

SHEATHING

PLAINTIFF'S EXHIBIT

GP-659

SGP 0025096

Fire Resistant Gypsum Sheathing

SGP 0025097

DESCRIPTION . . . a
USES . . . b
FUNCTION AND UTILITY . . . c
WEATHER PROTECTION . . . d
VAPOR PERMEABILITY . . . e
STRUCTURAL STRENGTH . . . f
ECONOMICAL . . . g
PERMANENCE . . . h
LIMITATIONS OF USE . . . i
DESIGN DATA . . . j
☐ WATER REPELLENCY . . . j-1
☐ VAPOR PERMEABILITY . . . j-2
☐ STRUCTURAL . . . j-3
☐ ATTACHMENT . . . j-4
☐ CONSTRUCTION DETAILS . . . j-5
SPECIFICATIONS . . . k

Gypsum Association



Fire resistant Gypsum Sheathing

DESCRIPTION (a)

Gypsum sheathing is $\frac{1}{2}$ in. thick and is manufactured in 2 x 8, 4 x 8 and 4 x 9 ft. sheets. The longitudinal edges of 2 x 8-ft. gypsum sheathing are v-shaped tongue and groove. The 4 x 8 ft. and 4 x 9 ft. panels have square edges. Gypsum sheathing is enveloped in heavy water-repellent paper. It weighs approximately 2.1 lb. per sq. ft., and has a thermal conductivity value of: conductance "C", 2.25; resistance "R", 0.45. It has a fire resistant, water-repellent gypsum core. Gypsum sheathing is manufactured to comply with the requirements of ASTM Designation C79 and Federal Specification SS-L-306.

USES (b)

Gypsum sheathing is used with such exterior finishes as wood siding, masonry veneer, stucco and shingles. Generally, it does not require the use of exterior building paper. And, use of large panels eliminates the need for diagonal bracing of the frame. See Design Data section.

FUNCTION AND UTILITY (c)

Fire Protection — The core of gypsum sheathing is noncombustible. Furthermore, it protects wood studs from the hazards of external fire — even when it is covered with wood siding. This is due to the unique chemical composition of gypsum — by slowly releasing its chemically-combined water, gypsum actually fights fire until it is completely calcined.

WEATHER PROTECTION (d)

All 2 ft. wide panels of gypsum sheathing have tight-fitting tongue and groove edges which minimize wind infiltration. The large 4 x 8 and 4 x 9 ft. panels are applied vertically with all edges over the framing supports — which also blocks the passage of wind.

Water Repellency — Gypsum sheathing is water repellent. These features of gypsum sheathing — weather protection and water repellency — are the main reasons why the use of building paper is unnecessary.

VAPOR PERMEABILITY (e)

The escape of normal water vapor is provided with gypsum sheathing. It has an average vapor permeability rating well over 20 perms (grains per sq. ft., per hour, per in. of mercury vapor pressure differential). This greatly exceeds the accepted minimum standard of 5.0 perms.

STRUCTURAL STRENGTH (f)

Gypsum sheathing stiffens a wall and provides the necessary strength to resist lateral forces resulting from wind and vibration. As shown in the section on Design Data, gypsum sheathing provides structurally sound walls — without diagonal bracing.

ECONOMICAL (g)

Material cost is low for gypsum sheathing — often as little as 50 per cent of other sheathing materials. There is a minimum of waste too, generally less than three per cent. Waste from end cuts is minimized because the panels are made in lengths which are multiples of both 16 in. and 24 in. — for both stud spacings. And the large sheets, used vertically, eliminate the need for diagonal bracing.

Gypsum sheathing panels go up quickly and easily. Almost 50 per cent fewer nails are required to cover a given area as compared with other sheathing materials. An average home can be sheathed in approximately eight man-hours.

PERMANENCE (h)

As an inert material, gypsum sheathing provides long-lasting stability to a structure's vital framing elements. It will not decay or rot, and it's vermin proof. Test inspections of 25-year-old residences showed that the original gypsum sheathing was in excellent condition and showed no signs of deterioration.

