Assembly Evaluation Report

AER-09038

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Initial Listing	Re-Approved		
April, 2009	November 8, 2011	58640 State Road 15 Goshen, Indiana 46528	574-533-0337 www.p-e-i.com

Listed Assemblies

USG Shaft & Stair Wall Systems

Listed For

United States Gypsum Company

550 West Adams Street

Chicago, IL 60661

Progressive Engineering Inc. is an accredited Testing Laboratory and Third Party Quality Control Agency. This **Assembly Evaluation Report** represents a system that *Pei* has performed testing and evaluation. This **Assembly Evaluation Report** in no way implies warranty for this product or relieves United States Gypsum Company of their liabilities for this product. *Pei* is accredited to ISO Standard 17020 and 17025. This **AER** is an official document if it is within one year of the initial or renewal date.

Assemblies Listed For

1. Non Axial Load Bearing Wall
2. Transverse Load Capacity
3. Fire Resistance

Compliance

1. Meets the requirements for shaft enclosures in accordance with the 2009 International Building Code®.
2. Meets the requirements for non-combustible construction in accordance with Section 703.4 of the 2009 International Building Code®.
3. Meets the requirements for structural integrity of exit enclosures and elevator hoistway enclosures for High-Rise Buildings (Section 403.2.3. of the 2009 International Building Code) when minimum 4-inch, 20 gage framing members are used in conjunction with a base layer of Fiberock® VHI in a minimum 2-hour fire resistance rated assembly.
4. Tested for fire resistance in accordance to ASTM E119.
5. **USG** Shaftwall Systems are classified and tested by Underwriters Laboratories Inc. as to fire resistive design listings of assemblies, and as described in this report.

Component Descriptions

USG Shaft & Stair Wall Systems are generally constructed with the following components.

1. J-Runners

The metal framing members used in construction of **USG** Shaft & Stair Wall Systems are manufactured from cold roll-formed light gauge galvanized steel conforming to ASTM A 653, with a yield strength of 33,000 psi minimum. The galvanization coating shall be a G40 minimum. The available sizes in 2-1/2", 4" and 6" deep and lengths of up to 16 feet, 20 or 24 gauges. Position steel J-runners at floor and ceiling with the 1" leg towards the finished side of the wall. Securely attach the runners to the structure supports with power actuated fasteners.

For attachment to steel framed construction install floor and ceiling J-runners and End wall J-Runners or E-Studs, on columns and beams before the steel is fireproofed.

2. Steel C-H Studs

USG Steel C-H and E Studs are manufactured from cold roll-formed light gauge steel conforming to ASTM A653 with a yield strength of 33,000 psi minimum. The galvanization coating shall be a G40 minimum. The available sizes are 2-1/2", 4" and 6" deep and lengths of up to 16 feet, 20 or 25 gauges.

Cut the C-H studs 3/8" to 5/8" shorter than the floor-to-ceiling height. Install C-H studs interlocked between the SHEETROCK brand gypsum Liner Panels with the liner panels securely engaged.

Terminations: Install full length steel E-Studs or J-Runners vertically at T-Intersections, corners, door jambs and *Openings:* Frame with vertical E-stud or J-Runner at vertical edges, horizontal J-runner at head or sill.

3. Gypsum Liner Panels

The paper-faced products listed below comply with ASTM C1396 and Glass-Mat panel is in compliance with ASTM C1658. Both types are tested in accordance with ASTM E119, E136 (modified), E84 and are classified as composite non-combustible, Class A building materials.

SHEETROCK® Brand Gypsum Liner Panels a high performance panel that is composed of a non-combustible gypsum core encased in a water resistant 100% recycled **green** face and back paper. Gypsum Liner Panels are a nominal thickness of 1" x 24" wide x 8-14 ft. long. Used in Fire-Rated, non-load bearing Shaftwall assemblies.

3. Gypsum Liner Panels cont.

SHEETROCK® Brand Mold Tough™ Gypsum Liner Panels feature a non-combustible, moisture- and mold-resistant gypsum core encased in moisture and mold-resistant, 100-percent **blue** face and back papers. They offer enhanced moisture and mold resistance over standard gypsum liner panels. The panels are UL Classified for fire-rated construction (Type SLX). Available 1 inch thick, 24 inches wide and in lengths up to 14 feet.

SHEETROCK® Brand Glass-Mat Liner Panel have a noncombustible, moisture- and mold-resistant gypsum core that is encased in moisture- and mold-resistant glass mat. The panels are UL Classified as to fire resistance (Type SLX) and feature double-beveled edges for easy installation.

Note: All of these panels should be cut 1" shorter than the floor-to-ceiling height, to allow for the panel to be fitted between the top and bottom J-runners. Where shaft wall height exceeds the length of the liner panel; it must be butted together with meeting factory end cuts. The joints should be staggered and positioned in the upper or lower 1/3 of the wall. Panels are UL/ULC classified for fire resistance and identified as Type SLX on the UL marking and UL Fire Resistance Directory.

4. Gypsum Wallboard

The products listed below comply with ASTM C1396 and are tested in accordance with ASTM E119, E136 (modified), E84 and are classified as composite non-combustible, Class A building materials.

