

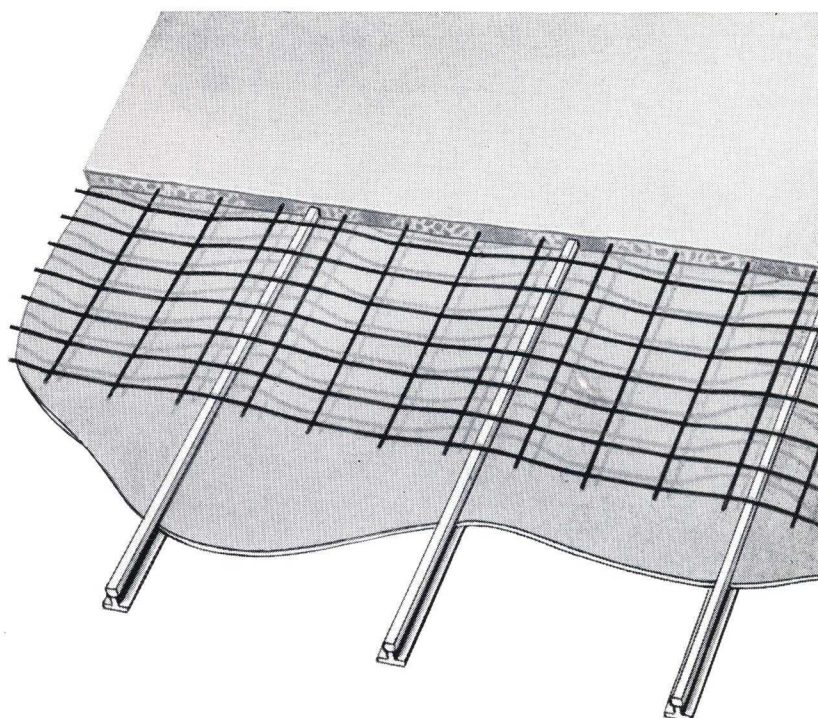
TECHNICAL INFORMATION

SHEETROCK* PYROFILL*

USG* Insulation PYROFILL • Asbestos-Board PYROFILL
Acoustical PYROFILL

ROOF DECKS

*no vapor barrier -
cures from bottom -
water absorbent
Hard to accommodate
Holes thru roof.*



*Trademarks Reg. U. S. Pat. Off.

MAY, 1952



United States Gypsum

For Building • For Industry

Gypsum • Lime • Steel • Insulation • Roofing • Paint

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PYROFILL ROOF DECKS

SHEETROCK PYROFILL • USG Insulation PYROFILL • Asbestos Board PYROFILL

INSTALLATION SERVICE

Reinforced PYROFILL roof decks are installed by experienced U. S. G. Gypsum Roof Deck Contractors who are located conveniently in all parts of the U. S. A. This service insures the best in workmanship, quality and safety. Consult your USG representative for contractors serving your area.

DESCRIPTION

SHEETROCK PYROFILL, USG Insulation PYROFILL and Asbestos Board PYROFILL roof decks are reinforced gypsum concrete (PYROFILL) slabs poured in place over permanent formboards of SHEETROCK, USG Insulation or asbestos cement boards.

Two basic methods of installation are used:

1. Over structural steel framing with roof purlins spaced more than 36" on centers, where steel sub-purlins are required as supplemental supports.
2. Over bar-joist or lightweight steel beams spaced not more than 36" on centers, where supplemental supports are not structurally required.

STEEL SUB-PURLINS are lightweight carbon steel sections, of structural quality. They are available in various sizes, weights and shapes, and are selected according to their utility and economy. NOTE: Steel sub-purlins are not manufactured or sold by USG.

SHEETROCK Formboard is a rigid type gypsum board, 1/2" thick by 32" wide (or 48" wide), and made to specified lengths to fit purlin spacings. Treated to resist mildew effectively.

REFERENCE: Federal Specification SS-W-51a. Type A and ASTM C36-50.

USG Insulation Formboard is a rigid type wood fiber insulation board, 1" thick, 32" wide, (or 48" wide), and cut to specified lengths to fit purlin spacings. Treated to resist mildew effectively. REFERENCE: Federal Specification LLL-F-321b.

ASBESTOS-CEMENT Formboard is a rigid industrial type asbestos cement board, 1/4" thick, cut to 32" wide by 48" long. Supplemental tees required in cross joints. REFERENCE: Federal Specification SS-S-283 Type I or II.

NOTE: Asbestos cement formboard is not manufactured or sold by USG.

STEEL REINFORCING for PYROFILL slabs is a welded type galvanized wire mat consisting of No. 12 gauge longitudinal wires spaced 4" on centers and No. 14 gauge transverse wires spaced 8" on centers—usually referred to as BD 1214 mat. The effective cross sectional area per foot width of slab (No. 12 gauge wires) is 0.026 sq. in. Other comparable types of galvanized mat may be used if their effective cross sectional area is equal to or greater than BD 1214 mat, and if they will give adequate bond.

NOTE: Galvanized reinforcing mats are not manufactured or sold by USG.

PYROFILL is a mill mixed gypsum concrete consisting of calcined gypsum and not more than 12 1/2% by weight of wood chips, shavings or fibers. It requires the addition of water only on the job. REFERENCE: Complies with ASA—A59.1—1945.

DESIGN

REINFORCED PYROFILL slabs (2" of reinforced PYROFILL poured over permanent formboards) are designed to span continuously over sub-purlins spaced 32 5/8" on centers, or over bar joist spaced not more than 36" on centers.

STEEL SUB-PURLINS vary in size, weight and shape, and are selected according to required span and loading. The standard spacing is 32 5/8" on centers to accommodate 32" wide formboards. 48" wide formboards are never used with sub-purlins. See specifications for slabs over bar joist for use of 48" wide formboards.

FORMBOARDS, as described herein, are permanently installed between the sub-purlins or over bar joist.

STEEL REINFORCEMENT for poured in place PYROFILL slabs is installed with the Number 12 gauge wires placed continuous and perpendicular to the sub-purlins or bar joist.

PYROFILL (gypsum concrete) is mixed at the job site with clean water only, then poured in place, over the formboards, to an average thickness of not less than 2".

FUNCTION AND UTILITY

Economical and safe roof decks are built with USG poured in place reinforced PYROFILL construction. Some of the outstanding features are:

Lightweight

A regular SHEETROCK PYROFILL slab, including sub-purlins (2" of reinforced PYROFILL over 1/2" SHEETROCK Formboard), weighs approximately 12 lbs. per sq. ft.; a USG Insulation PYROFILL slab, approximately 11.5 lbs.; and an Asbestos board PYROFILL slab, approximately 13.5 lbs. See table on page 4.

Strong

In tests by nationally recognized laboratories, a continuous 2" Reinforced PYROFILL slab and permanent formboards over supports spaced 32 5/8" on centers carries a total load equivalent to more than 450 lbs. per sq. ft. when thoroughly wet, and over 700 lbs. per sq. ft. when dry.

Incombustible

SHEETROCK PYROFILL and Asbestos board PYROFILL slabs will not burn. USG Insulation PYROFILL slabs are usually classed as incombustible with a deficiency penalty when the incombustible reinforced PYROFILL slab is supported independent of the formboard.

Durable

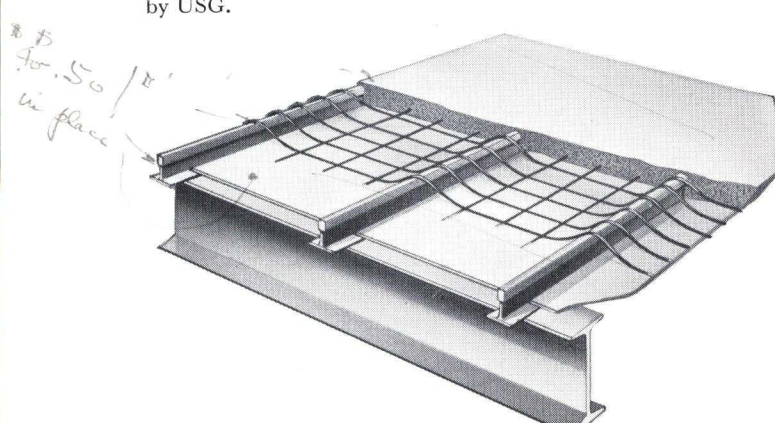
Gypsum is chemically inert and will not rot, burn or decay. Reinforced PYROFILL slabs have been in use for half a century and are still in excellent condition. Reinforced PYROFILL roof deck constructions are thoroughly proven by the test of time. Alterations can be made freely as the slab can be cut and patched easily and quickly, with a minimum of expense.

Appearance

The permanent formboards provide a smooth, light-colored ceiling of good-looking panelled surfaces, which should not require further decorating. See "Painting" under "Limitations of Use."

