precast gypsum roof decks

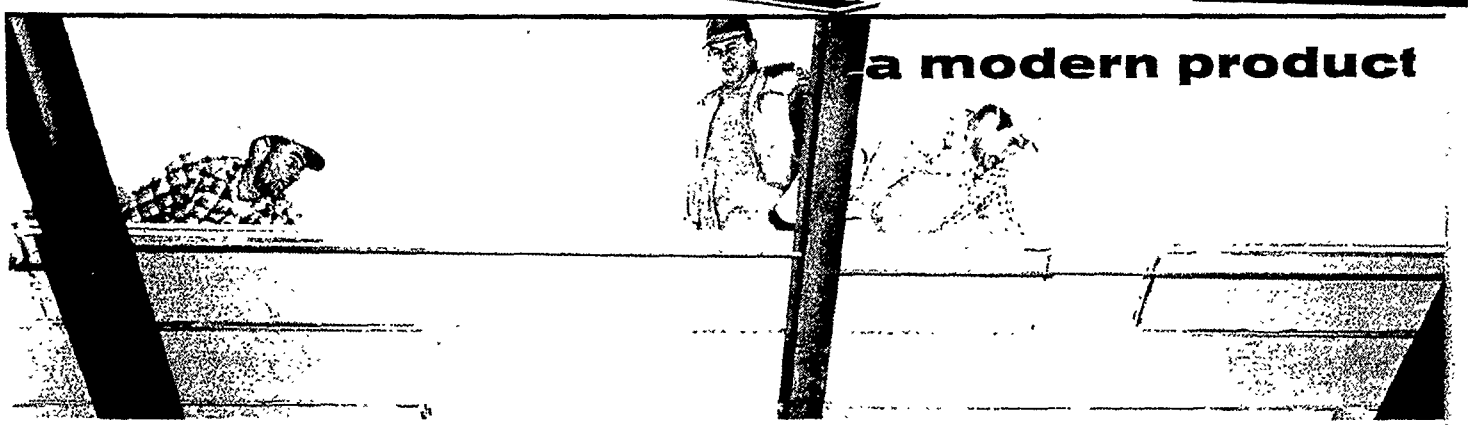
BESTWALL®

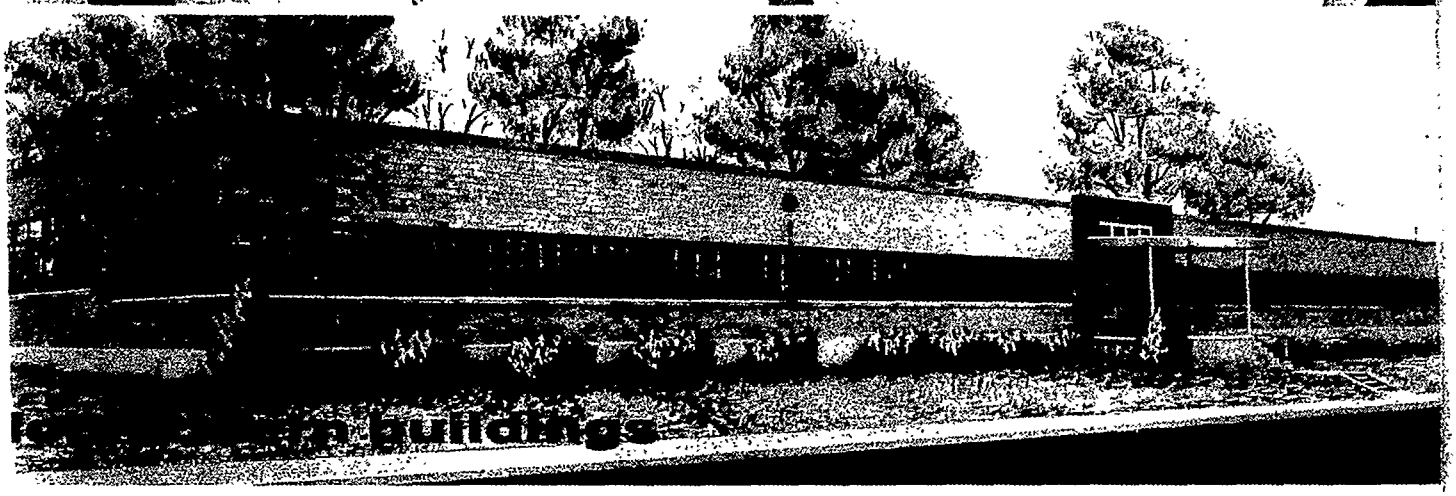
gypsteel plank

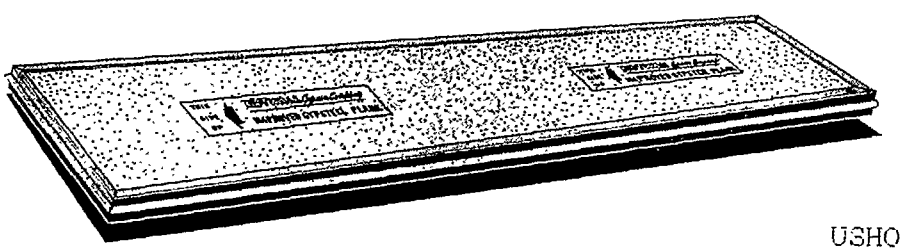


PLAINTIFF'S
EXHIBIT
USX-260

a modern product





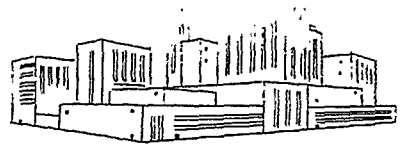


USHO 002885

INDUSTRIAL GYPSUM
BESTWALL
BUILDING PRODUCTS

Sold through
BESTWALL CERTAIN-TEED SALES CORPORATION

a modern product



GYPSTEEL PLANK is a structural, precast roof deck unit. All four sides are bound with a steel framework that is tongued and grooved so that adjacent units lock to form a series of strong, rigid "I" beams. The gypsum core of each plank contains a steel wire mat.

The wide-spread acceptance of Bestwall Gypsteel Plank by architects, engineers and builders is established by the many millions of square feet of Gypsteel now in service all over the Country. Gypsteel Plank is used as a roof decking in industrial, commercial and institutional buildings.

IMPORTANT ADVANTAGES

1. QUALITY — Gypsteel Plank is unsurpassed in quality and uniformity because it is precast under factory quality control. This feature permits an architect to exercise the maximum control over the quality of the finished roof deck.

2. ECONOMICS —

(a) Gypsteel Plank is ready to apply when it arrives at the job; no special experience or equipment is necessary for erection. Gypsteel Plank is applied without grout and, therefore, winter time delays are avoided. It may be erected in any weather that men can work.

(b) Unlike many roof deck systems Gypsteel Plank does not require a special vapor barrier beneath roof insulation nor a sprinkler system to obtain a favorable fire insurance rating.

(c) Gypsteel Plank is light in weight and structurally well designed. This permits the selection of light framing members and allows maximum spacing. Gypsteel has the ability to follow warped surfaces, if not too extreme.

(d) Gypsteel Plank may be laid directly over wood, concrete, or steel supports of any type and of either uniform or variable spacing (not exceeding 7′ on centers). End joints must be staggered, but need not come over the supports. This reduces cutting to a minimum and practically eliminates waste, for a small piece left over from the last Plank in any row may be used to start the next row.