SHEETROCK® Brand FIRECODE® Core Gypsum Panels (Type X) are composed of fire-resistant gypsum core encased in 100-percent recycled natural finish face paper and 100-percent recycled liner paper on the back side. The panels are UL Classified for fire-rated construction (Type SCX). Available 5/8 inch thick, 48 or 54 inches wide and lengths up to 14'.

SHEETROCK® Brand FIRECODE® C Core Gypsum Panels provide improved fire protection over standard FIRECODE panels due to additives that enhance the integrity of the core under fire exposure. Comply with Type X requirements. The panels are UL Classified for fire-rated construction (Type C). Available in 1/2 and 5/8 inch thicknesses, 48 inches wide and lengths up to 14'.

SHEETROCK® Brand Mold Tough™ Gypsum Panels have a non-combustible, moisture- and mold-resistant gypsum core encased in moisture- and mold-resistant, 100-percent recycled green face and brown back paper. They offer enhanced moisture and mold resistance over standard gypsum panels. Available in FIRECODE® and FIRECODE® C core formulations in the same widths, thicknesses and lengths listed above.

5. Fiber Reinforced Gypsum Panels

The product listed below complies with ASTM C1278 in accordance with ASTM E119, E84 and are classified as a Class A building material.

FIBEROCK Brand VHI (Very High Impact) Abuse-Resistant Interior Panels (Type X) are high performance abuse resistant panels. The panels are UL classified for fire-rated construction (Type FRX-G). Available panels are 5/8" thick, 48" wide and available in lengths up to 12'.

~ *Cavity Shaft Wall Systems* ~

One-Hour Cavity Shaft Wall (Non-Load Bearing), See Figure 1

1. Minimum 2-1/2" wide 24 gauge floor and ceiling J-runners, attached to structure as described above.
2. One-layer, 5/8" thick SHEETROCK® Brand FIRECODE® Core Gypsum Panels (Type X), installed vertically with 1" long Type S screws spaced 12" o.c. in field and at edges for vertical application, and 8" o.c. for horizontal application.
3. Minimum 2-1/2" deep **USG** C-H Studs 25 gauge 24" o.c., with the H-Section of C-H Stud towards the shaft side of the assembly. Screw attachment is not required to affix the stud to the runner, if Shaft Wall is less then 16 ft. tall. E-shaped studs may be used for closure panels at end of the walls or columns. (If J-runners are used at end walls, the gypsum liner is fastened at the ends with 1-5/8" long Type S Screws 12" o.c.)
4. 1" thick SHEETROCK® Brand Gypsum Liner Panel - Friction-fitted in "H" portion of C-H studs.

Two-Hour Cavity Shaftwall (Non-Load Bearing), See Figure 2

1. 2-1/2" deep 25 gauge minimum floor and ceiling J-runners, attached to structure as described above.
2. Two (2) layers, 1/2" thick SHEETROCK® Brand FIRECODE® C Core Gypsum Panels. Apply base layer with 1" long Type S screws 24" o.c. in field and at the edges for vertical application and 16" o.c. for horizontal applications. Apply face layer C-H studs and J-runners with 1-5/8" long Type S screws. Space the screws 12" o.c. at the edges and in the field when applied horizontally. All joints between the base and face layers must be staggered.
3. A minimum 2-1/2" deep **USG** C-H studs 25 gauge, spaced 24" o.c., with the H-Section of the C-H stud towards the shaft side of the assembly. Screw attachment is not required to affix the stud to the runner, if Shaft Wall is less then 16 ft. tall. E-shaped studs may be used for closure panels at the end of walls or columns. (If J-runners are used at end walls, the gypsum liner needs to be fastened at the ends with 1-5/8" long Type S screws that are spaced 12" o.c.).
4. 1" thick SHEETROCK® Brand Gypsum Liner Panel - Friction-fitted in "H" portion of CH studs.

~ Cavity Shaft Wall Systems cont. ~

Two-Hour Stair Cavity Shaftwall (Non-Load Bearing), See Figure 3

1. Minimum 2-1/2" deep, 25 gauge floor and ceiling J-runners, attached to the structure as described.

2. Apply one (1) layer of 1/2" SHEETROCK® Brand FIRECODE® Gypsum Panels (Type C) to each side of the C-H stud. Attach the C-H stud with 1" long Type S screws 12" o.c. in the field and at the edges for a vertical application and 8" o.c. center for a horizontal application.

3. A minimum of 2-1/2" deep **USG** C-H studs 25 gauge, spaced 24" o.c., with the H-section of the C-H stud towards the shaft side of the assembly, if the Shaft Wall is less than 16 ft. tall. Screw attachment is not required to affix the stud to the runner, if Shaft Wall is less then 16 ft. tall. E-shaped studs may be used for closure panels at the end of walls or columns. (If J-runners are used at end walls, the gypsum liner needs to be fastened at the ends with 1-5/8" long Type S screws that are 12" o.c.).

4. 1" thick SHEETROCK® Brand Gypsum Liner Panel - Friction-fitted in "H" portion of C-H studs.