Speed of Erection

No other monolithic type of poured concrete roof deck can be installed faster. PYROFILL sets quickly (within 30 minutes), permitting workmen to work on previously poured sections in pouring new sections. Up to 30,000 sq. ft. of roof area have been poured in one day.



"USG", "PYROFILL" and "SHEETROCK" are registered trademarks owned by United States Gypsum and are used by it to distinguish its products. "PYROFILL" identifies the particular gypsum fiber concrete; "SHEETROCK" identifies the particular gypsum formboard, all manufactured by United States Gypsum.

PYROFILL ROOF DECKS

SHEETROCK PYROFILL • USG Insulation PYROFILL • Asbestos Board PYROFILL

All-Weather Construction

These roof decks can be installed during the coldest weather in which men normally work. Sufficient heat within the gypsum is generated to prevent freezing during the set. See "Exposure" under "Limitations of Use."

Adaptability

Reinforced PYROFILL slabs may be installed on flat, warped, saw tooth, curved or pitched roof framing.

Seismic Loads

PYROFILL roof decks have been accepted by the City and County of Los Angeles, California, as adequate for seismic loads. The requirements of these code authorities are available on request.

Low Cost

The simplicity of design, light weight, and speed of erection combined with its other outstanding qualities of rigidity, incombustibility, and finished undersurface make the overall cost of this construction very economical.

LIMITATIONS OF USE & RECOMMENDATIONS

Excessive Moisture or Temperature

PYROFILL roof decks are suitable for all types of buildings and occupancy with normal temperature and humidity conditions. Where intermittent high temperatures occur, it is advisable to use cement asbestos-board PYROFILL roof decks. Where abnormally high humidity conditions prevail, such as in wet process plants, or where unusually high temperatures prevail such as in foundries, over breechings, in furnace rooms, etc., consult your USG representative for recommendations.

Exposure

During application, PYROFILL roof decks withstand the effects of normal rainfall, snow, freezing and thawing; however, they should be covered as soon as practicable. The water-proof (built-up type) roof covering should be applied as soon as the top surface of the slab is reasonably dry; i.e., when there is no visible moisture gloss. For the application of built-up roof covering, we recommend that the first 2 plies of the felt be nailed. The nail for this purpose should be a large head roofing nail not less than 10 ga. which will penetrate approximately 2", or a clinch type nail used with a conventional type tin cap.

Drying

PYROFILL roof slabs dry out from the underside (through the formboard). Adequate heat and ventilation below the slab are required to permit the escape of this moisture. In buildings without windows or with fixed windows, adequate mechanical (forced) ventilation is required to remove all construction moisture. Consult your USG representative if unusual conditions prevail.

Acids

Acid fumes generally are not harmful to gypsum although they may be harmful to other materials. If acid fumes are considered a problem, consult your USG representative.

Heavy Loads

Although the reinforced PYROFILL slab will carry loads in excess of 100 lbs. per sq. ft. with adequate factors of safety, the sub-purlins or bar joists govern the safe load limit. All superimposed concentrated loads, such as flag pole bases, water tanks and ventilating fans, must be directly or indirectly supported on steel framing, not on the gypsum slab.

Steep Roofs

PYROFILL roof slabs are designed to receive built-up roof coverings. On steep roofs, where slate, ceramic tile or rigid type shingle roof coverings are required, the use of USG's 3" SHORT SPAN "NAILING TYPE" Gypsum Roof Tile is recommended. See page 11 for PYROFILL nail holding data.

Expansion and Contraction

Reinforced PYROFILL roof decks, like all roof decks, are subject to expansion and contraction due to temperature changes. When the slab is rigidly attached to the steel framing, the slab movement is controlled largely by the movements in the steel framing itself. When expansion joints have been provided in the main structure, it is also necessary to provide them in the roof deck.

Expansion and contraction problems are usually associated with long narrow buildings, long narrow skylights, and buildings of "L" or "U" shape. Expansion joints in the main structural framing should always be considered in these cases.

As a general precaution, a wood fiber or glass fiber filler at all junctions of roof slabs with parapet walls is recommended. See details. Consult your USG representative for further recommendations.

Painting

PYROFILL Roof Decks do not generally require further decorating, as the formboards provide a finished undersurface. When decoration is desired, painting should not be done until the slab is thoroughly dry. Before painting, the slab should be checked for dryness throughout its entire thickness. An electric type moisture meter can be used if contacts are driven well into interior of slab. Consult your USG representative.

Suspended Ceilings

Suspended ceilings under PYROFILL roof decks should be hung from the structural steel frame. If they are hung from the roof deck, the hangers should be attached to the sub-purlins, never in the gypsum slab. When hung from the sub-purlins, the sub-purlins must be capable of supporting the added weight of the ceiling with a deflection not to exceed 1/360 of their span. See selection table on page 5 for load values of various sub-purlins.

Sheet Metal Roof Coverings

Sheet metal roof coverings such as aluminum, copper or tin can be successfully applied over PYROFILL roof decks if properly anchored to the slab. The recommended attachment is by bolting the anchoring members to the slab, using toggle bolts extending entirely through the slab.

Uplift

During hurricanes or high winds all roof decks are subject to uplift forces. Therefore, roof decks should be anchored to supports to resist this uplift. The usual requirement is to resist a total uplift force of 35 lbs. per sq. ft. over the main roof area, and 45 lbs. per sq. ft. over the projecting eaves, etc. In developing adequate resistance, the total dead load of the roof deck can be considered as part of the total resistance. In laboratory tests PYROFILL roof decks, using steel rails or bulb tee sub-purlins welded to the steel framing, have an average uplift resistance equivalent to more than 200 lbs. per sq. ft. Slabs with standard tee or flanged channel (fence post sections) sub-purlins and slabs over bar-joist should have supplemental anchorage to develop the required uplift resistance.

SALES REPRESENTATIVES

On the front cover of this folder are listed the locations of our district offices. A competent sales representative located at each of these offices will be glad to assist you with any problems or questions concerning the design or function of these constructions. Call him. There is no obligation on your part.

PYROFILL ROOF DECKS

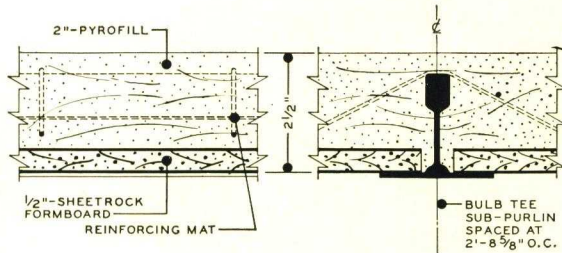
TYPES OF PYROFILL APPLICATION

SHEETROCK PYROFILL

APPLICATION ON SUB-PURLINS

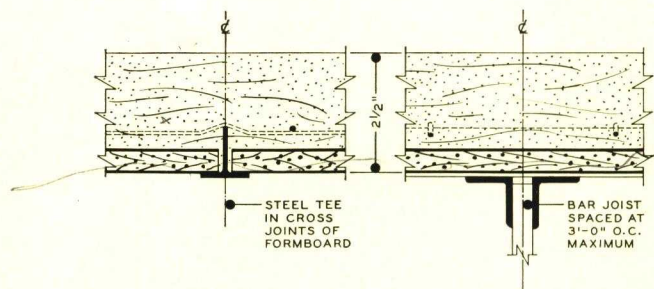
SCALE - 3" = 1'-0"

APPLICATION ON BAR JOIST



LONGITUDINAL

TRANSVERSE



LONGITUDINAL

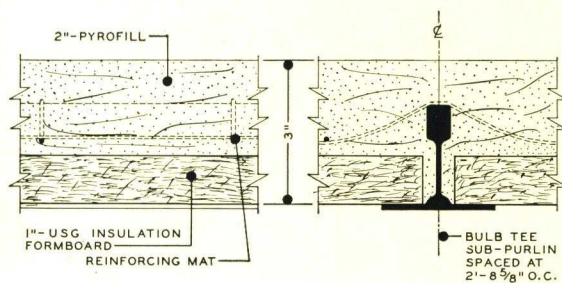
TRANSVERSE

USG-INSULATION PYROFILL

APPLICATION ON SUB-PURLINS

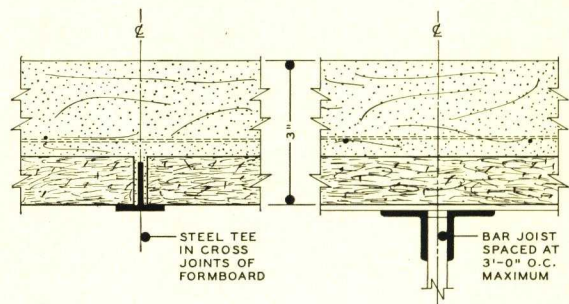
SCALE - 3" = 1'-0"

