3. Grid board
4. 5/8" Firestop 120
5. Eternawall
6. C. T. Board
7. Lath
8. Sound deadening board

ASK FOR THE ORDER!!

SALES ADVANTAGES:

1. Numerous patterns and designs possible thru mix and match ceilings with acoustical and ceiling tiles.
2. Only 2-hour Fire-Resistant Gypsum Ceiling.
3. Low Cost - competitive with any ceiling.
4. Washable surface.
5. Excellent noise control qualities.
6. Fast delivery.
7. Job site delivery in trucking area.
8. Permits applicator to maintain small inventory.
9. Easy cutting - less waste.
10. Plenum area accessable.
11. U.L. label on Firestop 120
12. Mineral with all advantages of gypsum.

SERVICE - COST - APPEARANCE

BESTWALL HAS THEM.

"FIRESTOP-120"

REPRINTS OF OFFICIAL FIRE TESTS OF BESTWALL "FIRESTOP-120" CEILING TILE

Project T-2104
Engineering Experiment Station, The Ohio State University

File R2717-32
Underwriters' Laboratories, Inc.

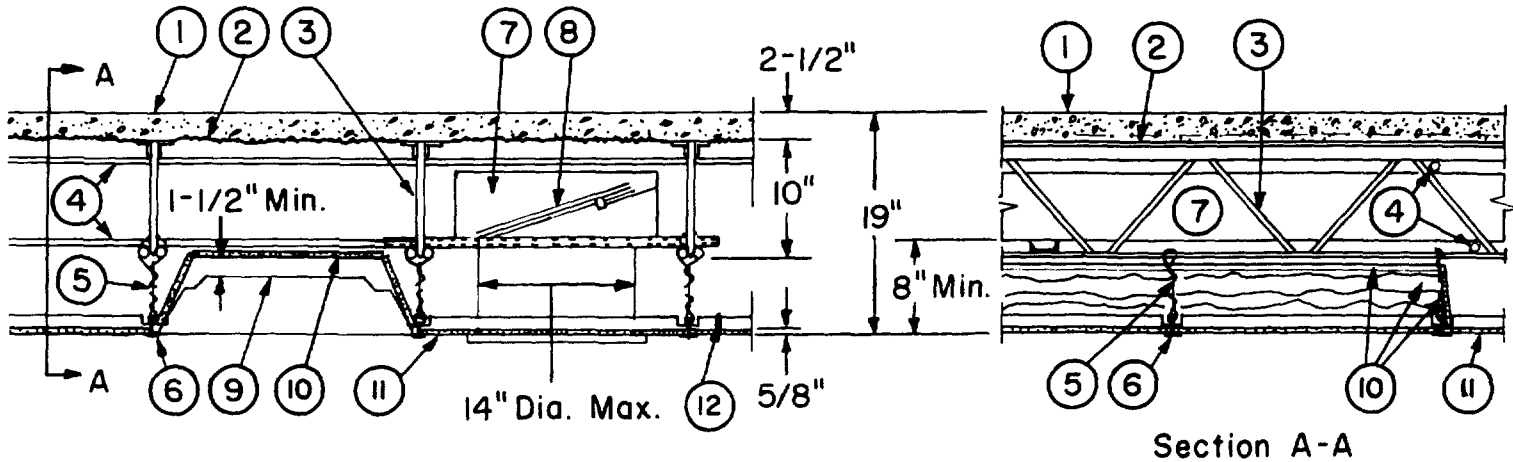
The tests reported herein were conducted in accordance with the Standard Method of Fire
Tests of Building Construction and Materials, ASTM Designation E 119-61 and include
Fire Endurance and Hose Stream Tests



GEORGIA-PACIFIC / **BESTWALL** GYPSUM DIVISION

2 INDUSTRIAL BOULEVARD, PAOLI, PENNSYLVANIA 19301

SGP 0027815



Class D-2 Designs
Design No. 208 - 2 Hour

Description of Numbered Items

1. Sand-Gravel Concrete - 1:3:3-3/4 mix, 4000-psi strength.
2. Metal Lath - 3.4 lb, 3/8-in. rib, expanded steel; tied to each joist 9 in. O.C. and side overlap tied midway between joists, with No. 18 SWG galvanized steel wire.
3. Steel Joists - Type 10J3; spaced 24 in. O.C. and welded to end supports.
4. Horizontal Bridging - 1/2 in. diameter continuous steel bar stock; welded to top and bottom chords of each joist.
5. Hanger Wire - No. 12 SWG galvanized steel; located 4 ft. O.C. along main runners. Hanger wires also located at ends of main runners and cross tees where butted against walls, at corners and midspan along 4-ft sides of light fixtures, and 24 in. O.C. around air-duct outlet.
6. Steel Framing Members - Listed by Und., Lab.

Inc. (Building Materials List, Guide No. 40 U18.18). Main runners, nominally 12 ft long, located perpendicular to long dimension and at both ends of light fixtures and spaced 4 ft O.C. otherwise. Adjacent lengths of main runners secured together with main runner splices. Cross tees, nominally 4 ft long, installed (perpendicularly) between main runners and spaced 24 in. O.C. Cross tees, nominally 2 ft long, installed (perpendicularly) between 4-ft cross tees to complete 2 by 2-ft grid of ceiling. No minimum clearance required at walls.

7. Air Duct - Galvanized steel with air outlets not exceeding 76 sq. in. per each 100 sq. ft. of ceiling area. Air duct supported 48 in. O.C. on pieces of No. 16 gauge, 1-1/2 in. deep cold-rolled steel channels which are supported on lower chords of joists and tied in place with No. 18

SWG galvanized steel wire. Air outlet protected with 1/32-in. thick asbestos paper on outside surface.

8. Damper – No. 16 gauge galvanized steel cut to form 15-5/8 by 15-5/8-in. door. Protected on both surfaces with 1/16-in. thick asbestos paper and held open with fusible link listed by Und. Lab., Inc., (Building Materials List, Guide No. 120 UO).

9. Light Fixture – Recessed type with sheet steel housing, 2 by 4-ft. size; spaced to permit not more than 8 sq. ft. per each 100 sq. ft. of ceiling area. Listed by Und. Lab., Inc., (Electrical Construction Materials List, Guide No. 210 I2.18).

10. Light-Fixture Protection Shield – Made of 5/8-in. thick gypsum wallboard listed by Und. Lab., Inc., (Building Materials List, Guide No. 40 U18.23). One 30 by 48-in. piece scored on one side and broken to lay lengthwise over light fixture, forming diagonal sides 7 in. wide and top piece 16 in. wide. Ends of protection shield cut 6 by 26 in. in size and slotted to fit over cross tees at each end. End pieces secured to top and

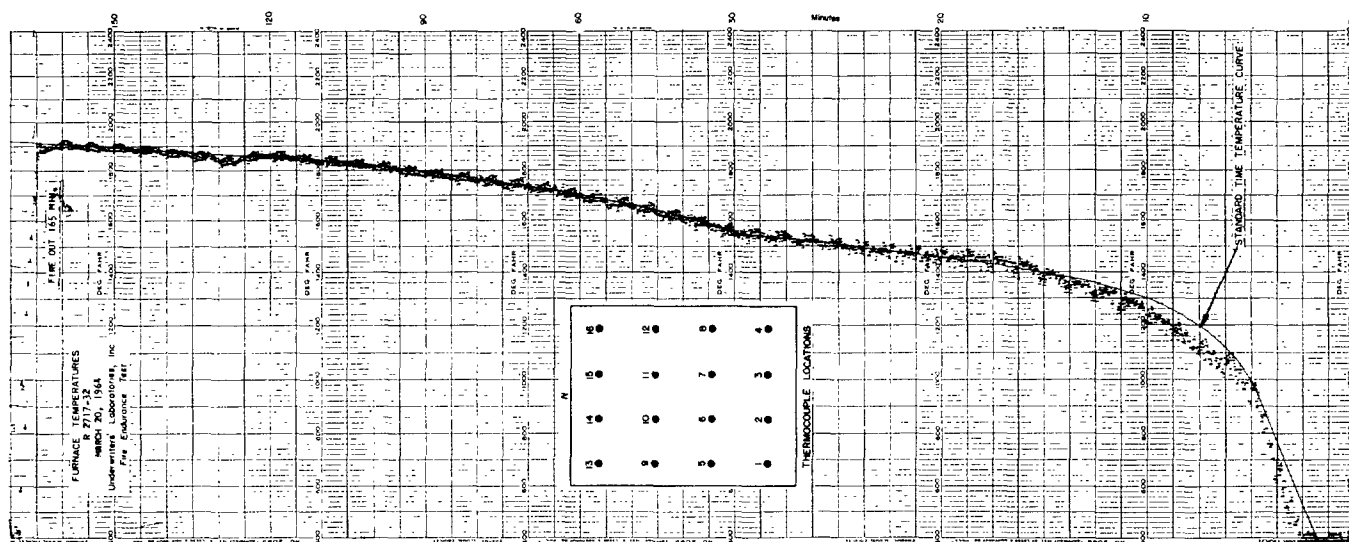
sides of shield with 8d common nails.

11. Wallboard, Gypsum – Nominal 2 by 2 ft., 5/8-in. thick lay-in tile units listed by Und. Lab., Inc., (Building Materials List, Guide No. 40 U18.23). Border pieces supported at walls by No. 25 gauge, 1-5/8 in. deep, sheet-steel channels with 1-in. bottom leg and 1/2-in. top leg.

12. Hold Down Clips – No. 26 gauge spring steel, 2 in. wide by 1 in. high by 3/8 in. deep, one hold-down clip uniformly spaced along each side of gypsum tile.

CONCLUSION – It is judged that floor and ceiling assemblies constructed of the materials and erected as previously described (illustrated) in this Report will afford 2-hr resistance to passage of flame or dangerous heat transmission. These assemblies will support the full design load during the resistance period.

This classification is based on the "Conditions of Acceptance" for tests of floors and roofs specified in the Standard, Fire Tests of Building Construction and Materials, UL263 (ASTM E 119, NFPA No. 251).



TESTS PROVE BESTWALL "FIRESTOP 120" CEILING TILE ADDS TWO-HOUR FIRE RATING TO CEILING STRUCTURES

The first low-cost two-hour fire rated
ceiling assembly on the market.

To meet the challenge of rising costs and greater demands for fire safety, Bestwall research introduced the lowest-cost two hour fire rated ceiling assemblies on the market today . . . BESTWALL "FIRESTOP-120"!

"Firestop-120" gypsum ceiling tile has been thoroughly tested in accordance with procedure set forth in ASTM E-119-61 and has achieved a two-hour fire endurance rating when used in a rated ceiling assembly in conjunction with a concrete floor and bar joist construction. "Firestop-120" is also listed by Underwriters' Laboratories under Fire Resistance Classification as Design No. 208-2 hours. All product boxes carry the UL Label.

STRONG - Glass fiber reinforcement adds strength and resiliency to the tile during handling and application, and after it is in place.

EASY WORKING - Easy to handle panels 24" x 24" x 5/8". "Firestop-120" is also easy to maintain and clean. Decorative finishes are

tough, hard surfaces resistant to marking.

FAST WORKING - Saves construction time as lay-in application is quick and economical.

VERSATILITY - Offers all the advantages of conventional types of exposed grid suspensions plus the benefits of a 2-hour fire rated floor and ceiling construction. Lighting and air conditioning facilities in the ceiling design may be changed easily when desired. Each "Firestop-120" unit is removable for immediate access to pipes, ducts, and utility lines above the ceiling. The UL listing covers 2 hour fire rating with recessed lights and air vent openings.

ECONOMICAL - "Firestop-120" is engineered to provide savings in two ways: on-the-job and year after year. Here's why:

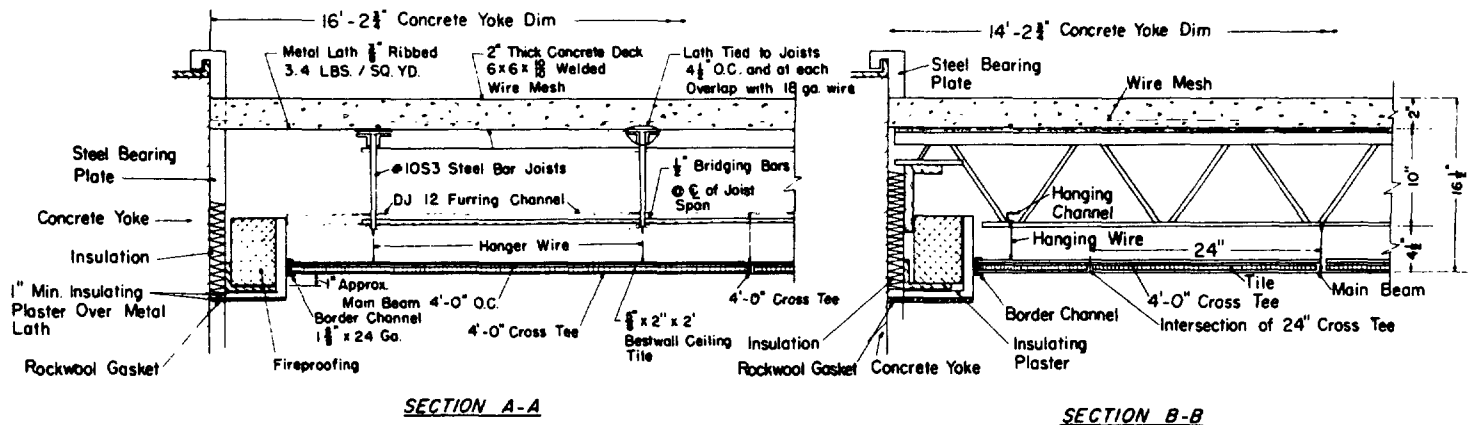
- offers increased fire protection
- can earn low insurance rates
- simple installation on exposed grid systems
- reduces construction time
- provides low maintenance

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SGP 0027818

**Excerpts from ENGINEERING EXPERIMENT STATION, THE OHIO STATE UNIVERSITY,
FIRE ENDURANCE TEST REPORT, PROJECT T-2104**



Construction Details

CEILING TILE

The ceiling tile used was Bestwall "Firestop-120" Ceiling Tile lay-in units composed of fibered gypsum nominally 24 inches wide by 24 inches long by 5/8 inches thick. The formulation is on file as confidential data.

CONSTRUCTION

The concrete test yoke was assembled to form the 16 ft. 2-3/4 inch by 14 ft. 2-3/4 inch opening for the test specimen. Steel ledge angles measuring 7 inches by 4 inches by 7/8 inches thick were attached to hanger plates across each 16 ft. 2-3/4 inch end of the yoke frame to form the end supports for the joists. The 10S3 steel joists were placed 24 inches on center with the ends bearing on the ledge angles 2-7/8 inches and with bridging bars welded to both top and bottom chords on the centerline. The 3/8 inch rib lath was attached at right angles to the joists and

was tied with No. 18 gauge wire 9 inches on center at the side laps of the selvage and every other 3/8 inch rib at the joist.

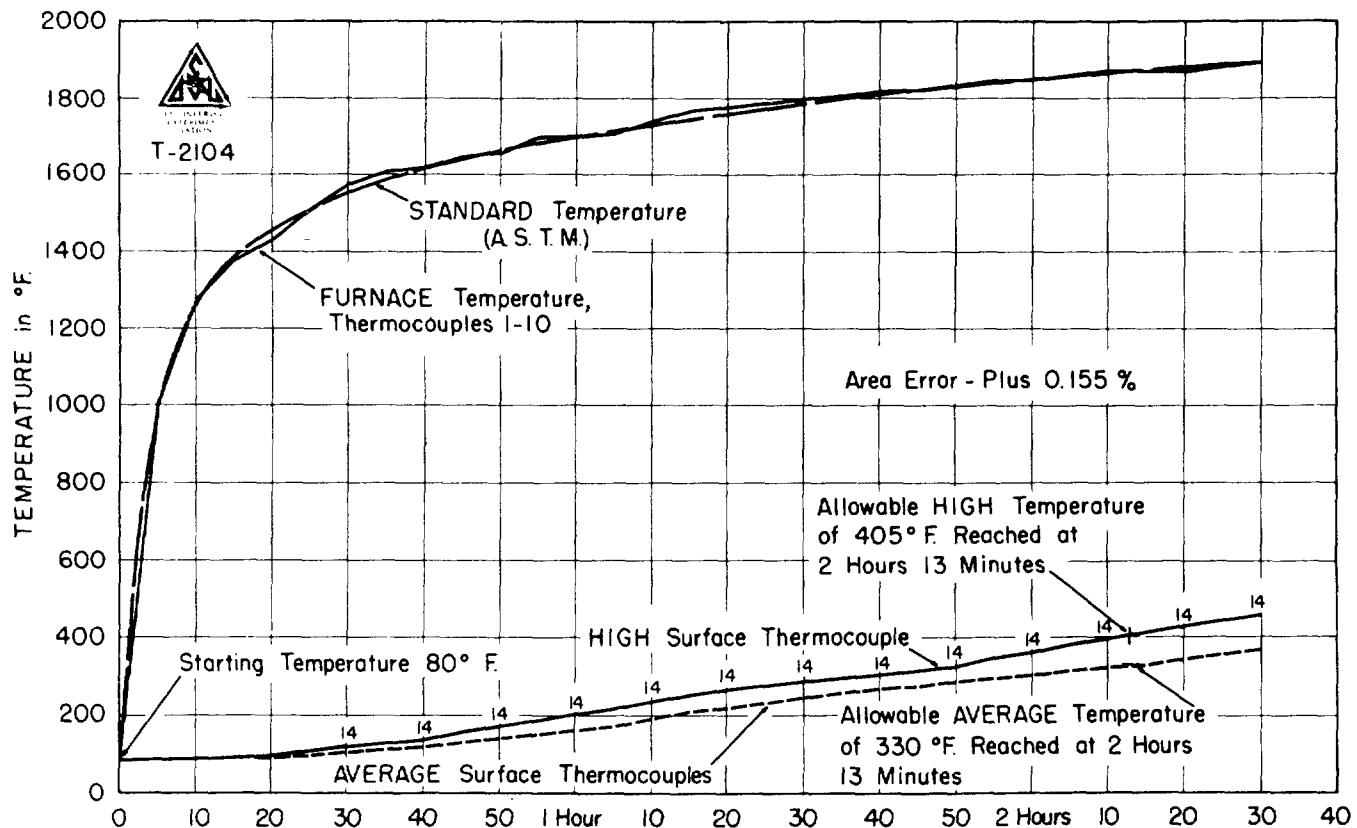
The end laps were approximately 2-7/8 inches. A concrete slab measuring two inches thick over the bar joists reinforced with 6 by 6 by No. 10 by 10 welded wire mesh was placed over the lath. The border channels were attached to the periphery with 3-1/2 inch long nails approximately 8 inches on center. The bottom leg of the channel was 16-1/2 inches below the surface plane of the concrete deck. The main beams were placed perpendicular to the joists 48 inches on center and were supported by No. 12 gauge single strand tie wire hangers. Cross tees 4 feet long were placed between the main beams 2 feet on center. The cross tees extending from the main beams to the border channels were supported by

No. 12 gauge wire hangers near the border channel. The hangers were suspended from 3/4 inch cold rolled furring channel that was placed on the top of the bottom chords of the open web joists. Cross tees 2 feet long were placed between the 4 foot long cross tees 2 feet on center. The ceiling tile was then laid in the suspension system. Spring steel hold-down clips were clipped on the cross tees approximately 24 inches on center holding the ceiling tile in place. The last tile to be placed was held down by a modified spring steel hold-down clip, since the plenum at this point was not accessible to complete the construction.

SUMMARIZATION OF TEST RESULTS

A floor and ceiling assembly constructed of 10 inch deep open web steel joists, a 2 inch thick concrete deck on metal lath and a Donn Fire Grid Suspension System supporting two feet wide by two feet long by 5/8 inch thick Bestwall "Fire-stop-120" Ceiling Tile, demonstrated an ASTM Fire Endurance Time of 2 hours and 13 minutes while subjected to a load calculated to impose design stresses. The test was conducted on April 27, 1962 in accordance with the Standard Method of Fire Tests of Building Construction and Materials, ASTM Designation E 119-61.

Time-Temperature Curve for Fire Endurance Test





BESTWALL

INCOMBUSTIBLE CEILING TILE
FIRESTOP-120 FIRE RATED TILE



GEORGIA-PACIFIC

BESTWALL

GYPSUM DIVISION

SGP 0027821

INCOMBUSTIBLE CEILING TILE

... for lower cost Class A incombustibility and design freedom

DESCRIPTION

Bestwall Incombustible Ceiling Tile is a predecorated lay-in unit designed for use in exposed grid suspended ceilings where low cost fire safety is a primary factor. It meets Class A requirements for incombustibility and provides full 0.78 light reflection.

Bestwall Incombustible Tile is reinforced with glass fibers. These glass fiber filaments are of uniform length and strength, approximately $\frac{1}{2}$ " long and as strong as high strength steel of the same size.

Miles of glass fibers are dispersed in the gypsum

core of Bestwall Incombustible Ceiling Tile to add greater strength, resiliency, and increased resistance to fire.

Bestwall Incombustible Tile is available through qualified and approved Georgia-Pacific/Bestwall Acoustical Contractors.

Dimensions: $\frac{3}{8}$ " thick, nominal 24" by 24" ($23\frac{3}{4}$ " by $23\frac{3}{4}$ "), and $\frac{1}{2}$ ", nominal 24" by 48" ($23\frac{3}{4}$ " by $47\frac{3}{4}$ "). For design purposes a weight of 1.5 lbs. per sq. ft. may be used for the $\frac{3}{8}$ " ceiling tile; 2.0 lbs. per sq. ft. for the $\frac{1}{2}$ " ceiling tile.

Finish: Textured glarefree surface in white.

FIRESTOP-120

... on a rated exposed grid gives a system which results in the lowest cost membrane fire proofing currently available

The Bestwall Gypsum Division, a pioneer in gypsum building products for private and commercial construction, now makes available "Firestop-120" a new ceiling tile, to provide the lowest cost 2-hour fire-rated ceiling.

Tested in accordance with procedure set forth in ASTM E-119-61, "Firestop-120" gypsum ceiling tile achieved a 2-hour fire endurance rating in a rated ceiling assembly.

"Firestop-120" is listed by Underwriters Laboratories under Fire Resistance Classification as Design 208—2 hours. Product boxes carry the U L Label. A Firestop gypsum board product, "Firestop-120" is covered under the Fire Hazard Classification of 10-15.

Many advantages of Bestwall "Firestop-120" are beneficial to all architects, contractors and building owners.

"Firestop-120" is approved under National Model Building Codes as well as local Building Department Codes of large cities.

TO THE ARCHITECT

Provides a quick, low cost method of protecting incombustible floor systems.

Reduces sound transmission.

Glass fiber reinforcement adds strength and resiliency to the tile during handling and application, and after it is in place.

Each tile unit is removable for immediate access to pipes, ducts and utility lines above the ceiling.

The official fire test of "Firestop-120" included recessed light fixtures totaling 16 sq. ft. per 203 sq. ft. or 8% of ceiling area and openings for vents of 71 sq. in. per 100 sq. ft. of ceiling area. Thus the rating of 2 hours permits modern flat ceiling design with recessed fixtures.

Lighting and air conditioning facilities in the ceiling design may be easily changed when desired.

Easy to handle panels 24" x 24" x $\frac{5}{8}$ ".

Packed 6 tiles to a carton insuring arrival in good condition, with minimum loss through breakage or soiling.

Saves construction time, as "lay-in" application is quick and economical, allows other trades to move in faster.

Factory finish insures uniform appearance.

Lowers construction costs as intermediate fire protection is eliminated, and clean-up operations are reduced.

Pre-decorated units eliminate need for on-site decoration.

TO THE BUILDING OWNER

Greater fire protection generally results in reduced insurance premiums.

Plain or textured finishes of the tile reflect light evenly and without glare.

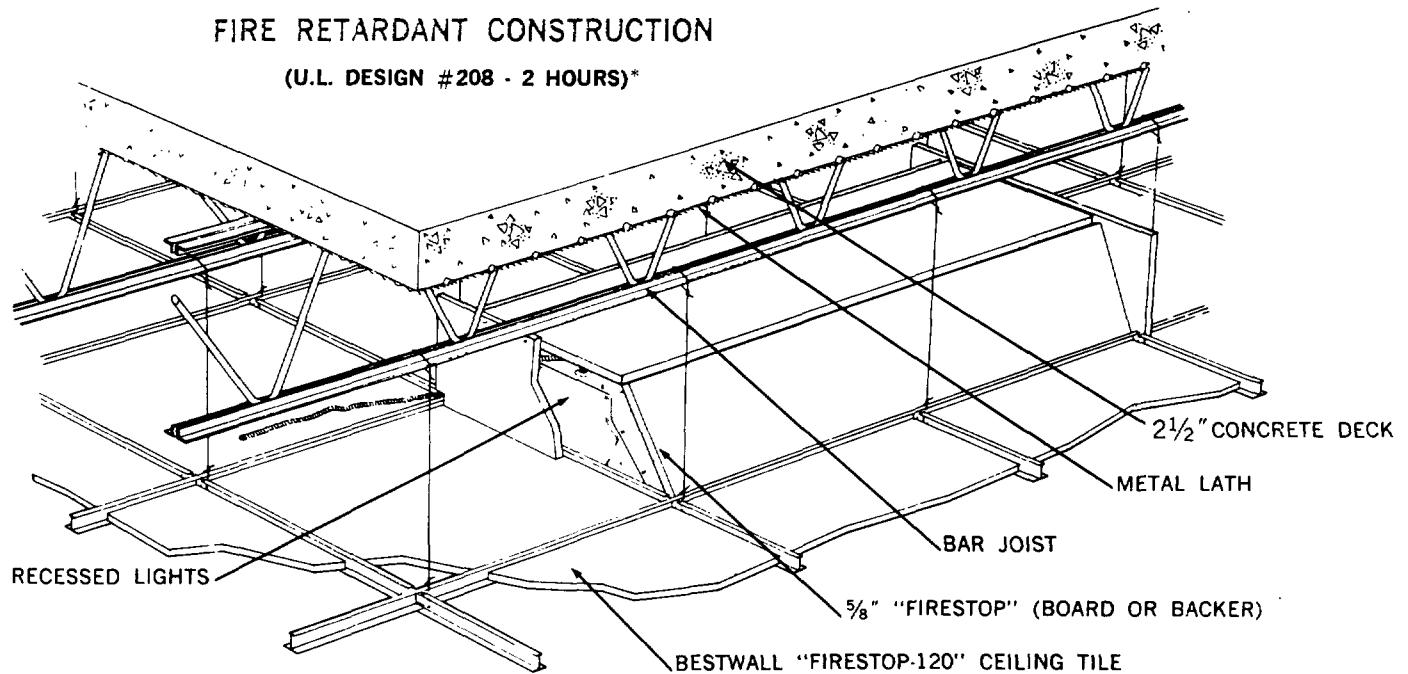
Heat and sound transmission are reduced.

Decorative finishes may be repainted economically by any conventional method.

SGP 0027822

FIRE RETARDANT CONSTRUCTION

(U.L. DESIGN #208 - 2 HOURS)*



*ENGINEERING EXPERIMENT STATION, THE OHIO STATE UNIVERSITY, FIRE ENDURANCE TEST REPORT, DESIGN T-2104 (NOT SHOWN)
PROVIDES A 2-HOUR RATING, WITHOUT OPENINGS FOR UTILITIES USING A 2" CONCRETE DECK.

Easy to maintain and clean.

Accessibility to any area of pipes, ducts or utility lines above the ceiling.

Reduced construction time permits earlier occupancy.

"Firestop-120" offers all advantages of conventional types of exposed grid suspension systems plus the benefits of a 2-hour rated ceiling.

Bestwall "Firestop-120" is the first gypsum ceiling tile to be given a fire retardant time designated rating. It developed 2-hour fire resistance in an Official Fire Test when the assembly was constructed in accordance with the Standard Method of Fire Tests of Building Construction and Materials, ASTM Designation E-119-61.

REQUIREMENTS OF STANDARD FIRE TEST

SUSTAIN APPLIED LOAD

One of the requirements of the Standard Fire Test is that "the construction shall have sustained the applied load (theoretically the design load) during the fire endurance test . . . for a period equal to that for which classification is desired".

Where design loading is not feasible, there is an alternate requirement to determine the protection provided to steel beams. It states that the maximum temperature on the steel beams must not rise above 1200°F and the average temperature of a section of the beam must not exceed 1000° F. "Firestop-120" ceiling tile on a rated exposed grid provides this type of protection to structural steel.

In the Official Tests the assembly did not fail under load nor was a critical temperature even reached on the bar joists during the 2-hour fire test. Only the tile prevented heat from being transmitted to the plenum.

TEMPERATURE RISE ABOVE CONCRETE

The second condition of the Standard Fire Test is "transmission of heat through the construction during the fire endurance test shall not have been such as to raise the temperature on its unexposed surface (top of the deck or slab) more than 250° above its initial temperature".

The deck or floor construction plays an important role in meeting this requirement. Gypsum, Portland Cement concrete, and similar materials—because of their compositions—tend to restrain a temperature rise on the top of the slab.

ADVANTAGES OF BESTWALL "FIRESTOP-120"

Bestwall "Firestop-120" makes it possible, where design requirements permit, to specify lighter weight floor ceiling assemblies.

In instances where Bestwall "Firestop-120" provides greater protection to a building than codes require, the added protection may provide lower fire insurance rates on the building and contents.

BESTWALL "FIRESTOP-120" IS:

- **Strong**—Glass fiber reinforcement adds strength and resiliency to the tile during handling and application, and after it is in place.
- **Easy Working**—Easy to handle panels 24" x 24" x 5/8". "Firestop-120" is also easy to maintain and clean. Decorative finishes are tough, hard surfaces resistant to marking.
- **Fast Working**—Saves construction time as lay-in application is quick and economical.
- **Versatile**—Offers all the advantages of conventional types of exposed grid suspensions plus the benefits of a 2-hour fire rated floor and ceiling construction. Each "Firestop-120" unit is removable for immediate access to pipes, ducts, and utility lines above the ceiling.

SOUND ATTENUATION IN ALL FREQUENCIES

FREQUENCY	125	177	250	354	500	707	1000	1414	2000	2828	4000
ATTENUATION	28	33	30	33	37	41	42	44	45	44	41
AVERAGE 38 db											

Tested by Geiger and Hamme Laboratories using the "Two Room Method"
5/8" material reported, 3/8" & 1/2" material tested with practically the same results.

SGP 0027823

SPECIFICATIONS FOR BESTWALL INCOMBUSTIBLE TILE

SHORT FORM

Tile shall be Bestwall Incombustible Tile* manufactured by the Georgia-Pacific, Bestwall Gypsum Division, Paoli, Pennsylvania. Tile shall be installed by the manufacturer's approved Acoustical Contractors and in accordance with manufacturer's specifications.

The suspension system used shall be from a reputable manufacturer, designed to carry the 24" by 24", or 24" by 48"† units and shall be erected according to the manufacturer's recommendations.

LONG FORM JOB CONDITIONS

1. The building should be fully enclosed.
2. The heating or air conditioning systems shall be in operation so proper conditions are maintained before, during, and after acoustical installation.
3. All poured roof decks, plaster, concrete, terrazzo or other "wet" operations shall be completed and thoroughly dry.
4. The plenum chamber shall be vented to the outside.
5. The Bestwall Incombustible Tile* shall be delivered to the job just prior to installation time.

SPECIAL CONDITIONS

Bestwall Incombustible Tile* shall be installed by an Acoustical Contractor approved by the Bestwall Gypsum Division.

MATERIALS

a. Tile shall be Bestwall Incombustible Tile* as manufactured by the Georgia-Pacific, Bestwall Gypsum Division, Paoli, Pennsylvania. The tile shall be factory painted, white (plain or textured), packed in suitable cartons and complying with Federal Specifications SS-A-118b, Type IIA, Class A, Incombustible.

b. Bestwall Tile* shall be installed on the flanges of an exposed rigid metal grid suspension system consisting of main carriers and interlocking cross tees. The grid system shall be installed to provide 24" x 24" or 24" by 48"† modules. The main carriers shall be hung from the ceiling slab or structure. Hangers and main runners shall be spaced in accordance with manufacturer's specifications and recommendations governed by the expected maximum load. Main runners shall be accurately leveled and spaced. Baked enamel finished or natural aluminum finish metal angle moulding, matching the exposed grid shall be installed where border units abut the walls or other vertical surfaces.

INSTALLATION

Bestwall Tile* and the suspension system shall be installed in accordance with standard practices by the Acoustical Contractor. (For "Firestop-120" an approved fire rated suspension system shall be used where one-hour or two-hour ratings are required.)

*In the above specifications insert the applicable tile:

Bestwall Incombustible Ceiling Tile

Bestwall "Firestop-120" Ceiling Tile

†In the above specifications insert the applicable dimensions:

Bestwall Incombustible Ceiling Tile,

3/8" thick, 24" x 24" or 1/2" thick, 24" x 48".

Bestwall "Firestop-120" Ceiling Tile,

5/8" thick, 24" x 24" only.

SALES OFFICES

ATLANTA
801 Peachtree 25th Building
1720 Peachtree, N.W.
Atlanta, Georgia 30309

BRUNSWICK
Foot of Union Street
Brunswick, Georgia 31521

CHICAGO
5544 W. St. Charles Road
Berkeley, Illinois 60162

CLEVELAND
3530 Warrensville Center Road
Shaker Heights
Cleveland, Ohio 44122

DALLAS
600 Exchange Bank Building
Dallas, Texas 75235

DETROIT
Suite 227, Offcenter Building
Detroit, Michigan 48235

HOUSTON
Bayou Building
3322 Richmond Avenue
Houston, Texas 77019

KANSAS CITY
4233 Blue Ridge Boulevard
Kansas City, Missouri 64133

NEW ORLEANS
7800 Alamonaster Drive
New Orleans, Louisiana 70126

SAN FRANCISCO
301 El Cerito Plaza
El Cerito, California 94532

WESTERN
Room 404, Tribune Building
143 S. Main Street
Salt Lake City, Utah 84101

WILMINGTON
Wilmington Marine Terminal
Wilmington, Delaware 19899



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SGP 0027824



INCOMBUSTIBLE CEILING TILE AND "FIRESTOP-120"

Now a low cost $\frac{3}{8}$ " tile that meets all Class A requirements—Bestwall Incombustible Ceiling Tile. Open new perspectives in design with greater application ease and planning. Save in maintenance costs and insurance rates. Here's an incombustible ceiling tile that offers the perfect combination—low cost incombustibility plus true design freedom.

For fire rated ceilings specify "Firestop-120" for use in the lowest-cost 2-hour fire rated ceiling assembly available today! Tested in accordance with ASTM E-119, "Firestop-120" Gypsum Ceiling Tile achieved a 2-hour fire endurance rating in a rated ceiling assembly. "Firestop-120" is listed by Underwriters Laboratories under Fire Resistance Classification as Design No. 208—2 hours. All product boxes carry the U.L. Label.

Reinforced with miles of glass fibers, Bestwall Incombustible and "Firestop-120" Ceiling Tile are pre-decorated, lay-in units, specially designed for use in exposed grid suspension systems. Available in plain or textured white finishes, they perform with unusual versatility in schools, warehouses, factories, supermarkets and other commercial structures.

BESTWALL

SGP 0027825

BESTWALL INCOMBUSTIBLE CEILING TILE AND "FIRESTOP-120"

... CHECK THESE PROVEN ADVANTAGES

FIRE PROTECTION—Bestwall Incombustible Ceiling Tile satisfies most building codes. It complies with Federal Specifications SS-A-118b Class A, Incombustible. "Firestop-120", when tested in accordance with procedure set forth in ASTM E-119, achieved a 2-hour fire endurance rating in an incombustible floor and ceiling assembly.

LOW COST—Lightweight, easy to handle 24" by 24" or 24" by 48" units go up fast. After-hours installation permits uninterrupted business operations, allowing other trades to move in faster.

GLASS FIBER REINFORCED—Bestwall Incombustible Ceiling Tile and "Firestop-120" are reinforced with interlocking textile glass filaments of uniform strength and length. This unique advantage adds strength and resilience, minimizing breakage in handling and installation. The gypsum core is further protected by a tough surface paper—over 10 percent heavier than standard paper.

HIGH LIGHT REFLECTION—Both Bestwall Incombustible Tile and "Firestop-120" offer a 0.78 light reflection. Plain and textured finishes reflect light evenly and without glare.

EASY MAINTENANCE—Prefinished surface may be cleaned with a cloth or sponge slightly dampened with a mild detergent. Tile can be economically repainted, if desired.

Bestwall Incombustible Ceiling Tile is available either $\frac{3}{8}$ " thick and 24" by 24" square or $\frac{1}{2}$ " thick and 24" by 48". "Firestop-120" is $\frac{5}{8}$ " thick and 24" by 24" square. Precision cutting at the plant assures uniform tile dimensions.

FAST INSTALLATION—Bestwall Incombustible Ceiling Tile and "Firestop-120" are available only through qualified and approved Acoustical Contractors. Their extensive experience insures

quality installation. Both Bestwall Incombustible Ceiling Tile and "Firestop-120" units can be rapidly installed in conventional types of exposed grid suspension systems. "Hold down" clips assure snug alignment of the tile in the grid system. Extreme humidity conditions should be avoided.

DECORATION—Tile may be repainted by any conventional method. This feature permits color styling of the ceiling before or after installation.

VERSATILITY—Each tile unit is removable for immediate access to ducts, pipes and utility lines above the ceiling. Lighting and air conditioning fixtures may be incorporated into the ceiling design and changed when desirable at a minimum cost.

SPECIFICATIONS—Ceiling tile shall be Bestwall Incombustible Ceiling Tile (or "Firestop-120") manufactured by Georgia-Pacific, Bestwall Gypsum Division, Paoli, Pennsylvania. Tile shall be installed by the manufacturer's approved Contractors and in accordance with manufacturer's specifications. The suspension system used shall be from a reputable manufacturer, designed to carry the 24" by 24" units or the 24" by 48" units and shall be erected according to the manufacturer's recommendations. (Fire rated suspension systems shall be used with "Firestop-120" to obtain fire rating.)

For over half a century, Bestwall gypsum building materials have been accepted as a standard of quality everywhere. This recognition is earned through continued creative research which provides you with better building products and construction components. Witness Bestwall Incombustible Ceiling Tile and "Firestop-120", economical choices for functional, fireproof ceilings designed for unequalled service-life in your building.

Ask your Georgia-Pacific/Bestwall representative for complete details. Or write directly to us.



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PLANTS AND OFFICES THROUGHOUT THE UNITED STATES

SGP 0027826



THE SHERWIN-WILLIAMS Co.

860 BROAD STREET
NEWARK 1, N. J.

August 8, 1960

Mr. R. G. Megaw
Bestwall Certain-Teed
120 E. Lancaster Avenue
Ardmore, Pa.

Dear Mr. Megaw:

When we were asked to develop a tile coating for your company the main factor considered was the fire resistance of the coating. Some of your competitors in the tile field test for flame resistance against the ASTM spec CS4249. Under this test procedure the "charred" area must be under 12 sq. inches. We have noticed that some of these coatings run just under 12 square inches (11.7 square inches and sometimes as low as 10 square inches). The coating on your tile under the ASTM spec CS4249 runs between 3 and 4 square inches. Quite an improvement. Mr. W. O. Stoll can give you the wind tunnel test results that again speak for the excellent fire resistance of the coating.

Washability is another important factor. This test is run on a Gardner scrub machine that counts the strokes of a scrub brush (under pressure) on the tile surface that is fed a constant supply of soapy water. Your coating will withstand 200 strokes and I have seen competitive tile go only 100 strokes. In fact one of your competitors only requires 100 strokes.

We have combined excellent fire resistance with very good scrubability. This, as I explained to you, is quite unusual in that when you upgrade fire resistance you downgrade scrubability. You will normally see either one or the other -- not both. If the fire resistance is just passable, then the scrub resistance is good. You have both.

Our formula is a thermosetting type and is therefore non-blocking. This is important to your sales department in that when the tiles are packaged you need have no fear of your customers unpacking them and finding "block" marks on the surface of the tile where it stuck to the back of, or the face of, another tile.

SGP 0027827

The coating gives a tough, hard, and uniform flat surface to your tile. Many tiles are highly susceptible to marking by metal tools and equipment. The Bestwall coating is highly resistant to such marking. It will metal mark, but we believe it is much better than some of the competitive tiles.

The uniform matt finish of this coating is important from two standpoints.

1. It provides a softness on the eye and that is most important for ceiling tile.
2. It will not "polish". Polishing of a film is due to the surface being rubbed (thru washing or rubbing together during shipment or during installation).

Have your men look at the flat coated tile from various angles and you will notice the finish is flat. Some competitive tiles have a sheen. This is done to eliminate the "polishing" effect. Your formula provides a flat, matt, finish that does not polish - even when compared to tiles that have a slight sheen. Check your competition on this point and then use it as an effective sales tool.

The coating is also free from water spotting. It is not sensitive to water - many coatings are. This is important when cleaning the tile. We agree that the tile should be washed with a damp sponge or rag. This coating can take it; some cannot - they are water sensitive; your coating is not.

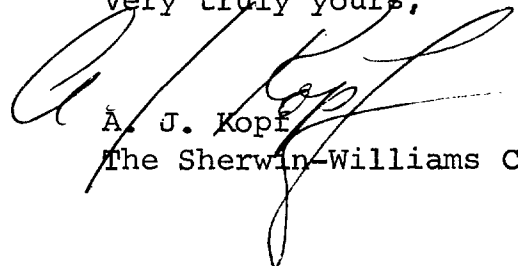
The color of the white tile coating can be on the blue side or red side. The sample we supplied to Mr. Stoll was unshaded and therefore the tiles in his possession are unshaded. The color can remain as it is or can be tinted slightly to your preference.

I sincerely hope that this information will contribute to your sales meeting. Your men can be proud of this tile coating.

Should you need additional information, please let me know.

Kindest personal regards.

Very truly yours,



A. J. Kopf
The Sherwin-Williams Company

AJK/gek
cc. Walter O. Stoll

SGP 0027828

BEST WALL GYPSUM COMPANY

GYPSUM WALLBOARD MANUAL

Section 8.

1965 EDITION

LIST OF MANUFACTURERS OF METAL COMPONENTS FOR
SUSPENDED CEILING

1. Donn Products, Inc.,
700 Bassett Road
Westlake, Ohio 44091
Phone 216 871-1000
2. National Rolling Mill
N. Morehall Road
Malvern, Penna.
3. Eastern Products Corp.,
1001 Wicomico Street,
Baltimore, Md. 21230
Phone 301 837-6700
4. Hastings Aluminum Products, Inc.
Hastings, Michigan

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SGP 0027830

Fire-Rated Exposed Grid

DONN D-L SYSTEM

The Donn D-L Fire-Rated Exposed Grid System is a complete, factory-engineered, fire-rated ceiling system. It is designed to provide a fire-rated ceiling for areas where fire resistance is required. The system consists of a main beam, cross tees, and a grid. The main beam is a double web bulb section of not less than .021" steel. The cross tees are double web bulb sections of not less than .021" steel. The grid is a continuous 1" roll formed cap. The system is designed to provide a fire-rated ceiling for areas where fire resistance is required.

The Donn D-L Fire-Rated Exposed Grid System is designed to provide a fire-rated ceiling for areas where fire resistance is required. The system consists of a main beam, cross tees, and a grid. The main beam is a double web bulb section of not less than .021" steel. The cross tees are double web bulb sections of not less than .021" steel. The grid is a continuous 1" roll formed cap. The system is designed to provide a fire-rated ceiling for areas where fire resistance is required.

The Donn D-L Fire-Rated Exposed Grid System is designed to provide a fire-rated ceiling for areas where fire resistance is required. The system consists of a main beam, cross tees, and a grid. The main beam is a double web bulb section of not less than .021" steel. The cross tees are double web bulb sections of not less than .021" steel. The grid is a continuous 1" roll formed cap. The system is designed to provide a fire-rated ceiling for areas where fire resistance is required.

The Donn D-L Fire-Rated Exposed Grid System is designed to provide a fire-rated ceiling for areas where fire resistance is required. The system consists of a main beam, cross tees, and a grid. The main beam is a double web bulb section of not less than .021" steel. The cross tees are double web bulb sections of not less than .021" steel. The grid is a continuous 1" roll formed cap. The system is designed to provide a fire-rated ceiling for areas where fire resistance is required.

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ARCHITECTURAL SPECIFICATIONS

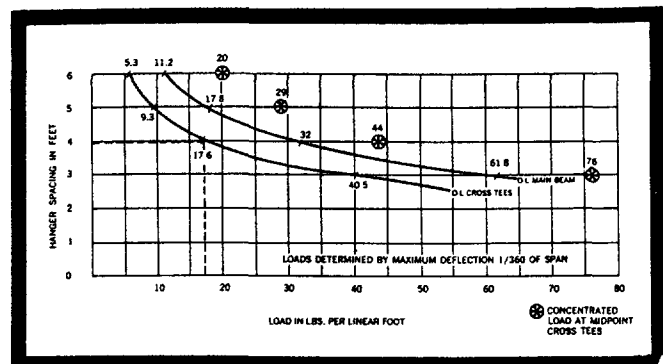
Suspension System: Shall be Donn D-L Fire Rated Suspension System as manufactured by Donn Products, Inc., Westlake, Ohio.

Requirements: Main beam shall be double web bulb section of not less than .021" steel. Beam shall have a height of not less than 1 1/2"; bottom flange shall be faced with a continuous 1" roll formed cap. Beam shall have a maximum of one factory installed splice per 12' length.

Cross tees shall be double web bulb section of not less than .021" steel. Tees shall have a height of not less than 1 1/2"; bottom flange shall be faced with a continuous 1" roll formed cap. Tees shall not be spliced, but shall have identical end detail to rest-on, automatically engage, level and lock to main beams. Molding shall be angle or box type.

Finish: Shall be pre-coated satin white steel cap or anodized natural aluminum cap.

Installation: Attach 12' D-L main beams suspended and level at 48" on centers, utilizing No. 12 galvanized wire spaced 48", on centers. Join 4' cross tees to main beams at 24" on centers and through slots in main beams, for 2' x 4' panels. Join 2' cross tees between 4' cross tees and through slots in 4' cross tees for 2' x 2' panels. Main beams and cross tees shall be supported at wall with angle mold.

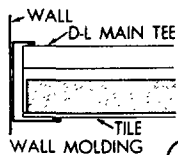
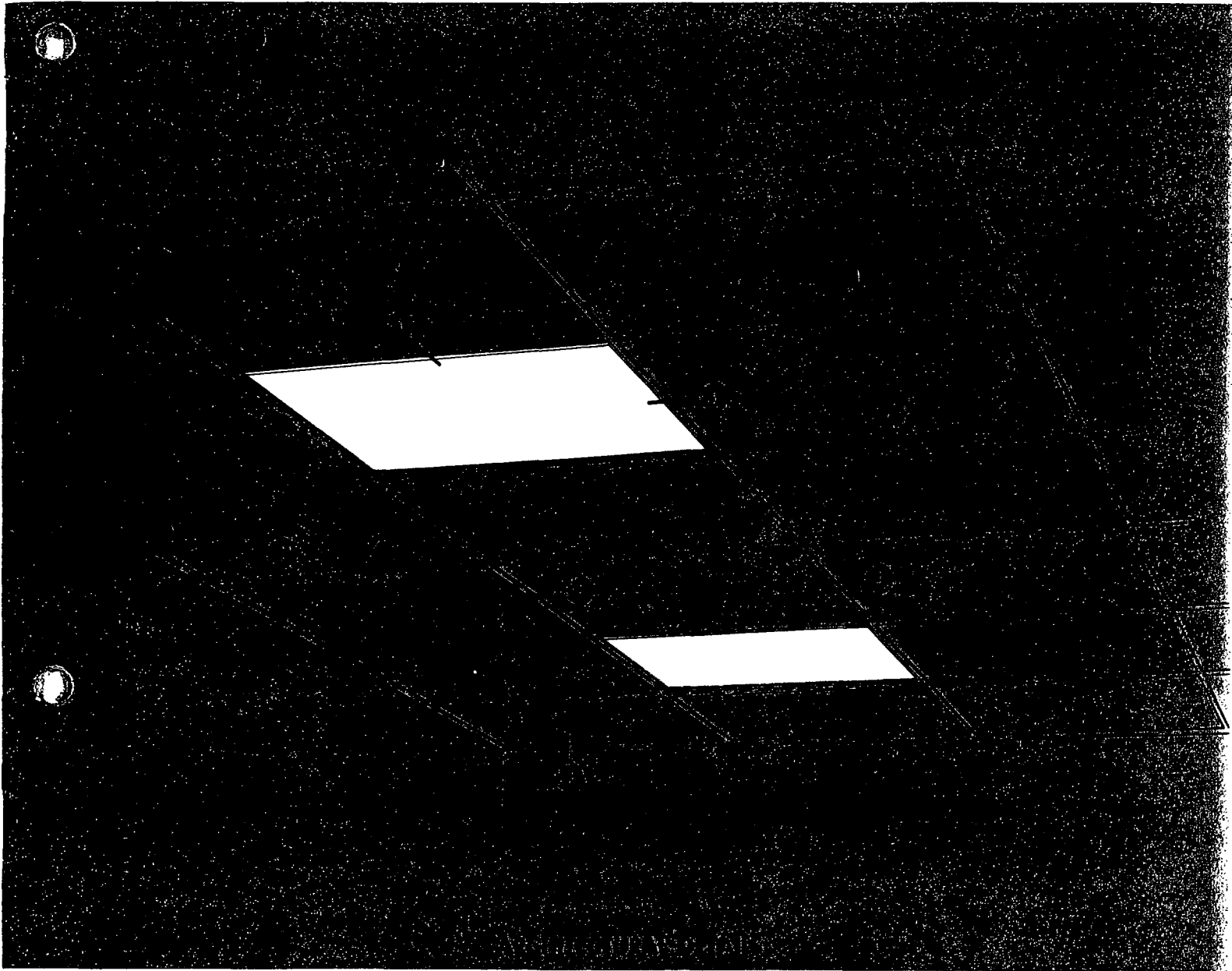


Allowable Load Graph. The loads above are limited by deflection 1/360 of the span. For unusual or special loading conditions, please request recommendations.

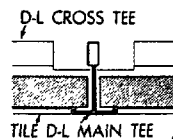
SGP 0027831

Fire-Rated Exposed Grid

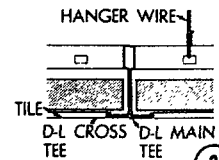
DONN D-L SYSTEM



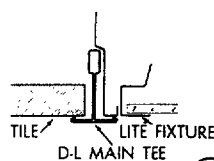
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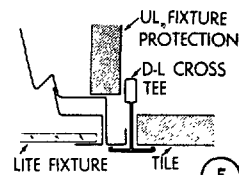
②



③



④



⑤

SGP 0027832

Exposed Tee Grid

DONN D-B & D-K SYSTEMS

The Donn D-B & D-K systems are designed for use in exposed tee grid applications. The systems are designed to provide a strong, rigid, and durable structure for use in a variety of applications. The systems are designed to provide a strong, rigid, and durable structure for use in a variety of applications. The systems are designed to provide a strong, rigid, and durable structure for use in a variety of applications.

The Donn D-B & D-K systems are designed for use in exposed tee grid applications. The systems are designed to provide a strong, rigid, and durable structure for use in a variety of applications. The systems are designed to provide a strong, rigid, and durable structure for use in a variety of applications. The systems are designed to provide a strong, rigid, and durable structure for use in a variety of applications.

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PHYSICAL DATA

STRUCTURAL DATA

Donn Main Beam	Single Span				
	4	5	6	7	8
DB-21	150	175	200	—	—

Heavy Duty Main Beam	Single Span				
	4	5	6	7	8
DB-25	280	150	8.5	50	8.5

PHYSICAL DATA

STRUCTURAL DATA

Donn Main Beam	Single Span				
	4	5	6	7	8
DB-21	150	175	200	—	—

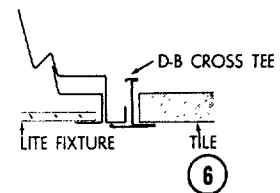
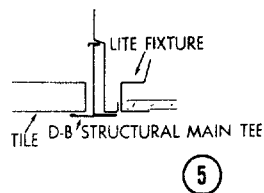
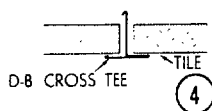
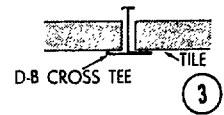
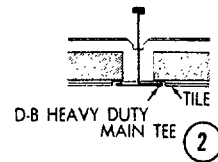
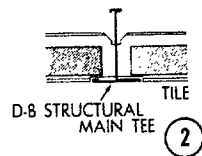
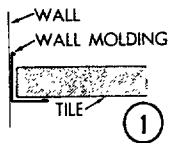
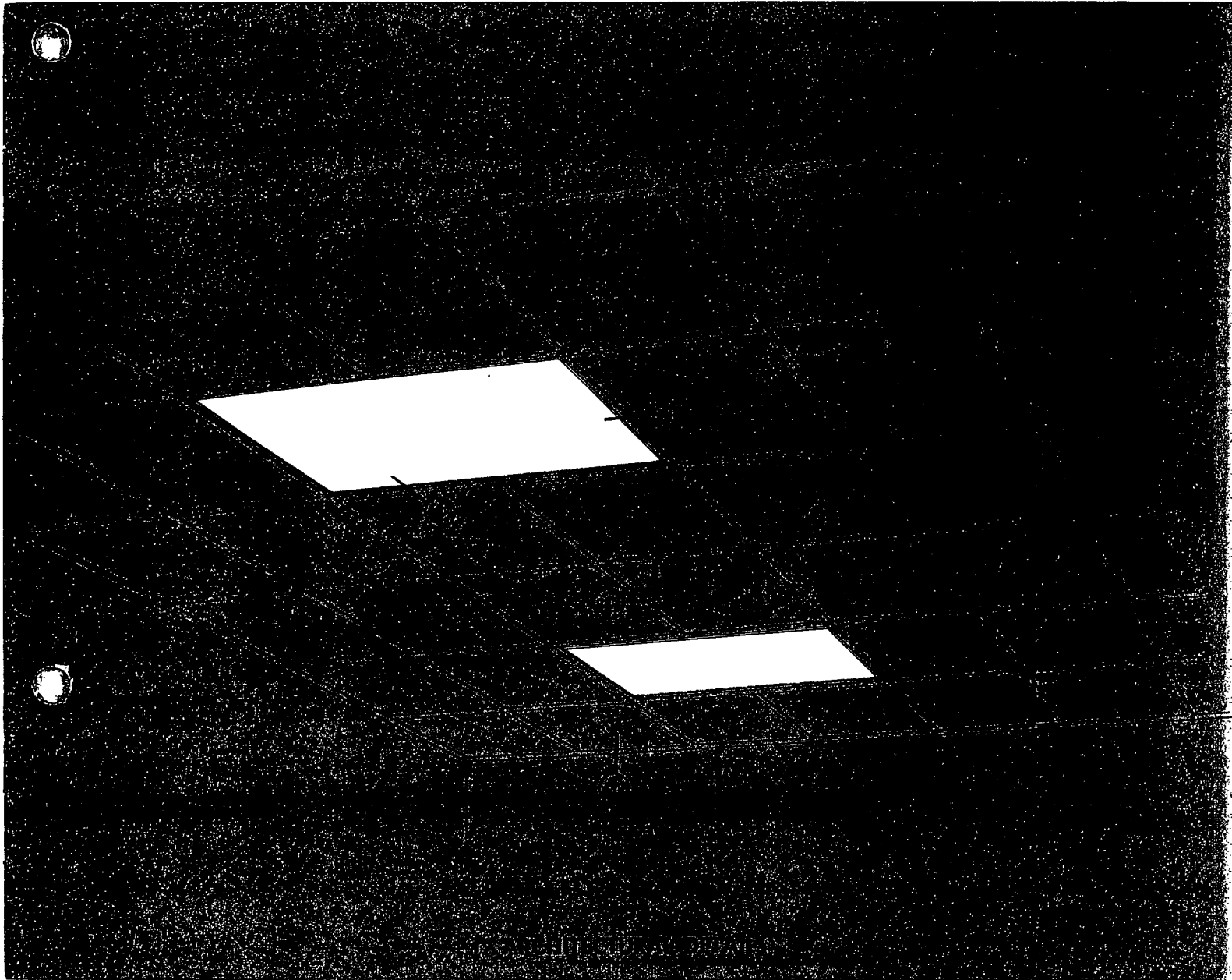
Donn Main Beam	Single Span				
	4	5	6	7	8
DB-21	150	175	200	—	—

LOAD for 1/360 SPAN DEFLECTION

SGP 0027833

Exposed Tee Grid

DONN D-B & D-K SYSTEMS



SGP 0027834

Exposed Modular Pan Grid

DONN D-P SYSTEM

The DONN D-P EXPOSED MODULAR PAN GRID SYSTEM offers complete ceiling installation through the use of modular sections. Each basic pan is available in any width from 2' to 4' and in any length from 2' to 8'. The system is designed for use in areas where the ceiling is exposed, including commercial buildings and schools. The system is designed to be used in areas where the ceiling is exposed, including commercial buildings and schools. The system is designed to be used in areas where the ceiling is exposed, including commercial buildings and schools.

ARCHITECTURAL SPECIFICATIONS

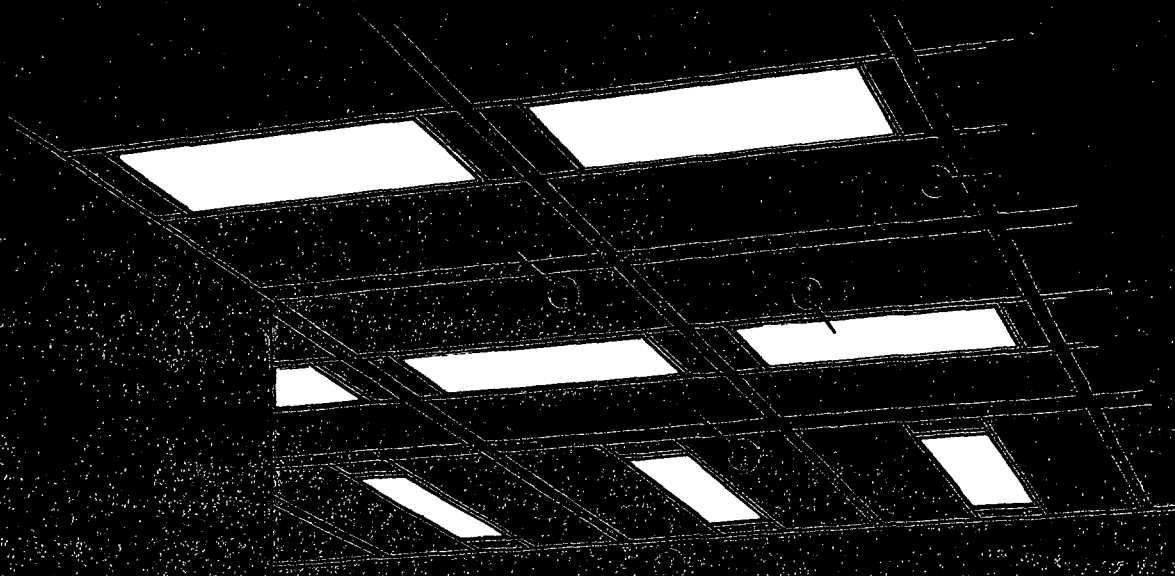
Area to be Treated:—A space in which the ceiling is exposed and the floor is finished.

Dimensions:—See the No. 2 Architectural Data Sheet for dimensions. The dimensions are given in feet and inches, and are subject to change without notice.

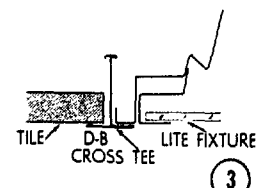
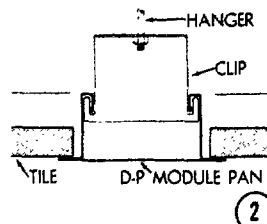
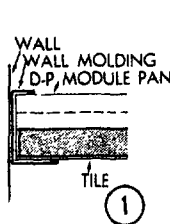
Basic Pan:—See the No. 2 Architectural Data Sheet for dimensions. The basic pan is a rectangular unit, 2' wide by 2' long, and is made of aluminum.

Grid:—See the No. 2 Architectural Data Sheet for dimensions. The grid is a rectangular unit, 2' wide by 2' long, and is made of aluminum.

Installation:—The grid is installed by placing the basic pan in the grid. The basic pan is then secured to the grid by means of a clip. The clip is a small metal piece, 1/2" wide by 1/2" long, and is made of aluminum.



ARCHITECTURAL DETAILS



PHYSICAL DATA

LOAD DATA

Pan Number	Dim. "A"	Simple Span				
		4'	6'	8'	7'	8'
DP-32	2	25.2	13.2	7.7	4.8	3.2
DP-40	2.5	26.2	14.0	8.2	5.1	3.4
DP-48	3	27.1	14.8	8.7	5.4	3.6
DP-60	3.5	28.0	15.6	9.2	5.7	3.8
DP-84	4.0	28.9	16.5	9.7	5.9	4.0
DP-78	4.75	29.8	17.3	10.2	6.2	4.2

LOAD for 1/360 SPAN DEFLECTION

SGP 0027835

Semi-Exposed Modular Pan

DONN D-P SYSTEM

THE DONN D-P SYSTEM IS A MODULAR PAN SYSTEM WHICH PROVIDES A FAST, EASY TO INSTALL, AND MAINTAINABLE CEILING SYSTEM. THE SYSTEM IS DESIGNED TO BE USED IN A VARIETY OF APPLICATIONS, INCLUDING COMMERCIAL, INDUSTRIAL, AND RESIDENTIAL. THE SYSTEM IS AVAILABLE IN A RANGE OF SIZES AND FINISHES TO MEET YOUR SPECIFIC REQUIREMENTS.

APPLICATIONS

Commercial Buildings—The Donn D-P System is ideal for use in commercial buildings, providing a clean, modern ceiling finish. The system is easy to install and maintain, making it a popular choice for office buildings, hotels, and retail stores.

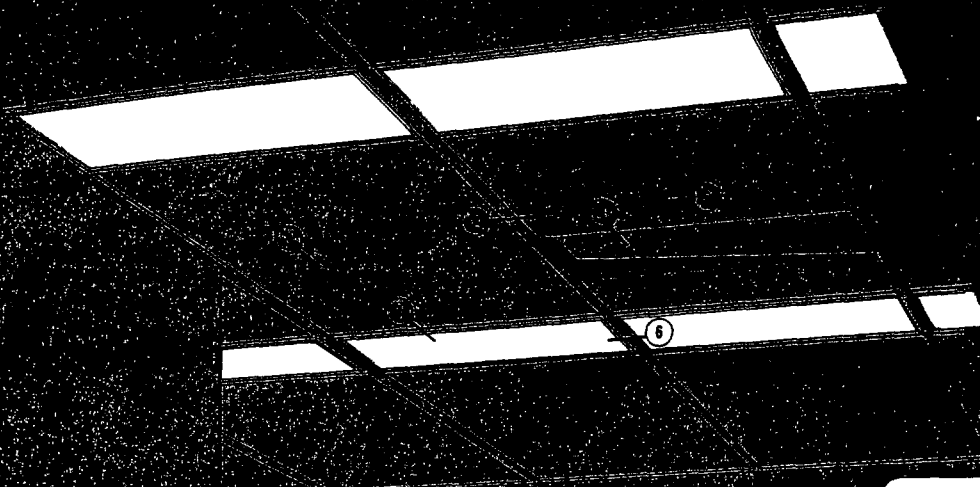
Industrial Buildings—The Donn D-P System is also suitable for use in industrial buildings, providing a durable and easy-to-clean ceiling finish. The system is designed to withstand harsh environments and is available in a range of finishes to meet your specific requirements.

Residential Buildings—The Donn D-P System can be used in residential buildings, providing a stylish and functional ceiling finish. The system is easy to install and maintain, making it a popular choice for homes and apartments.

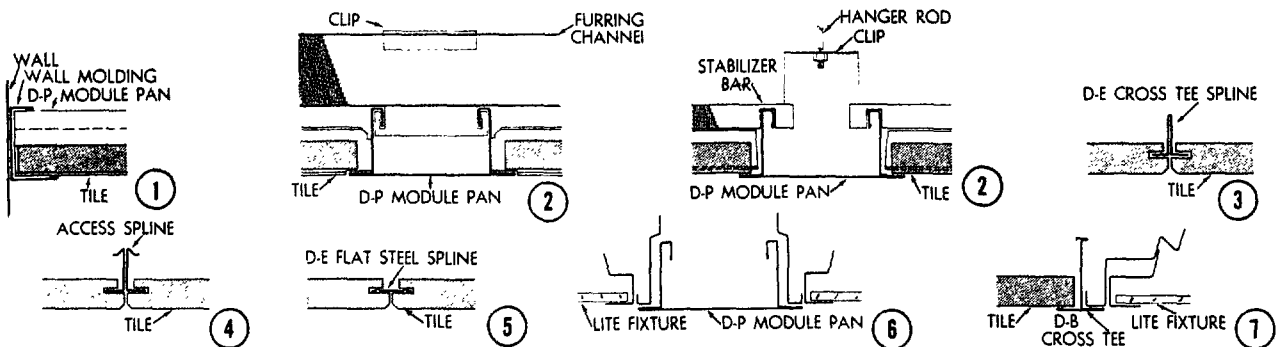
THE DONN D-P SYSTEM IS A MODULAR PAN SYSTEM WHICH PROVIDES A FAST, EASY TO INSTALL, AND MAINTAINABLE CEILING SYSTEM. THE SYSTEM IS DESIGNED TO BE USED IN A VARIETY OF APPLICATIONS, INCLUDING COMMERCIAL, INDUSTRIAL, AND RESIDENTIAL. THE SYSTEM IS AVAILABLE IN A RANGE OF SIZES AND FINISHES TO MEET YOUR SPECIFIC REQUIREMENTS.

THE DONN D-P SYSTEM IS A MODULAR PAN SYSTEM WHICH PROVIDES A FAST, EASY TO INSTALL, AND MAINTAINABLE CEILING SYSTEM. THE SYSTEM IS DESIGNED TO BE USED IN A VARIETY OF APPLICATIONS, INCLUDING COMMERCIAL, INDUSTRIAL, AND RESIDENTIAL. THE SYSTEM IS AVAILABLE IN A RANGE OF SIZES AND FINISHES TO MEET YOUR SPECIFIC REQUIREMENTS.

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SGP 0027836



PHYSICAL DATA

LOAD DATA

	Spline Number	Dim. "A"	Simple Span	Load per Lin. Foot
	DE-208	.500	24"	4.49
	DE-308	.500	36"	1.35
	DE-314	.875	36"	6.49
	DE-414	.875	48"	2.73

LOAD for 1/360 SPAN DEFLECTION

PHYSICAL DATA

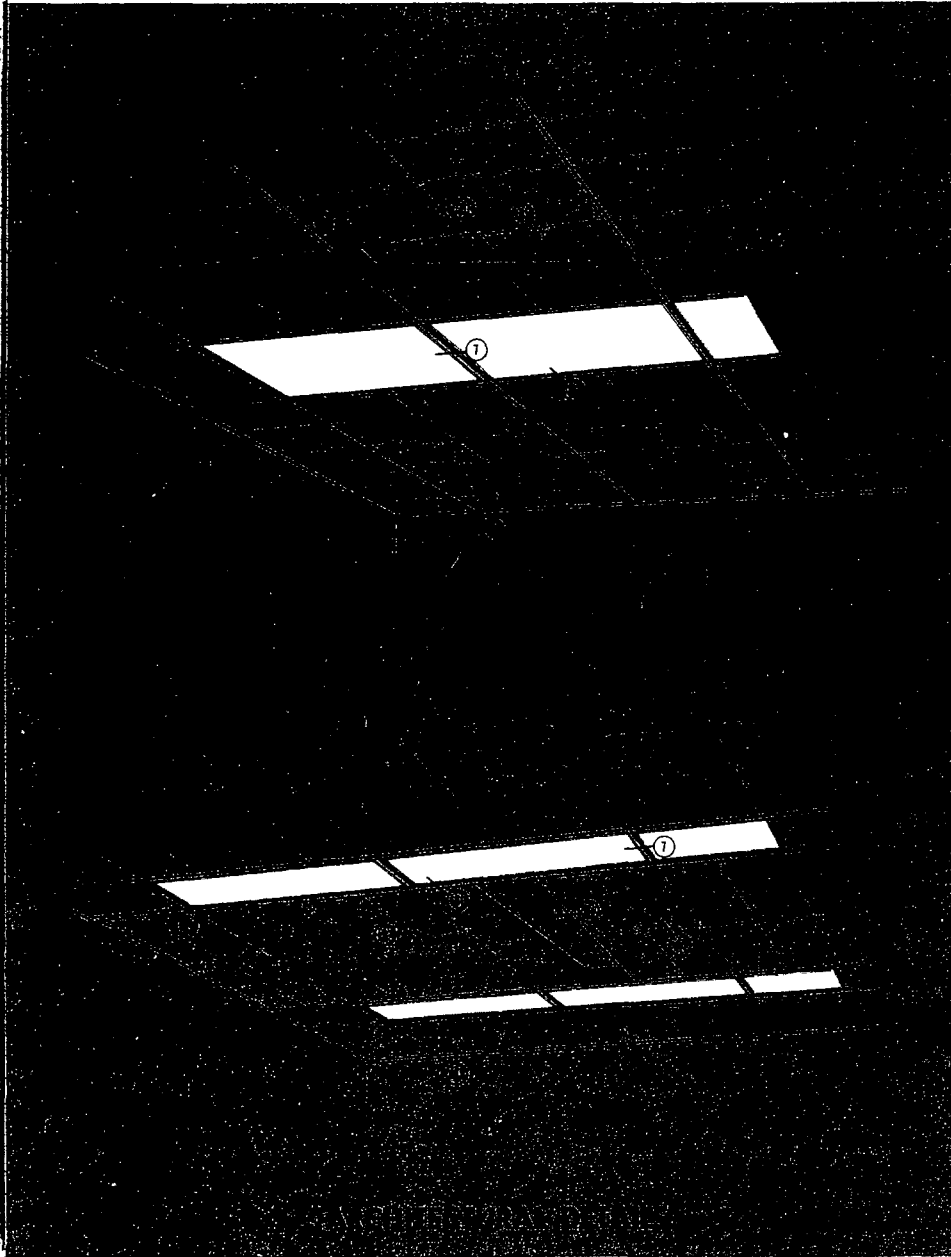
LOAD DATA

	Spline Number	Dim. "A"	Simple Span Paired	Load
	DM-308	.50	3	3.6
	DM-314	.875	3	8.5
	DM-414	.875	4	4

LOAD for 1/360 SPAN DEFLECTION

One Directional Exposed Tee

DONN D-M SYSTEM



The **DONN® D-M EXPOSED TEE SYSTEM** is a directly suspended system providing great economy and extremely rapid installation of exceptionally rigid exposed tee beams with excellent spanning characteristics. Stabilized over the top with utterly functional and secure stabilizer bars it offers unusual design possibilities yet is completely accessible. Finished in pre-coated satin white steel cap or anodized natural aluminum cap.