Three-Hour Cavity Shaft Wall (Non-Load Bearing), See Figure 4

1. A minimum 2-/12" deep 25 gauge floor and ceiling J-runners, attached to the structure as described in the Figure 4.

2. Apply (3) layers of 5/8" thick SHEETROCK® Brand FIRECODE® C Core Gypsum Panels (Type C), vertically or horizontally to the room side of the C-H stud. First layer shall be attached with a 1" long Type S screw placed 24" o.c. in the field and at the edges when applied vertically, for horizontal applications the screws shall be spaced 16" o.c. The second layer shall be applied with 1-5/8" long Type S screws spaced 24" o.c. when applied vertically or spaced 16" o.c. when the applied horizontally. The Face layer shall be applied with 2-1/4" long Type S screws that are spaced 16" o.c. when the board is applied vertically, and spaced 12" o.c. when the board is applied horizontally. All joints must be staggered a minimum of 24" o.c. from the adjacent layers, where screws are offset a minimum of 6" from the layer below.

3. A minimum 2-1/2" **USG** C-H studs 25 gauge that are spaced 24" o.c., with the H-section of the C-H stud towards the shaft side of the assembly. Screw attachment is not required to affix the stud to the runner, if Shaft Wall is less then 16 ft. tall. E-shaped studs may be used for closure panels at the end of walls or columns. (If J-runners are used at the end walls, the gypsum liner needs to be fastened at the ends with 1-5/8" Type S screws spaced 12" o.c.)

4. 1" thick SHEETROCK® Brand Gypsum Liner Panel - Friction-fitted in "H" portion of C-H studs.

Three-Hour Stair Cavity Shaftwall (Non-Load Bearing), See Figure 5

1. A minimum 2-1/2" deep 25 gauge floor and ceiling J-runners attached to the structure as described above.

2. Apply two (2) layers of 5/8" thick SHEETROCK® Brand FIRECODE® C Core Gypsum Panels (Type C), vertically or horizontally to the "room" side of the C-H stud. For vertical applications using a 1" long Type S screw spaced 24" o.c. in the field and at the edges. For vertical applications the gypsum panels need to be spaced 16" o.c. and for horizontal applications they need to be spaced at 16" o.c.

3. A minimum 2-1/2" deep **USG** C-H Stud 25 gauge spaced 24" o.c., where the H-section of the C-H stud faces the shaft. Screw attachment is not required to affix the stud to the runner, if Shaft Wall is less then 16 ft. tall. E-shaped studs may be used for closure panels at the end of the walls or columns. (If J-runners are used at end walls, the gypsum liner should be fastened at the ends with a 1-5/8" long Type S screw, spaced 12" o.c.)

4. 1" thick SHEETROCK® Brand Gypsum Liner Panel - Friction-fitted in "H" portion of C-H studs.

Two-Hour Horizontal Stud Cavity Shaft Wall Assembly (Non-Load Bearing), See Figure 6

1. A minimum 4" deep 20 gauge J-runner to be installed vertically, on the ends of the wall.

2. Apply two (2) layers of 5/8" thick SHEETROCK® Brand FIRECODE® Core Gypsum Panels (Type X) vertically or horizontally to the room side of the C-H stud, with 1" long Type S screws spaced 12 " o.c. in the field and at the edges for the BASE layer. The FACE layer shall be installed with 1-5/8" long Type S screws spaced 8" o.c. All joints must be staggered a minimum of 24" from the adjacent layers.

3. A minimum 4" deep **USG** C-H stud or E Studs 20 gauge, are to be installed horizontally between the J-runners. The H-section of the C-H stud faces the shaft. C-H Studs shuld be attached to vertical J-runners with Type S fasteners.

4. 1" thick SHEETROCK® Brand Gypsum Liner Panel - Friction-fitted in "H" portion of C-H studs. The wall width is limited to the length of the Gypsum Liner Panel.

One & Two Hour Horizontal Cavity Ceiling Membrane (Corridor Ceiling or Underside Stair Applications), See Figure 7

1. A minimum 2-1/2" deep 24 gauge J-runner attached horizontally to perimeter or boundary walls with a power actuated fasteners.

~ Cavity Shaft Wall Systems cont. ~

One & Two Hour Horizontal Cavity Ceiling Membrane (Corridor Ceiling or Underside Stair Applications), See Figure 7

2. Gypsum Wall

a. For a one (1) hour assembly: Attach one (1) layer of 5/8" thick SHEETROCK® Brand FIRECODE® C Core Gypsum (Type C), to the underside of the "Corridor Ceiling" of the C-H stud and the perimeter J-runners. Use 1" long Type S screws that are spaced 12" o.c. in the field and at the edges.

b. For a two (2) hour assembly: Attached two (2) layers of minimum 1/2" thick SHEETROCK® Brand FIRECODE® C Core Gypsum Panels (Type C), to the underside of the "Corridor Ceiling" of the C-H stud and the perimeter J-For the BASE layer, use a 1" long Type S screw that is spaced 24" o.c. along the perimeter and the edges. The FACE layer should be applied with a 1-5/8" long Type S screw that is spaced 12" o.c. in the field and perimeter. All joints must be staggered a minimum of 24" o.c. from the adjacent layer.

3. Install the C-H studs perpendicular to the J-runner spaced 24" o.c. with the C-section of the C-H stud facing downward towards the corridor side of the assembly with two (2) screws a minimum 1/2" long Type S-12 screws, one on each side.

4. 1" thick SHEETROCK® Brand Gypsum Liner Panel - Friction-fitted in "H" portion of C-H studs.