APPLICATION ON BAR JOIST



LONGITUDINAL

TRANSVERSE



LONGITUDINAL

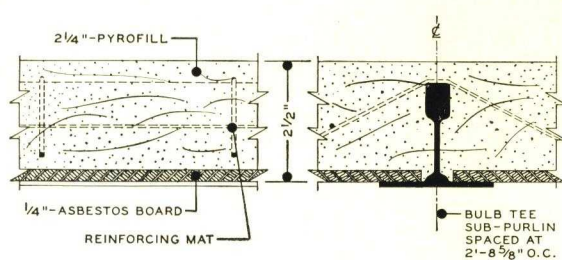
TRANSVERSE

CEMENT ASBESTOS BOARD PYROFILL

APPLICATION ON SUB-PURLINS

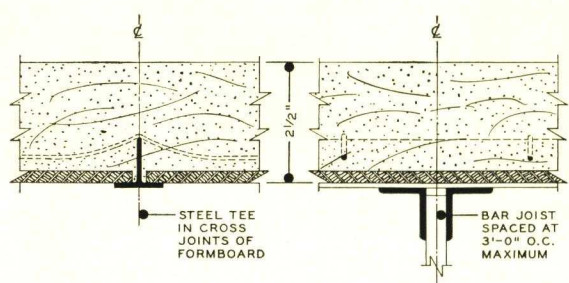
SCALE - 3" = 1'-0"

APPLICATION ON BAR JOIST



LONGITUDINAL

TRANSVERSE



LONGITUDINAL

TRANSVERSE

TABLE OF SLAB WEIGHTS AND THERMAL INSULATION VALUES

	Approx. Slab Weight per Square Foot	"U" Factor for complete roof slab including built-up roof covering (Btu per sq. ft., per hr., per deg. F. diff. in temperature)		
		No Insulation	1/2" Insulation	1" Insulation
STANDARD 2 1/2" SHEETROCK PYROFILL ROOF SLAB 2" PYROFILL Over 1/2" SHEETROCK	10.7	0.38	0.24	0.18
STANDARD 3" U.S.G. INSULATION PYROFILL ROOF SLAB 2" PYROFILL Over 1" U.S.G. INSULATION FORMBOARD	10.1	0.19	0.15	0.12
STANDARD 2 1/2" Asbestos Board PYROFILL ROOF SLAB 2 1/4" PYROFILL Over 1/4" Asbestos Board	12.2	0.40	0.25	0.18

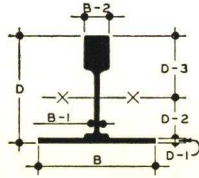
NOTES: 1. For total weight of roof deck add weight of sub-purlins to the approx. slab weights shown above.

2. The component materials weigh approximately: PYROFILL 52 lbs. cu. ft. 1/2" SHEETROCK 2.05 lbs. sq. ft. 1" U. S. G. Insulation Formboard 1.45 lbs. per sq. ft. and 1/4" Asbestos board 2.44 lbs. per sq. ft.

PYROFILL ROOF DECKS

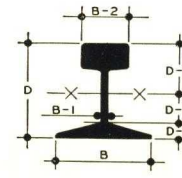
INDIVIDUAL TABLES FOR SUB-PURLIN DETAILS

BULB TEE



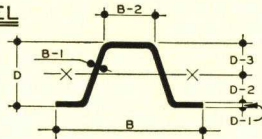
Type	Wt. Ft.	I in 4	S in 3	B inch	B ¹ inch	B ² inch	D inch	D ¹ inch	D ² inch	D ³ inch
178 Bulb T (I)	2.40	0.346	0.313	1.9000	0.1406	0.5000	1.8750	0.1406	0.6294	1.1050
178 Bulb T (B)	2.40	0.340	0.294	2.0000	0.1406	0.5625	1.8750	0.1406	0.5634	1.1710
218 Bulb T (B)	2.95	0.60	0.470	2.3750	0.138	0.5000	2.1875	0.125	0.785	1.2775
200 Bulb T (I)	2.97	0.503	0.460	2.0630	0.1406	0.6563	2.0000	0.1406	0.7674	1.0920
214 Bulb T (B)	3.20	0.682	0.510	2.3750	0.1406	0.6250	2.2500	0.1406	0.7614	1.3480

A.S.C.E. RAIL



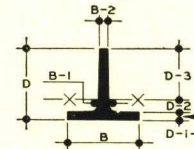
Type	Wt. Ft.	I in 4	S in 3	B inch	B ¹ inch	B ² inch	D inch	D ¹ inch	D ² inch	D ³ inch
8 lbs. per yd.	2.67	0.27	0.31	1.5625	0.1875	0.8125	1.5625	0.2812	0.4188	0.8625
12 lb. per yd.	4.00	0.66	0.63	2.0000	0.1875	1.0000	2.0000	0.3437	0.6163	1.0400
16 lb. per yd.	5.33	1.24	1.01	2.3750	0.2500	1.1875	2.3750	0.3750	0.7750	1.2250
20 lb. per yd.	6.67	1.94	1.43	2.6250	0.2500	1.3750	2.6250	0.4375	0.8325	1.3550

FLANGED CHANNEL



Type	Wt. Ft.	I in 4	S in 3	B inch	B ¹ inch	B ² inch	D inch	D ¹ inch	D ² inch	D ³ inch
1.5 lb. per ft. (B)	1.50	0.072	0.120	2.5625	0.1196	1.0000	1.0625	0.1196	0.3444	0.5985
2.0 lb. per ft. (B)	2.00	0.165	0.218	3.1250	0.1094	1.0938	1.4375	0.1250	0.5520	0.7605
2.25 lb. per ft. (B)	2.25	0.194	0.250	3.1875	0.1094	1.0000	1.4687	0.1406	0.5514	0.7770

STRUCTURAL TEE



Type	Wt. Ft.	I in 4	S in 3	B inch	B ¹ inch	B ² inch	D inch	D ¹ inch	D ² inch	D ³ inch
1" x 1" x 5/16"	1.00	—	0.045	1.000	0.1562	0.1562	1.000	0.1562	—	—
1 1/2" x 1 1/2" x 1/8"	1.33	0.091	0.088	1.500	0.1250	0.1250	1.500	0.1250	0.340	1.035
2" x 2" x 1/4"	3.56	0.370	0.260	2.000	—	0.2500	2.000	0.2500	0.340	1.410
2 1/4" x 2 1/4" x 1/4"	4.10	0.520	0.320	2.250	—	0.2500	2.250	0.2500	0.400	1.600
2 1/2" x 2 1/2" x 1/4"	4.60	0.740	0.420	2.500	—	0.2500	2.500	0.2500	0.460	1.790

SELECTION TABLE OF SUB-PURLINS FOR 2" PYROFILL SLABS OVER FORMBOARDS

VALUES SHOWN ARE BASED ON: Purlins Spaced 2'8 1/2" On Centers, fs @ 20,000 psi, M=1/10 WL except as noted
Exceptions to spacing and slab thickness are noted in the table.

