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The Subcommittee on Evaluation has reviewed the data submitted for compliance with the *Standard Building Code*® and submits to the Building Official or other authority having jurisdiction the following report. The Subcommittee on Evaluation, ICC-ES and its staff are not responsible for any errors or omissions to any documents, calculations, drawings, specifications, tests or summaries prepared and submitted by the design professional or preparer of record that are listed in the Substantiating Data Section of this report. Portions of this report were previously included in SBCCI Evaluation Reports #7720, #8256, #8565 and #9007, and PST & ESI Evaluation Reports #9304, #9525, and #9525A.

REPORT NO.: 9525B

EXPIRES: See the current EVALUATION REPORT INDEX

CATEGORY: FIRE RESISTIVE CONSTRUCTION

SUBMITTED BY:

NATIONAL GYPSUM COMPANY
2001 REXFORD ROAD
CHARLOTTE, NORTH CAROLINA 28211

1. PRODUCT TRADE NAME

Gold Bond I-Stud Cavity Shaft-Wall System

Licensee:

Phillips Manufacturing Company
504 Walnut Street
Niles, Ohio 44446

2. SCOPE OF EVALUATION

Fire-Resistance Construction and Sound Isolation

3. USES

An interior non-bearing partitions between occupancies and as hoistway and stairway enclosures where one or two hour fire resistive walls are required. All of the systems in the evaluation report are based on ASTM E 119, "Methods of Fire Tests of Building Construction and Materials".

4. DESCRIPTION

Gold Bold I-Stud Cavity Shaftwall is a non-bearing interior partition system make up of Fire-Shield gypsum shaftliner, steel framing members and Fire-Shield gypsum wallboard face panels.

The I-Stud system was developed to enclose elevator shafts and other vertical chases in buildings where it is advantageous to erect these walls from one side only and where fire resistance and resistance to air pressures are required. It may also be erected with gypsum wallboard face panels on each side for use as stairway enclosures or between occupancies.

The system consists primarily of three basic elements: 1" (25.4 mm) Fire-Shield Type FSW gypsum shaftliner; 5/8" (15.9 mm) Fire-Shield FSW or 1/2" (13 mm) Fire-Shield G Type FSW-G gypsum board; and metal "I" shaped studs available in 2 1/2", 4", and 6" (64, 102, and 152 mm) widths.

The gypsum shaftliner panels are manufactured by National Gypsum Company and are produced 1" (25.4 mm) thick, are 24" (610 mm) wide, and are available in lengths up to 14' (4.3 m). They are produced with a special fire resistive core, designated Type FSW.

The gypsum wallboard is manufactured by National Gypsum Company and is 1/2" or 5/8" (12.7 or 15.9 mm) thick by 48" (1219 mm) wide and is available in lengths up to 16' (4.9 m). It has a special fire resistive core. The 1/2" (12.7 mm) product is designated Type FSW-G and the 5/8" (15.9 mm) product is designated Type FSW. It is supplied as standard Fire-Shield wallboard, as Fire-Shield moisture resistant M-R board or as Fire-Shield Kal-Kore veneer plaster base over which a nominal 3/32" (2 mm) veneer plaster may be applied.

The metal components are manufactured by Phillips Manufacturing Company and consist of metal I-Studs and track. The studs are fabricated from 25 gage, 20 gage, 19 gage corrosion resistant steel in an "I" shape having 1 1/2" (38 mm) wide flanges with 2 1/4" (57 mm) long tabs projecting out from the web to each side 1" (25 mm) from the inner surface of one flange to receive 1" (25.4 mm) shaftliner. They are available in widths of 2 1/2", 4", and 6" (63, 102, and 152 mm) (6" (152 mm) in 19 and 20 gage only), and in lengths up to 22' (6.7 m).

The track, used to secure studs at floor and ceiling as well as along vertical ends and corners of partitions, is fabricated from 25 gage or 20 gage corrosion resistant steel in a "J" shape with one leg 1" (25 mm) high, the other 2 1/4" or 3" (57 or 76 mm) high (3" (76 mm) in 20 gage only) and with a web 2 1/2", 4", or 6" (63, 102, or 152 mm) wide (6" [152 mm] in 20 gage only). It is supplied in 10' (3 m) lengths.