Two-Hour Horizontal Gypsum Duct Enclosure, See Figure 8

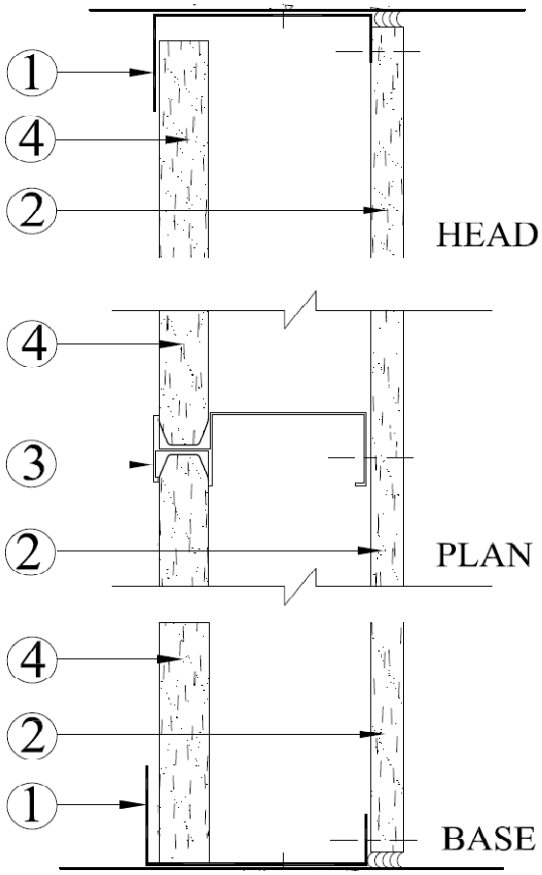
1. A minimum 2-1/2" deep 24 gauge J-runners attached horizontally to the perimeter or boundary wall, with power actuated fasteners.

2. Attach three (3) layers of 1/2" (minimum) SHEETROCK® Brand FIRECODE® C Core Gypsum Panels to the underside "ceiling" side of the assembly. The Base layer is attached with 1" long Type S Screws that are spaced 24" o.c. The second layer is attached with 1-5/8" long Type S screws that are spaced 12" o.c., with all the joints staggered 24" o.c. from the base layer. The Face layer is attached perpendicular to the C-H Studs with 2" long Type S screws that are spaced 12" o.c. and the joints are staggered 24" o.c. from the base layer.

3. Install the C-H studs perpendicular to the J-runners, spacing them 24" o.c. with the C-section of the C-H stud facing downward towards the corridor side of the assembly with two (2) screws a minimum of 1/2" long Type S-12 screws, one on

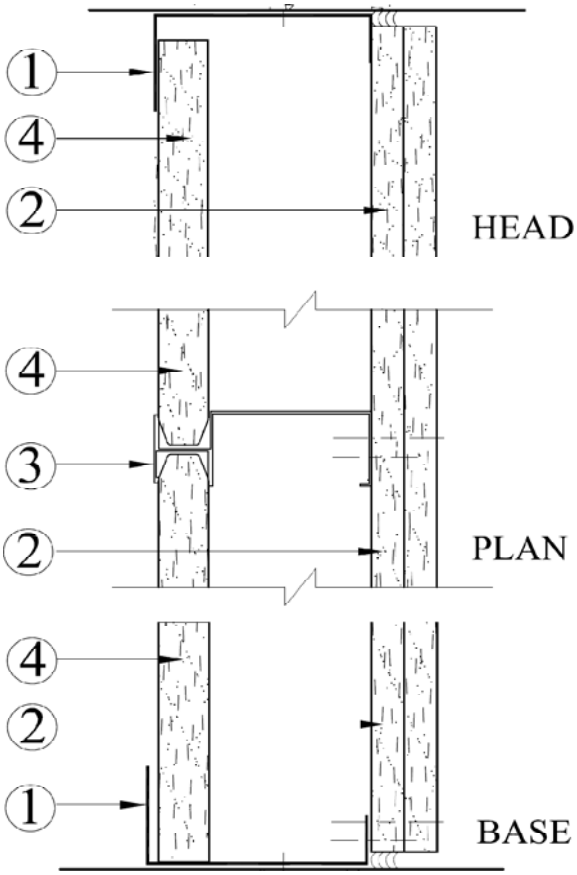
4. 1" thick SHEETROCK® Brand Gypsum Liner Panel - Friction-fitted in "H" portion of C-H studs.

Figure 1



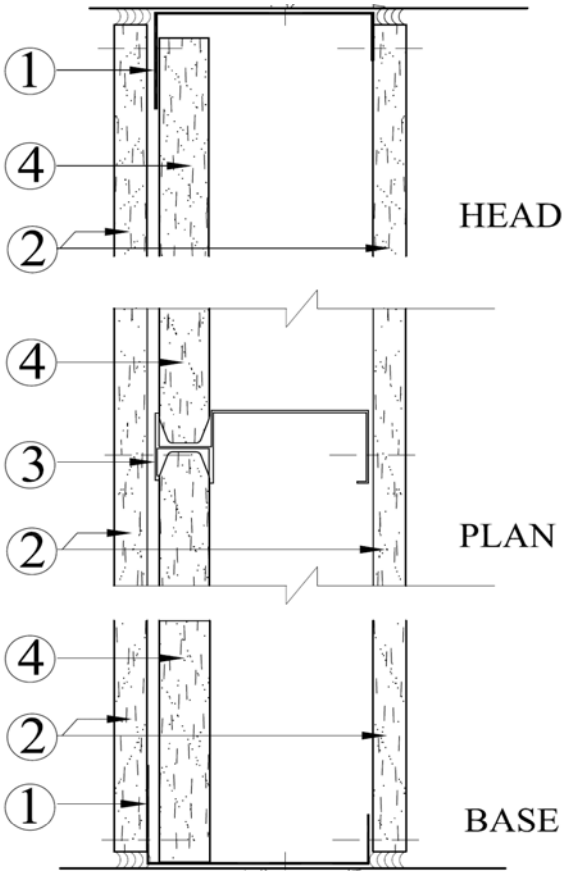
1-HR Cavity Shaft Wall (Non-Load Bearing)