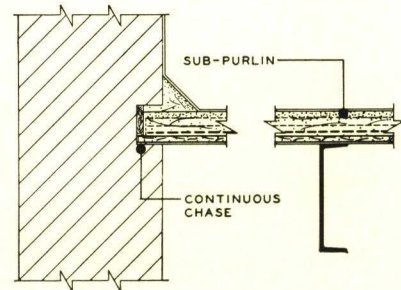
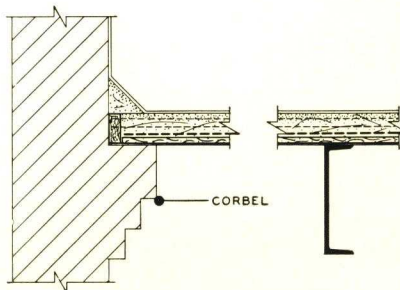
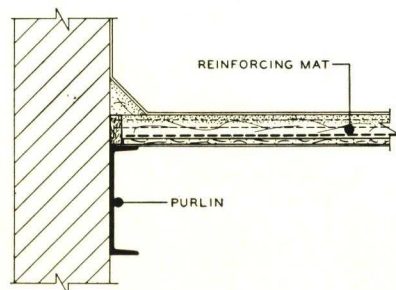
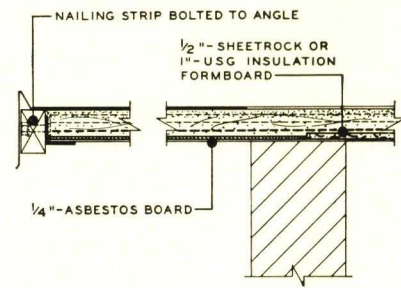
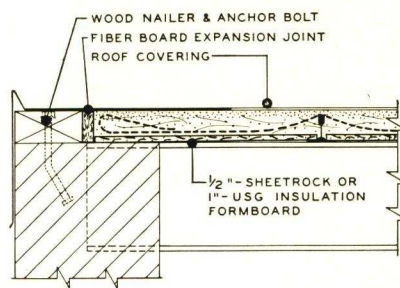
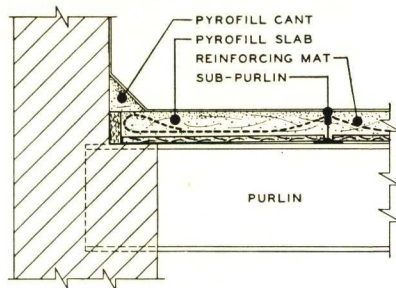
SUB-PURLINS		SAFE TOTAL LOAD in pounds per sq. ft. uniformly distributed for spans of 3' 0" to 12' 0" in increments of 6 inches																		
TYPE	Weight psf of Roof	3'0"	3'6"	4'0"	4'6"	5'0"	5'6"	6'0"	6'6"	7'0"	7'6"	8'0"	8'6"	9'0"	9'6"	10'0"	10'6"	11'0"	11'6"	12'0"
1½x1½x¼" T	0.49	60	44	34																
1.5 lb. Flg. Ch.	0.54	80	58	45	35	sub-purlins spaced 2'9½" on center														
2.0 lb. Flg. Ch.	0.71	—	105	81	64	52	42	36	sub-purlins spaced 2'10" on centers											
2.25 lb. Flg. Ch.	0.80	—	120	92	72	59	48	40	35	sub-purlins spaced 2'10" on centers										
2x2x¼" T	1.31	—	—	100	78	64	53	44	38	33										
178 Bulb T (B)	0.88	—	—	113	89	72	60	50	43	37	32									
8 lb. ASCE Rail	0.98	—	—	119	94	76	63	53	45	39	34									
178 Bulb T (I)	0.88	—	—	120	95	77	63	53	45	39	34									
2¼x2¼x¼" T	1.51	—	—	123	97	79	65	55	46	40	35	31								
2½x2½x¼" T	1.69 min slab 3" total	—	—	127	103	85	72	61	52	46	40	36	32							
218 Bulb T (B)	1.08	—	—	—	—	115	95	80	68	59	51	45	40	36	32					
200 Bulb T (I)	1.09	—	—	—	—	113	93	78	67	57	50	44	39	35	32					
214 Bulb T (B)	1.18	—	—	—	—	125	103	87	74	64	56	49	43	39	35					
12 lb. ASCE Rail	1.47	—	—	—	—	—	127	107	91	79	69	60	53	48	*42	*38	*35			
16 lb. ASCE Rail	1.96	—	—	—	—	—	—	—	—	126	110	97	86	76	69	62	*55	*49	*45	*40
20 lb. ASCE Rail	2.45 min slab 3" Total	—	—	—	—	—	—	—	—	—	—	—	121	108	97	88	79	72	*65	*59

- NOTES: 1. Loads to left of heavy line have deflections less than 1/360 of span—To Right over 1/360 but less than 1/240 of span.
2. Loads marked * limited by deflection—deflection based on semi-continuous spans or D=3 WL/384 EI Per A.I.S.
3. To determine total safe load for Bending Moment of 1/8 WL use 80% of the tabulated load.
4. To determine total safe load for a maximum fiber stress of 18,000 psi use 90% of tabulated load.
5. For suspended ceilings use loads shown to the left of the heavy line; or 75% of loads shown to right of the heavy line can generally be safely used.
6. The most economical spans are from 6'0" to 8'0"—Values for other sub-purlin spacings can be determined by direct ratio.
7. (I) Inland Steel Co. (B) Buffalo Steel Co.
8. We do not recommend using loads less than 45 pounds per sq. ft.

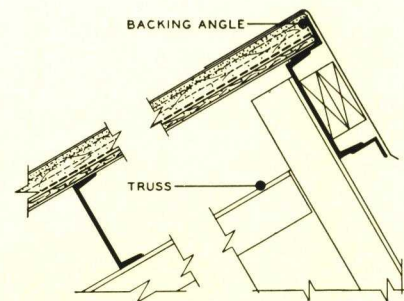
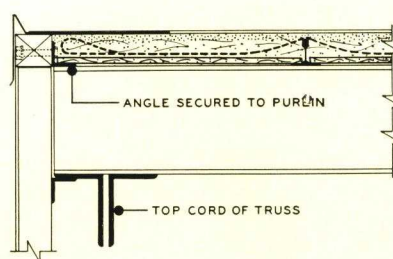
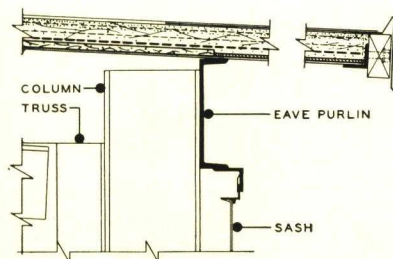
PYROFILL ROOF DECKS

APPLICATION OVER STEEL BEAMS

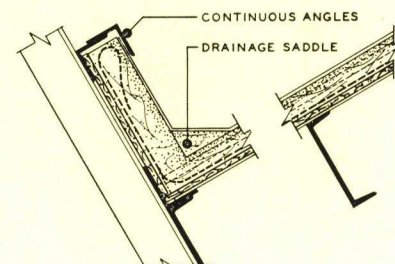
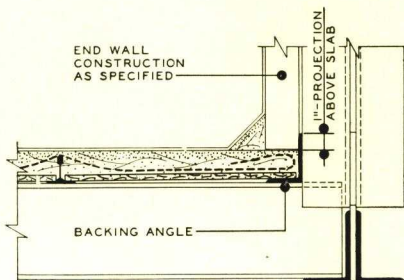
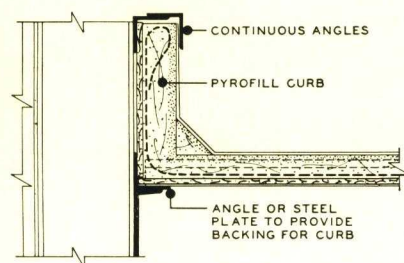
WALL DETAILS



EAVES



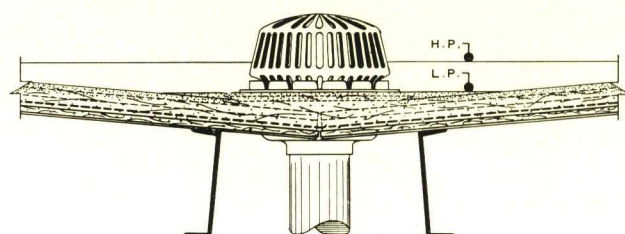
CURBS



RIDGE



VALLEY

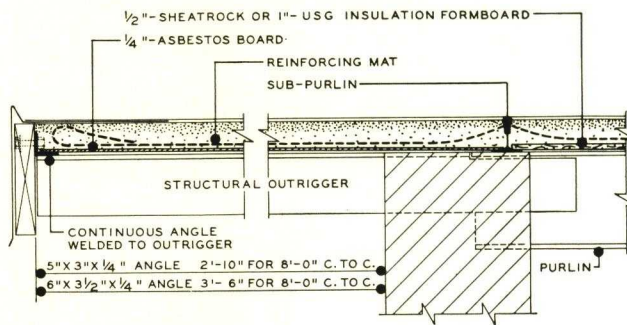
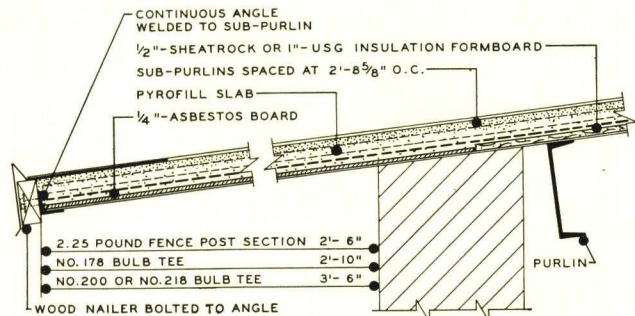


PYROFILL ROOF DECKS

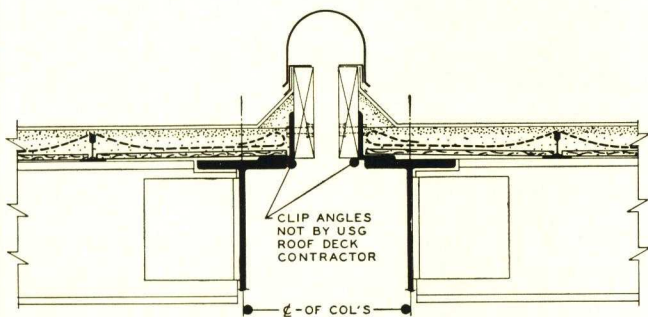
APPLICATION OVER STEEL BEAMS

EAVE & GABLE OVERHANG
(OVERHANG BASED ON 45#/' TOTAL LOAD)

