

EVALUATION REPORT

Report No. 1601
October, 1987

Filing Category: FIRE-RESISTIVE CONSTRUCTION—Gypsum Wallboard

**GOLD BOND SCREW STEEL STUDS AND
FURRING CHANNELS
GOLD BOND BUILDING PRODUCTS, A NATIONAL
GYPSUM DIVISION
1650 MILITARY ROAD
BUFFALO, NEW YORK 14217**

I. **Subject:** Gold Bond Screw Steel Studs and Furring Channels.

II. **Description:** A. **General:** The studs and floor-ceiling tracks are manufactured from No. 25 gauge (0.0197-inch = t) steel having a yield strength of $F_y = 33,000$ psi galvanized or coated with rust-resistive material, in widths of $1\frac{5}{8}$ inches, $2\frac{1}{2}$ inches, $3\frac{5}{8}$ inches, 4 inches and 6 inches. The studs have ribbed flanges with stiffeners $\frac{1}{4}$ inch wide at the edge of the flanges. One flange is $1\frac{7}{16}$ inch wide and the other is $1\frac{21}{64}$ inch wide. The floor-ceiling tracks have flanges 1 inch high with the flanges bent inward to provide a clamping force when studs are inserted, and are attached with recognized fasteners spaced 24 inches maximum on center. The studs are inserted sideways into the tracks and turned to a perpendicular position to obtain a friction fit. Gypsum wallboard is attached to the studs by means of Gold Bond 1-inch or longer self-drilling Type S sheet metal screws driven by a powered screw driver. For nonfire-rated use, the screws are spaced 12 inches on center.

The studs and floor ceiling tracks are also manufactured from No. 20 gauge (0.035-inch = t) galvanized steel having a yield strength of $F_y = 33,000$ psi in depths of $2\frac{1}{2}$ inches, $3\frac{5}{8}$ inches, 4 inches and 6 inches.

Gold Bond screw furring channels are rolled from No. 25 gauge, galvanized or coated with rust-resistive material, steel into hat-shaped channels having an overall width of $2\frac{3}{4}$ inches with hemmed winged flanges $\frac{1}{2}$ inch wide. The top of the hat section is ribbed. Gypsum wallboard is attached to the furring channels by means of the screws described above for the studs. The furring channels are attached to wall or ceiling framing in an acceptable manner and are spaced a maximum of 24 inches on center.

B. **One-hour Fire-resistive Nonload-bearing Partition:** Consists of $2\frac{1}{2}$ -inch minimum depth Gold Bond screw studs, as described above, spaced 24 inches on center. On one side, a single layer $\frac{1}{2}$ -inch Fire-Shield Type X wallboard (regular or Durasan) is installed vertically and is attached to the studs with 1-inch-long Type S self-drilling screws spaced 8 inches on center along vertical edges and attached to intermediate studs with a continuous $\frac{3}{8}$ -inch bead of Gold Bond MC (modified contact) adhesive. On the opposite side a base layer of $\frac{1}{2}$ -inch-thick Fire-Shield Type X wallboard is installed vertically and is attached with 1-inch-long Type S self-drilling screws spaced 8 inches on center along vertical edges and 12 inches on center along intermediate supports. Over this layer a face layer of $\frac{1}{2}$ -inch-thick Fire-Shield Type X wallboard (regular or Durasan) is installed and is attached with $1\frac{5}{8}$ -inch-long Type S screws spaced 8 inches on center at vertical edges and along the center of the board by a continuous $\frac{3}{8}$ -inch vertical bead of Gold Bond MC adhesive. Vertical joints of the base and face layers are staggered 24 inches. Joints of regular Fire-Shield Type X wallboard are treated with joint compound and reinforcing tape. As an alternate, $\frac{1}{2}$ -inch Fire-Shield Durasan Type X wallboard may be substituted for the face layer described above. Attachment is identical to that above except that in addition, aluminum battens and/or steel retainers and aluminum battens are installed over the vertical joints and are attached with $1\frac{5}{8}$ -inch-long screws spaced 9 inches on center. As a substitute for aluminum battens, polyvinyl chloride battens may be used. Joint compound and tape are not required.