3. VERSATILITY — Gypsteel Plank is adaptable to flat roofs, pitched roofs and curved roofs having a radius of 150 ft. or more. So that Gypsteel Plank may be attached to any steel structural supporting member in use, there are special clips available. The type, including manufacturer and size, of the structural supports to be used should be given at the time the order for Plank is placed so that proper clips may be furnished.

4. STABILITY AND DURABILITY — Gypsteel Plank represents an extremely durable and stable product. It is not effected by changes in temperature or atmospheric conditions. It will not rot, decay or deteriorate, it is vermin proof, termite proof, and is as permanent as any structure. In addition, the product will not lose its dimensional stability, appearance, or permanent structural strength due to leaks which may occur in the roofing material, providing repairs to the roofing membrane are made within a reasonable length of time.

5. APPEARANCE AND MAINTENANCE — The roof deck presents a smooth, attractive, light-reflective ceiling area which requires no maintenance. It may be painted if desired.

6. THERMAL VALUE — The insulation value afforded by Gypsteel Plank is sufficiently high to meet the requirements of most industrial and commercial buildings including factory areas, warehouses, and loading sheds. By comparison, the "U" value, including a built-up roof covering, of Gypsteel Plank is .52; steel decks — .94; 2″ concrete plank — .58; and 6″ poured concrete — .65.

7. FIREPROOF—Gypsteel Plank is non-combustible. Because of the unusual properties of gypsum when subjected to heat, Gypsteel Plank affords greater fire protection to a building and its contents than any comparable system. Wood will burn when exposed to heat of 300° F., steel will begin to soften at 900° F., 1″ of gypsum will contain a fire of 1700° F. for one hour. This phenomenon allows gypsum to act as a fire insulator for areas to be protected. In case of fire, Gypsteel Plank will protect a building from fuel contribution from roofing materials as long as the structural support remains intact.