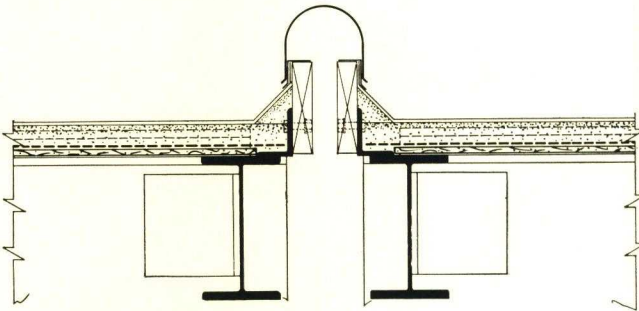
(OVERHANG BASED ON 45#/' TOTAL LOAD)



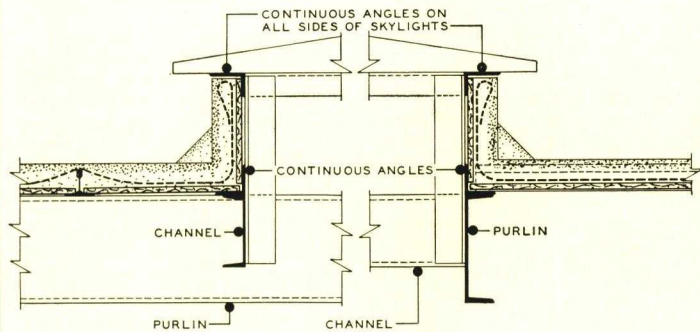
EXPANSION JOINT PARALLEL TO GIRDER



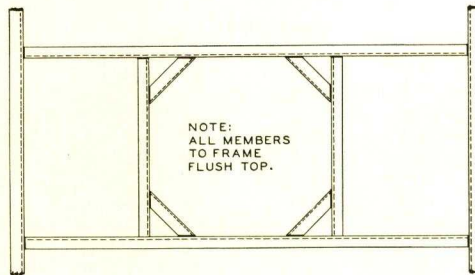
EXPANSION JOINT PARALLEL TO PURLIN



MISCELLANEOUS DETAILS



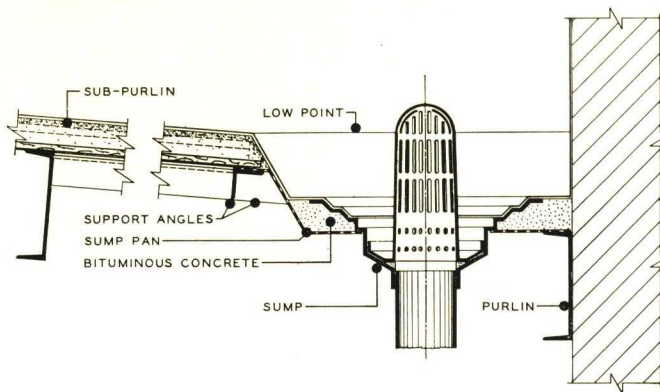
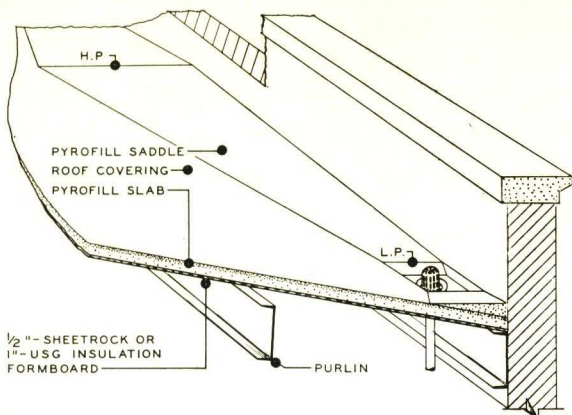
SKYLIGHT DETAIL



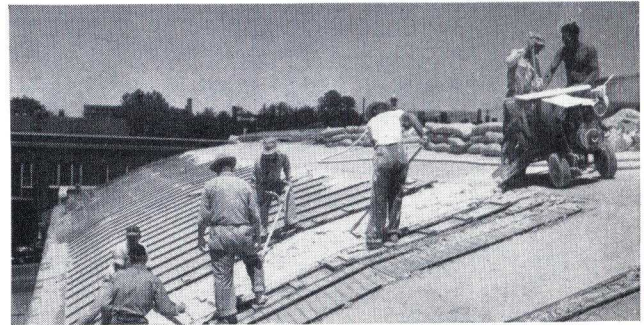
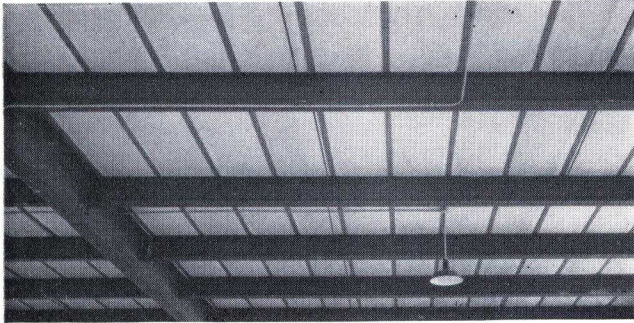
NOTE:
ALL MEMBERS
TO FRAME
FLUSH TOP.

TYPICAL FRAMING AROUND
OPENINGS LARGER THAN 30"
OPENINGS LESS THAN 30" TO BE
FRAMED WITH SUB-PURLINS

OPENINGS LESS THAN 30" TO BE
FRAMED WITH SUB-PURLINS



PYROFILL ROOF DECKS



ARCHITECTURAL SPECIFICATIONS POURED GYPSUM ROOF DECK WITH SUB-PURLINS

SHORT FORM

WORK INCLUDED:

The contractor shall furnish all material, labor and equipment and install (select one):

- a. U.S.G. Standard 2½" SHEETROCK PYROFILL
- b. U.S.G. Standard 3" Insulation PYROFILL
- c. U.S.G. Standard 2½" Asbestos-board PYROFILL

poured gypsum roof deck on the entire area of the building. All to be in accordance with standards of the United States Gypsum Company as currently published.

LONG FORM

SCOPE OF WORK:

The contractor shall furnish all labor, material and equipment and install complete the poured gypsum roof decks, together with cants, curbs and drainage fills as shown and specified. Approved shop drawings are required before work proceeds.

MATERIALS

1. **Steel Sub-purlins:** The steel sub-purlins shall be an approved type capable of carrying the required live load and dead load. All to be cut to length and shop painted one coat of an approved paint. All end joints are to bear on roof supports.
2. **Formboards:** The permanent formboards shall be: (select one):
 - a. USG ½" treated SHEETROCK formboard 32" wide, in lengths equal to main purlin spacings.
 - b. 1" treated USG Insulation formboard 32" wide in lengths equal to main purlin spacings.
 - c. Cement-asbestos board ¼" thick, 32" wide, 48" long complete with approved galvanized or painted steel tees in the cross joints between sub-purlins.
3. **Reinforcing Mesh:** The reinforcing in the poured gypsum slab shall be a galvanized welded wire mesh having No. 12 gauge longitudinal wires spaced 4" on centers, or similar type with equal or better qualities, having an effective cross sectional area of not less than 0.026 square inch per foot width of slab.
4. **Gypsum Concrete:** The gypsum concrete shall be PYROFILL containing calcined gypsum with not more than 12½% by weight of wood chips, shaving or fibers. PYROFILL is processed and bagged at the producing mill ready for use by the addition of water only at the job site.

INSTALLATION

1. **Steel Sub-purlins:** Place and weld each sub-purlin to main purlins

at each contact point using ¾" long fillet welds placed on alternate sides of sub-purlins where accessible.

2. **Formboards:** Place formboards on flanges of sub-purlins with all end or cross joints supported. Forms to fit neatly on all four edges. Cut forms to fit at walls, curbs and openings as shown or required.