5. INSTALLATION

University of California Report ES-7408 dated November, 1975 substantiates a 2-hour fire resistance rating for a partition finished on one side and constructed in the following manner:

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The "J" track is installed along floor and ceiling lines and along vertical peripheral edges normally with the 2¹/₄" (57 mm) legs on the shaft (unfinished) side. The 1" (25.4 mm) Fire-Shield shaftliner panels are erected vertically with the peripheral vertical shaftliner edges secured to the "J" tracks with 1⁵/₁₆" (33 mm) Type S screws spaced 24" (610 mm) o.c. The other edge and the edges of adjacent shaftliner panels are secured with the I-Studs. On the other side two layers of 5/8" (15.9 mm) Fire-Shield gypsum wallboard are installed over the studs with the base layer attached to the studs with 1" (25 mm) Type S screws spaced 24" (610 mm) o.c. and the face layer with 1⁵/₈" (41 mm) Type S screws spaced 12" (305 mm) o.c. The face layer wallboard joints and screw heads are covered with a joint compound system.

Factory Mutual Report J.I. 1G7Q1.AC dated October 14, 1981, substantiates a 2-hour fire resistance rating for a partition finished on one side and constructed in a manner identical to ES-7408 above except that two layers of 1/2" (12.7 mm) Fire-Shield G gypsum wallboard were installed rather than 5/8" (15.9 mm) wallboard.

University of California Report ES-7047 dated December, 1975 substantiates a 2-hour fire resistance rating for a partition finished on both sides and constructed in the following manner:

The track, I-Studs, and Fire-Shield gypsum shaftliner are installed as described above for test No. ES-7408. A single layer of 5/8" (15.9 mm) Fire-Shield Type FSW gypsum wallboard is installed horizontally to each face of the partition, secured to the I-Studs with 1" (25 mm) Type S screws spaced 12" (305 mm) o.c. The wallboard joints and screw heads are covered with a joint compound system.

Factory Mutual Report J.I. 1G7Q5.AC dated December 22, 1982 substantiates a 2-hour fire resistance rating for a partition finished on both sides and constructed in a manner identical to ES-7407 above except that 1/2" (12.7 mm) Fire-Shield G gypsum wallboard was installed on each side rather than 5/8" (15.9 mm) wallboard.

To achieve a Sound Transmission Class rating of 51 for a partition finished only on one side, erection should conform to details as follows:

The track, I-Stud, and Fire-Shield gypsum shaftliner are installed as described above for test ES-7408. Fiberglass insulation 1¹/₂" or 2¹/₂" (38 or 64 mm) thick is installed in the I-Stud cavities. Gold Bond RF Resilient Furring Channels (25 gage hat shaped 1/2" (13 mm) deep steel channels with expanded sloping legs) are applied horizontally spaced 24" (610 mm) o.c. and attached to the I-Studs on the non-shaftliner side with 3/8" (10 mm) pan head Type S screws, one per stud-channel intersection. Over the RF Channels two layers of 5/8" (15.9 mm) Fire-Shield gypsum wallboard are installed; base layer secured to RF Channels with 1" (25 mm) Type S screws spaced 24" (610 mm) o.c. and face layer with 1⁵/₈" (41 mm) Type S screws spaced 12" (305 mm) o.c. The wallboard joints and screwheads are covered with a joint compound system and perimeter is caulked with beads of non-hardening permanently resilient acoustical sealant.

When the partition is erected as described above except that 1/2" (12.7 mm) Fire-Shield G gypsum wallboard is used in lieu of 5/8" (15.9 mm) Fire-Shield gypsum wallboard, a Sound Transmission Class rating of 51 is achieved.

To achieve a Sound Transmission Class rating of 50 for a partition finished on both sides, erection should conform to details described below.

The track, I-Studs, and Fire-Shield gypsum shaftliner are installed as described above for test ES-7408. Fiberglass insulation 1¹/₂" or 2¹/₂" (38 or 64 mm) thick is installed in the I-Stud cavities. Gold Bond RF Resilient Furring Channels are applied horizontally spaced 24" (610 mm) o.c. and attached to the I-Studs on the non-shaftliner side with 3/8" (10 mm) panhead Type S screws, one per stud-channel intersection. A single layer of 5/8" (15.9 mm) Fire-Shield gypsum wallboard is applied to each side with 1" (25 mm) Type S screws placed 12" (305 mm) o.c. The wallboard joints and screwheads are covered with a joint compound system and perimeter is caulked with a non-hardening, permanently resilient acoustical sealant.