ARCHITECTURAL SPECIFICATIONS

Area to be Treated—All areas as shown on architect's drawings and in the finish schedule.

Hangers—Shall be No. galvanized wire spaced 48" on centers. (Dependent on ceiling load to be carried).

Main Tee Beams—Shall be Donn D-M main tee beams of double web bulb section not less than 1 1/2" high and of not less than .021" steel. Integral snap-lock splice shall be factory installed.

Stabilizer Bars—Shall be Donn D-M stabilizer bars notched to fit tightly on square main tee bulbs and of not less than .030" steel.

Concealed Cross Tee Splines and Access Splines—(Select from chart below and on page 7.)

Installation—Attach Donn D-M main beams suspended and level at on centers (12", 24" or 48" dependent on lighting design). Main beams to be finish. Secure stabilizer bars to main beams in a staggered pattern 8' on centers and at each light fixture. Cross tee splines shall be inserted into kerfed tile perpendicular to main beams, when tile spanning characteristics require or where breathing is a consideration. Ends of main beams shall be mounted on top of M-6 edge molding. Use MK-11 aluminum molding with aluminum capped beams.

LOAD DATA

Span Between Hangers	Load per Lin. Foot
4	32
5	17.8
6	12.2
7	6.8
8	4.6

LOAD for 1/360 SPAN DEFLECTION

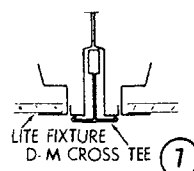
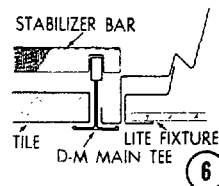
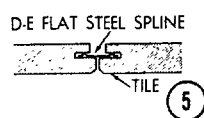
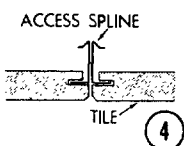
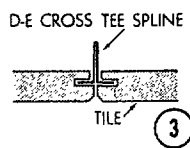
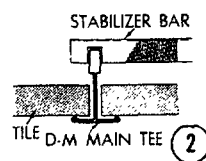
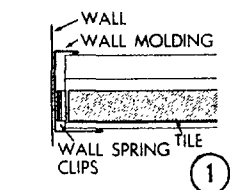
PHYSICAL DATA

LOAD DATA

Spline Number	Dim. "A"	Single Span	Load per Lin. Foot
DE-208	.508	24"	4.49
DE-308	.500	36"	1.35
DE-314	.875	36"	6.49
DE-414	.875	48"	2.73

LOAD for 1/360 SPAN DEFLECTION

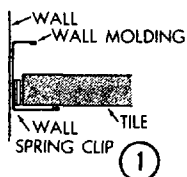
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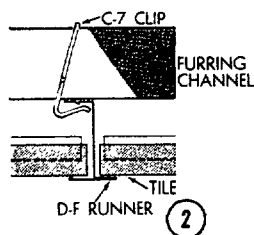
One Directional Exposed "Z"

DONN D-F SYSTEM

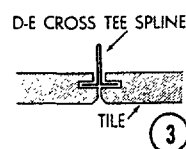
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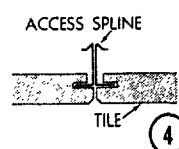
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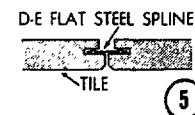
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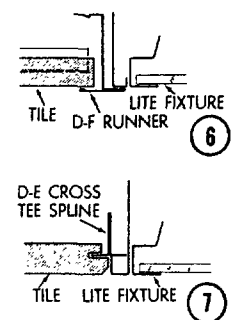
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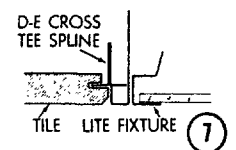
4



5



6



7

PHYSICAL DATA

LOAD DATA

Runner Number	Dim. "A"	Runner Splice	4'	5'	6'	7'
DF-16	1.00"	F-1	8.2	4.08	2.36	
DF-22	1.38"	F-21	16.45	8.43	4.88	3.07
DF-25	1.56"	F-31	22.69	11.61	6.52	4.94
DF-28	1.75"	F-41	28.50	14.67	8.46	5.33

LOAD for 1/360 SPAN DEFLECTION

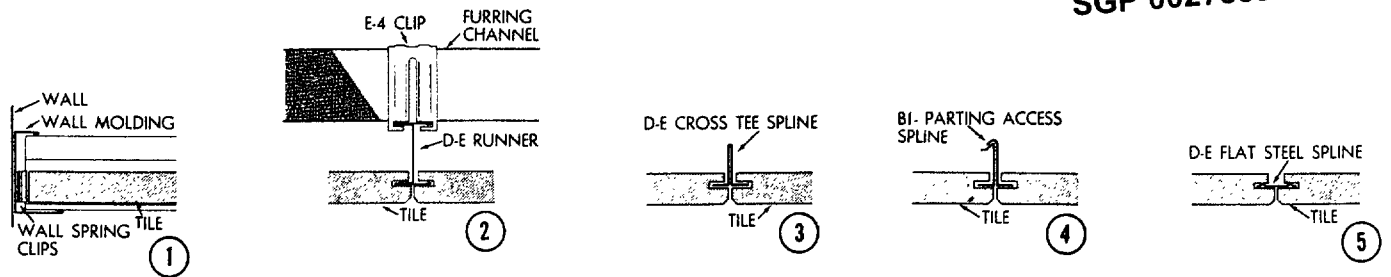
PHYSICAL DATA

LOAD DATA

Spline Number	Dim. "A"	Simple Span	Load Lb. per Lin. Foot
DE-208	.500	24"	4.49
DE-308	.500	36"	1.35
DE-314	.875	36"	6.49
DE-414	.875	48"	2.73

LOAD for 1/360 SPAN DEFLECTION *SEE PAGE 11 FOR ACCESS SPLINES

SGP 0027839

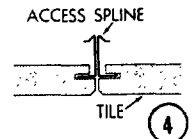
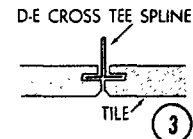
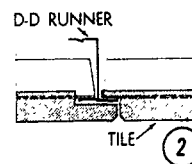
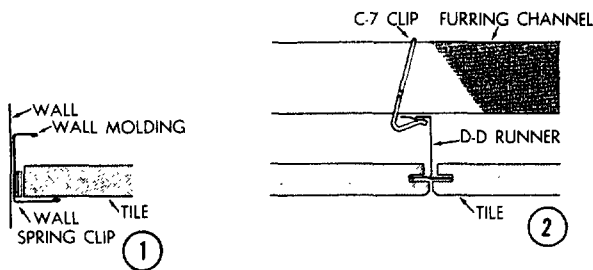
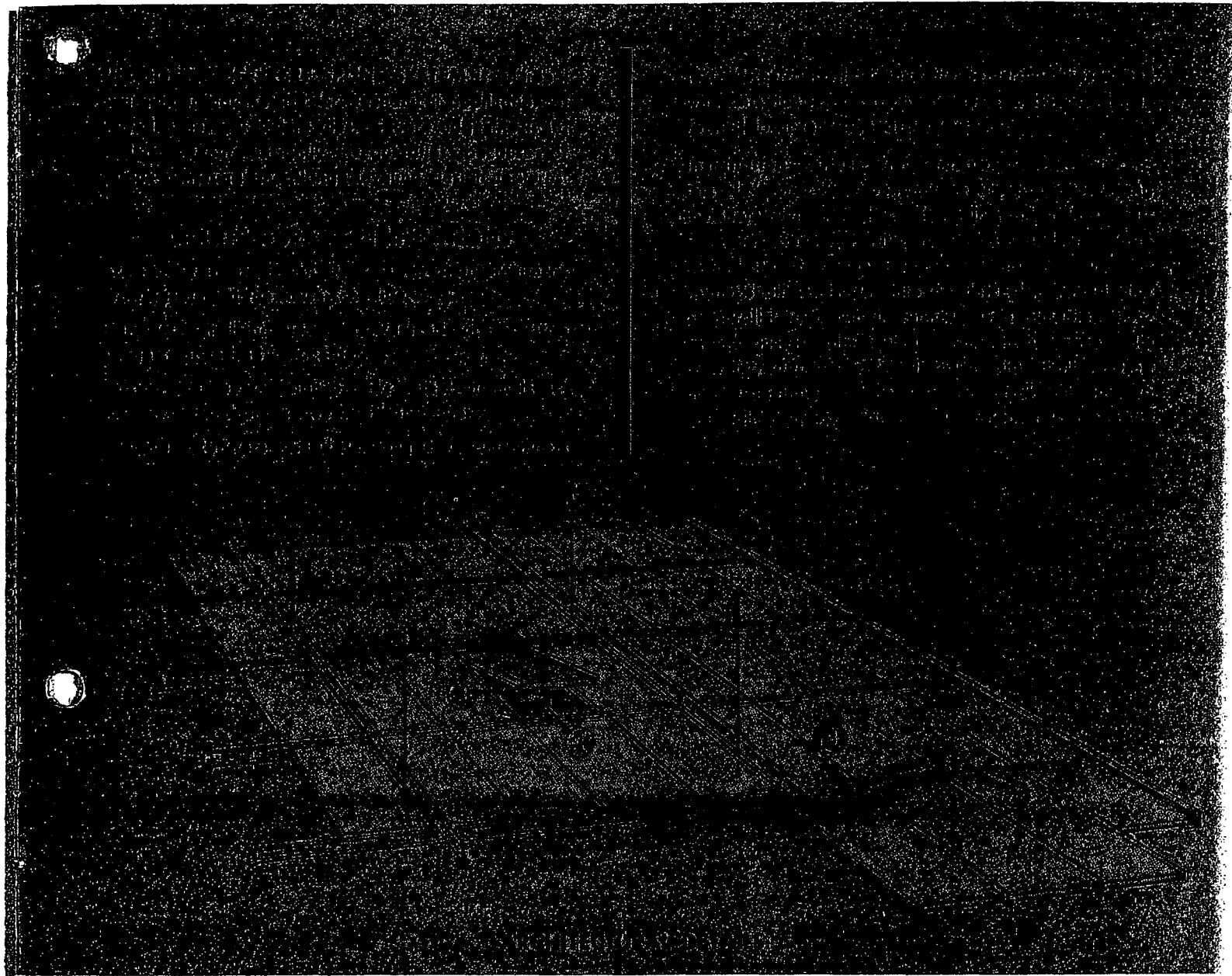


PHYSICAL DATA				LOAD DATA			
	Runner Number	Dim. "A"	Runner Splice	Simple Span			
				4'	5'	6'	7'
	DE-16	1.00	E-1	8.5	4.3	2.5	—
	DE-20	1.25	E-21	13.0	7.0	4.0	2.5
	DE-24	1.50	E-31	19.0	10.5	6.0	3.8
	DE-28	1.75	E-41	—	14.0	8.8	5.5
	DE-32	2.00	E-51	—	18.5	11.5	7.0

	PHYSICAL DATA		LOAD DATA	
	Spine Number	Dim. "A"	Baffle Span	Load Lb. per Lin. Foot
	DE-208	.500	24"	4.49
	DE-308	.500	36"	1.35
	DE-314	.875	36"	6.49
	DE-414	.875	48"	2.73

Concealed "Z"

DONN D-D SYSTEM



SGP 0027840

PHYSICAL DATA

LOAD DATA

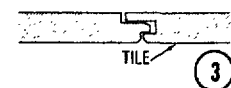
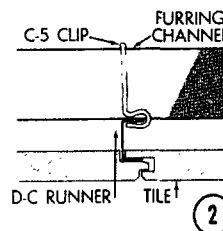
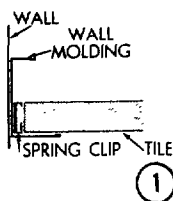
Runner Number	Dim. "A"	Dim. "B"	Runner Splice	Simple Span 4'	Simple Span 6'	Simple Span 8'
DD-12	.81	.75	D-1	3.0	1.8	1.1
DD-21	1.31	.75	D-31	9.0	5.5	3.3
DD-25	1.56	.75	D-41	14.5	7.5	4.8
DD-121	.75	.88	D-1	3.8	2.2	1.2
DD-211	1.31	.88	D-31	10.8	5.0	3.7
DD-251	1.56	.88	D-41	16.0	8.3	5.2

Spline Number	Dim. "A"	Simple Span Span	Simple Span Paired Load
DM-308	.50	3	3.6
DM-314	.875	3	8.5
DM-414	.875	4	4

LOAD for 1/360 SPAN DEFLECTION SEE PAGE 10 FOR CROSS TEE SPLINES

Concealed "T&G"

DONN D-C SYSTEM



SGP 0027841

PHYSICAL DATA

LOAD DATA

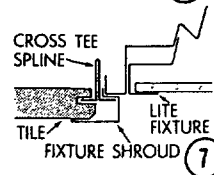
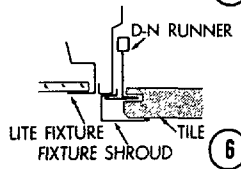
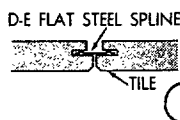
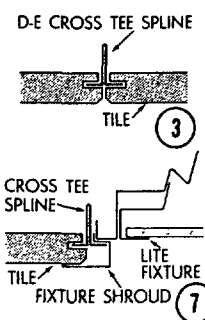
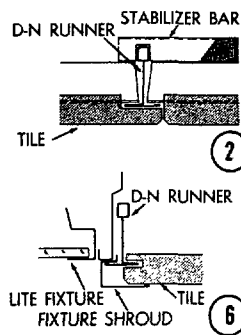
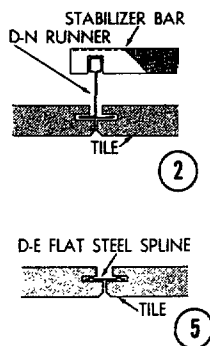
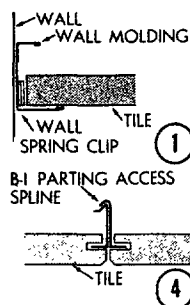
Runner Number	Runner Splice	Single Span 1'-0" s.c.
DC-12	C-3	2.21#
DC-24	C-3	2.21#

LOAD for 1/360 SPAN DEFLECTION

Concealed Tee Grid

DONN D-N SYSTEM

SGP 0027842



PHYSICAL DATA

LOAD DATA

Runner Number	Dim. "A"	Runner Spline	Single Span			
DN-24	1.50	Incl.	15.6	8.2	4.1	2.0
DN-20	1.25	Incl.	15.0	7.5	3.8	—
EXTERIOR TOP SPLINE FOR ADDITIONAL STRENGTH						

LOAD for 1/360 SPAN DEFLECTION

PHYSICAL DATA

LOAD DATA

Spline Number	Dim. "A"	Single Span	Load per Lin. Foot
DE-208	500	24"	4.49
DE-308	500	36"	1.35
DE-314	875	36"	6.49
DE-414	875	48"	2.73

LOAD for 1/360 SPAN DEFLECTION

Metal Pan Tee Bar

DONN D-T SYSTEM

The Donn D-T Metal Pan Tee Bar is a continuous metal bar with a T-shaped cross-section. It is designed to be used in conjunction with the Donn D-T Metal Pan Furring Channel to provide a strong, rigid, and fire-resistant floor system. The bar is available in two standard lengths, 10' and 12', and can be cut to any length required.

ARCHITECTURAL SPECIFICATIONS

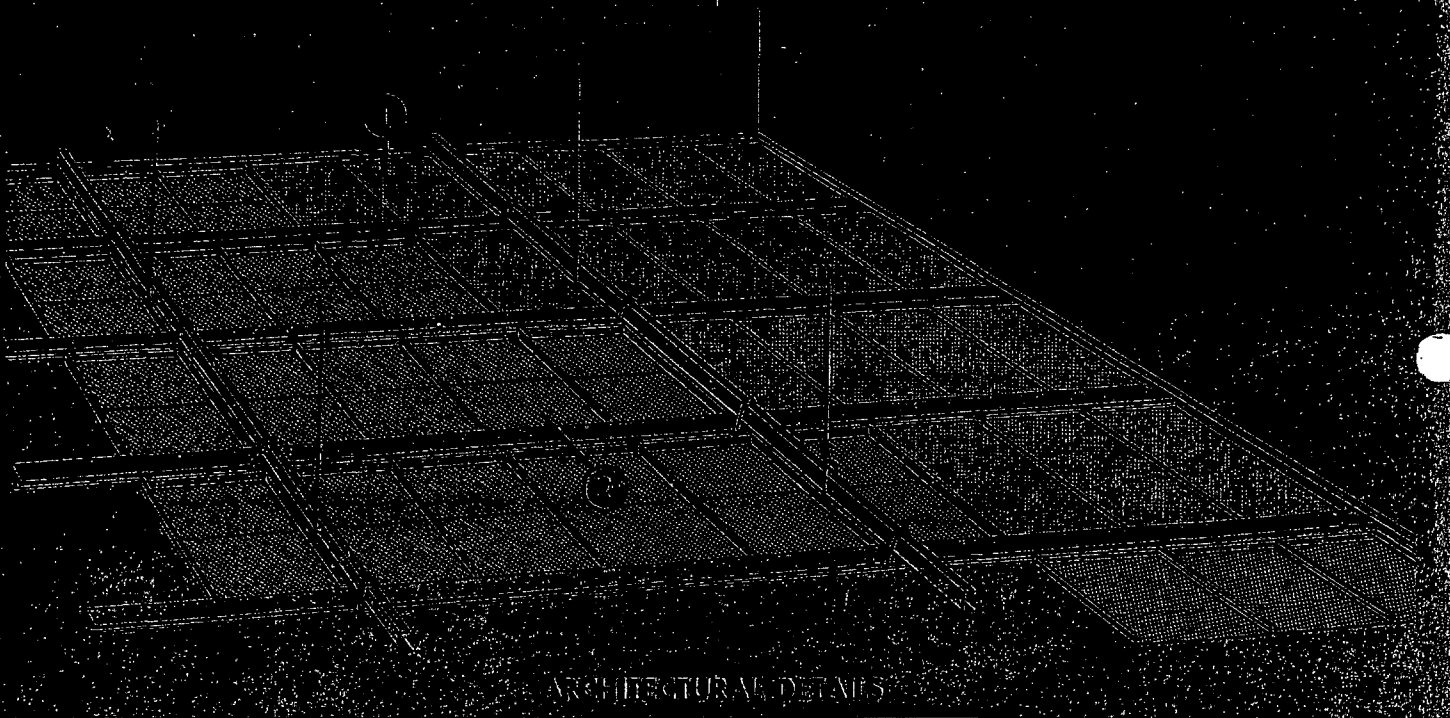
Donn D-T Metal Pan Tee Bar shall be specified as follows:
 1. Material: Steel, minimum yield strength 36,000 psi.
 2. Finish: Galvanized or painted.

Donn D-T Metal Pan Furring Channel shall be specified as follows:
 1. Material: Steel, minimum yield strength 36,000 psi.
 2. Finish: Galvanized or painted.

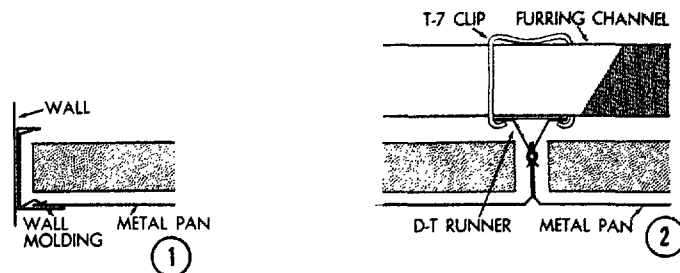
Donn D-T Metal Pan Tee Bar shall be installed as follows:

1. The bar shall be installed in a continuous manner across the entire span of the floor.
 2. The bar shall be supported by the Donn D-T Metal Pan Furring Channel at regular intervals.

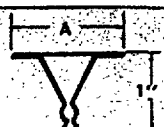
3. The bar shall be secured to the furring channel with T-7 clips.
 4. The clips shall be installed at a maximum spacing of 48" on center.
 5. The clips shall be installed in such a manner as to hold the bar down against the furring channel.



ARCHITECTURAL DETAILS



SGP 0027843

	PHYSICAL DATA		LOAD DATA	
	Runner Number	Dist. "A"	Runner Splice	Simple Span I' B'
	DT-24	1.50	T-21	3.03 4.82
	DT-12	.75	T-1	6.43 3.53

LOAD for 1/360 SPAN DEFLECTION

Ceiling Furring Members

DONN D-A, D-G and D-W SYSTEMS

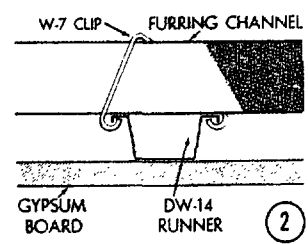
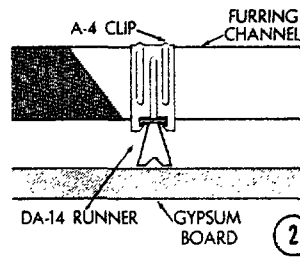
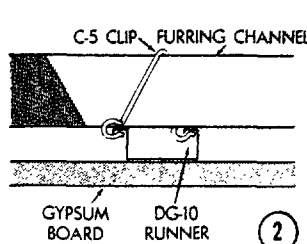
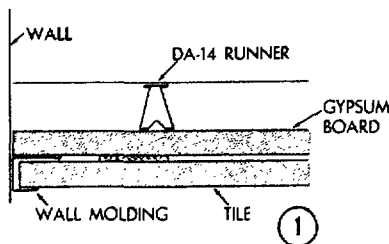
THE DONN® D-A, D-G and D-W SYSTEMS are designed for use in ceiling applications. They are designed to provide a strong, rigid, and durable ceiling system. The D-A system is designed for use in ceiling applications. The D-G system is designed for use in ceiling applications. The D-W system is designed for use in ceiling applications. All three systems are designed to provide a strong, rigid, and durable ceiling system. They are designed to provide a strong, rigid, and durable ceiling system. They are designed to provide a strong, rigid, and durable ceiling system. They are designed to provide a strong, rigid, and durable ceiling system.

These systems are designed for use in ceiling applications. They are designed to provide a strong, rigid, and durable ceiling system. They are designed to provide a strong, rigid, and durable ceiling system. They are designed to provide a strong, rigid, and durable ceiling system. They are designed to provide a strong, rigid, and durable ceiling system. They are designed to provide a strong, rigid, and durable ceiling system. They are designed to provide a strong, rigid, and durable ceiling system. They are designed to provide a strong, rigid, and durable ceiling system.



SGP 0027844

ARCHITECTURAL DETAILS



DG-10			PHYSICAL AND LOAD DATA					
			DA-14			DW-14		
Simple Span	Load per Lin. Foot		Simple Span	Load per Lin. Foot		Simple Span	Load per Lin. Foot	
4	4.0		4	4.5		4	7.5	
5	—		5	3.5		5	4.0	

LOAD for 1/360 SPAN DEFLECTION

Special Components

Technical Data

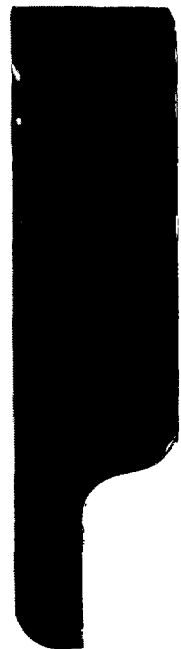
SYSTEM	Concealed Cross Tee Spline	Concealed Access Spline	Bi-parting Access Spline	Flat Steel Spline	Stabilizer Bar	Exposed Cross Tee	Direct Suspend	OPTIONAL CLIPS																								
								1½" Furring Channel												DE-24		Bar Joists				Bar Joists or Wood Joists				Wood Joists		
																				ONLY												
								A-4	B-4	C-5	C-7	E-4	E-9	T-7	W-7	E-60	D-2	E-2	A-12	C-6	C-12	E-18	E-8	E-16	E-32	E-9	A-8	C-10	C-11			
F. R. Exposed Tee Grid Donn D-L System						•	•																									
Exposed Tee Grid Donn D-B System						•	•		•																							
Exposed Modular Pan Donn D-P System						•	•																									
Semi-exposed Modular Pan Donn D-P System	•	•		•	•	•	•																									
One Direction Exposed Tee Donn D-M System	•	•		•	•	•	•																									
One Direction Exposed Tee Donn D-F System	•	•		•					•	•			•			•	•										•	•				
Concealed H & T Donn D-E System	•		•	•						•	•		•		•		•	•	•	•												
Concealed Zee Donn D-D System	•	•	•	•					•	•			•			•	•										•	•				
Concealed T & G Donn D-C System									•	•			•			•	•										•	•				
Concealed Tee Grid Donn D-N System	•	•	•	•	•		•																									
Metal Pan Donn D-T System										•		•			•																	
Ceiling Furring Donn D-A System								•			•		•			•				•						•	•					
Donn D-G System										•							•	•														
Donn D-W System												•																				

SGP 0027845

DONN products, Inc.

Printed in U.S.A.

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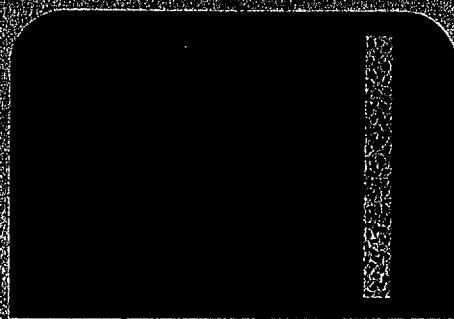


SGP 0027846

A. Fire Ratings

Design
Data
1971-72 EDITION

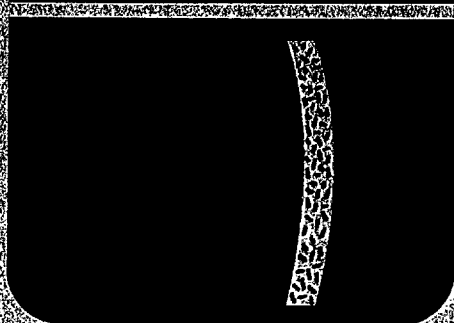
Fire Resistance



FIRE



SOUND



STRUCTURAL

SGP 0027848



GYPSUM ASSOCIATION
201 North Wells Street • Chicago, Illinois 60606

GYPSUM ASSOCIATION
April 1971
POWELL PASTER
GYPSUM FINISHES

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SGP 0027849

Characteristics, properties or performance of materials or systems herein described are based on data obtained under controlled test conditions. The Gypsum Association and the member companies make no warranties or other representations as to their characteristics, properties or performance under any variation from such conditions in actual construction. Test conditions details will be furnished by the Gypsum Association or the appropriate member company on request. In cases where industry practices have changed so that standard descriptions no longer accurately describe products used in tests, the standard descriptions used in this manual are those that are deemed to most closely describe the product. This manual is intended to serve only as a guide. For complete information on systems and component parts used in tests the test report and testing agency should be consulted.

Intended as a convenient, accurate aid to the designer, this manual allows the user to see quickly and easily the essential performance characteristics of a wide range of fire resistant construction assemblies. Comparison of these characteristics enables him to be more accurate in meeting particular design requirements. It also provides accurate data for building officials, fire fighting and insurance personnel.

Assemblies in this book use gypsum products, thus, they provide fire resistant walls and partitions, floor-ceilings, columns, beams and roof decks. They are classified according to use and fire resistance ratings, with walls, partitions and floor-ceilings further classified with sound transmission class (STC) ratings. An additional design criteria has been included in this 1971-72 edition of the Fire Resistance Manual; that is the structural height limitations of nonload-bearing partitions. (For engineering criteria, see page 4.)

The assemblies are divided into the abovementioned categories: walls and partitions, floor-ceilings, columns, beams, and roof decks. They are then listed according to their fire resistance rating starting at one hour and increasing.

All of the assembly categories in the manual are in the Table of Contents. To locate a particular assembly simply look for the category under which it would be listed and turn to the page indicated.

The horizontal black title line at the top of each page indicates the category of the assemblies listed below.

Each of the vertical columns on the page gives specific information about a particular assembly. The first column is the fire rating. For example, all assemblies on page 24 have been given a fire rating of two hours.

The second column lists each assembly's sound classification. Of the six assemblies listed on page 24, three have a sound transmission class (STC) of 50 to 54, and three are rated 45 to 49.

Column three gives the construction type, that is, it defines the components making up that particular assembly. The next column contains the GA (Gypsum Association) code number for identification and reference to each test listed in the manual. When a member company identification letter is found beneath the GA code number, it means that the assembly or one or more of its parts is considered proprietary. Those assemblies which show only the GA number are considered generic. A listing of Gypsum Association members and their code letters is shown on page 100.

The fifth column indicates the thickness of the assembly followed by the limiting heights column which tells the height limitation for nonload-bearing partitions.

The weight of the assembly in pounds per square foot is shown in the next column. The fire test reference column gives code initials for the agency which performed the test as well as an identifying number or date. The agencies which performed the fire tests listed in this manual are identified with code initials as follows:

BMS	Building Materials & Structures (NBS)
FM	Factory Mutual (Research Corp.)
FPL	Forest Products Laboratory
NBS	National Bureau of Standards
PCA	Portland Cement Association
R	Underwriters' Laboratories, Inc.
SFT	Fire Prevention Research Institute
T	Ohio State University
UC	University of California

Test details and results are on file and can be furnished by the Gypsum Association or the appropriate member company on request.

The last column on the page contains a cross sectional sketch of the assembly to show what it looks like.

The first column on page 25 gives a detailed description of each assembly and is self-explanatory. Where mineral fiber is used in a fire test the density is given. If no density is given the fiber is only required for the sound rating. The next column, Sound Test Reference, gives code initials for the agency which performed the test as well as an identifying number. The agencies which performed the sound tests listed in this manual are identified with the code initials as follows:

ACI	Acoustical Consultants, Inc.
BMS	Building Material & Structures (NBS)
CK	Cedar Knolls Acoustical Laboratories
G&H	Geiger and Hamme
KG	Kaiser Acoustical Laboratories
NBS	National Bureau of Standards
NGC	National Gypsum Company Acoustical Laboratories
OR	Ohio Research Corporation
RAL	Riverbank Acoustical Laboratories
USG	United States Gypsum Acoustical Research Center

Test details and results are on file and can be furnished by the Gypsum Association or the appropriate member company on request.

The final eight columns show the Transmission Loss values of the assembly at test frequencies from 125 Hz to 4000 Hz. The white columns list the test frequencies and the colored columns list the Transmission Loss values of the assembly at that frequency.

FIRE TESTS

All fire resistance ratings described in this manual are based on full-scale fire tests conducted in accordance with the requirements of ASTM E 119 and conducted by nationally recognized independent laboratories. These ratings are generally recognized and accepted by building code authorities and fire insurance rating bureaus.

Fire ratings are the result of tests conducted on assemblies made up of specific materials put together in a specific manner.

When designing and building to meet a given fire resistive requirement, caution must be exercised that each component is as specified in the test referred to by number and laboratory, and that the assembly is constructed of materials equal to those fire tested. All fire resistive assemblies should be fire-stopped in accordance with the prevailing building code requirements.

It is important to note that many ratings do not require the finishing of the joints and fasteners although the illustrations of typical assemblies found on pages 12, 13 and 68 show the gypsumboard face joints to be taped and fasteners concealed. Consult the referenced fire test report or the laboratory's published rating list for specific joint and fastener finishing requirements.

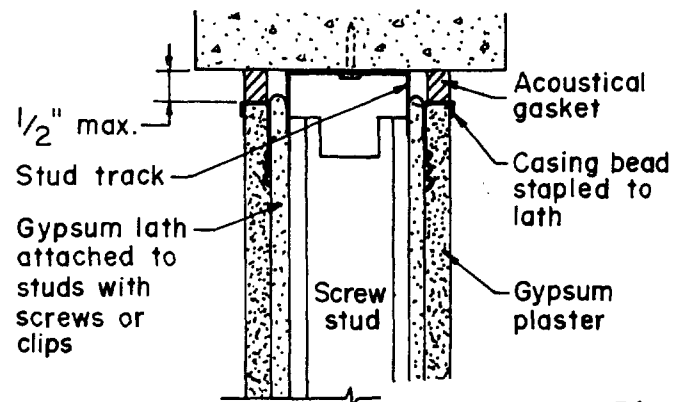
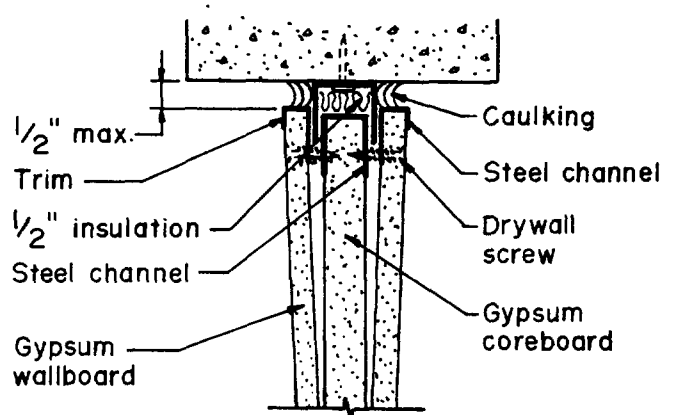
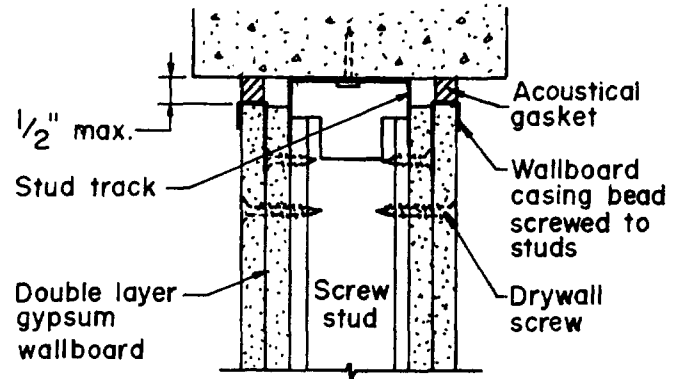
Although each fire rated partition assembly is detailed with only one stud depth, additional tests have shown that stud depths may be increased from those shown to at least 6" and, in certain cases, even greater depth when two separate rows of studs are run parallel for a chase wall and continue to maintain the assigned rating.

In the case of suspended ceilings, the ceiling may be lowered without affecting the fire rating.

PERIMETER RELIEF

Engineering studies and fire tests have been conducted which determine that perimeter relief systems can be used in most nonload-bearing partition systems without reducing the fire resistance classification already established for these assemblies. The tests were

conducted in accordance with ASTM E 119 and utilized the relief system as detailed in the sketches below. Other similar relief systems are available from various manufacturers.



SGP 0027851

INSURANCE ECONOMIES

Although a building may be designed to meet the fire resistance requirements of the local building code, these code requirements may not result in the most economical fire insurance rates. A design which incorporates a higher fire rated system than is required to meet the code may result in premium reduction, helping to offset the increased initial building cost. This is particularly true of other than Type I and II buildings which generally have code requirements resulting in economical insurance rates.

Insurance rating bureaus and fire insurance engineers are ready and willing to advise the means by which these lower insurance rates may be obtained on any structure. The designer is urged to avail himself of such professional advice.

SOUND TESTS

Sound control data is included because gypsum products are recognized for their excellent sound control characteristics and are available at low cost. In addition to fire insurance and building code fire resistance requirements, there is an increasing demand for sound control, especially by mortgage lending institutions and building code authorities.

These assemblies are grouped in range according to their Sound Transmission Class (STC). The higher STC ranges are listed first. All of the sound tests shown have been conducted according to the requirements of ASTM E 90 for vertical assemblies. The designer must adhere to specified materials and construction details for sound rated assemblies, particularly in plaster assemblies since substitution of lightweight aggregates for sand or reduction of sand proportion in plasters may decrease the sound transmission class. Also, sound flanking paths must be eliminated by making the assembly airtight with the entire periphery sealed.

LIMITING HEIGHTS (NONLOAD-BEARING)

Because of the value to the designer, maximum height limitations are given for most nonload-bearing partitions. In instances where no height limit is given for special purpose partitions, such as moveable or shaft wall systems, the manufacturer should be consulted.

Criteria used to evaluate transverse load tests (conducted to determine maximum heights) are five pounds per square foot for both stress and deflection requirements with a deflection limitation of height

divided by 120 for wallboard and high strength gypsum veneer finishes and height divided by 240 for gypsum or metal lath and plaster finishes.

Where a height in excess of that given is required, it may be obtained by using a deeper stud than used in the fire test or by spacing the studs closer together. The table below may be used as a guide for gypsum wallboard and high strength gypsum veneer finishes. As an example, the height limit of partition WP 1340 of 10 feet may be increased to 17 feet 3 inches by changing the stud depth from 1 5/8 inches to 3 5/8 inches.

Allowable Partition Heights Based on Gypsumboard and No. 25 Gage Studs Acting As a Composite Section*

Stud Spacing (in inches)	Facing on Each Side	STUD DEPTH (In Inches)				
		1 5/8	2 1/2	3 1/4	3 5/8	4
		HEIGHT IN FEET AND INCHES				
16	1/2" -one-ply	11'0"	14' 8"	17'10"	19'5"	20'8"
24	1/2" -one-ply	10'0"	13' 5"	16' 0"	17'3"	18'5"
24	1/2" -two-ply	12'4"	15'10"	18' 3"	19'5"	20'8"

* (1) Steel studs comply with A.S.T.M. Specification C 645; steel screws comply with A.S.T.M. Specification C 646 and are spaced in accordance with A.N.S.I. A97.1 Specification for the Application of Gypsum Wallboard.

* (2) Where solid core or double doors are used in partitions built to maximum height, it is recommended that door closers be used or the door frame be reinforced.

A higher degree of performance for some applications may be desirable such as for offices and institutional buildings as compared to industrial buildings. Lower height limits may therefore be warranted for improved performance as related to human response to flexure from impact or to vibration of the partition.

The limiting height shown for partitions for which a company code letter is indicated may take into account other factors; however, the height given does not exceed that based upon the above criteria.

EXPLANATORY NOTES

Fasteners installed on the edges of gypsumboard are placed along the paper bound edges on the long dimension of the board. Fasteners at the end are placed along mill cut ends on the short dimension. Fasteners on the perimeter of the board are on both edges and ends.

Vertically applied boards have the edges parallel to framing members. Horizontally applied boards have the edges at right angles to the framing members. Intermediate vertical framing members are those between the vertical edges or ends of the board.

Mixes of a 100 pound bag of gypsum plaster to two cubic feet of aggregate are shown as 1:2 gypsum-perlite, -vermiculite or -sand. Many fire tests have been conducted to show that the 1:2 gypsum-vermiculite mix may be substituted for the 1:3 mix in all fire ratings. The 1:2 gypsum-perlite mix may be substituted for 1:3 mix in one and two hour ratings only. Perlite and vermiculite may also be interchanged in one and two hour constructions.

The plaster thicknesses shown in the assembly listings are from the face of the lath only, regardless of the base used.

PERFORMANCE OF PLASTER

The designer with a knowledge of the ultimate performance characteristics of lath and plastering systems is able to specify a building plan designed to increase the crack resistance of plaster. In order to assist the designer, the Gypsum Association has prepared a series of recommendations aimed at increasing such accuracy of evaluation.

These recommendations are not intended to be all-inclusive but they reflect the basic design principles and their influence on performance. Familiarity with these principles and the effect of each on over-all performance will lead to a greater degree of integrity in the plaster surface. You will find the recommendations in these Gypsum Association publications:

“Performance of Lath and Plaster”

“Recommended Specifications — Gypsum Plastering”

Job performance is, of course, affected by factors other than those covered in these publications — for example, extreme weather conditions, poor or no ventilation, thermal shock, unusual framing or frame loading, etc. Precautions should be taken to prevent these factors from affecting performance.

Proper plaster membrane fireproofing performance can be achieved by utilizing the recommendations and performance data compiled from the long and extensive laboratory and field experience of the gypsum industry.

SPRAY PLASTER

On metal deck assemblies protected by special gypsum spray plasters, the protective layer follows the deck contour except where otherwise noted. The special spray plasters listed in this manual may be prepared by manufacturers other than those listed as members of the Gypsum Association.

ABBREVIATIONS

The following abbreviations are used in this book:

C&P	Carpet and Pad
cps	cycles per second
dB	decibels
est	estimated
ft	foot
ga	gage
Hz	Hertz (cycles per second)
hr	hour
IIC	impact insulation class
INR	impact noise rating
in	inch
ISO	International Organization for Standardization
lab	laboratory
lb	pound
(LB)	load-bearing (fire-tested under load)
Mfr	Manufacturer
N/A	not available or not applicable
(NLB)	nonload-bearing
o.c.	on center
pcf	pounds per cubic foot
psf	pounds per square foot
sq	square
STC	sound transmission class
STL	sound transmission loss
TL	transmission loss

SGP 0027853

THE FIRE RESISTANT PROPERTIES OF GYPSUM

Gypsum, the most commonly used fire resistive material, is well known for its light weight, durability, excellent sound control characteristics, and economy. It is mined or quarried in many locations throughout the nation and other parts of the world.

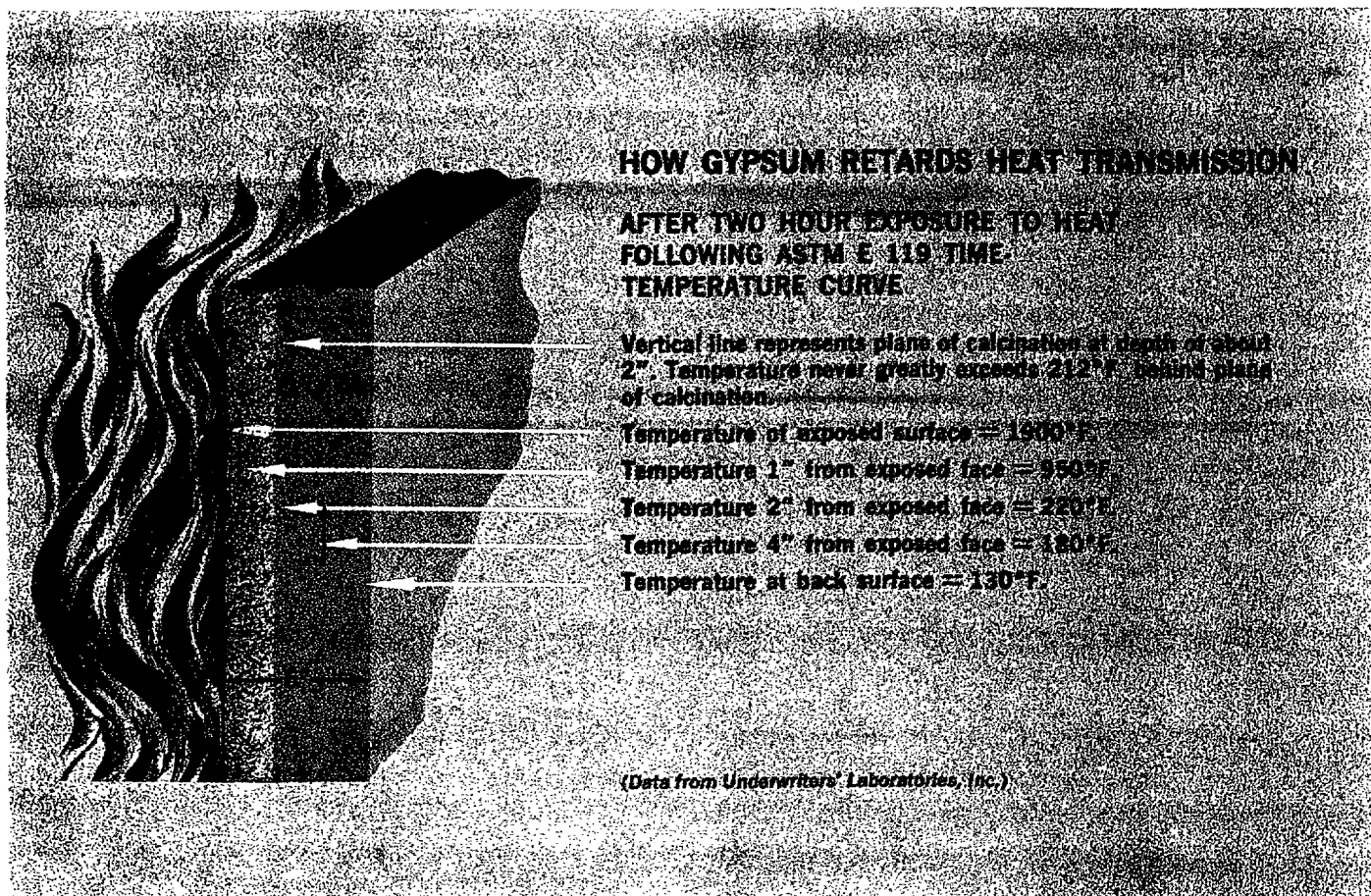
Calcined gypsum is the base material from which most finished gypsum products are made. It has a great affinity for water in this state and when water is added to it the calcined gypsum returns quickly to its original chemical composition becoming rock hard through the process of "setting".

The combined water in gypsum is what makes it so effective as a fire barrier, because when gypsum is exposed to fire, water is slowly released as steam, effectively retarding heat transmission. Thus, gypsum has the inherent ability to repeat the unique calcining process. It can, in a sense, be compared to what happens when a blowtorch is turned on a block of ice. Although the ice is being melted one can hold his

hand on the opposite side without being burned. Even though the ice gets very thin it effectively blocks the transfer of the intense heat and one's hand would not be burned until the ice was melted through.

Not only does gypsum by its nature have a great ability to retard the transmission of intense heat, it has the added characteristic of being noncombustible.

When gypsum-protected structural members are exposed to a fire the chemically combined water being released as steam acts as a fire barrier until the slow process of calcination is completed. The temperature directly behind the plane of calcination is only slightly higher than that of boiling water (212°F.), and that is considerably below the temperature at which steel begins to lose its strength or lumber ignites. Once the gypsum is completely calcined, the white chalky material still remains as an insulation from direct contact with the flames.



SGP 0027854

REQUIREMENTS FOR FIRE PROTECTION

The construction of totally fireproof structures is just not practical, much as it is to be desired. Consequently, the designer must strive within his design concept for a workable combination of the fire protection measures that are required by law (building codes) and others aimed at making the building more economical in terms of fire insurance costs. Building codes in addition to their basic interest of safeguarding life are concerned with:

1. Noncombustibility of materials
2. Fire resistance
3. Flame spread

The fire insurance industry is concerned with all of these as well as fire damage to the structure itself.

NONCOMBUSTIBILITY

Most building codes require the use of noncombustible construction materials in Type I and II buildings and, to a limited degree, in many less fire resistive structures.

Several definitions of noncombustibility are in use today. The more widely used definitions, such as that found in the American Insurance Association's National Building Code, classify gypsum products such as concrete, tile, plank, plaster, lath, backerboard, coreboard, wallboard, and sheathing as noncombustible.

This noncombustibility definition, also promulgated by the Gypsum Association, is as follows:

"Noncombustible as applied to a building construction material means a material which, in the form in which it is used, falls in one of the following groups a. through c. It does not apply to surface finish materials nor to the determination of whether a material is noncombustible from the standpoint of clearances to heating appliances, flues or other sources of high temperature. No material shall be classed as noncombustible which is subject to increase in combustibility or flame spread rating beyond the limits herein established, through the effects of age, moisture or other atmospheric condition. Flame spread rating as used herein refers to ratings obtained according to the Standard Test Method for Fire Hazard Classification of Building Materials, ASTM E 84.

"a. Materials no part of which will ignite when subjected to fire. Any material which liberates flammable gas when heated to any temperature up to 1380° F for five minutes shall not be considered noncombustible within the meaning of this paragraph.

"b. Materials having a structural base of noncombustible material, as defined in a. with a surfacing not over 1/8-inch thick which has a flame spread rating not higher than 50.

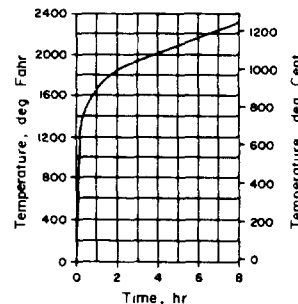
"c. Materials in the form and thickness used, other than as described in a. or b., having a flame spread not higher than 25 without evidence of continued progressive combustion and of such composition that surfaces that would be exposed by cutting through the material in any way would not have a flame spread rating higher than 25 without evidence of continued progressive combustion."

FIRE RESISTANCE TESTS

As mentioned earlier, there are a number of nationally recognized laboratories capable of running full scale fire tests to establish fire resistance ratings conducted according to procedures outlined in ASTM Standard E 119, "Fire Test of Building Construction and Materials." The conditions for tests are thoroughly detailed and the time of failure or end of the test is the time at which point there is excess heat transmission, passage of flame or load failure.

Comprehensive research by fire protection engineers has determined the average combustible content to be expected for a given occupancy; also the time required for the contents to be consumed by fire and the resulting temperature. Thus, the average fire load may be predicted for a given occupancy, and fire resistance ratings are assigned accordingly in building codes and similar regulations.

In the ASTM Standard E 119 fire tests, various wall, ceiling, column and beam assemblies are exposed in a furnace which reaches the following average temperatures at the time stated (the standard time-temperature curve):



All of the walls and partitions tested must be at least 100 sq. ft. with no side dimension less than nine ft. Temperatures are taken at a minimum of nine points on the unexposed surface of the assembly. For failure the average of these nine readings is used unless one of the thermocouples has risen 30 percent or more above the average limiting temperature (which is judged failure of the assembly).

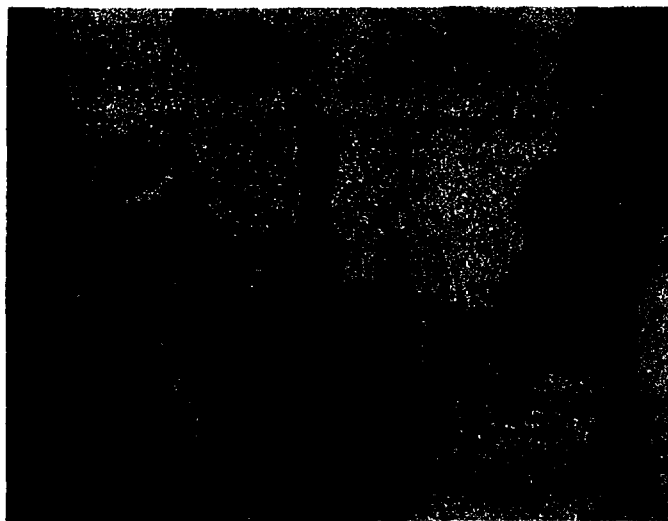
When testing, both load-bearing walls and partitions are loaded to simulate the stress of actual construction. They must bear this load during the test. After cooling, and within 72 hours of the test, they must bear twice this load.

REQUIREMENTS FOR FIRE PROTECTION

Walls must also stop flame or hot gases capable of igniting cotton waste. The average temperature of the unexposed surface cannot increase more than 250° F above ambient. It is also required that a duplicate of the assembly be fire tested for half the specified resistance period, but no longer than one hour, after which it must withstand the impact, erosion and cooling effect of water under high pressure from a fire hose. It must effectively block the water from the hose.

The unexposed surface of an assembly refers to the surface away from the fire during a test. The exposed surface refers to the surface facing the fire.

Floor-ceiling assemblies tested have to be a minimum of 180 sq. ft. with their shortest dimension at least 12 feet. Thermocouples are attached the same as for wall and partition tests. The assemblies must sustain a load throughout the test and not allow either flame or hot gases to pass through. The unexposed surface may not go more than an average of 250° F above the initial temperature or any one thermocouple 30% above the average.



Beams have loads applied to develop working stresses commonly used in building design and the test is a success if the member supports the load in the heat of the furnace for the prescribed period. Columns are usually tested under a temperature limit criteria.

The temperature of the steel is measured by at least 4 thermocouples at each of four sections and it is a

successful test if the temperature average of any section does not exceed 1000° F, and no individual point goes above 1200° F.

Roof decks are tested in the same way as floor-ceilings.

FLAME SPREAD RATINGS

Flame spread ratings are intended as a guide in the selection and use of finishing materials and are obtained by measuring the extent and rapidity with which flames spread over their surfaces. The test generally used to establish a material's flame spread characteristics is defined by ASTM Specification E 84, better known as the Tunnel Test. This test measures relative flame spread, fuel contribution and the amount of smoke issuing from the tested material.

In cases where the hazard to life is high, as in schools, public assembly rooms, corridors, exitways and the like, building codes may require the use of interior finish materials with a flame spread rating of not more than 25.

ASTM has set up a method of numerical classification to permit comparison of a given material's flame spread performance with that of another. Here are some of the more commonly used gypsum materials with their representative flame spread ratings, as tested according to ASTM Specification E84, and compared with asbestos cement board and red oak as specified in the test procedures.

Asbestos—Cement Board	0
Gypsum Plaster	0
Gypsum Lath	10
Gypsum Wallboard	10-15
Gypsum Sheathing	15-20
Gypsum Formboard	15-20
Red Oak	100

FIRE-STOPPING

The fire-stopping requirements for partition walls usually require that the interiors of walls contain horizontally attached members that block the vertical open space between framing members. This eliminates the chimney draft effect within stud spaces that could contribute to the spread of fire from one protected area to another.

SGP 0027856

IMPACT NOISE TESTS

In a building, impact noise is caused by footsteps, moving furniture, or other similar sources. Because of the complex nature of impact noise, there is no "official" impact noise test method in this country. The test method recommended by the Federal Housing Authority and used by the National Bureau of Standards is the most widely used method in this country. This test method is based on and is very similar to the International Organization for Standardization test method, ISO/R140-1960 (E), "Field and Laboratory Measurements of Airborne and Impact Sound Transmission."

A single number is also preferred for evaluating the effectiveness of floor-ceiling assemblies to resist impact noise. The single number rating method recommended by the FHA (HUD TS-24 "A Guide to Airborne, Impact, and Structure Borne Noise Control in Multi-family Dwelling") is the Impact Insulation Class (IIC). It replaces the older Impact Noise Rating (INR).

To determine the IIC of a floor, a standard ISO impact machine with steel hammers raps on a test floor assembly installed in an opening above a special receiving room. Microphones in the receiving room record the average sound pressure level produced by the tapping machine at $\frac{1}{3}$ octave frequency bands between 100 and 3150 Hz or cps. These levels are then normalized to a standard room absorption and plotted.

The IIC is determined by comparing the normalized impact sound pressure levels at the 16 test frequencies

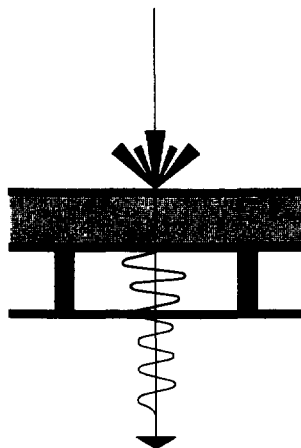
with a transparent overlay on which the IIC reference contour is drawn. The reference contour has a flat portion from 100 to 315 Hz; a middle line segment decreasing 5 dB in the interval 315 to 1000 Hz; followed by a high frequency line segment decreasing 15 dB in the interval 1000 to 3150 Hz. The IIC reference contour is shifted vertically relative to the test curve until some of the measured impact levels are above those of the IIC contour and the following conditions are fulfilled:

1. The noise level at any test frequency cannot be greater than 8 dB above the reference contour.
2. The sum of the differences above the reference contour curve and the curve of the normalized impact noise levels cannot be greater than 32 dB.

The IIC for the specimen is the difference between 110 and the value on the normalized impact noise level scale (i.e. ordinate scale) at 500 Hz of the lowest contour for which the above conditions are fulfilled.

Generally, the IIC is about 51 points higher (algebraic addition) than the INR (e.g. $-3 \text{ INR} = +48 \text{ IIC}$). However, an "across the board" addition to the INR of 51 points will not necessarily be accurate as the spread could actually vary as much as ± 2 points on the IIC scale.

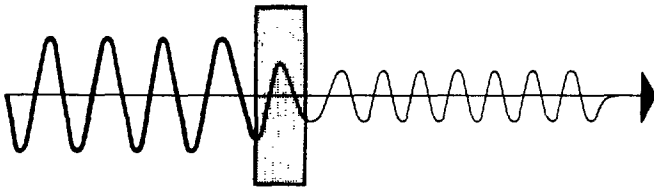
It is generally acknowledged that the addition of a pad and carpeting will add greatly to the impact noise resistance of virtually any floor/ceiling assembly. For example: FC 5115 shows an IIC of 47. The addition of 44 oz. wool carpet and 40 oz. all hair pad will raise the IIC to 74.



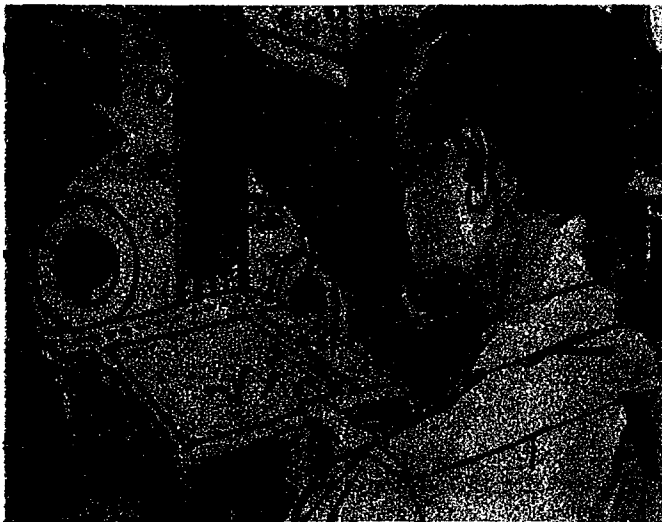
SGP 0027857

SOUND TRANSMISSION LOSS TESTS

ASTM Standard E 90-70 "Recommended Practice for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions" outlines a procedure for measuring the sound transmission loss which is the difference between the sound energy in a source room and a receiving room when the two rooms are separated by the assembly being tested.



The sound transmission loss is measured at $\frac{1}{3}$ octave test frequencies—125, 160, 200, 250, 315, 400, 500, 630, 800, 1000, 1250, 1600, 2000, 2500, 3150, 4000 Hz (Hertz or cycles per second)—and the sound transmission loss curve is plotted.



In reporting the effectiveness of an assembly in resisting transmission of airborne sound, whether it be wall, partition or floor-ceiling, a single number rating is preferred. This rating is the STC or sound trans-

mission class and it is obtained from a sound transmission loss curve. This manual uses a range of number ratings in order to make the comparison of various assemblies more significant.

ASTM Designation E 413-70T "Determination of the Sound Transmission Class," is appended to ASTM E 90-70. Using this method a standard curve is fitted over the sound transmission loss curve plotted on $\frac{1}{3}$ octave paper and the STC is read where the standard curve crosses the 500 Hz coordinate.

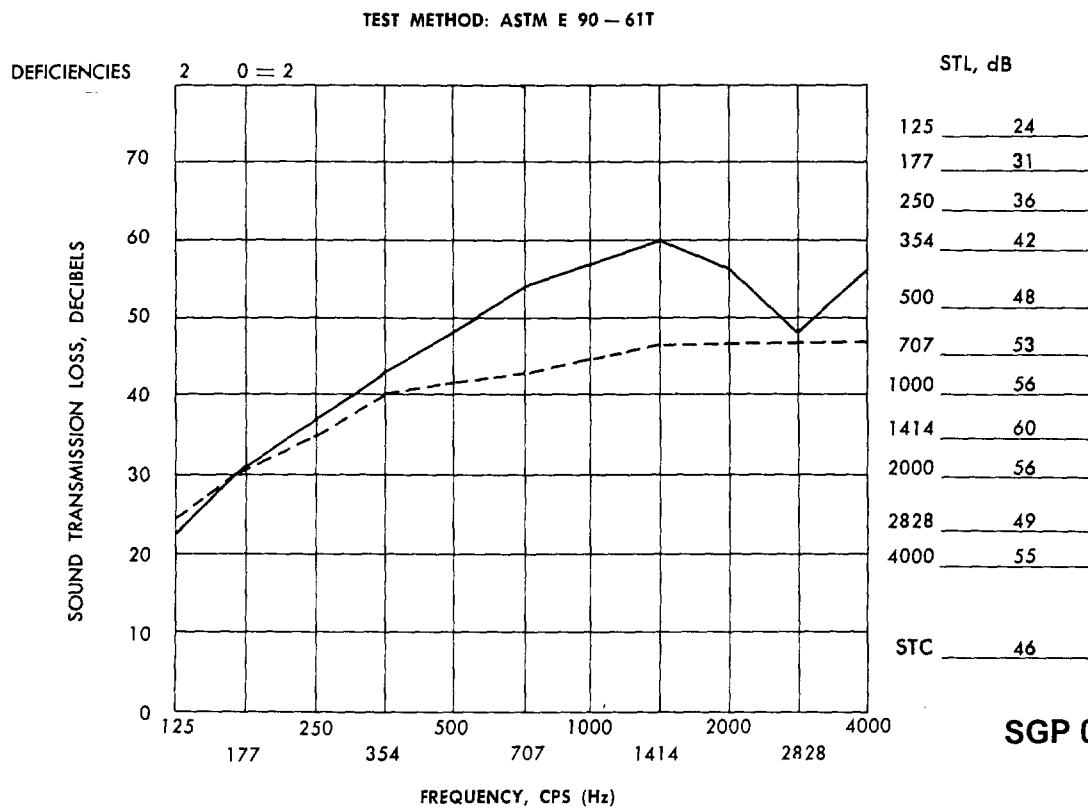
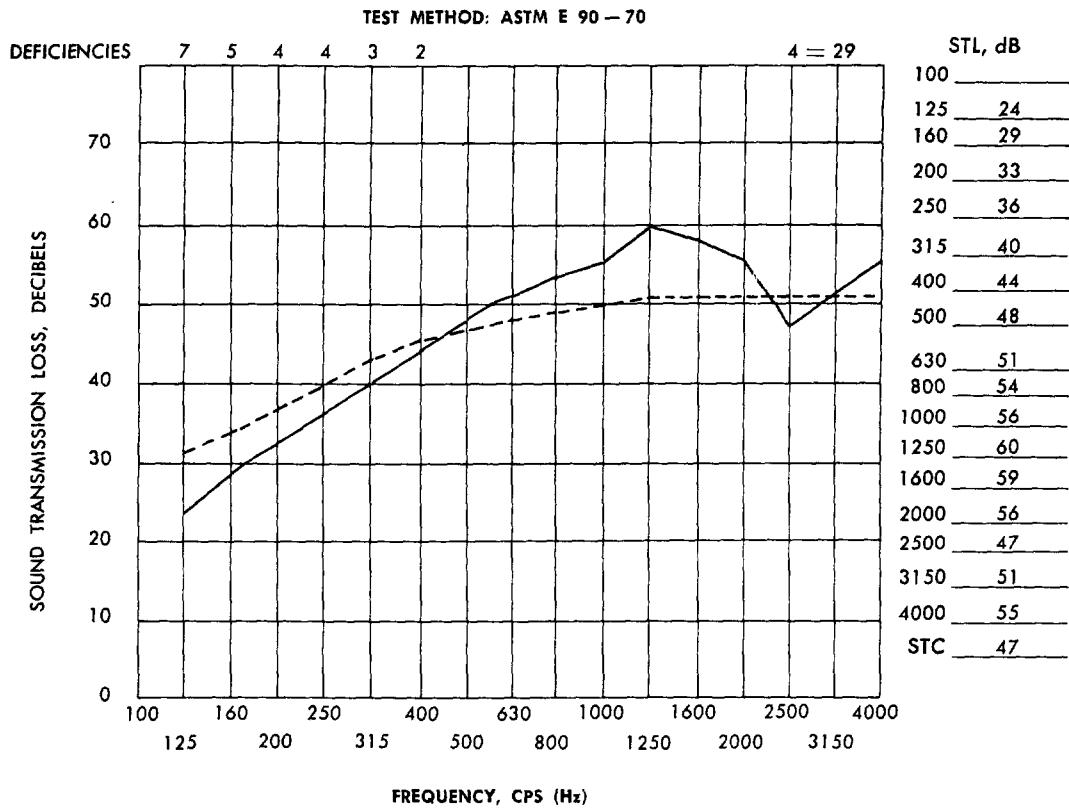
The standard curve has a flat portion from 4000 Hz to 1250 Hz, it drops 5 dB between 1250 Hz and 400 Hz, then it drops 15 dB between 400 Hz and 125 Hz. In fitting the standard to the measured curve, the following requirements must be met:

1. The STL curve may dip only a maximum of 8 dB below the standard curve at any test frequency.
2. The sum of the differences at the test frequencies between the standard curve and the point on the STL curve below it shall not be greater than 32.

Most of the STC values in this manual, however, were derived according to slightly different standards prevailing before 1970. For instance, ASTM E 90-61T, the previous sound test procedure, called for measurements at $\frac{1}{2}$ octave frequencies, and the rules for fitting the standard curve were different. The STC for either method will generally fall in the same range, as illustrated by the graphs on page 11.

The smallest dimension of the assembly tested should be at least eight feet, and the recommended minimum volume for each of the sound-source and receiving rooms is 2900 cubic feet. The assembly is constructed between these rooms which are so arranged that the only significant sound transmission is through the test specimen.

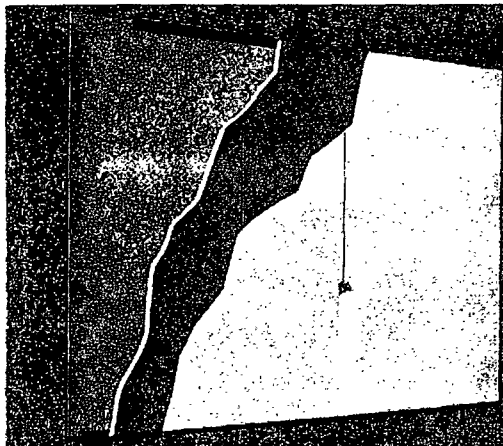
The source room contains one or more sound sources, a diffusing means such as a rotating reflector, and microphones located to sample adequately the sound field in the space. The receiving room has only the diffusing means and a microphone. The sound measurements in both rooms are made according to procedures outlined in ASTM E 90-70.



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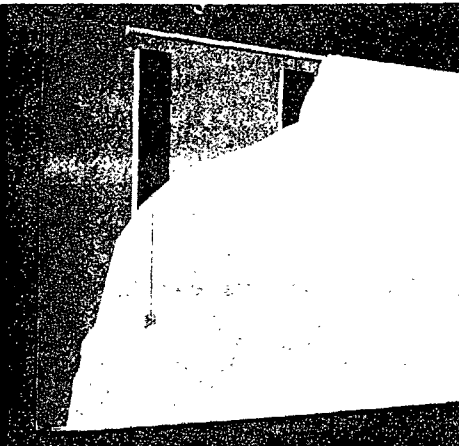
PARTITIONS

GYPSUM WALLBOARD



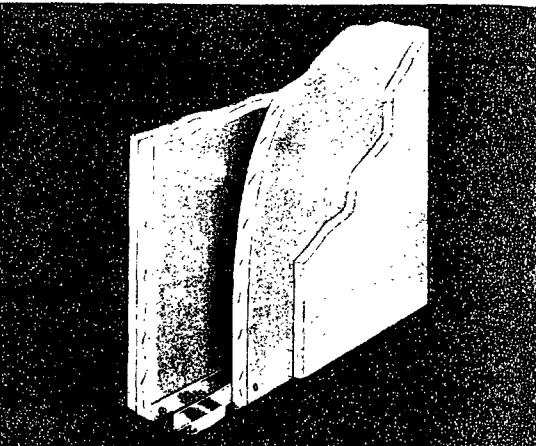
SOLID GYPSUM WALLBOARD

Gypsum wallboard face panels laminated to gypsum wallboard core panels — non-load bearing.



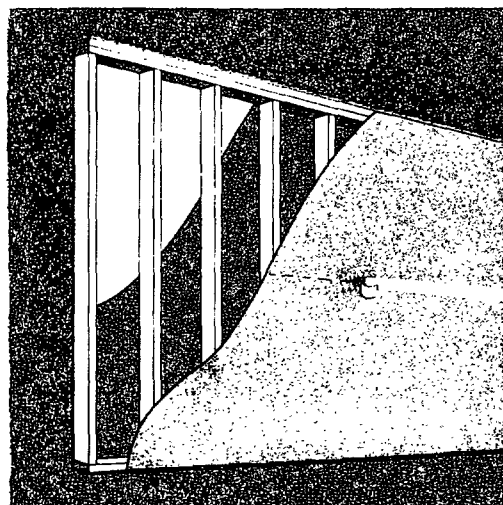
SEMI-SOLID GYPSUM WALLBOARD

Gypsum wallboard face panels laminated to narrow gypsum ribs, single or multi-layer each side — non-load bearing.



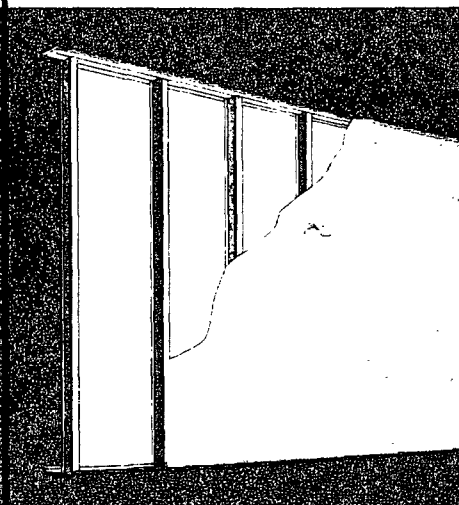
DOUBLE SOLID GYPSUM WALLBOARD

Gypsum wallboard face panels laminated to gypsum core panels — non-load bearing.