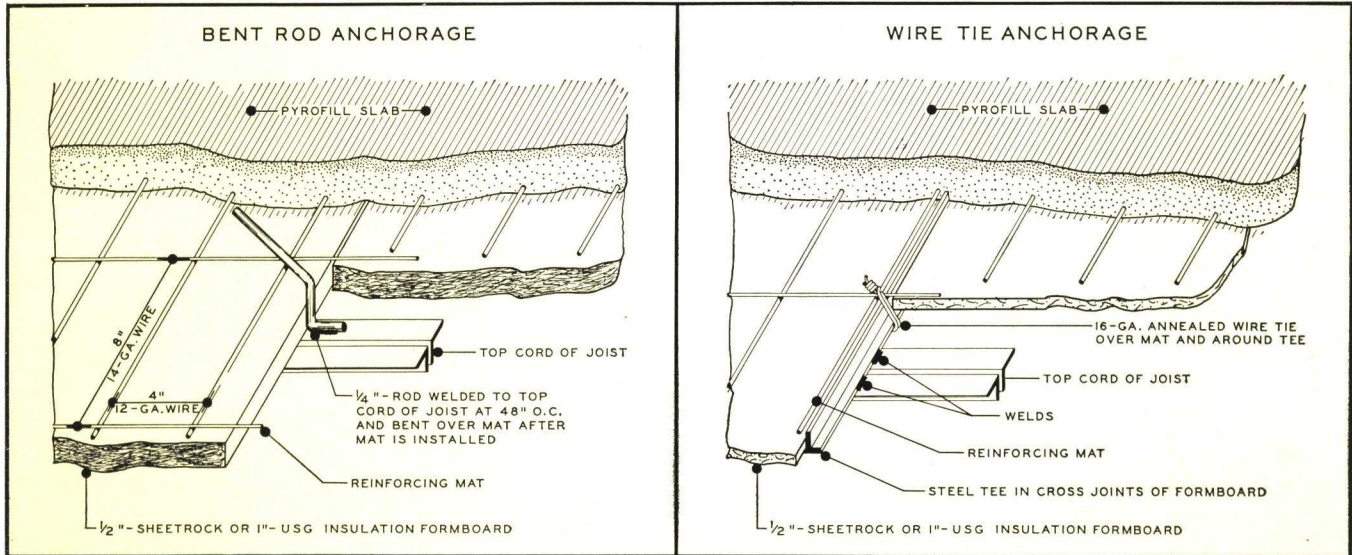
3. **Reinforcing:** Place reinforcing mesh with the No. 12 gauge wires at right angles to the sub-purlins. Lap ends of mesh not less than 6 inches. Sides of mesh are not to be lapped. Cut mesh to fit at all walls, curbs and openings, and carry the mesh into all areas where PYROFILL is poured.

4. **Gypsum Concrete:** Mix PYROFILL with clean water only and pour over the forms to an average thickness of not less than 2 inches (2¼ inches over asbestos board). Screed all surfaces to a smooth even plane ready to receive the waterproof roof covering specified in another section. Pour all cants, curbs and drainage fills as shown or required. After pouring, leave roof deck free and clean for other trades.

NOTES TO ARCHITECT

1. **Expansion Joints:** Where expansion joints are provided in the main structure, they should also be provided in the roof deck.
2. **Up-lift Resistance:** Where resistance to up-lift forces is required, the bulb tee and ASCE type of sub-purlins are most effective, while other types may need supplementary anchorage.
3. **Painting:** Painting the underside of poured gypsum decks is not recommended until it is thoroughly dry. Refer to "Painting" under "Limitations of Use."
4. **Rigid Type Roof Coverings:** PYROFILL roof decks are not recommended for the application of metal or other rigid types of roof coverings. USG's 3" Short Span Precast Gypsum Roof Tile are recommended where rigid types of roof coverings are to be applied.
5. **Suspended Ceilings:** Where suspended ceilings are required, United States Gypsum recommends:
 - a. that they be hung from the main purlins whenever economically possible.
 - b. when hung from the roof deck, that the hangers be attached to the sub-purlins, never in the gypsum slab. The selection of the proper size sub-purlin will depend on the added weight of the suspended ceiling.
6. **Precast Curbs or End Walls:** If conditions require factory precast gypsum roof tile for curbs or end walls, consult your USG representative for recommendations.
7. **Eave Angles and Wood Nailers:** Unless impractical, this work should be included in the steel and carpentry specifications.

PYROFILL ROOF DECKS



ARCHITECTURAL SPECIFICATIONS

POURED GYPSUM ROOF DECK *WITHOUT* SUB-PURLINS, USUALLY OVER BAR JOISTS (For use when purlin spacing does not exceed 36" on center)

SHORT FORM

WORK INCLUDED

The contractor shall furnish all material, labor and equipment and install (select one):

- U.S.G. Standard 2½" SHEETROCK PYROFILL
- U.S.G. Standard 3" Insulation PYROFILL
- U.S.G. Standard 2½" Asbestos-board PYROFILL

poured gypsum roof deck on the entire area of the building. All to be in accordance with standards of the United States Gypsum Company as currently published.

LONG FORM

SCOPE OF WORK

The contractor shall furnish all labor, material and equipment and install complete the poured gypsum roof decks, together with cants, curbs, and drainage fills as shown on plans and specified herein.

MATERIALS

- Supplemental Tees:** Install approved, light weight galvanized or shop painted steel tees in all cross joints of formboard between main supports.
- Formboards:** The permanent formboards shall be (select one):
 - U.S.G. ½" treated SHEETROCK formboard 32" or 48" wide, in lengths equal to multiples of purlin spacings.
 - 1" treated USG Insulation formboard 32" or 48" wide, in lengths equal to multiples of purlin spacings.
 - Cement-Asbestos board ¼" thick, 32" wide and 48" long, complete with necessary supplemental steel tees for proper support per details.
- Reinforcing Mesh:** The reinforcing mesh in the poured gypsum slab shall be a galvanized welded wire mesh having No. 12 gauge longitudinal wires spaced 4" on centers and No. 14 gauge transverse wires spaced 8" on centers; or similar type with equal or better qualities, having an effective cross sectional area of not less than 0.026 sq. in. per foot width of slab.
- Gypsum Concrete:** The gypsum concrete shall be PYROFILL containing calcined gypsum with not more than 12% by weight of wood chips, shavings or fibers. PYROFILL is processed and bagged at the producing mill ready for use by the addition of water only at the job site.

INSTALLATION

- Supplemental Tees:** Place supplemental steel tees in cross joints of the formboards as required. Tack weld the tees to supports at each contact point. Ends of tees to bear on supports.
- Formboards:** Place formboards on the steel framing and supplemental tees so that all four edges are supported. Cut to fit at walls, curbs, and openings as required.
- Reinforcing:** Place reinforcing mesh over the formboards with the No. 12 gauge wires running at right angles to the main supports. Lap ends of mesh not less than 6 inches. Sides of mesh are not to be lapped. They may be spaced apart, but not more than 4 inches. Cut to fit at all walls, curbs and openings and carry the mesh into all areas where PYROFILL is poured.
- Gypsum Concrete:** Mix PYROFILL with clean water only and pour over the forms to an average thickness of not less than 2 inches (2¼ inches over asbestos board). Scream all surfaces to a smooth even plane ready to receive the waterproof roof covering specified in another section. Pour all cants, curbs and drainage fills as shown or required. All mixing and pouring to be done as close as possible to the point of deposit. After pouring, clean all surfaces of debris and loose particles and leave roof deck free and clean for other trades.