C. **One-hour Fire-resistive Nonload-bearing Partition:** Consists of $2\frac{1}{2}$ -inch minimum-depth Gold Bond screw studs, as described above, spaced 24 inches on center faced each side with a single layer of $\frac{1}{2}$ -inch-thick Fire-Shield G gypsum wallboard designated FSW-G installed horizontally. The wallboard is attached with 1-inch-long Type S screws spaced 8 inches on center along vertical edges and plates and 12 inches on center at intermediate studs. Horizontal joints on both faces are not staggered. Verti-

cal butt joints are staggered 4 feet between adjacent courses and from butt joints on the opposite face. Unfaced mineral wool batts 2 inches thick having a density of 3 pounds per cubic foot are installed in the stud cavities. Board joints are reinforced with paper tape. Joints and fastener heads are treated with a joint compound system.

D. **One-hour Fire-resistive Nonload-bearing Partition:** Consists of $2\frac{1}{2}$ -inch minimum-depth Gold Bond screw studs, as described above, spaced 24 inches on center. On one side, a single layer of $\frac{1}{2}$ -inch-thick Fire-Shield G gypsum wallboard designated Type FSW-G is installed horizontally and attached with 1-inch-long Type S screws spaced 8 inches on center along vertical ends and 12 inches on center at the intermediate studs and horizontal wall perimeter. On the opposite side, two layers of $\frac{1}{2}$ -inch-thick Fire-Shield G gypsum wallboard are installed horizontally. The base layer is installed with horizontal joints offset 24 inches between layers and also from those joints on the opposite side. Vertical joints are staggered 4 feet between layers and 2 feet from board joints on the opposite side of the wall. Base layer attachment is with 1-inch-long Type S screws spaced 12 inches on center at bearing edges and at intermediate studs. The second layer is installed with horizontal joints in line with those on the opposite side and is attached with $1\frac{5}{16}$ -inch-long minimum Type S screws spaced 8 inches on center at vertical joints and 12 inches on center at intermediate studs and horizontal wall perimeter. Exposed board joints are reinforced with paper tape. Exposed joints and fastener heads of face layer are covered with a joint compound system.

E. **Two-hour Fire-resistive Nonload-bearing Partition:** Consists of $2\frac{1}{2}$ -inch-minimum-depth Gold Bond screw studs, as described above, spaced 24 inches on center faced each side with two layers of $\frac{1}{2}$ -inch-thick Fire-Shield gypsum wallboard designated FSW-G. The base layer is attached vertically to the studs with 1-inch-long Type S self-drilling screws spaced 12 inches on center along vertical edges and at third points to the intermediate studs. The second layer of $\frac{1}{2}$ -inch Fire-Shield FSW-G gypsum wallboard is installed horizontally, attached to the studs with $1\frac{5}{8}$ -inch-long Type S self-drilling screws spaced 8 inches on center at vertical joints and 12 inches on center at the intermediate studs. Vertical joints of the face layer are offset 2 feet from those of the base layer. Exposed joints and fastener heads of the face layer are covered with a joint compound system.