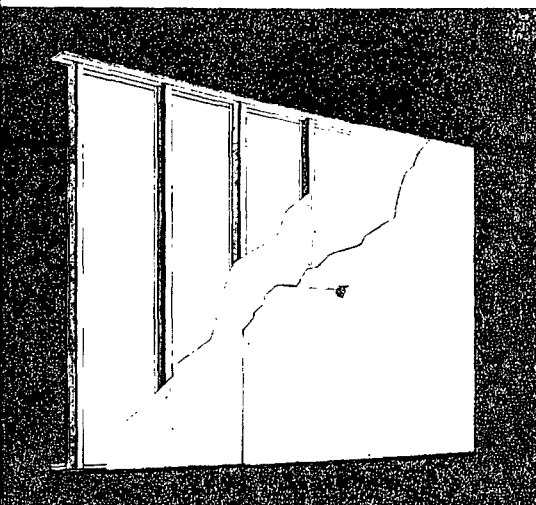
GYPSUM WALLBOARD ON WOOD STUDS

Single layer each side — load or non-load bearing. Partitions over 8 ft. high may require fire blocking.



GYPSUM WALLBOARD ON METAL STUDS

Single layer attached to non-load bearing steel studs, or to load-bearing 16 ga. studs.

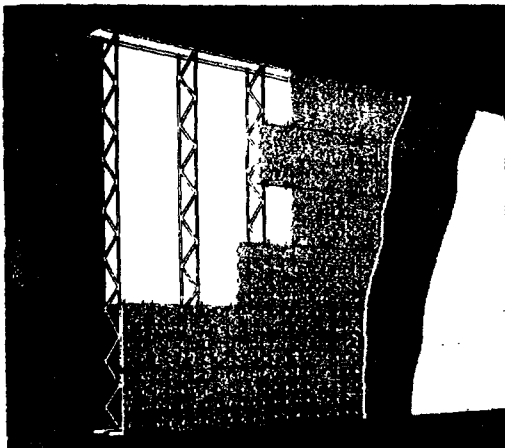


DOUBLE LAYER GYPSUM WALLBOARD

2 ply one or both sides of wood or metal studs (metal studs shown) — load or non-load bearing.

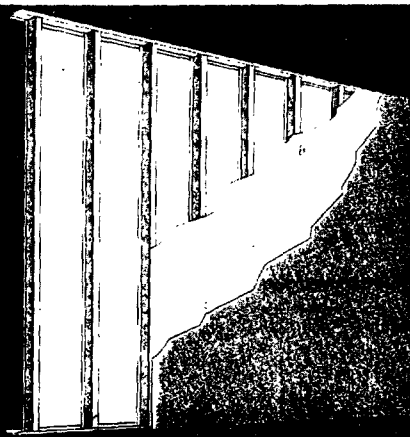
PARTITIONS

LATH AND PLASTER



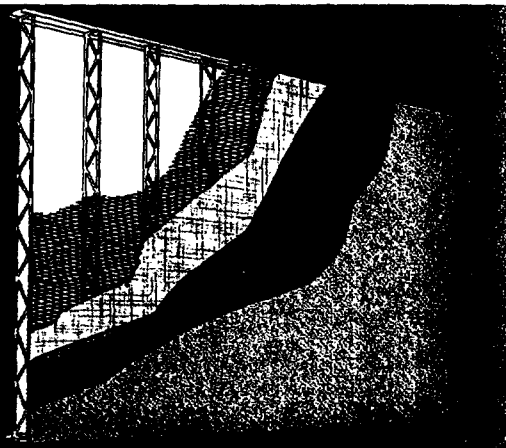
GYPSUM LATH AND PLASTER

Gypsum lath clip attached to open web steel studs—non-load bearing.



VENEER PLASTER OVER GYPSUM BASE

Single or double layer gypsum base on wood or metal studs (single on metal studs shown) — non-load bearing.



METAL LATH AND PLASTER ON WOOD OR METAL STUDS

Metal lath attached to open web steel studs — load or non-load bearing.



LATH AND PLASTER ON WOOD STUDS

Gypsum plaster on metal or gypsum lath attached to wood studs (perforated gypsum lath shown) — load or non-load bearing.



SOLID GYPSUM LATH AND PLASTER WITH 1/2 INCH OR 1 INCH LATH

2 to 2 1/2 inches finished thickness — non-load bearing.



SOLID METAL LATH AND PLASTER WITH STUDS OR STUDLESS

2 to 2 1/2 inches finished thickness — non-load bearing.

PARTY WALLS AND INTERIOR PARTITIONS, NONCOMBUSTIBLE

Sound Rating STC		GA & Company Codes	Thick- ness	Limiting Height	Weight psf	Fire Test Ref.
55 to 59		WP 1010 (g, k)	4 1/4"	13'-10"	7	Based on T-3854
		WP 1015	4 1/4"	13'-10"	7	Based on T-3362
50 to 54		WP 1020	5 1/8"	17'-3"	7	Based on FM WP-51-1
		WP 1032 (k)	4"	13'-5"	6	T-4848
		WP 1040	3 1/8"	10'-10"	7	UC 12/28/65
		WP 1050 (g, k)	4"	13'-10"	7	R 2717- 53, 54 Design 32-1

DETAILED DESCRIPTION	Sound Test Ref.	TL Values at Test Frequencies From 125 Hz to 4000 Hz			
Base layer 1/4" special gypsum wallboard applied parallel to each side of 2 1/2" metal studs 24" o.c. with 1" type S drywall screws 12" o.c. Face layer 5/8" type X gypsum wallboard or veneer base applied on each side parallel to studs with 1 3/8" long type S drywall screws 24" o.c. to studs and 12" o.c. to top and bottom runners. Stagger joints 24" o.c. each layer and side. Sound tested using 2" mineral fiber friction fit in stud space. (NLB)	G & H BW-18 FT	125 500 2000	175 700 2800	250 1000 4000	350 1400
Base layer 1/4" gypsum wallboard applied parallel to each side of 2 1/2" metal studs 24" o.c. with 7/8" type S drywall screws 12" o.c. Face layer 5/8" type X gypsum wallboard or veneer base applied on each side parallel to studs with 1 5/16" type S drywall screws 12" o.c. Stagger joints 24" o.c. each layer and side. Sound tested using 1 1/2" mineral fiber in stud space. (NLB)	CK 684-14	125 315 800 2000	160 400 1000 2500	200 500 1250 3150	250 630 1600 4000
One layer 1/2" type X gypsum wallboard or veneer base applied parallel to one side of 3 5/8" metal studs 24" o.c. with 1" type S drywall screws 8" o.c. 1 1/2" mineral fiber 3.0 pcf stapled to back in stud space with 5/16" long No. 11 staples placed at random. Two layers 1/2" type X gypsum wallboard or veneer base applied on other side parallel to studs with 1" type S drywall screws 12" o.c. in base layer and 1 1/2" type S drywall screws in face layer 12" o.c. Stagger joints 24" o.c. each layer and side. (NLB)	NGC 2253	125 315 800 2000	160 400 1000 2500	200 500 1250 3150	250 630 1600 4000
One layer 1/2" type X gypsum wallboard or veneer base applied parallel to one side of 2 1/2" metal studs 24" o.c. with 1" type S drywall screws 16" o.c. Two layers 1/2" regular gypsum wallboard or veneer base applied parallel to studs on other side with 1" type S drywall screws to base layer and 1 5/8" type S drywall screws 12" o.c. to face layer. Stagger joints 24" o.c. each layer and side. Sound tested using 2" mineral fiber friction fit in stud space. (NLB)	OR 66-6	125 500 2000	175 700 2800	250 1000 4000	350 1400
Base layer 1/4" gypsum wallboard applied parallel to each side of 1 5/8" metal studs with 1" type S drywall screws 27" o.c. to edges and 36" o.c. to intermediate studs. Face layer 1/2" type X gypsum wallboard or veneer base applied on each side parallel to studs with 1 5/8" type S drywall screws 12" o.c. Stagger joints 24" o.c. each layer and side. Sound tested using 1 1/2" mineral fiber in stud space. (NLB)	ACI 7115-2022a	125 500 2000	175 700 2800	250 1000 4000	350 1400
Base layer 1/4" special gypsum wallboard applied parallel to each side of 2 1/2" metal studs 24" o.c. with 1" type S drywall screws 12" o.c. Face layer 1/2" type X gypsum wallboard, veneer base or vinyl faced wallboard applied on each side parallel to studs with 1 3/8" type S drywall screws in top and bottom runners 8" o.c. Apply 3/4" beads of laminating compound 12" o.c. to full field of face layers. Stagger joints 24" o.c. each layer and side. Sound tested using 2" mineral fiber friction fit in stud space. (NLB)	G & H BW-17 FT	125 500 2000	175 700 2800	250 1000 4000	350 1400

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PARTY WALLS AND INTERIOR PARTITIONS, NONCOMBUSTIBLE

Sound Rating STC		GA & Company Codes	Thick- ness	Limiting Height	Weight psf	Fire Test Ref.
50 to 54		WP 1051	4"	13'-10"	7	FM WP 152-1
		WP 1060	3 $\frac{5}{8}$ "	12'-4"	10-12	UC 9/21/64
45 to 49		WP 1070	3 $\frac{1}{2}$ "	13'-5"	5	FM WP 51-1
		WP 1080	5 $\frac{1}{2}$ "	17'-3"	8	T-3240
		WP 1090	3 $\frac{1}{8}$ "	10'-10"	7-8	UC 12/28/65
		WP 1100	3 $\frac{3}{8}$ "	10'-4"	7	R1319 71, 72 Design 23-1
		WP 1110	3 $\frac{5}{8}$ "	12'-4"	10-12	UC 9/21/64

DETAILED DESCRIPTION	Sound Test Ref.	TL Values at Test Frequencies From 125 Hz to 4000 Hz			
Base layer 1/4" regular gypsum wallboard applied parallel to each side of 2 1/2" metal studs 24" o.c. with 1" type S drywall screws 12" o.c. Face layer 1/2" type X gypsum wallboard or veneer base applied on each side parallel to studs with 1 5/8" type S drywall screws in top and bottom runners 8" o.c. Apply 1/4" beads of laminating compound 2" o.c. to full field of face layers. Stagger joints 24" o.c. each layer and side. Sound tested using 2" mineral fiber friction fit in stud space. (NLB)	Based on NGC 2318	125 315 800 2000	160 400 1000 2500	200 500 1250 3150	250 630 1600 4000
Base layer 1/2" regular gypsum wallboard or veneer base applied parallel to each side of 1 5/8" metal studs 24" o.c. with 1" type S drywall screws 12" o.c. Face layer 1/2" regular gypsum wallboard or veneer base applied on each side parallel to studs with 1 5/8" type S drywall screws 12" o.c. Stagger joints 24" o.c. each layer and side. Sound tested using 1 1/2" mineral fiber friction fit in stud space. (NLB)	CK 654-40	125 315 800 2000	160 400 1000 2500	200 500 1250 3150	250 630 1600 4000
One layer 1/2" type X gypsum wallboard or veneer base applied parallel to each side of 2 1/2" metal studs 24" o.c. with 1" type S drywall screws 8" o.c. to edges and 12" o.c. to intermediate studs. 2 1/2" mineral fiber 2.5 pcf friction fit in stud space. Stagger joints 24" o.c. each side. (NLB)	RAL TL 69-42	125 315 800 2000	160 400 1000 2500	200 500 1250 3150	250 630 1600 4000
One layer 5/8" type X gypsum wallboard or veneer base applied parallel to each side of 3 5/8" metal studs 24" o.c. with 1" type S drywall screws 8" o.c. to edges and vertical joints and 12" o.c. to intermediate studs. Face layer 5/8" type X gypsum wallboard or veneer base applied on one side parallel to studs with 1 5/8" type S drywall screws 8" o.c. to edges and sides and 12" o.c. to intermediate studs. Apply 1/2" beads of laminating compound 2" o.c. to full field of face layer. Stagger joints 24" o.c. each layer and side. (NLB)	RAL TL 64-245	125 500 2000	175 700 2800	250 1000 4000	350 1400
Base layer 1/4" gypsum wallboard applied parallel to each side of 1 5/8" metal studs with 1" type S drywall screws 24" o.c. to edges and 36" o.c. to intermediate studs. Face layer 1/2" type X gypsum wallboard or veneer base applied on each side parallel to studs with 1 5/8" type S drywall screws 12" o.c. Stagger joints 24" o.c. each layer and side. (NLB)	ACI 7115-2019c	125 700 2800	175 1000 4000	250 1400	350 2000
Base layer 1/2" mineral fiberboard applied parallel to each side of 1 5/8" metal studs 24" o.c. with 1" type S drywall screws 27" o.c. and 2 screws per panel to top and bottom runners. Face layer 1/2" type X gypsum wallboard or veneer base applied on each side parallel to studs with 1 5/8" type S drywall screws 12" o.c. Stagger joints 24" o.c. each layer and side. (NLB)	G & H USG-57 FT	125 500 2000	175 700 2800	250 1000 4000	350 1400
Base layer 1/2" regular gypsum wallboard or veneer base applied parallel to each side of 1 5/8" metal studs 24" o.c. with 1" type S drywall screws 12" o.c. Face layer 1/2" regular gypsum wallboard or veneer base applied on each side parallel to studs with 1 5/8" type S drywall screws 12" o.c. Stagger joints 24" o.c. each layer and side. (NLB)	KG 374	125 500 2000	175 700 3000	250 1000 4000	350 1400

PARTY WALLS AND INTERIOR PARTITIONS, NONCOMBUSTIBLE

Sound Rating STC		GA & Company Codes	Thick- ness	Limiting Height	Weight psf	Fire Test Ref.
45 to 49		WP 1120	3 5/8"	14'-8"	5-6	Based on T-3124 and UC 5/31/66
		WP 1123 (t)	4 3/4"	Refer to Mfr.	7	T-4831
40 to 44		WP 1130	3 5/8"		31	T-38
		WP 1200	4 7/8"	17'-3"	5-7	FM WP-45
		WP 1210 (p)	4"	13'-5"	6	FM WP-66
		WP 1230	3 3/8"	12'-0"	8	UC 11/17/64
		WP 1240	3 5/8"	14'-8"	5-6	Based on UC 5/31/66

DETAILED DESCRIPTION	Sound Test Ref.	TL Values at Test Frequencies From 125 Hz to 4000 Hz			
One layer 1/2" type X gypsum veneer base applied at right angles to each side of 2 1/2" metal studs 16" o.c. with 1" type S drywall screws 8" o.c. to ends and 12" o.c. to intermediate studs. Omit screws in runners. 3/32" gypsum veneer plaster applied over entire face both sides. Sound tested using 1 1/2" mineral fiber in stud space. (NLB)	CK 664-1	125 700 2800	175 1000 4000	250 1400	350 2000
One layer 1/2" type X gypsum veneer base applied vertically with 1" type S drywall screws 12" o.c. to resilient furring channels 16" o.c. screw attached at right angles to each side of 2 1/2" open web wire studs spaced 24" o.c. Joints taped and 3/32" gypsum veneer plaster applied over entire face both sides sound tested using 1 1/2" mineral fiber in stud space. (NLB)	RAL TL 69-278	125 315 800 2000	160 400 1000 2500	200 500 1250 3150	250 630 1600 4000
3/4" 1:3 gypsum-sand plaster on unglazed side of 4" thick ceramic glazed tile, 3/4" shells (one cell). (NLB)					
One layer 5/8" type X gypsum wallboard or veneer base applied at right angles to each side of 3 5/8" metal studs 24" o.c. with 1" type S drywall screws 8" o.c. to ends and 12" o.c. to intermediate studs. Stagger joints 24" o.c. each side. (NLB)	NGC 2385	125 315 800 2000	160 400 1000 2500	200 500 1250 3150	250 630 1600 4000
One layer 1/2" type X gypsum wallboard or veneer base applied parallel to one side of 2 1/2" metal studs 24" o.c. with 1" type S drywall screws 8" o.c. to vertical edges and 3/8" adhesive beads to intermediate studs. Opposite side base layer 1/2" type X gypsum wallboard or veneer base applied parallel to studs with 1" type S drywall screws 8" o.c. to vertical edges and 12" o.c. to intermediate studs. Face layer 1/2" type X gypsum wallboard or veneer base applied parallel to studs with 1 5/8" type S drywall screws 8" o.c. to vertical edges and with adhesive beads over joints at intermediate studs. Stagger joints 24" o.c. each layer and face. Face layer may be predecorated. Either side exposed to fire. (NLB)	NGC 2124	125 315 800 2000	160 400 1000 2500	200 500 1250 3150	250 630 1600 4000
Base layer 3/8" regular gypsum wallboard or veneer base applied parallel to each side of 1 5/8" metal studs 24" o.c. with 1" type S drywall screws 27" o.c. to edges and 54" o.c. to intermediate studs. Face layer 1/2" regular gypsum wallboard or veneer base attached on each side parallel to studs with 1 5/8" type S drywall screws 12" o.c. to perimeter and 24" o.c. to intermediate studs. Stagger joints 24" o.c. each layer and side. (NLB)	KG 141	125 500 2000	175 700 2800	250 1000 4000	350 1400
One layer 1/2" type X gypsum veneer base applied at right angles to each side of 2 1/2" metal studs 16" o.c. with 1" type S drywall screws 8" o.c. to ends and 12" o.c. to intermediate studs. Omit screws in top and bottom runners. 1/16" gypsum veneer plaster applied over both sides. (NLB)	ACI 7115-2016b	125 500 2000	175 700 2800	250 1000 4000	350 1400

PARTY WALLS AND INTERIOR PARTITIONS, NONCOMBUSTIBLE

Sound Rating STC		GA & Company Codes	Thick-ness	Limiting Height	Weight psf	Fire Test Ref.
40 to 44		WP 1250 (k)	3 3/4"	13'-5"	6-7	T-4545
		WP 1260	4 1/4"	11'-2"	14	FM WP 65-1
		WP 1270	4 1/4"	9'-7"	10	UC 7/3/64
		WP 1280	4 1/4"	11'-2"	14	T-347
		WP 1290	4 1/2"	9'-2"	13	FM WP-53
		WP 1300	4 3/4"	13'-6"	18	T-4228
35 to 39		WP 1310	2"	11'-0"	8-9	UC 4/4/61
		WP 1320	2 1/2"	13'-0"	20	BMS 92/32
		WP 1330	2 1/2"	12'-0"	6-8	R2717-19, 21 Design 10-1

DETAILED DESCRIPTION	Sound Test Ref.	TL Values at Test Frequencies From 125 Hz to 4000 Hz				
One layer 1/2" type X gypsum veneer base applied at right angles to each side of 2 1/2" metal studs 24" o.c. with 1" type S drywall screws 8" o.c. 3/32" gypsum veneer plaster applied over both sides. (NLB)	Based on ACI 7115-2016b	125 500 2000	175 700 2800	250 1000 4000	350 1400	
1/2" 1:2 gypsum-sand plaster applied over face of 3/8" plain gypsum lath fastened at right angles to each side of 2 1/2" open web metal studs 16" o.c. with 12 gage galvanized wire clips. 16 gage furring channel stiffener installed horizontally at mid-height through web of studs and wire tied. Stagger end joints each lath on each side. (NLB)	NGC 3042	125 500 2000	175 700 2800	250 1000 4000	350 1400	
1/2" 1:2-1:3 gypsum-sand plaster applied over each face of 3/8" type X gypsum lath attached at right angles to each side of 2 1/2" metal nailable studs 24" o.c. with three annular grooved nails 1 1/2" long, 0.117" shank, 1/32" heads in each lath to each stud with clips at lath ends. (NLB)	Based on RAL TL 65-241	125 500 2000	175 700 2800	250 1000 4000	350 1400	
1/2" 1:2 gypsum-sand plaster applied over each face of 3/8" perforated gypsum lath attached with 12 gage wire clips at right angles to each side of 2 1/2" open web metal studs spaced 16" o.c. (passed 90 minute fire test). (NLB)	Based on NGC 3042	125 315 800 2000	160 400 1000 2500	200 500 1250 3150	250 630 1600 4000	
1/2" 1:2 gypsum-sand plaster applied over each face of 1/2" plain gypsum lath attached with 12 gage wire clips 16" o.c. at right angles to each side of 2 1/2" metal screw type studs spaced 24" o.c. (NLB)	NGC 2061	125 315 800 2000	160 400 1000 2500	200 500 1250 3150	250 630 1600 4000	
5/8" 1:2 gypsum-sand plaster applied over 3.4 lb. metal lath attached with 24 gage galvanized steel clips 6" o.c. to each side of 3 1/4" open web metal studs spaced 16" o.c. (NLB)	Based on BMS 144/229	128 512 4096	192 768	256 1024	384 2048	
One layer 1/2" regular gypsum wallboard or veneer base laminated over the entire contact surface with laminating compound to each side of 1" tongue and groove gypsum coreboard erected vertically. Stagger joints 8" minimum each side. (NLB)	NGC 2359	125 315 800 2000	160 400 1000 2500	200 500 1250 3150	250 630 1600 4000	
2 1/2" solid 1:1 gypsum-sand plaster applied over 2.5 lb. metal lath wire tied 6" o.c. to one side of 3/4" cold rolled channel studs 16" o.c. embedded in plaster. (Passed 90 minute fire test) (NLB)	BMS 144/172	125 500 4000	200 800	250 1000	400 2000	
One layer 5/8" type X gypsum wallboard or veneer base applied parallel to each side of 6" wide ribs made of 2 or 3 layers of laminated gypsum panels 24" o.c. Attach wallboard to ribs with 1" type G drywall screws 20" o.c. and with laminating compound. Fire tested with 1" thick ribs. (NLB)	G & H BW 8 FT	125 500 2000	175 700 2800	250 1000 4000	350 1400	

PARTY WALLS AND INTERIOR PARTITIONS, NONCOMBUSTIBLE

Sound Rating STC	GA & Company Codes	Thick-ness	Limiting Height	Weight psf	Fire Test Ref.
35 to 39	WP 1340	2 7/8"	10'-0"	5-6	T-3296
	WP 1341	2 7/8"	10'-0"	5-7	UC 4/18/61
	WP 1360	4 1/4"	11'-2"	9-10	T-1450
	WP 1370	4 1/4"	11'-6"	9-10	UC 12/21/65
	WP 1380	2"	12'-6"	18	T-129
	WP 1390	2"	10'-0"	18	T-162
	WP 1400	3 1/8"	8'-0"	12-14	T-1511
55 to 59	WP 1510 (g)	6 1/4"	19'-5"	11	R3660-1 Design 30-2

DETAILED DESCRIPTION	Sound Test Ref.	TL Values at Test Frequencies From 125 Hz to 4000 Hz					
One layer 5/8" type X gypsum wallboard or veneer base applied parallel to each side of 1 5/8" metal studs 24" o.c. with 1" type S drywall screws 8" o.c. to edges and 12" o.c. to intermediate studs. Stagger joints 24" o.c. each side. (NLB)	RAL TL 64-244	125 500 2000	175 700 2800	250 1000 4000		350 1400	
One layer 5/8" type X gypsum wallboard or veneer base applied parallel to each side of 1 5/8" metal studs spaced 24" o.c. with 1" type S drywall screws 8" o.c. to edges and 12" o.c. to intermediate studs. Wallboard joints at right angles to studs are backed with 6" wide by 5/8" thick strips of wallboard laminated and screw attached to panel backs using No. 10 wood screws 1 1/2" long 4" o.c. (NLB)	Based on RAL TL 64-244	125 500 2000	175 700 2800	250 1000 4000		350 1400	
1/2" 1:2 gypsum-perlite plaster applied over each face of 3/8" plain gypsum lath attached with 12 gage wire clips to each side of 2 1/2" open web metal studs 16" o.c. (NLB)	Based on NGC 3053	125 315 800 2000	160 400 1000 2500	200 500 1250 3150		250 630 1600 4000	
1/2" 1:2 gypsum-sand plaster applied over 3/8" perforated gypsum lath attached at right angles to each side of 2 1/2" metal studs 24" o.c. with two 7/8" type S drywall screws each lath at studs. 3/8" by 22 gage end joint clips used at lath joint intersections. Stagger lath end joints each side. (NLB)	RAL TL 63-268	125 500 2000	175 700 2800	250 1000 4000		350 1400	
2" solid 1:1-1:2 gypsum-sand plaster applied over 2.5 lb. metal lath wire tied 6" o.c. to 3/4" cold rolled channel studs 16" o.c. embedded in plaster. (NLB)	BMS 144/523	125 500 4000	200 800	250 1000		400 2000	
2" 1:2 gypsum-sand plaster applied over each side of 3/8" rib metal lath to form 2" solid studless wall. (NLB)	BMS 144/527	125 500 4000	200 800	250 1000		400 2000	
5/8" 1:2-1:3 gypsum-sand plaster applied over 3.4 lb. metal lath wire tied 6" o.c. to each side of 1 5/8" open web metal studs 16" o.c. (NLB)	RAL TL 61-2	125 500 2000	175 700 2800	250 1000 4000		350 1400	
Base layer 5/8" type X gypsum wallboard or veneer base applied parallel to each side of 3 5/8" metal studs 24" o.c. with 1" type S drywall screws 32" o.c. Staple 2" mineral fiber 0.9 pcf to one side in stud space. Face layer 5/8" type X gypsum wallboard or veneer base applied parallel to one side of studs with 1 5/8" type S drywall screws 12" o.c. to edges and 24" o.c. to intermediate studs. On opposite side second layer 1/2" type X gypsum wallboard or veneer base applied parallel to studs with 1 5/8" type S drywall screws 12" o.c. Third face layer 1/4" or 3/8" gypsum wallboard or veneer base laminated parallel to studs with 3/4" daubs of adhesive spaced 12" o.c. each way. Stagger joints 24" o.c. each layer and side. (NLB)	RAL TL 69-118	125 315 800 2000	160 400 1000 2500	200 500 1250 3150		250 630 1600 4000	SGP 0027871

PARTY WALLS AND INTERIOR PARTITIONS, NONCOMBUSTIBLE

Sound Rating STC	GA & Company Codes	Thick- ness	Limiting Height	Weight psf	Fire Test Ref.
50 to 54	WP 1530	3 5/8"	12'-4"	9	Based on UC 12/7/64
	WP 1545	4 1/2"	15'-10"	10	R1319- 101, 105 Design 28-2
	WP 1560	4 3/4"	15'-10"	10	R5085-7 Design 27-2
45 to 49	WP 1615	4 1/2"	15'-10"	10	UC 9/7/64
	WP 1621	6 1/8"	19'-5"	10	R1319- 31, 32 Design 11-2
	WP 1630	4 1/2"	15'-10"	9-10	T-3218

DETAILED DESCRIPTION	Sound Test Ref.	TL Values at Test Frequencies From 125 Hz to 4000 Hz				
Base layer 1/2" type X gypsum wallboard or veneer base applied parallel to each side of 1 5/8" metal studs 24" o.c. with 1" type S drywall screws 12" o.c. Face layer 1/2" type X gypsum wallboard or veneer base applied on each side parallel to studs with 1 5/8" type S drywall screws 8" o.c. Stagger joints 24" o.c. each layer and side. Sound tested using 1 1/2" mineral fiber in stud space. (NLB)	ACI 7-1131	125 500 2000	175 700 2800	250 1000 4000	350 1400	
Base layer 1/2" type X gypsum wallboard or veneer base applied parallel to each side of 2 1/2" metal studs 24" o.c. with 1" type S drywall screws 12" o.c. 1 1/2" mineral fiber 2 pcf stapled to studs in stud space. Face layer 1/2" type X gypsum wallboard or veneer base on each side applied parallel to studs with 1 5/8" type S drywall screws 12" o.c. Stagger joints 24" o.c. each layer and side. (NLB)	CK 654-40	125 315 800 2000	160 400 1000 2500	200 500 1250 3150	250 630 1600 4000	
Base layer 1/2" type X gypsum veneer base applied parallel to each side of 2 1/2" metal studs 24" o.c. with 1" type S drywall screws 24" o.c. Face layer 1/2" type X gypsum wallboard or veneer base applied on each side parallel to studs with 1 5/8" type S drywall screws 12" o.c. No screws in runners. Apply 3/2" gypsum-veneer plaster over each face. Stagger joints 24" o.c. each layer and side. Sound tested using 1" mineral fiber in stud space. (NLB)	CK 654-66	125 315 800 2000	160 400 1000 2500	200 500 1250 3150	250 630 1600 4000	
Base layer 1/2" type X gypsum wallboard or veneer base applied parallel to each side of 2 1/2" metal studs 24" o.c. with 1" type S drywall screws 24" o.c. Face layer 1/2" type X gypsum wallboard or veneer base applied parallel to each side of studs with 1 5/8" type S drywall screws 12" o.c. (NLB)	G & H KG 49 FT	125 500 2000	175 700 2800	250 1000 4000	350 1400	
Base layer 5/8" type X gypsum wallboard or veneer base applied parallel to each side of 3 5/8" metal studs spaced 24" o.c. with 1" type S drywall screws 8" o.c. to edges and 12" o.c. to intermediate studs. Face layer 5/8" plain or pre-decorated type X gypsum wallboard or veneer base applied parallel to studs over base layers with laminating compound combed over entire surface. Metal base and top retainer channels. Stagger joints 24" o.c. each layer and side. (NLB)	RAL TL 61-213	125 500 2000	175 700 2800	250 1000 4000	350 1400	
Base layer 1/2" type X gypsum wallboard or veneer base applied parallel to each side of 2 1/2" metal studs 24" o.c. with 1" type S drywall screws 12" o.c. to perimeter and 36" o.c. to intermediate studs. Face layer 1/2" type X gypsum wallboard or veneer base on each side applied parallel to studs with drywall laminating adhesive in 4" wide strips 2" from board edges and 4" off board centerline and with 1 3/4" type S drywall screws 12" o.c. to perimeter and 16" o.c. to intermediate studs. Stagger joints 24" o.c. each layer and side. (NLB)	NGC 2250	125 315 800 2000	160 400 1000 2500	200 500 1250 3150	250 630 1600 4000	

SGP 0027873

SGP 0027873

PARTY WALLS AND INTERIOR PARTITIONS, NONCOMBUSTIBLE

Sound Rating STC	GA & Company Codes	Thick- ness	Limiting Height	Weight psf	Fire Test Ref.
45 to 49	WP 1640	3 7/8"	10'-0"	7.8	UC 11/27/62
40 to 44	WP 1712 (p)	6 1/8"	Refer to Mfr.	10	FM WP 197-2
	WP 1714 (p)	5"	Refer to Mfr.	10	FM WP 199-2
	WP 1720	4 3/4"	11'-2"	13-15	T-1813
	WP 1730	4 1/4"	11'-2"	16-18	BMS 92/31
	WP 1750	4"		24	BMS 117/5
35 to 39	WP 1810	2 1/2"	10'-0"	9-10	NBS 300
	WP 1830	3 5/8"	14'-0"	10	UC 2/8/62

DETAILED DESCRIPTION	Sound Test Ref.	TL Values at Test Frequencies From 125 Hz to 4000 Hz				
Base layer 1/2" mineral fiberboard applied parallel to each side of 1 5/8" metal studs 24" o.c. with 1" type S drywall screws 24" o.c. Face layer 5/8" type X gypsum wallboard or veneer base on each side applied parallel to studs with 1 5/8" type S drywall screws 12" o.c. and 6" wide beaded strips of laminating compound at edges and center of wallboard surface. Stagger joints 24" o.c. each layer and side. (NLB)	KG-21	125 500 2000	175 700 2800	250 1000 4000	350 1400	
Base layer 5/8" type X gypsum wallboard or veneer base applied parallel to each side of 3 5/8" extruded aluminum "I" shaped studs (1 5/8" wide, 0.060" flanges x 0.055" web) spaced 24" o.c. with 1" type S-12 drywall screws 12" o.c. Face layer 5/8" type X gypsum wallboard or veneer base on each side applied parallel to studs with 1 5/8" type S-12 drywall screws 12" o.c. Stagger joints 24" o.c. each layer and side. (NLB)						
Base layer 5/8" type X gypsum wallboard or veneer base applied parallel to 2 1/2" 18 gage steel studs 16" o.c. with 1" type S-12 drywall screws 12" o.c. Face layer 5/8" type X gypsum wallboard or veneer base on each side applied parallel to studs with 1 5/8" type S-12 drywall screws 12" o.c. Stagger joints 16" o.c. each layer and side. (LB)						
3/4" 1:2 gypsum-perlite plaster applied over 3/8" perforated gypsum lath attached at right angles to each side of 2 1/2" open web metal studs spaced 16" o.c. with 12 gage wire clips. (NLB)						
3/4" gypsum-wood fiber plaster applied over 3.4 lb. metal lath wire tied at right angles to each side of 2 1/2" open web metal studs 16" o.c. (NLB)						
1/2" 1:3 gypsum-sand plaster applied over both sides of 3" thick expanded shale aggregate units 76% solid. (NLB)	Based on BMS 144/69	250 4000	500	1000	2000	
1" 1:2-1:2 gypsum-vermiculite plaster applied over each side of vertically placed 1/2" by 24" wide gypsum long length lath. (NLB)	Based on BMS 144/517	125 500 4000	200 800	250 1000	400 2000	
Base layer 1/2" type X gypsum wallboard or veneer base applied parallel to each side of 1 5/8" x 6" gypsum ribs 24" o.c. with laminating compound combed over entire surface of ribs and 2" type G drywall screws at 24" o.c. to ribs. Face layer 1/2" type X gypsum wallboard or veneer base applied parallel to each side of ribs with laminating compound combed over entire contact surface and 2" type G drywall screws spaced 24" o.c. to ribs. Edges secured to top and bottom channels with 1 1/2" type S drywall screws 24" o.c. Stagger joints 24" o.c. for each layer and side. (NLB)	KG 38	125 500 2000	175 700 2800	250 1000 4000	350 1400	

SGP 0027875

PARTY WALLS AND INTERIOR PARTITIONS, NONCOMBUSTIBLE

Sound Rating STC	GA & Company Codes	Thick-ness	Limiting Height	Weight psf	Fire Test Ref.
35 to 39	WP 1840	2"	11'-0"	8.9	R3564 Design 3-2
	WP 1850	2"	11'-0"	9	T-1339
30 to 34	WP 1930	2½"	12'-0"	12	R3453
50 to 54	WP 2310	6"		27	T-118
	WP 2320	9¼"		48	BMS 92/20
45 to 49	WP 2410	6¼"		49	T-37
35 to 39	WP 2450	4"		21-22	T-118
25 to 29	WP 2470	3"		12-13	T-26
45 to 49	WP 2810	9¼"		58	BMS 92/20

DETAILED DESCRIPTION	Sound Test Ref.	TL Values at Test Frequencies From 125 Hz to 4000 Hz					
One layer 1/2" regular gypsum wallboard or veneer base applied with laminating compound over entire surface to each side of 1" laminated, interlocking, gypsum coreboard. Stagger joints 24" o.c. each layer and side. (NLB)	Based on NGC 2359	125 500 2000	175 700 2800	250 1000 4000	350 1400		
One layer 1/2" type X gypsum wallboard or veneer base applied parallel to each side of 1" tongue and groove gypsum coreboard with laminating compound combed over entire surface. Stagger joints 24" o.c. each layer and side. Sound tested using 2 1/4" partition with 5/8" type X gypsum wallboard faces. (NLB)	Based on NGC 2359	125 315 800 2000	160 400 1000 2500	200 500 1250 3150	250 630 1600 4000		
2 1/2" solid 1:2-1:2 gypsum-perlite plaster applied over each side of 3.4 lb. metal lath wire tied to one side of 3/4" cold rolled channels 16" o.c. embedded in plaster. (NLB)	Based on BMS 144/510	125 500 4000	200 800	250 1000	400 2000		
5/8" 1:3 gypsum-sand plaster applied over one side of 4" thick hollow gypsum blocks with vertical joints staggered. On opposite side 3/8" gypsum lath attached with resilient steel clips and faced with 1/2" 1:2 gypsum-sand plaster. (NLB)	G & H USG 110 FT	125 500 2000	175 700 2800	250 1000 4000	350 1400		
5/8" 1:3 gypsum-sand plaster applied over each side 8" thick load bearing clay tile, 2 cells in wall thickness, units 40% solid. (LB)	Based on BMS 144/62	250 4000	500	1000	2000		
3/4" 1:3 gypsum-sand plaster applied over one side of 4" clay tile units at least 60% solid with 2" glazed tile on opposite side. (NLB)							
1/2" 1:3 gypsum-sand plaster applied over both sides of 3" thick hollow gypsum block. (NLB)	Based on BMS 144/304	125 500 4000	200 800	250 1000	400 2000		
3" thick solid gypsum block, no plaster required. (NLB)							
5/8" 1:3 gypsum-sand plaster applied over each side of 8" thick load bearing clay tile, 2 cells in wall thickness, units 49% solid. (LB)	Based on BMS 144/62	250 4000	500	1000	2000		

SGP 0027877

PARTY WALLS AND INTERIOR PARTITIONS, NONCOMBUSTIBLE

Sound Rating STC	GA & Company Codes	Thick- ness	Limiting Height	Weight psf	Fire Test Ref.
45 to 49	WP 2820	8 3/8"		45	FM WP-94
	WP 2830	13 1/4"		70	BMS 92/20
	WP 2840	13"		77	BMS 120/4
40 to 44	WP 2910	5"		23-25	T-118
	WP 2920	6 5/8"		28	T-26-1

SGP 0027878

DETAILED DESCRIPTION	Sound Test Ref.	TL Values at Test Frequencies From 125 Hz to 4000 Hz					
$\frac{3}{8}$ " gypsum-veneer plaster applied over each side of 8" light weight aggregate hollow core concrete block laid-up with mortar adhesive. (LB)							
$\frac{5}{8}$ " 1:3 gypsum-sand plaster applied over each side of 12" thick load bearing clay tile, 3 cells in wall thickness, units 40% solid. (LB)							
$\frac{1}{2}$ " 1:3 gypsum-sand plaster applied over each side of 12" thick siliceous gravel concrete block units, 58% solid. (LB)							
$\frac{1}{2}$ " 1:3 gypsum-sand plaster applied over each side of 4" thick hollow gypsum block. (NLB)	Based on BMS 144/305	125 500 4000	200 800	250 1000	400 2000		
$\frac{5}{8}$ " 1:3 gypsum-sand plaster applied over one side of 6" thick hollow gypsum block or tile. (NLB)	Based on BMS 144/305	125 500 4000	200 800	250 1000	400 2000		

SGP 0027879

PARTY WALLS AND INTERIOR PARTITIONS, WOOD-FRAMED

Sound Rating STC	GA & Company Codes	Thick- ness	Limiting Height	Weight psf	Fire Test Ref.
60 to 64	WP 3010 (g)	6 7/8"		12	R3660-2 Design 33-1
55 to 59	WP 3110 (g)	6 3/4"		12	R3660-2 Design 33-1
50 to 54	WP 3230	5 3/8"		7-8	T-3127

DETAILED DESCRIPTION	Sound Test Ref.	TL Values at Test Frequencies From 125 Hz to 4000 Hz				
Base layer 5/8" type X gypsum wallboard or veneer base applied at right angles with 1" type S drywall screws 12" o.c. to resilient channels 24" o.c. attached at right angles to one side of 2" x 4" wood studs 16" o.c. with 1" type S drywall screws. Face layer 5/8" type X gypsum wallboard or veneer base applied on same side parallel with studs and spot laminated with 3/4" daubs of adhesive 12" o.c. each way. Opposite side base layer 5/8" type X gypsum wallboard or veneer base applied parallel to studs with 5d coated nails 1 5/8" long, 0.086" shank, 1 5/4" heads, 32" o.c. Center layer 1/2" type X gypsum wallboard or veneer base applied parallel to studs with 8d coated nails 2 3/8" long, 0.113" shank, 3/32" heads, 12" o.c. Face layer 3/8" special gypsum wallboard applied parallel with studs and spot laminated to center layer with 3/4" daubs of adhesive 12" o.c. each way. Staple 2" mineral fiber 0.90 pcf to three layer side in stud space. Stagger joints 24" o.c. each layer and side. (LB)	RAL TL 69-117	125 315 800 2000	160 400 1000 2500	200 500 1250 3150	250 630 1600 4000	
Base layer 5/8" type X gypsum wallboard or veneer base applied at right angles with 1" type S drywall screws 12" o.c. to resilient channels 24" o.c. attached at right angles to one side of 2" x 4" wood studs 16" o.c. with 1" type S drywall screws. Face layer 5/8" type X gypsum wallboard or veneer base applied on same side parallel with studs and spot laminated with 3/4" daubs of adhesive 12" o.c. each way. Opposite side base layer 5/8" type X gypsum wallboard or veneer base applied parallel to studs with 5d coated nails 1 5/8" long, 0.086" shank, 1 5/4" heads, 32" o.c. Center layer 1/2" type X gypsum wallboard or veneer base applied parallel to studs with 8d coated nails 2 3/8" long, 0.113" shank, 3/32" heads, 12" o.c. Face layer 1/4" special gypsum wallboard applied parallel with studs and spot laminated to center layer with 3/4" daubs of adhesive 12" o.c. each way. Staple 2" mineral fiber 0.90 pcf to three layer side in stud space. Stagger joints 24" o.c. each layer and side. (LB)	RAL TL 68-286	125 315 800 2000	160 400 1000 2500	200 500 1250 3150	250 630 1600 4000	
One layer 5/8" type X gypsum wallboard or veneer base applied parallel to resilient channels 24" o.c. with 1" type S drywall screws in edges 6" o.c. and center row 12" o.c. End joints back-blocked with resilient channels. Resilient channels attached at right angles to 2" x 4" wood studs 16" o.c. with 6d coated nails, 1 7/8" long, 0.086" shank, 1/4" heads. 1/2" x 3" gypsum wallboard filler strip attached to studs at floor line with 6d nails as described above. 1 1/2" mineral fiber 0.8 pcf attached to studs in stud space with 1/2" long staples. On opposite side one layer 5/8" type X gypsum wallboard or veneer base applied at right angles to studs with 6d nails as described above. Stagger end joints 48" o.c. each side. (LB)	OR 64-16	125 500 2000	175 700 2800	250 1000 4000	350 1400	

SGP 0027881

SGP 0027881

PARTY WALLS AND INTERIOR PARTITIONS, WOOD-FRAMED

Sound Rating STC		GA & Company Codes	Thick- ness	Limiting Height	Weight psf	Fire Test Ref.
50 to 54		WP 3240 (t)	5 3/8"		7	R1319-93, 94, 129 Design 27-1
		WP 3260 (g, k)	5 3/8"		9	Based on Design 30-1
45 to 49		WP 3320	5 7/8"		7-8	T-3376
		WP 3330	5 7/8"		8-9	T-3533
		WP 3340 (g, k)	5 1/8"		7-8	R2717-52 Design 30-1

DETAILED DESCRIPTION	Sound Test Ref.	TL Values at Test Frequencies From 125 Hz to 4000 Hz			
One layer 5/8" type X gypsum wallboard or veneer base applied parallel to resilient channels 24" o.c. with 1" type S drywall screws in edges and center row 12" o.c. End joints back-blocked with resilient channels. Resilient channels attached at right angles to 2" x 4" wood studs 16" or 24" o.c. with 1 1/4" type S drywall screws. 3" mineral fiber 2.3 pcf stapled to studs in stud space. On opposite side one layer 5/8" type X gypsum wallboard or veneer base applied at right angles to studs with 1 1/4" type W drywall screws 12" o.c. Stagger vertical joints 48" o.c. each side. Sound test based on studs at 16" o.c. (LB)	G & H USG 33 FT	125 500 2000	175 700 2800	250 1000 4000	350 1400
Base layer 1/4" special gypsum wallboard applied parallel to each side of 2" x 4" wood studs 16" o.c. with 4d coated nails 1 1/2" long, 0.099" shank, 1/4" heads, 12" o.c. 1 1/2" mineral fiber 0.8 pcf in stud space. Face layer 5/8" type X gypsum wallboard or veneer base applied parallel to studs and attached with 6" wide strips of laminating compound each edge and center and 6d coated nails 1 7/8" long, 0.0915" shank, 1/4" heads, 16" o.c. to plates. Stagger joints 24" o.c. each layer and side. (LB)	G & H BW 35 ST	125 2000	250 4000	500	1000
One layer 5/8" type X gypsum wallboard or veneer base applied parallel to resilient channels 24" o.c. with 1" type S drywall screws 12" o.c. and vertical end joints back-blocked with 1/2" x 6" wide type X gypsum wallboard panels attached with 1 1/2" type G drywall screws 12" o.c. each side of joint. Resilient channels attached at right angles to each side of 2" x 4" wood studs 16" o.c. with 1 1/4" long GWB 54 drywall nails. 1/2" x 6" wide type X gypsum wallboard filler strips attached to each side of studs at floor and ceiling with 1 1/4" long, GWB 54 drywall nails 36" o.c. Stagger joints 48" o.c. each side. (LB)	RAL TL 63-13	125 500 2000	175 700 2800	250 1000 4000	350 1400
Base layer 1/2" wood fiberboard nailed parallel to each side of 2" x 4" wood studs 16" o.c. with 6d coated nails, 1 7/8" long, 0.0915" shank, 1/4" heads, 12" o.c. and to top and bottom plates at 16" o.c. Face layer 5/8" type X gypsum wallboard or veneer base on each side applied parallel to studs with 8" wide strips of 1/2" beads of laminating adhesive 2" o.c. to perimeter and center of board and 8d coated nails 2 1/2" long, 0.131" shank, 3/32" heads, 12" o.c. to perimeter and one nail at mid-height to intermediate studs. Stagger joints 24" o.c. each layer and side. (LB)	OR 64-73	125 500 2000	175 700 2800	250 1000 4000	350 1400
Base layer 1/4" special gypsum wallboard applied parallel to each side of 2" x 4" wood studs 16" o.c. with 4d coated nails, 1 1/2" long, 0.099" shank, 1/4" heads, 12" o.c. Face layer 1/2" type gypsum wallboard or veneer base or vinyl faced board on each side applied parallel to studs with 3/8" beads of adhesive 12" o.c. and 6d coated nails, 1 7/8" long, 0.0915" shank, 1/4" heads, 6" o.c. at top and bottom plates only. Stagger joints 24" o.c. each layer and side. (LB)	G & H BW-27 FT	125 500 2000	175 700 2800	250 1000 4000	350 1400

SGP 0027883

PARTY WALLS AND INTERIOR PARTITIONS, WOOD-FRAMED

Sound Rating STC		GA & Company Codes	Thick- ness	Limiting Height	Weight psf	Fire Test Ref.
45 to 49		WP 3341	5 1/8"		7-8	FM WP-147
		WP 3350	5 3/8"		8	UC 1/5/65
		WP 3360	5 5/8"		8-9	UC 2/4/65
		WP 3370	5 7/8"		12-16	UC 2/15/66
		WP 3375	6"		10-11	T-1449
		WP 3380	6 1/8"		15	T-1329

DETAILED DESCRIPTION	Sound Test Ref.	TL Values at Test Frequencies From 125 Hz to 4000 Hz			
		125	160	200	250
Base layer 1/4" gypsum wallboard applied parallel to each side of 2" x 4" wood studs 16" o.c. with 4d coated nails 1 1/2" long, 0.099" shank, 1/4" heads, 12" o.c. Face layer 1/2" type X gypsum wallboard or veneer base or vinyl faced board on each side applied parallel to studs with 1/4" beads of adhesive 2" o.c. and 6d coated nails 1 7/8" long, 0.0915" shank, 1/4" heads, 6" o.c. top and bottom only. Stagger joints 24" o.c. each layer and side. (LB)	NGC 2321	315 800 2000	400 1000 2500	500 1250 3150	630 1600 4000
Base layer 3/8" regular gypsum wallboard or veneer base applied parallel to each side of 2" x 4" wood studs 16" o.c. with 5d coated nails 1 5/8" long, 0.086" shank, 7/32" heads 24" o.c. beginning 6" above the bottom along all studs. Face layer 1/2" regular gypsum wallboard or veneer base on each side applied parallel to studs with 5d coated nails 1 5/8" long, 0.086" shank, 7/32" heads, 12" o.c. to edges and 24" o.c. to intermediate studs. Stagger joints 16" o.c. each layer and side. (LB)	KG 331	125 500 2000	175 700 3000	250 1000 4000	350 1400
Base layer 3/8" regular gypsum wallboard or veneer base nailed parallel to each side of 2" x 4" wood studs 16" o.c. with 5d coated nails 1 3/4" long, 0.082" shank, 7/32" heads, 12" o.c. Face layer 5/8" type X gypsum wallboard or veneer base applied parallel to studs each side with 6" wide combed strips of laminating compound on edges and intermediate studs and 6d finish nails 2" long, 0.0915" shank, 0.135" heads driven horizontally at 45° angle 24" o.c. to intermediate studs. (LB)	ACI 7115-2004a	125 500 2000	175 700 2800	250 1000 4000	350 1400
1/2" 1:2-1:3 gypsum-sand plaster applied over 3/8" type X gypsum lath attached at right angles to resilient strips with 3/4" type S drywall screws three across each lath at each strip. Lath attached at top of wall with 5d coated nails, 1 5/8" long, 0.072" shank, 7/32" heads, 3 per lath. Resilient strips attached 16" o.c. at right angles to each side of 2" x 4" wood studs 16" o.c. with 5d nails as described above. 1/2" x 3" strips of gypsum wallboard nailed to upper stud plate at ceiling and at mid-height of studs on each side of wall with 5d nails as described above 16" o.c. Stagger horizontal joints 16" o.c. and vertical joints 6" o.c. (LB)	RAL TL 66-299	125 500 2000	175 700 2800	250 1000 4000	350 1400
1/2" 1:2 mill-mixed gypsum-perlite plaster over 3/8" perforated gypsum lath applied at right angles to both sides of 2" x 4" wood studs 16" o.c. with resilient clips. (LB)	Based on BMS 144/423	125 500 4000	200 800	250 1000	400 2000
1/2" 1:2 gypsum-sand plaster over 3/8" perforated gypsum lath applied at right angles to both sides of 2" x 4" wood studs 16" o.c. with resilient clips. (Passed 90 minute fire test) (LB)	RAL TL 60-20	125 500 2000	175 700 2800	250 1000 4000	350 1400

SGP 0027885

PARTY WALLS AND INTERIOR PARTITIONS, WOOD-FRAMED

Sound Rating STC		GA & Company Codes	Thick- ness	Limiting Height	Weight psf	Fire Test Ref.
40 to 44		WP 3430	5 $\frac{3}{8}$ "		14-15	T-948 T-1380
		WP 3431	5 $\frac{3}{8}$ "		14-15	T-1488
35 to 39		WP 3510	4 $\frac{7}{8}$ "		7	R-3501- 47-48 Design 25-1 R-1319- 129 Design 38-1
		WP 3520 (p)	4 $\frac{7}{8}$ "		7	FM WP-90
		WP 3530	5"		7-8	R 1319-4, 6 R 3501-52 Design 5-1 R 2889
		WP 3535 (t)	5"		7-8	R-1319-84 Design 5-1
		WP 3540	5 $\frac{5}{8}$ "		10-12	NBS 227,228
		WP 3550	5 $\frac{1}{8}$ "		8-9	T-118

DETAILED DESCRIPTION	Sound Test Ref.	TL Values at Test Frequencies From 125 Hz to 4000 Hz				
		125	175	250	350	
1/2" 1:2 gypsum-sand plaster over 3/8" plain or perforated gypsum lath applied at right angles to 2" x 4" wood studs 16" o.c. and nailed with 13 gage, 1 1/8" long, 0.0915" shank, 1 3/4" heads, blue lath nails 4" o.c. (LB)	RAL TL 58-60	500 4000	700	1000		2000
1/2" 1:2 gypsum-sand plaster over 3/8" type X gypsum lath applied at right angles to each side of 2" x 4" wood studs 16" o.c. and nailed with 13 gage, 1 1/8" long, 0.0915" shank, 1 3/4" heads, blue lath nails 5" o.c. (LB)	RAL TL 58-60	500 4000	700	1000		2000
One layer 5/8" type X gypsum wallboard or veneer base applied parallel with or at right angles to each side of 2" x 4" wood studs spaced 24" o.c. with 6d coated nails 1 7/8" long, 0.0915" shank, 1/4" heads, 7" o.c. (LB)	NGC 2404	125 315 800 2000	160 400 1000 2500	200 500 1250 3150		250 630 1600 4000
One layer 5/8" type X predecorated gypsum wallboard applied parallel to each side of 2" x 4" wood studs 24" o.c. with 6d coated nails 1 7/8" long, 0.0915" shank, 1/4" heads, 7" o.c. at joints and 3/8" beads of adhesive on intermediate studs. Stagger joints 24" o.c. each side. (LB)	G & H NG 246 FT.	125 500 2000	175 700 2800	250 1000 4000		350 1400
One layer 5/8" type X gypsum plain or predecorated wallboard or veneer base applied parallel with or at right angles to each side of 2" x 4" wood studs 16" o.c. with 6d coated nails, 1 7/8" long, 0.0915" shank, 1/4" heads, 7" o.c. Joints of square edge, bevel edge or predecorated wallboard may be left exposed. (LB)	OR 64-8	125 500 2000	175 700 2800	250 1000 4000		350 1400
One layer 5/8" type X special water resistant gypsum wallboard applied parallel with or at right angles to each side of 2" x 4" wood studs 16" o.c. with 6d coated nails 1 7/8" long, 0.0915" shank, 1/4" heads, 7" o.c. (LB)	G & H USG 30 FT.	125 500 2000	175 700 2800	250 1000 4000		350 1400
Base layer 1/2" regular gypsum wallboard or veneer base applied at right angles to each side of 2" x 4" wood studs 16" o.c. with 5d coated nails, 1 5/8" long, 0.086" shank, 1 5/4" heads, 8" o.c. Face layer 1/2" regular gypsum wallboard applied on each side at right angles to studs with 8d coated nails, 2 3/8" long, 0.113" shank, 3/32" heads, 7" o.c. Stagger joints 24" o.c. each layer and side. (LB)	Based on BMS 144/225	125 500 4000	200 800	250 1000		400 2000
Base layer 3/8" regular gypsum wallboard or veneer base applied parallel to each side of 2" x 4" wood studs 16" o.c. with 4d coated nails 1 3/8" long, 0.080" shank, 7/32" heads, 8" o.c. Face layer 3/8" regular gypsum wallboard or veneer base applied at right angles to each side of studs with laminating compound combed over the entire contact surface and nailed to studs with 5d coated nails 1 5/8" long, 0.086" shank, 1 5/4" heads, 8" o.c. (LB)	Based on BMS 144/225	125 500 4000	200 800	250 1000		400 2000

SGP 0027887

PARTY WALLS AND INTERIOR PARTITIONS, WOOD-FRAMED

Sound Rating STC		GA & Company Codes	Thick- ness	Limiting Height	Weight psf	Fire Test Ref.
30 to 34		WP 3610	5 3/8"		10-11	NBS 251, 252, 253, 254
		WP 3620	4 7/8"		7	UC 1/12/66
45 to 49		WP 4010	8 1/8"		13	Based on Design 4-2
40 to 44		WP 4120	6 1/8"		12-14	T-194
		WP 4130	6 1/8"		12-14	R-1319- 11, 12 Design 4-2
35 to 39		WP 4210	6 3/8"		14	T-961

SGP 0027888

DETAILED DESCRIPTION	Sound Test Ref.	TL Values at Test Frequencies From 125 Hz to 4000 Hz			
		125	200	250	400
1/2" 1:2 gypsum-perlite or vermiculite plaster over 3/8" perforated gypsum lath applied at right angles to each side of 2" x 4" wood studs 16" o.c. with four 13 gage, 1 1/8" long, 3/32" heads, blue lath nails or 1 1/4" long, 7/16" crown width, 16 gage staples per lath per stud. (LB)	Based on BMS 144/203	125 500 4000	200 800	250 1000	400 2000
One layer 1/2" type X veneer base applied at right angles to each side of 2" x 4" wood studs 16" o.c. with 5d etched nails, 1 3/4" long, 0.099" shank, 1/4" heads, 8" o.c. Minimum 3/32" gypsum-veneer plaster over each face. Stagger vertical joints 16" and horizontal joints each side 12". Sound tested without veneer plaster. (LB)	G & H IBI 35 FT.	125 500 2000	175 700 2800	250 1000 4000	350 1400
Base layer 5/8" type X gypsum wallboard or veneer base applied to each side of 2" x 4" wood studs 16" o.c. staggered 8" o.c. on 2" x 6" wood plates with 6d coated nails 1 7/8" long, 0.0915" shank, 1/4" heads, 6" o.c. Face layer 5/8" type X gypsum wallboard or veneer base applied on each side parallel to studs with 8d, 2 3/8" long, 0.113" shank, 3/32" heads, 8" o.c. Stagger joints 24" o.c. each layer and side. (LB)	RAL TL 69-210	125 315 800 2000	160 400 1000 2500	200 500 1250 3150	250 630 1600 4000
Base layer 5/8" type X gypsum wallboard or veneer base applied parallel to each side of 2" x 4" wood studs 16" o.c. with 6d coated nails 1 7/8" long, 0.0915" shank, 1/4" heads, 9" o.c. Face layer 5/8" type X gypsum wallboard or veneer base applied on each side parallel to studs with 8d coated nails 2 3/8" long, 0.113" shank, 3/32" heads, 7" o.c. Stagger vertical joints on opposite sides. (LB)	OR 64-12	125 500 2000	175 700 2800	250 1000 4000	350 1400
Base layer 5/8" type X gypsum wallboard or veneer base applied parallel or at right angles to each side of 2" x 4" wood studs 16" o.c. with 6d coated nails 1 7/8" long, 0.0915" shank, 1/4" heads, 6" o.c. to studs and 8" o.c. to top and bottom plates. Face layer 5/8" type X gypsum wallboard or veneer base applied on each side parallel or at right angles to studs with laminating compound combed over entire contact surface. Stagger joints 24" o.c. each layer and side. 6d temporary nails were used 12" o.c. and driven below the surface of the face layer prior to the fire test. (LB)	BMS 144/241	125 500 2000	175 700 2800	250 1000 4000	350 1400
1" 1:2-1:2 gypsum-perlite plaster over 3/8" perforated gypsum lath applied at right angles to each side of 2" x 4" wood studs 16" o.c. with 13 gage 1 1/8" long, 0.0915" shank, 1/64" heads, blue lath nails. Lath covered with 1" galvanized hexagonal 20 gage wire mesh nailed 8" o.c. with 12 gage 1 3/4" long galvanized furring nails with 3/8" heads and 3/8" paper spacers and held approximately 3/16" from face of lath. (LB)	Based on BMS 144/204	125 500 4000	200 800	250 1000	400 2000

SGP 0027889

CHASE WALLS, NONCOMBUSTIBLE

Sound Rating STC	GA & Company Codes	Thick- ness	Limiting Height	Weight psf	Fire Test Ref.
50 to 54	WP 5010 (g, k)	7½"	16'-0"	6-7	Based on Design 32-1
45 to 49	WP 5020	6"	9'-2"	14	UC 4/27/65
55 to 59	WP 5110	4"	8'-6"	12	UC 4/25/61
	WP 5111	4⅝"	8'-6"	12	T-1747
	WP 5120	8¾"	16'-0"	11	Based on Design 28-2
45 to 49	WP 5210	4"	8'-6"	12	UC 4/25/61
	WP 5211	4⅝"	10'-0"	12	T-1747

DETAILED DESCRIPTION	Sound Test Ref.	TL Values at Test Frequencies From 125 Hz to 4000 Hz			
		125	160	200	250
Base layers 1/4" special gypsum wallboard applied parallel to a double row of 1 5/8" metal studs 24" o.c. and 2 3/4" apart with 1" type S drywall screws 16" o.c. Studs braced with 6" x 12" spacers of 1/2" gypsum wallboard 36" o.c. attached with 1" type S drywall screws. Face layers 1/2" type X gypsum wallboard or veneer base applied parallel to studs with 1 3/4" type S screws 12" o.c. and laminated to base layers with 3/8" ribbons of adhesive 16" o.c. Stagger joints 24" o.c. each layer and side. 1 1/2" mineral fiber 0.8 pcf friction fit in stud space. (NLB)	G & H BW 34 ST	125 315 800 2000	160 400 1000 2500	200 500 1250 3150	250 630 1600 4000
1/2" 1:2-1:3 gypsum-sand plaster applied over 3/8" type X gypsum lath stapled at right angles to the face of two rows of 7/8" nailer studs 4" apart and 16" o.c. with 1 5/8" long, 3/16" crown staples, 5" o.c. Studs braced with 3/4" cold rolled channels 36" o.c. and tied horizontally to each stud. End joints staggered and bridged with clips. Sound tested using 3" mineral fiber friction fit in stud space. (NLB)	RAL TL 65-242	125 500 2000	175 700 2800	250 1000 4000	350 1400
One layer 1/2" regular gypsum wallboard or veneer base applied with 3/8" beads of laminating compound 2" o.c. to exterior side only of 1" gypsum coreboards placed on each side of 1" air space. Sound tested with 3" air space and 1 1/2" mineral fiber stapled on one side in cavity. (NLB)	ACI 109006c	125 500 2000	175 700 2800	250 1000 4000	350 1400
One layer 1/2" regular gypsum wallboard or veneer base applied with 3/8" beads of laminating compound 2" o.c. to exterior side only of 1" gypsum coreboards placed on each side of 1 5/8" air space. Sound tested with 3" air space and 1 1/2" mineral fiber stapled on one side in cavity. (NLB)	ACI 109006c	125 500 2000	175 700 2800	250 1000 4000	350 1400
Base layer 1/2" type X gypsum wallboard or veneer base applied parallel to each face of double row of 1 5/8" metal studs spaced 6 3/4" apart and 24" o.c. with 1" type S drywall screws 12" o.c. 1" mineral fiber 0.8 pcf stapled 18" o.c. in stud space to back of one side only. 6 3/4" x 12" x 1/2" type X gypsum wallboard or veneer base gussets spanning chase and attached to studs at 48" o.c. with 1" type S drywall screws. Face layer 1/2" type X gypsum wallboard or veneer base applied parallel to studs with 1 5/8" type S drywall screws 24" o.c. Stagger joints 24" o.c. each layer and side. (NLB)	KG 239	125 500 2000	175 700 3000	250 1000 4000	350 1400
One layer 1/2" regular gypsum wallboard applied with 3/8" beads of laminating compound 2" o.c. to exterior sides only of 1" gypsum coreboards placed on each side of 1" air space. (NLB)	KG 264	125 500 2000	175 700 2800	250 1000 4000	350 1400
1/2" regular gypsum wallboard or veneer base applied with 3/8" beads of laminating compound 2" o.c. to exterior sides only of 1" gypsum coreboards placed on each side of 1 5/8" air space. (NLB)	KG 264	125 500 2000	175 700 2800	250 1000 4000	350 1400

SGP 0027891

CHASE WALLS, NONCOMBUSTIBLE

Sound Rating STC	GA & Company Codes	Thick- ness	Limiting Height	Weight psf	Fire Test Ref.
45 to 49	WP 5220 (t)	6¾"	12'-0"	13	R1319- 82, 83 Design 24-2
40 to 44	WP 5310	5"	9'-4"	13	Based on R-2717- 20, 22 Design 5-3

SGP 0027892

DETAILED DESCRIPTION	Sound Test Ref.	TL Values at Test Frequencies From 125 Hz to 4000 Hz			
		125 500 2000	175 700 2800	250 1000 4000	350 1400
Double row of hollow core tongue and groove gypsum panels set 3" apart. Panels made of one layer 5/8" type X gypsum wallboard or veneer base laminated to each side of 5/8" x 6" wide gypsum wallboard ribs. Panels attached to floor and ceiling runners with 2 1/4" type S drywall screws 18" o.c. Joints reinforced with 1 1/2" type G drywall screws at quarter points. (NLB)	RAL TL 64-189				
Double layer 1/2" x 6" wide regular gypsum wallboard strips laminated together to form vertical ribs 24" o.c. applied to base layer of 5/8" type X gypsum wallboard or veneer base with adhesive over entire rib surface. Ribs at wallboard edges placed to overlap adjoining wallboard at joints. Wallboard rib units attached to top and bottom 1" x 1 5/8" metal runners with 1" type S drywall screws 8" o.c. Adhesive applied to overlapping joint ribs and nailed with 6d finishing nails, 2" long, 0.0915" shank, 0.135" heads, 8" o.c. driven at 45° horizontally into each rib and 1 1/2" long type G drywall screws 20" o.c. into joints. Face layer 5/8" type X gypsum wallboard or veneer base applied at right angles to base layer with adhesive over entire contact surface and attached to top and bottom runners with 1 5/8" type S drywall screws, 8" o.c. vertical joints fastened with 2" long type G drywall screws 20" o.c. and nailed with 8d finishing nails 2 1/2" long, 0.099" shank, 0.142" heads, 8" o.c. horizontally driven at 45° into each rib. Opposite side identical construction except ribs offset 12" from first side and 2 1/2" apart. (NLB)	RAL TR 57-34	125 500 4000	175 700	250 1000	350 2000

SGP 0027893

CHASE WALLS, WOOD-FRAMED

Sound Rating STC	GA & Company Codes	Thick- ness	Limiting Height	Weight psf	Fire Test Ref.
55 to 59	WP 5510 (g, k)	10¼"		9-10	Based on R 2717- 49, 50 Design 30-1
50 to 54	WP 5610	8½"		8-9	R 3501- 33, 35 Design 17-1
	WP 5620	8¼"		8-9	R 3501- 49, 50 Design 26-1
45 to 49	WP 5710	6"	8'-6"	12	T-2575

SGP 0027894

DETAILED DESCRIPTION	Sound Test Ref.	TL Values at Test Frequencies From 125 Hz to 4000 Hz				
Base layer 1/4" special gypsum wallboard applied parallel to each side of double row of 2" x 4" wood studs 16" o.c. and 1 1/2" apart with 4d coated nails 1 1/2" long, 0.099" shank, 1/4" heads, 12" o.c. Face layer 1/2" type X gypsum wallboard, veneer base or vinyl faced board laminated to base layers parallel to studs with 3/8" ribbons of adhesive 16" o.c. and 5d coated nails 1 3/4" long, 0.099" shank, 1/4" heads, 16" o.c. to top and bottom plates and 4d finish nails 1 1/2" long, 0.072" shank, 0.1055" heads, at 45° angle 16" o.c. horizontally, 24" o.c. vertically. 1 1/2" mineral fiber 0.8 pcf in stud space. (LB)	G & H BW-32 ST	125 315 800 2000	160 400 1000 2500	200 500 1250 3150	250 630 1600 4000	
Base layer 1/2" wood fiberboard applied parallel to 2" x 3" wood studs spaced 16" o.c. on separate plates spaced 1" apart with 6d coated nails 1 7/8" long, 0.0915" shank, 1/4" heads, 12" o.c. at edges and 30" o.c. to intermediate studs. Studs staggered 8" o.c. Face layer 5/8" type X gypsum wallboard or veneer base applied at right angles to studs with 7d coated nails 2 1/8" long, 0.113" shank, 1/64" heads, 7" o.c. (LB)	G & H NG 213 FT	125 500 2000	175 700 2800	250 1000 4000	350 1400	
Base layer 1/2" wood fiberboard applied parallel to 2" x 3" wood studs 24" o.c. on separate plates spaced 1" apart with 6d coated nails 1 7/8" long, 0.0915" shank, 1/4" heads, 12" o.c. at edges and 30" o.c. to intermediate studs. Stagger studs 12" o.c. Face layer 1/2" type X gypsum wallboard or veneer base applied at right angles to studs with 7d coated nails 2 1/8" long, 0.113" shank, 1/64" heads, 7" o.c. (LB)	NGC 1009	125 315 800 2000	160 400 1000 2500	200 500 1250 3150	250 630 1600 4000	
One layer 1/2" regular gypsum wallboard laminated with adhesive to 1" gypsum tongue and groove coreboard erected vertically on each side of 3" wide top and bottom wood runners with 6d coated nails, 1 7/8" long, 0.0915" shank, 1/4" heads, 24" o.c. Apply laminating compound to entire contact surface of face layer. 8d finishing nails 2 1/2" long, 0.099" shank, 0.142" heads driven at 45° horizontally, 24" o.c. along joints and center row. (NLB)	OR 64-39	125 500 2000	175 700 2800	250 1000 4000	350 1400	

SGP 0027895

DETAILED DESCRIPTION	Sound Test Ref.	TL Values at Test Frequencies From 125 Hz to 4000 Hz					
One layer 1/2" type X predecorated gypsum wallboard applied parallel to each side of 2 1/2" metal studs 24" o.c. with 1" type S drywall screws 30" o.c. and with aluminum battens over steel track fastened to each stud by 1" type S drywall screws 12" o.c. 2" mineral fiber 3.0 pcf placed in stud cavity. Stagger joints 24" o.c. 2 1/2" aluminum base applied along bottom edge. (NLB)	NGC 2213	125 315 800 2000	160 400 1000 2500	200 500 1250 3150	250 630 1600 4000		
One layer 1/2" type X predecorated gypsum wallboard applied parallel to each side of 2 1/2" metal studs 24" o.c. with 1" type S drywall screws 30" o.c. at vertical edges with aluminum battens over steel track fastened by 1" type S drywall screws 9" o.c. Board held to intermediate studs with adhesive. 2" mineral fiber 3.0 pcf in stud space. 2 1/2" aluminum base applied along bottom edge. (NLB)	RAL TL 65-101	125 500 2000	175 700 2800	250 1000 4000	350 1400		
One layer 1/2" type X gypsum wallboard or veneer base applied parallel to each side of 2 1/2" metal studs 24" o.c. with 1" type S drywall screws through aluminum battens at joints 12" o.c. Boards held to intermediate studs with adhesive. 2" mineral fiber 3.86 pcf in stud space. Stagger joints 24" o.c. each side. 3 1/2" aluminum base applied along bottom edge. (NLB)	USG 17084	125 315 800 2000	160 400 1000 2500	200 500 1250 3150	250 630 1600 4000		
1/2" type X gypsum wallboard or veneer base applied parallel to each side of 2 1/2" metal studs 24" o.c. with 1" type S drywall screws 30" o.c. along the edges. Aluminum battens over each stud fastened with 1" type S drywall screws 12" o.c. 2" mineral fiber 2.63 pcf stapled 24" o.c. inside stud space. Stagger joints 24" o.c. each side. (NLB)	KG 517	125 315 800 2000	160 400 1000 2500	200 500 1250 3150	250 630 1600 4000		
5/8" type X predecorated or plain gypsum wallboard or veneer base applied parallel each side of 2 1/2" metal studs 24" o.c. with 1" steel tracks fastened with 1" type S drywall screws 9" o.c. Aluminum battens snapped over steel track and 2 1/2" aluminum base applied to bottom edge of assembly. Sound tested using 3" mineral fiber in stud space. (NLB)	G & H NG 146 FT	125 500 2000	175 700 2800	250 1000 4000	350 1400		
Base layer of 24" wide 3/8" regular gypsum wallboard and face layer of 24" wide, 5/8" type X gypsum wallboard or veneer base laminated so that edges overlap to fit 2 1/8" wide interlocking studs which hold panels in place. Top and bottom of panels fastened to metal runners with screws at each corner. Sound tested using 1 1/2" mineral fiber in stud space. (NLB)	KG 454	125 315 800 2000	160 400 1000 2500	200 500 1250 3150	250 630 1600 4000		
5/8" type X special gypsum wallboard panels, 24", 30" or 48" wide, with steel hook strips laminated to the back for attachment to each side of 2 1/2" special slotted metal studs spaced 24" or 30" o.c. 2 1/2" mineral fiber 0.7 pcf in stud space. (NLB)	KG 690	125 315 800 2000	160 400 1000 2500	200 500 1250 3150	250 630 1600 4000		