USHO 002886

technical data

THICKNESS	WIDTH	LENGTH	WEIGHT PER SQ. FT.
2"	15"	10'	12#

INSULATION COEFFICIENTS

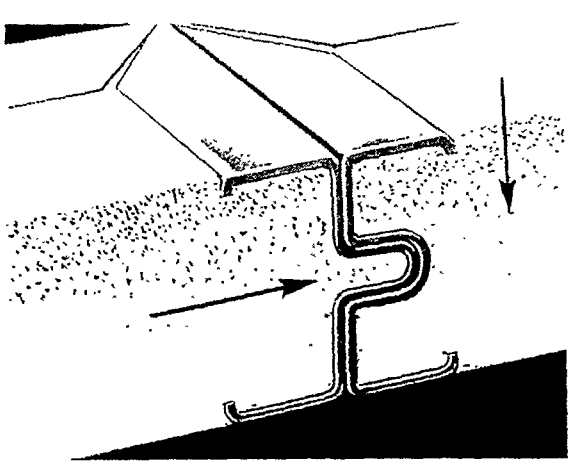
U-Factor (Air to Air) including roofing covering, ½" Gypsum Backer Board and ¾" Acoustical Tile on bar joist or suspended ceiling.			U-Factor (Air to Air) including a built-up roof covering. Thermal conductivity — Btu per sq. ft. per hour per degree F. difference in temperature.		
No Insulation	½" Insulation	1" Insulation	No Insulation	½" Insulation	1" Insulation
.16	.13	.12	.52	.28	.19

UNIFORM LOAD CARRYING CAPACITY CHART

SPAN	CARRYING CAPACITY	SAFETY FACTOR
4'	230 lbs. per sq. ft.	4
5'	146 lbs. per sq. ft.	4
6'	105 lbs. per sq. ft.	4
7'	75 lbs. per sq. ft.	4

NAIL HOLDING CHART

DESCRIPTION OF NAIL	HOLDING POWER OF DRY GYPSUM— DIRECT PULL ON NAIL Penetration ¼ less than nail's length.
1½" square cut nail	175.1 pounds
1¾" galvanized roofing nail	69.4 pounds



Carefully designed tongue provides for easy meshing, yet tight fitting joint, transmitting load from one plank to the adjacent one without causing separation of the plank.

UPLIFT RESISTANCE:

Standard clips have a holding power of 229 lbs. each. Based on an average of 2½ clips per plank, this means a resistance to uplift of 46 lbs. per square foot which with the 12# deadload of the deck is more than ample to meet building code requirements.

CANTILEVERING:

Gypsum Plank may be cantilevered in the lengthwise direction up to 30 inches providing each plank is attached to the exterior wall, that every other row of plank is started with a full plank and alternate rows are started with not less than a 4 ft. section.

Gypsum Plank may be cantilevered up to 6 inches in a crosswise direction.

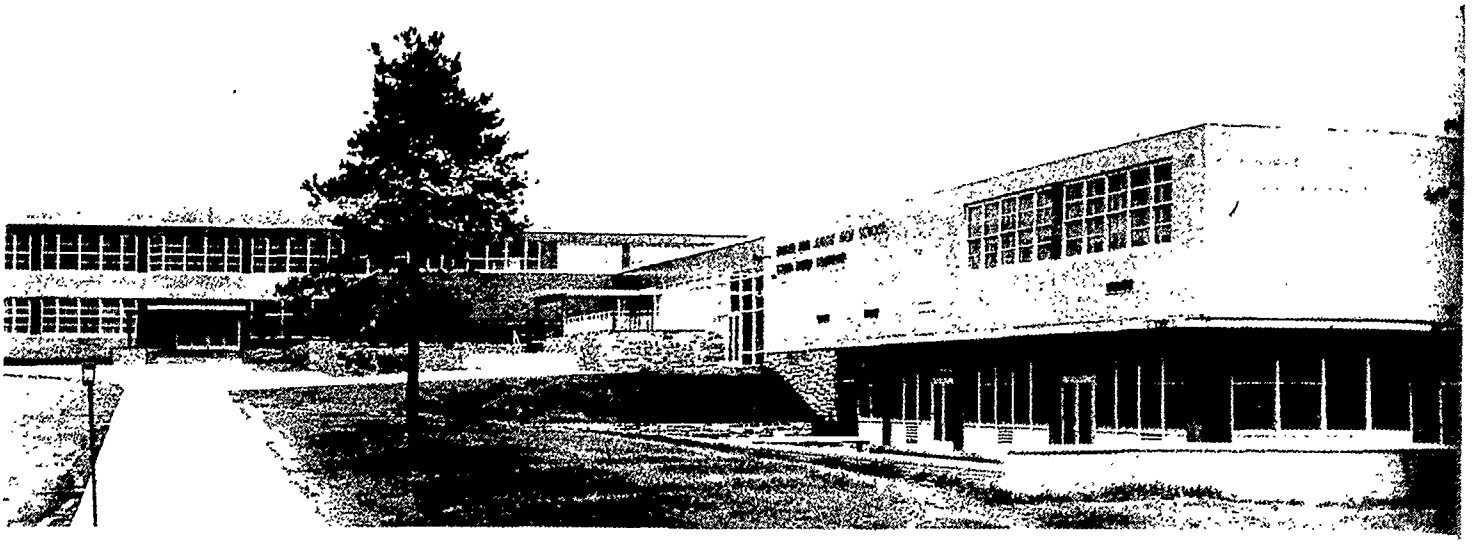
FEDERAL SPECIFICATIONS:

Gypsteel Plank meets Federal Specification SS-S-439, Type I, including the limitation on the deflection of 1/120 of the span with a 75# per sq. ft. live load over a clear span of 6' - 8". The plank will also pass the overload test requirements of this Federal Specification.