Figure 2



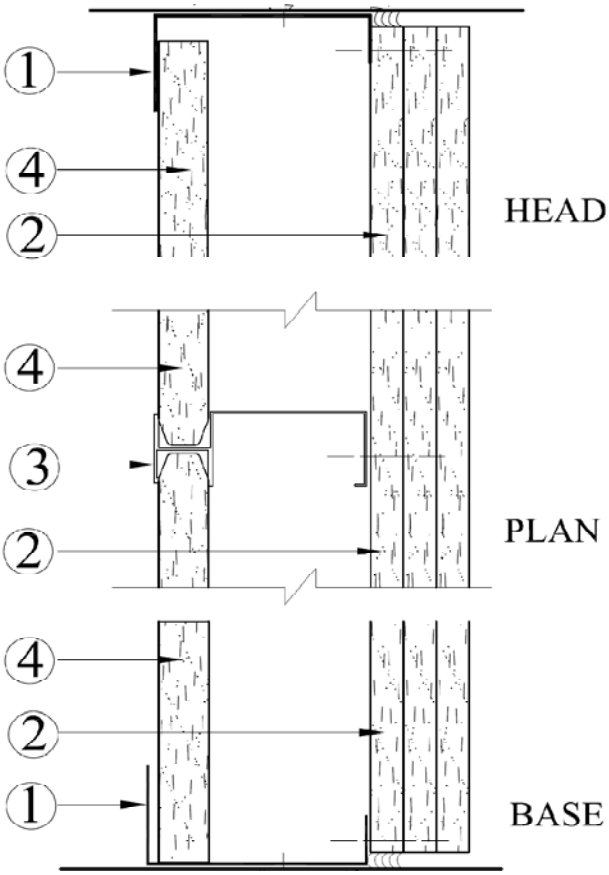
2-HR Cavity Shaft Wall (Non-Load Bearing)

Figure 3



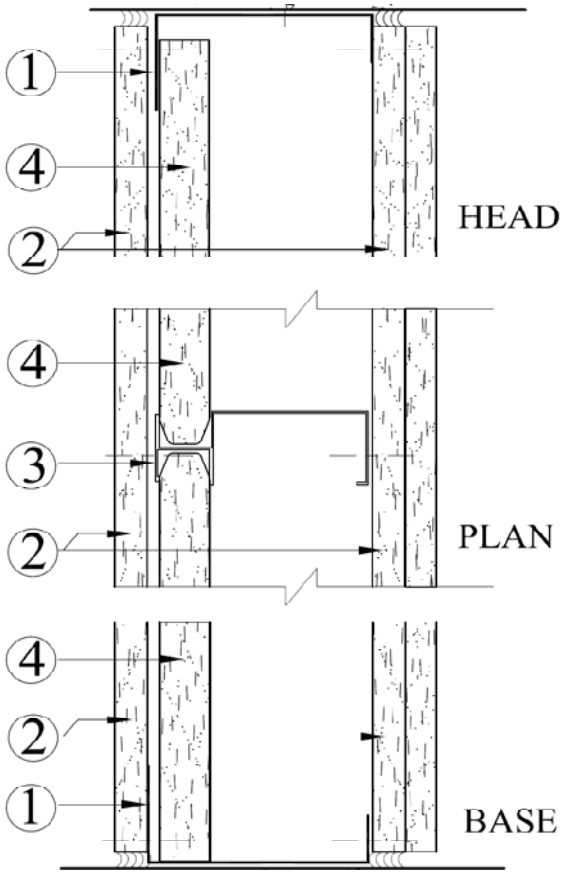
2-HR Stair Cavity Shaft Wall (Non-Load Bearing)