SGP 0027897

MOVABLE AND OFFICE PARTITIONS

Sound Rating STC	GA & Company Codes	Thick- ness	Limiting Height	Weight psf	Fire Test Ref.
45 to 49	WP 6010	3 1/2"	12'0"	5	FM WP-96-1
	WP 6020	3 1/2"	12'-0"	5	FM WP-110-1
	WP 6025	3 1/2"	12'-0"	5	UC 7/27/70
	WP 6030	3 1/2"	12'-0"	6	T-4264
	WP 6040	3 3/4"	13'-5"	7	R-3501- 23, 24 Design 20-1
	WP 6050 (n)	3 3/8"	refer to mfr.	9	UC 4/6/64
	WP 6060 (n)	3 3/4"	refer to mfr.	7	UC 1/21/71

MOVABLE AND OFFICE PARTITIONS

Sound Rating STC		GA & Company Codes	Thick- ness	Limiting Height	Weight psf	Fire Test Ref.
40 to 44		WP 6110	3"		8	T-3658
		WP 6120	3 3/4"	13'-5"	6	R 3501- 23, 24 Design 20-1
		WP 6125 (t)	3 3/8"	refer to mfr.	6	UC 9/21/70 7/23/69 8/18/67
		WP 6130 (p)	3 3/4"	12'-0"	5 1/2	FM WP-109
		WP 6140 (n)	3 3/8"	refer to mfr.	9	UC 4/6/64
		WP 6145 (n)	3 3/4"	refer to mfr.	7	UC 1/25/71
35 to 39		WP 6210 (t)	2 1/4"	14'-0"	9	UC 5/24/65
		WP 6220	2 1/4"	14'-0"	9	UC 9/25/56

SGP 0027898

DETAILED DESCRIPTION	Sound Test Ref.	TL Values at Test Frequencies From 125 Hz to 4000 Hz					
Panel with steel facing bonded to 1/2" type X gypsum wallboard and fitted on each side of wall into prefabricated 3" wide metal and gypsum wallboard stud assemblies 30" o.c. 2" mineral fiber 2.66 pcf in stud space. (NLB)							
One layer 5/8" type X predecorated or plain gypsum wallboard or veneer base applied parallel to each side of 2 1/2" metal studs 24" o.c. with 1" steel tracks fastened with 1" type S drywall screws 9" o.c. Aluminum battens snapped over steel track and 2 1/2" aluminum base applied to bottom edge of assembly. (NLB)	G & H NG 145 FT	125 500 2000	175 700 2800	250 1000 4000			350 1400
One layer 3/4" type X kerfed gypsum wallboard placed between metal "C" studs, back to back, 24" or 30" o.c. on exposed side. 3/4" type X kerfed gypsum wallboard placed between "T" studs 24" or 30" o.c. on the unexposed side. "C" and "T" studs alternately spaced. (NLB)	RAL TL 69-259	125 315 800 2000	160 400 1000 2500	200 500 1250 3150			250 630 1600 4000
One layer 5/8" type X plain or predecorated 30" wide gypsum wallboard applied parallel to each side of 2 1/2" metal studs 30" o.c. with 1" type S drywall screws 30" o.c. and secured with battens held to each stud by 1" type S drywall screws 9" o.c. Sound tested using 2" mineral fiber in stud space. (NLB)	NGC 2218	125 315 800 2000	160 400 1000 2500	200 500 1250 3150			250 630 1600 4000
Base layer of 24" wide, 3/8" regular gypsum wallboard and face layer of 24" wide, 5/8" type X gypsum wallboard or veneer base laminated so that edges overlap to fit 2 1/8" wide interlocking metal studs which hold panels in place. Top and bottom of panels fastened to metal runners with screws at each corner. (NLB)	KG 455	125 315 800 2000	160 400 1000 2500	200 500 1250 3150			250 630 1600 4000
One layer 5/8" special type X gypsum wallboard panels, 24", 30" or 48" wide, with steel hook strips laminated to the back for vertical attachment to each side of 2 1/2" special slotted metal studs spaced 24" or 30" o.c. (NLB)	KG 689	125 315 800 2000	160 400 1000 2500	200 500 1250 3150			250 630 1600 4000
24" wide prefabricated gypsum wallboard tongue and groove panels held in metal runners. Panels fabricated of 1" gypsum coreboard with face layers of 5/8" type X gypsum wallboard laminated with adhesive on entire contact surface. (NLB)	RAL TL 64-213	125 500 2000	175 700 2800	250 1000 4000			350 1400
One layer 24" wide 1/2" regular gypsum wallboard or veneer base laminated vertically to each side of two layers 24" wide 5/8" type X gypsum wallboard or veneer base laminated together with adhesive over entire contact surfaces. Face layers providing a 1 3/4" overlap making an interlocking joint. Metal cap track 18 gage 2 1/4" wide, 3" wide 20 gage snap-in locking base. (NLB)	Based on RAL TL 64-213	125 500 2000	175 700 2800	250 1000 4000			350 1400

SGP 0027899

MOVABLE AND OFFICE PARTITIONS

Sound Rating STC	GA & Company Codes	Thick- ness	Limiting Height	Weight psf	Fire Test Ref.
35 to 39	WP 6230 (t)	2¼"	12'-0"	7	R1319- 63, 64 Design 22-1
	WP 6240	2¼"	12'-0"	6-7	FM WP142-1
	WP 6250	3¾"		5	T-2898
	WP 6260	3¾"		5-6	T-2069
50 to 54	WP 6510 (t)	5¼" to 6¾"	12'-0"	13	R1319- 82, 83 Design 24-2

SGP 0027900

DETAILED DESCRIPTION	Sound Test Ref.	TL Values at Test Frequencies From 125 Hz to 4000 Hz				
		125	175	250	350	
Face layer $\frac{5}{8}$ " type X gypsum wallboard or veneer base applied vertically with laminating compound to each side of 1" x 6" nominal gypsum coreboard ribs (2 per panel approximately 12" apart with face layers 24" wide). 2" long No. 8 wood screws in joint edges 30" o.c. (NLB)	RAL TL 64-212	500 2000	700 2800	1000 4000	1400	
Prefabricated 24" wide, tongue and groove panels of $\frac{5}{8}$ " type X gypsum wallboard or veneer base laminated to each side of 1" x 6" gypsum coreboard ribs 24" o.c. Panels mounted in floor and ceiling channels. Joints held by type G, $1\frac{1}{2}$ " screws 30" o.c., 2" from joint on tongue edge and 4" from joint on groove edge. (NLB)	Based on TL 64-212	125 500 2000	175 700 2800	250 1000 4000	350 1400	
$\frac{5}{8}$ " type X predecorated gypsum wallboard applied parallel to each side of $2\frac{1}{2}$ " metal studs 24" o.c. with 1" type S drywall screws 12" o.c. along floor and ceiling tracks. Aluminum battens applied at studs with $1\frac{1}{2}$ " type S drywall screws 12" o.c. and covered with plastic inserts. 4" snap-on aluminum base applied to bottom edge of assembly. (NLB)	OR 64-65	125 500 2000	175 700 2800	250 1000 4000	350 1400	
One layer of $\frac{5}{8}$ " type X gypsum wallboard or veneer base applied parallel each side of special $2\frac{1}{2}$ " metal studs 24" o.c. with steel batten strips which snap-in and lock, anchoring the board to studs. Alternate studs insulated with $\frac{5}{8}$ " x $2\frac{1}{2}$ " strips of wallboard applied with $1\frac{5}{8}$ " type S drywall screws 24" o.c. At intermediate studs, gypsum board anchored with No. 12 flat head wood screws $1\frac{1}{8}$ " long 30" o.c. (NLB)	OR 63-1	125 500 2000	175 700 2800	250 1000 4000	350 1400	
Double row of hollow core tongue and groove gypsum panels set 3" apart. Panels made of two layers of $\frac{5}{8}$ " type X gypsum wallboard or veneer base laminated to $\frac{5}{8}$ " gypsum wallboard ribs. Panels attached to floor and ceiling runners with $2\frac{1}{4}$ " type S drywall screws 18" o.c. Joints reinforced with $1\frac{1}{2}$ " type G drywall screws at quarter points. Sound tested using 2" mineral fiber 2.5 pcf in stud space. (NLB)	RAL TL 65-72	125 315 800 2000	160 400 1000 2500	200 500 1250 3150	250 630 1600 4000	

SGP 0027901

SHAFT WALLS

Sound Rating STC	GA & Company Codes	Thick- ness	Limiting Height	Weight psf	Fire Test Ref.
35 to 39	WP 7005 (k)	2 1/8"	refer to mfr.	9	T-4982
	WP 7010 (n)	2 5/8"	refer to mfr.	11	T-4422
40 to 44	WP 7101 (k)	7 3/4"	refer to mfr.	11	T-4991
	WP 7105 (t)	4 3/4"	refer to mfr.		UC 8/18/70
	WP 7110 (t, n)	3"	refer to mfr.	12	T-4481

SGP 0027902

DETAILED DESCRIPTION	Sound Test Ref.	TL Values at Test Frequencies From 125 Hz to 4000 Hz					
1 5/8" x 24" gypsum board panels inserted in top metal "J" track and butted to bottom "L" runner. Panels attached with 2" type S-12 drywall screws 24" o.c. to metal "T" splines between panels with flanges on shaft side. 5/8" type X gypsum wallboard laminated and attached to panels with 1 5/8" type G drywall screws 16" o.c. at edges and center (90 min. rating). (NLB)							
2" x 24" laminated gypsum board panels installed vertically between floor and ceiling "J" runners, with "H" members between panels. 5/8" regular gypsum wallboard applied parallel to studs one side with 1" type S drywall screws staggered along "H" member flanges 12" o.c. (NLB)							
1 5/8" x 24" gypsum board panels inserted in top metal "J" track and butted to bottom metal "L" runner. Panels attached with 2" type S-12 drywall screws 24" o.c. to metal "T" splines between panels with flanges on shaft side. Metal "L" runner 40" o.c. and at right angles to panels attached to "T" splines. 2 1/2" metal studs 24" o.c. spaced minimum 3" from panels. Studs connected to panel wall with short sections of "L" runner and 3/8" sheet metal screws. 5/8" type X gypsum wallboard applied parallel to studs with 1" type S drywall screws 12" o.c. (NLB)							
1" x 24" type X special gypsum coreboard installed vertically between 2 1/2" floor and ceiling "J" runners with 2 1/2" "Box T" members between coreboards. Two layers of 5/8" regular gypsum wallboard or veneer base on unexposed side with base layer applied at right angles to framing and face layer applied parallel to "Box T" studs with 1" type S drywall screws on outer layer. Sound tested using 1" mineral fiber 4 pcf stapled in cavity. (NLB)	RAL TL 71-21	125 315 800 2000	160 400 1000 2500	200 500 1250 3150		250 630 1600 4000	
2" x 24" laminated gypsum board panels installed vertically between floor and ceiling "J" runners, with "H" members between panels. Two layers of 1/2" regular gypsum wallboard or veneer base on unexposed side applied parallel to "H" members with 7/8" type S drywall screws staggered along flanges 12" o.c. inner layer and 1 5/16" type S drywall screws staggered along flanges 12" o.c. outer layer. (NLB)	RAL TL 70-69	125 315 800 2000	160 400 1000 2500	200 500 1250 3150		250 630 1600 4000	

SGP 0027903

SHAFT WALLS

Sound Rating STC	GA & Company Codes	Thick- ness	Limiting Height	Weight psf	Fire Test Ref.
35 to 39	WP 7112 (p)	2½"	refer to mfr.	9	FM WP-156
	WP 7115 (k)	2⅝"	refer to mfr.	10½	T-4958
	WP 7120	3⅝"	13'-0" **	15-16	T-1101
	WP 7125 (n)	4⅛"	refer to mfr.	9½	UC 4/13/70
30 to 34	WP 7210	2¼"	11'-0" **	9-10	R 1319- 58, 74 Design 21-2
40 to 44	WP 7510 (t, n)	4⅛"	refer to mfr.	14	T-4423

DETAILED DESCRIPTION	Sound Test Ref.	TL Values at Test Frequencies From 125 Hz to 4000 Hz				
One layer 1/2" type X gypsum wallboard or veneer base attached vertically to one side of 2" shiplapped metaledged gypsum board panels with 1" type S drywall screws 12" o.c. into near side channels at vertical edges and intermediate channels. Gypsum board panels consist of two 1" x 16" or 24" wide gypsum coreboards with metal channels on long edges mill laminated with 2 1/2" offset and secured to top and bottom tracks with three 2 5/8" type S drywall screws per panel and with adjacent edges secured with 1 5/8" type S drywall screws 24" o.c. (NLB)	NGC 3065	125 315 800 2000	160 400 1000 2500	200 500 1250 3150	250 630 1600 4000	
1 5/8" x 24" gypsum board panels inserted in top metal "J" track and butted to bottom metal "L" runner. Panels attached with 2" type S-12 drywall screws 24" o.c. to metal "T" splines between panels with flanges on shaft side. Two layers 1/2" regular gypsum wallboard laminated with 3/8" beads of adhesive 12" o.c. Base layer attached with 1 5/8" type G drywall screws 24" o.c. and face layer attached with 1 5/8" type G drywall screws 16" o.c. to edges and center of face layer. (NLB)						
5/8" 1:3 gypsum-sand plaster on unexposed side of 3" thick hollow gypsum block. (NLB)	Based on BMS 144/304	125 500 4000	200 800	250 1000	400 2000	
4 layers 5/8" type X gypsum wallboard or veneer base, applied at right angles to one side of 1 5/8" metal studs 24" o.c. with drywall screws. Special 26 gage steel strips attached vertically at each stud line between third and fourth layers of wallboard. Stagger joints 24" o.c. each layer. (NLB)	KG 634	125 315 800 2000	160 400 1000 2500	200 500 1250 3150	250 630 1600 4000	
One layer 5/8" type X gypsum wallboard or veneer base applied vertically to each side of 1" gypsum board panels (solid or laminated) with laminating compound combed over entire contact surface. Panel supported by metal runners at top and bottom and horizontal bracing angles of No. 22 gage galvanized steel 3/4" x 1 1/4" spaced 5'-0" o.c. or less on shaft side. (NLB)						
2" x 24" laminated gypsum board panels installed vertically between floor and ceiling "J" runners with steel "H" members between panels. Base layer 5/8" regular gypsum wallboard or veneer base applied parallel to one side of panels, with 1" type S drywall screws 12" o.c. to "H" studs. Drywall furring channels horizontally attached 24" o.c. to "H" studs with 1" type S drywall screws. Face layer 5/8" regular gypsum wallboard or veneer base attached at right angles to furring channels with 1" type S drywall screws 12" o.c. Stagger joints 24" o.c. each layer and side. (NLB)						SGP 0027905

SHAFT WALLS

Sound Rating STC		GA & Company Codes	Thick- ness	Limiting Height	Weight psf	Fire Test Ref.
40 to 44		WP 7515 (p)	3 1/4"	Refer to Mfr.	11	FM WP-139
35 to 39		WP 7610	3 5/8"	13'-0" **	16	T-1315
		WP 7620	4 1/2"	17'-0" **	19-21	T-99

**Limiting height shown is based on interior partition exposure conditions. Shaft wall exposure conditions may require reduction of limiting height.

SGP 0027906

DETAILED DESCRIPTION	Sound Test Ref.	TL Values at Test Frequencies From 125 Hz to 4000 Hz			
Base layer 5/8" type X gypsum wallboard or veneer base attached vertically to one side of 2" ship lapped metaledged gypsum coreboard panels with 2 1/4" type S drywall screws 12" o.c. into far side coreboard channels at vertical edges and with 1 1/4" type S drywall screws 24" o.c. into intermediate near side channels. Face layer 5/8" type X gypsum wallboard or veneer base attached vertically over base layer with 1 5/8" type S drywall screws 24" o.c. into near side coreboard channels along vertical edges and intermediate channels. Coreboard panels consist of two 1" x 16" or 24" wide gypsum coreboards with metal channels on long edges mill laminated with 2 1/2" offset and are secured to top and bottom tracks with three 2 5/8" type S drywall screws per panel with adjacent edges secured with 1 5/8" type S drywall screws 24" o.c. (NLB)	NGC 3064	125 315 800 2000	160 400 1000 2500	200 500 1250 3150	250 630 1600 4000
5/8" 1:3 gypsum-sand plaster over exposed side only of 3" hollow gypsum block or tile. (NLB)	Based on BMS 144/304	125 500 4000	200 800	250 1000	400 2000
1/2" 1:3 gypsum-sand plaster over unexposed side only of 4" thick hollow gypsum block. (NLB)	Based on BMS 144/305	125 500 4000	200 800	250 1000	400 2000

SGP 0027907

EXTERIOR WALLS

Sound Rating STC		GA & Company Codes	Thick- ness	Limiting Height	Weight psf	Fire Test Ref.
35 to 39		WP 8110 (p)	5 1/4"		8	FM WP-78
		WP 8120	5 5/8"		14-16	NBS- 191, 192
45 to 49		WP 8200 (t)	5 3/8"		18	T-4866
45 to 49		WP 8310	6 1/2"			T-4133
		WP 8320 (t)	5 3/4"		20	T-4851

DETAILED DESCRIPTION	Sound Test Ref.	TL Values at Test Frequencies From 125 Hz to 4000 Hz
Interior: One layer $\frac{5}{8}$" type X gypsum wallboard or veneer base attached at right angles to 2" x 4" wood studs 16" o.c. with 6d coated nails $1\frac{7}{8}$" long, 0.0915" shank, $\frac{1}{4}$" heads, 7" o.c. Exterior: Base layer $\frac{1}{2}$" gypsum sheathing attached at right angles to studs with galvanized roofing nails $1\frac{1}{2}$" long, 0.125" shank, $\frac{7}{16}$" heads, 8" o.c. Face layer $\frac{3}{8}$" mineral cellulose fiber clapboard or panel siding over base layer gypsum sheathing. Clapboard applied over sheathing at right angles to studs with 8d galvanized nails, $2\frac{1}{2}$" long, 0.105" shank, $\frac{7}{32}$" heads, $\frac{3}{4}$" from bottom, each course. Panel siding applied over sheathing and attached parallel to studs with 6d galvanized nails, 2" long, 0.105" shank, $\frac{3}{16}$" heads, 4" o.c. along perimeter and 12" o.c. to intermediate studs. Vertical joints covered with batten strips attached with 8d galvanized siding nails 12" o.c. (LB)		
Exterior base layer $\frac{1}{2}$" gypsum sheathing nailed at right angles to 2" x 4" wood studs 16" o.c. with galvanized roofing nails, $1\frac{3}{4}$" long, 0.160" shank, $\frac{1}{2}$" heads, 8" o.c. Face layer wood siding applied at right angles to studs with 7d coated nails, $2\frac{1}{4}$" long, 0.099" shank, $\frac{1}{4}$" heads, 16" o.c. Interior side $\frac{1}{2}$" thick 1:2 gypsum-sand plaster applied over $\frac{3}{8}$" perforated gypsum lath nailed at right angles to studs with blue lath nails $1\frac{1}{8}$" long, 0.0915" shank, $\frac{3}{8}$" heads. (LB)		
$\frac{5}{8}$" special type X gypsum wallboard or veneer base attached with 1" type S drywall screws 12" o.c. to resilient channels 16" o.c. screw attached to $3\frac{1}{4}$" open web wire studs 16" o.c. Opposite side 3.4 lb. polyethylene backed metal lath tied or clipped 6" o.c. to studs and tied at laps with 18 gage galvanized wire. 1" portland cement-lime stucco face. (NLB)		
Exterior: exposed face 1" portland cement lime plaster applied over 3.4 lb. galvanized metal lath wire tied with 18 gage steel wire to 4" punched steel studs 16" o.c. with $\frac{3}{4}$" channels bridging at third points. Interior unexposed side 1" 1:2 gypsum-sand plaster applied over 3.4 lb. metal lath wire tied to vertically installed $\frac{1}{4}$" dia. pencil rods attached to studs with resilient clips. 2 mill polyethylene vapor barrier on interior side of stud cavity and 3" mineral fiber 3.86 pcf friction fit in stud cavity. (NLB)		
One layer $\frac{5}{8}$" special type X gypsum wallboard or veneer base applied parallel to $3\frac{5}{8}$", 20 gage metal studs 16" o.c. with 1" type S drywall screws 8" o.c. Friction fit mineral fiber 3" thick 2 pcf in stud cavity. Opposite side 3.4 lb. self-furring metal lath applied over $\frac{1}{2}$" gypsum sheathing attached at right angles to studs. Metal lath attached through sheathing to studs with $1\frac{1}{4}$" type S drywall screws 8" o.c. 1" portland cement-lime stucco face. (NLB)		SGP 0027909

EXTERIOR WALLS

Sound Rating STC	GA & Company Codes	Thick- ness	Limiting Height	Weight psf	Fire Test Ref.
40 to 44	WP 8410	10 $\frac{1}{8}$ "		38-40	R 1505-1, 2 Design 23-2
	WP 8420	8 $\frac{5}{8}$ "			UC 12/21/67

SGP 0027910

DETAILED DESCRIPTION	Sound Test Ref.	TL Values at Test Frequencies From 125 Hz to 4000 Hz							
Interior base layer $\frac{5}{8}$" type X gypsum wallboard or veneer base applied parallel to or at right angles to 2" x 4" wood studs 16" o.c. with 6d coated nails, $1\frac{7}{8}$" long, 0.0915" shank, $\frac{1}{4}$" heads, 8" o.c. Face layer $\frac{5}{8}$" type X gypsum wallboard or veneer base applied parallel to or at right angles to studs with 8d coated nails, $2\frac{3}{8}$" long, 0.113" shank, $\frac{5}{32}$" heads, 8" o.c. Exterior base layer $\frac{1}{2}$" gypsum sheathing applied at right angles to studs with galvanized roofing nails, $1\frac{3}{4}$" long, 0.125" shank, $\frac{7}{16}$" heads. Face layer 2" x 4" x 8" clay brick with 1" air space between brick and exterior sheathing. No. 20 gage galvanized wire ties attached to each stud with 8d coated nails as described above, located at every 6th course of bricks. (LB)									
Interior base layer $\frac{5}{8}$" type X gypsum wallboard or veneer base applied parallel to 2" x 6" fire retardant treated wood studs 16" o.c. with 6d coated nails, $1\frac{7}{8}$" long, 0.0915" shank, $\frac{1}{4}$" heads, 12" o.c. on edges and to intermediate studs. Face layer $\frac{5}{8}$" type X gypsum wallboard or veneer base applied at right angles to studs with 8d coated nails, $2\frac{3}{8}$" long, 0.113" shank, $\frac{5}{32}$" heads, 8" o.c. along edges and 12" o.c. to intermediate studs. Exterior base layer $\frac{5}{8}$" type X gypsum wallboard or veneer base applied same as interior base layer and covered with a single layer fire resistant protective vapor barrier paper stapled along each edge at 16" o.c. under galvanized self-furring wire mesh nailed with 8d galvanized roofing nails, $2\frac{3}{8}$" long, 0.113" shank, $\frac{5}{32}$" heads, 6" o.c. Cement-stucco applied to wire mesh in two $\frac{1}{2}$" thick coats with bonding agent applied between coats. (LB)									

SGP 0027911

METAL CLAD PARTITIONS

Sound Rating STC	GA & Company Codes	Thick- ness	Limiting Height	Weight psf	Fire Test Ref.
30 to 34	WP 9010	5"		8	R 4013-14 Design 37-1
	WP 9060	4 5/8"		7	FM WP 155-1 WP 167-1
30 to 34	WP 9210	6"		10	Designs 5-2, 10-2, 12-2
	WP 9220	6 1/2"		12	Design 9-2
	WP 9230	6"		10	R 4013-12 Design 29-2

DETAILED DESCRIPTION	Sound Test Ref.	TL Values at Test Frequencies From 125 Hz to 4000 Hz
Two layers $\frac{5}{8}$ " type X gypsum wallboard or veneer base attached with $1\frac{5}{8}$ " type S drywall screws 12" o.c. to subgirts 3" in from top and bottom and faced with steel liner backed with $1\frac{1}{2}$ " mineral fiber and steel facia element. For types of designs, facias, and methods of attachment, consult manufacturer. (NLB)		
Interior exposed side: Base layer $\frac{5}{8}$ " type X gypsum wallboard or veneer base attached with 1" type S drywall screws 12" o.c. at right angles to steel furring channels applied horizontally to legs of exterior panels with 1" type S drywall screws 16" o.c. Face layer $\frac{5}{8}$ " type X gypsum wallboard or veneer base attached at right angles to furring channels laminated to base layer with adhesive and with $1\frac{7}{8}$ " type S drywall screws 12" o.c. along top and bottom edges. Alternately, base layer attached with 1" type S drywall screws 24" o.c. to vertical edges and with face layer secured with $1\frac{7}{8}$ " type S drywall screws 12" o.c. to furring channels. Exterior panels consist of fluted steel wall panels, 24 gage steel, 16" wide, having "J" shaped 3" deep legs which interlock along vertical edges. 3" thick mineral fiber 1 pcf friction fit in panel cavity. (LB) (One hour with either side exposed to fire-NLB)		
Four layers $\frac{1}{2}$ " type X gypsum wallboard or veneer base attached together vertically and/or horizontally with joints between adjacent layers staggered. Successive layers secured with impaling spikes, screws, and/or bolts. For various types and designs of steel facings, and attachment details, see specific design numbers as listed by U.L., Inc., Guide No. 40 U 18-24. (NLB)		
Five layers $\frac{1}{2}$ " type X gypsum wallboard or veneer base applied vertically and horizontally with joints staggered 12" o.c. progressively from first layer with impaling clip spikes. Faced with steel or aluminum facings as listed by U.L., Inc., Guide No. 40 U 18-24. (NLB)		
Three layers $\frac{5}{8}$ " type X gypsum wallboard or veneer base attached to subgirts and each other with $1\frac{5}{8}$ " type S drywall screws and faced with various steel and aluminum facias. For types of designs, facias, and methods of attachment, consult manufacturers. (NLB)		SGP 0027913

METAL CLAD PARTITIONS

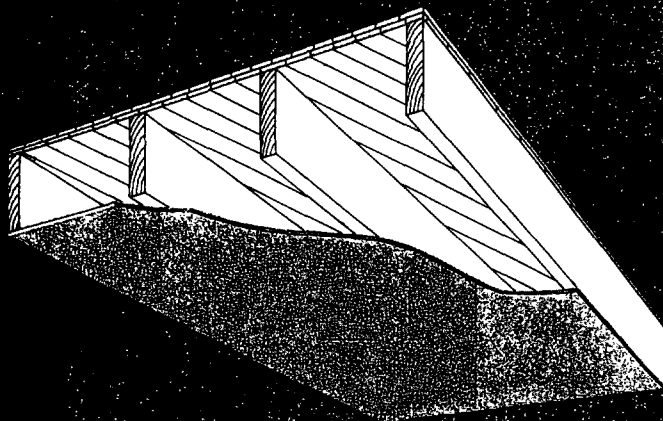
Sound Rating STC		GA & Company Codes	Thick-ness	Limiting Height	Weight psf	Fire Test Ref.	
45 to 49		WP 9325	5 3/4"		11	FM WP 150-2	
30 to 34		WP 9410	6 1/2"		11	Design 7-3	
		WP 9420	6"		10	R 4013-13 Design 11-3	

SGP 0027914

DETAILED DESCRIPTION	Sound Test Ref.	TL Values at Test Frequencies From 125 Hz to 4000 Hz					
Interior exposed side: Four layers 1/2" type X gypsum wallboard or veneer base. Base layer attached with 1" type S drywall screws 24" o.c. at right angles to steel furring channels, applied horizontally to legs of exterior panels with 1" type S drywall screws 16" o.c. Second layer attached to furring channels with 1 7/8" type S drywall screws 24" o.c. with vertical joints offset 16". Third layer attached with 1" type S drywall screws 24" o.c. to furring channels placed over the second layer directly over the first rows of furring channels and attached thereto with 1 7/8" type S drywall screws 16" o.c. Face layer attached to furring channels with 1 7/8" type S drywall screws 12" o.c. Exterior panels consist of fluted steel wall panels, 24 gage steel, 16" wide, having "J" shaped 3" deep legs which interlock along vertical edges. 3" thick mineral fiber 1 pcf friction fit in panel cavity. (LB) (one hour with either side exposed to fire-NLB)							
Five layers 1/2" gypsum wallboard or veneer base applied vertically and horizontally with joints staggered 12" o.c. progressively from first layer with impaling clip spikes. For types of designs, facias, and methods of attachment. See U.L., Inc. Guide No. 40 U 18-24. (NLB)							
Four layers 5/8" type X gypsum wallboard or veneer base vertically attached to subgirts and each other with 1 5/8" type S drywall screws and faced with various steel or protected metal liner and fascia elements. Stagger horizontal and vertical wallboard joints each layer and side. For types of designs, facias, and methods of attachment, consult manufacturer. (NLB)							

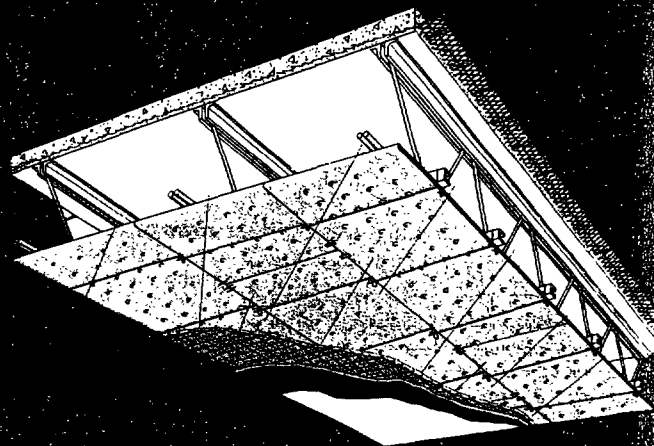
SGP 0027915

FLOOR-CEILING ASSEMBLIES



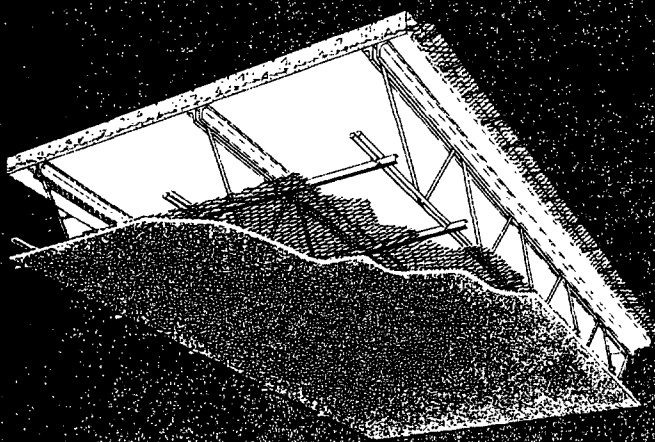
WOOD JOIST CONSTRUCTION

With gypsum wallboard, gypsum or metal lath and plaster ceiling direct to joists.



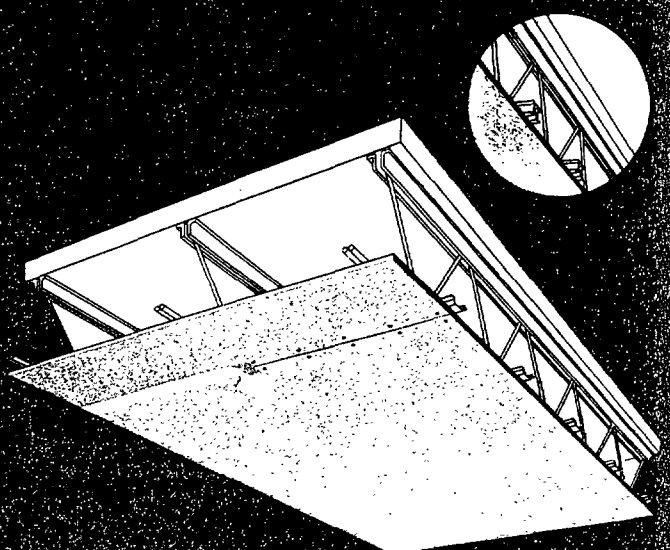
GYPSUM LATH AND PLASTER CEILINGS

Lath clipped, nailed or screw attached to steel channels furred or suspended from steel joists or floor slab.



METAL LATH AND PLASTER CEILINGS

Lath wire tied to steel channels furred or suspended from steel joists or floor slab.



GYPSUM WALLBOARD CEILINGS

Gypsum wallboard attached to nailing or screw type channels — furred or suspended from steel joists or floor slabs.

FIRE RESISTANT FLOOR-CEILING ASSEMBLIES

A ceiling used as membrane fireproofing usually consists of gypsum or metal lath and gypsum plaster or gypsum wallboard. Tests have been conducted to show that metal furring channels can be either suspended or attached directly to the bottom chords of steel beams, bar joists or wood joists without lowering the fire resistance rating.

FIRE-STOPPING

Many building codes and fire insurance rating regulations require that the plenum space between fire resistant ceilings and floor slabs above the ceilings be fire-stopped with unpenetrated vertical barriers at specified intervals. Such fire stopping must be continuous from the ceiling to the slab above as well as across the area (horizontally).

Beams or girders having solid webs provide acceptable vertical fire-stopping if the ceiling or a fire rated partition is in contact with the lower flange of such structural members. Where the supporting steel cannot be used for fire-stopping, a partition may be extended to the floor slab above, or a gypsum fireproofing vertical barrier from the ceiling to the floor construction above may be installed.

CEILING OPENINGS

Tests have been conducted to determine the effect of openings, such as air ducts and electrical outlets, on the fire resistance of a ceiling assembly.

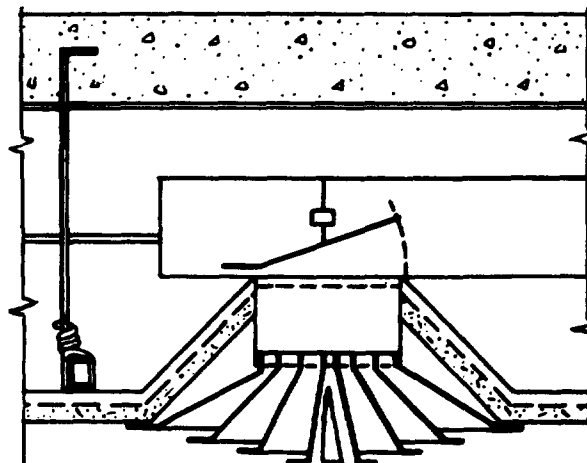
These tests show that such ceiling openings have little or no effect on the fire resistance, provided the aggregate area of openings in a given ceiling does not exceed 100 sq. in. per 100 sq. ft. of ceiling area.

Most building codes permit unprotected openings when so limited and/or require protected openings for larger areas. In addition, air duct openings should be protected to meet code requirements.

The area of electrical outlets should not exceed 16 sq. in. per outlet.

USE OF PLENUM SPACE

If the plenum space formed by the floor slab and ceiling is used as a duct to supply or exhaust conditioned air through ceiling openings, the air temperature should not exceed 125°F. Condensation within the plenum space should be avoided. Where directly applied, furred or suspended ceilings occur under roof construction, the plenum should be vented according to recommended engineering practices.



SGP 0027917

FLOOR-CEILING ASSEMBLIES, NONCOMBUSTIBLE

Sound Rating		GA & Company Codes	Ceiling Weight psf	Fire Test Ref.	IIC
50 to 54		FC 1105	2	FM FC-134	20 (67 C & P)
45 to 49		FC 1110	2	R 2717-30 Design 17-1½	20 (67 C & P)
		FC 1120	2-4	T-1936	
		FC 1130	2-3	T-3694	
		FC 1140	4	R 3657-6 Design 10-1	26 (73 C & P)
		FC 1150	3-4	BMS 141/317	26 (73 C & P)
		FC 1160	4	T-3693	

DETAILED DESCRIPTION	Sound Test Ref.	TL Values at Test Frequencies From 125 Hz to 4000 Hz				
1/2" type X gypsum wallboard or veneer base applied across 3 5/8" steel studs spaced 24" o.c. with 1" type S drywall screws 12" o.c. each stud. Studs wire tied with double strand 18 gage wire 8'-0" o.c. to steel joists spaced 24" o.c. supporting 3/8" rib metal lath and 2 1/2" concrete slab.	Based on NGC 4075	125 315 800 2000	160 400 1000 2500	200 500 1250 3150	250 630 1600 4000	
1/2" type X gypsum wallboard or veneer base applied across drywall furring channels 24" o.c. with 1" type S drywall screws 12" o.c.; at end joints 8" o.c. to additional pieces of drywall furring channels. Furring channel wire tied 24" o.c. to open web steel joists supporting 3/8" rib metal lath or 5/16" deep 28 gage corrugated steel and 2" concrete slab. (Passed 90 minute fire test.)	Based on NGC 4075	125 315 800 2000	160 400 1000 2500	200 500 1250 3150	250 630 1600 4000	
5/8" type X gypsum wallboard or veneer base applied across drywall furring channels 24" o.c. with 1" type S drywall screws 12" o.c. End joints on channels attached with screws 8" o.c. or are reinforced with 6" strips of 5/8" board laminated to backside. Furring channels wire tied 48" o.c. with 18 gage steel wire to open web steel joists 24" o.c. supporting 3/8" rib metal lath and 2" concrete slab.						
5/8" type X gypsum wallboard or veneer base applied across 3 5/8" or 6" drywall steel studs 16" o.c. with 1" type S drywall screws 12" o.c. to form ceiling envelope without direct attachment to joists except at stud ends. The studs with a stud sleeve on one end were inserted in runners around the sidewalls suspended by 1/8" x 1" steel straps from open web steel bar joists 24" o.c. supporting a 2" concrete slab laid over 3/8" rib metal lath. 11'-10" maximum span with 3 5/8" studs 16" o.c. and 12'-10" for 6" studs 16" o.c.						
1/2" mill-mixed gypsum-perlite plaster applied over 3/8" perforated gypsum lath attached with 11 gage barbed ratchet nails 1 1/8" long, 1 1/32" heads, 5" o.c. to 25 gage nailing channel 16" o.c. and with three end joint clips at lath ends. Nailing channels wire tied with 18 gage steel wire to open web steel joists 24" o.c. supporting 3/8" rib metal lath or 5/16" deep, 28 gage corrugated steel and 2" concrete slab.	NGC 4056	125 315 800 2000	160 400 1000 2500	200 500 1250 3150	250 630 1600 4000	
1/2" 1:2 gypsum-perlite plaster applied over 3/8" perforated gypsum lath clip attached to 3/4" cold rolled channels 16" o.c. wire tied with 18 gage wire to open web steel joists 24" o.c. supporting 3/8" rib metal lath and 2" concrete slab.	Based on NGC 4056	125 315 800 2000	160 400 1000 2500	200 500 1250 3150	250 630 1600 4000	
1/2" 1:2-1:3 gypsum-sand plaster applied over 3/8" type X gypsum lath attached with 1 1/8" long ring shanked lath nails or 1 1/8" long by 5/16" crown staples at right angles to 25 gage nailing channels 16" o.c. wire tied with 18 gage wire to open web steel joists 24" o.c. supporting 3/8" rib metal lath and 2" concrete slab. No. 10 gage 3" wide welded wire reinforcing mesh, nailed or stapled over lath and under plaster to nailing channels.						

SGP 0027919

SGP 0027919

FLOOR-CEILING ASSEMBLIES, NONCOMBUSTIBLE

Sound Rating		GA & Company Codes	Ceiling Weight psf	Fire Test Ref.	IIC
45 to 49		FC 1170	4	R 3657-5 Design 7-1	26 (73 C & P)
		FC 1180	3-4	BMS 92/43	
50 to 54		FC 2020	2½	R 4024-3, 6, 12 Design 63-2	
		FC 2030	2	R 3501-28 Design 94-2	21 (67 C & P)
		FC 2040	5-6	FM FC-33	28 (77 C & P)
45 to 49		FC 2110 (t)	3	R 1319-112 Design 266-2	37
		FC 2120	2-3	PCA 1281-1	
		FC 2130 (g, k)	2½	R 2717-43 Design 259-2	21 (67 C & P)

DETAILED DESCRIPTION	Sound Test Ref.	TL Values at Test Frequencies From 125 Hz to 4000 Hz				
5/8" 1:2 gypsum-perlite plaster applied over 3/8" perforated gypsum lath clip attached to 3/4" cold rolled furring channels 16" o.c. wire tied with 18 gage wire to open web steel joists 24" o.c. supporting 3/8" rib metal lath and 2" concrete slab.	Based on NGC 4056	125 315 800 2000	160 400 1000 2500	200 500 1250 3150	250 630 1600 4000	
5/8" 1:2-1:3 gypsum-sand plaster applied over 3/8" rib metal lath wire tied with 18 gage steel wire 5" o.c. to open web steel joists 24" o.c. supporting 3/8" rib metal lath and 2" concrete slab. (Passed 90 minute fire test)						
5/8" type X gypsum wallboard or veneer base applied at right angles to drywall furring channels with 1" type S drywall screws 8" o.c. Furring channels 12" o.c. wire tied with 18 gage wire 48" o.c. to open web steel joists 24" o.c. supporting 3/8" rib metal lath or 5/16" deep, 28 gage corrugated steel and 2 1/2" concrete slab.						
One layer 1/2" type X gypsum wallboard or veneer base applied at right angles to drywall furring channels with 1" type S drywall screws 12" o.c. Furring channels 24" o.c. attached with 18 gage wire ties or 11 gage wire clips 48" o.c. to open web steel joists 24" o.c. supporting 3/8" rib metal lath or 5/16" deep, 28 gage corrugated steel and 2 1/2" concrete slab. Double channel at wallboard end joints.	NGC 4075	125 315 800 2000	160 400 1000 2500	200 500 1250 3150	250 630 1600 4000	
1/2" 1:2 gypsum-sand plaster over 1/2" type X gypsum lath attached with 1" type S drywall screws 7" o.c. to furring channels 16" o.c. attached with 18 gage wire ties to open web steel joists 24" o.c. supporting 3/8" rib metal lath and 2" concrete slab. End joints between channels supported by clips.	NGC 4031	125 315 800 2000	160 400 1000 2500	200 500 1250 3150	250 630 1600 4000	
One layer 5/8" type X gypsum wallboard or veneer base applied with 1" type S screws 12" o.c. to drywall furring channels wire tied 24" o.c. with 18 gage wire to open web steel joists spaced 48" o.c. and supporting 2" metal edged gypsum floor plank welded to joists and topped with 1/2" special gypsum underlayment compound.	CK 6612-26	125 315 800 2000	160 400 1000 2500	200 500 1250 3150	250 630 1600 4000	
5/8" type X gypsum wallboard or veneer base screw attached to drywall furring channels with 1" type S drywall screws 8" o.c. Furring channels 24" o.c. suspended from precast joists 35" o.c. with 21 gage galvanized steel hanger straps fastened to sides of joists.						
5/8" type X gypsum wallboard or veneer base applied perpendicular to drywall furring channels with 1" type S drywall screws 12" o.c. Drywall furring channels 24" o.c. attached with 18 gage wire ties to open web steel joists 24" o.c. and supporting 3/8" rib metal lath and 2" concrete slab. Double channel at wallboard end joints.	Based on NGC 4075	125 315 800 2000	160 400 1000 2500	200 500 1250 3150	250 630 1600 4000	

SGP 0027921

FLOOR-CEILING ASSEMBLIES, NONCOMBUSTIBLE

Sound Rating		GA & Company Codes	Ceiling Weight psf	Fire Test Ref.	IIC
45 to 49		FC 2140	4	BMS 141/318	
		FC 2150	7	NBS 345	
		FC 2160	3-5	BMS 92/43	
		FC 2170	4	R 5429-1	
40 to 44		FC 2190 (t)	2½	R 1319-126 Design 312-2	
35 to 39		FC 2211	2½	R 4374-10, 18, 31 Design 294-2	
50 to 54		FC 3010 (t)	3	R-1319-79 Design 82-3	

SGP 0027922

DETAILED DESCRIPTION	Sound Test Ref.	TL Values at Test Frequencies From 125 Hz to 4000 Hz				
1/2" 1:2 gypsum-perlite plaster over 3/8" perforated gypsum lath clip attached to 3/4" cold rolled channels 16" o.c. secured with 18 gage wire ties to open web steel joists 24" o.c. supporting 3/8" rib metal lath and 2" concrete slab. Additionally, support gypsum lath with 14 gage galvanized wire secured on the diagonal extending from wall to wall and passing under the junctions of successive wire clips.						
5/8" 1:2-1:3 gypsum-sand plaster over 3/8" perforated gypsum lath clipped to 3/4" cold rolled channels 12" o.c. secured with 18 gage wire ties to open web steel joists 24" o.c. supporting 3/8" rib metal lath and 2" concrete slab. Additionally, support gypsum lath with 14 gage galvanized wire secured on the diagonal extending from wall to wall and passing under the junctions of successive wire clips.						
5/8" gypsum-vermiculite plaster or 7/8" gypsum-wood fiber plaster applied to 3/8" rib metal lath wire tied with 18 gage wire 5" o.c. to open web steel joists 24" o.c. supporting 3/8" rib metal lath and 2" concrete slab.						
3/4" 1:1 gypsum-sand wood-fibered plaster applied to 3.4 lb. metal lath wire tied 6" o.c. with 18 gage wire to 3/4" cold rolled channels 13 1/2" o.c. with 18 gage wire ties to open web steel joists 24" o.c. supporting 3/8" rib metal lath and 2 1/2" concrete slab.						
Nominal 24" x 24" x 1/2" type X gypsum wallboard lay-in panels supported by steel framing members suspended from steel open web joists supporting 3/8" rib metal lath and 2 1/2" concrete slab.						
1/2" special gypsum-vermiculite plaster spray-applied to under surface of steel deck supporting 2 1/2" concrete slab.						
5/8" type X gypsum wallboard or veneer base screw attached with 1" type S drywall screws 12" o.c. at right angles to furring channels 24" o.c. (double channels at end joints). Furring channel wire tied to open web steel joist 24" o.c. supporting 3" reinforced concrete slab over 3/8" rib metal lath.						

SGP 0027923

FLOOR-CEILING ASSEMBLIES, NONCOMBUSTIBLE

Sound Rating		GA & Company Codes	Ceiling Weight psf	Fire Test Ref.	IIC
45 to 49		FC 3110	5	BMS 141/313	
		FC 3120	4	BMS 141/312	
		FC 3130	3	NBS 337	
		FC 3140	4	BMS 92/43	
		FC 3150	2½	R 3574-6 Design 11-3	
35 to 39		FC 3211	2	R 4374-15 Design 72-3	
		FC 3221	2½	R 4374-18 Design 52-3	

SGP 0027924

DETAILED DESCRIPTION	Sound Test Ref.	TL Values at Test Frequencies From 125 Hz to 4000 Hz					
5/8" 1:2 gypsum-perlite plaster applied over 3/8" perforated gypsum lath clip attached and additionally supported with 14 gage diagonal wire reinforcing to 3/4" cold rolled channels 12" o.c. wire tied with 18 gage wire to open web steel joists 24" o.c. supporting 3/8" rib metal lath and 2" concrete slab.							
1/2" 1:2 gypsum-perlite plaster applied over 3/8" perforated gypsum lath clip attached and additionally supported with 1" hexagonal mesh 20 gage galvanized wire fabric to 3/4" cold rolled channels 16" o.c. wire tied with 18 gage wire to open web steel joists 24" o.c. supporting 3/8" rib metal lath and 2" concrete slab.							
1/2" 1:2 gypsum-perlite plaster applied over 3/8" perforated gypsum lath clip attached and additionally supported with 14 ga. diagonal wire reinforcing to 3/4" hot rolled channels 12" o.c. wire tied to 1 1/2" cold rolled channels 24" o.c. hung from the steel deck with No. 8 gage steel wire or 3/16" x 1" steel straps 24" o.c. 2 1/2" concrete slab over cellular rolled steel decks supported by steel beam. Gypsum-perlite plaster applied 7/8" thick over 3/8" perforated gypsum lath around beam.							
5/8" 1:2-1:3 gypsum-vermiculite plaster or 7/8" neat-wood fiber gypsum plaster applied over 3.4 lb. metal lath wire tied with 18 gage wire 5" o.c. to open web steel joists 24" o.c. supporting 3/8" rib metal lath and 2 1/2" concrete slab.							
5/8" thick mill-mixed gypsum-perlite plaster applied over 3.4 lb. metal lath wire tied to 3/4" cold rolled channels 12" o.c. wire tied to 1 1/2" cold rolled channels 48" o.c. suspended with 8 gage steel wire 36" o.c. from 2" concrete slab over cellular steel deck.							
5/8" special gypsum-vermiculite plaster spray applied under cells and 3/4" between cells of cellular steel decking supporting 2 1/2" concrete slab.							
1 1/16" special gypsum-vermiculite plaster spray applied to flat plates and 1 3/16" on sides and across top of fluted sections of undersurface of steel deck supporting 2 1/2" concrete slab.							

SGP 0027925

FLOOR-CEILING ASSEMBLIES, NONCOMBUSTIBLE

Sound Rating		GA & Company Codes	Ceiling Weight psf	Fire Test Ref.	IIC
45 to 49		FC 4110	5½	BMS 141/311	
		FC 4120	5	BMS 92/43	
		FC 4130	5	R 3355 Design 1-4	
		FC 4150	6	NBS 338	

SGP 0027926

DETAILED DESCRIPTION	Sound Test Ref.	TL Values at Test Frequencies From 125 Hz to 4000 Hz							
1" 1:2-1:3 gypsum-perlite plaster applied over $\frac{3}{8}$ " perforated gypsum lath clip attached and additionally supported with 1" mesh 20 gage galvanized wire fabric to $\frac{3}{4}$ " cold rolled channels 12" o.c. wire tied to open web steel joists 24" o.c. supporting $\frac{3}{8}$ " rib metal lath and 2" concrete slab.									
$\frac{7}{8}$ " 1:2-1:3 gypsum-vermiculite plaster applied over $\frac{3}{8}$ " rib metal lath wire tied 5" o.c. to open web steel joists 24" o.c. supporting $\frac{3}{8}$ " rib metal lath and 2 $\frac{1}{2}$ " concrete slab.									
$\frac{7}{8}$ " 1:2 gypsum-vermiculite plaster applied over 3.4 lb. metal lath wire tied 5" o.c. to $\frac{3}{4}$ " cold rolled channels 12" o.c. wire tied to 1 $\frac{1}{2}$ " cold rolled channels 48" o.c. suspended with 8 gage steel wire hangers 48" o.c. from 2" concrete slab over cellular steel deck.									
$\frac{1}{2}$ " gypsum acoustical plaster spray applied over $\frac{5}{8}$ " 1:2 gypsum-perlite plaster applied to 3.4 lb. metal lath wire tied 5" o.c. to $\frac{3}{4}$ " hot rolled channels 12" o.c. wire tied to 1 $\frac{1}{2}$ " runner channels suspended by No. 8 gage wire or $\frac{3}{16}$ " x 1" steel strap hangers 48" o.c. from cellular steel deck and 2 $\frac{1}{2}$ " concrete slab.									

SGP 0027927

FLOOR-CEILING ASSEMBLIES, WOOD-FRAMED

Sound Rating		GA & Company Codes	Ceiling Weight psf	Fire Test Ref.	IIC
55 to 59		FC 5105 (k)	2	R 2717-29 Design 33-1	73
50 to 54		FC 5110	6¼	SFT-42	
		FC 5115	2	R 3453-7 Design 62-1	47
45 to 49		FC 5220 (t)	5	R 1319-90 Design 22-1½	
		FC 5230	2	FM FC-77	
		FC 5240 (t)	3	R 1319-65 Design 41-1	

DETAILED DESCRIPTION	Sound Test Ref.	TL Values at Test Frequencies From 125 Hz to 4000 Hz				
1/2" type X gypsum wallboard or veneer base applied at right angles to resilient drywall furring channels with 1" type S drywall screws 12" o.c. Resilient channels applied 24" o.c. at right angles to wood joists 16" o.c. with 6d common nails. Wood joists supporting 5/8" plywood and 1 1/4" special gypsum underlayment. Sound tested using 3 1/2" mineral fiber in joist spaces and with carpet and pad.	G & H BW 10 MT	125 315 800 2000	160 400 1000 2500	200 500 1250 3150	250 630 1600 4000	
1/2" 1:2-1:3 gypsum-sand plaster applied over 3/8" type X gypsum lath and 3" wide woven wire strips over joints screw attached with three 1" type S drywall screws per lath per bearing to drywall resilient channels nailed 16" o.c. to wood joists 16" o.c. with 6d coated nails 1 7/8" long, 0.0915" shank, 1/4" heads, supporting 1" nominal wood sub and finish floor.						
5/8" type X gypsum wallboard or veneer base applied at right angles to drywall furring channels with 1" type S drywall screws 12" o.c. Drywall furring channels 24" o.c. at right angles to wood joists 16" o.c. with 1 1/4" type W drywall screws. Wood joists supporting 5/8" plywood sub-floor and 1 5/8" perlite-sand concrete reinforced with No. 19 SWG galvanized hexagonal wire mesh 3" mineral fiber 0.90 pcf in joist space.	Kodaras Acoustical Laboratory L 224-34-65	125 500 2000	175 700 2800	250 1000 4000	350 1400	
Face layer 1/2" type X gypsum wallboard or veneer base applied at right angles to resilient channels 24" o.c. with 1" type S drywall screws. Resilient channel attached at right angles to wood joists 16" o.c. and over base layer of 1/2" type X gypsum wallboard or veneer base with 1 7/8" drywall furring channel screws. Base layer applied at right angles to joists with 6d coated nails 1 7/8" long, 0.0915" shank, 1/4" heads, 1", 6" and 21" from each side edge in the field of the board, supporting 1" nominal wood sub and finish floor.						
1/2" type X gypsum wallboard or veneer base applied across resilient furring channels 24" o.c. with 1" type S drywall screws 12" o.c. Resilient furring channels spaced 24" o.c. with two 5d coated nails 1 5/8" long, 0.086" shank, 1 5/16" heads per wood joist, spaced 16" o.c. and supporting 1 1/32" special cellulose fiber decking. Gypsum board butt joints secured with additional pieces of drywall furring channel.						
1/2" type X gypsum wallboard or veneer base applied at right angles to resilient furring channels 24" o.c. with 1" type S drywall screws 12" o.c. Resilient furring channels spaced 24" o.c. with 1 1/4" type W drywall screws to wood joists 16" o.c. supporting 1" nominal wood sub and finish floor. Gypsum board butt joints secured with additional pieces of furring channel.						

SGP 0027929

FLOOR-CEILING ASSEMBLIES, WOOD-FRAMED

Sound Rating		GA & Company Codes	Ceiling Weight psf	Fire Test Ref.	IIC
45 to 49		FC 5250	2	R 2717-29 Design 33-1	39 (67 C&P)
40 to 44		FC 5300	2	R 3501-29 Design 34-1	38 (63 C & P)
		FC 5310	2½	Design 28-1	
		FC 5320	5½	Design 53-1	
		FC 5410	2	R 1319-66 Design 42-1 R 3501-45 Design 44-1 R 2717-38 Design 46-1	32 (66 C & P)
35 to 39		FC 5420	2½	R 3501-5, 9 R 1319-2, 3 Design 1-1	32 (66 C & P)
		FC 5430	3½	R 5229-1 Design 47-1	

DETAILED DESCRIPTION	Sound Test Ref.	TL Values at Test Frequencies From 125 Hz to 4000 Hz				
1/2" type X gypsum wallboard or veneer base applied at right angles to resilient furring channels with 1" type S drywall screws 12" o.c. in field and 8" o.c. at end joints. Resilient channels 24" o.c. applied with 6d coated nails, 2" long, 0.113" shank, 1/64" heads to wood joists 16" o.c. supporting 1" nominal wood sub and finish floor.	RAL TL 64-155	125 500 2000	175 700 2800	250 1000 4000	350 1400	
1/2" type X gypsum wallboard or veneer base applied at right angles to drywall resilient furring channels 24" o.c. with 1" type S drywall screws 12" o.c. and nailed with two 4d coated nails, 1 1/2" long, 0.080" shank, and 7/32" heads to wood joists 16" o.c. supporting 1" nominal wood sub and finish floor.	NGC 4010	125 315 800 2000	160 400 1000 2500	200 500 1250 3150	250 630 1600 4000	
5/8" type X gypsum wallboard or veneer base applied at right angles to drywall metal furring channels 24" o.c. with 1" type S drywall screws 12" o.c. Furring channels attached with two 1 1/4" type S drywall screws to each 4" x 10" wood joist spaced 48" o.c. supporting 1 1/8" tongue and groove plywood floor. Gypsum board end joints fastened to additional pieces of furring channels.						
1/2" type X gypsum wallboard or veneer base applied at right angles to wood joists 16" o.c. with 6d coated nails 1 7/8" long, 0.0915" shank, 1/4" heads, 6" o.c. and over 18" x 14" mesh galvanized screen cloth attached parallel to joists with 1/2" x 1/2" wire staples 3 1/4" o.c. Joist cavity completely and uniformly filled with mineral fiber to a density of not less than 3.5 pcf. Joists supporting 5/8" plywood decking applied perpendicular to joists with ends staggered and centered over joists and with edges supported by 2" x 4" wood blocking.						
1/2" type X gypsum wallboard or veneer base applied at right angles to wood joists 16" o.c. with 5d nails 1 3/4" long, 0.099" shank, 1/4" heads, 6" o.c. supporting 1" nominal wood sub and finish floor.	NGC 4024	125 315 800 2000	160 400 1000 2500	200 500 1250 3150	250 630 1600 4000	
5/8" type X gypsum wallboard or veneer base applied at right angles to wood joists 16" o.c. with 6d coated nails 1 7/8" long, 0.0915" shank, 1/4" heads, 6" o.c. Joists supporting 1" nominal wood sub and finish floor.	Based on NGC 4024	125 315 800 2000	160 400 1000 2500	200 500 1250 3150	250 630 1600 4000	
1/2" type X gypsum wallboard or veneer base applied over 1/2" fiberboard with 5d coated nails 1 5/8" long, 0.086" shank, 1/64" heads, 12" o.c. and across stressed-skin factory-built plywood panel consisting of 5/8" plywood adhesive bonded with casein glue to 2" x 6" wood joist 12" o.c. with 8d coated nails 2 3/8" long, 0.113" shank, 5/32" heads, 6" o.c. at end joints and 8" o.c. in the field.						

SGP 0027931

SGP 0027931

FLOOR-CEILING ASSEMBLIES, WOOD-FRAMED

Sound Rating		GA & Company Codes	Ceiling Weight psf	Fire Test Ref.	IIC
35 to 39		FC 5460	4	NBS 258	
		FC 5470	4	T-2134-1	
		FC 5480	6	FM FC-30	
		FC 5490	6	SFT-6, 8, 11, 12, 13	
		FC 5500	6	BMS 92/42	
		FC 5510	9	BMS 92/42	
30 to 34		FC 5610	4	NBS 272, 281	

DETAILED DESCRIPTION	Sound Test Ref.	TL Values at Test Frequencies From 125 Hz to 4000 Hz				
1/2" 1:2 gypsum-perlite plaster over 3/8" perforated gypsum lath nailed with blue lath nails 1 1/4" long, 13 gage shank, 1 3/4" heads, 5" o.c. to wood joists 16" o.c. supporting 1" nominal wood sub and finish floor.						
5/8" 1:2 gypsum-perlite plaster over 3/8" type X gypsum lath nailed with blue lath nails 1 1/4" long, 13 gage shank, 3/32" heads or 16 gage 1 1/2" long 7/16" crown staples, four fasteners per lath per bearing, at right angles to wood joists 16" o.c. supporting 1" nominal wood sub and finish floor.						
1/2" 1:2 gypsum-sand plaster over 1/2" x 16" x 48" type X gypsum lath nailed with blue lath nails 1 3/4" long, 0.0915" shank, 1 3/4" heads, 5" o.c. at right angles to wood joists spaced 16" o.c. supporting 1" nominal wood sub and finish floor. Lath end joints clip reinforced at each corner.						
1/2" 1:2 gypsum-sand plaster over 3/8" type X gypsum lath at right angles to wood joists 16" o.c. with blue lath nails 1 1/8" long, 0.0915" shank, 1 3/4" heads, 4 nails per lath per bearing. Joists supporting 1" nominal wood sub and finish floor. Continuous stripping supporting gypsum lath under each joist with 2.5 lb. metal strip lath nailed with 11 gage, 1 1/2" long, 7/16" heads roofing nails, 6" o.c.						
1/2" 1:2 sand-plaster over 3/8" perforated gypsum lath nailed at right angles to wood joists 16" o.c. with blue lath nails 1 1/8" long, 0.0915" shank, 1 3/4" heads, 4" o.c. Joists supporting 1" nominal wood sub and finish floor. 3" wide strips of 2.5 lb. metal lath applied under joists with two nails 1 1/2" long, 11 gage, 7/16" heads at each joist longitudinally and three nails at end joints.						
5/8" 1:2-1:3 gypsum-sand plaster over 3.4 lb. metal lath nailed 6" o.c. with barbed roofing nails 1 1/2" long, 0.120" shank, 7/16" heads to wood joists 16" o.c. supporting 1" nominal wood sub and finish floor.						
5/8" 1:2-1:3 gypsum-vermiculite plaster over 3.4 lb. metal lath nailed 5" o.c. with barbed roofing nails 1 1/2" long, 0.120" shank, 7/16" heads to wood joists 16" o.c. supporting 1" nominal wood sub and finish floor. Tested 1 3/4 hours.					SGP 0027933	

FLOOR-CEILING ASSEMBLIES, WOOD-FRAMED

Sound Rating	GA & Company Codes	Ceiling Weight psf	Fire Test Ref.	IIC
45 to 49	FC 5810 (p)	3	FM FC-137	43 (62 C & P)
35 to 39	FC 5815 (p)	3	FM FC-139	32 (66 C & P)
45 to 49	FC 6010 (t)	6	R 1319-114 Design 272-2	
	FC 6020	6	R 2717-35 Design 217-2	

SGP 0027934

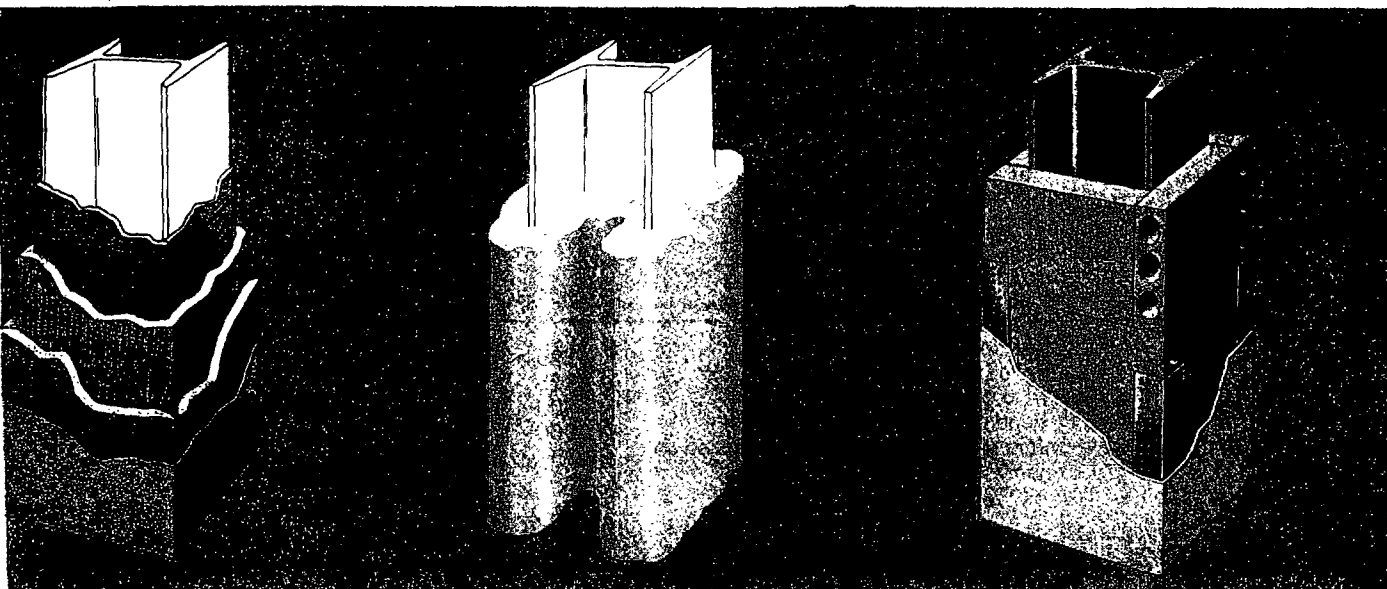
DETAILED DESCRIPTION	Sound Test Ref.	TL Values at Test Frequencies From 125 Hz to 4000 Hz				
One layer 5/8" type X gypsum wallboard or special 5/8" type X gypsum board electrical radiant heating panels attached with 1" type S screws 5 3/4" o.c. at right angles to resilient furring channels spaced 24" o.c. installed at right angles to 2" x 10" wood joists 16" o.c. with 3 1/2" mineral fiber, 0.075 pcf, friction fit in joist space. Wood floor of nominal 1" T&G or 1/2" plywood subfloor and nominal 1" T&G or 5/8" plywood finish floor.	Based on NGC 4021	125 315 800 2000	160 400 1000 2500	200 500 1250 3150		250 630 1600 4000
One layer 5/8" type X gypsum wallboard or special 5/8" type X gypsum board electrical radiant heating panels attached at right angles to 2" x 10" wood joists 16" o.c. with 6d coated nails 1 7/8" long, 0.0915" shank, 1/4" heads or 1 5/8" type S screws spaced 5 3/4" o.c. with 3 1/2" mineral fiber, 0.75 pcf, friction fit in joist space. Wood floor of nominal 1" T&G or 1/2" plywood subfloor and nominal 1" T&G or 5/8" plywood finish floor.	Based on NGC 4024	125 315 800 2000	160 400 1000 2500	200 500 1250 3150		250 630 1600 4000
Face layer 1/2" type X gypsum wallboard or veneer base applied at right angles to resilient channels 24" o.c. with 1" type S drywall screws 12" o.c. Resilient channels applied at right angles to wood joists 16" o.c. and over base layer of 5/8" type X gypsum wallboard or veneer base with 1 7/8" type S drywall screws 16" o.c. Base layer applied at right angles to joists with 8d coated nails 2 1/2" long, 0.113" shank, 1/4" heads, 7" o.c. to wood joists supporting 1" nominal wood sub and finish floor. Gypsum butt joints secured with additional pieces of furring channel.						
Face layer 5/8" type X gypsum wallboard or veneer base applied at right angles to resilient furring channels with 1" type S drywall screws 12" o.c. Drywall furring channel spaced 24" o.c. and nailed at right angles to joists and through base layer with one 8d nail, 2 1/2" long, 0.131" shank, 3/32" head, at each joist and extra channel installed at butt ends of face layer. Base layer 5/8" type X gypsum wallboard or veneer base applied at right angles to wood joists 16" o.c. with 8d nails 2 3/8" long, 0.099" shank, 1/4" heads, 7" o.c. Wood joists supporting 1" nominal wood sub and finish floor.						

SGP 0027935

FIRE RESISTANT COLUMNS

Membrane fireproofing provides a fast, efficient and economical method of fire protecting steel columns. A dead load saving of from 50% to 75% can be real-

ized as compared to other column fireproofing. It reduces the cross-sectional area, saves construction time, and provides a ready surface for decoration.