USHO 002887

flat roofs

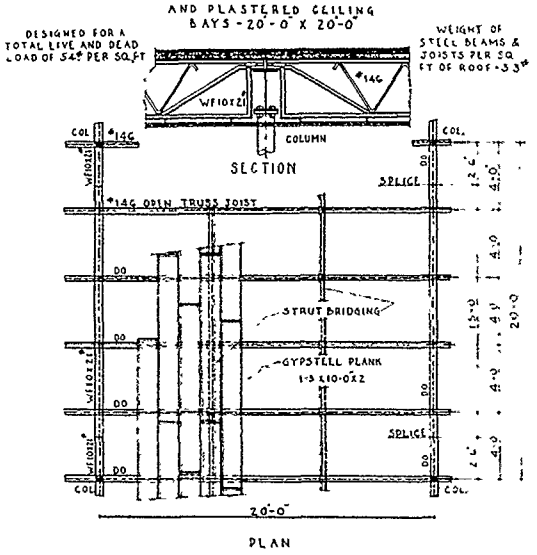
For school and institutional type buildings



FLAT ROOF

CANTILEVERED STEEL CONSTRUCTION AND PLASTERED CEILING

BAYS - 20'-0" X 20'-0"

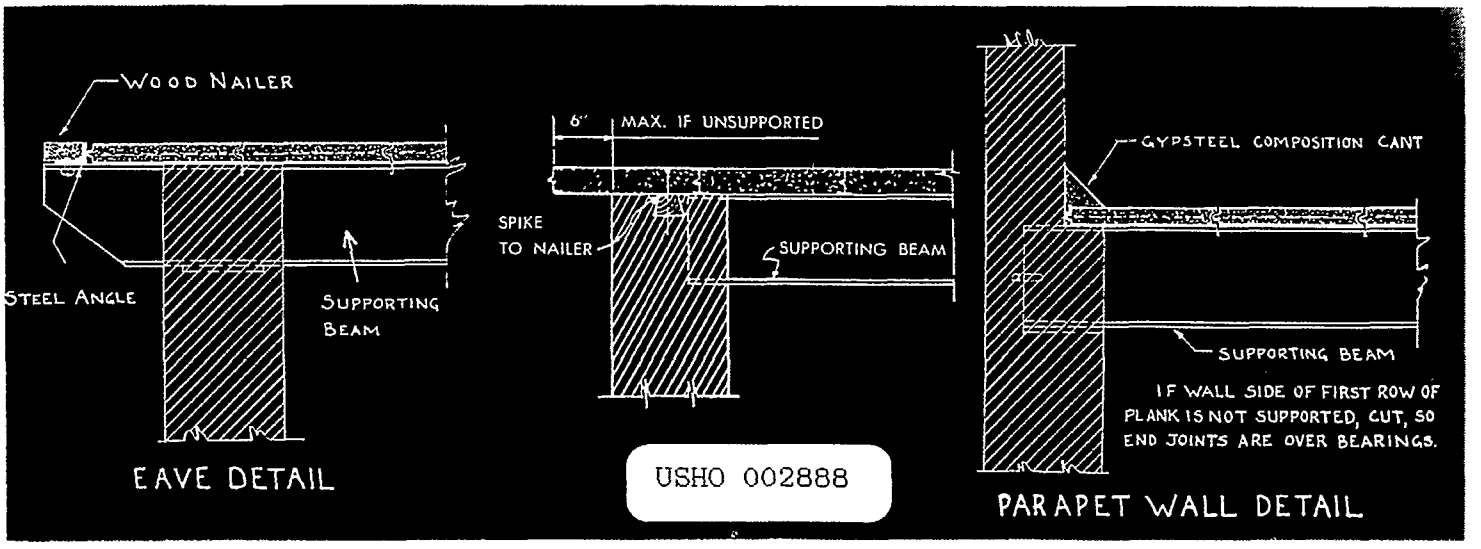


Gypsteel Plank is widely used in the construction of schools and institutional buildings because of the superior fire ratings and protection afforded by the product.

The design, (as illustrated), is very adaptable for schools because it lends itself to the construction of a suspended ceiling to which a finished ceiling material may be applied.

Consult technical data on page 3 for insulation coefficients requirements.