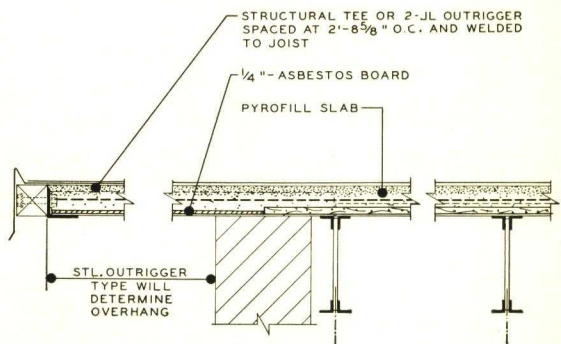
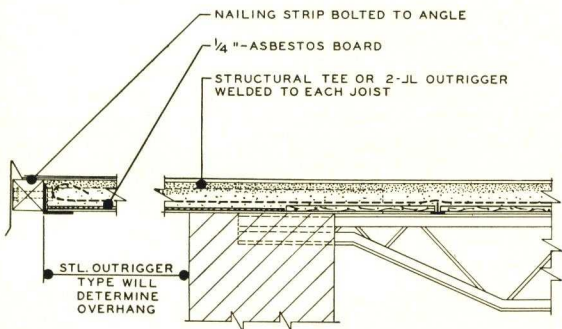
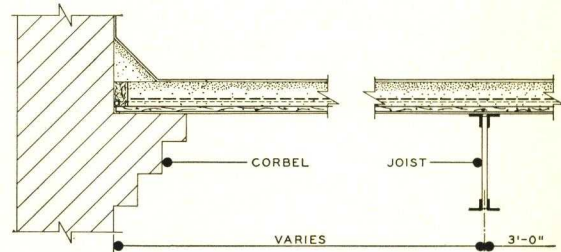
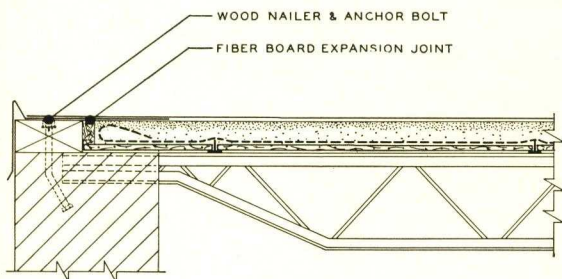
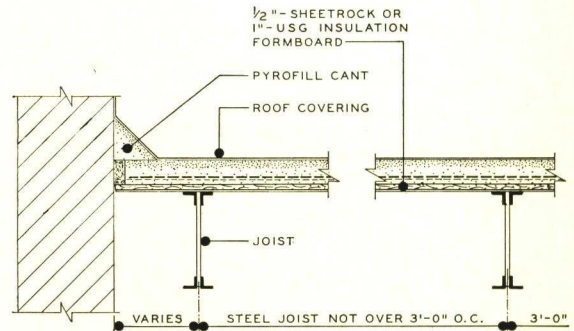
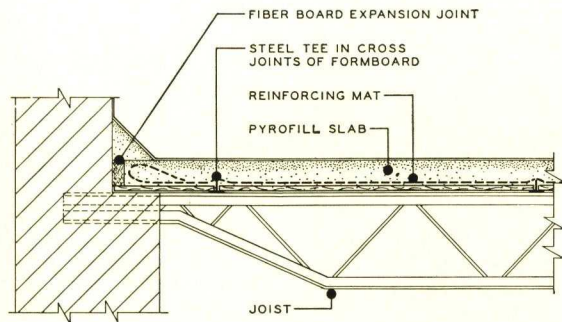
NOTES TO ARCHITECT

- Expansion Joints:** Where expansion joints are provided in the main structure, they should also be provided in the roof deck.
- Up-lift Resistance:** Where resistance to up-lift forces is required supplemental anchorage is necessary. See details above for suggested methods.
- Painting:** Painting the underside of poured gypsum decks is not recommended until they are thoroughly dry. Refer to "Painting" under "Limitations of Use."
- Rigid Type Roof Coverings:** PYROFILL roof decks are not recommended for application of metal or rigid types of roof coverings. USG's 3" Short Span Precast Gypsum Roof Tile are recommended for this purpose.
- Precast Curbs or End Walls:** If conditions require factory precast gypsum roof tile for curbs or end walls, consult your USG representative for recommendations.
- Eave Angles and Wood Nailers:** Unless impractical, this work should be included in the steel and carpentry specifications.

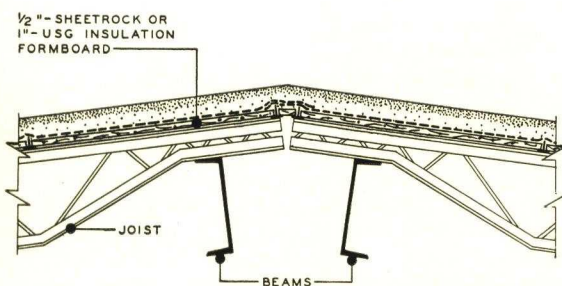
PYROFILL ROOF DECKS

APPLICATION ON BAR JOIST

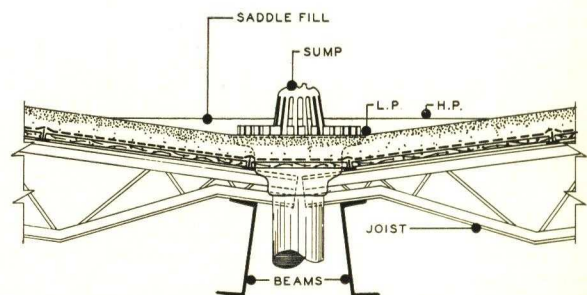
WALL DETAILS



RIDGE DETAIL


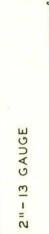
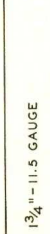
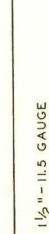






VALLEY DETAIL

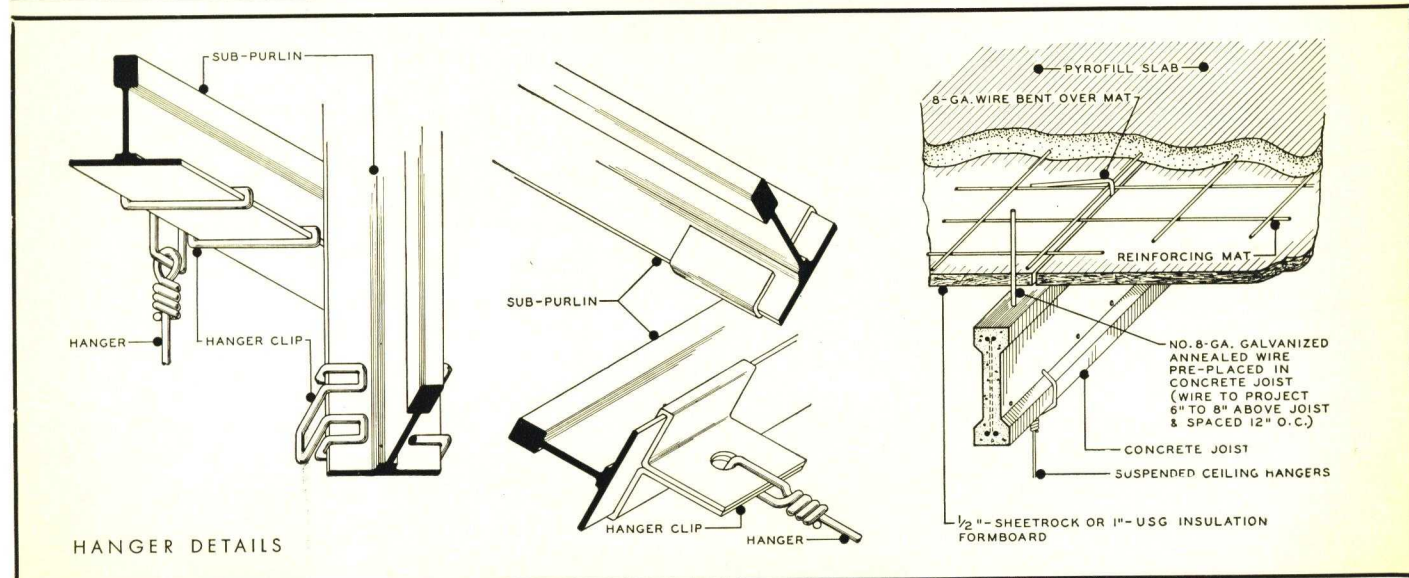
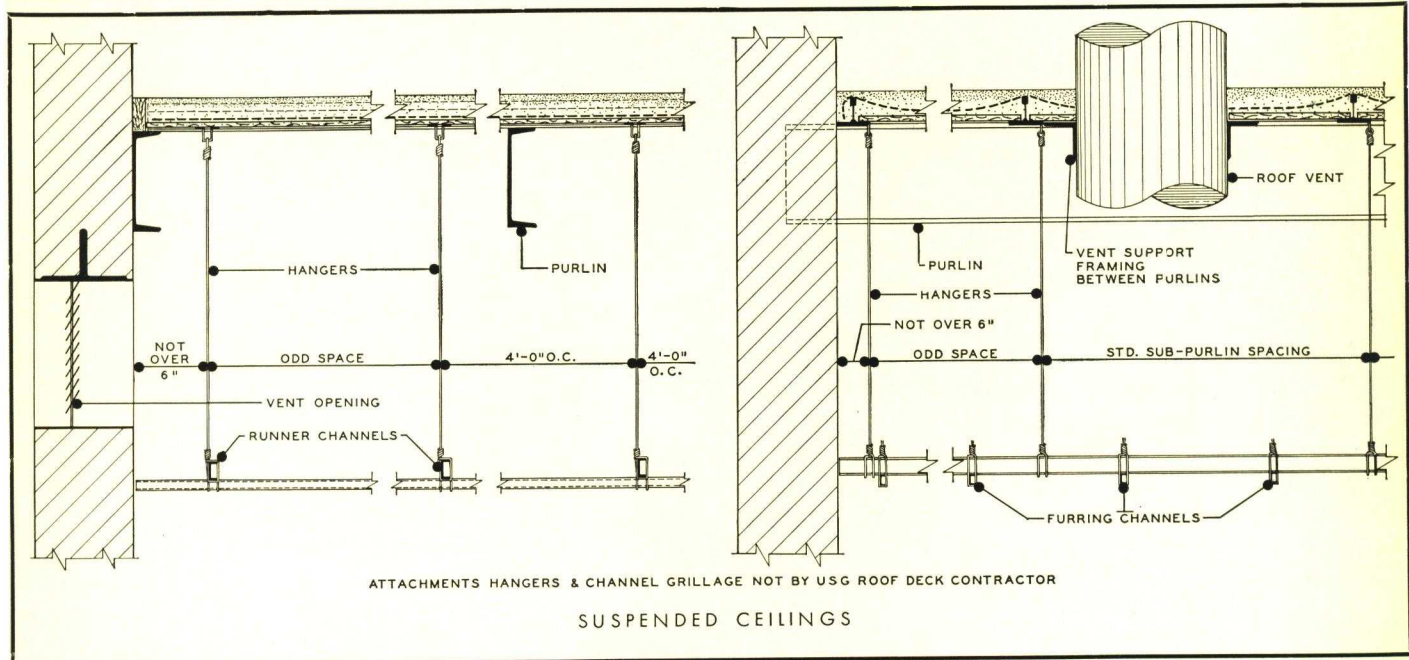