LIMITATIONS OF USE (i)

Gypsum sheathing should not be used as a nailing base. Such materials as wood siding, stucco mesh and wall ties must be applied with fasteners that penetrate through the sheathing into the wood framing. Maximum stud spacing should be 24 in. o.c. To eliminate the need for diagonal bracing, where required by regulation, the maximum stud spacing should be 16 in. o.c. and the 4 ft. panels should be erected vertically.

(i) Design Data

(j-1) Water repellancy

TYPICAL IMMERSION TEST* — GYPSUM SHEATHING

TIME	WATER ABSORPTION PER CENT OF WEIGHT
30 minutes	3.0%
1 hour	4.0%
2 hours	5.0%

* ASTM C473 — Water Resistance Characteristics Of Core-Treated Water-Repellent Gypsum Sheathing.

(j-2) Vapor permeability

Gypsum sheathing provides escape for normal water vapor. Its vapor permeability rating of over 20 perms exceeds the accepted minimum standard of 5.0.

(j-3) Structural

Load deformation tests prove that gypsum sheathed walls are rigid and strong.

FLEXURAL STRENGTH*

LOAD IN POUNDS	
Applied Across Fiber	Applied Parallel to Fiber
110 minimum	50 minimum

* ASTM C473 — Flexural Strength Of Gypsum Boards (a bending test)

RACKING TEST*

HORIZONTAL DEFLECTION, IN.			LOAD, LB.	
With Diagonal Bracing (Applied Horizontally)	At 800 lb.	At 1,200 lb.	At Failure	
			total	per lin. ft.
1/2 in., 2 x 8-ft. Gypsum Sheathing	0.125	0.19	4,880	610
1 x 8-in. Wood Shiplap Sheathing Without Diagonal Bracing (Applied Horizontally)	0.14	0.30	4,625	578
1/2 in., 2 x 8-ft. Gypsum Sheathing	0.125	0.325	2,450	306
1 x 8-in. Wood Shiplap Sheathing Without Diagonal Bracing (Applied Vertically)	1.51	3.67	1,900	238
	1,200 lb.	2,400 lb.	total	per lin. ft.
1/2 in., 4 x 8-ft. Gypsum Sheathing	0.073	0.188	6,850	855

* ASTM E72 — Racking Load (8 x 8 ft., wall sections of 2 x 4 in. studs, 16 in. o.c., faced on one side, loaded laterally)

SGP 0025099

SHEATHING SIZE	SPACING
$\frac{1}{2}$ in., 2 x 8 ft. (Applied Horizontally) Nail With siding or with diagonal bracing With no siding or diagonal bracing* Staple With diagonal bracing With siding but without diagonal bracing*	8 in. o.c. 4 in. o.c. 6 in. o.c. 4 in. o.c.
$\frac{1}{2}$ in., 4 x 8 ft.; 4 x 9 ft. (Applied Vertically) Nail Without diagonal bracing Staple Without diagonal bracing	8 in. o.c. field 4 in. o.c. perimeter 6 in. o.c. field 3 in. o.c. perimeter

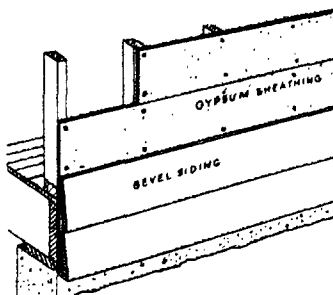
* Recommended where regulations permit the use of 1 x 8 in. horizontal wood sheathing without bracing

NAILS—1½ in. long galvanized roofing nail, 11 gauge, ⅜ in. to ⅝ in. head.

STAPLES—16 gauge flattened galvanized wire, ⅝ in. wide crown (outside measure), 1½ in. long legs with divergent points.

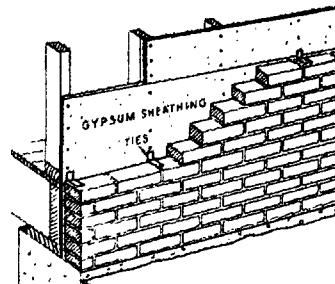
All fasteners shall be spaced not less than ⅜ in. from the ends or edges of the sheathing. They shall be driven in such a manner that the sheathing bears tightly against the framing members without cutting the face paper.