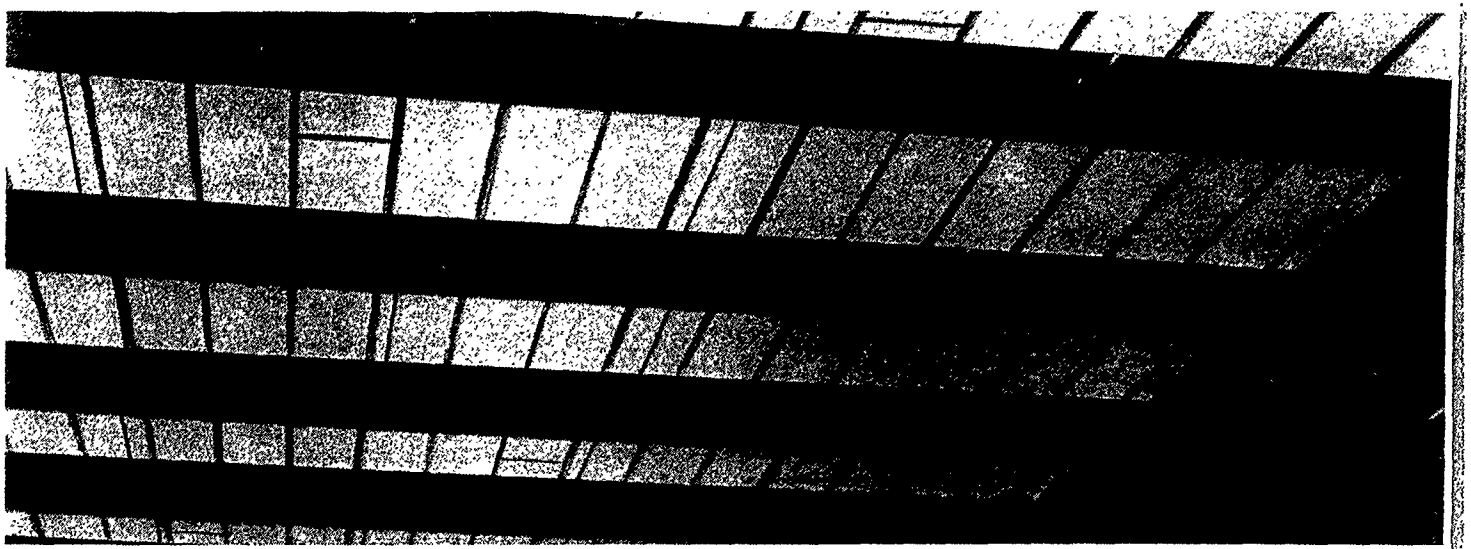
Local Building Codes should be consulted. Drawings are for purpose of illustration only and are not warranted by Bestwall Gypsum Company.