F. **Three-hour Fire-resistive Nonload-bearing Partition:** Consists of minimum No. 25 gauge Gold Bond screw studs, $1\frac{5}{8}$ inches deep or wider as described above, spaced 24 inches on center, faced on each side with three layers of $\frac{1}{2}$ -inch-thick Fire-Shield G gypsum wallboard designated FSW-G. The base layer is attached vertically to the studs with 1-inch-long Type S self-drilling screws spaced 12 inches on center along vertical edges and intermediate studs. Joints are offset 24 inches from joints on opposite side of studs. The second layer of $\frac{1}{2}$ -inch-thick Fire-Shield G gypsum wallboard is installed vertically with vertical edges offset 8 inches minimum from studs and secured to all studs with $1\frac{5}{8}$ -inch-long Type S self-drilling screws spaced 30 inches on center and to the base layer wallboard with $1\frac{1}{2}$ -inch-long Type G screws spaced 12 inches on center, and placed $1\frac{1}{2}$ inches from vertical edges of the second layer of wallboard at all board joints. The third layer of $\frac{1}{2}$ -inch-thick Fire-Shield G gypsum wallboard is installed horizontally with vertical butt joints over studs offset 24 inches along each row and from the opposite side. The face layer is attached to all studs with $2\frac{1}{4}$ -inch-long Type S self-drilling screws spaced 12 inches on center. Type G screws, $1\frac{1}{2}$ inch long, are placed midway between studs and installed $1\frac{1}{2}$ inches from horizontal joints. Exposed joints and fastener heads of the face layer are treated with a joint compound and gypsum wallboard tape.

G. **Four-hour Fire-resistive Nonload-bearing Partition:** Consists of minimum No. 25 gauge Gold Bond screw studs, $1\frac{5}{8}$ inches deep or wider as described above, spaced 24 inches on center, faced on each side with four layers of $\frac{1}{2}$ -inch-thick Fire-Shield G gypsum wallboard designated FSW-G. The first or base layer is attached vertically to the studs with 1-inch-long Type S self-drilling screws spaced 48 inches on center and to floor and ceiling tracks with screws spaced 24 inches center. Joints are offset 24 inches from joints on opposite side of studs. The second layer of $\frac{1}{2}$ -inch-thick Fire-Shield G gypsum wallboard is installed vertically with joints directly over base layer joints and attached to all studs with $1\frac{5}{8}$ -inch-long

Evaluation reports of ICBO Evaluation Service, Inc., are issued solely to provide information to Class A members of ICBO, utilizing the code upon which the report is based. Evaluation reports are not to be construed as representing aesthetics or any other attributes not specifically addressed nor as an endorsement or recommendation for use of the subject report.

This report is based upon independent tests or other technical data submitted by the applicant. The ICBO Evaluation Service, Inc., technical staff has reviewed the test results and/or other data, but does not possess test facilities to make an independent verification. There is no warranty by ICBO Evaluation Service, Inc., express or implied, as to any "Finding" or other matter in the report or as to any product covered by the report. This disclaimer includes, but is not limited to, merchantability.

Type S screws spaced 12 inches on center. The third layer of 1/2-inch-thick Fire-Shield G gypsum wallboard is installed vertically with vertical edges placed 8 inches minimum from studs and secured to all studs with 2 1/4-inch-long Type S screws spaced 30 inches on center and to the second layer of wallboard with 1 1/2-inch-long Type G screws spaced 12 inches on center, and placed 1 1/2 inches from vertical edges. The fourth or face layer of 1/2-inch-thick Fire-Shield G gypsum wallboard is installed horizontally with vertical butt joints over studs offset 24 inches along each row and from each side of stud. The face layer is attached to all studs with 2 5/8-inch-long Type S screws spaced 12 inches on center. Type G screws, 1 1/2 inch long, are placed midway between studs, 1 1/2 inches from horizontal joints. Exposed joints and fastener heads of the face layer are treated with a joint compound and gypsum wallboard tape.

H. Nonfire-rated Nonload-bearing Partitions: Consists of 1 5/8-inch or wider Gold Bond screw studs, as described previously, spaced not over 24 inches on center with 1/2-inch or 3/8-inch Gold Bond gypsum wallboard installed vertically on each side. The gypsum wallboard is secured to intermediate studs with 1/4-inch-diameter beads of Gold Bond MC adhesive. Vertical edges are secured by Gold Bond Edge Grip Clips spaced 16 inches on center. Edge Grip Clips are produced from 0.020-inch-thick SAE 1050 spring steel and are coated with a rust-resistive material. They are 1 3/4 inches wide with two 3/8-inch-long triangular prongs raised 3/16 inch from the plane of the clip, and parallel to it, which are pressed into paper bound edges of the gypsum board.