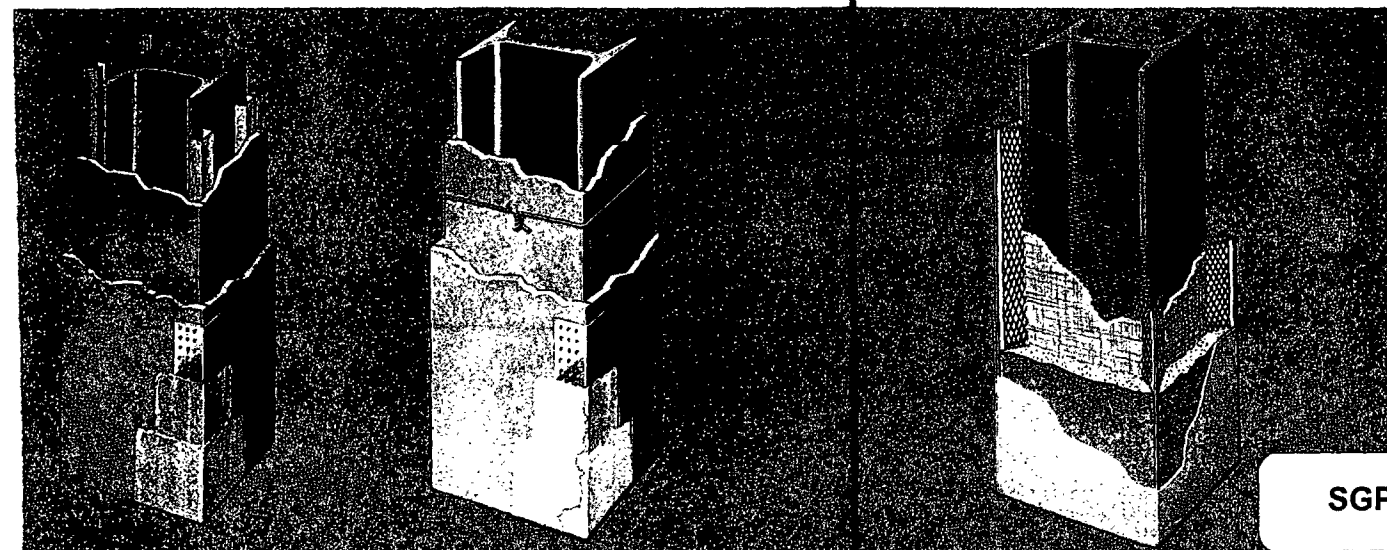


GYPSUM LATH AND PLASTER

1 to 4 hour fire resistance ratings with sand, perlite or vermiculite aggregated plaster of appropriate thickness applied to gypsum lath. The same protection can also be obtained with special spray-on gypsum plaster applied direct to columns in the appropriate thickness.

MASONRY GYPSUM BLOCK (TILE)

1 to 4 hour fire resistance ratings — plastered as required — non-load-bearing.



GYPSUM WALLBOARD

Up to 4 hour fire resistance ratings can be obtained by using specific types of gypsum wallboard and specific types of construction.

METAL LATH AND PLASTER

1 to 4 hour fire resistance ratings with sand, perlite or vermiculite aggregated plaster of appropriate thickness, applied to a self-furring metal lath or diamond mesh metal lath furred from column.

SGP 0027936

FIRE RESISTANT COLUMNS

GA & Company Codes	Thick-ness	CONSTRUCTION DETAILS*	Fire Test Reference
CM 1100	1"	Base layer 1/2" regular gypsum wallboard or veneer base tied to column with 18 gage wire 15" o.c. Face layer 1/2" regular gypsum wallboard or veneer base applied with laminating compound over entire contact surface.	NBS 303
CM 1300	3/4"	5/8" 1:3 gypsum-sand plaster applied to 3.4 lb. metal lath wrapped and wire tied to column with 18 gage wire 6" o.c.	BMS 92/40
CM 2010	2 5/8"	Base layer 1/2" type X gypsum wallboard or veneer base against flanges and across web openings fastened to 1 5/8" metal studs with 1" type S drywall screws 24" o.c. at corners. Face layers 1/2" type X gypsum wallboard or veneer base at right angles to flanges and screw-attached to studs with 1" type S drywall screws 12" o.c. to provide a cavity between boards on the flange. Face layers across the web opening laid flat across the base layer and screw attached with 1 5/8" type S drywall screws 12" o.c. Metal corner beads nailed to outer layer with 4d nails 1 3/8" long, 0.067" shank, 1 3/4" heads, 12" o.c.	R 1319-80 Design 10-2
CM 2020	1 7/8"	Three layers of 5/8" type X gypsum wallboard or veneer base around column with first and second layers nailed with 1 3/8" long ring shank nails as required for support. 1/2" x 0.015" metal strapping 30" o.c. around second layer beginning 18" from each end of column. Face layer attached to 1 1/4" x 1 1/4" 25 gage steel angles held on corners by metal strapping. Drywall corner bead applied each corner with 1" type S drywall screws spaced 12" o.c. at each corner.	R 1319-33 Design 5-2
CM 2110	2 1/8"	One layer 1/2" type X gypsum wallboard or veneer base attached to 1 5/8" steel studs with 1" type S drywall screws 12" o.c. Studs located at each corner of heavy steel column. 1 1/4" metal corner bead crimp attached at 6" intervals.	R 3501-58 Design 20-2
CM 2120	2 5/8"	Two layers of 5/8" type X gypsum wallboard or veneer base, screw attached to 1 5/8" metal studs located at each corner of columns with 1" type S screws 24" o.c. for base layer and 1 5/8" type S drywall screws 12" o.c. for face layer. 1 1/4" metal beads at corners attached with 6d coated nails 1 3/4" long, 0.0915" shank, 1/4" heads, 12" o.c.	R 2717-34 Design 8-2

SGP 0027937

*NOTE: All columns are 10WF49 unless otherwise specified. Heavy columns are 14WF228.

FIRE RESISTANT COLUMNS

GA & Company Codes	Thick-ness	CONSTRUCTION DETAILS*	Fire Test Reference
CM 2310	2 1/4"	1 5/8" 1:1-1:1 wood-fibered gypsum-sand plaster over 3.4 lb. diamond-mesh expanded metal lath sheets wire tied with 18 gage wire 6" o.c. at seams and 1/2" x 3/4" spacers. Lath applied over spacers made of 3/4" furring channel with 2" legs bent around each corner and 40" o.c.	R 4024-10
CM 2320	1 3/8"	1" 1:2-1:3 gypsum-perlite plaster over 3.4 lb. self-furring expanded diamond mesh metal lath and 2 1/2" wide flanged expanded metal corner beads wire tied with 18 gage galvanized wire 6" o.c.	R 3187-4, 5, 7 Design 2-2
CM 2410	3"	3" hollow gypsum block enclosing column. Gypsum mortar at horizontal joints and against flanges.	BMS 92/40
CM 3110	2"	Three layers of 5/8" type X gypsum wall-board or veneer base. First and second layers wire tied with 18 gage wire 6" from each end and 21" o.c. Third layer applied with laminating compound over entire contact surface. 1" type S drywall screws spaced 12" o.c. between second and first layers and third and second layers at corners. 1" corner bead each corner over second and third layers.	R 1319-36 Design 14-3
CM 3120	3 1/2"	Three layers of 5/8" type X gypsum wall-board or veneer base screw attached to 1 5/8" metal studs located at each corner of column. Base layer attached with 1" type S drywall screws 24" o.c., second layer with 1 5/8" type S drywall screws 12" o.c. and 18 gage wire tied 24" o.c. Face layer attached with 2 1/4" type S drywall screws 12" o.c. and 1 1/4" corner bead at each corner nailed with 6d coated nails, 1 7/8" long, 0.0915" shank, 1/4" heads, 12" o.c.	R 2717-31 Design 18-3 R 3501-36 Design 20-3
CM 3130	2 5/8"	Two layers 1/2" type X gypsum wallboard or veneer base. Base layer screw attached to 1 5/8" steel studs located at corners of heavy steel column with 1" type S drywall screws 24" o.c. Face layer attached with 1 5/8" type S drywall screws 12" o.c. into studs. 1" corner bead applied each corner with 4d coated nails 1 3/8" long, 0.067" shank, 1 3/4" heads, 12" o.c.	R 3501-61 Design 39-3

*NOTE: All columns are 10WF49 unless otherwise specified. Heavy columns are 14WF228.

SGP 0027938

FIRE RESISTANT COLUMNS

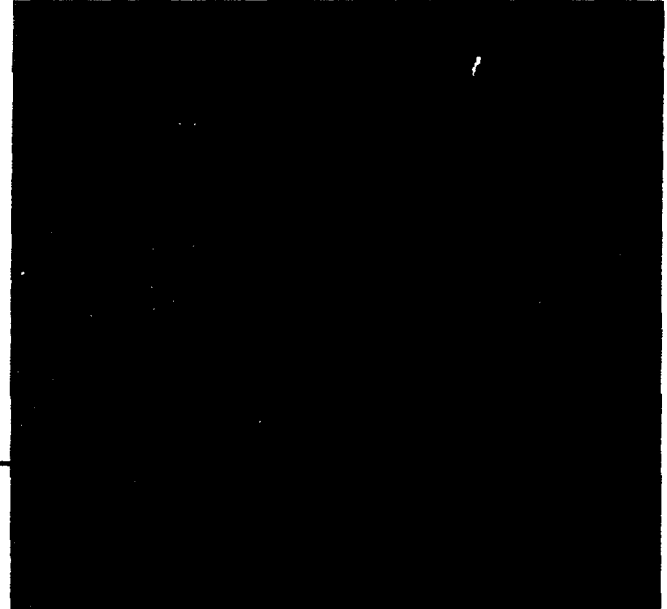
GA & Company Codes	Thick-ness	CONSTRUCTION DETAILS*	Fire Test Reference
CM 3310	1 3/4"	1 3/8" 1:2-1:3 gypsum-perlite plaster over 3.4 lb. self-furring metal lath wire tied 6" o.c. with 18 gage wire.	R 3187-4, 5, 7 Design 6-3
CM 4320 (t)	1"	Base layer 1/2" type X gypsum wallboard or veneer base applied to 1 5/8" metal studs with 1" type S drywall screws 12" o.c. Studs placed at the outside of flange edge of heavy steel column. Face layer 1/2" type X gypsum wallboard or veneer base applied to studs through base layer with 1 5/8" type S drywall screws 12" o.c. 1 1/4" corner bead, each corner attached with 4d coated nails 1 3/8" long, 0.067" shank, 1 3/4" heads, 12" o.c.	R 1319-127 Design 48-4
CM 4410	2 1/8"	1 3/4" 1:2-1:3 gypsum-perlite plaster over self-furring 3.4 lb. metal lath wire tied 6" o.c. with 18 gage wire.	R 3187-4, 5, 7 Design 6-4
CM 4420	1 15/16"	1 1/2" 1:2-1:3 gypsum-perlite plaster over 3.4 lb. metal lath wire tied with 18 gage wire 24" o.c. set 7/16" away from the column with 3/4" cold rolled channels.	R 3187-6 Design 7-4
CM 4510	2 5/8"	One layer of 5/8" type X gypsum wallboard or veneer base applied to 2" thick solid gypsum block with 1" type S drywall screws along vertical edges to 1 3/8" x 7/8" No. 22 gage galvanized steel corner angles 12" o.c. Gypsum block secured with 3/8" thick mortar bed and No. 26 gage galvanized steel straps 2" wide, 24" o.c.	R 1319-99 Design 31-4
CM 4520	5 3/8"	5/8" type X gypsum wallboard or veneer base attached with 1" type S drywall screws 8" o.c. to 1 3/8" x 7/8" No. 22 gage galvanized steel corner angles over vertical edges of 3" thick hollow gypsum block laid up with 1/2" mortar beds and 2" wide, No. 26 gage galvanized steel straps 24" o.c. encasing column.	R 1319-103 Design 34-4
CM 4610	3 5/8"	5/8" 1:3 gypsum-sand plaster over 3" thick hollow gypsum block laid up with 1/2" mortar bed.	BMS 92/40
CM 4710	2 1/2"	5/8" 1:3 gypsum-sand plaster over 2" thick solid gypsum block with 3/8" mortar bed.	BMS 92/40

SGP 0027939

GYPSUM ASSOCIATION

Most building codes and fire insurance rating regulations allow beams, girders and trusses to be membrane fireproofed. Lath and plaster fireproofing of beams, etc., generally weighs about 10 lbs. per sq. ft. of surface area of the shell. To accomplish the same degree of protection with concrete, it would require a much greater thickness. The saving in weight is significant to the ultimate design.

Beams, girders and trusses may be protected by either a continuous ceiling membrane of gypsum lath and plaster, or gypsum wallboard, or by enclosing them individually.

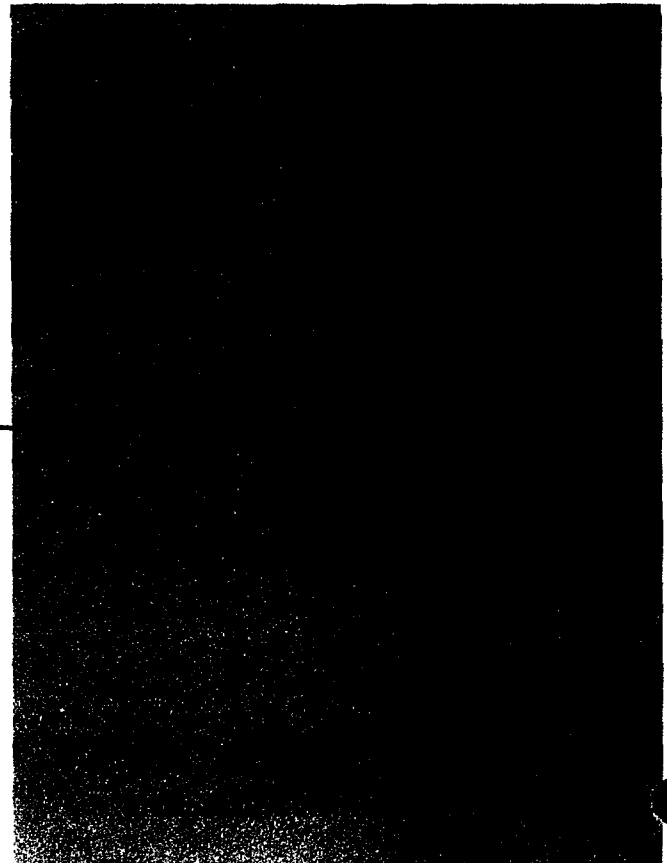


CONTINUOUS CEILING PROTECTION

The American Insurance Association and most building codes allow for use of gypsum wallboard or gypsum lath and plaster ceilings, as described in the Fire Resistant Floor-Ceiling Assemblies section, for beam or girder protection. The ceiling must carry the same rating as required for the structural member.

If the bottom of the beam extends not more than 6 inches below the plane of the ceiling, the ceiling is furred down and around the structural member. If the projection is more than 6 inches, the gypsum lath and plaster beam protection should extend from ceiling to floor above (individually protected).

When the ceiling fireproofing is in contact with the bottom of a solid web structural member, the structural member can be considered to be a fire stop. Care must be taken, however, that no combustible material is present in the plenum space.



INDIVIDUAL ENCASEMENT PROTECTION

The individual encasement of beams, girders, etc., with a shell of gypsum lath and plaster or gypsum wallboard is generally accepted by regulatory bodies, and may be desirable:

- (1) when the fire protection for such members, usually higher than for floors, would unduly increase the cost of the ceiling. If there are relatively few 3 or 4 hour protected beams, girders, etc., and only a 2-hour ceiling is required, it is generally uneconomical to use a 3 or 4 hour ceiling throughout.
- (2) where no ceiling is required or where a non-rated ceiling is to be used. Individual encasement of heavy beams, girders, etc., is usually accomplished by application of gypsum plaster to self-furring metal lath which has been formed to box the member, or gypsum plaster may be applied directly to the member itself, or gypsum wallboard may be formed to box the member.

PROTECTION OF BEAMS, GIRDERS AND TRUSSES

GA & Company Codes	CONSTRUCTION DETAILS	Fire Test Ref.
BM 2011	Special gypsum-vermiculite plaster sprayed direct to steel beam to a uniform $\frac{1}{2}$ " thickness.	R 4374-24 Design 40-4
BM 2120	Two layers of $\frac{5}{8}$ " type X gypsum wallboard or veneer base around beam. Base layer attached with $1\frac{1}{4}$ " type S drywall screws 16" o.c., face layer attached with $1\frac{3}{4}$ " type S drywall screws 8" o.c. to frame of 25 gage runner and corner angles suspended from 25 gage channel brackets 24" o.c. Runners attached to steel deck units with fasteners 12" o.c. $\frac{1}{2}$ " space provided between beam and angle edges all around. Outside corners protected by 20 gage corner bead crimped or nailed.	R 4024-5 Design 254-2
BM 2130	Two layers $\frac{5}{8}$ " type X gypsum wallboard or veneer base around beam. Base layer attached with $1\frac{1}{4}$ " type S drywall screws 16" o.c., face layer attached with $1\frac{3}{4}$ " type S drywall screws 8" o.c. to frame of 25 gage galvanized steel channels. $\frac{1}{2}$ " space provided between beam and channel edges all around. Outside corners protected with 20 gage corner bead.	R 4024-5 Design 255-2
BM 2210	$\frac{7}{8}$ " 1:2 gypsum-vermiculite plaster over 3.4 lb. diamond mesh metal lath fastened by 8 gage wire hangers 13" o.c. around beam and fastened to steel deck units. $\frac{1}{2}$ " clearance between lath and ceiling.	Design 7-3
BM 2220	1" 1:2 vermiculite-plaster on 3.4 lb. diamond mesh self-furring metal lath fastened around beam with 6 gage wire lath hangers approximately 5" o.c.	Design 3-2

SGP 0027941

PROTECTION OF BEAMS, GIRDERS AND TRUSSES

GA & Company Codes	CONSTRUCTION DETAILS	Fire Test Ref.
BM 3050	Three layers of $\frac{5}{8}$ " type X gypsum wallboard or veneer base applied to "U" shaped brackets spaced 24" o.c. No. 25 gage $1\frac{5}{8}$ " x 1" galvanized metal channels installed parallel to and on each side of the top beam flange to provide a $2\frac{1}{8}$ " clearance between the inner layer of gypsum board and the sides and bottom of the beam respectively. 1" x 2" x 24 gage angle frame attached to lower corners of "U" brackets with drill screws. First layer of gypsum board attached with 1" type S drywall screws 16" o.c. Second layer attached with $1\frac{5}{8}$ " type S drywall screws 12" o.c. Apply one layer No. 20 gage 1" hexagonal galvanized wire mesh under soffit to middle layer and up sides approximately 2" with $1\frac{5}{8}$ " type S drywall screws 12" o.c. Face layer applied with $2\frac{1}{4}$ " type S drywall screws 8" o.c. and one screw at mid-depth of bracket in each layer. Reinforce bottom corners with 1" metal corner beads nailed with 4d coated nails, $1\frac{1}{2}$ " long, 0.099" shank, $\frac{1}{4}$ " heads, 12" o.c. both legs of bead.	R 4024-11 Design 214-3
BM 3110	$1\frac{1}{4}$ " mill-mixed gypsum perlite plaster over 3.4 lb. diamond mesh metal lath attached to beam with 11 gage steel clips 9" o.c.	R 4197-1 Design 19-3
BM 3210 (t)	$\frac{5}{8}$ " type X gypsum wallboard or veneer base screw attached with 1" type S drywall screws 12" o.c. to drywall furring channels 24" o.c. tied with 18 gage wire to bottom chord of steel joist spaced 24" o.c.	R 1319-79 Design 82-3
BM 3310	Suspended ceiling of $\frac{1}{2}$ " type X gypsum wallboard or veneer base screw attached with 1" type S drywall screws 12" o.c. to furring channels spaced 24" o.c. attached with 18 gage tie wire or 11 gage clips to bottom chord of steel joists spaced 24" o.c.	R 3501 Design 94-2 (Beam 3 Hr.)

SGP 0027942

PROTECTION OF BEAMS, GIRDERS AND TRUSSES

GA & Company Codes	CONSTRUCTION DETAILS	Fire Test Ref.
BM 3410	$\frac{7}{8}$ " 1:2 $\frac{1}{2}$ gypsum-perlite plaster over $\frac{3}{8}$ " perforated gypsum lath tied on "U" shaped angle brackets spaced 12" o.c. around beam extending below ceiling. Provide 2 $\frac{3}{4}$ " space between lath and beam. $\frac{1}{2}$ " 1:2 $\frac{1}{2}$ gypsum-perlite plaster over $\frac{3}{8}$ " perforated gypsum lath ceiling between beams attached to $\frac{3}{4}$ " furring channels 12" o.c. with 14 gage diagonal wire reinforcement over lath and beam projection suspended from cellular steel deck and 2 $\frac{1}{2}$ " concrete slab.	NBS 337
BM 4011	Special gypsum-vermiculite plaster sprayed direct to steel beam to a uniform $\frac{1}{2}$ " thickness.	R 4374-24 Design 40-4
BM 4041	Special gypsum-vermiculite plaster spray applied $\frac{7}{8}$ " thick to 3.4 lb. self-furring metal lath wrapped around beam and attached to flanges with 11 gage galvanized clips 9" o.c.	R 4374-5 Design 40-2 (Beam 4 Hr.)
BM 4310	1 $\frac{1}{2}$ " 1:2 gypsum-perlite plaster applied over 3.4 lb. self-furring diamond mesh metal lath tied with 18 gage wire 6" o.c. and held $\frac{1}{4}$ " from steel.	R 3413 Design 5-3 (Beam 4 Hr.)
BM 4320	1 $\frac{1}{2}$ " 1:2 $\frac{1}{2}$ gypsum-perlite plaster over 3.4 lb. diamond mesh metal lath tied with 18 gage galvanized wire 4" o.c. to floor units and 6" o.c. to No. 6 gage lath hangers spaced 22" to 28" o.c. and wrapped completely around beams.	R 3789-1 Design 15-5
BM 4330	1 $\frac{1}{2}$ " mill-mixed gypsum-perlite plaster over 3.4 lb. diamond mesh metal lath attached to beam flanges with 11 gage lath clips spaced 9" o.c.	R 4197-2 Design 29-4
BM 4340	1 $\frac{1}{2}$ " 1:2 gypsum-vermiculite plaster over 3.4 lb. diamond mesh metal lath around beam attached with 8 gage galvanized wire hangers spaced 12" o.c.	Design 19-4

SGP 0027943

PROTECTION OF BEAMS, GIRDERS AND TRUSSES

		GA & Company Codes	CONSTRUCTION DETAILS	Fire Test Ref.	
		BM 4410	¾" 1:2 mill-mixed gypsum-perlite plaster over suspended 3.4 lb. diamond mesh metal lath wire tied with 18 gage wire to ¾" cold rolled channels 12" o.c. wire tied to 1½" cold rolled channels 48" o.c. and suspended from steel deck and 2" concrete slab.	R 3574-6 Design 11-3 (Beam 4 Hr.)	
		BM 4420	7/8" 1:2-1:3 gypsum-perlite plaster over 3.4 lb. diamond mesh metal lath tied with 18 gage wire to ¾" cold rolled channels 12" o.c. wire tied to 1½" cold rolled channels 36" o.c. and suspended from cellular steel deck and 2" concrete slab with 8 gage hanger wire 48" o.c.	R 3355 Design 5-4	
		BM 4430	1" 1:2-1:3 gypsum-vermiculite plaster over 3.4 lb. diamond mesh metal lath tied with 18 gage wire to ¾" cold rolled channels 12" o.c. wire tied to 1½" cold rolled channels 36" o.c. suspended from corrugated steel deck and 4½" concrete slab with 8 gage hanger wire 36" o.c. Two layers 5/8" Type X gypsum wallboard or veneer base placed under beam and over metal lath.	R 3413-1 Design 7-4	

FIRE RESISTANT GYPSUM CONCRETE ROOF DECKS



A poured-in-place gypsum concrete roof deck consists of a noncombustible gypsum formboard or mineral fiberboard formboard supported on the flanges of steel tees welded to the structural frame. A 2 inch-minimum thick gypsum concrete slab (1½ inch minimum where framing spacing does not require structural tee subpurlins) is cast-in-place over the formboard.

Several fire-rated gypsum deck designs do not require any protection for the bottom flanges of the steel tee subpurlins.

Gypsum decks with gypsum formboard, or other noncombustible formboards such as asbestos or mineral fiber formboard, are classed as noncombustible.

Gypsum formboard tested in accordance with the current ASTM Specification E 84 provides a 15-20 flame spread rating.

Gypsum concrete is available in regular or lightweight (insulating) densities and in two compressive strength classes—500 psi (Class A) and 1000 psi (Class B). Regular gypsum concrete is available in both Class A and Class B. Lightweight is Class A only. Most code and fire insurance authorities accept use of Class B for Class A in fire-rated constructions.

GA & Company Codes	CONSTRUCTION DETAILS	Fire Test Ref.
RD 1110	2" gypsum concrete reinforced with 48-1214 welded wire fabric on ½" gypsum formboard on exposed subpurlins (bulb tees) with no ceiling.	NBS 400
RD 1210	2" gypsum concrete roof reinforced with 2" hexagonal 19 gage reinforcing mesh and covered with asphalt-saturated felt roofing. Deck laid on ½" gypsum formboards supported by trussed tee subpurlins over steel beams not more than 9 feet apart. Beams protected by 1½" spray-applied special gypsum plaster. No ceiling. (Passed 90 minutes fire test.)	R 5790-1 Design RC 4-1 ½
RD 1310	Rib type steel roof deck covered with 1" wood fiberboard and 3 ply asphalt-saturated felt roof. ¾" 1:2-1:3 gypsum-sand plaster applied to ceiling of 3.4 lb. diamond metal lath tied to furring channels spaced 12" o.c. tied to steel joists.	NBS 57
RD 1320	Rib type steel roof deck with 1½" wood fiberboard covered with asphalt saturated felt. Suspended ceiling of 3.4 lb. metal lath and 1" 1:2 gypsum-sand plaster. (Passed 90 minute fire test.)	NBS 58

ROOF DECKS

GA & Company Codes	CONSTRUCTION DETAILS	Fire Test Ref.
RD 2010 (t)	2" precast metal-edged gypsum plank clipped to open web steel joists 7'-0" o.c. Suspended ceiling of acoustical ceiling board.	R 5403-3 Design RC 22-2
RD 2110	2½" thick gypsum concrete reinforced with 48-1214 welded wire fabric (½" self-furring or furred ½" above formboard). ½" gypsum formboard on exposed subpurlins (bulb tees) with no ceiling.	NBS 406
RD 2210 (t)	2" gypsum concrete roof reinforced with 2" hexagonal 19 gage and 16 gage reinforcing mesh covered with Class A, B or C, built-up roof covering. Deck laid on 1"-1½" mineral fiber formboard supported by trussed tee subpurlins spaced 32¾" o.c. over steel beams not more than 7'-0" apart. Beams protected with 1½" spray-on cementitious mixture. No ceiling.	R 5169-1 Design RC-15-2
RD 2310	2" gypsum concrete roof deck reinforced with 2" hexagonal 19 gage reinforcing mesh and covered with an asphalt-saturated 3-ply felt roof. Deck laid on ½" gypsum formboards supported by trussed tee subpurlins over steel beams not more than 8 ft. apart. Beams protected by 1½" spray-applied special gypsum-vermiculite plaster. No ceiling.	R 5790-1 Design RC-23-2
RD 2410 (p)	2" lightweight or regular gypsum concrete reinforced with 48-1214 welded wire fabric on ½" gypsum formboard, supported by bulb tee subpurlins on bar joists. Suspended ceiling of acoustical tile.	FM FC-39-2
RD 2420 (t)	2" lightweight or regular gypsum concrete reinforced with 48-1214 welded wire fabric on ½" gypsum formboard supported by bulb tee subpurlins on bar joists. Suspended mineral acoustical ceiling. Light fixture shield protected with 1¼" mineral fiber batts.	R 4351-17 Design RC-13
RD 2460	1½" gypsum concrete reinforced with 48-1214 welded wire fabric on ½" gypsum formboard supported by steel bulb tees welded, or sheet metal tees clipped, to bar joists. Suspended ceiling of mineral acoustical ceiling board. Light fixture shield protected with 1¼" mineral fiber batts.	R 4351-6 Design RC-6-2

The following technical literature on the use of gypsum products in construction is published by the Gypsum Association.

American National Standards Institute, *Specifications for Gypsum Plastering*, ANSI A 42.1

American National Standards Institute, *Specifications for Interior Lathing and Furring*, ANSI A 42.4

American National Standards Institute, *Specifications for Reinforced Gypsum Concrete*, ANSI A 59.1

American National Standards Institute, *Specifications for the Application of Gypsum Wallboard and Backing Board, Including Finishing*, ANSI A 97.1

Gypsum Association,

Specifications for the Installation of Screw Type Steel Framing Members to Receive Gypsumboard

Specifications, Application of Gypsum Base for Gypsum Veneer Plasters and Application of Gypsum Veneer Plaster

Manual of Gypsum Lathing and Plastering

Design Data—Gypsum Wallboard

Using Gypsum Board for Walls and Ceilings

Recommended Guide for Gypsum Drywall Construction

Design Data—Poured Gypsum Roof Decks

How to Inspect a Gypsum Roof Deck

Single copies are available on request.

SGP 0027947

GYPSUM ASSOCIATION MEMBERSHIP LIST

Member	Company Code Letter	Member	Company Code Letter
THE CELOTEX CORPORATION	g	KAISER CEMENT AND GYPSUM CORP.	n
P.O. Box 22602		300 Lakeside Drive	
Tampa, Florida 33622		Oakland, California 94612	
THE FLINTKOTE COMPANY	h	NATIONAL GYPSUM COMPANY	p
400 Westchester Avenue		325 Delaware Avenue	
White Plains, New York 10604		Buffalo, New York 14202	
GEORGIA-PACIFIC CORPORATION	k	TEXAS GYPSUM COMPANY, INC.	s
Gypsum Division		P.O. Box 768	
900 S.W. Fifth Avenue		Irving, Texas 75060	
Portland, Oregon 97204		UNITED STATES GYPSUM COMPANY	t
GRAND RAPIDS GYPSUM COMPANY	m	101 South Wacker Drive	
Post Office Box 1674		Chicago, Illinois 60606	
Grand Rapids, Michigan 49501			

GYPSUM ASSOCIATION

201 North Wells Street
Chicago, Illinois 60606

1800 North Highland Avenue
Hollywood, California 90028



GYPSUM ASSOCIATION

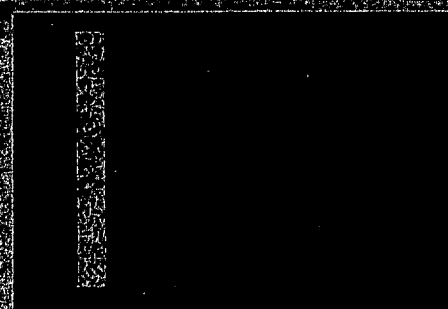
201 North Wells Street • Chicago, Illinois 60606

Design
Data
1971/72 Edition

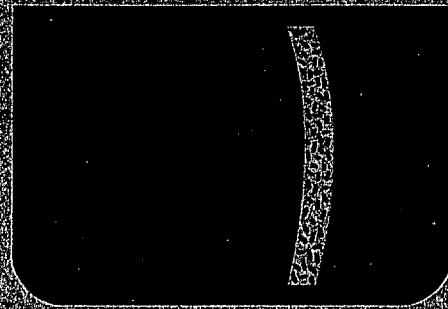
Fire Resistance



FIRE



SOUND



STRUCTURAL



GYPSUM ASSOCIATION
201 North Wells Street, Chicago, Illinois 60606

SGP 0027949

GYPSUM ASSOCIATION
619 GLENN BLVD
NORTH CHICAGO, ILL. 60064

B. Sound Tests

SGP 0027950

BESTWALL GYPSUM COMPANY

GYPSUM WALLBOARD MANUAL

1965 EDITION

SOUND CONTROL

Section 9
Sub-Section B
Revised 2/1/65
(Cancels all
previous-sheets)

Tests for solutions to noise control problems are conducted for the Bestwall Gypsum Company by the following:

- 1 - Geiger and Hamme Acoustical Laboratories
Ann Arbor, Michigan
- 2 - Ohio Research Corp.
Avon, Ohio
- 3 - Riverbank Laboratories - Geneva, Illinois

Results of Sound Tests are listed by the following:

- 1 - Sound Advice - Bestwall Gypsum Literature
- 2 - Sweet's - Bestwall Gypsum Wallboard Products
- 3 - Owens - Corning Fiberglas - Solutions to noise
control problems in the construction of houses, apartments,
motels and hotels (second edition-February 1964)
- 4 - Gypsum Association - Fire Resistance - Design Data.
- 5 - I B I Publications - Noise Control with insulation board for
homes, apartments, motels and offices.
- 6 - F H A Publications
- 7 - Sweet's - Bestwall Gypsum Lath and Plaster Literature
- 8 - Sweet's - Bestwall - Incombustible Acoustical Tile - Incombustible
Ceiling Tile - Fire Rated Tile
- 9 - Sound Tests of Wall and Ceiling Assemblies

1/4"
INCOMBUSTIBLE
GYPSUM
SOUND
DEADENING
BOARD

**SOUNDS
GREAT**



GEORGIA-PACIFIC / GYPSUM DIVISION

SGP 0027952

INCOMBUSTIBLE, STRONG, ECONOMICAL

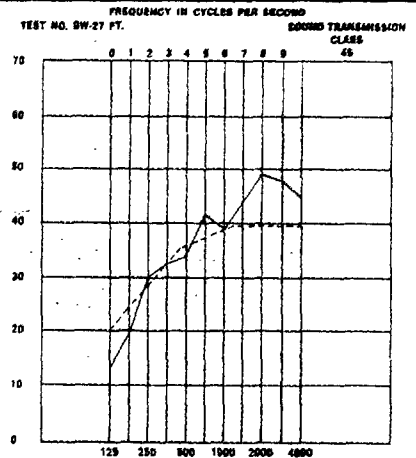
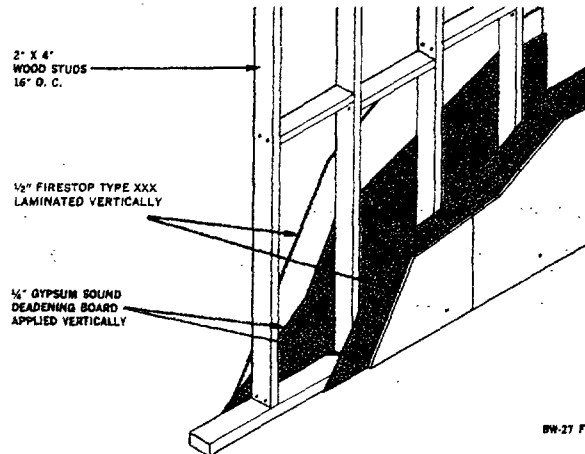
1/4" Incombustible Gypsum Sound Deadening Board is a new concept in Sound Control, offering high STC ratings, combined with strength and economy. It can be used in wood and metal stud partitions, as well as in floor-ceiling assemblies. The product is a unique formulation, and is easily identifiable by its green face paper. G-P Bestwall® Incombustible 1/4" Gypsum Sound Deadening Board has been tested in several assemblies, both floor-ceiling and partitions, and some of the significant

test results and details are contained in these pages. These sound tests were conducted under laboratory conditions where controlled environment reduces variables to a minimum. Joints of G-P Bestwall 1/4" Gyps Deadening Board do not need joint treatment for these ratings. Since Georgia-Pacific Corporation does not have prior knowledge of specific building design, and its construction or the methods of application under specific job conditions, no warranty of field performance is made.



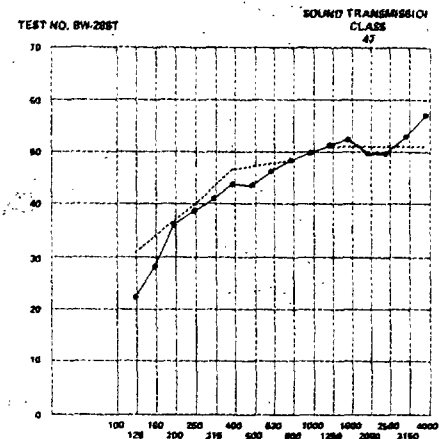
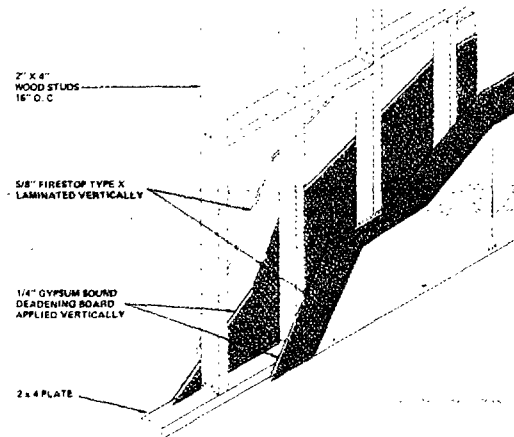
WOOD STUD PARTITION

STC 45
FIRE RATING
1 Hr. Combustible. Test
UL No. 30



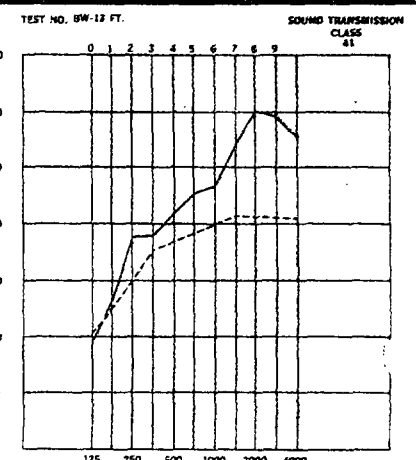
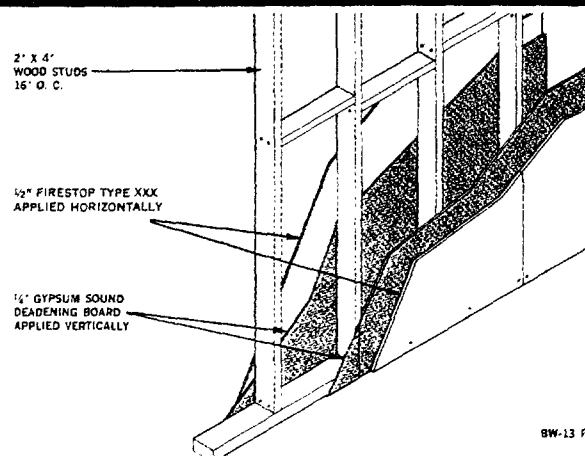
WOOD STUD PARTITION

STC 47
FIRE RATING
1 Hr. Combustible (Est.)



WOOD STUD PARTITION

STC 41
FIRE RATING
1 Hr. Combustible (Est.)



ADVANTAGES:

INCOMBUSTIBLE—Unlike other Sound Boards, this product is made of incombustible gypsum.

LOW COST—Can obtain 1 hour ratings and high STC ratings with ½" Firestop as well as ⅝" Firestop. This results in lower cost partitions.

ERECTION SPEED AND EASE OF HANDLING

—Lighter weight of the product plus lighter weight of ½" Firestop to obtain needed sound and fire ratings.

STRONG—Combined with ½" or ⅝" Gypsum Wallboard makes a tough combination that will withstand much abuse.

IMPORTANT: These tests were made under stabilized laboratory conditions. In an actual building, every effort must be made to eliminate noise leaks and flanking paths. A recognized sealant, or equivalent material should be used over top and under bottom plates or tracks. Doors, windows, outlet boxes and other variations from the tested assembly will affect the sound rating. Careful construction practices should be followed if these listed STC ratings are to be obtained.

PARTITION PROPERTIES

MATERIALS USED

APPLICATION DETAILS

SOUND TEST DATA

Test No.: BW-27FT
Date: July 6, 1967
Conducted By: Geiger & Hamme, Inc.
Test Partition: Height: 9'
Width: 14' ½"
Thickness: 5⅝"
Weight: 7.60 lbs./sq. ft.
Sound Transmission Class 45
9 Frequency Average 43.1
11 Frequency Average 45.6

1. 2" x 4" Wood Studs
2. 2" x 4" Wood Plates
3. ½" Bestwall Gypsum Sound Deadening Board
4. ½" Bestwall Firestop Type XXX Wallboard or Firestop Gypsum Wallboard
5. 5/16" GWB Nails
6. 10' Gypsum Laminating Compound
7. 5/16" Gypsum Laminating Compound

SOUND TEST DATA

Test No.: BW28ST
Date: March 15, 1968
Conducted By: Geiger & Hamme, Inc.
Test Partition: Height: 9' 0"
Width: 14' ½"
Thickness: 5⅝"
Weight: 8.30 lbs./sq. ft.
Sound Transmission Class 47
9 Frequency Average 43.0
11 Frequency Average 44.4

1. 2" x 4" Wood Studs
2. 2" x 4" Wood Plates
3. ½" Bestwall Gypsum Sound Deadening Board
4. ½" Bestwall Firestop Type XXX Wallboard or Firestop Gypsum Wallboard
5. G-P Laminating Compound
6. 5/16" Gypsum Laminating Compound
7. 5/16" Gypsum Laminating Compound

SOUND TEST DATA

Test No.: BW-13FT
Date: July 21-28, 1966
Conducted By: Geiger & Hamme, Inc.
Test Partition: Height: 9'
Width: 14' ½"
Thickness: 5⅝"
Weight: 7.96 lbs./sq. ft.
Sound Transmission Class 41
9 Frequency Average 40.8
1 Frequency Average 43.6

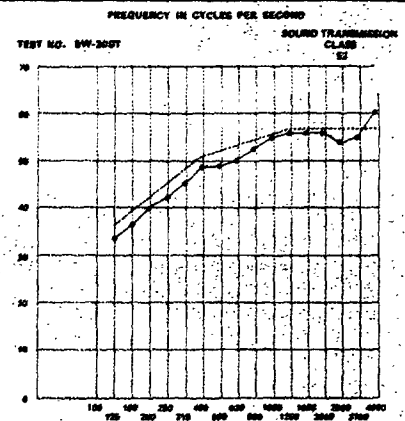
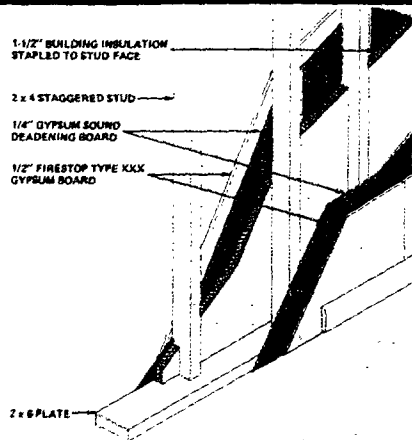
1. 2" x 4" Wood Studs
2. 2" x 4" Wood Plates
3. ½" Bestwall Gypsum Sound Deadening Board
4. ½" Bestwall Firestop Type XXX Wallboard
5. 1½" GWP-54 Nails
6. 1½" GWP-54 Nails

NOTE: The above tests were made under stabilized laboratory conditions. In an actual building, every effort must be made to eliminate noise leaks and flanking paths. A recognized sealant, or equivalent material should be used over top and under bottom plates or tracks. Doors, windows, outlet boxes and other variations from the tested assembly will affect the sound rating. Careful construction practices should be followed if these listed STC ratings are to be obtained.



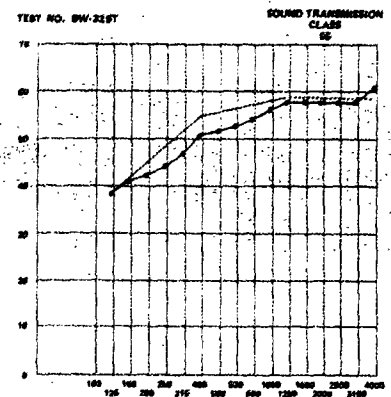
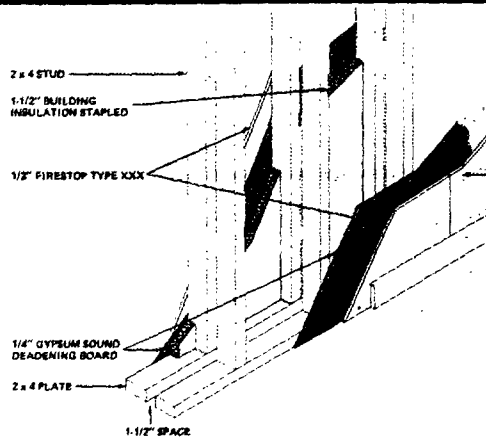
STAGGERED WOOD STUD PARTITION

STC 52 (with insulation)
STC 47 (no insulation)
FIRE RATING
1 Hr. Combustible (Est.)



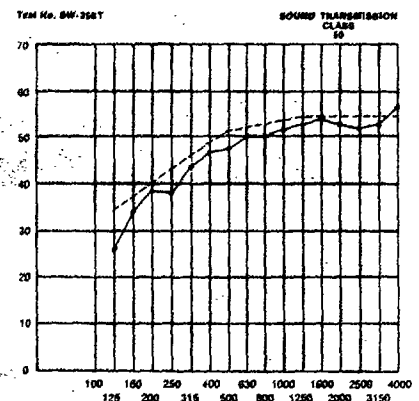
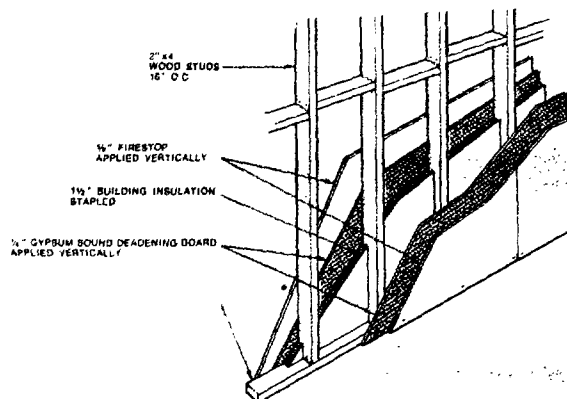
WOOD STUD DOUBLE PARTITION

STC 55 (with insulation)
STC 50 (no insulation)
FIRE RATING
1 Hr. Combustible (Est.)



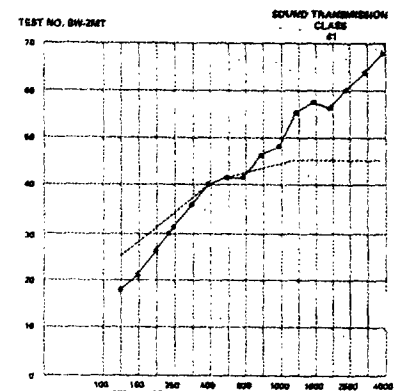
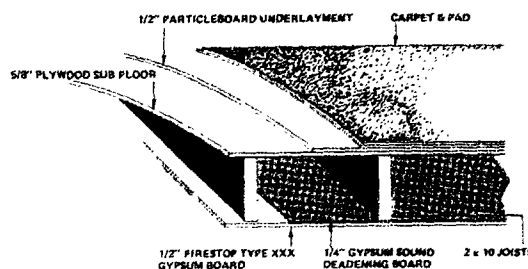
WOOD STUD PARTITION

STC 50
FIRE RATING
1 Hr. Combustible (Est.)



WOOD JOIST FLOOR- CEILING ASSEMBLY

INR + 25
STC 41
FIRE RATING
1 Hr. Combustible (Est.)



SOUND TEST DATA

Test No.: BW-29ST (no insulation)
 Test No.: BW-30ST (with insulation)
 Dates: March 29, 1968-April 5, 1968
 Conducted By: Geiger & Hamme, Inc.

Test Partition: Weight:
 Height: 9' 0" 8.79 lbs./sq. ft.—
 Width: 14' ½" (no insulation)
 Thickness: 7 ⅞" 8.92 lbs./sq. ft.—
 (with insulation)

Sound Transmission Class 47 (no insul.)
 Sound Transmission Class 52 (with insul.)
 9 Frequency Average 43.6 (no insul.)
 9 Frequency Average 47.7 (with insul.)
 11 Frequency Average 45.2 (no insul.)
 11 Frequency Average 48.9 (with insul.)

1. 2" x 4" Wood Studs
 2. 2" x 6" Wood Planks
 3. ½" Bestwall Gypsum
 Sound Deadening
 Board
 4. ½" Bestwall
 Firestop Type XXX
 Wallboard or Firestop
 Renewal
 5. G-P Laminating
 Compound
 6. 4d Ring Shank
 and 6d Common Nails
 7. 6d Common Nails
 8. 1 ½" Fiberglass
 Batt (on BW-30ST for
 STC 52)

SOUND TEST DATA

Test No.: BW-31ST (no insulation)
 Test No.: BW-32ST (with insulation)
 Date: April 15, 1968-April 22, 1968

Test Partition: Weight:
 Height: 9' 0" 9.14 lbs./sq. ft.—
 Width: 14' ½" (no insulation)
 Thickness: 10 ¼" 9.29 lbs./sq. ft.—
 (with insulation)

Sound Transmission Class 55 (with insul.)
 Sound Transmission Class 50 (no insul.)
 9 Frequency Average 45.9 (no insul.)
 9 Frequency Average 50.5 (with insul.)
 11 Frequency Average 47.6 (no insul.)
 11 Frequency Average 51.9 (with insul.)

1. 2" x 4" Wood Studs
 2. 2" x 6" Wood Planks
 3. ½" Bestwall Gypsum
 Sound Deadening
 Board
 4. ½" Bestwall
 Firestop Type XXX
 Wallboard or Firestop
 Renewal
 5. G-P Laminating
 Compound
 6. 1 ½" Fiberglass
 Batt (on BW-32ST
 with insulation for
 STC 55)

SOUND TEST DATA

Test No.: BW-35ST
 Dated: April 3, 1969
 Conducted By: Geiger & Hamme, Inc.

Test Partition:
 Height: 9'
 Width: 14' ½"
 Thickness: 5 ¾"

Sound Transmission Class 50
 9 Frequency Average 45
 11 Frequency Average 46

1. 2" x 4" Wood Studs
 2. 2" x 6" Wood Planks
 3. ½" Fiberglass Batt
 4. ½" G-P Bestwall
 Gypsum Sound
 Deadening Board
 5. ½" Bestwall
 Firestop Type X
 Wallboard or
 Firestop Renewal
 6. G-P Laminating
 Compound
 7. 4d Nails
 8. 6d Nails

SOUND TEST DATA

Test No.: BW-2-MT
 Date: April 25, 1968
 Conducted By: Geiger & Hamme, Inc.
 Test Sample: 12' x 16'
 Impact Noise Rating: + 25
 Sound Transmission Class 41

1. 2" x 10" Wood Joists
 2. Carpet (20 oz. per sq.
 yd.) and pad (48 oz. per
 sq. yd.) sponge rubber
 3. ½" Particleboard
 Underlayment
 4. ¾" OD Grade
 Plywood Subfloor
 5. ½" G-P Bestwall
 Gypsum Sound
 Deadening Board
 6. ½" G-P Bestwall
 Firestop Type XXX
 Wallboard
 7. 4d Ring Shank
 Nails; 6d Common Nails;
 8d Common Nails

STEEL ASSEMBLIES



METAL STUD PARTITION

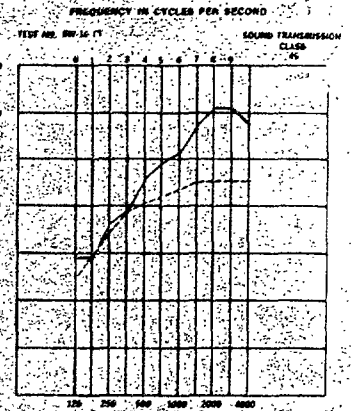
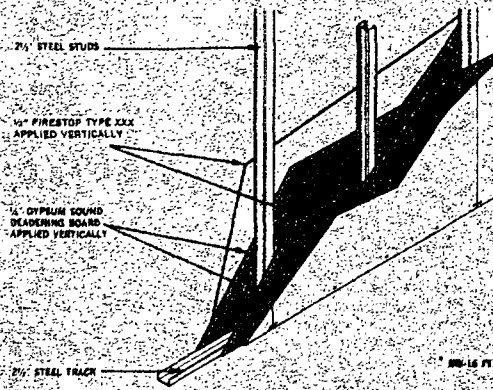
STC 45

FIRE RATING

1 Hr. Incombustible
=T3854

1 Hr. Incombustible

UL No. 32



METAL STUD PARTITION

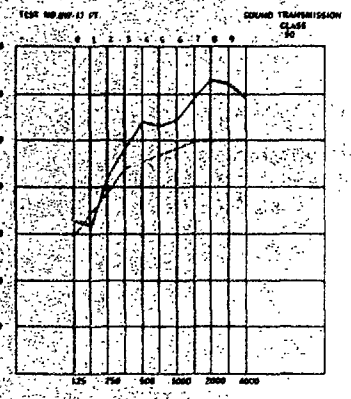
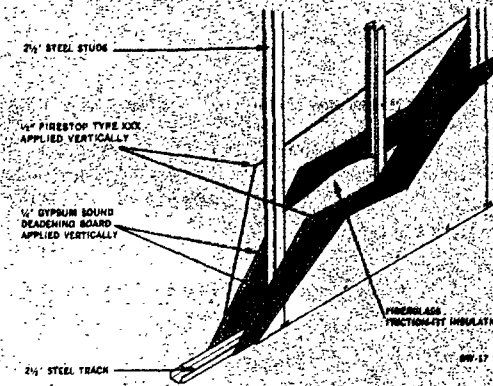
STC 50

FIRE RATING

1 Hr. Incombustible
=T3854

1 Hr. Incombustible

UL No. 32

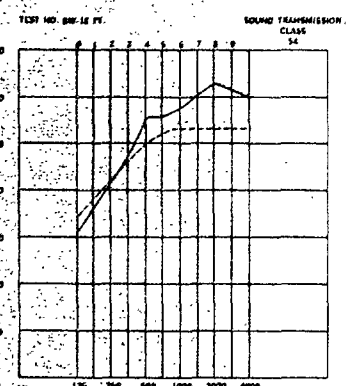
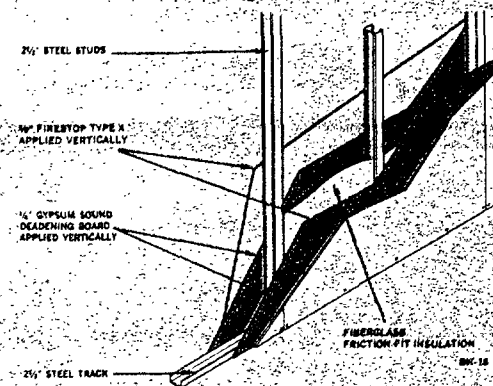


METAL STUD PARTITION

STC 54

FIRE RATING

1 Hr. Incombustible (Est.)



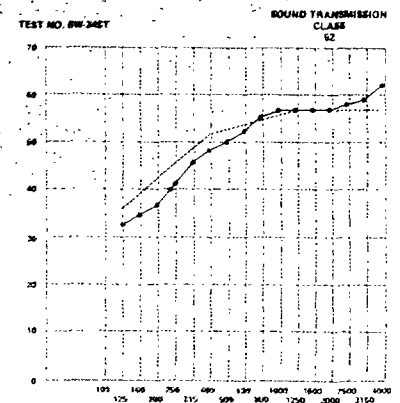
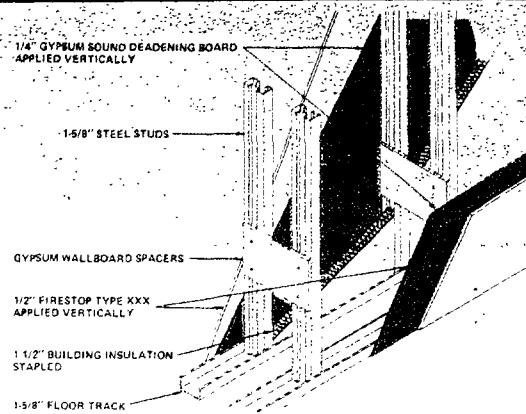
METAL STUD DOUBLE (Chase Wall) PARTITION

STC 52 (with insulation)

STC 47 (no insulation)

FIRE RATING

1 Hr. Incombustible (Est.)



SOUND TEST DATA

Test No.: BW-16FT
 Dated: July 21-28, 1966
 Conducted By: Geiger & Hamme, Inc.
 Test Partition: Height: 9'
 Width: 14' 1/2"
 Thickness: 4"
 Weight: 7 lbs./sq. ft.
 Sound Transmission Class 45
 9 Frequency Average 44.3
 11 Frequency Average 48.9

SOUND TEST DATA

Test No.: BW-17FT
 Dated: July 21-29, 1966
 Conducted By: Geiger & Hamme, Inc.
 Test Partition: Height: 9'
 Width: 14' 1/2"
 Thickness: 4"
 Weight: 7.12 lbs./sq. ft.
 Sound Transmission Class 50
 9 Frequency Average 48.7
 11 Frequency Average 50.9

SOUND TEST DATA

Test No.: BW-18FT
 Dated: July 21-29, 1966
 Conducted By: Geiger & Hamme, Inc.
 Test Partition: Height: 9'
 Width: 14' 1/2"
 Thickness: 4 1/4"
 Weight: 8.12 lbs./sq. ft.
 Sound Transmission Class 54
 9 Frequency Average 50.2
 11 Frequency Average 52.1

SOUND TEST DATA

Test No.: BW-33ST (no insulation)
 Test No.: BW-34ST (with insulation)
 Date: April 24, 1968
 Conducted By: Geiger & Hamme, Inc.
 Test Partition: Height: 9' 0" Weight:
 Width: 14' 1/2" 6.69 lbs./sq. ft.—
 Thickness: 7 1/2" (no insulation)
 6.84 lbs./sq. ft.—
 (with insulation)
 Sound Transmission Class 47
 with insulation 52
 9 Frequency Average 44.3 (no insul.)
 9 Frequency Average 48.2 (with insul.)
 11 Frequency Average 46.1 (no insul.)
 11 Frequency Average 49.8 (with insul.)



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GEORGIA-PACIFIC / GYPSUM DIVISION
P.O. BOX 311 • PORTLAND, OREGON 97207



GEORGIA-PACIFIC

1/4" GYPSUM SOUND DEADENING BOARD

Questions and Answers

Q. WHAT IS G-P 1/4" GYPSUM SOUND DEADENING BOARD?

A. New Georgia-Pacific 1/4" Gypsum Sound Deadening Board is an incombustible gypsum backer board with a highly absorbent face paper and a specially formulated gypsum core. It was developed to provide an incombustible and efficient sound deadening material that could be marketed at a competitive price.

Q. WHY IS IT USED?

A. To provide extremely good sound control and fire resistive values at very low costs.

Q. WHERE IS IT USED?

A. In low and high-rise apartment buildings, motels, office and store buildings, anywhere it is desirable to provide a low-cost incombustible barrier to the transmission of unwanted sound.

Q. IS IT FIRE RATED?

A. Tests at independent laboratories (Underwriters' Laboratories, Inc. and Ohio State Research) have proven that G-P 1/4" Gypsum Sound Deadening Board and 1/2" G-P Firestop Gypsum Wallboard provide 1-hour fire resistance when applied each side of wood or steel studs.

Q. HOW IS IT USED?

A. Between conventional gypsum wallboard on wood or steel studs. It is not a finished product and should only be used as a backer board.

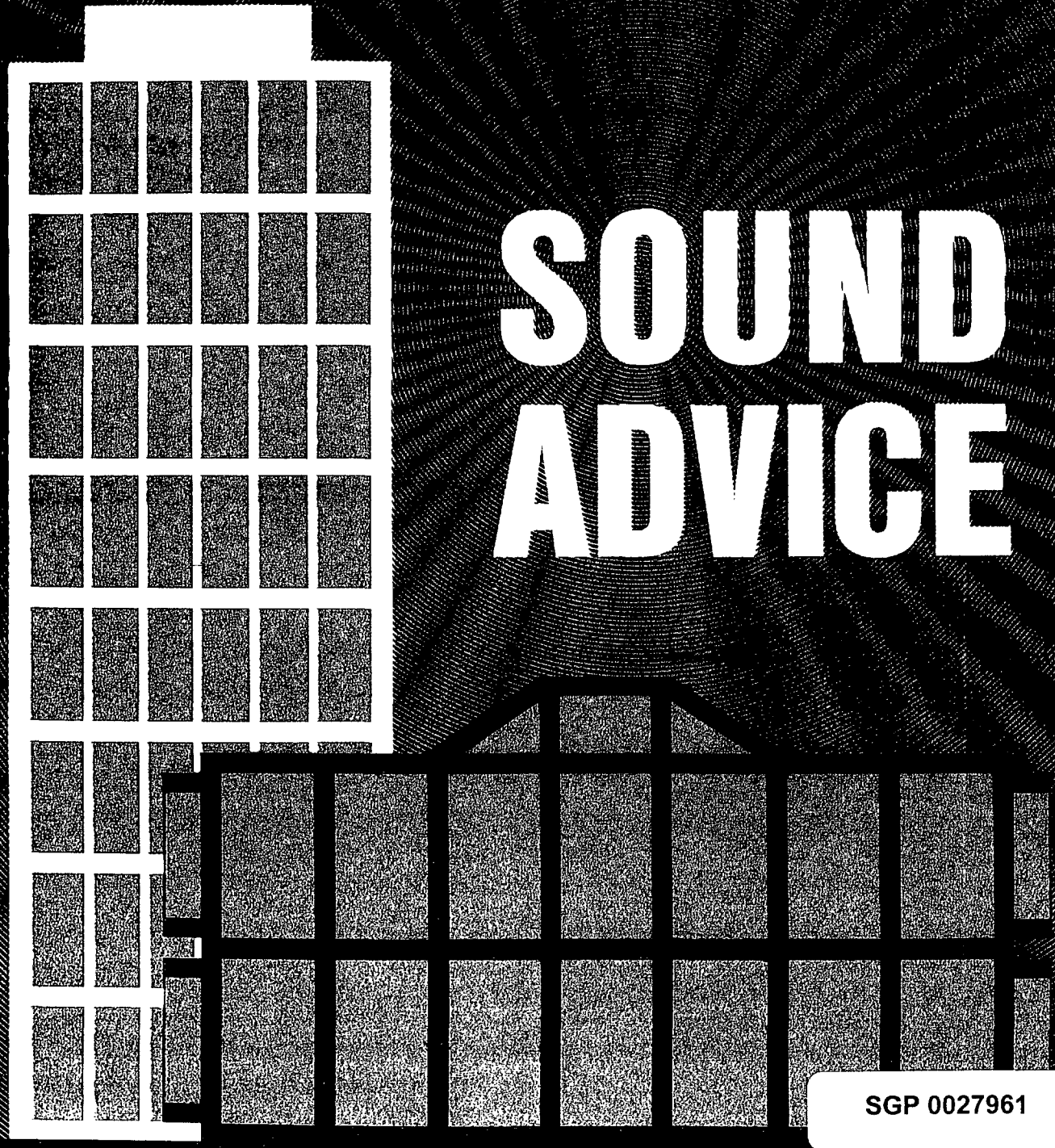
Q. WHAT ARE ITS ADVANTAGES?

- A.**
1. Incombustible.
 2. Low Cost.
 3. Extremely good sound control qualities.
 4. Can be ordered in large or small quantities, in cars or trucks of regular gypsum products.
 5. It's a gypsum product which is hung, scored, cut and handled in the same manner as gypsum wallboard, which means it's easy to handle and erect.

Practical systems for Noise Control in
Homes, Apartments, Motels, Offices

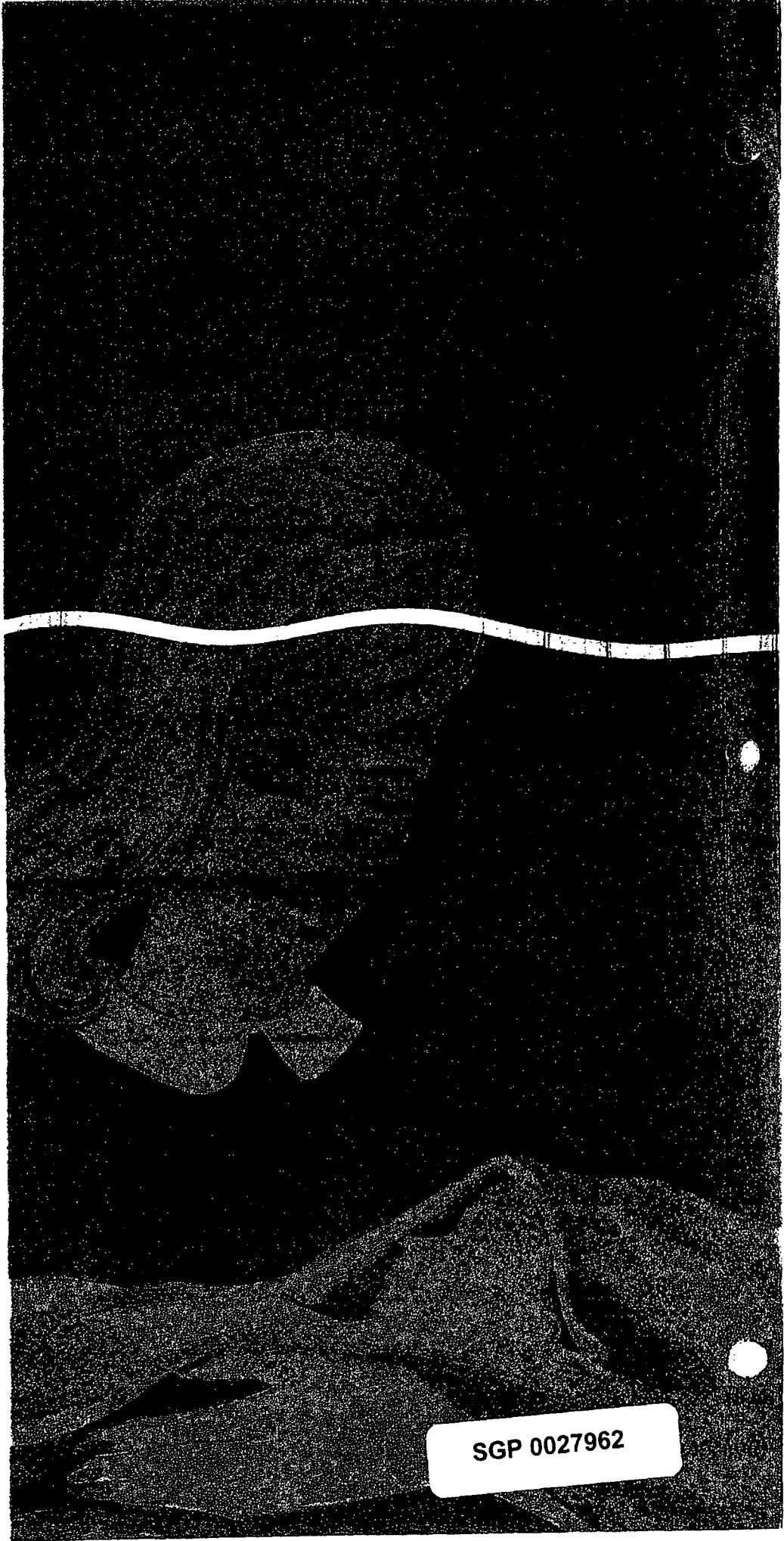


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SOUND ADVICE

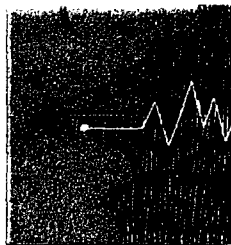
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		3



ATTENUATION (sound isolation, sound insulation) / The reduction in the intensity of sound. Attenuation is measured in decibels.

BACKGROUND NOISE LEVEL / Noise level of the environment, created by street traffic, trains, mechanical equipment, etc. An objective of noise control is to reduce the sound transmitted to a level below the background noise level.

DECIBEL / A unit used for measuring the intensity (loudness) of sound. The easiest way to identify sound pressure levels is to compare them to sounds which we recognize readily. For example, the sound heard in a quiet home or soft radio music would be at approximately the 35 decibel level. The sound in a noisy office or department store would be at approximately the 60 decibel level. Average conversation is in the 40 to 60 decibel range.

FREQUENCY / The number of sound waves per second produced by the source of sound. Audible frequencies range from 20 cycles per second (cps) to 20,000 cps. Middle "C," for example, is 262 cps.

NOISE / Unwanted sound.

SOUND / A pressure wave that travels outward in all directions from its source at a speed of 1,120 feet per second. Sound may also be the source, or the sensation experienced in the ears when pressure waves strike the eardrums.

SOUND ABSORPTION / The absorption of the energy of sound waves by a porous or soft, limp material. Carpeting and upholstered furniture will help absorb sound within a room, whereas hard walls, floors and ceiling surfaces will reflect sound.

GYPSUM SOUND DEADENING BOARD / A new incombustible 1/4" thick gypsum board, designed to reduce sound transmission in wall and floor-ceiling assemblies economically.

SOUND DEADENING FIBERBOARD / A low density product designed to reduce sound transmission in wall and floor-and-ceiling systems.

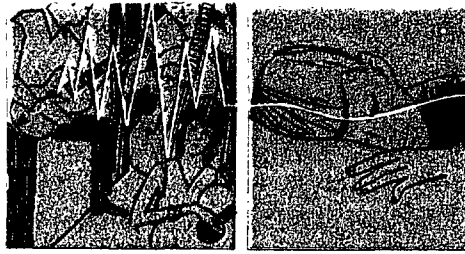
SOUND LEVEL / The loudness or intensity of sound, measured in decibels.

SOUND TRANSMISSION CLASS (STC) / The sound transmission loss performance of a partition designated by a single number. The STC rating provides a reliable means of comparing the noise reduction properties of wall systems. The STC rating, by use of a standard curve, lowers the rating of a partition with poor sound characteristics at isolated frequencies which is not done by the arithmetical average.

SPEECH INTERFERENCE ZONE / The frequency range (500-2800 cps) which includes average conversation. The Speech Interference Zone number is obtained by averaging the transmission loss curve between 500 and 2800 cps.

TRANSMISSION LOSS / The difference in sound levels (measured in decibels) obtained by measuring the sound intensity on both sides of a wall assembly with a noise source on one side.

TRANSMITTED NOISE LEVEL / The sound that passes through a wall.



introduction

In recent years, we have seen the development of a myriad of new conveniences. These modern day miracles have enriched our lives and benefited us in many ways. They have, however, introduced one big disadvantage. These conveniences create unwanted sound in performing their functions. Consider the increase in the number of radios, the increased number of motor vehicles, the five and one-half million television sets, plus other noisemakers such as dishwashers, stereo sets and air conditioning units. Occupants and tenants of homes, apartments and motels demand isolation from these unwanted sounds. Since in most cases it is not feasible to eliminate these noise sources, an immense challenge has been presented to the architect, builder, contractor, and building material and equipment manufacturer to control acoustic environment.

WHAT IS SOUND? / Before sound can be effectively controlled, its general nature must be understood. Sound is a pressure wave that travels outward in all directions from its source at a speed of 1,120 feet per second. It exists in a range of audible frequencies from 20 cycles or vibrations per second to 20,000 cycles per second. At 20 cycles, the sound is very low pitched or dull, and at 20,000 cycles the sound is very high pitched or shrill. Most speech falls in the 350 to 4000 cycle range. The loudness of sound, regardless of frequency, is measured in units called decibels. A range of about 10 to 120 decibels covers the intensity of sound from a faint whisper to a deafening roar. Average conversation is at the 40 to 60 decibel level. Sound may be pleasant and necessary. When it becomes annoying and unwanted we call it noise.