USHO 002888

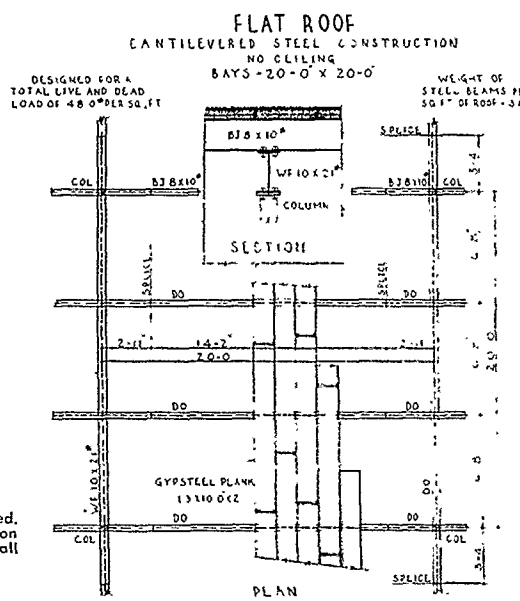
flat roofs

for industrial and commercial type buildings



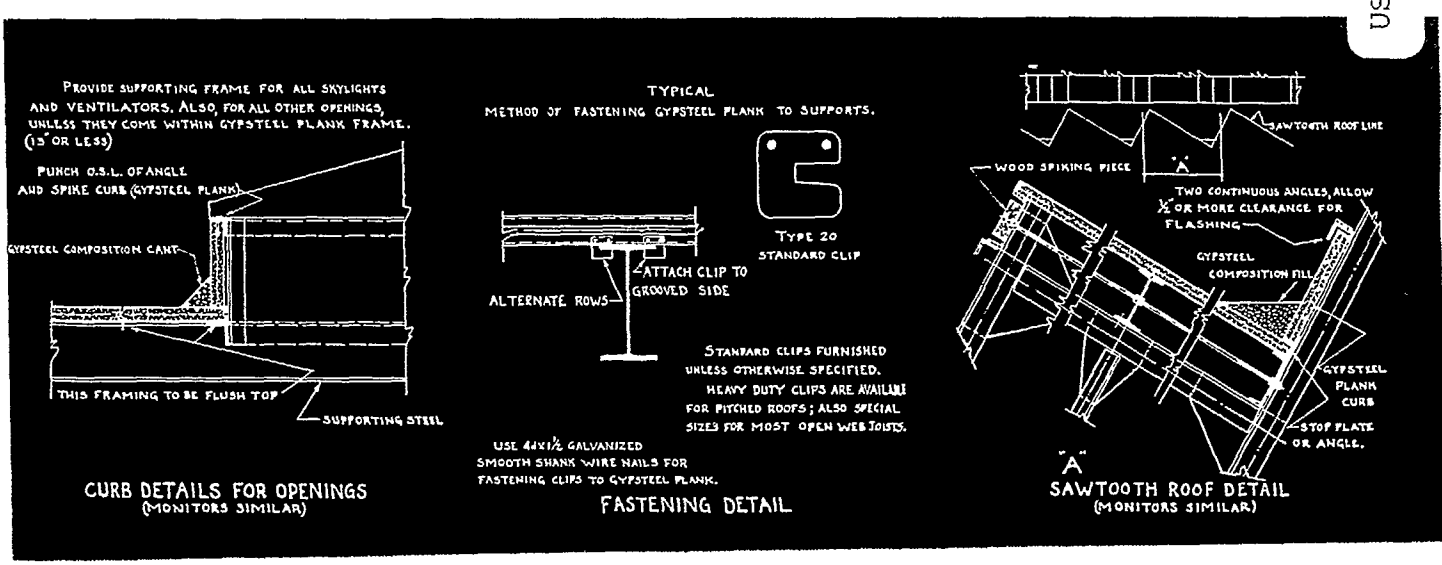
Gypsteel Plank has been designed to present a smooth, pleasant, light reflective surface. This finished appearance, coupled with a contemporary steel design as illustrated, will create a modern appearance for any warehouse, factory or manufacturing area.

Gypsteel Plank affords protection against the rapid spread of fire in factory areas where the structural steel is left exposed. The Plank, insulating the roof covering materials from interior fire for a considerable period of time, prevents these materials from becoming contributory fuel.



Local Building Codes should be consulted. Drawings are for purpose of illustration only and are not warranted by Bestwall Gypsum Company.

USHO 002899



pitched roofs

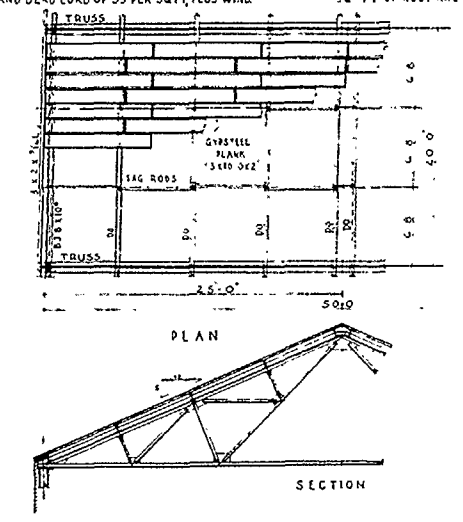
for church and traditional type buildings

Gypsteel Plank is a material similar to wood planking in handling, erection and nailability; however, it provides the added advantage of incombustibility.

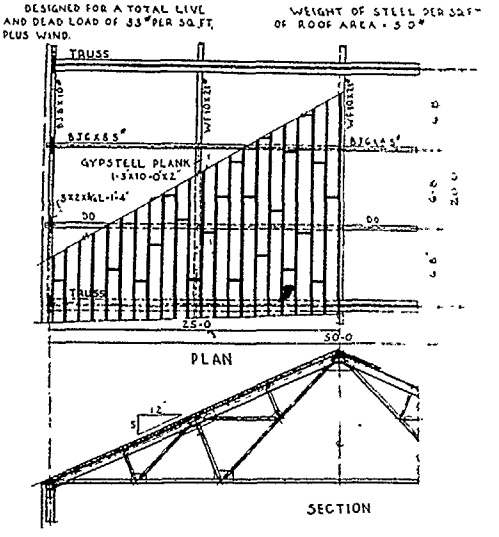
A study of the fire insurance rates of any proposed structure will show that Gypsteel Plank supported on steel framework could provide considerable saving on fire insurance premiums. The illustrated designs have been used for churches, libraries, and other buildings where an incombustible rating is desired.

Local Building Codes should be consulted. Drawings are for purpose of illustration only and are not warranted by Bestwall Gypsum Company.