At an abutting joint, the clips of the first panel are attached to the stud with 3/8-inch Type S panhead screws; the projecting ends of the clips of the second panel are slid between the stud and back of the first panel. At the ends or corners of partitions, panels are secured to framing with 1-inch Type S screws spaced 12 inches on center.

TABLE NO. I—ALLOWABLE INTERIOR PARTITION HEIGHTS FOR NO. 25 GAUGE STUDS BASED ON STUD PROPERTIES ONLY^{1 2}

DEFLECTION LIMITATION	STUD SPACING (In Inches)	STUD DEPTH (In Inches)			
		1 5/8	2 1/2	3 5/8	4
L/240 (Brittle)	12 o.c.	8'-2"	11'-4"	15'-1"	16'-3"
	16 o.c.	7'-5"	10'-6"	13'-9"	14'-9"
	24 o.c.	6'-6"	9'-0"	12'-0"	12'-11"
L/120 (Flexible)	12 o.c.	10'-4"	14'-3"	19'-0"	20'-6"
	16 o.c.	9'-5"	13'-0"	17'-3"	18'-1"
	24 o.c.	8'-2"	11'-4"	12'-8"	12'-1"

¹The tabulated partition heights are based on the steel stud section properties only to conform to the load and deflection criteria specified in Section 2309 (b) of the code.

Allowable stresses are computed in accordance with U.B.C. Standard No. 27-9, based on a minimum yield point, $F_y = 33,000$ psi.

²The tabulated heights are based on both flanges when in compression having continuous adequate lateral support as provided by acceptable wall coverings with minimum attachments per Section 4711 (a) of the code. Top and bottom runners are to be adequately attached to structure.

TABLE NO. II—ALLOWABLE INTERIOR PARTITION HEIGHTS FOR NO. 20 GAUGE STUDS BASED ON STUD PROPERTIES ONLY^{1 2}

DEFLECTION LIMITATION	STUD SPACING (In Inches)	STUD DEPTH (In Inches)			
		2 1/2	3 5/8	4	6
h/240 (Brittle)	12	14'-0"	18'-8"	20'-2"	25'-0"
	16	12'-9"	17'-0"	18'-4"	22'-10"
	24	11'-1"	14'-10"	16'-0"	19'-11"
h/120 (Flexible)	12	17'-8"	23'-6"	25'-5"	31'-7"
	16	16'-1"	21'-5"	23'-1"	28'-11"
	24	14'-0"	18'-8"	20'-2"	25'-0"

¹The tabulated partition heights are based on the steel stud section properties only to conform to the load and deflection criteria specified in Section 2309 (b) of the code. Allowable stresses are computed in accordance with U.B.C. Standard No. 27-9, based on a minimum yield point, $F_y = 33,000$ psi.

²The tabulated heights are based on both flanges when in compression having continuous adequate lateral support as provided by acceptable wall coverings with minimum attachments per Section 4711 (a) of the code. Top and bottom runners are to be adequately attached to structure.

I. Identification: Fire-Shield gypsum wallboard with a plain or vinyl covering and of minimum thickness of 5/8 inch is identified by the designation FSW which appears on bundling tape. For 1/2-inch-thick Fire-Shield gypsum wallboard the designation FSW-I or FSW-G appears on the bundling tape. The 1/2-inch or 3/8-inch Fire-Shield gypsum wallboard is also identified with an Underwriters Laboratories Inc. or Factory Mutual Research Corporation label. For 1/2-inch-thick Fire-Shield Kal-Kore base, the designation FSK-I or FSK-G appears on the bundling tape.

Studs and furring channels are identified in the field by tags or labels affixed to each bundle bearing the name of the product and the producer.