THREE WAYS TO CONTROL SOUND / Basically, unwanted sound can be reduced in three ways: The first is to reduce the sound level within a room or other undivided space. Sound absorbing materials are very effective for this purpose. These materials absorb the noise instead of reflecting it back into the room. Hard walls, floors and ceiling surfaces will reflect sounds and increase noise problems. Carpeting, drapes and upholstered furniture will absorb sound and help control it within a room. Acoustical tile and acoustical plasters are also used to absorb sound. It is important to note that many acoustical materials may do an excellent job of reducing noise levels within a room but have poor sound transmission barrier qualities, thus

having little effect on reducing sound transmitted to adjacent rooms. The second way to limit the noise within a room or other interior area is to prevent sound waves from being transmitted from an adjacent room or occupancy by providing effective sound barrier construction for the walls, floors and ceilings which separate the rooms. The third method is to isolate the sound source. Considerable sound energy may be transmitted through the legs of a piano or radio into the floor. This can be partly eliminated by putting the legs in caster cups or inserting any type of cushion under the legs. Sound may also be caused by machinery which communicates its own vibration to the building structure by direct mechanical contact. In this case a resilient mounting placed under the machine or a separate floating foundation may be used.

SOUND ISOLATION / Reduction in the intensity of sound is called sound isolation. Like sound intensity, it is measured in decibels (db). If a sound level of 70 db is generated in one room and the sound level in the second room is 30 db, the difference between the sound levels is a measure of the isolation provided by the wall, and the wall is referred to as having 40 db Sound Transmission Loss. A factor that must be considered is the background noise level that will mask an equivalent amount of sound. Background noises can be caused by street traffic, trains, mechanical equipment, etc.; thus the level of this background noise is dependent upon the building and room location. The basic objective in sound isolation is to reduce the transmitted noise level below that of the background noise level or to an acceptable level, whichever is greater.

THE TWO-ROOM TEST METHOD / To compare the effectiveness of wall construction in preventing the passage of sound, a two-room sound test method is generally used. In this method, a steady sound is generated on one side of the wall and then measured on both sides. This is generally done at eleven frequencies from 125 to 4000. The difference in sound level is called the transmission loss of the wall. It may refer to one frequency or the arithmetic average of 9 or 11 frequencies. In the illustration previously used, a sound level of 70 db is generated in one room and a level of 30 db is measured in the adjoining room. Therefore the transmission loss of the wall is 40 db.

introduction

SOUND TRANSMISSION CLASS / In the past, several different means were used for rating walls. Arithmetical averages frequently used were sometimes unfair, in that they allowed a good rating to be given a wall that performed poorly at an important frequency. In the recently revised ASTM Designation E90-66 T, "Tentative Recommended Practice for LABORATORY MEASUREMENT OF AIRBORNE SOUND TRANSMISSION LOSS OF BUILDING FLOORS AND WALLS," provision is made for rating walls and other partitions by a single number called the Sound Transmission Class (STC). This system measures the performance of a wall in conformance to certain predetermined standards at all frequencies. The STC rating is easy to use and is currently the most realistic means for comparing performance. The higher the STC value, the better the assembly will resist sound passage.

WHAT PARTITION DO YOU CHOOSE?

/ Before choosing a partition for a building, whether it be high rise, industrial or residential, you must clearly define the sound control problem you face. First, what is the background noise level? The higher the background noise, the more transmitted noise can be tolerated. Background noise is an exceedingly important element in all noise control situations, for it helps mask sporadic intruding sounds. For example, an intruding noise which would be intolerable in a quiet country village might go completely unnoticed in an apartment on a busy street, where the continuous hum of traffic masks out the noises from the adjoining room without itself seeming unpleasant. Next, how critical is the situation in regard to sound isolation? Naturally certain rooms will require more privacy than others, depending upon their use.

PROPER INSTALLATION / After the wall and floor-and-ceiling constructions have been selected, it is important that they be installed properly. The following precautions should be taken during installation to avoid situations or

conditions which will detract from the sound control properties of the assembly:

1. Caulk between top and bottom members and floor or ceiling line. Leaks allow sound to pass through.
2. Avoid back-to-back electrical outlets, plumbing outlets, etc. Sound can pass directly through the wall at these locations.
3. Do not use unnecessary fasteners. Fasteners recommended are optimum, and additional fasteners may reduce the separation effect and cause the wall to lose some of its isolation properties.
4. When laminating full size sheets, apply laminating adhesive in narrow bands around the perimeter and down the center of each sheet. Full lamination reduces sound barrier properties.
5. Use gasketing at areas where partitions join windows or other difficult to seal areas. Sound can travel around a partition if given the opportunity to do so.
6. Avoid connecting plenum chambers, ducts, vents, etc. These permit the unrestricted flow of sound. Corrective measures are to make partitions full height, and use ducts lined with absorbent material.

SOUND CONTROL . . . NOT A MATTER OF CHANCE

/ You can readily see from this introduction that partitions with good sound isolation properties do not happen by chance. It takes a basic understanding of sound, careful planning, careful selection of materials, and proper installation.

The Georgia-Pacific Systems shown in this booklet are the result of intensive research by our engineers into the problem of noise control. Some of these systems have better sound control properties than others, but all, to some extent, give us the ability to control our acoustic environment. The system you choose will depend upon your budget limitations and upon the acoustical requirements you must meet.

general information

PARTITION SELECTOR GUIDE

Location	Degree of Privacy	STC Requirement	Example of Wall Construction Needs
RURAL (20 db background noise level)	High	60 or over	12" or over solid masonry
	Moderate	50 to 60	2½" steel studs, ¼" Gypsum Sound Deadening Board, ⅝" G-P/Bestwall® Firestop® Wallboard, 2" insulation
	Low	45 to 50	¼" Gypsum Sound Deadening Board, ½" G-P Firestop, wood or steel studs
SUBURBAN (30 db background noise level)	High	55 and over	G-P Triple solid partition
	Moderate	45 to 55	2x4 wood studs, ¼" G-P/Bestwall Gypsum Sound Deadening Board, ½" G-P/Bestwall Firestop wallboard
	Low	40 to 45	2x4 wood studs, resilient channel one side, ⅝" G-P/Bestwall Firestop both sides
CITY (40 db background noise level)	High	45 and over	2½" steel studs, ¼" Gypsum Sound Deadening Board, ½" G-P/Bestwall Firestop wallboard, 2" insulation
	Moderate	40 to 45	2½" steel studs, 2 layers G-P/Bestwall ⅝" Firestop one side, 1 layer G-P/Bestwall ⅝" other side
	Low	35 to 40	2x4 wood studs, 2 layers G-P/Bestwall ⅝" Firestop one side, 1 layer G-P/Bestwall ⅝" Firestop other side

The above chart is presented only as a guide. It gives a general indication of partition performance required to meet specific sound control needs with regard to ambient noise. It does not incorporate the effects of flanking, interconnecting ducts, wiring, and plumbing. These are special problems that should be considered in choosing a wall.

SOUND TRANSMISSION CLASS / Sound Transmission Class (STC) numbers represent a measure of resistance of a given construction component, i.e., a wall to the passage of sound. In these ratings, higher numbers show better sound barriers. Examples for "city" locations:

25	30	35	42	45	48	50
Normal speech can be heard quite easily.	Loud speech can be heard quite easily.	Loud speech can be heard, but not understood.	Loud speech can be heard, only as a murmur.	Must strain to hear loud speech.	Only some loud speech can be barely heard.	Loud speech cannot be heard.

There are some important factors affecting sound transmission loss of partitions that have not been previously mentioned. They should, however, be given careful consideration.

One way to reduce sound transmission is to reduce the amount of fasteners used. This makes the attachment less rigid, which is desirable from the standpoint of sound isolation. An improvement also occurs if a resilient attachment is used between the studs and the wallboard. This allows some relative movement between the board and the stud. Another method to consider is complete separation. This can be accomplished in partitions by staggering the studs. Staggered studs tend to break the continuity of sound because, being independent, they transmit less sound from one wall surface to another. Unequal sides, such as two sheets of gypsum wallboard on one side

and one sheet on the other, reduce sound transmission by preventing the faces from vibrating sympathetically. The use of sound absorbent materials such as mineral wool or other fibrous material and/or sound deadening board in an assembly can also play an important role in sound control.

All of the test results on the following pages are results obtained under laboratory testing conditions where controlled conditions reduce variables to a minimum. In the field, these laboratory conditions are not always met, since many other variables are introduced. Laboratory results will generally exceed results of field tests, but the tests under controlled conditions are the only logical way to compare the performance of different assemblies.

wood stud partitions/load bearing



Bestwall® Firestop®-2 layers both sides

STC/41

Non-radiating 2 hrs combustible
Fire test no. T-194

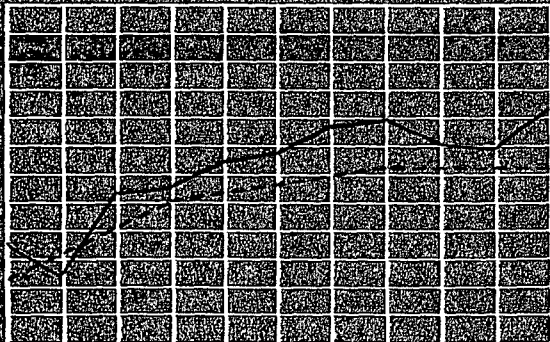
partition properties

assembly data

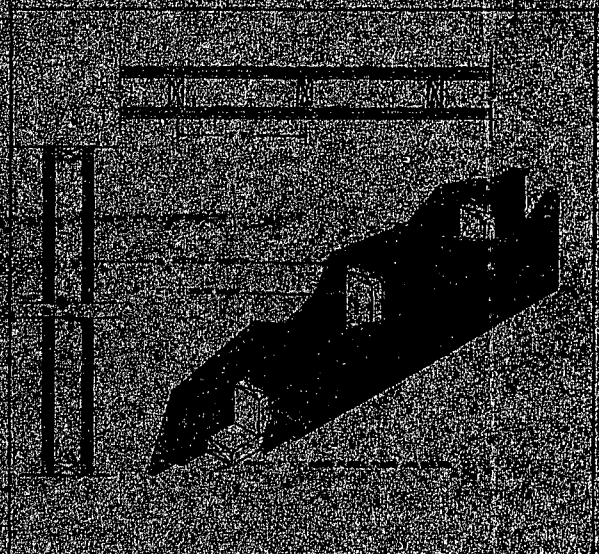
Test No. G-1432 Dated February 10, 1982
Conducted by Ohio Research Corporation
Test Location: Highland
Width 12"
Thickness 6"
Height 17 1/2' by 8' 6"
Solid Transmission Class 15 dB
Sound Reduction Average 36 dB
Speech Interference Zone 15 dB

fire resistance test data

Fire Test No. T-194 Dated April 12, 1982
Conducted by Engineering Experiment Station
Ohio State University



Solid line Partition performance
Dotted line ASTM E90-91 standard curve



materials used

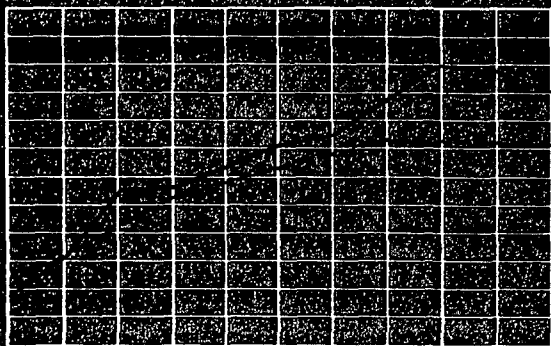
1. 2" x 4" Wood Studs
2. 1/2" x 1/2" x 1/2" Bestwall Firestop
3. 1/2" x 1/2" x 1/2" Bestwall Firestop
4. 1/2" x 1/2" x 1/2" Bestwall Firestop
5. 1/2" x 1/2" x 1/2" Bestwall Firestop
6. Bestwall Firestop Compound

installation details

1. Install wood studs in 6" to 2" x 4" wood plate at floor and ceiling.
2. Apply a single layer of 1/2" Bestwall Firestop Type X vertically with joints offset 16" from those in first layer by laminating with Bestwall Firestop Compound. Hold in place with 2" screws placed 12" o.c. along the edge joints and in the field and top and bottom plates.
3. Apply a second layer of 1/2" Bestwall Firestop Type X vertically with joints offset 16" from those in first layer by laminating with Bestwall Firestop Compound. Hold in place with 2" screws placed 12" o.c. along the edge joints and in the field and top and bottom plates.
4. Taped joints not required to obtain fire rating.

SGP 0027968

 Bestwall[®] $\frac{1}{2}$ " Firestop[®] over $\frac{1}{4}$ " gypsum
sound deadening board—nailed both sides

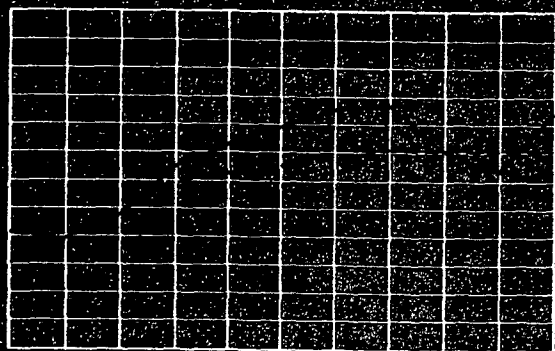


Wallboard on Wood

SGP 0027969

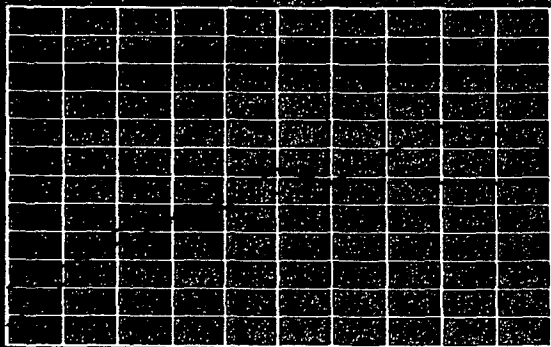
wood stud partitions/load bearing

 Bestwall® Firestop® on resilient channel



SGP 0027970

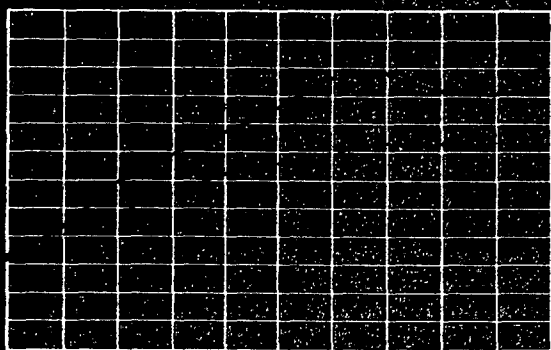
 Bestwall[®] 1/2" Firestop[®] laminated over 1/4"
gypsum sound deadening board



SGP 0027971

wood stud partitions/ load bearing

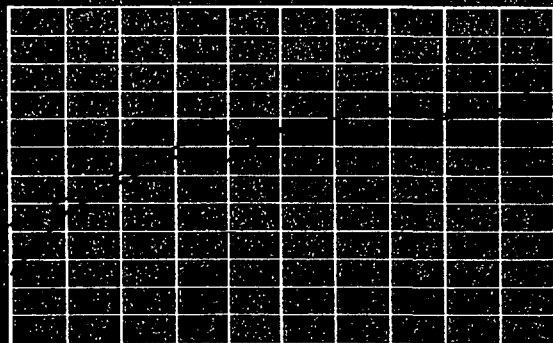
 Bestwall[®] 5/8" Firestop[®] over fiber sound deadening board



SGP 0027972



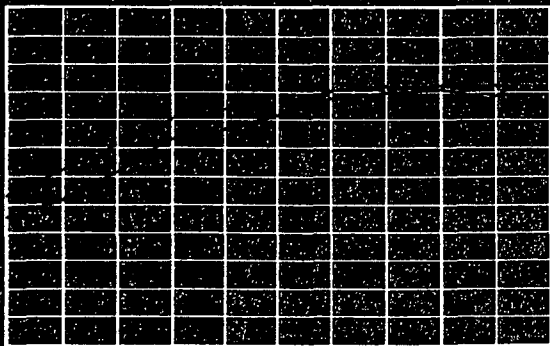
Bestwall^{5/8"} Firestop¹ laminated over ¹/_{4"}
gypsum sound deadening board



SGP 0027973

staggered wood stud partition/load bearing

 Bestwall[®] 1/2" Firestop[®] laminated over
1/4" gypsum sound deadening board
(two assemblies)



SGP 0027974

 Bestwall[®] 5/8" Firestop³, 2 layers one side,
1 layer on resilient channel other side

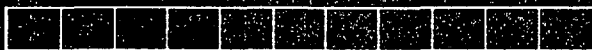
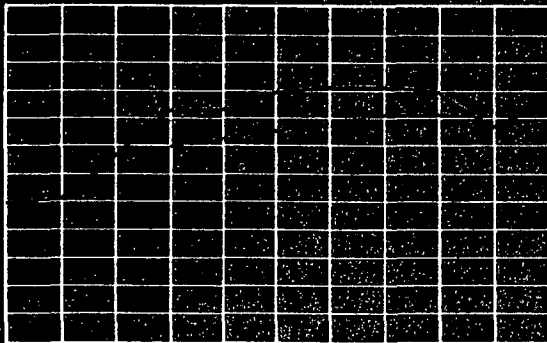


SGP 0027975

1980, and 1981. The first two years were
 planned and the last two were
 unplanned. The first two years
 were planned and the last two
 were unplanned. The first two
 years were planned and the last
 two were unplanned. The first
 two years were planned and the
 last two were unplanned. The
 first two years were planned and
 the last two were unplanned.

wood stud partition/ load bearing

 Bestwall[®] 5/8" Firestop[®] on resilient channel
with building insulation in the cavity



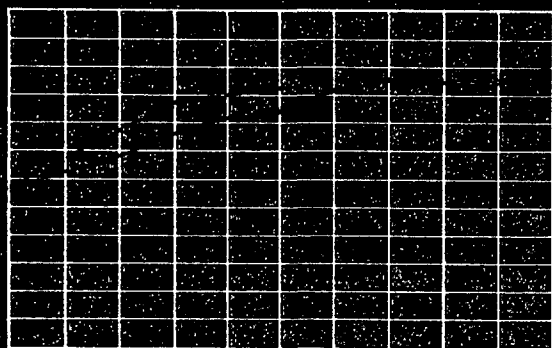
SGP 0027976

double wood stud partition/load bearing



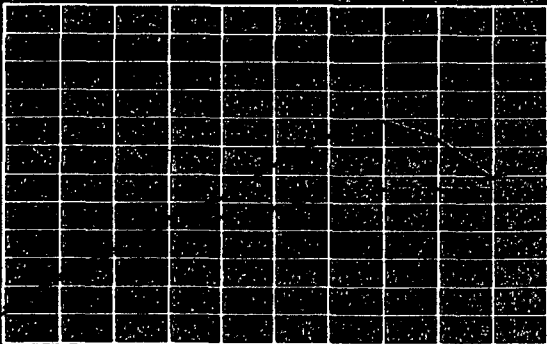
Bestwall[®] ½" Firestop[®] over ½" gypsum
sound deadening board (two assemblies)

SGP 0027977



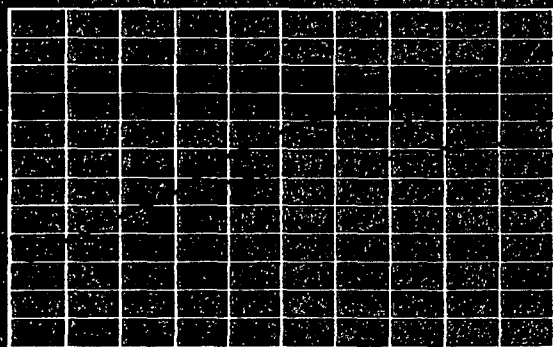
steel stud partitions / non-load bearing

 Bestwall gypsum wallboard with and without an expansion control joint at ceiling track (two assemblies)



SGP 0027978

 Bestwall® 5/8" Finestop® 1 layer one side,
2 layers other side



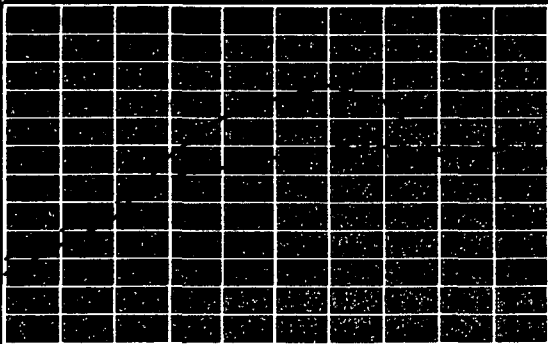
wallboard on steel

SGP 0027979

steel stud partitions / non-load bearing



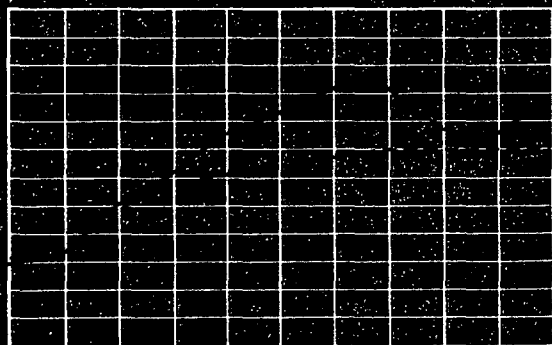
Bestwall[®] 5/8" Firestop[®] both sides with
building insulation in the cavity (two
assemblies)



SGP 0027980



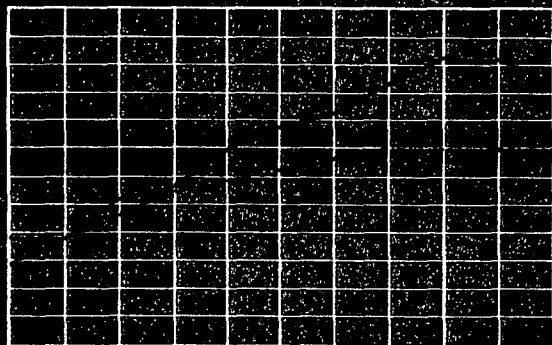
Bestwall[®] 5/8" Firestop[®] over fiber sound
deadening board (two assemblies)



SGP 0027981

steel stud partitions/non-load bearing

 Bestwall[®] 1/2" Firestop[®] over 1/4" gypsum
sound deadening board

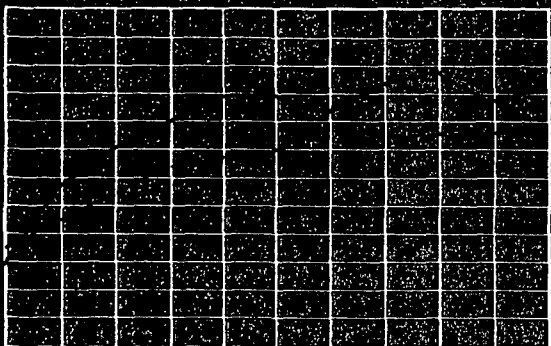


1/2" Bestwall[®] Firestop[®]
1/4" Gypsum Sound Deadening Board
1/2" Bestwall[®] Firestop[®]
1/4" Gypsum Sound Deadening Board
1/2" Bestwall[®] Firestop[®]
1/4" Gypsum Sound Deadening Board
1/2" Bestwall[®] Firestop[®]
1/4" Gypsum Sound Deadening Board
1/2" Bestwall[®] Firestop[®]
1/4" Gypsum Sound Deadening Board

SGP 0027982



SGP 0027983



7517 *Phragmites australis* (Cav.) Trin. ex Steud.

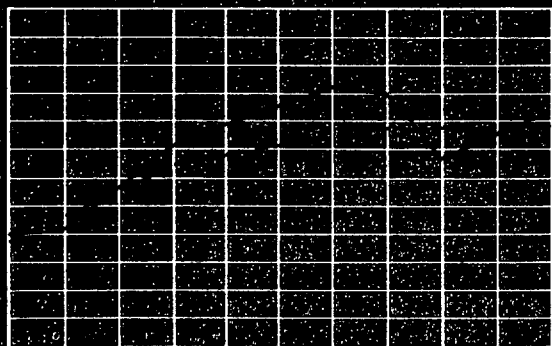
THE UNIVERSITY OF CHICAGO

[illegible]

Table 1. *Mean (SD) values of the variables measured in the 1000 subjects*

steel stud partitions/non-load bearing

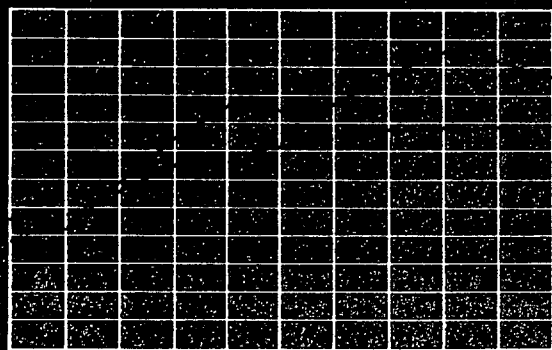
 Bestwall $\frac{5}{8}$ " Firestop, 2 layers both sides



SGP 0027984



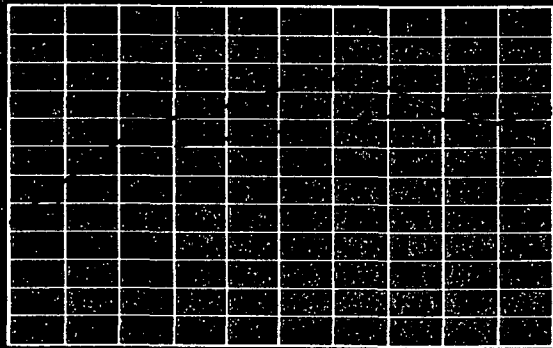
Bestwall[®] 1/2" Firestop[®] over 1/2" gypsum
sound deadening board with building
insulation in the cavity



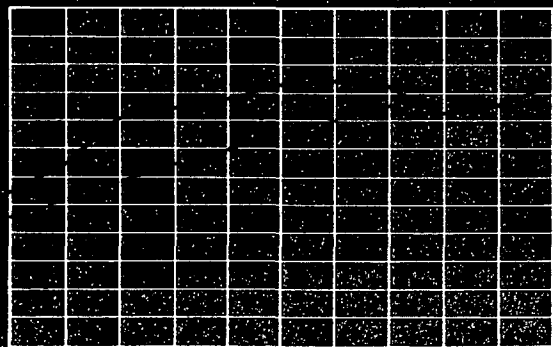
SGP 0027985

steel stud partitions/non-load bearing

 Bestwall® $\frac{5}{8}$ " Firestop,® 2 layers one side,
1 layer other side, with building insulation
in the cavity



 Bestwall[®] 5/8" Firestop,[®] 2 layers both sides
with building insulation in the cavity

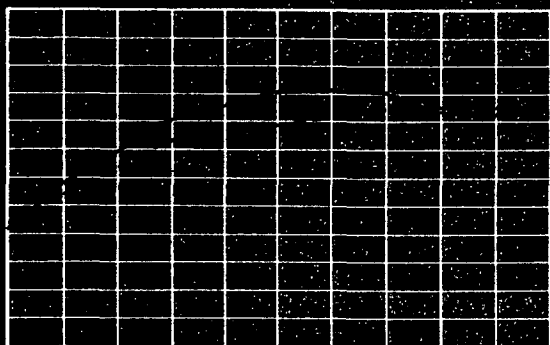


SGP 0027987

steel stud partitions / non-load bearing



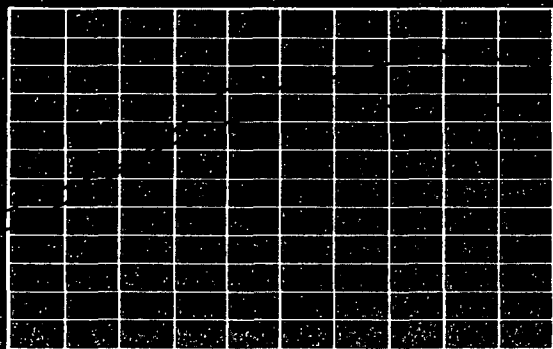
Bestwall³ $\frac{5}{8}$ " Firestop³ and coreboard with building insulation in the cavity



SGP 0027988



Bestwall[®] $\frac{5}{8}$ " Firestop[®] over $\frac{1}{4}$ " gypsum
sound deadening board with building
insulation in the cavity

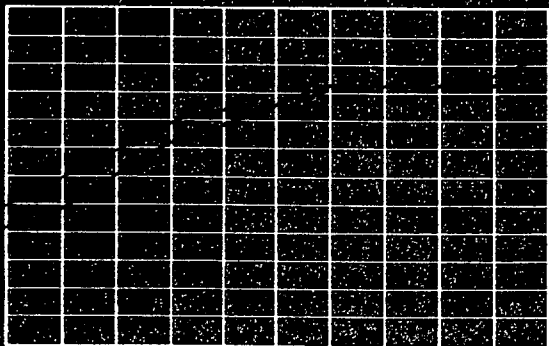


SGP 0027989

steel stud double (chase wall) partition/ non-load bearing



Bestwall[®] ½" Firestop[®] over ¼" gypsum
sound deadening board (two assemblies)

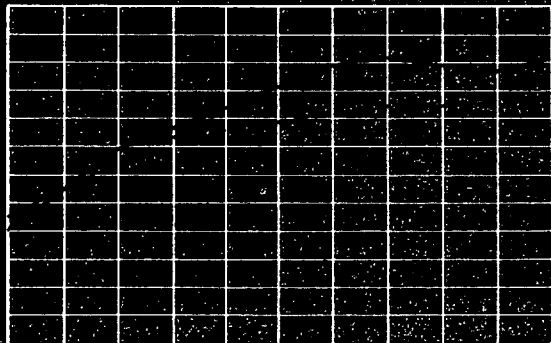


SGP 0027990

gypsum stud partitions/non-load bearing



Bestwall® 5/8" Firestop[®] over fiber sound deadening board



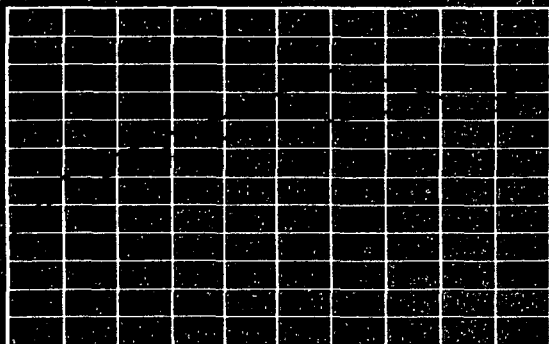
Wallboard.com/SGP594.htm

SGP 0027991

gypsum stud partition/ non-load bearing



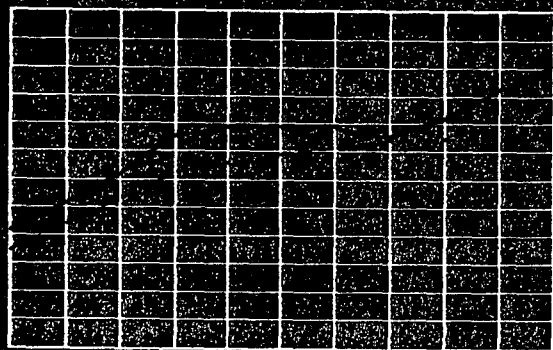
Bestwall[®] 5/8" Firestop[®] each side, resilient channel one side, building insulation in the cavity



SGP 0027992

gypsum stud partitions/double solid

Bestwal. $\frac{3}{8}$ " gypsum wallboard over coreboard

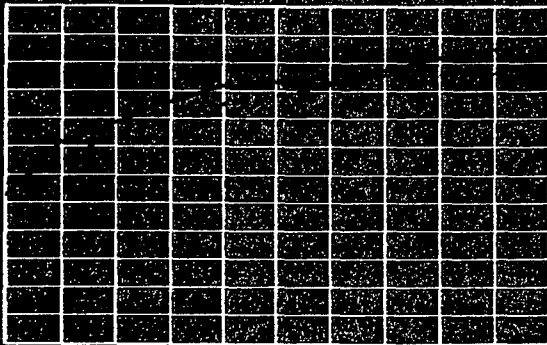


SGP 0027993

gypsum stud partitions / this is solid



Bestwall^{1/2} gypsum wallboard over
coreboard with building insulation in the
cavity

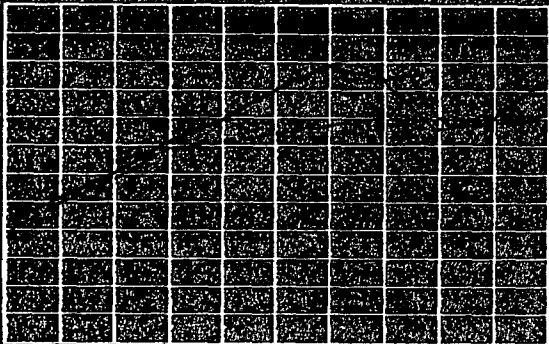


SGP 0027994

lath and plaster



Bestwall[®] resilient lath and plaster partition



1. Remove the old lath and plaster from the wall and ceiling. Remove the old lath and plaster from the wall and ceiling. Remove the old lath and plaster from the wall and ceiling.

2. Apply Bestwall[®] resilient lath and plaster to the wall and ceiling. Apply Bestwall[®] resilient lath and plaster to the wall and ceiling. Apply Bestwall[®] resilient lath and plaster to the wall and ceiling.

3. Apply Bestwall[®] resilient lath and plaster to the wall and ceiling. Apply Bestwall[®] resilient lath and plaster to the wall and ceiling. Apply Bestwall[®] resilient lath and plaster to the wall and ceiling.

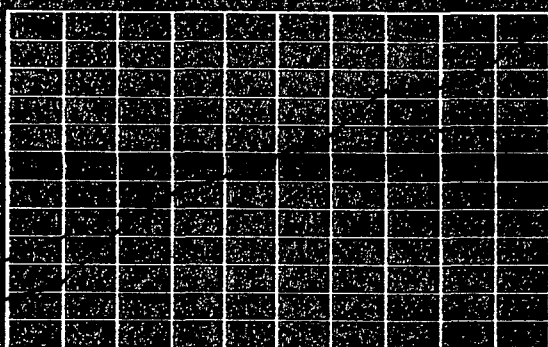
4. Apply Bestwall[®] resilient lath and plaster to the wall and ceiling. Apply Bestwall[®] resilient lath and plaster to the wall and ceiling. Apply Bestwall[®] resilient lath and plaster to the wall and ceiling.

assemblies

wood floor/beaming assemblies



Bestwall[®] Freestockover[®] gypsum sound deadening board

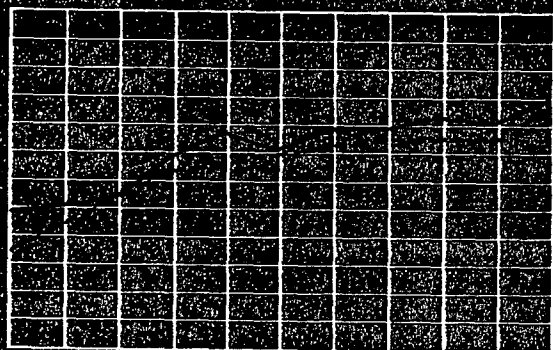


Assembly Details

1. 2x10 Joist
2. Gypsum Board
3. 1/2" Plyboard
4. GP Grid Plyboard
5. GP Freestockover Gypsum Sound Deadening Board
6. GP Bestwall Freestockover Type X Gypsum Board
7. 1/2" Plyboard
8. 2x10 Joist

SGP 0027996

Bestwall[®] Finestock on resilient metal furring



1. Bestwall[®] Finestock on resilient metal furring
 2. Bestwall[®] Finestock on resilient metal furring

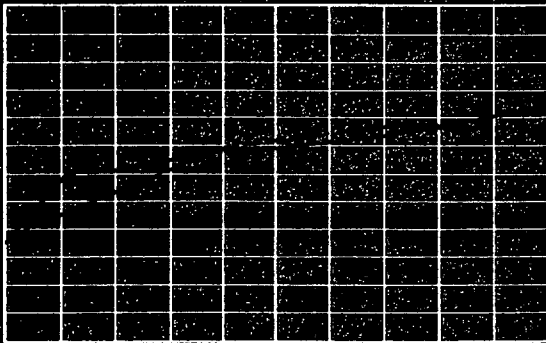
1. Bestwall[®] Finestock on resilient metal furring
2. Bestwall[®] Finestock on resilient metal furring
3. Bestwall[®] Finestock on resilient metal furring
4. Bestwall[®] Finestock on resilient metal furring

SGP 0027997

wood floor/ceiling assemblies



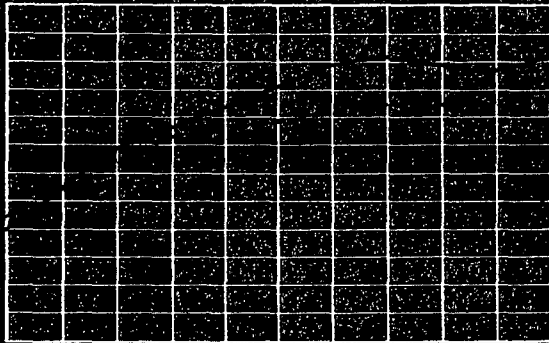
Bestwall[®] $\frac{5}{8}$ " Firestop[®] on resilient metal furring



SGP 0027998



Bestwall[®] 5/8" Firestop[®] insulation, with ceiling independent of floor



SGP 0027999



SGP 0028000





GYPSUM PRODUCTS SPECIFICATION DIRECTORY

This list provides a simple up-to-date cross reference of Bestwall products with applicable American Society for Testing Materials Standards (ASTM Standards), Federal Specifications and American Standards Association Specifications (ASA). The last two digits in the

ASTM reference number indicate the year of the edition. Where any specification covers more than one material the type or paragraph is shown. Items for which no standard is written are indicated.

GYPSUM BOARD PRODUCTS

PRODUCT	THICK- NESS	WIDTH	LENGTH	ASTM STANDARDS	FEDERAL SPEC.	APPLIED UNDER	
GP/BESTWALL WALLBOARD Tapered Edge	1/4"	4'	6' to 12'	C 36-67	SS-L-30c Type III—Grade R 3/20/67	ASA A97.1	
Square, Tapered or Round Edge	3/8"	4'	6' to 16'				
	1/2"	4'	6' to 16'				
	5/8"	4'	6' to 16'				
GP/BESTWALL INSULATING WALLBOARD Square or Tapered Edge	3/8"	4'	6' to 16'	C 36-67	SS-L-30c Type III—Grade R 3/20/67	ASA A97.1	
	1/2"	4'	6' to 16'				
	5/8"	4'	6' to 16'				
GP/BESTWALL ETERNAWALL™ Square or Beveled Edge	1/2"	4'	8'†	C 36-67	SS-L-30c Type III—Grade R or Grade X Class III 3/20/67	ASA A97.1	
	5/8"	4'	8'†				
GP/BESTWALL FIRESTOP™ WALLBOARD Square or Tapered Edge	1/2"	4'	6' to 16'	C 36-67	SS-L-30c Type III—Grade X 3/20/67	ASA A97.1	
	5/8"	4'	6' to 16'				
GP/BESTWALL FIRESTOP INSULATING WALLBD. Square or Tapered Edge	1/2"	4'	6' to 16'	C 36-67	SS-L-30c Type III—Grade X 3/20/67	ASA A97.1	
	5/8"	4'	6' to 16'				
GP/BESTWALL TILE BACKER BOARD Tapered Edge	1/2"	4'	8', 11' and 12'	C630-68T	—	—	
	5/8"	4'					
GP/BESTWALL GYPSUM SOUND DEADENING BD. Square Edge	1/4"	4'	8'	C442-67	SS-L-30c Type IV—Grade R	—	
GP/BESTWALL BACKER Square or T & G Edge	3/8"	4'	8' Std.†	C 422-67	SS-L-30c Type IV Grade R Grade X	—	
	1/2"	2'	8' Std.†				
	5/8"	2'	8' Std.†				
GP/BESTWALL FIRESTOP™ GYPSUM SHEATHING Long edges - Tongue and Groove	Core-treated	1/2"	4'	8' & 9'	SS-L-30c Type II Grade R&W	—	
Tongue and Groove	Core-treated	1/2"	2'	8' Std.†			C 79-67
Square Edge	Non core-treated	1/2"	2'	8' Std.†			C 79-67
GP/BESTWALL DENS-COTE BASE	1/2"***	4'	8' & 10'†	C 588-66T	—	—	
GP/BESTWALL LATH Plain, Pinholath or Perfolath	3/8"	16"	48"	C 37-67	SS-L-30c Type I Grade R*	ASA A42.4	
Insulating Lath	1/2"	16"	48"				
	3/8"	16"	48"				
	1/2"	16"	48"				
Long Length (Plain Only) Round Edge or Tongue and Groove Edge	1/2"	24"	8' Std.†	*All Bestwall Lath, except Perfolath, meets Type X Requirements.			

†Standard Length—Other Lengths on Order.

**Standard Thickness—Other Thicknesses on Order.

SGP 0028002

GYPSUM PRODUCTS SPECIFICATION DIRECTORY

PLASTER PRODUCTS

BRAND	PRODUCT	ASTM STANDARDS	FEDERAL SPEC.	APPLIED UNDER
GP/BESTWALL	NEAT BASE COAT PLASTER Unfibered, Fibered*, and Extra Fibered*	C-28-66	SS-P-00402a Type II	ASA A42.1
GP/BESTWALL	LITE-MIX BASE COAT PLASTER Unfibered, Fibered (Glass Only) and Masonry Mix	C-28-66	SS-P-00402a Type I	ASA A42.1
GP/BESTWALL	WOOD FIBERED PLASTER	C-28-66	SS-P-00402a Type III	ASA A42.1
GP/BESTWALL	CONCRETE BOND PLASTER	C-28-66	SS-P-00402a Type IV	ASA A42.1
GP/BESTWALL	PREPARED TROWEL FINISH PLASTER	—	—	ASA A42.1
GP/BESTWALL	PREPARED AND FLOAT FINISH PLASTER—White	—	—	ASA A42.1
GP/BESTWALL	BUILDERS LIME (Autoclaved Finish Lime)	C 206-61	SS-L-351 (F)	ASA A42.1
GP/BESTWALL	SMOOTH FINISHING LIME (Normal Hydrated Mason's Lime)	C 6-61	SS-L-351 (F)	ASA A42.1
GP/BESTWALL	SPEEDY MASON'S LIME (Autoclaved Mason's Lime)	C 207-49 S	SS-L-351 (M)	ASA A42.1
GP/BESTWALL	MASON'S LIME (Normal Hydrated Mason's Lime)	C 207-49 N	SS-L-351 (M)	ASA A42.1
GP/BESTWALL	KEENE'S CEMENT	C 61-64	SS-P-00410a	ASA A42.1
GP/BESTWALL	GAUGING PLASTER—White (SATIN SPAR)	C-28-63	SS-P-00402a Type V	ASA A42.1
	Local	C-28-63	SS-P-00402a Type V	ASA A42.1
GP/BESTWALL	MOULDING PLASTER—White (SUNFLOWER)	C 59-65	—	—
	Local	C 59-65	—	—
GP/BESTWALL	DENS-COTE SMOOTH FINISH†	C-587-66T	—	—

*Glass Fibered unless Specified Sisal

†Texture Finish on Order

MISCELLANEOUS PRODUCTS

BRAND	PRODUCT	ASTM STANDARDS	FEDERAL SPEC.	APPLIED UNDER
GP/BESTWALL	JOINT SYSTEM MATERIALS	C 475-64	SS-J-570a 10/24/66	ASA A97.1
*	BONDING COMPOUNDS FOR INTERIOR PLASTERING	C631-68T		
GP/BESTWALL	METRO-MIX	C 317-64		ASA A59.1
GP/BESTWALL	FORM BOARD	C 318-67	Type V SS-L-30c Grade R	ASA A59.1

*Not manufactured by Georgia-Pacific

Any question not answered by the information on this sheet or available from local sources should be referred to the General Sales Office. Be sure to give all information as to issuing office, date of specification, job description, location, enforcing party, product involved, description of use if other than normal, amount involved, etc. This is particularly important when special limitations under standard specifications are involved.

Gypsum Division field locations have a book of applicable Federal and ASTM Specifications. Each Specification is preceded with a detailed analysis prepared by the Laboratory of which GP/Bestwall products meet the specification and any limitations. The Local Sales Office is authorized to write a letter of certification in accordance with the Laboratory analysis.



GEORGIA-PACIFIC / GYPSUM DIVISION

900 S.W. FIFTH AVENUE • PORTLAND, OREGON 97204

SGP 0028003

BEST WALL GYPSUM COMPANY

GYPSUM WALLBOARD MANUAL

Section 10

1965 EDITION

Building Codes

and

Building Officials

(Refer to the Gypsum Lath and Plaster Manual Section 9 -- Building Codes)

1965 Edition for an article on Building Codes and Building Officials.

Many salesmen are overawed by the voluminous amount of building regulations and the many matters covered in building codes. 75% or more of these are of no concern to Bestwall. In a building code, it is necessary to know only three or four of the following:

- 1 - How building materials are approved under the Code.
- 2 - Is a separate approval required for specific assemblies, even with material approval?
- 3 - Fees and data required.
- 4 - Time required.

BEST WALL GYPSUM COMPANY

GYPSUM WALLBOARD MANUAL

Section 10

1965 EDITION

1964 UNIFORM BUILDING CODE

The 1964 Uniform Building Code, the official Model Building Code of the West Coast building Officials organization, who call themselves the International Conference of Building Officials, is reprinted each three years, incorporating all changes the group have agreed on in the preceding period.

Many communities which follow the Uniform Building Code have arrangements to automatically adopt the latest edition of the Code. Other cities have arrangements to automatically accept the Approvals of the Research Committee insofar as approvals of materials and assemblies are concerned. Tables No. 43-A, 43-B, and 43-C giving standard assemblies with fire resistance of 1 to 4 hours. This is the bible for such communities and is used as a reference on fire resistance by all who refer to the UBC.

Attached hereto are excerpts from Table 43 pertaining to Gypsum Wallboard Assemblies, all of which cover Bestwall materials as well as those of other gypsum manufacturers. Remember, Bestwall's Type "X" Board is Firestop.

Please notice that insofar as these ratings are concerned, they all call for a paper tape and cement for joint treatment for the fire resistive ratings. The Bestwall Gypsum Company has conducted tests at Underwriters' to prove specifically that the paper tape and cement was not necessary for the fire resistive rating and have reports and letters from the Underwriters' covering this feature. All approvals of Bestwall are being so requested and Underwriters' Listing of Materials for 1964 have that notation.

Use the new Table 43 in the 1964 Edition for proof of your assemblies in those communities where the Uniform Building Code is used.

In taking advantage of the Gypsum Association's work, the Bestwall Gypsum Company has dropped Research Report #1145.6 as of April in '64 when it was due to be reviewed and reissued, making it current. Be sure that you understand and that any of your customers or Building officials who are concerned, understand that the 1145 was dropped only because the assembly is now covered in Table #43 and hence is a part of the Code itself.

1145 covered the 1-Hour approval for Bestwall's Firestop Gypsum Wallboard over wood studs and beneath wood floor and joists for 1-Hour fire resistance.

TABLE NO. 43-B RATED FIRE-RESISTIVE PERIODS FOR VARIOUS WALLS AND PARTITIONS

MATERIAL	CONSTRUCTION	Minimum Finished Thickness Face-To-Face(Including Plaster Where Mentioned)	
		2 Hr.	1 Hr.
Solid Gypsum Wallboard Partition	One layer $\frac{1}{2}$ " Type "X" wallboard laminated to each side of 1" V-Edged coreboards with approved laminating compound. Vertical joints of 2" face layer & coreboard are staggered 3" or more. Joints are taped and finished		
Interior Stud Partition W/Gypsum Wallboard on each side	Wood studs with 2 layers $\frac{3}{8}$ " gypsum wallboard each side. First layer nailed to studs in vertical position. Face layer laminated to base layer in horizontal position w/joints staggered using gypsum joint cement and nails.		5"
	Wood studs w/space between filled w/mineral wool bats nailed to studs, $\frac{1}{2}$ " gypsum wallbd.ea.side		4 $\frac{1}{2}$ "
	Wood studs w/two layers of $\frac{1}{2}$ " gypsum wallboard each side, joints staggered		5 $\frac{1}{2}$ "
Interior Stud Partition W/Gypsum Wallboard on each side	Wood studs w/one layer $\frac{5}{8}$ " Type "X" gypsum wallboard nailed 7" on center to each side w/end joints on nailing members. Joints taped and finished (Firestopped)		4 $\frac{7}{8}$ "
	Wood studs w/two layers $\frac{5}{8}$ " Type "X" gypsum wallboard each side. Base layers applied vertically and nailed 9" on center. Face layers applied vertically or horizontally & nailed 7" on center. For nail-adhesive application base layers are nailed 6" on center. Face layers applied with coating of wallboard adhesive and nailed 12" on center. Face layer joints taped & finished (Firestopped)		6 $\frac{1}{8}$ "
Exterior Stud Wall	Drop siding over $\frac{1}{2}$ " gypsum sheathing on exterior surface w/interior surface treatment as required for interior stud partitions		5 $\frac{5}{8}$ "
	Wood studs w/one layer $\frac{5}{8}$ " Type "X" gypsum wallboard nailed 7" on center on the inside w/end joints on nailing members. Covered on the exterior w/one of the materials specified above. Joints taped & finished (Firestopped)		5 $\frac{1}{8}$ "
		Minimum Thickness of Ceiling	
		2 Hr.	1 Hr.
Wood joists w/subfloor of 1" nominal boarding, or $\frac{5}{8}$ " plywood, a layer of build- ing paper & $\frac{1}{2}$ " T. & G. flooring	Attached ceiling of one layer $\frac{5}{8}$ " Type "X" gypsum wallboard nailed 6" on center to joists w/end joints on nailing members. Joints taped and finished		5/8"
	Attached ceiling of 2 layers $\frac{1}{2}$ " gypsum wallboard w/ a separately attached 20-gauge 1" wire mesh between the two layers		1"

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Note 5 or 6: Six-penny No. 13 gauge, 1-7/8" long, 1/4" diameter, flat head nail

Note 5 or 6: Eight-penny No. 11 1/2 gauge, 2-3/8" long, flat head nail

REGIONAL CODE APPROVALS

AGENCIES

PRODUCT	FIRE RESISTIVE RATING	USC	SBCC	ICBO	BOCA	NYB STD. & A	CITY OF L.A.	LOCAL	USE
5/8" FIRESTOP	2 Hr.		6280	1000.6		709-51 SM			MULTIPLE LAYER APPLICATION WALLS AND PARTITIONS - LOAD BEARING AND NON-LOAD BEARING (HUMMER B-MOD)
"	1 Hr.		6280			709-51 SM WALL 710-51 SM CEILING			SINGLE LAYER APPLICATION-WALLS & PARTITIONS - (WOOD OR STEEL) FLOOR & CEILING-LOAD BEARING & NON-LOAD BEARING
"	1 Hr.			1145.6		710-51 SM			SINGLE LAYER APPLICATION-LOAD BEARING (WOOD STUD: 16" O.C.) WALL & PARTITION FLOOR & CEILING (WOOD JOISTS 16" O.C.)
"	1 Hr.			1155.8		709-51 SM 710-51 SM	RR2230 RR2390		SINGLE LAYER-STEEL STUDS 24" O.C.-WALLS & PARTIT FLOOR & CEILING-2 1/2" CONCRETE ON STEEL JOISTS
"	1 Hr.			1144.7					MULTIPLE LAYER-GYPSUM RIBS LAMINATED TO PANELS NON-LOAD BEARING PARTITION ASSEMBLY
"	1 1/2 Hr.		6280						MULTIPLE LAYER APPLICATION-FLOOR & CEILING
"	2 & 3 Hr.			1263.6		709-51 SM			4 & 5" THICK NON-LOAD BEARING LAMINATED WALLBOARD: PARTITIONS (HUMMER B - MODIFIED)
"	3 Hr.		6280			709-51 SM			MULTIPLE LAYER APPLICATION-WALLS & PARTITIONS- NON-LOAD BEARING
"	1 Hr. 1 Hr.					710-51 SM			MULTIPLE LAYER APPLICATION-FLOOR & CEILING 2" CONCRETE SLAB - STUB JOISTS
HUMMER "C"	1 Hr.			1466.3		682-56 SM	3-9-59 LTR.		A 2-3/4" THICK 24" WIDE FACTORY FABRICATED NON- LOAD BEARING PARTITION
BESTWALL GYPSUM SHEATHING						683-56 SM			EXTERIOR SHEATHING ON WOOD FRAME CONSTRUCTION CLASS IV CONSTRUCTION-CORE TREATED & NON-CORE TREATED.
SPACIAL SILENCE ACOUSTICAL & CEIL- ING TILE						682-56 SM			INCOMBUSTIBLE TILE FOR USE IN APPROVED SUSPENSION SYSTEM.
FIRESTOP-120 CEILING TILE	2 Hr.		6283		62-25	710-51 SM			CEILING ASSEMBLIES IN AN APPROVED FIRERATED SUSPENSION SYSTEM
PLAIN GYPSUM LATH AND PINHOLATH	1 Hr.		6285	1526.4	62-23	686-56 SM			FLOOR & CEILING CONSTRUCTION-PLAIN OR PINHOLATH & GYP. SAND OR PERLITE PLASTER, NO METAL REIN- FORCEMENT-NON-LOAD BEARING METAL STUDS-WOOD FLOOR JOISTS.
TYPE "X"					62-23				

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AGENCIES

PRODUCT	FIRE RESISTIVE RATING	UBC	SBCC	IOBO	BOCA	NYB STD. & A	CITY OF L.A.	LOCAL	USE
BASE COAT PLASTERS FINISH COAT MATERIALS						685-56 SM			BASE COAT PLASTER, NEAT, FIBERED, UNFIBERED, COM GAUGING, SLOW SET, FAST SET, SATIN SPAR GAUGING, KEENES CEMENT, WOOD FIBERED PLASTER, SUN FLOWER MOLDING, CONCRETE BOND PLASTER,
METRO-MIX	1-2 HR.					159-55 SM			GYPSUM CONCRETE FOR POURED ROOF DECKS - 2 TO 2 1/2" THICK
PLASTER & LATH CEILING ASSEMBLIES	TYPE 1-1 HR. TYPE 2&3-1 1/2 HR. TYPE 4-2 HR. TYPE 5-2 1/2 HR. TYPE 6,7,8- 3 HR. TYPE 9,10, 11-4 HR.					1305-61 SM			COMPONENT PART OF FIRE RESISTIVE FLOOR & CEILING SYSTEM
PLASTER & LATH PARTITIONS	1 HR. 1 1/2 HR. 1 HR. 1 1/2 HR. 2 HR.					1306-61 SM			GYPSUM LATH & PLASTER FOR SOLID & HOLLOW PARTITIONS NON-LOAD BEARING TYPE 1-PERLITE OR VERMICULITE PLASTER TYPE 2-SANDED GYPSUM PLASTER TYPE 3-2" PLAIN LATH - GYPSUM PLASTER TYPE 4-2" PLAIN LATH - PERLITE OR VERMICULITE TYPE 5-2" PLAIN LATH - PERLITE OR VERMICULITE
PLASTER & LATH COLUMNS	1 HR. 1 1/2 HR. 1 HR. 3 1/2 HR. 1 1/2 HR. 3 HR. 3 HR. 4 HR. 4 HR.					1307-61 SM	RR2911 (2 HR.)		FIREPROOFING OF STRUCTURAL STEEL COLUMN S, TYPE 1 - TYPE 2 - TYPE 3 - TYPE 4 - TYPE 5 - TYPE 6 - TYPE 7 - TYPE 8 - TYPE 9 -

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AGENCIES

PRODUCT	FIRE RESISTIVE RATING	UBC	SBCC	ICBO	BOCA	NYB STD. & A.	CITY OF L.A.	LOCAL	USE
GYPSUM WALLBOARD									
GYPSUM BACKERBOARD				1874.1					TO FORM THE INTERIOR FINISH OF DUCTS OR PLENUM CHAMBERS BY PARTS OF THE BUILDING STRUCTURE.
GYPSUM LATH & PLASTER									
GYPSUM WALLBOARD				1733.1					APPLICATION OF GYPSUM WALLBOARD IN SHOWER & BATH AREAS.
GYPSUM DRYWALL BOARD & SYSTEMS	1 Hr.				63.9 (REPORT NO. 176)				S.B.R.-176 A-WOOD STUDS - 5/8" B/W FIRESTOP
	2 Hr.				"				S.B.R.-176 B-WOOD STUDS - 5/8" B/W FIRESTOP
	1 Hr.				"				S.B.R.-176 C-STEEL STUDS-5/8" B/W FIRESTOP
	1 Hr.				"				S.B.R.-176 D-1" GYPSUM STUDS 5/8" B/W FIRESTOP
	2 Hr.				"				S.B.R.-176 E-1" GYPSUM STUDS 5/8" B/W FIRESTOP
	3 Hr.				"				S.B.R.-176 F-1" GYPSUM STUDS 5/8" B/W FIRESTOP
	2 Hr.				"				S.B.R.-176 G-STEEL Z STUDS 5/8" B/W FIRESTOP
	1 Hr.				"				S.B.R.-176 H-FLOOR & CEILING ASSEMBLY 5/8" B/W FIRESTOP
	2 Hr.				"				S.B.R.-176 I-FLOOR & CEILING ASSEMBLY 5/8" B/W FIRESTOP
	1 1/2 Hr.				"				S.B.R.-176 J-FLOOR & CEILING ASSEMBLY 5/8" B/W FIRESTOP
5/8" FIRESTOP	2 Hr.			1000.8					NESLO Z STUD - 2 LAYERS - 5/8" B/W FIRESTOP
VINYL FACED GYPSUM WALLBOARD	1 Hr.			1661.3					PENMETAL PANEL-BOARD PARTITION SYSTEM.
5/8" B/W FIRESTOP TYPE "X"									
DW-SCREW CHANNEL STUD SYSTEM	1 Hr.			1736.2					DONN DW-SCREW CHANNEL STUD SYSTEM
FIBERGLAS NOISE STOP BOARD PARTITION	1 Hr.			1809.2					OWENS-CORNING-FIBERGLAS NOISE STOP BOARD - 5/8" B/W FIRESTOP PARTITION

BUILDING CODE DATA

S/R _____ SALES DISTRICT _____ DATE _____

1. CITY _____ POPULATION _____

2. PERSON IN CHARGE OF BUILDING DEPARTMENT

Name _____ Title _____

Address _____

BUILDING INSPECTOR _____

Address _____

PLAN ENGINEER _____

Address _____

CHIEF FIELD INSPECTOR _____

Address _____

3. BUILDING CODE

DATE OF CURRENT CODE _____

PATTERNED AFTER MODEL CODE? YES ___ NO ___. UBC ___ BOCA ___ SBCC ___ NRC ___
Check one)

NEW CODE BEING CONSIDERED? YES ___ NO ___

4. HOW ARE MATERIALS AND ASSEMBLIES APPROVED

(a) BY ONE PERSON? YES ___ NO ___. WHO? _____

(b) BY A GROUP? YES ___ NO ___

WHAT IS GROUP? _____

MEMBERS _____

Name _____ Title _____

(c) ANY FEE REQUIRED? YES ___ NO ___. AMOUNT _____

(d) WHAT DATA IS NEEDED?

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ANY LAB _____ MEETING WHAT STANDARD _____

or ONLY ONE LAB? YES ___ NO ___. WHAT LAB? _____

- 7 -

5. IS BESTWALL MATERIAL APPROVED?

	(Hrs.) Walls				(Hrs.) Ceilings				Column	Beam
Yes	No	1	2	3	4	1	2	3	4	
NEAT GYPSUM PLASTER										
LITE MIX										
GYPSUM LATH										
PINHOLATH										
GYPSUM WALLBOARD										
5/8" FIRESTOP										
1/2" FIRESTOP										
2'x8' GYPSUM SHEATHING										
4'x8' GYPSUM SHEATHING										
ANY PROBLEMS										

SIGNED

S/R

Address

PAOLI, PENNSYLVANIA

2 October 1965

To: All Regional Sales Managers
All Area Sales Managers
All Salesmen

General Sales Bulletin #93-65

Subject: 1/2" BESTWALL FIRESTOP
B O C A

Re: Approval #52-3-R
Superceeds #52-3,
dated July 12, 1965

Cc: Mr. R. I. Fredericks Paoli

Mr. K. A. McCaskill Paoli

By: G. C. Moore / ghp

File in Gypsum Wallboard Manual #2
Product Manual
Section - 10

Attached herewith one card from the Building Officials Conference of America, Inc., in reference to the new approval #52-3R which superceeds #52-3. This approval is dated July 12, 1965 and covers the use of 1/2" Bestwall Firestop in wall and ceiling construction assemblies.

The assemblies covered under this approval number:

CONSTRUCTION	WALL SURFACE	FIRE TEST REF.	FIRE RAT.
Partition (Combustible) 2" x 4" wood studs - 16" o.c.	1/2" Bestwall Fire-stop, 1 layer both sides	U.L. #1	45 Min.
Partition (Combustible) 2" x 4" wood studs - 16" o.c.	1/2" Bestwall Fire-stop, 1 layer each side, mineral wool in stud space	BMS-92	1 hour
(Combustible) Finished floor on rough subfloor - wood joists - 16" o.c.	1/2" Bestwall Fire-stop, 1 layer on resilient channel	U.L.-#33	1 hour
Floor & Ceiling (Incombustible) (Incombustible) 2" concrete floor on metal lath over steel bar joists - 24" o.c.	1/2" Bestwall Firestop, 1 layer	U.L.-#1	45 Min.
	1/2" Bestwall Firestop, U.L.-#17		1-1/2hrs.

As with other approvals such as this, be sure that you are aware in your own areas where the B O C A Code is followed, it is those communities this report has value and assists you in obtaining the acceptance for gypsum wallboard products and assemblies.

SGP 0028012

**BUILDING OFFICIALS CONFERENCE OF AMERICA, INC.
MATERIAL APPROVALS COMMITTEE**

PRODUCT CLASSIFICATION - 1/2" Firestop Gypsum Wallboard

APPROVAL NO.

52-3R

Supersedes

APPLICANT - GEORGIA-PACIFIC CORPORATION,

52-3

BESTWALL GYPSUM DIVISION

REPORT NO.

13R

PRODUCT TRADE NAME - Firestop

APPROVED:

July 12, 1963

PERFORMANCE FOR WHICH APPROVAL WAS REQUESTED - Fire Resistance

RECOMMENDED APPROVAL - Based on Structural Bureau Report No. 13R, dated May 14, 1963, and subject to requirements due to peculiar local conditions, the following approvals are recommended provided that the sections set forth in the report and any other applicable sections of the BOCA Codes (1960 as amended 1964) are observed, that the product is installed within the limitations of this report and in accordance with the manufacturer's specifications noted therein:

1. Approval is recommended for the use of 1/2" Firestop Bestwall Gypsum Wallboard as a non-combustible protective material in the construction of floor and ceiling assemblies, and for wall and partition assemblies of wood frame construction within the following limitations:
 - a. In wall and partition construction, the wallboard may be applied either vertically or horizontally on 2 x 4 wood studs spaced on not over 16 inch centers and firestopped as required. The protection limit is for 45 minutes fire resistance. Joints must be butted but need not be taped or finished.
 - b. An exception to IV B 1.2 may increase the fire resistance rate to 1-hr. provided the stud space is filled with mineral wool batts nailed to the studs or the partition, is nonbearing, and has mineral wool fill.
 - c. In protected combustible floor and ceiling systems where the wood joists are spaced on not over 16 inch centers, the assembly is of the Class E-1 1-Hr. (combustible) group such as Design No. 33, and the assembly is protected on the ceiling side by 1/2" Firestop, fastened to resilient furring channels spaced on not over 24 inch centers, the fire resistance rating is recommended to be 1-hour. In these assemblies, there is no requirement that the joints need be finished or the nails or wallboard screws protected.

(over)

d. In protected combustible floor and ceiling systems where the wood joists are spaced on not over 16 inch centers and the assembly is protected on the ceiling side by 1/2" Firestop nailed or drive screw fastened directly to the joists such as Class F-43 Design, Design No. 1 - 45 Min. - Combustible, the fire-resistance rating is recommended to be 45 minutes. In these assemblies, there is no requirement that the joints need be finished or the nail or screw heads protected.

e. In protected noncombustible floor and ceiling systems where the steel joists are located on not over 24 inch centers, the assembly is of the Class E-1, 1 1/2 Hr. group such as Design No. 17, and the assembly is protected on the ceiling side by 1/2" Firestop fastened to 25 gauge sheet steel runners spaced on not over 24 inch centers, the fire-resistance rating is recommended to be 1 1/2 hours. In these assemblies, there is no requirement that the joints need to be finished or the nails or wallboard screws protected.

In items IV B 1 c, d, and e, it is recommended that the wallboard sheets be lapped at all joints in order to merit the noted fire-resistance ratings.

IDENTIFICATION - All sheets of 1/2" Firestop Bestwall Gypsum Wallboard and all packages of this material manufactured under this Approval shall be clearly marked with the identifying symbol "BOCA 52-3R", which shall be affixed at the place of manufacture.

*Copies of the Structural Bureau Report may be obtained from the BOCA Executive Office,
1313 East 60th Street, Chicago 37, Illinois, for \$1.00 each.*

COMMITTEE

MYRON J. SASSER, Chm.
BURNNIE HOLLIDAY
J. D. LYONS

Southern Building Code Congress

BROWN-MARK BUILDING



BIRMINGHAM, ALABAMA

REPORT: 6601

APPROVED: 3-29-66

EXPIRES: — —

COMMITTEE on COMPLIANCE APPROVAL REPORT

ON

$\frac{1}{2}$ " BESTWALL FIRESTOP PARTITION — FLOOR AND CEILING ASSEMBLIES

SUBMITTED BY

**BESTWALL GYPSUM DIVISION
GEORGIA-PACIFIC CORPORATION
PAOLI, PENNSYLVANIA**

The Manufacturer made formal application on August 2, 1965, together with Manufacturer's technical literature, test reports, etc.

The Committee on Compliance has reviewed the data submitted for compliance with the Southern Standard Building Code and submits its Report as follows:

DESCRIPTION:

Bestwall Firestop is a gypsum wallboard having a special core formulation under a patented process in which incombustible glass fibers and unexpanded vermiculite have been added to the gypsum core. Firestop is manufactured in $\frac{1}{2}$ " and $\frac{5}{8}$ " thicknesses, 4 foot width and 6 to 16 foot lengths. It is available in tapered, square or tongue and groove edges. The following is a brief description of the various partition, floor and ceiling assemblies using $\frac{1}{2}$ " Bestwall Firestop and their fire retardant rating:

1. **Bestwall Wood-Framed Partition.** (1 hour) is a load bearing 2" x 4" wood stud partition with $\frac{1}{2}$ " Bestwall Firestop gypsum wallboard on each side of studs and mineral-wool fill between stud space — BMS-92.
2. **Bestwall Wood-Framed partition** (1 hour) is a non-load-bearing 2" x 4" wood stud partition with $\frac{1}{2}$ " Bestwall regular gypsum wallboard on each side of studs and mineral wool fill between stud space — BMS-92.
3. **Bestwall Screw Type Steel Stud Partition** (2 hours) is a fire resistive non-load-bearing partition system composed of steel floor and ceiling runners, steel studs spaced 24" o.c., faced on each side with two layers of $\frac{1}{2}$ " Bestwall Firestop gypsum wallboard attached to the studs with special drywall screws. — O. S. U. Report T-3218.
4. **Metal Faced Partition** (2 hours) is a non-bearing wall with aluminum and steel units and five (5) layers of $\frac{1}{2}$ " Bestwall Firestop gypsum wallboard. U. L. Design Number 9. (The R. C. Mahon Company). U. L. Report No. 4008.6.
5. **Non-Load Bearing Steel Faced Wall** (2 hours) is a non-bearing wall with steel facing units and two (2) double layers of $\frac{1}{2}$ " Bestwall Firestop gypsum wallboard. U. L. Design Number 9. (The H.H. Robertson Company). U. L. Report No. R-4013-2.
6. **Non-Bearing Steel Faced Wall.**
 - a. (2 hours) is a non-bearing wall with steel facing units and four (4) layers of $\frac{1}{2}$ " Bestwall Firestop gypsum wallboard. U. L. Design Number 12. (Elwin G. Emsworth Smith and Company). U. L. Report No. R4448.
 - b. (2 hours) in a non-bearing wall with steel facing units and four (4) layers of $\frac{1}{2}$ " Bestwall Firestop gypsum wallboard. U. L. Design Number 10. (Walcon Corporation). U. L. Report No. 4193.1.
 - c. (2 hours) is a non-bearing wall with steel facing units and four (4) layers of $\frac{1}{2}$ " Bestwall Firestop gypsum wallboard. U. L. Design 5. (The R. C. Mahon Company). U. L. Report No. 4008-2-3.
 - d. (3 hours) is a non-bearing wall with steel facing units and two (2) layers of $\frac{1}{2}$ " Bestwall Firestop gypsum wallboard on each side. U. L. Design Number 8. (The R. C. Mahon Company). U. L. Report No. 4008-5-7.
 - e. (3 hours) is a non-bearing wall with steel facing units and five (5) layers of $\frac{1}{2}$ " Bestwall Firestop gypsum wallboard. U. L. Design Number 7. (The R. C. Mahon Company). U. L. Report No. 4008-4.
7. **Bestwall 2" Solid Gypsum Wallboard Partition** (2 hours) is a fire resistive non-combustible, non-bearing partition system composed of a 1" thick gypsum wallboard core, homogenous or two $\frac{1}{2}$ " layer laminations, metal runners, with $\frac{1}{2}$ " type X gypsum wallboard and $\frac{1}{2}$ " regular gypsum wallboard each side of the core. U. L. Report No. R 3564.
8. **Bestwall Double Solid Gypsum Wallboard Partition** (2 hours) is a fire resistive non-combustible, non-bearing partition composed of 1 $\frac{1}{2}$ " x 3" wood runners, with gypsum coreboard each side of wood runners and $\frac{1}{2}$ " Bestwall regular gypsum wallboard facing laminated to the 1" coreboard. O. S. U. Report T-2575.
9. **Bestwall Wood Frame Ceiling System** (1 hour) consist of wood joist spaced 16" o.c., bridging, nominal 1" tongue and groove subflooring, finish flooring and one (1) layer of $\frac{1}{2}$ " Bestwall Firestop gypsum wallboard nailed to bottom of joist. U. L. Report No. R 2717-38. Design No. 46.