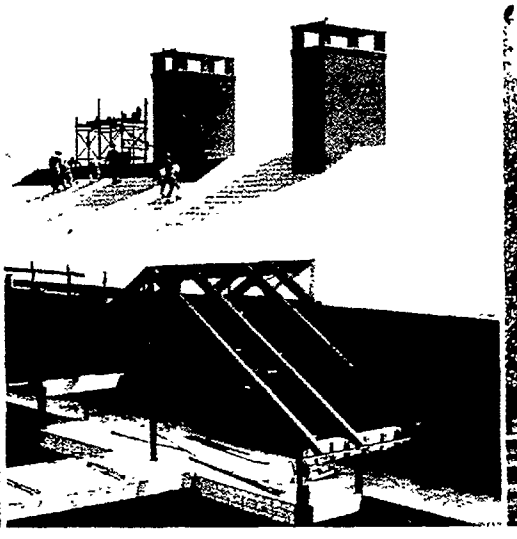
PITCHED ROOF
TRUSS AND PURLIN CONSTRUCTION
BAYS - 20-0" X 50-0"

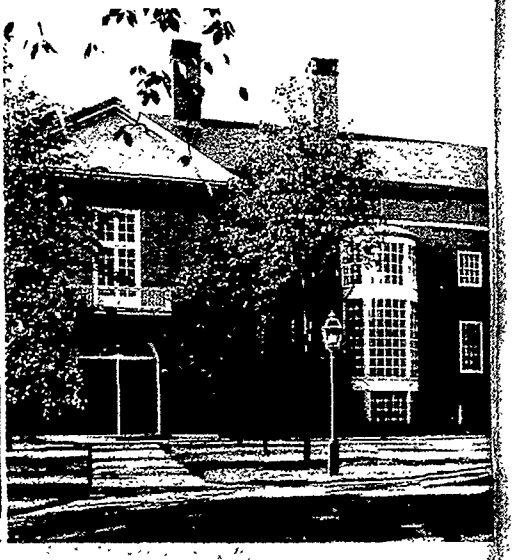


PITCHED ROOF
TRUSS AND RAFTER CONSTRUCTION
BAYS - 20'-0" X 50'-0"

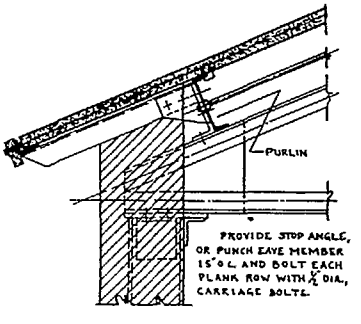


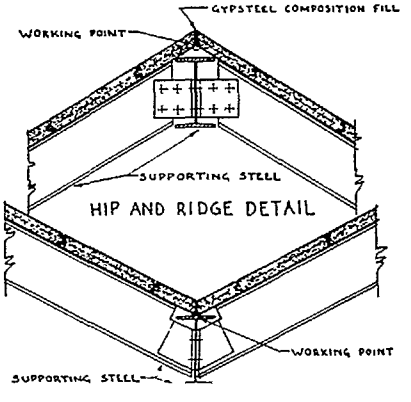




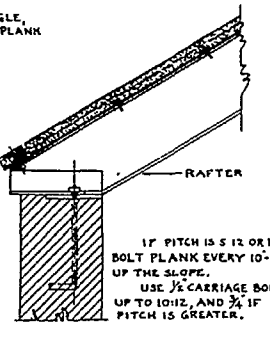


IF SLOPE IS LESS THAN 4:12, STOP ANGLE AND BOLTING MAY BE OMITTED, IN EITHER CASE SPECIFY TYPE 1C PLANK CLIPS.





IF NO EAVE ANGLE, BOLT FIRST TWO PLANK ROWS TO EVERY RAFTER.



USHO 002890

recommendations

and construction details



JOB STORAGE & PROTECTION: Gypsteel Plank should be shipped, stored, hoisted and handled on edge with tongue edge up, never flat until laid in place on the deck. The Plank should be protected from the ground by being placed on three 4 x 4's equally spaced under the Plank. Gypsteel should then be covered by a tarpaulin or a polyethylene sheet to protect it from rain or snow.

HOISTING: Plank should be placed on edge and hoisted to the roof with care to prevent damage of the tongued edge.

CUTTING OF PLANK: Gypsteel Plank should be cut to fit hips, ridges, valleys and monitors in workman-like manner. This can be accomplished by the use of a wide set hack saw to cut the steel binding, the gypsum core scored and snapped and finally the wire mat cut. Where power equipment is available, the Plank may be cut with an electric hand saw.

When using an electric hand saw the following resinoid blades are recommended by their manufacturers:

Bag State Abrasive Company	No. BGR
Carborundum Company	No. TC 207-T-B3
Eveready Briksaw Co., Inc.	No. 313
Norton Company	No. 37C241-014BN
Skilsaw, Inc.	Abrasive Discs

Table saws can be used with a center resinoid blade manufactured by the Carborundum Company — No. RC-16-Q-B7N.