III. Evidence Submitted: Reports on fire endurance tests conducted in accordance with U.B.C. Standard No. 43-1 with descriptive data are submitted. Data to establish heights for nonrated partitions are submitted.

Findings

IV. Findings: That the Gold Bond Screw Steel Studs and Furring Channels described in this report comply with the 1985 Uniform Building Code under the following conditions:

1. Partition heights comply with Table No. I, II, III or IV.
2. The uncoated minimum steel thickness delivered to the job site shall not at any location be less than 95 percent of the thickness t used in design. The thickness may be less at bends such as corners, due to cold-forming effects.

This report is subject to re-examination in two years.

TABLE NO. III—ALLOWABLE PARTITION HEIGHTS BASED ON WALLBOARD AND NO. 25 GAUGE STUDS ACTING AS A COMPOSITE SECTION^{1 2}

STUD SPACING (In Inches)	FACING ON EACH SIDE	STUD DEPTH (In Inches)				
		1 5/8	2 1/2	3 5/8	4	6
Height in Feet and Inches						
16	1/2"—One Ply	11'-0"	14'-8"	19'-5"	20'-8"	18'-10"
24	1/2"—One Ply	10'-0"	13'-5"	17'-3"	18'-5"	17'-8"
24	1/2"—Two Ply ³	12'-4"	15'-10"	19'-5"	20'-8"	19'-0"

¹The tabulated partition heights are based on the steel studs acting as a composite section with the wallboard to conform to the load and deflection criteria specified in Section 2309 (b) of the code.

²Allowable partition heights are applicable only where wallboard is applied to both flanges with screws in accordance with Section 4711 (a) of the code.

³Allowable partition heights are also applicable when additional plies of wallboard are installed.

TABLE NO. IV—ALLOWABLE HEIGHTS FOR NO. 20 GAUGE NONBEARING EXTERIOR STUDS^{1 2}

WINDLOAD (Lbs./Ft. ²)	STUD SPACING (Inches)	2 1/2" STUD	3 5/8" STUD	4" STUD	6" STUD
		Height in Feet and Inches			
15	12	9'-7"	12'-9"	13'-10"	17'-5"
	16	8'-8"	11'-7"	12'-7"	15'-10"
	24	7'-7"	10'-1"	11'-0"	13'-9" ³
20	12	8'-8"	11'-7"	12'-7"	15'-9"
	16	7'-11"	10'-6"	11'-5"	14'-4"
	24	6'-11"	9'-2"	9'-11"	12'-6" ³
25	12	8'-1"	10'-9"	11'-8"	14'-8"
	16	7'-4"	9'-9"	10'-7"	13'-4" ³
	24	6'-5"	8'-6"	9'-3" ³	10'-4" ³
30	12	7'-7"	10'-1"	11'-0"	13'-9" ³
	16	6'-11"	9'-2"	10'-0"	12'-6" ³
	24	6'-0"	8'-0" ³	8'-8" ³	8'-7" ³
35	12	7'-3"	9'-7"	10'-5"	13'-1" ³
	16	6'-7"	8'-9"	9'-6"	11'-0" ³
	24	5'-9"	7'-5" ³	8'-3" ³	7'-5" ³
40	12	6'-11"	9'-2"	9'-11"	12'-6" ³
	16	6'-3"	8'-4"	9'-1" ³	9'-8" ³
	24	5'-6"	6'-6" ³	6'-6" ³	6'-6" ³

¹Stud heights limited by deflection of height divided by 240 using the average of the moments of inertia of the gross and net section.

²The tabulated heights are based on both flanges when in compression having continuous adequate lateral support as provided by acceptable wall coverings with minimum attachments per Section 4711 (a) of the code. Top and bottom runners are to be adequately attached to structure.

³Allowable heights require each stud flange be attached to top and bottom thick flanges with one Gold Bond 1/2-inch-long Type S-12 pan head or low profile drywall screws at each intersection.