Figure 4



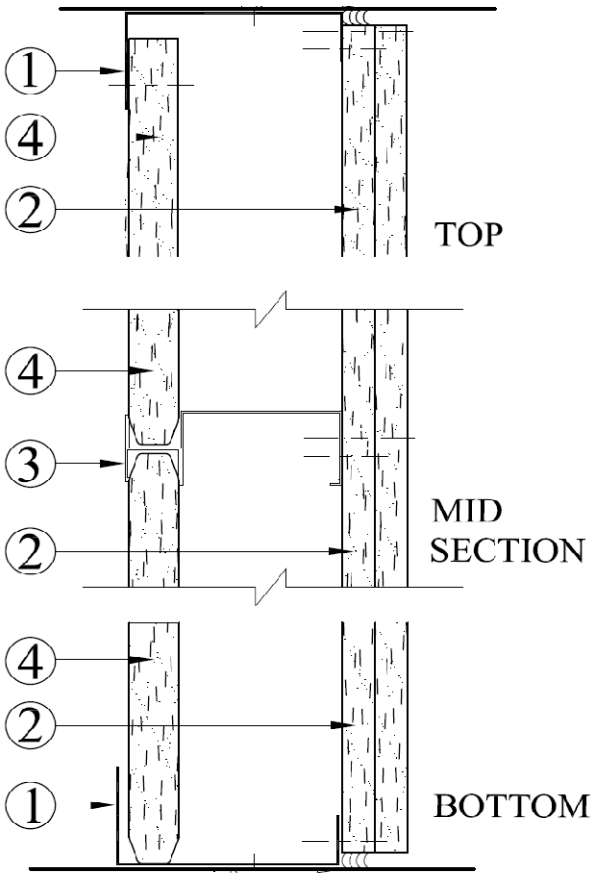
3-HR Cavity Shaft Wall (Non-Load Bearing)

Figure 5



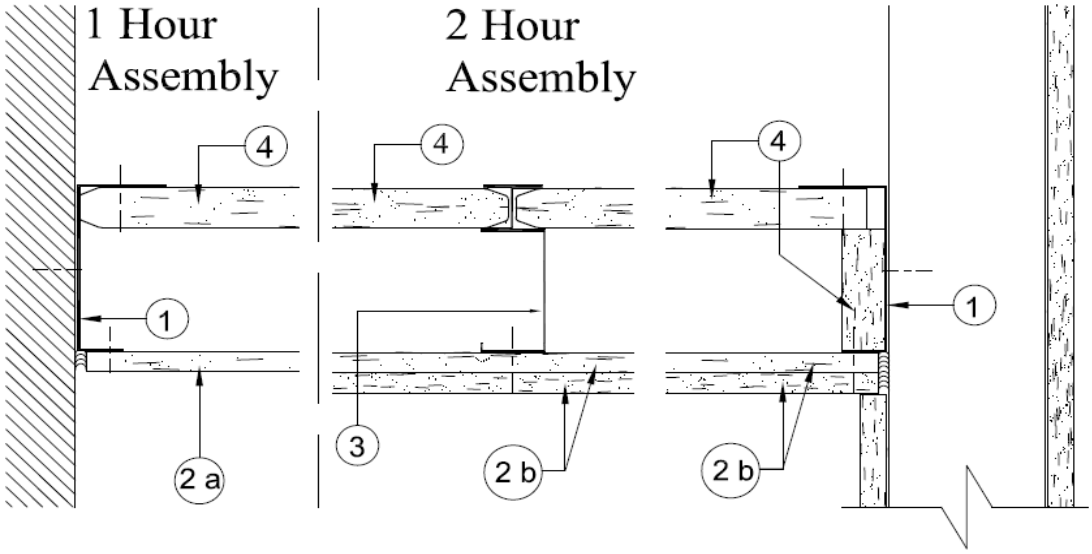
3-HR Stair Cavity Shaft Wall (Non-Load Bearing)

Figure 6



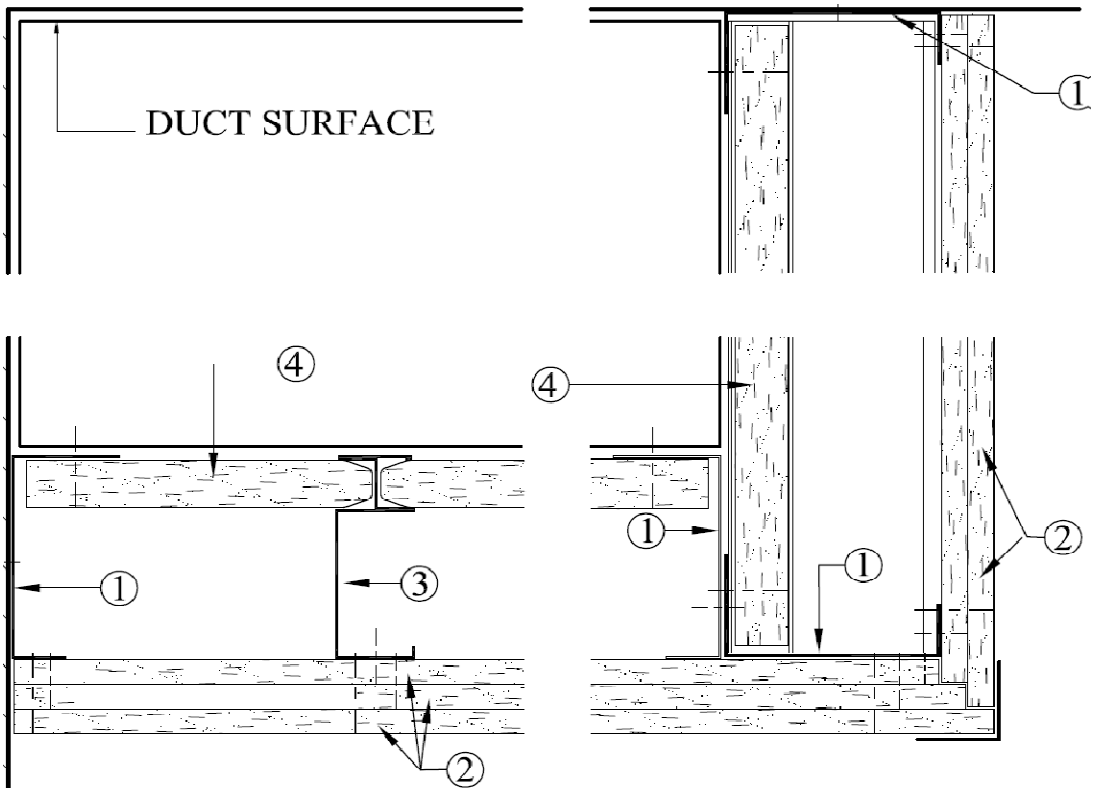
2-Hr Horizontal Stud Cavity Shaft Wall Assembly (Non-Load Bearing)