PYROFILL ROOF DECKS

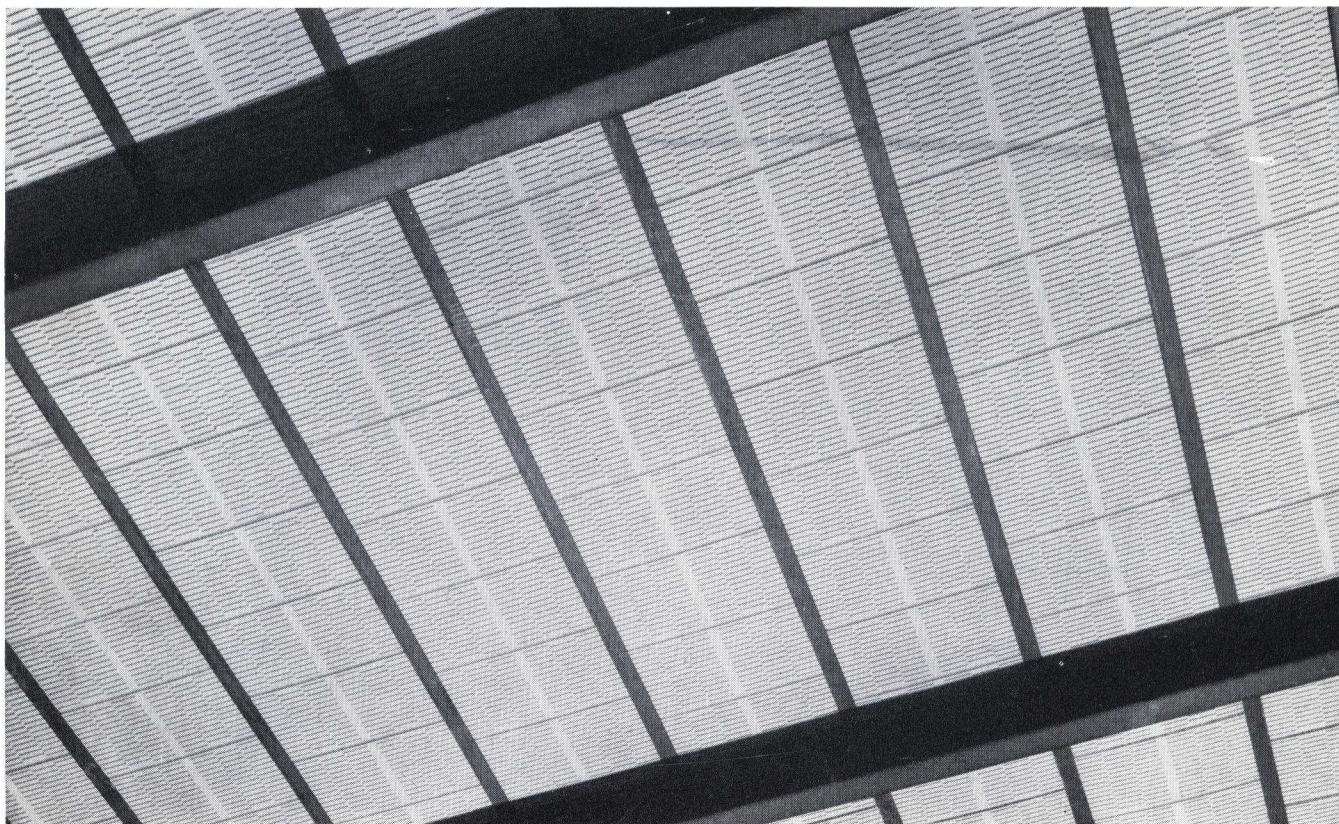
MISCELLANEOUS DATA AND DETAILS

NAIL HOLDING POWER								
RESISTANCE TO DIRECT PULL IN POUNDS PER NAIL FOR PENETRATION SHOWN								
TYPE OF NAIL	SMOOTH WIRE NAILS						CUT NAIL	ES-NAIL
DETAILS OF NAILS								
PENETRATION	2"	1 7/8"	1 5/8"	1 1/4"	1 1/8"	7/8"	1 7/8"	1 5/8"
7d - BOX	33	—	—	—	—	—	—	—
CEMENT COATED	—	48	—	—	—	—	—	—
GALVANIZED	—	—	28	26	—	21	—	49
BRIGHT	—	—	28	24	24	—	—	—
COPPER	—	—	—	—	—	—	135	—

- NAIL HOLDING VALUES SHOWN ARE BASED ON THE FOLLOWING:
- 1.-RESULTS OF TESTS BY USG RESEARCH LABORATORY.
 - 2.-NAILS DRIVEN INTO AND PULLED FROM DRY SLABS OF 50 POUNDS PER CUBIC FOOT DENSITY.
 - 3.-NAILS WERE DRIVEN NORMAL TO THE SURFACE OF THE SLAB AND PULLED DIRECT IN THE SAME PLANE.
 - 4.-OTHER NAILS OF SAME SHANK SIZE AND PENETRATION SHOULD GIVE EQUAL HOLDING POWER.
 - 5.-CLINCH TYPE NAILS (ES-NAIL) MUST BE DRIVEN THROUGH METAL DISK TO OPERATE CLINCHING MECHANISM.



ACOUSTICAL PYROFILL ROOF DECKS



DESCRIPTION

Acoustical PYROFILL Roof Decks consist of a 2" thick reinforced, incombustible PYROFILL gypsum concrete slab poured in place over USG Acoustical formboard to provide a rigid, monolithic, paintable, insulated roof deck—with excellent acoustical value.

Sub-Purlins—use regular sub-purlins spaced 24 $\frac{5}{8}$ " on centers to accommodate 24" Acoustical Formboard.

USG Acoustical Formboard is a rigid type wood fiber insulation board, 1" thick, 12" wide, 24" long with square cut ends and ogee tongue and groove matched longitudinal edges. The exposed surface is slotted and painted white.

Slab Reinforcement—same as for regular PYROFILL gypsum concrete construction.

PYROFILL Slab—2" minimum thickness, same as for regular PYROFILL construction.

Load Carrying Capacity—with 24 $\frac{5}{8}$ " spacing, refer to the selection table on page 5 and multiply the tabulated loads by 1.372. For example, a tabulated load of 35 psf would become 48 psf.

Installation—similar to regular PYROFILL construction. Sub-purlins are spaced 24 $\frac{5}{8}$ " on centers and welded to main purlins. USG Acoustical Formboard is placed with ends supported on flanges of steel sub-purlins and with matched edges closely fitted to prevent leakage of PYROFILL. Slab reinforcement is placed over sub-purlins and Formboard. PYROFILL gypsum concrete is poured to a minimum thickness of 2" over the Formboard, and screeded to an even plane to receive built-up roof covering.

FUNCTION AND UTILITY

This construction provides the outstanding advantages of regular PYROFILL construction, plus:

High Acoustical Absorption Value—noise reduction coefficient (N.R.C.)=.65.

High Light Reflection—78%.

Excellent Appearance—finish: Hi-Lite, painted white.

Lightweight—USG Acoustical Formboard weighs only 1.2 lbs. per square foot.

High Insulation Value—U=.20 Btu (3" total thickness slab);

Paintable—without loss of noise reduction efficiency.

Economy—considerably lower in cost than regular deck constructions, plus separate acoustical treatment.

LIMITATIONS OF USE

This construction is subject to the same limitations of use as other PYROFILL constructions.

SPECIFICATIONS

Follow specifications on page 8, but modify to show USG Acoustical Formboard and 24 $\frac{5}{8}$ " sub-purlin spacing, etc.