When the partition is erected as described above except that 1/2" (12.7 mm) Fire-Shield G gypsum wallboard is used in lieu of 5/8" (15.9 mm) Fire-Shield gypsum wallboard, a Sound Transmission Class rating of 50 is achieved.

Factory Mutual Report J.I. 1K8Q5.AC dated February 27, 1985, substantiates a 1-hour fire resistance rating for a partition finished on one side and constructed in the following manner:

The track, I-Studs, and Fire-Shield gypsum shaftliner are installed as described above for test No. ES-7408. On the other side a single layer of 5/8" (15.9 mm) Fire-Shield gypsum wallboard is installed horizontally and secured to the I-Studs and track with 1" (25 mm) Type S screws spaced 12" (305 mm) o.c. in the field and perimeter and 8" (203 mm) o.c. at vertical joints. The face layer wallboard joints and screw heads are covered with a joint compound system.

When installed between occupancies, the bottom "J" track is secured to foundation and I-Studs and shaftliner are installed as specified above projecting through the floor framing approximately 3" (76 mm) above each intermediate floor. Back-to-back "J" track is installed over the studs and shaftliner and additionally serves as the bottom track for the next segment of the partition. "L" shaped 16 ga. aluminum breakaway clips, 2" (51 mm) wide, secure the studs to adjacent wood framing at floor lines. A layer of gypsum wallboard as specified above is applied to each side of the studs as specified above to meet two-hour fire resistive requirements.

Warnock Hersey Report WHI-694-0300.1 dated March 5 and 7, 1986, substantiates a two hour fire resistance rating for a horizontal assembly finished from one side and constructed in the following manner:

The "J" track is installed horizontally to the supporting framework forming the boundaries of the area to be protected. The "J" track is attached to the supporting framework with appropriate fasteners spaced a maximum of 24 inches (610 mm) on center. The 2¹/₄" (57 mm) leg of the "J" track is oriented toward the unfinished side of the assembly. The 1 inch (25.4 mm) thick Fire-Shield shaftliner panels are installed with the longitudinal edges of the panels engaged between the flanges of the I-Studs and the retaining tabs. Longitudinal edges of the Fire-Shield shaftliner panels are screw attached to the 2¹/₄ inch (57 mm) "J" track flange on perimeter edges with 1⁵/₈ inch (41 mm) long Type S screws, spaced 12 inches (305 mm) on center. On the other side of the studs, three layers of 1/2" (12.7 mm) thick Gold Bond Fire-Shield G gypsum wallboard panels are attached to the studs. The base and middle layers are attached with longitudinal edges parallel and over the stud flanges, with joints offset. The face layer is installed with longitudinal edges perpendicular to the studs with end (butt) joints between studs. The base layer is attached to the studs and track with 1 inch (25 mm) Type S screw spaced 24 inches (610 mm) on center. Middle layer is

attached to the studs and track with $1\frac{5}{8}$ inch (41 mm) Type S screws spaced 24 inches (610 mm) on center. The face layer is attached to studs and track with $2\frac{1}{4}$ inch (57 mm) long Type S screws spaced 12 inches (305 mm) on center. End (butt) joints of the face layer are attached to the other two layers of wallboard with $1\frac{1}{2}$ inch (38 mm) long Type G screws spaced 8 inches (203 mm) on center. The face layer wallboard joints and screw heads are covered with a joint compound system.

The manufacturer's installation instructions shall be strictly adhered to and copies of these instructions shall be available at the jobsite at all times during construction.