Design Data-Construction Details (j-5)



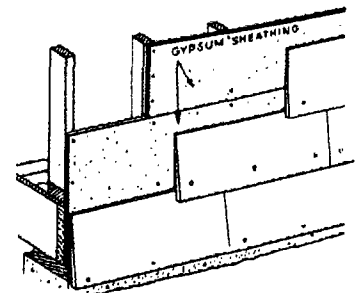
WOOD SIDING

Wood siding is applied directly over gypsum sheathing with nails driven through the sheathing and into the studs.



MASONRY VENEER

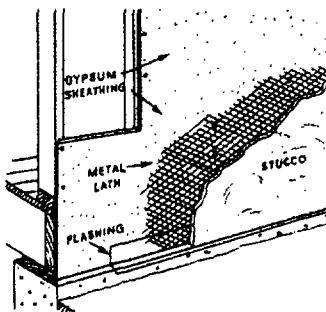
Masonry veneer can be applied over gypsum sheathing in the same manner as over any other type of sheathing. The wall ties are secured by nails driven through the gypsum sheathing and into the studs.



CEMENT ASBESTOS—WOOD SHINGLES

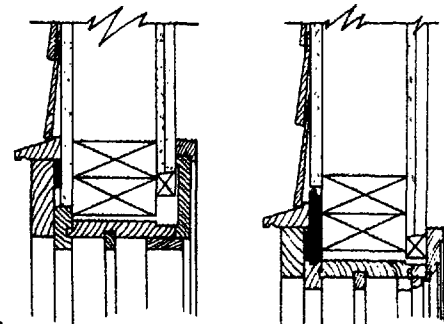
(a) Applied directly over gypsum sheathing using nails such as ES-11 with shanks which expand in the gypsum core. Or, with light metal channels which engage the butts of shingles, the channels being nailed to the framing.

(b) Applied over 1 x 2 in. horizontal wood nailing strips, spaced according to shingle exposure and secured through gypsum sheathing into studs.



EXTERIOR STUCCO

Self-furring stucco mesh may be directly applied over gypsum sheathing which has been secured with nails 8 in. o.c. Wood furring strips or self-furring nails may be used for attachment of flat stucco reinforcement.



DETAILS FOR FRAMED OPENINGS

Frames with reversible blind stops listed by the National Door Manufacturers Association permit the use of ½ in. or ¾ in. thick sheathing without alterations.

Frames with ¾ in. blind stops require the

insertion of wood strips between sheathing and trim. If neither is available, the standard window frame with ¾ in. blind stop is equally satisfactory, provided a ¼ wood strip is inserted between the sheathing and the trim.



Fire resistant Gypsum Sheathing

**FIREPROOF ■
ECONOMICAL
RIGID ■ PERM
ANENT WIND
TIGHT WATER
REPELLENT ■**

Specifications

SCOPE OF WORK:

All exterior walls shall be covered with gypsum sheathing.

FRAMING:

Framing members shall be erected in the manner of approved standard practice and spaced 16 in. (or 24 in.) o.c.

MATERIALS:

Sheathing: Sheathing shall be core-treated, water-repellent gypsum sheathing, $\frac{1}{2}$ in. thick, 2 x 8 ft. with tongue and groove longitudinal edges or $\frac{1}{2}$ in. thick, 4 x 8 ft. or 4 x 9 ft., with square longitudinal edges. All sizes shall meet the requirements of ASTM C79.

Nails: Nails shall be 11 gauge, $\frac{3}{8}$ in. head, $1\frac{1}{2}$ in. long for 2 ft. wide sheathing and 12 gauge, $\frac{3}{8}$ in. head, $1\frac{1}{2}$ in. long for 4 ft. wide sheathing.

Staples: Staples shall be 16 gauge, $7/16$ x $1\frac{1}{2}$ in. with divergent points.

APPLICATION:

Gypsum Sheathing—2 x 8 ft.