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10. **Bestwall Wood Frame Ceiling System (1 hour)** consist of wood joist spaced 16" o.c., bridging, nominal 1" tongue and groove subflooring, finish flooring, 2½" wide by ½" deep furring channels attached to bottom of joist and ½" Bestwall Firestop gypsum wallboard attached to the furring channels by means of special gypsum wallboard screws. U.L. Report No. R 2717-29. Design No. 33.

11. **Bestwall Drywall Furring Channel Ceiling System (1½ hours)** consist of 2" sand-gravel concrete slab on ¾" rib metal lath over steel joist, with 25 gauge 2-5/16" wide by ¾" deep forming channels attached to bottom of joist spaced 24" o.c. and ½" Bestwall Firestop gypsum wallboard attached to the furring channels by means of special gypsum wallboard self tapping and self drilling metal screws. U.L. Report No. R 2717-30. Design No. 17.

12. **Bestwall Drywall Furring Channel Ceiling System (2 hours)** consist of 2½" sand-gravel concrete slab on ¾" rib metal lath over steel joist, with 25 gauge 2-7/16" wide at top and 1-7/16" wide at bottom by ¾" deep furring channels attached to bottom of joist spaced 24" o.c. and ½" Bestwall Firestop gypsum wallboard attached to the furring channels by means of special gypsum wallboard self tapping, self drilling metal screws. U.L. Report R 2717-37. Design No. 237.

Note: All Bestwall Firestop Gypsum Wallboard bears the U.L. Label.

SUBSTANTIATING DATA:

1. Manufacturer's technical data.
2. Fire endurance test per ASTM E 119 conducted by Underwriters' Laboratories, Inc., or the Ohio State University.

a. Underwriters' Laboratories, Inc.

R 2717 - 29	1 hour
R 2717 - 30	1½ hour
R 2717 - 37	2 hour
R 2717 - 38	1 hour
R 3564	2 hour

b. The Ohio State University.

T - 2575	2 hour
T - 3218	2 hour

3. Underwriters' Laboratories, Inc., Building Materials List Journal 1965.
4. Gypsum Association design data.
5. Building Materials and Structures Report BMS 92.

REFERENCES TO SOUTHERN STANDARD BUILDING CODE:

Section 103.6	Alternate Materials and Alternate Methods of Construction.
Section 201.2	Definition—Noncombustible Material.
Section 601.2	Fire Resistive Construction Requirements
Chapter VII	Fire Protection Requirements.
Chapter X	Fire Resistance Standards for Materials and Construction.
Appendix B	Fire Resistance Ratings for Materials and Construction.

LIMITATIONS:

1. Assemblies 1 and 2 — Bestwall Wood Framed Partitions.
 - a. Maximum spacing of framing members is 24" o.c.; 16" o.c. for fire rated systems.
 - b. Assembly 2 shall not be used as a load-bearing partition.

2. Assembly 3 — Bestwall Screw Type Steel Stud partition.

- a. This assembly shall not be used as a load-bearing partition.
- b. That partition heights to be limited to the following table:

Stud Width	Stud Spacing	
	24" o.c.	16" o.c.
1½"	10'-0"	12'
2½"	12'-0"	16'
3½"	16'-0"	20'-0"

3. Assembly 4 — Metal Faced Partition. (4008-6) — (U.L. #9 - 2-hr) R. C. Mahon Company.

- a. This assembly shall not be used as a load-bearing partition.
- b. That partition heights to be limited to the following table:

Width Between Restraints	Maximum Ceiling Height
10 ft.	Unlimited

4. Assembly 5 — Non-Load Bearing Steel Faced Wall. (R-4013-2) — (UL #8 - 2 hr) H. H. Robertson Company.

- a. This assembly may be used as a non-bearing partition.
- b. That partition heights to be limited to the following table:

Width Between Restraints	Maximum Ceiling Height
10 ft.	Unlimited

5. Assembly 6 — Non-Bearing Steel Faced Wall. No. (R-4448) — (U.L. #12-2 hr) Elwin G. Emsworth Smith & Company.

- a. These assemblies shall not be used as a load-bearing partition.
- b. That partition heights to be limited to the following table:

Width Between Restraints	Maximum Ceiling Height
10 ft.	Unlimited

6. Assembly 7 — Bestwall Solid or Laminated Gypsum Wallboard Partition.

- a. That this partition be non-load-bearing.
- b. That partition heights shall be limited to 12 feet.

7. Assembly 8 — Bestwall Double-Solid Gypsum Wallboard Partition.

- a. That this partition be non-load-bearing.
- b. That partition heights shall be limited to the following table.

Without Horizontal Bracing	With Horizontal Bracing	Length Between Restraints
10 ft.	None	Unlimited
12 ft.	None	Unlimited

8. Assembly 10—Bestwall Wood Frame Ceiling System.

- a. Channels shall not span more than 4 feet.
- b. Channels shall be spaced not more than 24" o.c.

9. Assemblies 11 and 12 Bestwall Drywall Furring Channel Ceiling System.

- a. Channels shall not span more than 4'0" for assembly 11 or more than 2'0" for assembly 12.
- b. Channels shall be spaced not more than 24" o.c.

10. Assemblies 1 through 12.

- a. That the Manufacturer's specifications and installation on all the wall systems and/or floor and ceiling assemblies enumerated in this Report be strictly adhered to.
- b. That gypsum wallboard shall not be used when exposed to excessive moisture or humidity.
- c. That gypsum wallboard shall be protected against excessive moisture during job handling, storage and application.
- d. That only accessories, impaling clips, facing units recommended by the Manufacturer shall be used in the assemblies enumerated in this Report.
- e. That the construction of partitions, walls and/or floor and ceiling systems must be in accordance with the respective testing Laboratories Designs in order to obtain the fire-resistance ratings.

IDENTIFICATION:

Bestwall Firestop is shipped twin mounted (2 boards face to face) and on end bundling tape with the U.L. Manifest (label) on each end.

All Bestwall Firestop Sheets shall carry a face marking in the center of the board, repeated every five feet ½" Bestwall Firestop.

COMMITTEE FINDINGS:

The Committee on Compliance after reviewing the data submitted, finds that, in their opinion, Bestwall Gypsum Di-

vision of Georgia-Pacific Corporation's partition and wall systems and/or floor and ceiling assemblies enumerated in this Report meets the provisions of the Southern Standard Building Code.

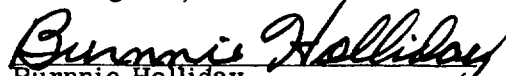
COMMITTEE RECOMMENDATIONS:

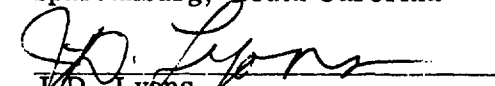
The Committee recommends, that Bestwall Gypsum Division of Georgia-Pacific Corporation's partition and wall systems and/or floor and ceiling assemblies, as enumerated in this Report, also uses and limitations as set forth in this Report, be approved by the Southern Building Code Congress.

PERIOD OF APPROVAL:

This Approval or Certificate of Compliance will be in effect as long as the product "Bestwall Firestop" is listed by Underwriters' Laboratories and manufactured under Underwriters' Inspection Service. Should any revision or changes of method of construction occur, this Approval shall terminate. This, however, is not to be construed to preclude any new submittals.


M. J. Sasser, Chairman
Birmingham, Alabama


Burnnie Holliday
Spartanburg, South Carolina


J. D. Lyons
Kingsville, Texas

GEORGIA-PACIFIC CORPORATION
BESTWALL GYPSUM DIVISION

February 8, 1967

TO: ALL REGIONAL SALES MANAGERS
ALL DISTRICT SALES MANAGERS
ALL SALESMEN

General Sales Bulletin #14-67

CC: R. I. Fredericks, Paoli
K. A. McCaskill, Paoli
M. M. Powers, Paoli

SUBJECT: S.B.C.C. REPORT NO. 6671

RE: 5/8" Firestop

BY: G. C. Moore:jw

FILE: Gypsum Products Manual #2
Section 10-Building Codes

Attached are two copies of an approval issued by the Model Building Code - "Southern Building Code Congress" (S.B.C.C.) Report No. 6671 dated November 17, 1966 that approves the use of all 5/8" thick Georgia-Pacific/Bestwall "FIRESTOP" gypsum wall-board in construction assemblies that include partitions, floor and ceilings and steel column fireproofing assemblies.

This report supercedes and takes precedence over S.B.C.C. Approval Report No. 6344 dated October 10, 1963.

This approval is divided into seven sections that describe the construction assemblies using 5/8" thick "FIRESTOP", and they are: (1) Wood Stud Partitions (L.B.) (2) Wood Stud Partitions (N.L.B.) (Fire retardant treated wood studs) (3) Metal Stud Partitions (N.L.B.) (4) Metal Stud Partitions (L.B.) (5) Solid and Semi-Solid Gypsum Wallboard Partitions (N.L.B.) (6) Floor and Ceiling Assemblies and (7) Steel Column Fireproofing

Please note that 5/8" GP/Bestwall "FIRESTOP" Tile Backer Board is approved for use with the described partition assemblies in single layer and/or multiple layer application where a water resistant gypsum wallboard is required with fire resistive rating.

Thin Veneer plaster systems that include GP/Bestwall Dens-Cote System has been approved and written into the "Red Book", the "Southern Standard Building Code."

This approval is of particular interest to the sales representatives that sell in areas that follow building standards as set forth by the Southern Building Code Congress

If additional copies of this approval are required they are available from the General Sales office, Paoli, Pennsylvania.

G. C. M.



Encl (2)

SGP 0028018

COMMITTEE

MYRON J. SASSER, Chm.
BURNNIE HOLLIDAY
J. D. LYONS

Southern Building Code Congress

BROWN-MARX BUILDING



BIRMINGHAM, ALABAMA

REPORT: 6671

APPROVED: 11-17-66

EXPIRES:

COMMITTEE on COMPLIANCE APPROVAL REPORT

ON

5/8" THICK BESTWALL FIRESTOP PARTITIONS-FLOOR

AND CEILING ASSEMBLIES-COLUMN FIREPROOFING

SUBMITTED BY

GEORGIA-PACIFIC CORPORATION

BESTWALL GYPSUM DIVISION

PAOLI, PENNSYLVANIA

The Manufacturer made formal application on June 29, 1966, for re-evaluation of their Approval Report 6344 dated October 10, 1963, together with new fire endurance test reports on new assemblies, column fireproofing and certification that there has been no significant changes in the various assemblies previously approved.

THIS APPROVAL REPORT SUPERSEDES AND TAKES PRECEDENCE OVER REPORT 6344 DATED OCTOBER 10, 1963, THEREBY REMOVING AND MAKING INVALID APPROVAL REPORT 6344 AS DATED OCTOBER 10, 1963.

The Committee on Compliance has reviewed the data submitted on August 11, 1958, July 19, 1963, together with new test reports, etc. submitted on June 29, 1966, for compliance with the Southern Standard Building Code and submits its Report as follows:

DESCRIPTION:

Bestwall Firestop is a gypsum wallboard having a special core formulation under a patented process in which incombustible glass fibers and unexpanded vermiculite have been added to the gypsum core. Firestop is manufactured in $\frac{1}{2}$ " and $\frac{5}{8}$ " thicknesses, 4 foot width and 6 to 16 foot lengths. It is available in tapered, square or tongue and groove edges. The following is a brief description of the various partitions, floor and ceiling assemblies and column fireproofing, using $\frac{5}{8}$ " Bestwall Firestop and their fire retardant ratings.

1. WOOD STUD PARTITIONS — LOAD BEARING.

- (a) Bestwall Wood-Framed Partition (1 hour) is a $4\frac{7}{8}$ " wide load bearing partition consisting of 2" x 4" wood studs 16" o.c., 2" x 4" fire stops between the studs at mid-height of the framing and $\frac{5}{8}$ " Bestwall Firestop gypsum wallboard attached to both sides of the studs with 6-d, 1 $\frac{1}{8}$ " long cement-coated, flat-head nails, spaced 7" o.c. U.L. Report R-2389 and Design No. 5.
- (b) Bestwall Wood-Framed Partition (1 hour) is a $5\frac{3}{8}$ " wide load bearing partition, consisting of 2" x 4" wood studs 16" o.c., 2" x 4" fire stops mid-height of the framing, resilient furring channels 24" o.c. horizontal on one side of the studs, 1 $\frac{1}{2}$ " fiberglass insulation in stud space and $\frac{5}{8}$ " Bestwall Firestop gypsum wallboard attached to resilient furring channels with 1" long drywall screws and nailed to the studs on the other side, one layer of $\frac{5}{8}$ " Firestop nailed with 6d cement-coated flat-head nails. O.S.U. Report T-3127.
- (c) Bestwall Wood-Framed Partition (1 hour) is a $5\frac{1}{8}$ " wide load bearing partition consisting of 2" x 4" wood studs 16" o.c., 2" x 4" firestops between studs at mid-height of the framing, $\frac{1}{2}$ " sound deadening fiberboard is attached to each side of the studs with 5d common cement-coated nails and $\frac{5}{8}$ " Bestwall Firestop gypsum wallboard laminated with three 4" strips of Bestwall Laminating Compound spaced off center line and $\frac{1}{2}$ " from each edge to the fiber-

board and nailed to the studs 8d box nails. O.S.U. Report T-3006.

- (d) Bestwall Wood-Framed Partition (1 hour) is a $4\frac{7}{8}$ " wide load bearing partition consisting of 2" x 4" wood studs 16" o.c., 2" x 4" fire stops between the studs at mid-height of the framing and $\frac{5}{8}$ " Bestwall Firestop Tile Backer Board is attached to both sides of the studs with 6d 1 $\frac{1}{8}$ " long cement coated flat head nails spaced 7" o.c. U.L. Design No. 5.
- (e) Bestwall Wood-Framed Partition (2 hours) is a $6\frac{1}{8}$ " wide load bearing partition, consisting of 2" x 4" stud walls 16" o.c., 2" x 4" fire stops between the studs at mid-height of the framing and two layers of $\frac{5}{8}$ " Bestwall Firestop gypsum wall attached to both sides of the studs with 6d and 8d cement coated common nails. O.S.U. Report T-194.

2. WOOD STUD PARTITIONS NON-LOAD BEARING.

- (a) Bestwall Partition with Treated Wood Framed Partition (1 hour) is a $4\frac{7}{8}$ " wide non-load bearing partition, consisting of 2" x 4" U.L. listed fire-retardant treated wood studs 24" o.c., 2" x 4" fire stops between studs at mid-height of the framing, and $\frac{5}{8}$ " Bestwall Firestop Type X gypsum wallboard attached to both sides of the studs with 6d cement coated nails. Forest Products Fire Test Furnace Fire Test was conducted for American Wood Preservers Institute on August 31, 1965.

3. METAL STUD PARTITIONS NON-LOAD BEARING.

- (a) Bestwall Metal Stud Partition (1 hour) is a $4\frac{7}{8}$ " wide non-load bearing partition consisting of 3 $\frac{1}{2}$ " F & H light weight galvanized nailable steel studs 24" o.c. attached to the top and bottom channels runners with four No. 6 sheet metal screws, two at top and bottom on opposite sides at flanges of the studs, and $\frac{5}{8}$ " Bestwall Firestop gypsum wallboard is attached to each side of the metal studs with $\frac{1}{8}$ x 1 $\frac{1}{2}$ " annular nails, $\frac{3}{4}$ " diameter nailing disc with $\frac{1}{8}$ " holes are used with the nails at the joints. U. L. Report 3843 and 2717, Design No. 11.
- (b) Bestwall Metal Stud Partition (1 hour) is a 2 $\frac{1}{2}$ " wide non-load bearing partition consisting of 1 $\frac{1}{2}$ " deep cold form steel channel studs, inserted in the ceiling and base tracks 24" o.c., and $\frac{5}{8}$ " Bestwall Firestop gypsum wallboard is attached to each side of the metal studs with 1" long self drilling sheet metal screws 8" o.c. at top and bottom edges and at the vertical butt joints where centered over studs, and 12" o.c. at all intermediate studs. O. S. U. Report No. T-2316.
- (c) Bestwall Metal Stud Partition (1 hour) is a 3 $\frac{3}{4}$ " wide non-bearing partition consisting of 2 $\frac{1}{2}$ " screwable steel channel studs 24" o.c., inserted and anchored to the top and bottom channel runners, and $\frac{5}{8}$ " Bestwall Firestop Eternawall Type "X" Vinyl coated gypsum wallboard attached to the metal studs with 1 $\frac{1}{4}$ " long screws 12" o.c. at the ceiling and base

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and at each stud at the center and 25" each way from the center. The base and ceiling trim was attached to the base and ceiling track and the battens were cut to length, positioned over each stud and fastened with 1½" screws 12" o.c., then the extruded plastic inserts are placed in the battens. O. S. U. Report T-2898.

(d) **Bestwall Metal Stud Partition (1½ hour)** is a 5½" wide non-bearing partition consisting of 3½" steel 25 gauge studs 24" o.c., inserted and anchored in the top and bottom channel runners, a layer of ⅝" Bestwall Firestop is fastened to one side of the studs with 1" long drywall screws 48" o.c., 3" of glass fiber insulation is attached to the back side of the gypsum wallboard with staples, a layer of ⅝" Bestwall Firestop is applied to the other side of the steel studs, with 1" long drywall screws 12" o.c., a second layer of ⅝" Bestwall Firestop is laminated to the first layer with staggered joints and fastened with 1¼" long drywall screws 16" o.c. at the intermediate studs and 12" o.c. at the vertical joints and periphery. O.S.U. Report T-3126.

(e) **Bestwall Metal Stud Partition (2 hours)** is a 5" wide non-bearing partition consisting of 2½" wide by 1⅝" deep channel section roll framed from 0.022 inch thick electra-galvanized steel studs 24" o.c., inserted and anchored in the top and bottom channel runners, a layer of ⅝" Bestwall Firestop gypsum wallboard is fastened to each side of the studs with 1" long self drilling sheet metal screws, and a second layer of ⅝" Bestwall Firestop is laminated to the first layer with the joints staggered and fastened with 1¼" long self drilling sheet metal screws. O. S. U. Report No. T-2557.

(f) **Bestwall Metal Stud Partition (2 hours)** is a 6¼" wide non-bearing partition consisting of 3 ⅝" Zee studs of 20 gauge electra-galvanized steel 24" o.c., inserted and anchored in the top and bottom channel runners, a layer of ⅝" Bestwall Firestop tapered edge gypsum wallboard is fastened to studs with metal clips 12" o.c. at vertical joints and 1" long self-drilling screws 12" o.c. at the blind studs, 24" o.c. at top and bottom of panel and 30" o.c. along both vertical edges, and a layer of ⅝" tapered edge Bestwall Firestop Eternawall gypsum wallboard is laminated to the first layer and fastened with 1½" self drilling screws, 8" o.c. at top of partition, 24" o.c. at bottom and vertical studs. O.S.U. Report T-2406.

4. METAL STUD PARTITIONS — LOAD BEARING.

(a) **Bestwall Metal Stud Partition (1 hour)** is a 4⅝" wide load bearing partition consisting of 3 ⅝" wide 16 gauge steel studs 24" o.c., and matching channels for base and ceiling. The steel frame work is assembled on the floor, the studs, top and bottom channel runners are fastened together with sheet metal screws, set in place properly aligned then the top and bottom channels are welded to the studs. A layer of ⅝" Bestwall Firestop gypsum wallboard is attached to the studs with 6d cement coated nails 7" o.c. and all vertical joints are sealed with cement and fiber tape. O. S. U. Report T-209.

5. SOLID AND SEMI-SOLID GYPSUM WALLBOARD PARTITIONS.

(a) **Bestwall Semi-Solid Hummer "B" Partition (1 hour)** is a 2¼" deep laminated non-load bearing partition, consisting of 1 x 1⅝" wood runners, (combustible) or 1" x 1½" 24 gauge galvanized steel "L" or "U" shaped runners (incombustible) 3¼" and 6¼" wide gypsum wallboard ribs of double layers ½" ordinary gypsum wallboard laminated with a casein type glue and ⅝" Bestwall Firestop gypsum wallboard with staggered joints laminated, nailed or screwed to the ribs and wood and/or metal runners in accordance with manufacturer's specification. U. L. Report R-2717-19-21, Design No. 10.

(b) **Bestwall Semi-Solid Modified Partition (2 & 3 hours)** is a 4" and 5" laminated non-load bearing partition consisting of 1½ x 1⅝" wood (combustible) or 1" x 1½" 24 gauge galvanized steel runners (incombustible) runners on the 4" partition and 1" x 1⅝" wood runners on the 5" partition, double row

of 1" x 6" wide gypsum wallboard ribs of double layers ½ regular gypsum wallboard laminated with a casein type of glue, and two layers of ⅝" Bestwall Firestop gypsum wallboard each side, laminated, nailed and screwed to the ribs and wood or metal runners in accordance with manufacturer's specifications. U. L. Report No. R-2717-20-22, Design No. 5-5" deep (3 hours), Design No. 2-4" deep (2 hours).

(c) **Bestwall Semi-Solid Gypsum Stud Partition (1 hour)** is a 4¼" deep laminated non-loadbearing partition, consisting of 1" x 2½" steel channel tracks formed of 25 gauge steel, 2½" x 3" gypsum studs consisting of four layers of ⅝" gypsum wallboard laminated together with Bestwall Laminating Compound, ½" Bestwall Sound Deadening Board and ⅝" Bestwall Firestop gypsum wallboard is laminated with three 4" strips of Bestwall Laminating Compound spaced off center line and ½" from the edges to the studs and fastened with drywall screws in accordance with manufacturer's specifications. O. S. U. Report No. T-3128.

NOTE: Bestwall ⅝" Thick Firestop Tile Backer Board may be used as an alternate method in construction assemblies as the face layer in all partition assemblies herein described. ⅝" thick Bestwall Firestop Tile Backer Board may be used in single or multiple layer applications that require a fire resistive rating, when used in shower or bath areas or where a fire rated gypsum wallboard is required as a backing for ceramic, metal or plastic tile is applied.

6. FLOOR AND CEILING ASSEMBLIES.

(a) **Bestwall Drywall Wood Frame Ceiling System (1 hour)** consists of nominal 1" wood sub-floor and finished floor over nominal 2" wood joist spaced 16" o.c. with ⅝" Bestwall Firestop Gypsum Wallboard nailed to the under side of the joist with 6d cement-coated common nails 1⅝" long and spaced 6" o.c. U. L. Report No. R-2717-7-8. U. L. Design No. 1.

(b) **Bestwall Drywall Wood Frame Ceiling System (2 hours)** consist of nominal 1" wood sub-floor and finished floor over nominal 2" wood joist spaced 16" o.c., with two layers of ⅝" Bestwall Firestop Gypsum Wallboard and resilient channels 24" o.c. between layers fastened to the bottom of the joist, in accordance with manufacturer's specifications. U. L. Report No. R-2717 - 35, Design No. 217.

(c) **Bestwall Drywall Steel Joist Ceiling System (1 hour)** consist of 2" reinforced concrete floor on ribbed lath supported on open web steel joist 24" o.c., steel furring channels 16" o.c., and ⅝" Bestwall Firestop gypsum wallboard fastened to bottom of channels with either 1¼" annular type nails 6" o.c., or No. 10 flathead sheet metal screws 8" o.c. U. L. Report No. R-2717-16, Design No. 2.

(d) **Bestwall Drywall Steel Joist Ceiling System (1½ hours)** consist of 2" reinforced concrete floor on ribbed lath supported on open web steel joist 24" o.c., galvanized steel furring channels 24" o.c., and ⅝" Bestwall Firestop gypsum wallboard fastened to bottom of channels with No. 6 - 1" long Phillips head tapping sheet metal screws 12" o.c. U. S. Report No. R-2717-26, Design No. 13.

(e) **Bestwall Drywall Steel Joist Ceiling System (2 hours)** consist of 2½" reinforced concrete floor on ribbed lath supported on open web steel joist 24" o.c., galvanized steel furring channels 24" o.c., and ⅝" Bestwall Firestop gypsum wallboard fastened to bottom of Channels with No. 6 - 1" long Phillips head self tapping sheet metal screws 12" o.c. U. L. Report No. R-2717-27, Design No. 69.

(f) **Bestwall Drywall Steel Joist Suspended Ceiling System (2 hours)** consist of 2½" reinforced concrete floor on rib lath supported on open web steel joist 24" o.c., exposed-grid suspension system with ⅝" thick x 24" x 24" Bestwall Firestop "120" lay-in gypsum ceiling tile and with recessed-type eight fixtures and air ducts. U. L. Report R-2717-32, Design No. 208.

- (g) **Bestwall Drywall Steel Joist Suspended Ceiling System (2 hours)** consist of 2" reinforced concrete floor on rib lath supported on open web steel joist 24" o.c., exposed-grid suspension system with $\frac{5}{8}$ " thick x 24" x 24" Bestwall Firestop "120" lay-in gypsum ceiling tile O.S.U. Report No. T-2104.

7. STEEL COLUMN FIREPROOFING.

- (a) **Bestwall Drywall Steel Column Protection (1 hour)** consist of a single layer of $\frac{5}{8}$ " Bestwall Firestop gypsum wallboard boxed around the column attached to lightweight galvanized channel studs which are installed vertically along the edges of each column flange with 1" L.G. Bestwall Drywall Screws 8" o.c. and $1\frac{1}{4}$ x $1\frac{1}{4}$ " metal corner bead.
- (b) **Bestwall Drywall Steel Column Protection (2 hours)** consist of two layers $\frac{5}{8}$ " Bestwall Firestop gypsum wallboard boxed around the column attached to lightweight galvanized channel studs which are installed vertically along the edges of each column flange with 1" and $1\frac{1}{4}$ " L.G. No. 6 Drywall screws 24" and 12" o.c. and $1\frac{1}{4}$ x $1\frac{1}{4}$ " metal corner bead. U.L. Report No. R-2717-34, Design No. 8.
- (c) **Bestwall Drywall Steel Column Protection (3 hour)** consist of three layers $\frac{5}{8}$ " Bestwall Firestop gypsum wallboard boxed around column attached to lightweight galvanized channel studs, which are installed vertically along the edge of each column flange, with 1", $1\frac{1}{4}$ " and $2\frac{1}{2}$ " L.G. No. 6 Drywall screws 12" and 24" o.c., and $1\frac{1}{4}$ x $1\frac{1}{4}$ " metal corner bead. U.L. Report No. R-2717-31, Design No. 18.
- (d) **Bestwall Drywall Steel Column Protection (4 hours)** consist of four layers $\frac{5}{8}$ " Bestwall Firestop gypsum wallboard boxed around column attached to lightweight galvanized channel studs, which are installed vertically along the edge of each column flange with 1", $1\frac{1}{4}$ " and $2\frac{1}{2}$ " L.G. No. 6 Drywall screws 12" and 24" o.c., the last layer of gypsum wallboard is laminated and nailed 8d finishing nails, and $1\frac{1}{2}$ " x $1\frac{1}{4}$ " metal corner bead. U.L. Design No. 26-4 hour.

NOTE: Based on Underwriter's Letter Report July 20, 1962, Tape and Cement not required for fire resistive ratings.

SUBSTANTIATING DATA:

- Manufacturer's technical data.
- Fire endurance test per ASTM E-119 conducted by Underwriter's Laboratories, Inc., or the Ohio State University.
 - Underwriter's Laboratories, Inc.

R - 2889	1 hour
R - 2717-7-8	1 hour
R - 3843 - 2717	1 hour
R - 2717 - 16	1 hour
R - 2717 - 19 - 21	1 hour
R - 2717 - 20 - 22	2 and 3 hours
R - 2717 - 26	$1\frac{1}{2}$ hours
R - 2717 - 27	2 hours
R - 2717 - 35	2 hours
R - 2717 - 32	2 hours
R - 2717 - 34	2 hours
R - 2717 - 31	3 hours
 - The Ohio State University

T - 209	1 hour
T - 194	2 hours
T - 2406	2 hours
T - 3006	1 hour
T - 3127	1 hour
T - 2316	1 hour
T - 2898	1 hour
T - 3126	$1\frac{1}{2}$ hours
T - 2557	2 hours
T - 3128	1 hour
T - 2104	2 hours

REFERENCES TO SOUTHERN STANDARD BUILDING CODE:

Section 103.6	Alternate Materials and Alternate Methods of Construction.
Section 201.2	Definition - Noncombustible Material.
Section 601.2	Fire Resistive Construction Requirements.
Chapter VII	Fire Protection Requirements.
Chapter X	Fire Resistance Standards for Materials and Construction.
Appendix B	Fire Resistance Ratings for Materials and Construction.

IDENTIFICATION:

Bestwall Firestop is shipped twin mounted (2 boards face to face) and an end bundling tape with the U.L. Manifest (label) on each end.

All Bestwall Firestop sheets shall carry a face marking in the center of the board, repeated every five feet " $\frac{5}{8}$ " (or $\frac{1}{2}$ ") Bestwall Firestop Type "X".

COMMITTEE FINDINGS:

The Committee on Compliance after reviewing the data submitted finds that, in their opinion, Bestwall Gypsum Division of Georgia-Pacific Corporation's $\frac{5}{8}$ " Thick Bestwall Firestop Partitions, Floor and Ceiling Assemblies and Column Fireproofing as enumerated in this Report meets the requirements of the Southern Standard Building Code.

COMMITTEE RECOMMENDATIONS:

The Committee recommends that Bestwall Gypsum Division of Georgia-Pacific Corporation's, $\frac{5}{8}$ " Thick Bestwall Firestop Partitions, Floor and Ceiling Assemblies and Column Fireproofing as enumerated in this Report, uses and limitations as set forth in this Report be approved by the Southern Building Code Congress.

LIMITATIONS:

- Assemblies 1 (2) through (e) Bestwall Wood Framed Partitions (load bearing).
 - Maximum spacing of framing members for load bearing partitions for fire rated systems 16" o.c.
- Assembly 2 (a) Bestwall Treated Wood Frame Partition (non-load bearing).
 - This assembly shall not be used as a load bearing partition.
- Assemblies 3 (a) through (g) Bestwall Metal Stud Partition (non-load bearing).
 - These assemblies shall not be used as a load bearing partition.
 - That partition heights be limited to the following table:

STUD WIDTH	STUD SPACING
	24" O.C.
$1\frac{1}{2}$ "	9 foot height
$2\frac{1}{2}$ "	12 foot height
$3\frac{1}{2}$ "	16 foot height

- Assembly 4 (a) Bestwall Metal Stud Partition (load bearing).
 - That floor and ceiling runners shall be metal.
 - That partition height shall be limited to 10 feet.
- Assemblies 5 (a) through (c) Bestwall Solid and Semi-Solid Gypsum Wallboard Partitions.
 - These assemblies shall not be used as load bearing partitions.

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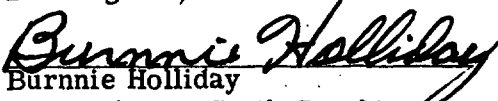
- (b) That partition height shall be limited to 12 feet.
6. Assemblies 6 (a) through (g) Bestwall floor and ceiling assemblies.
- (a) That wood joist shall not be spaced more than 16" o.c.
- (b) That steel joist shall not be spaced more than 24" o.c.
7. Assemblies 7 (a) through (d) Bestwall Steel Column Fireproofing.
- (a) That this system of column fireproofing be used only where it is not exposed to mechanical damage, excessive moisture or humidity.
8. Assemblies 1 through 7.
- (a) That the Manufacturer's specifications and installation on all the wall systems, floor and ceiling assemblies or column fireproofing enumerated in this Report be strictly adhered to.
- (b) That gypsum wallboard shall not be used when exposed to excessive moisture or humidity.
- (c) That gypsum wallboard shall be protected against excessive moisture during job handling, storage and application.
- (d) That only accessories, impaling clips, facing units recommended by the Manufacturer shall be used in the assemblies enumerated in this Report.
- (e) That the construction of partitions, wall, floor, ceiling systems and column fireproofing must be

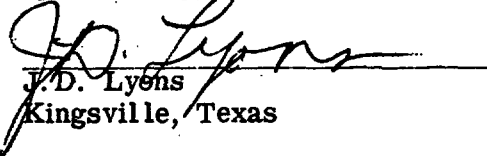
in accordance with the respective testing laboratories designs in order to obtain the fire-resistance ratings.

PERIOD OF APPROVAL:

This Approval or Certificate of Compliance will be in effect as long as the product "Bestwall Firestop" is listed by Underwriters' Laboratories and manufactured under Underwriters' Inspection Service. Should any revision or changes of method of construction occur, this Approval shall terminate. This, however, is not to be construed to preclude any new submittals.


M. J. Sasser, Chairman
Birmingham, Alabama


Burnnie Holliday
Spartanburg, South Carolina


J. D. Lyons
Kingsville, Texas

SGP 0028022

COMMITTEE

MYRON J. SASSER, Chm.
L. P. HAMILTON
THOMAS M. MOSES

Southern Building Code Congress

BROWN-MARX BUILDING



BIRMINGHAM, ALABAMA

REPORT: 6482

APPROVED: 12-7-64

EXPIRES:

COMMITTEE on COMPLIANCE APPROVAL REPORT

ON

BESTWALL "FIRESTOP-120" GYPSUM CEILING TILE

SUBMITTED BY

BESTWALL GYPSUM COMPANY

PAOLI, PENNSYLVANIA

The Manufacturer made formal application on September 24, 1964 for re-evaluation of their Approval Report 6283 dated December 31, 1962, together with new test report R-2717-32 on Firestop-120 Ceiling Tile system with recessed light fixtures and air vent openings.

THIS APPROVAL REPORT SUPERSEDES AND TAKES PRECEDENCE OVER REPORT 6283 DATED DECEMBER 31, 1962, THEREBY REMOVING AND MAKING INVALID APPROVAL REPORT 6283 AS DATED DECEMBER 31, 1962.

The Committee has reviewed the data submitted on August 30, 1962, and new data submitted on September 24, 1964, for Compliance with the Southern Standard Building Code and submits its Report as follows:

DESCRIPTION:

Bestwall "Firestop-120" is a fibered gypsum ceiling tile 5/8" x 24" x 24", designed for use in exposed grid suspended ceilings, hereinafter described, and is afforded a time design rating.

SUBSTANTIATING DATA:

1. Fire endurance Test Report No. T-2104 by Engineering Experiment Station of the Ohio State University.
2. Fire Test Report No. 533064 by Pittsburgh Testing Laboratory.
3. Sound Absorption Test No. A-60-33 by Armour Research Foundation.
4. Fire endurance Test Report R-2717-32, August 8, 1964, by Underwriters Laboratories, Inc.

REFERENCES TO SOUTHERN STANDARD BUILDING CODE:

- | | |
|---------------|--|
| Section 103.6 | Alternate Materials and Alternate Methods of Construction. |
| Chapter X | Fire Resistance Ratings for Materials and Construction. |

COMMITTEE FINDINGS:

The Committee on Compliance, in review of the data submitted, finds that, in their opinion, Bestwall "Firestop-120" Gypsum Ceiling Tile, used in floor and ceiling assemblies according to Ohio State University, Engineering Experiment Station, Fire Endurance Test Report T-2104, meets the requirements of the Southern Standard Building Code.

COMMITTEE RECOMMENDATIONS:

The Committee recommends that Bestwall "Firestop-120", uses and limitations as set forth in this Report, be approved

by the Southern Building Code Congress for Fire endurance rating of floor and ceiling assembly in accordance with the following summary of Ohio State University Test, T-2104 and Underwriters Laboratories Report R-2717-32.

T-2104—10" deep open web steel joist, 2" thick concrete deck on metal lath and a Donn fire Grid Suspension System supporting 24" x 24" x 5/8" thick Bestwall "Firestop-120" Ceiling Tiles—2 hour rating.

R-2717-32—10" deep open web steel joist, 2-1/2" thick concrete deck on metal lath. 24" x 24" x 5/8" gypsum lay-in tile in an exposed-grid suspension system, with recess type light fixtures and air duct system—Design 208—2 Hr.

LIMITATIONS:

1. That all limitations of use prescribed by the manufacturer be strictly adhered to.
2. That "Firestop-120" should not be exposed to relative high humidity above or below the tile.
3. That Bestwall "Firestop-120" Gypsum Ceiling Tile shall be made under Underwriters Inspection Service, listed by Underwriters Laboratories and carry the UL manifest on all cartons.

IDENTIFICATION:

Every box of "Firestop-120" Ceiling Tile shall bear the name of the Manufacturer and type of tile, Underwriters Label, also the Southern Building Code Congress Seal of Approval may be applied for field identification as to this Approval.

PERIOD OF APPROVAL:

This Approval or Certificate of Compliance will be in effect as long as the product Bestwall "Firestop-120" is listed by Underwriters Laboratories and manufactured under Underwriters Inspection Service. Should any revision or changes of method of construction occur, this Approval shall terminate. This, however, is not to be construed to preclude any new submittals.

SGP 0028023

Myron J. Sasser
Myron J. Sasser, Chairman
Birmingham, Alabama

L. P. Hamilton
L. P. Hamilton, Columbia, South Carolina

Thomas M. Moses
Thomas M. Moses, Winter Park, Florida

COMMITTEE

MYRON J. SASSER, Chm.
L. P. HAMILTON
THOMAS M. MOSES

Southern Building Code Congress

BROWN-MARX BUILDING



BIRMINGHAM, ALABAMA

REPORT: 6483

APPROVED: 12-7-64

EXPIRES: 12-7-67

COMMITTEE on COMPLIANCE APPROVAL REPORT

ON

BESTWALL GYPSUM LATH, PLAIN, PINHOLATH & PERFORATED

SUBMITTED BY

BESTWALL GYPSUM COMPANY
PAOLI, PENNSYLVANIA

SGP 0028024

The Manufacturer made formal application on September 25, 1964, for re-evaluation of their Approval Report 6285 dated December 31, 1962, together with certification that there has been no significant change in Bestwall Gypsum Lath previously approved.

THIS APPROVAL REPORT SUPERSEDES AND TAKES PRECEDENCE OVER REPORT 6285 DATED DECEMBER 31, 1962, THEREBY REMOVING AND MAKING INVALID APPROVAL REPORT 6285 AS DATED DECEMBER 31, 1962.

The Committee has reviewed the data submitted on September 28, 1962, for compliance with the Southern Standard Building Code and submits its Report as follows:

DESCRIPTION:

Bestwall Plain Gypsum Lath, consists of a core of gypsum rock, reinforced with glass fibers, sandwiched between two layers of special multi-layer covering and meets the requirements of a "Type X" lath. Pinholath has the same core as plain lath and surface perforations through the face paper. Perforated lath has the same core as plain lath and perforations approximately 3/4" in diameter, approximately 4" on center throughout the lath.

These laths when installed in accordance with the manufacturer's specifications as hereinafter described, will have a fire resistance rating of one hour.

USES:

As a plaster base for wall and ceiling assemblies. Pinholath is specially designed for machine applied plaster.

SUBSTANTIATING DATA:

1. Standard ASTM Fire Endurance and Fire and Hose Stream Test of Bestwall Plain Gypsum Lath, re-

inforced with Glass-Fibers. The test was conducted on July 11, and 12, 1960, at the Engineering Experimental Station of Ohio State University under Project T-1490.

2. Standard ASTM Fire Endurance and Fire and Hose Stream Test of Bestwall Pinhole Gypsum Lath. The test was conducted on October 18 and 20, 1960, at the Engineering Experimental Station of Ohio State University under Project T-1571.
3. Standard ASTM Fire Endurance Test of Bestwall Pinholath "Type X" and Gypsum Lath "Type X". The test was conducted on June 5, 1962 at the Engineering Experimental Station of Ohio State University under Project T-2134.
4. Test No. SFT-22 conducted at the Fire Prevention Research Institute at Gardena, California for the Bestwall Gypsum Company, entitled "Fire Test of Gypsum Lath and Plaster Applied to Wood Floor System", dated April 21, 1962.
5. "Bestwall Pinholath Reinforced with Glass Fibers."
6. "Bestwall Gypsum Lath and Plaster", A. I. A. File #21-B-2.

REFERENCES TO SOUTHERN STANDARD BUILDING CODE:

- | | |
|---------------|--|
| Section 103.6 | Alternate Materials and Alternate Methods of Construction. |
| Chapter X | Fire Resistance Ratings for Materials and Construction. |
| Chapter XVII | Wood Construction Practice, Design and Quality. |

SPECIFICATIONS AND TECHNICAL DATA:

The lath may be attached to wood or steel framing, with nails, staples or clips.

Construction		Type Base	Plaster		Fire Hour Rating
			Mix 1 part of Gypsum Plaster (100 lbs.)* to cu. ft. aggregate	Thickness Face of Lath to Face of Finished Surface	
Partitions					
Description	Thickness				
2" x 4" Wood Studs 16" o.c.	5-3/8"	3/8" Plain Lath	Sand or Perlite 1:2	1/2"	1 hr.
		3/8" Pinholath	Sand or Perlite 1:2	1/2"	1 hr.
		3/8" Plain Lath	Neat Wood Fiber	1/2"	1 hr.
		3/8" Perforated Lath	Sand or Perlite 1:2, 1:2	1/2"	1 hr.
Solid Partition	2"	1/2" Long Length Lath	Sand or Perlite 1:1, 1:2	1/2"	1 hr.
Steel Frame	4-1/4" to 5-3/8"	3/8" Pinholath	Sand or Perlite 1:2	1/2"	1 hr.
		3/8" Plain Lath	Perlite 1:2	1/2"	1 hr.
		3/8" Perforated Lath	Sand 1:2, 1:2	1/2"	1 hr.
Ceilings					
Wood Joists and Floor		3/8" Pinholath Reinforced with Metal Strips Along Joist	Sand 1:2 or Perlite 1:2	1/2"	1 hr.
		3/8" Pinholath No Reinforcing	Perlite 1:2	5/8"	1 hr.
		3/8" Plain Lath Reinforced with Metal Strips along Joist	Sand 1:2 or Perlite 1:2	1/2"	1 hr.
		3/8" Perforated Lath with Metal Lath Strip	Sand 1:2 or Perlite 1:2	1/2"	1 hr.

*Base Coat may be applied in one coat as a "Scratch Double Up" or in two separate coats as a scratch and brown.

COMMITTEE FINDINGS:

The Committee on Compliance in review of the data submitted finds that, in their opinion, Bestwall Gypsum, Plain, Pinholath and Perforated used in walls and ceiling assemblies, meets the requirements of the Southern Standard Building Code.

COMMITTEE RECOMMENDATIONS:

The Committee recommends that Bestwall Gypsum Lath, Plain, Pinholath, and Perforated, uses and limitations as set forth in this Report, be approved by the Southern Building Code Congress.

LIMITATIONS:

1. That the manufacturer's specifications for attaching the lath and thickness of plaster be strictly adhered to.
2. That all limitations of use prescribed by the manufacturer be adhered to.

IDENTIFICATION:

The Manufacturer shall furnish the customer a certification that Bestwall Gypsum Lath, Plain, Pinholath and Per-

forated meets the requirements of the Southern Standard Building Code and the certification shall be kept on file at the job site during the construction for field identification of this Approval by the Building Inspector.

PERIOD OF APPROVAL:

This Approval or Certificate of Compliance is granted for a period of three years from date. An extension may be granted only after a re-evaluation of Company data to insure that no change in design and/or manufacture has occurred during the interim period. Should any revision or change occur, this Approval shall terminate. This, however, is not to be construed to preclude any new submittals.


Myron J. Sasser, Chairman
Birmingham, Alabama


L. P. Hamilton, Columbia, South Carolina


Thomas M. Moses, Winter Park, Florida

SGP 0028025

INTERNATIONAL CONFERENCE OF BUILDING OFFICIALS

RESEARCH COMMITTEE RECOMMENDATION

Report No. 2255.1
February 2, 1968

LIGHTWEIGHT GYPSUM WALLBOARDS
GEORGIA-PACIFIC CORPORATION, BESTWALL
GYPSUM DIVISION
COMMONWEALTH BUILDING
P. O. BOX 311
PORTLAND, OREGON

FIBREBOARD CORPORATION
37851 CHERRY STREET
NEWARK, CALIFORNIA

BLUE DIAMOND GYPSUM DIVISION
THE FLINTKOTE COMPANY
P. O. BOX 2678, TERMINAL ANNEX
LOS ANGELES, CALIFORNIA

I. Introduction: At the request of the Georgia-Pacific Corporation, Bestwall Gypsum Division, Portland, Oregon, the Research Committee of the International Conference of Building Officials has made an examination of the data submitted for the Lightweight Gypsum Wallboards manufactured by the above companies.

II. Description: The lightweight wallboards are similar in manufacture to the regular gypsum wallboard and Type X wallboard described in U.B.C. Standard No. 47-10-67 and in various research recommendations maintained by the above companies.

The lightweight wallboards, however, have a weight of 1700 pounds per 1000 square feet (minimum) for ½-inch thick wall-

board and 2100 pounds per 1000 square feet (minimum) for ¾-inch thick wallboard.

The wallboards are suitable for the same uses as the heavier wallboards provided for in the Code.

The lightweight wallboards are identified identically to that described in individual research recommendations issued to the above companies.

III. Points of Variance with the Uniform Building Code: U.B.C. Standard No. 47-10-67 establishes minimum weights for gypsum wallboard.

IV. Evidence Submitted: Results of physical tests and fire endurance tests are submitted.

Recommendation

V. Recommendation: That the Lightweight Gypsum Wallboards as described in Part II of this report are satisfactory alternatives to the wallboards specified in U.B.C. Standard No. 47-10-67 for various uses covered in the Uniform Building Code and in research recommendations issued to the manufacturers listed in this report.

This recommendation is granted for a period of one year from date, at which time a request shall be made for re-examination in accordance with the Policy and Rules of Procedure of the Research Committee.

PAOLI, PENNSYLVANIA

May 2, 1966

TO: All Regional Sales Managers
All Area Managers
All Salesmen
Distribution Division Sales Personnel

General Sales Bulletin #30-66

SUBJECT: FIRESTOP AND FIRE RETARDANT
TREATED WOOD

CC: R. J. Fredericks, Paoli
K. A. McCaskill Paoli

By: C. E. Abbey-jw

CEW

Several months ago the American Wood Preservers Institute sponsored a fire test with a 5/8" thick type "X" gypsum wallboard over fire retardant treated wood studs, spaced 24" on center and developed a one hour non-loadbearing rating. The test was conducted at the Forest Products Laboratories and met all the requirements of the ASTM E-119 just as do the official tests at Underwriters' Laboratories or Ohio State University. The board used was 5/8" Bestwall Firestop from Ft. Dodge.

The purpose in writing you this information is twofold. First, if there is some jurisdiction or job where this will be helpful to you and you need to have the building department approve the assembly, we have obtained a few copies of the report and can submit one if you will give us the name of the building official, his address and a comment on the code, so that we can officially present the report to him.

However, the American Wood Preservers Institute are obtaining building code approvals, and your attention is called to the fact that they have approval of the ICB0 of the 1-hour non-loadbearing partition under Report No. 2096.1 dated February 4, 1966. This refers to a 5/8" thick Type "X" Gypsum Board and Bestwall's 5/8" Firestop meets the requirements under the ICB0 regulations.

The acceptance of this type assembly, in lieu of incombustible framing (steel studs) depends on the acceptance of fire retardant treated wood. Many of the companies manufacturing fire retardant treatment chemicals and some of the lumber and plywood associations are pushing for approval of fire retardant treated wood under building codes all around the country.

Research Report No. 1814.2 dated January 8, 1965 of the ICB0 gives the approval of that organization of fire retardant materials under various sections in the UBC. The most important is the acceptance of fire retardant treated wood framing in Type I and Type II buildings, which are totally incombustible, providing the assembly including the surfacing material will give the fire resistance required in the partition.

A summary of the acceptance under Building Codes and regulations in California as prepared by the J. H. Baxter & Co., one of the large fire retardant chemical manufacturers, as well as treating company, is attached to show you the extent to which this is being promoted.

SGP 0028027

Continued on Page 2...

General Sales Bulletin #30-66

May 2, 1966

Page 2.

Basically, you are selling gypsum products and, as such, are in opposition to fire retardant treated plywood, insulation board, and plastics for the wall surfacing material. We will continue to promote gypsum as fireproof and fire resistant building products. However, insofar as the framing is concerned, fire retardant treated studs give an excellent performance in a frame wall. It is a matter of price competition and workmens' preference and ability insofar as fire retardant treated studs versus steel studs are concerned. Your attention is also called to the fact that Georgia-Pacific in some other Divisions has a great deal of interest in fire retardant treated paneling and studs, as well as fire rated doors, which may involve similar material.

Where additional sales of gypsum products are possible, we will call to your attention developments insofar as fire retardant treated lumber, plywood and paneling are concerned.

File the attachment in your Gypsum Products Manual - Wallboard #2 - under "Building Codes".

Encl.

SGP 0028028

RESEARCH RECOMMENDATION

INTERNATIONAL CONFERENCE OF BUILDING OFFICIALS Report No. 2045.1
30 SOUTH LOS ROBLES • 961-4906 • PASADENA, CALIFORNIA
February 4, 1966

NONBEARING WOOD STUD PARTITION AMERICAN WOOD PRESERVERS INSTITUTE 1701 L STREET, N. W. WASHINGTON, D. C.

I. Introduction: At the request of the American Wood Preservers Institute, Washington, D. C., the Research Committee of the International Conference of Building Officials has made a study of the data submitted to support a one-hour fire-resistive rating for a nonbearing fire-retardant treated wood stud partition and has noted that the Uniform Building Code does not assign a fire-resistive rating to this type of construction.

II. Description: The partition consists of fire-retardant treated wood studs spaced 24 inches on center. Plates and fire blocking are also of fire-retardant treated wood.

Five-eighths-inch thick Type X gypsum board is applied horizontally and attached to each face of the studs and perimeter plates using 6-penny cement-coated cooler nails spaced 7 inches on center. Joints are taped and coated with joint compound.

III. Points of Variance with the Uniform Building Code: The Uniform Building Code does not assign a fire-resistive rating to this type of construction.

IV. Evidence Submitted: The results of a fire test conducted in accordance with Uniform Building Code Standard No. 43-1-64 are submitted.

Recommendation

V. Recommendation: That the partition construction described in Part II of this report is a satisfactory alternate method of construction to that specified in the Uniform Building Code for a one-hour fire-resistive nonbearing partition.

This recommendation is granted for a period of one year from date, at which time a request shall be made for re-examination in accordance with the Policy and Rules of Procedure of the Research Committee.

Research Committee

International Conference of Building Officials

(Signed) T. H. Carter

Managing Director

RESEARCH RECOMMENDATION

INTERNATIONAL CONFERENCE OF BUILDING OFFICIALS Report No. 1814.2
30 SOUTH LOS ROBLES • 961-4906 • PASADENA, CALIFORNIA
January 8, 1965

BAXCO-PYRESOTE FIRE-RETARDANT PRESSURE-TREATED LUMBER AND PLYWOOD J. H. BAXTER AND COMPANY 120 MONTGOMERY STREET SAN FRANCISCO, CALIFORNIA

BAXTER-WYCKOFF CO.
SEATTLE, WASHINGTON

MCCORMICK AND BAXTER CREOSOTING CO.
PORTLAND, OREGON

I. Introduction: At the request of J. H. Baxter and Company, San Francisco, California, the Research Committee of the International Conference of Building Officials has made a re-examination of the data submitted in connection with the use of Baxco-Pyresote Fire-Retardant Pressure-Treated Lumber and Plywood and has noted that the Uniform Building Code requires such material to be qualified by tests.

II. Description: Baxco-Pyresoted wood is lumber or plywood that has been pressure-impregnated with inorganic fire-retardant chemicals. The surface burning characteristics of Baxco fire-retardant lumber and plywood are as set forth in Table No. I.¹

The fire-retardant treated wood lumber products are identified by the words, "Baxco-Pyresote, ICBO Research 1814," stamped with indelible ink at 3-foot intervals. Both lumber and plywood are identified by a label from Underwriters' Laboratories, Inc., specifying the flame-spread, fuel contributed, and smoke density of the product when tested in accordance with U.B.C. Standard No. 42-1-64 for a period of 30 minutes.

¹See page 2.

After fire-retardant treatment, all lumber and plywood are kiln-dried.

III. Points of Variance with the Uniform Building Code: Section 407 of the Code defines fire-retardant treated wood as lumber or plywood impregnated with chemicals which when tested in accordance with U.B.C. Standard No. 42-1-64 for a period of 30 minutes shall have a flame-spread of not over 25 and show no evidence of progressive combustion.

IV. Evidence Submitted: Descriptive literature and results of tests conducted in accordance with U.B.C. Standard No. 42-1-64 are submitted.

Recommendation

V. Recommendation: That Baxco-Pyresote Fire-Retardant Pressure-Treated Lumber and Plywood be classified as fire-retardant treated wood, under the provisions of Section 407 of the 1934 Edition of the Uniform Building Code for the following uses:

1. In temporary partitions under the provisions of Section 1705.
2. For framing within nonbearing one-hour fire-resistive permanent partitions in Types I, II and IV one-hour buildings.

Such materials shall not be installed in areas exposed to weathering.

This recommendation is granted for a period of one year from date, at which time a request shall be made for re-examination in accordance with the Policy and Rules of Procedure of the Research Committee.

Research Committee

International Conference of Building Officials

(Signed) T. H. Carter

Managing Director

TABLE NO. I—SURFACE BURNING CHARACTERISTICS¹

	Douglas Fir Lumber	Redwood Lumber	Western Hemlock Lumber	White Fir Lumber	Douglas Fir Plywood
Flame-spread	15	20	20	20	15
Fuel Contributed	10	10	0	15	0
Smoke Developed	0	0	0	0	0

¹As determined in accordance with U.B.C. Standard No. 42-1-64 in a 30 minute test duration with specimens showing no evidence of significant progressive combustion

SGP 0028029

BAXCO-PYRESOTE - CODE ACCEPTANCE IN CALIFORNIA

BAXCO-Pyresote fire-retardant wood studs are now permitted for framing within 1-hr. non-bearing partitions in Types I, II and IV buildings by:

(a) Cities which have adopted the 1964 edition of the Uniform Building Code. ICBO Research card 1814.2 covers Pyresote treatment and Research card 2096.1 covers spacing on 24" centers.

(b) Cities like San Francisco or Oakland which publish their own building codes. In San Francisco, Ordinance No. 255-65 of October 13, 1965, covers the permissive use of Pyresote treated studs. Approval 192A25.1 of February 21, 1966, covers spacing on 24" centers. ICBO Research cards listed in (a) above are honored in Oakland.

(c) Cities which use earlier editions of the Uniform Building Code generally accept ICBO Research recommendations 1814.2 and 2096.1 described in (a) above.

(d) Title 19, California State Fire Marshal Administrative Code, which covers institutions, schools, buildings and all other occupancies over which the state has jurisdiction. Title 19 also permits roof decks and floors in Type IV buildings. Application has been made to the State Fire Marshal for approval and listing of the assembly with studs spaced on 24" centers. Until the general approval is granted, requests should be made for modification on each specific job.

(e) Federal Housing Administration "Minimum Property Standards for Multi-Family Housing" (FHA 2600) permits Pyresote treated wood studs for framing within 2-hr. non-bearing fire walls or party walls (Sect. M506-1.8a), studs within 2-hr. bearing fire walls or lot-line walls (Sect. M506-1.8b) and Pyresote studs in 1-1/2 hr. party walls in row or town house properties (Sect. M506-1.9).

Authorities having jurisdiction should be contacted to confirm the above and to determine the broader uses permitted by some cities.

Specification for BAXCO-Pyresote products can be found on back page of enclosed brochure.

SGP 0028030

5/1/66

GEORGIA-PACIFIC CORPORATION
BESTWALL GYPSUM DIVISION

November 29, 1966

TO: ALL REGIONAL SALES MANAGERS
ALL AREA SALES MANAGERS
ALL SALESMEN

General Sales Bulletin #75-66

CC: R. I. Fredericks, Paoli
K. A. McCaskill, Paoli
M. M. Powers, Paoli

SUBJECT: I.C.B.O. 1997.2

RE: Tile Backer Board

BY: G. C. Moore:jw
gem

FILE: GYPSUM WALLBOARD PRODUCT MANUAL #2
Section 10

Attached herewith for your information and files is one copy of a Research Recommendation approval Report No. 1997.2 dated June 3, 1966. This report is issued by the Model Building Code, International Conference of Building Officials. This replaces I.C.B.O. Report No. 1997.1 dated June 4, 1965.

This report number covers the use of Bestwall Tile Backer Board (1/2" or 5/8" thick - Regular or Type "X"), a new water-resistant type gypsum wallboard for use as a backing in the application of ceramic, metal or plastic tile in shower and tub enclosures.

Two items of importance to note in this approval number: one is found under the Installation Description: An Alternate method of treatment may be used in lieu of using the 2" wide vinyl tape to treat all wallboard cut edges, they may be treated with an approved waterproof sealer such as manufactured by the Minnesota Mining and Manufacturing Company, CTA 11; two is that Bestwall Tile Backer Board (1/2" or 5/8" thick, Regular or Type "X") may be used in single layer or face layer in multiple layer applications as covered and approved under I.C.B.O. Research Recommendation Report Nos. 1000, 1144, and/or 1155.

Tile Backer Board shall be installed in accordance with the American Standards Association specifications ASA A-97.1.

Additional copies of the Research Recommendation are available from General Sales, Paoli, Pennsylvania.

ATT: (1)

SGP 0028031

**BESTWALL TILE BACKER BOARD
GEORGIA-PACIFIC CORPORATION
BESTWALL GYPSUM DIVISION
2 INDUSTRIAL BOULEVARD
PAOLI, PENNSYLVANIA**

1. **Introduction:** At the request of the Georgia-Pacific Corporation, Bestwall Gypsum Division, Paoli, Pennsylvania, the Research Committee of the International Conference of Building Officials has made a re-examination of the data submitted in connection with the use of the above gypsum products for use as a backing material behind approved finish materials in shower and tub enclosures.

II. **Description: General:** The Bestwall Gypsum Division's Tile Backer Board is manufactured with a $\frac{1}{2}$ -inch thickness with widths of 4 feet and in lengths of 8 feet, 11 feet and 12 feet with tapered factory bound edges. The board contains an asphaltic gypsum core with a blue water-resistant face paper and a charcoal gray breather type back paper.

Bestwall Firestop Tile Backer Board is manufactured with a $\frac{3}{8}$ -inch thickness and may be used where fire-resistive construction is required. Installation shall be in accordance with the Code or as described in Research Recommendations No. 1000, No. 1144 or No. 1155 issued to the Bestwall Gypsum Division of Georgia-Pacific Corporation.

Installation: Full size sheets of gypsum wallboard having a thickness of $\frac{1}{2}$ inch are applied horizontally to supports spaced 16 inches on center and attached in the manner prescribed by the Code or applicable Research Recommendations.

For tub and shower enclosures, the tub or shower receptor or pan is positioned with respect to the studs so that projecting lips of the units are flush with the outside face of the wallboard. A $\frac{1}{4}$ -inch clearance between the paperbound edge of the wallboard and the tub, receptor or pan must be maintained. All wallboard joints, cut edges and pipe openings are protected with a 2-inch wide vinyl tape which is supplied as an integral part of the backing system. An alternate method of treatment in lieu of using 2-inch wide vinyl tape is to treat all wallboard joints cut or raw edges with an approved waterproof sealer such as manufactured by Minnesota Mining and Manufacturing Company's CTA 11. When ceramic tile is more than $\frac{1}{2}$ inch thick, solid blocking is required between studs. One row of the blocking is located approximately 1 inch above the tub or receptor and an additional row at the midpoint between the tub and the ceiling. Also, when the tile is more than $\frac{1}{2}$ inch thick, the nails for applying the gypsum wallboard shall be spaced a maximum of 4 inches on center. A waterproofing membrane is applied to the exposed face of the wallboard by either of the following methods:

1. With the flat edge of a trowel, a full $\frac{1}{8}$ -inch skim coat of tile adhesive is evenly applied to the entire surface receiving the tile. The adhesive is applied also to the bottom edge of the wallboard and to fill the cutout spaces around the pipes, soap dishes, towel bars, etc. A setting time of 24 hours is required. Adhesives used as sealants under ceramic tile must conform to U. S. Department of Commerce Commercial Standard No. 181-52, "Water-Resistant Organic Adhesives for Installation of Clay Tile."

After the skim coat has hardened so that it will not be grooved by the notches of the trowel, a bedding coat of the same adhesive is applied. The bedding coat extends down over the lip of the tub, receptor or pan to form a water dam behind the bottom edge of the tile.

2. A waterproofed sealer is used in lieu of the skim coat of the tile adhesive described above. Sealers shall be only those specifically made for the purpose, and compatible with the tile adhesive, such as certain rubber base sealants. The sealer is evenly applied in a heavy brush application. Permitted sealers are: Miracle Adhesive Corporation's Ceramic Tile Primer; Minnesota Mining and Manufacturing Company's CTA 50 Primer, or approved sealers of comparable quality. All edges of cutouts for pipes, soap dishes, towel bars, etc., must be sealed and then caulked with waterproof, nonhardening caulking compound. After the sealer coat has dried thoroughly, the bedding adhesive is trowelled on to receive the tile.

Identification: The products are identified by the color and by tape bearing the company and product name.

III. **Points of Variance with the Uniform Building Code:** Section 1711 (a) of the Uniform Building Code requires that materials forming shower and tub enclosures be of a type not adversely affected by moisture.

IV. **Evidence Submitted:** Installation instructions are submitted.

Recommendation

V. **Recommendation:** That the application of the Tile Backer Board described above in shower and bath areas as a backing material for approved nonabsorbent finishes is a satisfactory alternate method of construction to that specified in the Uniform Building Code provided the installation is in accordance with the description in Part II of this report.

This recommendation is granted for a period of one year from date, at which time a request shall be made for re-examination in accordance with the Policy and Rules of Procedure of the Research Committee.

Research Committee
International Conference of Building Officials

(Signed) T. H. Carter
Managing Director

GEORGIA-PACIFIC CORPORATION
BESTWALL GYPSUM DIVISION

October 26, 1966

TO: ALL REGIONAL SALES MANAGERS
ALL AREA SALES MANAGERS
ALL SALESMEN
DISTRIBUTION DIVISION SALES PERSONNEL

General Sales Bulletin #67-66

CC: R. I. Fredericks, Paoli
K. A. McCaskill, Paoli
M. M. Powers, Paoli

SUBJECT: ICBO REPORT NO 1993.2 5/6/66

RE: Steel Column Fireproofing
with Firestop

BY: G C. Moore:jw

GC

FILE: Gypsum Wallboard Product Manual #2
Section #10 - Building Codes

Attached is one copy of an International Conference of Building Officials Report No. 1993.2 dated May 6, 1966 in which four construction assemblies for the fireproofing of a steel column with 5/8" thick Bestwall Firestop gypsum wallboard has been given to the Bestwall Gypsum Division of the Georgia-Pacific Corporation. You will note that the 1-Hour, 2-Hour, 3-Hour and 4-Hour fire resistive column construction assemblies consist of one layer to four layers of 5/8" Bestwall Firestop respectively.

This approval is of particular interest to the sales representatives that sell in the areas that operate under the standards set forth by the International Conference of Building Officials and will help to increase your sales of gypsum wallboards. You will note in the right column, third paragraph, "Alternate Fire-resistive Column Protection" that ICBO has approved an alternate method of finish of the assemblies with the use of the Dens-Cote System. In place of the last or face layer of gypsum wallboard, one layer of 5/8" Firestop Dens-Cote Base and finished with an application 3/32" of Dens-Cote Finish is substituted in place of ivory faced board with the same 1-Hour, 2-Hour, 3-Hour or 4-Hour ratings, are approved under this report.

This replaces ICBO Report No. 1993.1.

If additional copies of this Report are required, they are available through General Sales, Paoli.

Att: (1)

SGP 0028033

**3/8-INCH BESTWALL FIRESTOP STEEL COLUMN
PROTECTION
GEORGIA-PACIFIC CORPORATION
BESTWALL GYPSUM DIVISION
2 INDUSTRIAL BOULEVARD
PAOLI, PENNSYLVANIA**

I. Introduction: At the request of the Georgia-Pacific Corporation, Bestwall Gypsum Division, Paoli, Pennsylvania, the Research Committee of the International Conference of Building Officials has made a re-examination of the data submitted in connection with the above Type "X" Gypsum wallboards for one-, two-, three and four-hour fire-resistive column protection and has noted that the Uniform Building Code does not assign fire-resistive ratings to these types of construction.

II. Description: One-hour Fire-resistive Column Protection: The one-hour fire-resistive column protection consists of a single layer of 5/8-inch thick Bestwall Firestop Type "X" gypsum wallboard installed to completely encase the column. The wallboard is furred 1 3/8 inches from the column flanges by means of four No. 25 gauge channel-shaped galvanized steel studs having a depth of 1 3/8 inches, a width of 1 3/8 inches with 1/4-inch wide folded flanges. The channels are installed at each column flange with the 1/4-inch folded flanges in contact with the column flange. The 5/8-inch Bestwall Firestop Type "X" gypsum wallboard is cut to size with overlapping corners and is connected with 1-inch long No. 6 drywall screws spaced 8 inches on center to each flange of each channel. No. 25 gauge metal corner beads with 1/4-inch wide perforated flanges are applied over each corner and are attached with 1-inch long No. 6 drywall screws spaced 24 inches on center. The screws have sufficient length so that they extend through the corner bead, wallboard and into the flanges of the channel-shaped furring studs.

Two-hour Fire-resistive Column Protection: The two-hour fire-resistive column protection consists of two layers of 5/8-inch thick Bestwall Firestop Type "X" gypsum wallboard installed so as to completely encase the column. The channel-shaped furring studs are identical to that described above for the one-hour fire-resistive construction. The first layer of wallboard is attached to each face of the furring channels with 1-inch long No. 6 drywall screws spaced 24 inches on center. The second layer of wallboard is cut to size and connected to each face of the furring studs with 1 3/8-inch long No. 6 drywall screws spaced 12 inches on center. The screws have sufficient length so that both layers of wallboard and the furring studs are penetrated. When both layers of wallboard are in position, No. 25 gauge corner beads with 1 1/4-inch wide perforated flanges are applied to each corner of the column and are connected to the wallboard with 6-penny nails spaced 12 inches on center.

Three-hour Fire-resistive Column Protection: The three-hour fire-resistive column protection consists of three layers of 5/8-inch thick Bestwall Firestop Type "X" gypsum wallboard installed so as to completely encase the column. The first two layers of wallboard and furring studs are installed identically to that described above for the two-hour fire-resistive column protection. Prior to installation of the third layer of 5/8-inch thick Type "X" gypsum wallboard No. 18 gauge galvanized double tie wires are installed so that they completely surround the column and are spaced a

maximum of 24 inches on center. When the tie wires are in place, a third layer of gypsum wallboard is cut to size and is secured to the previously applied layers with 2 1/4-inch long No. 8 drywall screws spaced 12 inches on center. Metal corner beads are identical to those described above fastened with 6-penny nails spaced 12 inches on center through each flange.

Four-hour Fire-resistive Column Protection: The four-hour fire-resistive column protection consists of four layers of 5/8-inch thick Bestwall Firestop Type "X" gypsum wallboard installed so as to completely encase the column. The first two layers of gypsum wallboard and metal furring channels are installed identically to that described for the three-hour fire-resistive column. The third layer of 5/8-inch Type "X" gypsum wallboard is attached to each flange of the four furring channels with 2 1/4-inch long No. 8 drywall screws spaced 12 inches on center. The screws have sufficient length to penetrate the three layers of 5/8-inch thick wallboard and the steel furring channels. Prior to installation of the fourth layer of 5/8-inch thick Type "X" gypsum wallboard No. 18 gauge galvanized double tie wires are installed identically to that described above for the three-hour column protection. The fourth layer of wallboard is cut to size and held in position with metal corner beads identical to those described above and fastened through each flange of the corner beads with 6-penny nails spaced 12 inches on center.

Alternate Fire-resistive Column Protection: As an alternate method of construction, 5/8-inch Bestwall Firestop Dens-Cote Base may be used in lieu of the face layer of Type "X" wallboard for the one-hour, two-hour, three-hour, and four-hour protection described above. The construction is identical except 1 1/4-inch by 1 1/4-inch Bestwall No. DC 120 Perforated Metal Corner Bead is applied and the base is finished with Dens-Cote Smooth Finish, or Textured Finish as described in Research Recommendation No. 2083.

Identification: All wallboards are identified with a light marking of the respective manufacturers consisting of the words "5/8-Inch Bestwall Firestop Type 'X'."

III. Points of Variance with the Uniform Building Code: The Uniform Building Code does not assign a fire-resistive time period to these types of column protection.

IV. Evidence Submitted: Results of fire endurance tests conducted by Underwriters' Laboratories, Inc., are submitted.

Recommendation

V. Recommendation: That the fire-resistive column protection described in Part II of this report is a satisfactory alternate type of construction to that specified in the Uniform Building Code for the respective fire-resistive ratings.

This recommendation is granted for a period of one year from date, at which time a request shall be made for re-examination in accordance with the Policy and Rules of Procedure of the Research Committee.

Research Committee

International Conference of Building Officials

(Signed) T. H. Carter
Managing Director

SGP 0028034

**GYPSUM BOARD PRODUCTS
GYPSUM ASSOCIATION
1350 NORTH HIGHLAND AVENUE
HOLLYWOOD, CALIFORNIA**

I. Introduction: At the request of the Gypsum Association, Hollywood, California, the Research Committee of the International Conference of Building Officials has made a study of the data submitted in connection with the use of Gypsum Board Products in ducts and plenum chambers and has noted that the Uniform Building Code does not fully provide for the use of this material.

II. Description: Gypsum Wallboard, Gypsum Backerboard, and Gypsum Lath and Plaster are applied to supports and attached in the manner prescribed by the Code to form the interior finish of ducts or plenum chambers formed by parts of the building structure.