6. SUBSTANTIATING DATA

- 6.1 Construction Guide No. 8599, dated April, 1988.
- 6.2 Manufacturer's products and assemblies description, dated September 15, 1976, and amended February 13, 1978, and April 5, 1982.
- 6.3 Report on Transverse Load Test of 2-1/2", 4" and 6" Gold Bond I-Stud Cavity Shaftwall by Pittsburgh Testing Laboratory, Report 1-82-CS, dated March 5, 1982.
- 6.4 Report on Two Hour Fire Test of Two and One-Half Inch Studco Stud Cavity Shaft Wall by Structural Research Laboratory University of California, Report ES-7408, dated, November, 1975.
- 6.5 Report on Two Hour Fire Test of the National Gypsum's Company Two and One-Half Inch Studco Stud Stairwell Shaft Wall System by Structural Research Laboratory University of California, Report ES-7407, dated December, 1975.
- 6.6 Report on Sound Transmission Loss Test for "I" Stud Partition with 1" Fire-Shield Shaftliner and Two Layer 5/8" Gypsum Wallboard by Kodaras Acoustical Laboratories, Report 437362, dated November 3, 1976.
- 6.7 Report on Sound Transmission Loss Test for "I" Stud Partition with 1" Fire-Shield Shaftliner and One layer 5/8" Gypsum Wallboard Each Side by Kodaras Acoustical Laboratories, Report 437363, dated November 4, 1976.
- 6.8 Report on Two Hour Fire Test of Gold Bond I-Stud Shaft Wall System by Factory Mutual Research, Report J.I. 1G7Q1.AC, dated October 14, 1981.
- 6.9 Report on Two Hour Fire Test of Gold Bond I-Stud Stairwell Wall System by Factory Mutual Research, Report J.I. 1G7Q5.AC, dated December 22, 1981.
- 6.10 Report on Sound Transmission Loss Test for I-Stud Partition with 1" Fire-Shield Shaftliner and Two Layers of 1/2" Fire-Shield G Gypsum Wallboard by Bolt Beranek and Newman, Report BBN-NGC 2609, dated April 15, 1982.
- 6.11 Report on Sound Transmission Loss Test for I-Stud Partition with 1" Fire-Shield Shaftliner and One Layer 1/2" Fire-Shield G Gypsum Wallboard Each Side by Bolt Beranek and Newman, Report BBN-NGC 2610, dated April 15, 1982.
- 6.12 Report on One Hour Fire Test of Gold Bond I-Stud Cavity Shaftwall in accordance with ASTM E 119, prepared by Factory Mutual Research, Report J.I. 1K8Q5. AC (Class No. 4510), dated February 27, 1985, signed by G. M. Price.
- 6.13 Technical Bulletin No.9-8636, dated April, 1988.
- 6.14 Report on Transverse Load Test of 2-1/2" Gold Bond I-Stud Cavity Shaftwall by Pittsburgh Testing Laboratory, Report 7-85-CS, dated December 20, 1985, signed by J. C. Burruano and William Scheiterle II.
- 6.15 Report on Transverse Load Test of 4" and 6" Gold Bond Heavy Gage (.040") I-Stud Cavity Shaftwall by Professional Service Industries, Inc., Pittsburgh Testing

Laboratory Division, Report 6-88-CS, dated August 30, 1988, signed by J. C. Burruano and Samuel Doak.

- 6.16 Report on two Hour Fire Test of Gold Bond I-Stud Cavity Shaftwall for Horizontal Duct Protection by Warnock Hersey, Report WHI-694-0300.1, dated March 5 and 7, 1986, signed by Harold J. Risler and R. Joseph Pearson.

7. CODE REFERENCES

Standard Building Code - 1999 Edition

Section 103.7	Alternate Materials and Methods
Section 303	Mixed Occupancies
Chapter 7	Fire Resistant Materials and Construction
Chapter 22	Steel
Chapter 25	Gypsum Board and Plaster

8. COMMITTEE FINDINGS

The Subcommittee on Evaluation in review of the data submitted finds that, in their opinion, the Gold Bond I-Stud Cavity Shaftwall System covered by this report conforms with or is a suitable alternate to that specified in the *Standard Building Code* or Supplements thereto.

9. LIMITATIONS

- 9.1 The Gold Bond I-Stud Cavity Shaftwall System shall not be used where it will be subjected to any one or combination of the following: (a) weathering; (b) extreme or continuous moisture; (c) free water; (d) exposed to temperatures in excess of 125°F for extended periods of time.
- 9.2 The system shall be used for non-bearing partitions only.
- 9.3 The construction of the system shall be in accordance with the respective design of the testing laboratory in order to obtain the fire-resistance rating.

10. IDENTIFICATION

The Gold-Bond I-Stud Cavity Shaftwall Systems shall bear the manufacturer's name and/or trademark, the SBCCI Public Safety Testing and Evaluation Services, Inc. initials (SBCCI PST & ESI) or seal, and the number of this report in a conspicuous place for field identification.

11. PERIOD OF ISSUANCE

SEE THE CURRENT EVALUATION REPORT INDEX FOR STATUS OF THIS LEGACY EVALUATION REPORT.

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