Apply $\frac{1}{2}$ in., 2 x 8-ft. gypsum sheathing with the long dimension perpendicular to the framing members—with grooved edges down interlocking the tongue of the adjacent panel. Ends of the panel shall abut over the centers of framing members and all end joints shall be staggered. Fit sheathing snugly around all window and door openings. Securely flash the heads of all openings. Secure sheathing to studs with nails spaced approximately 4 in. o.c. (8 in. o.c. where wood siding or diagonal bracing is used). Nails shall be not less than $\frac{3}{8}$ in. from edges or ends of sheathing. If staples are used, secure sheathing to studs by spacing staples 6 in. o.c. (with diagonal bracing) or 4 in. o.c. (with siding but no diagonal bracing).

Gypsum Sheathing—4 x 8 ft. and 4 x 9 ft.

Apply $\frac{1}{2}$ in., 4 x 8-ft. or 4 x 9-ft. gypsum sheathing with the long dimension parallel to the framing members. The long edge of the panel shall abut over centers of framing members. Fit sheathing snugly around all window and door openings. Securely flash the heads of all openings. If using nails, secure sheathing to studs 4 in. o.c. around the perimeter of the board and 8 in. o.c. in the field of the board (if using staples, secure sheathing to studs 3 in. o.c. around the perimeter of the board and 6 in. o.c. in the field). Staples shall be driven with the crown at right angle to the paperbound edge of the sheathing. This shall be done in a manner which assures that the crown will bear tightly against the sheathing—but not cut into the face paper. The legs of the staples shall be no less than $\frac{3}{8}$ in. from the ends and edges of the sheathing.

EXTERIOR FINISHES:

Note: Generally, building paper is not required over gypsum sheathing.

Wood Siding: Apply wood siding directly over gypsum sheathing. Nails shall have a minimum penetration of 1 in. into the stud when driven through the sheathing and into the framing. End joints of siding shall butt over framing members.

Stone or Brick Veneer: Fasten masonry ties for the veneer securely through the sheathing and into the framing, spacing ties as required by masonry courses. Use an 8d nail or larger.

Stucco: Apply stucco mesh according to manufacturer's directions, using self-furring material, furring strips or furring nails. Nail through the sheathing using nails which penetrate at least 1 in. into the framing.

Cement-Asbestos Siding or Wood Shingles: Attach directly to gypsum sheathing, using approved systems or fasteners in accordance with sheathing manufacturer's directions.

Alternate for Shingles: Apply 1 x 2 in. wood furring strips horizontally over the gypsum sheathing, spaced to correspond to the shingle exposure specified. Use nails of sufficient length to provide at least 1 in. penetration into the studs. Nail through the sheathing into the framing with a minimum of one nail at each intersection of stud and furring.



Gypsum Association

201 NORTH WELLS STREET, CHICAGO, ILLINOIS 60606
1350 N. HIGHLAND AVENUE, HOLLYWOOD CALIFORNIA 90028

SGP 0025102

GYPSUM ASSOCIATION

201 North Wells Street

Chicago, Illinois 60606

GYPSUM SHEATHING

RECOMMENDATIONS FOR NAILING AND STAPLING

FASTENER SPACING

SHEATHING SIZE	SPACING
$\frac{1}{2}$ in., 2 x 8 ft. (Applied Horizontally) Nail With siding or with diagonal bracing With no siding or diagonal bracing* Staple With diagonal bracing With siding but without diagonal bracing*	8 in. o.c. 4 in. o.c. 6 in. o.c. 4 in. o.c.
$\frac{1}{2}$ in., 4 x 8 ft.; 4 x 9 ft. (Applied Vertically) Nail Without diagonal bracing Staple Without diagonal bracing	8 in. o.c. field 4 in. o.c. perimeter 6 in. o.c. field 3 in. o.c. perimeter

* Recommended where regulations permit the use of 1 x 8 in. horizontal wood sheathing without bracing

NAILS — $1\frac{1}{2}$ in. long galvanized roofing nail, 11 gauge, $\frac{3}{8}$ in. to $\frac{7}{16}$ in. head.

STAPLES — 16 gauge flattened galvanized wire, $\frac{7}{16}$ in. wide crown (outside measure), $1\frac{1}{2}$ in. long legs with divergent points.

All fasteners shall be spaced not less than $\frac{3}{8}$ in. from the ends or edges of the sheathing. They shall be driven in such a manner that the sheathing bears tightly against the framing members without cutting the face paper.

SGP 0025103