Figure 7



1 & 2-Hr Horizontal Cavity Shaft Wall (Corridor Ceiling/Stair Application)

Figure 8



Horizontal Gypsum Duct Shaft Enclosure (2HR Fire Rating)

Table 1. Limiting Spans - Horizontal Shaft Walls (Ceiling Application), Applicable to Fig. 7 & 8

2-Hours Horizontal Membrane or Metal Duct Enclosure	
Triple-layer 1/2" gypsum panels	Maximum Span
212CH25-18	6' - 5"
212CH20-34	9' - 0"
400CH25-18	8' - 6"
400CH20-34	12' - 11"
600CH20-34	16' - 4"

2-Hours Corridor Ceiling and Stair Soffits	
Double-layer 1/2" gypsum panels	Maximum Span
212CH25-18	7' - 2"
212CH20-34	9' - 8"
400CH25-18	9' - 5"
400CH20-34	14' - 0"
600CH20-34	19' - 1"

1-Hour Corridor Ceiling and Stair Soffits	
Single-layer 5/8" gypsum panels	Maximum Span
212CH25-18	8' - 0"
212CH20-34	10' - 5"
400CH25-18	10' - 6"
400CH20-34	14' - 0"
600CH20-34	20' - 11"

Notes:

a) Based on L/240 allowable deflection with studs at 24" o.c. and JR24 runner.

b) Full stress allowed based on ASTM E119.

Table 2. Limiting Heights Vertical Shaft Walls, Applicable to Fig. 1

		1-hr Shaftwall/Stairwell							
Stud Description	***Allowable Deflection***	***5psf design (ft - in)***		***7.5psf design (ft - in)***		***10psf design (ft - in)***		***15psf design (ft - in)***	
212CH25-18	L/120	11	5	10	0	9	1	7	11
	L/240	10	7	9	3	8	4	7	4
	L/360	9	4	8	2	7	5	6	6
212CH20-34	L/120	13	5	11	8	10	8	9	3
	L/240	12	3	10	9	9	9	8	6
	L/360	10	10	9	6	8	7	7	6
400CH25-18	L/120	15	2	12	5	10	9	8	9
	L/240	14	5	12	5	10	9	8	9
	L/360	12	9	11	2	10	1	8	9
400CH20-34	L/120	20	5	17	10	16	2	13	4
	L/240	17	6	15	3	13	10	12	1
	L/360	15	3	13	4	12	1	10	7
600CH20-34	L/120	26	3	21	5	18	7	15	2
	L/240	24	0	20	12	18	7	15	2
	L/360	21	1	18	5	16	9	14	8

Table 3. Limiting Heights - Vertical & Horizontal Shaft Walls, Applicable to Fig. 2, 3 & 6

		2-hr Stairwell				2-hr Shaftwall			
Stud Description	Allowable Deflection	5psf design	7.5psf design	10psf design	15psf design	5psf design	7.5psf design	10psf design	15psf design
212CH25-18	L/120	12' 2"	10' 8"	9' 8"	8' 5"	12' 4"	10' 10"	9' 10"	8' 7"
	L/240	11' 2"	9' 9"	8' 10"	7' 9"	11' 4"	9' 11"	8' 12"	7' 10"
	L/360	9' 10"	8' 7"	7' 10"	6' 10"	10' 4"	9' 1"	8' 3"	7' 2"
212CH20-34	L/120	14' 2"	12' 5"	11' 3"	9' 10"	14' 3"	12' 5"	11' 4"	9' 11"
	L/240	13' 0"	11' 5"	10' 4"	9' 1"	12' 10"	11' 3"	10' 2"	8' 11"
	L/360	11' 6"	10' 0"	9' 1"	7' 12"	11' 7"	10' 1"	9' 2"	8' 0"
400CH25-18	L/120	16' 4"	14' 3"	12' 11"	10' 7"	17' 9"	14' 6"	12' 7"	10' 3"
	L/240	15' 2"	13' 3"	12' 0"	10' 6"	15' 7"	13' 8"	12' 5"	10' 3"
	L/360	13' 4"	11' 8"	10' 7"	9' 3"	13' 11"	12' 2"	11' 1"	9' 8"
400CH20-34	L/120	19' 6"	17' 1"	15' 6"	13' 7"	19' 11"	17' 4"	15' 9"	13' 10"
	L/240	17' 11"	15' 8"	14' 3"	12' 5"	18' 1"	15' 9"	14' 4"	12' 6"
	L/360	15' 10"	13' 10"	12' 7"	10' 12"	16' 2"	14' 1"	12' 10"	11' 3"
600CH20-34	L/120	28' 0"	25' 1"	21' 9"	17' 9"	25' 4"	22' 2"	19' 8"	16' 1"
	L/240	24' 10"	21' 9"	19' 9"	17' 3"	21' 9"	19' 0"	17' 4"	15' 1"
	L/360	21' 11"	19' 2"	17' 5"	15' 2"	20' 0"	17' 6"	15' 11"	13' 11"

Note: In Horizontal stud applications (Fig. 7), use above values for maximum stud spans.