III. Points of Variance with the Uniform Building Code: Section 5105 (i) 3 requires that ducts be constructed of incombustible material or may be formed by parts of the building structure if constructed of $\frac{3}{4}$ -inch cement or gypsum plaster on metal lath applied to both sides of supports.

IV. Evidence Submitted: The results of flame-spread tests conducted by Underwriters' Laboratories, Inc., are submitted.

Recommendation

V. Recommendation: That the use of Gypsum Board Products described in Part II of this report be accepted as a satisfactory alternate method of construction for the lining of duct and plenum chambers of air distribution systems provided:

1. The temperature in the duct or plenum does not exceed 125°F.
2. The Gypsum Board Products are installed on framing members in accordance with applicable requirements of the Code or Research Recommendations.
3. Where a ceiling is suspended to form a plenum chamber the suspended ceiling members shall be of incombustible materials.
4. Such systems are connected only to automatically operated electric gas or oil furnaces and low pressure steam or hot water heat exchangers except that installation of terminal reheats is permitted.
5. The materials are not used within 6 feet of the furnace plenum or heat exchanger casing.

This recommendation is granted for a period of one year from date, at which time a request shall be made for re-examination in accordance with the Policy and Rules of Procedure of the Research Committee.

International Conference of Building Officials
Research Committee

(Signed) T. H. Carter
Managing Director

**FIBERGLAS NOISE STOP BOARD PARTITION
(METAL STUDS)
OWENS-CORNING FIBERGLAS CORPORATION
PACIFIC COAST DIVISION
P. O. BOX 89
SANTA CLARA, CALIFORNIA**

I. Introduction: At the request of Owens-Corning Fiberglas Corporation, Santa Clara, California, the Research Committee of the International Conference of Building Officials has made a re-examination of the use of Fiberglas Noise Stop Board in a steel stud fire-resistive partition assembly and has noted that the Uniform Building Code does not fully provide for this product.

II. Description: General: Fiberglas Noise Stop Board has a thickness of $\frac{1}{2}$ inch and consists of a fiberglas core faced with a 70-pound kraft paper on the wall surface side. The kraft paper is laminated to the fiberglas core by an asphaltic adhesive weighing one and one-half ounces per square foot. The board is supplied in 4-foot by 4-foot or 4-foot by 8-foot panels.

One-hour Fire-resistive Nonbearing Metal Stud Partition: Consists of metal studs 16 inches on center covered on each side with an undercourse layer of Fiberglas Noise Stop Board and an outer layer of $\frac{5}{8}$ -inch-thick Type X gypsum wallboard.

The studs are formed from .021-inch to .022-inch thick light gauge galvanized steel into a channel section having a depth of $2\frac{1}{2}$ inches and flange widths of $1\frac{1}{4}$ inches. The ends of the flanges are returned at right angles a distance of $\frac{1}{4}$ inch and hemmed. The studs are inserted into runners formed from the same material and have similar dimensions except that the flanges are hemmed back in a direction parallel to the flange. The runners are attached at the top and bottom by means of approved fasteners spaced not over 24 inches on center. The studs are inserted into runners and twisted into position. The 4-foot by 4-foot or 4-foot by 8-foot sheets of fiberglas Noise Stop Board are fastened to the studs by means of 1-inch-long No. 6 self-drilling drywall screws with countersunk heads.

The vertical and horizontal joints of the Fiberglas Noise Stop Board are staggered 16 inches and 12 inches respectively on each side. Five-eighths-inch Type X gypsum wallboard in ceiling height lengths and widths of 4 feet are then attached to the studs by $1\frac{5}{8}$ -inch long No. 6 self-drilling drywall screws. The screws are spaced 9 inches on center around the perimeter of the sheet and at 12 inches on center at intermediate studs. The vertical joints on one side are staggered 16 inches with respect to those on the other. All joints are taped and all joints and screw heads are given two coats of joint compound.

The one-hour fire-resistive nonbearing metal stud partition consists of metal studs spaced 24 inches on center covered on each

side with an undercourse layer of Fiberglas Noise Stop Board and an outer layer of $\frac{1}{2}$ -inch thick Type X gypsum wallboard. The studs are formed from .0237-inch thick light gauge galvanized steel into channel-shaped sections having a depth of $1\frac{5}{8}$ inches and flange widths of $1\frac{1}{4}$ inches. The ends of the flanges are returned at right angles a distance of $\frac{1}{4}$ inch and hemmed. The studs are inserted into runners formed from the same material and have similar dimensions except that the flanges are hemmed back in a direction parallel to the flange. The runners are attached at the top and bottom by means of approved fasteners spaced not over 24 inches on center. The studs are inserted into runners and twisted into position. The 4-foot by 4-foot or 4-foot by 8-foot sheets of Fiberglas Noise Stop Board are fastened by means of $1\frac{1}{4}$ -inch long No. 6 self-drilling drywall screws spaced 12 inches on center along the top and bottom edges and along all studs.

The vertical and horizontal joints of the Fiberglas Noise Stop Board are staggered 24 inches and 12 inches respectively on each face of the partition. One-half-inch Type X gypsum wallboard, applied horizontally, is attached to the studs by $1\frac{1}{4}$ -inch long No. 6 self-drilling drywall screws spaced 9 inches on center where joints between wallboard occur, and 12 inches on center at intermediate studs. The vertical joints on one side are staggered 24 inches with respect to those on the other and the horizontal joints are staggered a minimum of 12 inches. All joints are taped and all joints and screw heads are given two coats of joint compound.

III. Points of Variance with the Uniform Building Code: The Uniform Building Code does not assign a fire-resistive rating to this type of construction.

IV. Evidence Submitted: The results of a fire-endurance test conducted in accordance with U.B.C. Standard No. 43-1-61 are submitted.

Recommendation

V. Recommendation: That the use of Owens-Corning Fiberglas Noise Stop Board as described in Part II of this report is a satisfactory alternate type of construction to that specified in the Uniform Building Code for a one-hour fire-resistive incombustible nonload-bearing partition, provided the partition height does not exceed 12 feet.

This recommendation is granted for a period of one year from date, at which time a request shall be made for re-examination in accordance with the Policy and Rules of Procedure of the Research Committee.

International Conference of Building Officials
Research Committee

(Signed) T. H. Carter
Managing Director

PAOLI, PENNSYLVANIA
January 10, 1966

To: All Regional Sales Managers
All Area Sales Managers
All Salesmen
Distribution Division Sales Personnel

General Sales Bulletin #4-66

Subject: I.C.B.O. 1766.3
October 1, 1965

CC: Mr. R. I. Fredericks, Paoli
Mr. K. A. McCaskill, Paoli

Re: Firestop 120

By: Gordon C. Moore-JW

gem

File: BW - Product Manual #2 - Section 10
GP - Product Manual - Section 2A

Attached are two (2) copies of the new (ICBO) International Conference of Building Officials Report No. 1766.3 dated October 1, 1965.

This report approves the use of Bestwall Incombustible Ceiling Tile "Firestop 120" a 2-Hour Floor and Ceiling Construction Assembly. This ICBO Report number applies to areas where Building Officials operate under the Uniform Building Code with approvals issued by the Research Committee of the ICBO.

Additional copies of this report are available from the Bestwall Gypsum Division General Sales Office, Paoli, Pennsylvania.

NOTE: ICBO No. 1766.3, 10/1/65 supersedes ICBO 1766.2, 10/9/64
Please destroy all copies of 1766.2

OK

SGP 0028037

**FIRESTOP 120 GYPSUM CEILING TILE
GEORGIA-PACIFIC CORPORATION
BESTWALL GYPSUM DIVISION
2 INDUSTRIAL BOULEVARD
PAOLI, PENNSYLVANIA**

I. **Introduction:** At the request of Georgia-Pacific Corporation, Bestwall Gypsum Division, Paoli, Pennsylvania, the Research Committee of the International Conference of Building Officials has made a re-examination of the data submitted in connection with the use of Bestwall Firestop 120 Gypsum Ceiling Tile and has noted that the Uniform Building Code does not assign a fire-resistive rating to this type of construction.

II. **Description: Two-hour Fire-resistive Incombustible Floor-ceiling or Roof-ceiling Construction:** Consists of a reinforced sand-gravel concrete slab 2 inches thick poured on a metal lath form spanning between steel joists and a ceiling consisting of Firestop 120 textured ceiling tile. Three-eighths-inch expanded ribbed metal lath weighing 3.4 pounds per square yard is attached to the top chord of the steel joists at alternate ribs with No. 18 gauge galvanized steel wire. Adjacent sheets of lath are overlapped 4½ inches at the sides and tied together with No. 18 gauge wires spaced 9 inches on center. End laps are approximately 3 inches. The concrete slab 2 inches thick is reinforced in accordance with the requirements of the Code and poured on the metal lath form.

A Donn fire grid suspension system provides support for the ceiling tile. Main beams consisting of No. 25 gauge steel 1½-inch deep bulb tee sections having a 1-inch flange width and a ¼-inch wide by ½-inch deep bulb are spaced 4 feet on center in a direction perpendicular to the joists and are saddle tied to the bottom chord of the joists with No. 12 gauge galvanized steel wire at 4-foot intervals. The bottom of the main beam is located 4½ inches below the bottom chord of the joists. Cross tees are placed perpendicular to the main beams at 24 inches on center and are fitted into the slots provided in the main beam at 6-inch intervals. Cross tees 2 feet long are placed perpendicular to the cross tees 4 feet long at 24-inch intervals to form a 2-foot by 2-foot grid for support of the ceiling tile. The cross tees are identical to the main beams. Special splices manufactured by Donn Products, Inc., are provided between the joints in the main beams to permit expansion.

The Firestop 120 textured ceiling tile is ⅝ inch thick and 24 inches by 24 inches in over-all size. The tile is supported on the projecting flanges of the bulb tee suspension system.

Alternate Construction: Two-hour Fire-restrictive Incombustible Floor-ceiling or Roof-ceiling: Consists of a 2½-inch thick concrete slab poured on a metal lath form spanning between steel bar joists spaced 24 inches on center. An exposed grid suspension system identical to that described above is suspended 16½ inches below the concrete slab and 6½ inches below the lower chord of the steel bar joists. The ceiling may contain 24-inch by 48-inch recessed type light fixtures protected with a box formed from ⅝-inch thick Firestop Bestwall. One 30-inch by 48-inch piece of Firestop Bestwall is scored on one side and is broken to form diagonal sides 7 inches wide and a top piece 16 inches wide. End sections 6 inches by 26 inches in size are slotted to fit over the T-sections and are nailed to the top and sides with 8-penny common nails. In addition, ducts protected with fusible link dampers covered with 1/16-inch thick asbestos paper may penetrate the ceiling provided the area does not exceed 76 square inches per 100 square feet of ceiling area. The area of light fixtures shall not exceed 8 square feet per 100 square feet of ceiling area and are identified with an Underwriters' Laboratories Label, Guide No. 21012.18.

Identification: The tile is packaged in cartons labeled "Firestop 120 Ceiling Tile."

III. **Points of Variance with the Uniform Building Code:** The Uniform Building Code does not assign a fire-resistive rating to this type of construction.

IV. **Evidence Submitted:** Results of fire-endurance tests and flame resistance tests conducted in accordance with U.B.C. Standards No. 43-1-64 and No. 42-1-64 are submitted.

Recommendation

V. **Recommendation:** That Firestop 120 Gypsum Ceiling Tile construction as described in Part II of this report are satisfactory alternates to that specified in the Uniform Building Code for a two-hour fire-resistive rating. Further the Firestop 120 ceiling tile has a flame-spread classification of 1.

This recommendation is granted for a period of one year from date, at which time a request shall be made for re-examination in accordance with the Policy and Rules of Procedure of the Research Committee.

Research Committee

International Conference of Building Officials

(Signed)

T. H. Carter

Managing Director

**FIRESTOP 120 GYPSUM CEILING TILE
GEORGIA-PACIFIC CORPORATION
BESTWALL GYPSUM DIVISION
2 INDUSTRIAL BOULEVARD
PAOLI, PENNSYLVANIA**

I. **Introduction:** At the request of Georgia-Pacific Corporation, Bestwall Gypsum Division, Paoli, Pennsylvania, the Research Committee of the International Conference of Building Officials has made a re-examination of the data submitted in connection with the use of Bestwall Firestop 120 Gypsum Ceiling Tile and has noted that the Uniform Building Code does not assign a fire-resistive rating to this type of construction.

II. **Description: Two-hour Fire-resistive Incombustible Floor-ceiling or Roof-ceiling Construction:** Consists of a reinforced sand-gravel concrete slab 2 inches thick poured on a metal lath form spanning between steel joists and a ceiling consisting of Firestop 120 textured ceiling tile. Three-eighths-inch expanded ribbed metal lath weighing 3.4 pounds per square yard is attached to the top chord of the steel joists at alternate ribs with No. 18 gauge galvanized steel wire. Adjacent sheets of lath are overlapped 4½ inches at the sides and tied together with No. 18 gauge wires spaced 9 inches on center. End laps are approximately 3 inches. The concrete slab 2 inches thick is reinforced in accordance with the requirements of the Code and poured on the metal lath form.

A Donn fire grid suspension system provides support for the ceiling tile. Main beams consisting of No. 25 gauge steel 1½-inch deep bulb tee sections having a 1-inch flange width and a ¼-inch wide by ½-inch deep bulb are spaced 4 feet on center in a direction perpendicular to the joists and are saddle tied to the bottom chord of the joists with No. 12 gauge galvanized steel wire at 4-foot intervals. The bottom of the main beam is located 4½ inches below the bottom chord of the joists. Cross tees are placed perpendicular to the main beams at 24 inches on center and are fitted into the slots provided in the main beam at 6-inch intervals. Cross tees 2 feet long are placed perpendicular to the cross tees 4 feet long at 24-inch intervals to form a 2-foot by 2-foot grid for support of the ceiling tile. The cross tees are identical to the main beams. Special splices manufactured by Donn Products, Inc., are provided between the joints in the main beams to permit expansion.

The Firestop 120 textured ceiling tile is ¾ inch thick and 24 inches by 24 inches in over-all size. The tile is supported on the projecting flanges of the bulb tee suspension system.

Alternate Construction: Two-hour Fire-restrictive Incombustible Floor-ceiling or Roof-ceiling: Consists of a 2½-inch thick concrete slab poured on a metal lath form spanning between steel bar joists spaced 24 inches on center. An exposed grid suspension system identical to that described above is suspended 16½ inches below the concrete slab and 6½ inches below the lower chord of the steel bar joists. The ceiling may contain 24-inch by 48-inch recessed type light fixtures protected with a box formed from ¾-inch thick Firestop Bestwall. One 30-inch by 48-inch piece of Firestop Bestwall is scored on one side and is broken to form diagonal sides 7 inches wide and a top piece 16 inches wide. End sections 6 inches by 26 inches in size are slotted to fit over the T-sections and are nailed to the top and sides with 8-penny common nails. In addition, ducts protected with fusible link dampers covered with 1/16-inch thick asbestos paper may penetrate the ceiling provided the area does not exceed 76 square inches per 100 square feet of ceiling area. The area of light fixtures shall not exceed 8 square feet per 100 square feet of ceiling area and are identified with an Underwriters' Laboratories Label, Guide No. 21012.18.

Identification: The tile is packaged in cartons labeled "Firestop 120 Ceiling Tile."

III. **Points of Variance with the Uniform Building Code:** The Uniform Building Code does not assign a fire-resistive rating to this type of construction.

IV. **Evidence Submitted:** Results of fire-endurance tests and flame resistance tests conducted in accordance with U.B.C. Standards No. 43-1-64 and No. 42-1-64 are submitted.

Recommendation

V. **Recommendation:** That Firestop 120 Gypsum Ceiling Tile construction as described in Part II of this report are satisfactory alternates to that specified in the Uniform Building Code for a two-hour fire-resistive rating. Further the Firestop 120 ceiling tile has a flame-spread classification of 1.

This recommendation is granted for a period of one year from date, at which time a request shall be made for re-examination in accordance with the Policy and Rules of Procedure of the Research Committee.

Research Committee

International Conference of Building Officials
(Signed)

T. H. Carter
Managing Director

DW-SCREW CHANNEL STUD SYSTEM
DONN PRODUCTS, INC.
909 SOUTH SANTA FE
LOS ANGELES, CALIFORNIA

I. **Introduction:** At the request of Donn Products, Inc., Los Angeles, California, the Research Committee of the International Conference of Building Officials has made a re-examination of the data submitted in connection with the DW-Screw Channel Stud System and has noted that the Uniform Building Codes does not assign a fire-resistive rating to this type of construction.

II. **Description:** Donn DW-Screw channel studs of various depths as shown in Table No. I are set into Donn DW floor and ceiling tracks at twenty-four inches (24") on center. The tracks are fastened to the wall and ceiling framing with approved fasteners spaced not more than twenty-four inches (24") on center. A layer of Type X gypsum wallboard five-eighths inch ($\frac{5}{8}$ ") thick is applied to each face of the studs with W-616 self-drilling sheet metal screws spaced eight inches (8") on center at the top and bottom edges and at the vertical butt joints which are centered over studs and at twelve inches (12") on center at all intermediate studs. The vertical butt joints on one side of the wall are offset one stud spacing from those on the opposite side of the wall. All joints and screw heads are finished with tape and finishing compound as recommended by the manufacturers of the wallboard.

The wall and ceiling tracks are formed from light gauge steel .025-inch thick and are C-shaped with legs one inch (1") high. The track width is equal to the nominal depth of the studs inserted into the track. The studs are C-shaped with top and bottom flanges

one and three-eighths inches ($1\frac{3}{8}$ ") wide containing flanges one-fourth inch ($\frac{1}{4}$ ") deep returned one-eighth inch ($\frac{1}{8}$ "). The web of the studs is offset a distance of one thirty-second inch ($\frac{1}{32}$ ") at a point three-eighths inch ($\frac{3}{8}$ ") in from each flange.

III. **Points of Variance with the Uniform Building Code:** The Uniform Building Code does not assign a fire-resistive rating to this type of construction.

IV. **Evidence Submitted:** The results of a fire-endurance test conducted in accordance with U.B.C. Standard No. 43-1-64 are submitted.

Recommendation

V. **Recommendation:** That the Donn Products DW-Screw Channel Stud System described in Part II of this report is a satisfactory alternate type of construction to that specified in the Uniform Building Code for one-hour fire-resistive incombustible non-load-bearing partitions provided the partition heights do not exceed the height set forth in Table No. I¹.

This recommendation is granted for a period of one year from date, at which time a request shall be made for re-examination in accordance with the Policy and Rules of Procedure of the Research Committee.

Research Committee
International Conference of Building Officials

(Signed) T. H. Carter
Managing Director

TABLE NO. I—STUD HEIGHTS

STUD DESIGNATION	STUD DEPTH (In Inches)	STUD HEIGHT (In Feet)
DW-26	1 $\frac{5}{8}$	9
DW-40	2 $\frac{1}{2}$	12
DW-48	3	14
DW-54	3 $\frac{3}{8}$	15
DW-58	3 $\frac{5}{8}$	16

APPLICATION OF GYPSUM WALLBOARD IN SHOWER AND BATH AREAS

GYPSUM ASSOCIATION

1350 NORTH HIGHLAND

HOLLYWOOD, CALIFORNIA

I. **Introduction:** At the request of the Gypsum Association, Hollywood, California, the Research Committee of the International Conference of Building Officials has made a study of the data submitted in connection with the use of Gypsum Wallboard as a backing material behind approved finish materials applied with water-resistant organic adhesives to shower and tub enclosure walls.

II. **Description:** Full size sheets of gypsum wallboard having a minimum thickness of $\frac{1}{2}$ inch are applied horizontally to supports and attached in the manner prescribed by the Code. Insulating foil surface wallboard shall not be used.

For shower and tub enclosures, the tub or shower receptor or pan is positioned with respect to the studs so that projecting lips of the units are flush with the outside face of the wallboard. A $\frac{1}{4}$ -inch clearance between the paperbound edge of the wallboard and the tub, receptor or pan must be maintained. All wallboard joints are taped and nail heads and joints are treated with two coats of joint compound. When ceramic tile is more than $\frac{7}{8}$ inch thick, solid blocking is required between studs. One row of the blocking is located approximately 1 inch above the tub or receptor and an additional row at the mid-point between the tub and the sealer. Also, when the tile is more than $\frac{7}{8}$ inch thick, the nails for applying the gypsum wallboard shall be spaced a maximum of 4 inches on center. A waterproofing membrane is applied to the exposed face of the wallboard by either of the following methods:

1. With the flat edge of a trowel, a full $\frac{1}{8}$ -inch skim coat of tile adhesive is evenly applied to the entire surface receiving the tile. The adhesive is applied also to the bottom edge of the wallboard and to fill the cutout spaces around pipes, soap dishes, towel bars, etc. A setting time of 24 hours is required. Adhesives used as sealants under ceramic tile must conform to U. S. Department of Commerce Commercial Standard No. 181-52, "Water-Resistant Organic Adhesives for Installation of Clay Tile."

After the skim coat has hardened so that it will not be grooved by the notches of the trowel, a bedding coat of the

same adhesive is applied. The bedding coat extends down over the lip of the tub, receptor or pan to form a water dam behind the bottom edge of the tile.

2. A waterproofed sealer is used in lieu of the skim coat of the tile adhesive described above. Sealers shall be only those specifically made for the purpose, and compatible with the tile adhesive, such as certain rubber base sealants. The sealer is evenly applied in a heavy brush application. Permitted sealers are: Miracle Adhesive Corporation's Ceramic Tile Primer; Minnesota Mining and Manufacturing Company's CTA 50 Primer, or approved sealers of comparable quality. All edges of cutouts for pipes, soap dishes, towel bars, etc., must be sealed and then caulked with waterproof, nonhardening caulking compound. After the sealer coat has dried thoroughly, the bedding adhesive is trowelled on to receive the tile.

III. **Points of Variance with the Uniform Building Code:** Section 1711 (a) of the Code requires that materials in shower and tub enclosure walls be of a type not adversely affected by moisture.

IV. **Evidence Submitted:** A report is submitted by the Armour Research Foundation of the Illinois Institute of Technology reflecting the investigation of performance of backing materials for ceramic tile.

Recommendation

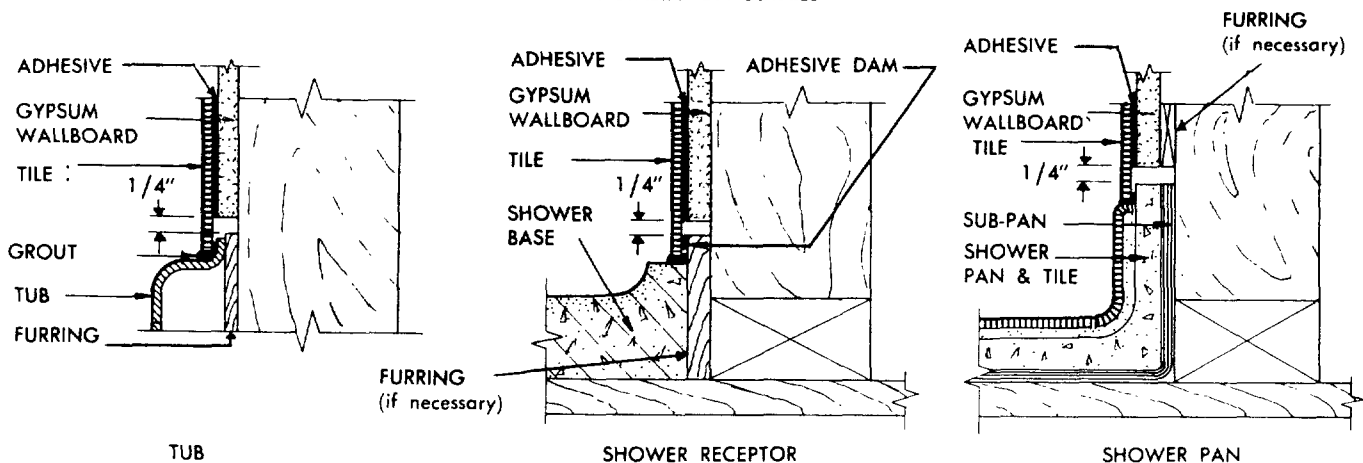
V. **Recommendation:** That the application of gypsum wallboard in shower and bath areas as a backing material for approved nonabsorbent finishes is a satisfactory alternate method of construction to that specified in the Uniform Building Code provided the installation is in accordance with the description in Part II of this report.

This recommendation is granted for a period of one year from date, at which time a request shall be made for re-examination in accordance with the Policy and Rules of Procedure of the Research Committee.

International Conference of Building Officials
Research Committee

(Signed) T. H. Carter
Managing Director

INSTALLATION DETAILS



**PENMETAL PANEL-BOARD PARTITION SYSTEM
PENN METAL COMPANY, INC.
4309 DISTRICT BOULEVARD
LOS ANGELES, CALIFORNIA**

I. Introduction: At the request of Penn Metal Company, Inc., Los Angeles, California, the Research Committee of the International Conference of Building Officials has made a re-examination of data submitted in connection with the Penmetal Panel-Board Partition System and has noted that the Uniform Building Code does not assign a fire-resistive rating to this type of construction.

II. Description: The Penmetal panel-board partition system is constructed of Permalock studs two and one-half inches ($2\frac{1}{2}$ ") deep, spaced twenty-four inches (24") on center and faced on each side with Bestwall Firestop FR Type X gypsum wallboard five-eighths inch ($\frac{5}{8}$ ") thick, having glass fibers on each face.

For construction, vertical starters consisting of a No. 24 gauge channel two and one-half inches ($2\frac{1}{2}$ ") wide centered on a Penn Metal Company No. 4-16 20-gauge channel four inches (4") wide are fastened to the supporting framework in thirty-six-inch (36") maximum intervals using approved fasteners. Ceiling and floor tracks are two and one-half inches ($2\frac{1}{2}$ ") wide No. 24 gauge Permalock track No. 1-11. The floor and ceiling tracks are anchored to the framework at twenty-four-inch (24") intervals with approved fasteners. Permalock studs No. 1-10, two and one-half inches ($2\frac{1}{2}$ ") deep, are placed in the floor and ceiling track at twenty-four inches (24") on center and secured with one sheet metal screw through each leg at the top and bottom on both sides of the studs. Penmetal Bridging Special No. 1-13 consisting of a channel-shaped section No. 24 gauge two and one-half inches ($2\frac{1}{2}$ ") wide is installed between the studs at mid-height. A strip of wallboard five-eighths inch ($\frac{5}{8}$ ") thick is installed on each side of every other stud where metal battens are used to attach the wallboard. The strips are cut to fit snugly within the flanges of the studs and are secured to the studs with sheet metal screws spaced thirty inches (30") on center and engaging the web of the studs. The gypsum wallboard face layers five-eighths inch ($\frac{5}{8}$ ") thick

are placed vertically with vertical joints staggered on one side with respect to those on the opposite side. There are no horizontal joints. The wallboard is inserted into the vertical starters and anchored at intermediate studs with No. 12 flat head wood screws one and one-half inches ($1\frac{1}{2}$ ") long spaced thirty inches (30") on center. The wallboard is held in place at the vertical edges by No. 3-53 quick-grip No. 24 gauge T-section batten strips. The flanges of the batten strips grip the outer side of the wallboard and the batten strips are impressed into the 1-10 studs. At the vertical starter the wallboard is held in place between the outstanding flanges of the vertical starter and the Permalock track No. 1-11. The base joint is completed by inserting one-inch by one and one-fourth-inch ($1" \times 1\frac{1}{4}"$) No. 20 gauge angle sections at the base track with the one-inch (1") outstanding leg on the outside of the wallboard. Exposed screw heads are covered with joint compound.

III. Points of Variance with the Uniform Building Code: The Uniform Building Code does not assign a fire-resistive rating to this type of construction.

IV. Evidence Submitted: The results of a fire endurance test conducted at Ohio State University are submitted.

Recommendation

V. Recommendation: That the Penmetal Panel-Board Partition System described in Part II of this report is a satisfactory alternate method of construction to that specified in the Uniform Building Code for a one-hour fire-resistive nonload-bearing partition of incombustible construction, provided the partition does not exceed a height of twelve feet (12").

This recommendation is granted for a period of one year from date, at which time a request shall be made for re-examination in accordance with the Policy and Rules of Procedure of the Research Committee.

Research Committee

International Conference of Building Officials

(Signed)

T. H. Carter

Managing Director

**FIRESTOP AND FIRETARD
4-INCH AND 5-INCH THICK NONLOAD-BEARING
LAMINATED WALLBOARD PARTITIONS
BESTWALL CERTAIN-TEED SALES CORPORATION
2 INDUSTRIAL BOULEVARD, BOX V
PAOLI, PENNSYLVANIA
JOHNS-MANVILLE SALES CORPORATION
22 EAST 40TH STREET
NEW YORK, NEW YORK**

I. Introduction: At the request of Bestwall Certain-teed Sales Corporation, Paoli, Pennsylvania, the Research Committee of the International Conference of Building Officials has made a re-examination of the test data submitted in connection with the approval of 4-Inch and 5-Inch Thick Laminated Partitions constructed of Bestwall Firestop manufactured by the Bestwall Gypsum Company and sold through the Bestwall Certain-teed Sales Corporation and Firetard made by the Bestwall Gypsum Company and sold through the Johns-Manville Sales Corporation, and it is noted that the Uniform Building Code does not take into consideration this type of construction.

II. Description: General: The 4-Inch and 5-Inch Thick Nonload-bearing Partitions are formed of four layers of Bestwall Firestop or Firetard Gypsum Board, five-eighths inch ($\frac{5}{8}$ ") thick, fastened to double layers of gypsum board ribs, one-half inch ($\frac{1}{2}$ ") thick. The ribs and the inner and outer layers of gypsum board, five-eighths inch ($\frac{5}{8}$ ") thick, extend the full height of the partition.

4-Inch Thick Two-hour Fire-Resistive Nonbearing Partition: The vertical six-inch (6") wide gypsum board ribs are laminated with Bestwall or Johns-Manville Laminating Compound to the interior surfaces of two inner layers of vertical five-eighths-inch ($\frac{5}{8}$ ") gypsum wallboard. The ribs are spaced twenty-four inches (24") on center and are centered over the longitudinal edges of the inner layer of wallboard. The two inner layers of five-eighths-inch ($\frac{5}{8}$ ") board are nailed to sill and header members with 5-penny nails, one and five-eighths inches ($1\frac{5}{8}$ ") long, spaced eight inches (8") on center. As each successive wallboard rib unit is butted against its neighbor the joint between them is made by the adhesive bond at the overlap provided by the ribs and 6-penny finishing nails spaced eight inches (8") on center, driven at a 45-degree angle into the ribs. Phillips head wood screws, one and one-half inches ($1\frac{1}{2}$ ") long, are driven at twenty inches (20") on center into the joints.

The outer layers of five-eighths-inch ($\frac{5}{8}$ ") gypsum board are coated with an adhesive spread at the rate of four pounds of mixed material per one hundred square feet (100 sq. ft.) and then bonded to the inner layer. Vertical joints of the outer layer are staggered six inches (6") from the vertical joints of the inner layers. The outer layer is attached to a one and one-half-inch by one and five-eighths-inch ($1\frac{1}{2}$ " x $1\frac{5}{8}$ ") sill and header with 8-penny nails, two and one-half inches ($2\frac{1}{2}$ ") long, spaced eight inches (8") on center. Phillips' head wood screws, spaced twenty-four inches (24") on center at the joint, are inserted through the inner layer into

the ribs and 8-penny finishing nails, two and one-half inches ($2\frac{1}{2}$ ") long, spaced eight inches (8") on center, are then driven at 45 degrees through the inner layer of wallboard into the ribs.

The wallboard joints may be left unfinished or may be finished along with nail and screw heads using the Bestwall or Johns-Manville Tape Joint System which consists of a paper tape finished with cement.

5-Inch Thick Three-Hour Fire-Resistive Nonbearing Partition: The construction of the 5-Inch Thick Partition is identical to the 4-Inch Thick Partition with the exception that a wider air space is provided between the double layers of gypsum board, five-eighths inch ($\frac{5}{8}$ ") thick and sills and headers are one inch by one and five-eighths inch (1 " x $1\frac{5}{8}$ ").

Identification: Each Bestwall gypsum wallboard panel is identified with a light ink marking consisting of the words " $\frac{5}{8}$ " Bestwall Firestop" which is repeated down the center of each sheet and spaced approximately five feet (5') on center. In addition, each bundle consisting of two sheets has an end bundling tape which bears the label of Underwriters' Laboratories, Inc. The Johns-Manville gypsum wallboard is identified by the words " $\frac{5}{8}$ " Type X" imprinted thereon.

III. Points of Variance with the Uniform Building Code: Chapter 43 of the Uniform Building Code does not assign a fire-resistive rating to the proposed type of construction.

IV. Evidence Submitted: A fire test report made by Underwriters' Laboratories, Inc., is submitted.

Recommendation

V. Recommendation: That the 4-Inch and 5-Inch Thick Nonload-bearing Laminated Wallboard Partitions are satisfactory alternate types of construction to that specified in the Uniform Building Code for use as incombustible fire-resistive nonbearing partitions provided:

1. Fire-resistive ratings not exceeding two hours and three hours are assigned to the four-inch (4") and five-inch (5") thicknesses, respectively. The unsupported height of partitions does not exceed ten feet (10').
2. Details of construction conform to Part II.
3. The walls are classified as combustible fire-resistive construction except that a rating of incombustible fire-resistive construction may be assigned where the top and bottom plates are of incombustible material.
4. The partitions are not installed in buildings of Type V construction used for residential purposes.

This recommendation is granted for a period of one year from date, at which time a request shall be made for re-examination in accordance with the Policy and Rules of Procedure of the Research Committee.

Research Committee
International Conference of Building Officials

(Signed) T. H. Carter
Managing Director

SGP 0028043

PAOLI, PENNSYLVANIA

August 22, 1966

To: All Regional Sales Managers
All Area Sales Managers
All Salesmen
Distribution Division Sales Personnel

General Sales Bulletin #59-66

Subject: I.C.B.O. 1155.9
December 3, 1965

CC: Mr. R. I. Fredericks, Paoli
Mr. K. A. McCaskill, Paoli

Re: Bestwall Firestop,
"Metal Framing"
1/2" and 5/8"

By: Gordon C. Moore - jp

File: BW - Product Manual #2 - Section 10

gcm

Attached is one copy of a new International Conference of Building Officials (ICBO) Report Number 1155.9, dated December 3, 1965.

This ICBO Report approves the use of 1/2" and 5/8" Bestwall Firestop on partitions and floor and ceiling construction assemblies using metal framing with one and two hour fire resistive rating.

The construction assemblies covered by this Report Number are:

PARTITIONS

T-209 - 1 Hr.
T-2016 - 1 Hr.
T-2316 - 1 Hr.
T-2898 - 1 Hr.
T-3126 - 1 Hr.
T-2406 - 2 Hr.
T-3218 - 2 Hr.

FLOOR AND CEILINGS

UL #2 - 1 Hr.
UL #19 - 1 Hr.
UL #13 - 1 Hr.
UL #17 - 1 Hr.
UL #69 - 2 Hr.
UL #237 - 2 Hr.
UL #208 - 2 Hr.
T-2104 - 2 Hr.

This ICBO Report Number is very important to the sales representatives that operate in areas where the municipalities and building officials approve the use of various construction assemblies covered under ICBO Report Numbers.

Additional copies of this report are available from General Sales, Bestwall Gypsum Division, Paoli, Pennsylvania.

NOTE: ICBO No. 1155.9, 12/3/65, supersedes ICBO No. 1155.8, 9/11/64.
Please destroy all copies 1155.8.

SGP 0028044

**STEEL STUDS AND JOISTS
BESTWALL FIRESTOP GYPSUM WALLBOARD AND
CEILING TILES
GEORGIA PACIFIC CORPORATION
BESTWALL GYPSUM DIVISION
2 INDUSTRIAL BOULEVARD
BOX V
PAOLI, PENNSYLVANIA**

I. Introduction: At the request of Georgia Pacific Corporation, Bestwall Gypsum Division, Paoli, Pennsylvania, the Research Committee of the International Conference of Building Officials has made a re-examination of the test data submitted in connection with the above gypsum wallboards and has noted that the Uniform Building Code does not fully provide for the use of these materials.

II. Description: General: The gypsum wallboards are $\frac{5}{8}$ inch thick and contain a core composed of gypsum, incombustible fibers and unexpanded vermiculite. The core is surfaced with paper which may be gray on both sides or have a finished paper on one side and a gray paper on the back side. They are made in 4-foot widths and in 8-foot to 16-foot lengths. The $\frac{5}{8}$ -inch wallboard is also supplied in 24-inch and 48-inch widths with tongue-and-groove edges. Joint treatment is not necessary for the fire-resistive ratings.

One-hour Fire-resistive Load-bearing Partition: Studs are 3 $\frac{1}{2}$ -inch deep Stran-Steel of No. 16 gauge material spaced 24 inches on center, attached to base and ceiling channels with sheet metal screws. After alignment, the studs are welded to the channels. The wallboard is attached to the studs with 6-penny cement-coated common nails spaced 7 inches on center.

One-hour Fire-resistive Nonbearing Partition: Consists of channel-shaped steel studs 1 $\frac{1}{2}$ inches, 2 $\frac{1}{2}$ inches or 3 $\frac{1}{2}$ inches deep formed from light gauge steel .022 inch thick. The studs have flanges 1 $\frac{1}{2}$ inches wide returned a distance of $\frac{1}{4}$ inch parallel to the stud depth and $\frac{1}{8}$ inch parallel to the flange widths. The studs are inserted into channel-shaped floor and ceiling tracks formed from material .025 inch thick and fastened to the supporting structure at 24-inch intervals. The $\frac{5}{8}$ -inch thick wallboard is installed vertically without horizontal joints to each face of studs with vertical joints staggered with respect to the two faces. The wallboard is attached to the studs with Donn W-616 1-inch long self-drilling sheet metal screws spaced 8 inches on center at the top and bottom edges and vertical butt joints centered over studs and at 12 inches on center at intermediate studs.

Two-hour Fire-resistive Nonbearing Partition: Consists of 2 $\frac{1}{2}$ -inch deep metal studs spaced 24 inches on center with two layers of $\frac{5}{8}$ -inch Bestwall Firestop Gypsum Wallboard applied to each face. The studs are formed from .022-inch thick electrogalvanized steel and are channel-shaped with a flange width of 1 $\frac{1}{2}$ inches. The ends of the flanges are returned $\frac{1}{4}$ inch. The studs are inserted into floor and ceiling tracks attached to the supporting structure with approved fasteners spaced not over 24 inches on center. The first layer of wallboard is fastened in place with 1-inch long W-616 self-drilling sheet metal screws. The screws are spaced 8 inches on center at top and bottom edges and at all butt joints and at 12 inches on center at intermediate supports. A second layer of wallboard then is applied by laminating it to the first layer by means of 3M brand contact drywall adhesive. Supplementary screws 1 $\frac{1}{4}$ inches long attach the second layer at 24-inch intervals around the perimeter of the wallboard and at 8 inches on center at the top to provide sufficient pressure to obtain adhesion. Vertical joints of the face layer are staggered with respect to those of the base layer.

One-hour Fire-resistive Nonbearing Partition with Glass Fiber Insulation: The construction consists of 3 $\frac{1}{2}$ -inch deep Donn DW-58 No. 25 gauge galvanized steel studs spaced 24 inches on center inserted into a metal track of corresponding width and identified as a Donn DS-580 track. The track is attached to the supporting framework with approved fasteners spaced not over 24 inches on center. The studs are cut $\frac{1}{2}$ inch short of the required height and positioned to provide for $\frac{1}{4}$ -inch expansion, top and bottom. Five-eighths-inch thick Firestop Bestwall Gypsum Wallboard is attached to one side vertically with 1-inch long No. 6 drywall screws spaced 48 inches on center. Three-inch thick glass fiber insulation batts weighing .66 pound per cubic foot then are attached to the back side of the wallboard with $\frac{1}{8}$ -inch long staples

installed at the four corners and center of each 24-inch by 48-inch batt. A layer of $\frac{5}{8}$ -inch thick Firestop wallboard then is fastened vertically to the opposite side with 1-inch long No. 6 drywall screws spaced 16 inches on center at intermediate studs and 12 inches on center around the perimeter of the board. A second layer of $\frac{5}{8}$ -inch Firestop wallboard having 4-inch wide strips of laminating compound spaced 2 inches from the edges and 4 inches from the vertical center line then is applied over the first layer to which was attached the glass insulation backing. The second layer is positioned so that vertical joints are offset from the initial layer and is secured with 1 $\frac{1}{4}$ -inch long No. 6 drywall screws spaced 16 inches on center at intermediate studs and 12 inches on center around the perimeter of the wallboard. Exposed joints are taped and joints and screw heads are treated with two coats of joint compound.

Two-hour Fire-resistive Nonbearing Partition: The partition construction consists of Donn DW-40 2 $\frac{1}{2}$ -inch deep by No. 25 gauge channel-shaped studs which are inserted into Donn DS-400 2 $\frac{1}{2}$ -inch by No. 25 gauge steel stud top and bottom tracks. Temporary shims, $\frac{1}{2}$ inch thick, are placed beneath each stud to maintain $\frac{1}{2}$ -inch clearance at both ends of the studs. The shims are removed after a base layer is applied to one side. A base layer of $\frac{1}{2}$ -inch Firestop Bestwall Gypsum Wallboard is attached to each side of the studs with 1-inch long drywall screws spaced 12 inches on center at vertical joints and along the stud tracks and at third points along intermediate studs (not to exceed 40 inches). The screws are self-drilling and self-tapping, contain a .345-inch diameter flat Phillips head, and are fully threaded with an outside thread diameter of .147 inch. Vertical joints on one face are offset one stud space with respect to those on the opposite face. Laminating compound then is applied to the back surface of a second layer of $\frac{1}{2}$ -inch wallboard in 4-inch wide strips located 2 inches from the edge and approximately 4 inches off the vertical center line. The second layer then is applied to the base layer and attached with 1 $\frac{1}{4}$ -inch long drywall screws of the same characteristics as described above spaced 12 inches on center at the vertical joints and tracks and 16 inches on center at intermediate studs. The face layer vertical joints are offset from base layer vertical joints one stud space. Joints are taped and finished with joint compound and screws are covered with a double coat of joint compound.

One-hour Fire-resistive Floor and Ceiling: The floor and ceiling construction consists of 2 inches of concrete on steel joists to which $\frac{3}{4}$ -inch cold-rolled furring channels or approved nailing channels are attached with No. 18 gauge galvanized wire. Channels are doubled where butt joints occur. The $\frac{5}{8}$ -inch thick wallboard is attached to the furring channels with No. 6 flathead sheet metal screws 8 inches on center or to the nailing channels with 1 $\frac{1}{4}$ -inch annular nails spaced 8 inches on center.

An alternate method of construction consists of steel joists spaced 24 inches on center with a sand-gravel reinforced concrete slab 2 inches thick poured over a metal lath form supported on the joists. The metal lath form is an expanded ribbed metal lath $\frac{3}{8}$ inch high weighing 3.4 pounds per square yard and attached to the joists at every other rib and at salvage overlaps with No. 18 gauge galvanized steel wire. Adjacent sheets of lath are overlapped at the side by nesting the outside salvage and are overlapped 3 inches at the ends.

Inverted hat-shaped No. 25 gauge galvanized furring channels $\frac{3}{8}$ inch deep and 2 $\frac{1}{2}$ inches wide are saddle tied to the bottom chord of the joists at 24-inch intervals by means of double strands of No. 18 gauge galvanized steel wire. Adjoining lengths of channels are lapped 6 inches to 12 inches and tied together with a double strand of tie wire. Five-eighths-inch Type "X" Bestwall Gypsum Wallboard is attached to the furring channels by means of No. 6 Phillips flathead self-tapping sheet metal screws 1 inch long spaced $\frac{5}{8}$ inch from wallboard edges and 12 inches on center. Support at end joints is provided by inserting an additional furring channel over the joint into which the butted ends of the wallboard are screwed. The additional channel is fastened as required for other channels and overlaps adjacent wallboards 6 inches to 12 inches. All screws are driven flush with the surface of the wallboard and the wallboard on each side of end joints is attached at the overlap of furring channels with one additional screw.

Two-hour Fire-resistive Floor-ceiling (Roof-ceiling) Construction: Identical to the alternate one-hour assembly described directly

above using Bestwall Gypsum Wallboard except the concrete slab has a thickness of 2½ inches and all butt joints of the wallboard are staggered and centered between doubled furring channels. The doubled channels are adjacent to each other and consist of a main continuous channel and an additional piece of channel parallel to it and extending approximately 6 inches to 12 inches over adjacent wallboard sheets. At such butt joints the wallboard is attached to each channel with screws spaced 12 inches on center providing a 1¼-inch end distance and a 1½-inch side distance.

Two-hour Fire-resistive Floor-ceiling (Roof-ceiling) Construction—Suspended Ceiling: The assembly is similar in floor construction to the two-hour system described above but has a suspended ceiling of ⅝-inch thick, 2-foot by 2-foot lay-in Bestwall Firestop "120" textured ceiling tile units. The suspension system consists of No. 12 gauge galvanized steel wire spaced 4 feet on center supporting main runners. The main runners consist of 1½-inch high by 1-inch wide inverted tee sections formed from No. 25 gauge galvanized steel. Cross tees of identical section also are provided and the flanges of both main runners and cross tees are faced with No. 32 gauge galvanized sheet steel stamped over the two edges and painted on the exposed surfaces. The main tee runners are in nominal 12-foot lengths and the cross tees are in nominal 2-foot or 4-foot lengths. Adjoining main runners are connected at the web with a 9⅝-inch by 1½-inch galvanized steel splicer punched from No. 21 gauge galvanized steel. The hanger wires are tied to the tees by drilling holes through the upstanding web of the tee to accommodate the 4-foot hanger wire spacing. The 4-foot long cross tees are supported at the main tees by a snap-lock which is located on both ends of the cross tee. The cross tee is pushed and hooked in place and leveled at the cross tee intersection holes that are located 12 inches on center on the main tees. The same type of connection is used for connecting the cross tees intersecting cross tees. The 2-foot long cross tees span between the 4-foot cross tees to form the 2-foot by 4-foot module. The gypsum wallboard lay-in tiles are supported on the flanges of the tees with the soffit of the tiles approximately 8 inches below the bottom chord of the joists. Steel air ducts aggregating not more than 70 inches in area for any 100 square feet of ceiling area may be installed in the ceiling system. The air ducts are supported by framing members spanned between the joists and are provided with fire dampers. Recessed light fixtures 2 feet by 4 feet in size and spaced to provide not more than 8 square feet in area for any 100 square feet of ceiling area also may be installed. The light fixtures are 24-inch Mobelex Type "G" as manufactured by Daybrite Lighting, Inc., and are protected by a light fixture protection shield. The shield consists of a 30-inch by 48-inch piece of wallboard scored on one side and broken to lay lengthwise over the light fixture forming sloping sides 7 inches wide with a top width of 16 inches. Ends of the shield are cut 6 inches by 26 inches in size and slotted to fit over the cross tees at each end. The end pieces are secured to the top and sides with 8-penny common nails. The light fixtures are placed on the main runners and cross tees.

Two-hour Fire-resistive Floor-ceiling (Roof-ceiling) with Best-wall Firestop "120" Ceiling Tile: The construction consists of a

2-inch thick reinforced concrete slab poured on a 3.4-pound ribbed metal lath form over 10-inch minimum depth open web steel joists spaced 24 inches on center. The ceiling construction consists of a suspended ceiling with the soffit location 4½ inches from the bottom chord of the joist. The ceiling suspension system is composed of main beams and cross tees formed from 1½-inch deep by No. 25 gauge steel bulb tee sections with a 1-inch flange and a ¼-inch by ½-inch deep bulb. The main beams are placed perpendicular to the joists at intervals of 48 inches on center and are supported by No. 12 gauge single strand wire hangers. The main runners are provided with an expansion relief splicer device for each tee. The expansion relief device consists of a "W" punched cutout extending from above the exposed flange through the bulb of the tee. The cutouts are located at splice plates. Elongated "T" slots attach the splicer to the main tee web, providing a slip joint between the tee and splicer. The splicers are held from slipping by the uncut exposed flange. Expansion also is provided for in cross tees at the stop which butts the main tee web, allowing the cross tee to overlap the main runner flange. Four-foot long cross tees then are placed between the main beams at 24 inches on center and connected thereto with a snap-lock connection as previously described. Bestwall Firestop "120" ceiling tile lay-in units ⅝ inch thick and 24 inches square then are placed in the exposed grid system.

Identification: All wallboards are identified with a light marking of the respective manufacturer consisting of the words "⅝" Best-wall Firestop-Type X" repeated down the center of each sheet and spaced approximately 5 feet on center. In addition, each bundle consisting of two sheets has an end bundling tape which bears the label service symbol of Underwriters' Laboratories, Inc. The ⅝-inch Type X gypsum wallboard is identified by the words "⅝-Inch Type X" printed on the tapered edge of each sheet.

III. Points of Variance with the Uniform Building Code: Chapter 43 assigns no fire-resistive rating to this type of construction.

IV. Evidence Submitted: The results of fire endurance tests conducted in accordance with U.B.C. Standard No. 43-1-64 are submitted.

Recommendation

V. Recommendation: That the types of construction described in Part II of this report are satisfactory alternate fire-resistive assemblies to those specified in the Uniform Building Code for the uses noted.

This recommendation is granted for a period of one year from date, at which time a request shall be made for re-examination in accordance with the Policy and Rules of Procedure of the Research Committee.

Research Committee

International Conference of Building Officials

(Signed) T. H. Carter
Managing Director

BESTWALL FIRESTOP NONBEARING PARTITION ASSEMBLY**BESTWALL GYPSUM COMPANY
120 EAST LANCASTER AVENUE
ARDMORE, PENNSYLVANIA****FIRETARD, NONBEARING PARTITION ASSEMBLY
JOHNS-MANVILLE SALES CORPORATION
22 EAST 40TH STREET
NEW YORK, NEW YORK**

I. Introduction: At the request of the Bestwall Gypsum Company, Ardmore, Pennsylvania, the Research Committee of the International Conference of Building Officials has made a re-examination of the test data submitted in connection with the Nonbearing Partition of Bestwall Firestop manufactured by the Bestwall Gypsum Company and sold through the Bestwall Certain-teed Sales Corporation, and of Firetard, manufactured by the Bestwall Gypsum Company and sold through the Johns-Manville Sales Corporation, and has noted that the Uniform Building Code does not take into consideration this type of construction.

II. Description: General: The job-fabricated partition consists of two layers of five-eighths-inch ($\frac{5}{8}$ ") thick Bestwall Firestop separated by a one-inch (1") air space. The four-foot (4') wide layers of wallboard are continuous from the bottom plate to the top plate. Vertical joints of opposing layers of wallboards are offset a distance of twenty-four inches (24"). The two layers of wallboard are interconnected at all vertical joints by means of six-inch (6") wide gypsum wallboard ribs one-inch (1"), one and one-fourth-inch ($1\frac{1}{4}$ "), one and five-eighths-inch ($1\frac{5}{8}$ ") or one and three-fourths-inch ($1\frac{3}{4}$ ") thicknesses extending the full height of the partition where incombustible runners are used and between runners where wood runners are used. The ribs are laminated to the two layers of Bestwall Firestop with a casein type glue known as Bestwall Laminating Compound. In addition, No. 16 Phillips head screws, one and one-half inches ($1\frac{1}{2}$ ") long, are screwed at twenty inches (20") on center into the vertical joint and 6-penny finishing nails are driven at a 45-degree angle on one side of the vertical joint. The nails are spaced at eight inches (8") on center.

In addition to the ribs located at vertical joints an intermediate vertical rib is provided approximately midway between other ribs, but not more than twenty-four inches (24") on center. The two layers of Bestwall Firestop are attached to this rib by means of a casein type glue known as Bestwall Laminating Compound and 6-penny finishing nails are driven at a 45-degree angle and spaced eight inches (8") on center. Joints may be left unfinished or finished with the Best-wall tape joint system.

The gypsum board has a flame-spread classification of I when tested in accordance with U.B.C. Standard No. 42-1-64.

Nonbearing Walls in Residential Buildings Having Clear Span Roof Truss Construction: The basic construction is similar to that specified for one-hour fire-resistive construction. The partition shall be installed as follows:

1. Not less than one-inch by one and five-eighths-inch ($1" \times 1\frac{5}{8}"$) net wood top and bottom plates shall be used with the partitions. The plates shall be nailed to the floor framing with not less than 16-penny nails spaced sixteen inches (16") on center and driven through predrilled holes.

2. Where spaced roof sheathing is used, the top plate shall be nailed to the exterior wall plate with not less than two 16-penny nails or approved equal (no toenails).
3. A separation of not less than one-half inch ($\frac{1}{2}"$) shall be provided between partitions and the lower chord of the trusses where the partitions run perpendicular to the span of the trusses. In lieu of the separation, truss web members may be placed from the lower chord (at point of contact with the partition) to an upper chord panel point.
4. Floor joists running parallel to and immediately below partitions located perpendicular to the truss span shall be doubled where the separation required in item No. 3 above is not provided.
5. Framing at openings shall consist of not less than one-inch by three and five-eighths-inch ($1" \times 3\frac{5}{8}"$) net wood members. The framing members shall be installed in a flat position and extend from the bottom to the top plate.

Identification: Each Bestwall gypsum wallboard panel is identified with a light ink marking consisting of the words "% Bestwall Firestop" which is repeated down the center of each sheet and spaced approximately five feet (5') on center. In addition each bundle consisting of two sheets has an end bundling tape which bears the label of Underwriters' Laboratories, Inc. The Johns-Manville gypsum wallboard is identified by the words "% Type X" imprinted thereon.

III. Points of Variance with the Uniform Building Code: The Uniform Building Code does not recognize this type of construction as having a fire-resistive rating.

IV. Evidence Submitted: A fire test made by Underwriters' Laboratories, Inc., and conforming to Chapter 43 of the Uniform Building Code, is submitted. Results of the test indicate this type of construction qualifies for a one-hour fire-resistive rating.

Recommendation

V. Recommendation: That the type of construction described in Part II of this report (material distributed by Bestwall Certain-teed Sales Corporation) is a satisfactory alternate type of construction to that specified in the Uniform Building Code for one-hour fire-resistive nonbearing partitions and for use as nonbearing walls in residential buildings having clear span truss construction provided:

1. The unsupported height does not exceed twelve feet (12').
2. The walls are classified as combustible fire-resistive construction except that a rating of incombustible fire-resistive construction may be assigned where the top and bottom plates are of incombustible material.

This recommendation is granted for a period of one year from date, at which time a request shall be made for re-examination in accordance with the Policy and Rules of Procedure of the Research Committee.

Research Committee

International Conference of Building Officials

(Signed) T. H. Carter
Managing Director

PAOLI, PENNSYLVANIA
January 10, 1966

To: All Regional Sales Managers
All Area Sales Managers
All Salesmen
Distribution Division Sales Personnel

General Sales Bulletin #3-66

Subject: I.C.B.O. 1000.9
August 6, 1965

CC: Mr. R. I. Fredericks, Paoli
Mr. K. A. McCaskill, Paoli

Re: Bestwall Firestop over
Wood Framing "1/2" and 5/8"

By: Gordon C. Moore-JW

File: BW - Product Manual #2 - Section 10
GP - Product Manual - Section 2A

Attached are two (2) copies of a new (ICBO) International Conference of Building Officials Report No. 1000.9 dated August 6, 1965.

ICBO Report No. 1000.9 approves the use of four partition construction assemblies and floor and ceiling construction assemblies that consist of wood framing members with the use of 1/2" and/or 5/8" Bestwall Firestop.

The eight assemblies were fire tested by the Bestwall Gypsum Division of the Georgia-Pacific Corporation at the (UL) Underwriters Laboratories, Inc., Chicago, Illinois and (T) Engineering Experiment Station, Ohio State University, Columbus, Ohio.

It is very important to sales representatives that operate in areas where the building officials approve the use of construction assemblies covered under ICBO report numbers for use in areas under their jurisdiction.

You will note that in all floor and ceiling assemblies covered by this report number there is an alternate method of construction. 1/2" Bestwall Sound Deadening Board may be installed between the subfloor and the finished floor in lieu of the building paper normally used.

ICBO Report No. 1000.9 covers the following assemblies:

PARTITIONS

UL #6 - 1 Hour
UL #5 - 1 Hour
T-3006 - 1 Hour
T-194 - 2 Hours

FLOOR AND CEILINGS

UL #1 - 1 Hour
UL #46 - 1 Hour
UL #33 - 1 Hour
UL #217 - 2 Hours

Additional copies of this report are available from the Bestwall Gypsum Division, Paoli, Pennsylvania.

NOTE: ICBO No. 1000.9, 8/6/65 supersedes ICBO No. 1000.8, 7/10/65
Please destroy all copies of 1000.8

SGP 0028048

**BESTWALL FIRESTOP OVER WOOD FRAMING
GEORGIA PACIFIC CORPORATION
BESTWALL GYPSUM DIVISION
2 INDUSTRIAL BOULEVARD
PAOLI, PENNSYLVANIA****J-M FIRETARD GYPSUM WALLBOARD
JOHNS-MANVILLE SALES CORPORATION
22 EAST FORTIETH STREET
NEW YORK, NEW YORK****FIREBLOC GYPSUM WALLBOARD
AMERICAN GYPSUM COMPANY
POST OFFICE BOX 8345
ALBUQUERQUE, NEW MEXICO****FIREHALT GYPSUM WALLBOARD
BLUE DIAMOND COMPANY
DIVISION OF THE FLINTKOTE COMPANY
1650 SOUTH ALAMEDA
LOS ANGELES, CALIFORNIA**

I. Introduction: At the request of Georgia Pacific Corporation, Bestwall Gypsum Division, Paoli, Pennsylvania, the Research Committee of the International Conference of Building Officials has made a re-examination of the test data submitted in connection with the above gypsum wallboards and has noted that the Uniform Building Code does not fully provide for the use of this material.

II. Description: General: Bestwall Firestop Gypsum Wallboard is a Type X wallboard conforming to the requirements of U.B.C. Standard No. 47-8-64. It is supplied in thicknesses of $\frac{1}{2}$ inch, $\frac{3}{4}$ inch or $\frac{1}{2}$ inch and in various lengths and widths. In wall construction, the wallboard may be applied vertically or horizontally. In double layer applications, the edge joints are staggered one stud space. Vertical joints in opposing faces are staggered one stud space. Joint tape and finish are not required for the ratings listed. All partitions are firestopped. The wallboard also is manufactured by Bestwall for Johns-Manville under the name "Firetard," by American Gypsum Company, under the name "Firebloc" and by Blue Diamond Company under the name "FireHalt." Bestwall Sound Deadening Board is a low density fiberboard product made from wood or cane fiber. It is $\frac{1}{2}$ inch thick, has square edges and is supplied in 4-foot widths and 8-foot or 9-foot lengths. It has an oven dry density of 15 to 18 pounds per cubic foot.

One-hour Fire-resistive Load-bearing Partition— $\frac{1}{2}$ -inch Gypsum Wallboard: Two layers of gypsum wallboard are applied to each face of 2-inch by 4-inch studs spaced 16 inches on center. Joints between the two layers are staggered with respect to the first layer and edges are spaced $\frac{1}{4}$ inch apart and filled with a gypsum filler. The second layer is nailed with No. 13 gauge cement coated nails 1 $\frac{1}{2}$ inches long spaced 6 inches on center at edges and 8 inches on center at intermediate studs.

One-hour Fire-resistive Load-bearing Partition— $\frac{3}{4}$ -inch Gypsum Wallboard: One layer of $\frac{3}{4}$ -inch gypsum wallboard is applied to 2-inch by 4-inch studs spaced 16 inches on center with edges of the wallboard butted together. Application of the wallboard is in accordance with the provisions of the Code using 6-penny cement coated nails 1 $\frac{1}{2}$ inches long with $\frac{1}{4}$ -inch diameter flat heads spaced 7 inches on center.

As an alternate method of construction the wallboard may be applied over an undercourse of $\frac{1}{2}$ -inch Bestwall Sound Deadening Fiberboard. In this construction the sound deadening board is applied vertically and attached with 5-penny cement coated nails spaced 24 inches on center vertically at edges and 16 inches on center horizontally at ends. There are no nails on intermediate framing members. The $\frac{3}{4}$ -inch wallboard has laminating compound applied to the back of the wallboard using a saw tooth applicator producing 6-inch wide strips of adhesive at the ends and edges and vertically down the center of the 4-foot wide sheets. The board is then nailed with 8-penny box nails spaced 12 inches on center around the perimeter of the sheet and at mid-height on intermediate studs.

Two-hour Fire-resistive Load-bearing Partitions: The partitions are constructed with 2-inch by 4-inch studs spaced 16 inches on center with 2-inch by 4-inch firestops installed at mid-height of the studs. The panels are covered on both sides with two layers of $\frac{3}{4}$ -inch gypsum wallboard applied vertically with the vertical joint between boards falling on the same stud for each layer. The first layer is attached to the studs with 6-penny cement coated common

nails at 9 inches on center along the stud, sill and plate. The second layer is applied directly over the first and nailed with 8-penny nails spaced 7 inches on center. Vertical joints on the opposite side of the partition are placed on the next adjacent stud. Taping of joints is not required for the rating. One or both layers also may be applied horizontally provided the edge and end joints in both sides of the assembly are staggered so that they do not fall over one stud.

One-hour Fire-resistive Floor-ceiling Construction— $\frac{1}{2}$ -inch Gypsum Wallboard: Consists of wood joists supporting a 1-inch nominal tongue and groove subfloor, a layer of building paper and a $\frac{3}{4}$ -inch tongue and groove finish floor. Five-eighths-inch gypsum wallboard is applied to the soffit of the joist using 6-penny cement coated nails spaced 6 inches on center. Nails are 1 $\frac{1}{2}$ inches long and have $\frac{1}{4}$ -inch diameter flat heads. As an alternate method of construction $\frac{1}{2}$ -inch Bestwall Sound Deadening Fiberboard may be installed between the subfloor and the finish floor in lieu of the building paper.

One-hour Fire-resistive Floor-ceiling Construction— $\frac{1}{2}$ -inch Gypsum Wallboard: Consists of the wood joist and double floor system described above with $\frac{1}{2}$ -inch gypsum wallboard applied to resilient furring channels which in turn are fastened to the joist soffit. The resilient furring channels are formed from No. 25 gauge galvanized steel into a modified channel-shaped cross section having an over-all width of 2 $\frac{1}{4}$ inches and an over-all depth of $\frac{1}{2}$ inch. One projecting flange of the furring channel having a flat width of $\frac{1}{2}$ inch is attached to the joist soffit with a 6-penny common nail. The channels are spaced 24 inches on center perpendicular to the joists and are overlapped 4 inches at splices with splicing occurring at joists. The $\frac{1}{2}$ -inch thick gypsum wallboard is attached to the 1 $\frac{1}{2}$ -inch flat width of the furring channel with 1-inch long self-drilling and self-tapping Phillips head screws having .129-inch outside shank diameter and a .355-inch head diameter.

The wallboard is applied with the long dimension perpendicular to the furring channels with side joints occurring between joists. The screws are spaced 12 inches on center and are installed with $\frac{1}{2}$ -inch minimum edge distances from the edge of the wallboard.

An alternate method of construction consists of $\frac{1}{2}$ -inch thick Bestwall Firestop Gypsum Wallboard attached to the soffit of the joists with 5-penny cement coated nails (coolers) spaced 6 inches on center. Nail edge distances are $\frac{3}{4}$ inch and $\frac{1}{2}$ inch from side and end joints, respectively. Joints are finished with joint tape and compound.

As an alternate method of construction $\frac{1}{2}$ -inch Bestwall Sound Deadening Fiberboard may be installed between the subfloor and the finish floor in lieu of the building paper.

Two-hour Fire-resistive Floor-ceiling Construction: Consists of the double wood floor and wood joist construction described above with two layers of $\frac{3}{4}$ -inch thick gypsum wallboard utilizing the resilient furring channels described above between the first and second layer of wallboard. The first layer is installed with the long dimension perpendicular to the joists and nailed with 8-penny box nails spaced 7 inches on center. The nails have a $\frac{1}{2}$ -inch edge distance from the wallboard edge and ends and end joints of the wallboard occur at the center line of the joists. The resilient furring channels described above then are applied over the wallboard at 24 inches on center and are fastened to each joist with 8-penny common nails. The second layer of wallboard is installed with the long dimension perpendicular to the furring channels and with edge joints of the second layer staggered with respect to end joints of the first layer. The second layer is attached to the channels with the screws described above spaced 12 inches on center. At side joints of the second layer, an additional screw is installed 3 inches each side of the joint. At end joints of the second layer, a furring channel is provided along each wallboard end. All screws are placed with a minimum edge and end distance of 1 inch.

As an alternate method of construction $\frac{1}{2}$ -inch Bestwall Sound Deadening Fiberboard may be installed between the subfloor and the finish floor in lieu of the building paper.

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JOHNS-MANVILLE SALES CORPORATION
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NEW YORK, NEW YORK**

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POST OFFICE BOX 6345
ALBUQUERQUE, NEW MEXICO**

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PAOLI, PENNSYLVANIA

October 12, 1965

To: All Regional Sales Managers
All Area Sales Managers
All Salesmen

General Sales Bulletin #97-65

Subject: POLYBAR POLYETHYLENE MOISTURE
SHIELD

CC: Mr. R. I. Fredericks - Paoli
Mr. K. A. McCaskill - Paoli

Re: Extra Service

By: G. C. Moore - hcs

Enclosed are two (2) pieces literature from the Polybar Corporation describing a new product for the use in application of gypsum wallboard, where the wallboard contacts metal window frames. "POLYBAR MOISTURE SHIELD" protects the wallboard from moisture condensation damage. Moisture damage is a condition that is prevalent in house construction, office and apartment construction.

Polybar form is available for 3/8", 1/2" and 5/8" gypsum wallboard thicknesses. The Bestwall Gypsum Division is offering the availability of Polybar as a service only to your customers.

The product is purchased from:

The Polybar Corporation
#5 Woodlawn Avenue
Willow Grove, Penna.
Attn: Mr. Harry Schore, President
Area Code (215) 657-0775

Mr. Schore has told us that moisture shield would cost your customer approximately 6¢ to 8¢ per lineal foot depending upon the area of the country to which it is shipped.

The installation of moisture shield will cost the builder approximately 50¢ to 75¢ per window.

We repeat, this is a service to your customer and the Bestwall Gypsum Division is not taking orders for the product.

The product has been used by many builders in the Pennsylvania area, and damage to gypsum wallboard caused from moisture condensation has been nil where this product has been used.

Enclosures (2 - 5" pieces of Polyethylene Moisture Shield samples) and (2 pieces of the Polybar Literature).

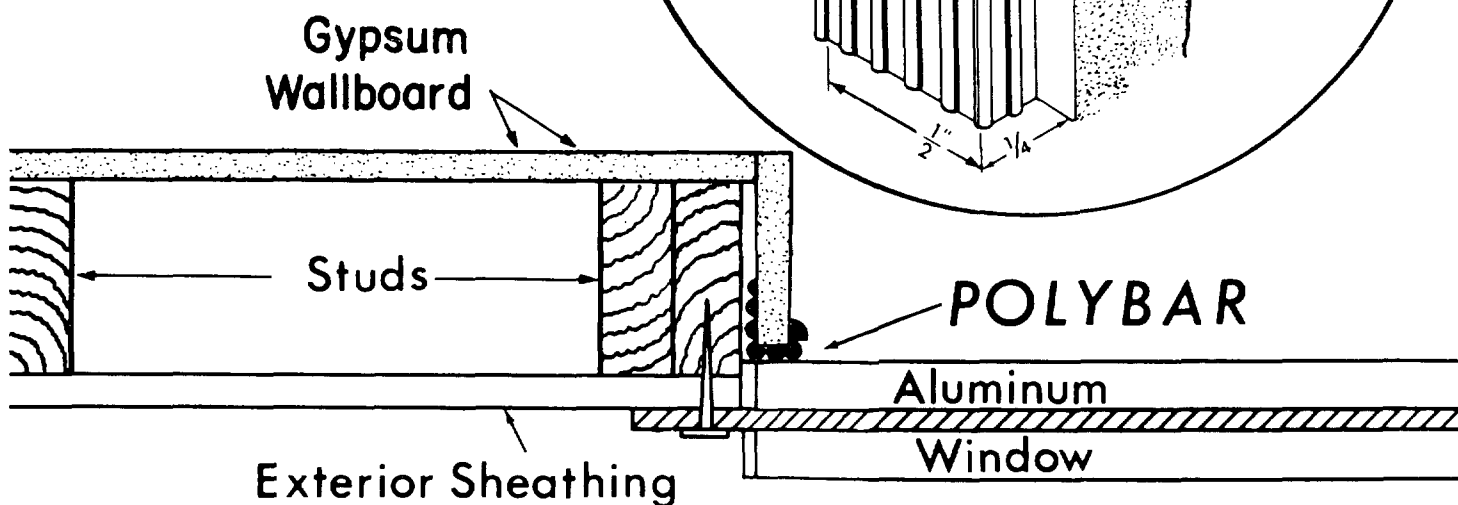
Sell - Bestwall Gypsum Wallboard Products and Assemblies through service and knowledge of better ways for the installations.

SGP 0028051

POLYBAR™

POLYETHYLENE MOISTURE SHIELD

**PROTECTS
GYPSUM WALLBOARD
FROM DAMAGING
CONDENSATION AT
CONTACT WITH
ALUMINUM WINDOW
FRAMES**



New, economical Polybar polyethylene moisture shield prevents costly moisture damage to wallboard. Used in construction with aluminum or other metal window frames,

- Completely impervious to water and moisture
- Permanent and non-deteriorating
- Flexible — cuts easily to desired length
- Protects wallboard — prohibits accumulation of damaging moisture
- Low initial cost — average 50¢ per window

Polybar provides a safe escape route for accumulated moisture . . . prevents deterioration before it starts! Polybar is easy to install, low in cost. Check these outstanding features:

- Prevents costly repair call-backs . . . safeguards good will
- Invisible on the job
- Available for 3/8", 1/2" and 5/8" Drywall Materials
- Easy installation . . . simply slip on exposed length of wallboard before application

POLYBAR CORPORATION

SGP 0028052

#5 WOODLAWN AVENUE • WILLOW GROVE, PA. • Area Code (215) 657-0775



SGP 0028054