PAINTING: Where painting of the underside of the deck is specified, the Plank should be dry before proceeding. In the event the Plank becomes wet due to rain or other weather conditions before the roof covering is applied or if the interior construction contributes moisture through condensation on the underside, the roof deck should be completely dried from the underside, by heat and ventilation if necessary, before proceeding with painting. The steel binding should be primed with a product designed for use over new galvanizing. For best results the entire underside of the deck should be primed before painting. Painting specifications of reliable paint manufacturers may be used.

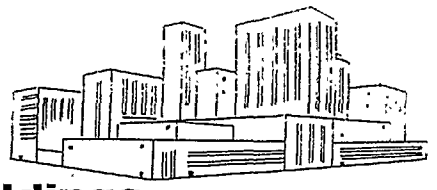
ROOF COVERING: Any type of standard roofing may be applied over Gypsteel Plank. Asphalt and asbestos shingles, and other lightweight roofings may be nailed directly to Gypsteel Plank using $1\frac{3}{4}$, 10 gauge LARGE HEAD, GALVANIZED ROOFING NAILS. Slate roofing may also be nailed directly to Gypsteel Plank using square cut galvanized or hard copper nails. Nails should penetrate $1\frac{1}{2}$" into Plank. For built-up roofs, nail the first two plys directly to the deck. This layer then acts as a dry or slip sheet to which additional plys may be mopped. Consult the specifications of reputable roofing manufacturers for detailed requirements.

REPAIRS: Repairs may be made by simply knocking out the damaged core (leaving the reinforcing mat in place), then placing a plywood form on the underside and pouring a new core with Bestwall Metro Mix gypsum concrete. If roof covering is in place, Plank may be repaired by plastering with Bestwall Wood Fiber Plaster from the underside.

EXCESSIVE HUMIDITY OR HEAT: Under certain conditions of excessive heat and humidity, special engineering and design treatment may be required. Submit details to our nearest sales office for recommendations.

USHO 002891

gypsteel plank



a modern product for modern buildings

SPECIFICATIONS

SCOPE: Unless otherwise designated in plans, all roof areas shall be covered with BESTWALL GYPSTEEL PLANK and all cants and saddles shall be constructed as shown or specified herein.

MATERIALS: All roof deck areas shall be covered by GYPSTEEL PLANK 2″ x 15″ x 10′ as manufactured by the BESTWALL GYPSUM COMPANY.

Clips to secure Gypsteel Plank to the structural members shall be furnished by the Plank manufacturer. (Unless otherwise determined, the clips should be ordered at the rate of 2½ per individual plank.) Nails, 2 per clip, shall be 4d galvanized slater nails or 1¼″ smooth shank, galvanized roofers nails.

All cants and saddles shall be constructed of BESTWALL METRO MIX gypsum concrete as manufactured by the BESTWALL GYPSUM COMPANY.

ERECTION: Start laying Gypsteel Plank at a corner of each independent area with the long dimension at right angles to the supports, laying the tongued side toward the exterior wall. Be certain the trademark face is up.

Start with a full Plank in the first row, a half or cut Plank in the second row, a full Plank for the third row, and so on for each succeeding row. Side and end joints shall be meshed as tightly as possible to form a smooth continuous surface.

End joints must be staggered whether they come over the supports or not. To accomplish this, the Planks which are left after cutting to fill out one row may be used to start another row, since it is not necessary to have a Plank receive support from two purlins to start a row. In staggering end joints, leave a minimum of thirty inches between them. Cut Plank to fit all hips, ridges and valleys as required by plans. Fill any voids with Bestwall Metro Mix gypsum concrete to present a finished area.

Attach the Plank to the top cord of steel purlin or joist at every point of support with galvanized steel clips furnished by the manufacturer. Where possible, clips should be placed on alternate sides of steel purlins on succeeding rows.

When Plank is laid over wood roof joints, the same erection details shall be followed except that the Plank shall be nailed with two 16d spikes at every point of support. In lieu of nailing plank to joists they may be wire tied by nailing into the edge of the Plank and using 14 gauge galvanized or Monel wire tied to nail in side of joists. Special nailing or a wire tie detail may be used in applying Gypsteel Plank to concrete joists.

On all Gypsteel Plank roofs with more than 4″ pitch per foot, the thrust shall be taken up at the eaves by a stop angle or other member of appropriate size and strength. If pitch is more than 5″ but less than 10″ to the foot, bolt Plank every 10′ up the slope using ½″ carriage bolts. When pitch exceeds 10″ to the foot use ¾″ carriage bolts in similar manner. On all sloping roofs, proper type clip for structural support made of *heavy* gauge metal shall be used. See details.

Cants and saddles shall be installed as indicated on plans using Bestwall Metro Mix gypsum concrete at a water ratio of 7 to 8 gallons per 80 lb. bag.

On all overhanging deck areas a wood nailer shall be attached to the edge of the Plank flush with the deck surface to provide for attaching gravel stop and roof covering.

BESTWALL

USHO 002892