	L/360	9' 10"	8' 7"	7' 10"	6' 10"	10' 4"	9' 1"	8' 3"	7' 2"
212CH20-34	L/120	14' 2"	12' 5"	11' 3"	9' 10"	14' 3"	12' 5"	11' 4"	9' 11"
	L/240	13' 0"	11' 5"	10' 4"	9' 1"	12' 10"	11' 3"	10' 2"	8' 11"
	L/360	11' 6"	10' 0"	9' 1"	7' 12"	11' 7"	10' 1"	9' 2"	8' 0"
400CH25-18	L/120	16' 4"	14' 3"	12' 11"	10' 7"	17' 9"	14' 6"	12' 7"	10' 3"
	L/240	15' 2"	13' 3"	12' 0"	10' 6"	15' 7"	13' 8"	12' 5"	10' 3"
	L/360	13' 4"	11' 8"	10' 7"	9' 3"	13' 11"	12' 2"	11' 1"	9' 8"
400CH20-34	L/120	19' 6"	17' 1"	15' 6"	13' 7"	19' 11"	17' 4"	15' 9"	13' 10"
	L/240	17' 11"	15' 8"	14' 3"	12' 5"	18' 1"	15' 9"	14' 4"	12' 6"
	L/360	15' 10"	13' 10"	12' 7"	10' 12"	16' 2"	14' 1"	12' 10"	11' 3"
600CH20-34	L/120	28' 0"	25' 1"	21' 9"	17' 9"	25' 4"	22' 2"	19' 8"	16' 1"
	L/240	24' 10"	21' 9"	19' 9"	17' 3"	21' 9"	19' 0"	17' 4"	15' 1"
	L/360	21' 11"	19' 2"	17' 5"	15' 2"	20' 0"	17' 6"	15' 11"	13' 11"

General Product Usage and Limitations

1. These products shall be installed in accordance with ASTM C 840 *Standard Specification for Application and Finishing of Gypsum Board,* and in accordance with **USG** Product Literature.

2. The **USG** Sheetrock® Brand Cavity Shaftwall system is designed to enclose stairwalls, elevator shafts, mechanical components and other vertical shafts.

3. For horizontal ceiling and ductwork applications, please see manufacturer's product brochure *SA926 Shaft Wall Systems*.

4. Non-load bearing and limited to fire-resistance only. Structural and other requirements shall be in accordance with pertinent building code and and manufacturer's requirements.

5. For High-Rise buildings as defined in Section 402.2.3 of the 2009 International Building Code, minimum 4", 20 gage framing must be in conjunction with a base layer of **FIBEROCK VHI** in a minimum 2-hour fire resistance rated assembly.

Product Labeling

Each assembled **USG** Drywall Shaft Partition System that is covered by this **AER**, must be marked with the following information:

1. **USG**'s name
2. Product Name
3. Plant Identifier & Date Code
4. UL Classification label for Firecode Resistance, surface burning characteristics and non-combustibility.

Tested to

ICC-ES (Formerly ICBO) AC86 (1995) - Acceptance Criteria for determining limiting height of composite walls constructed of gypsum and steel studs to revision date: July 1995.

ASTM E84 - Standard Test for Surface Burning Characteristics of Building Materials.

ASTM E330-97 - Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls and Doors by Uniform Static Air Pressure Differences, following procedure A. (Test Reports 2004-0329 B-L were based on this test method)

Product Documentation

USG Drywall Shaft Partition System Product Installation Guidelines SA926 (Rev 10/07)

An Assembly Evaluation Service Agreement between Progressive Engineering Inc. and **USG Company**

Test report No. R1319, Project 04NK2667 - Shaftwall Assembly With Horizontal Placement of Studs and Gypsum Liner Panels - Dated 2/10/2004.

Test report No. R1319, Project 04NK2667 - Shaftwall Assembly With Horizontal Placement of Studs and Gypsum Liner Panels - Dated 3/02/2004.

Test report No. WHI-495-PSH-0154/0167 - Two Pilot Scale Horizontal Fire Endurance Tests on a Corridor Ceiling/Duct Assembly with Either Side as the Exposed Face - Dated 2/05/1990 & 5/23/1990.

Test report No. R1319, Project No. 82NK27438 - Engineering Study - Classification of A 2 H Fire Resistance Shaft Wall Constructed of 1/2" Type C Gypsum Wallboard and 1" Gypsum Board Liner - Dated 12/17/1982.

Test report - Fire Tests of Two-Hour Cavity Shaft Wall System Having C-H Vented Studs - Dated 6/23/1975

Test report - Fire Tests of Two-Hour Cavity Shaft Wall System Having C-H Vented Studs - Dated 4/02/1975

A *Pei* test report No. 2003-1150 (A) - ICBO AC86 Limiting Height Test on a 2 Hour Shaftwall Using a 2-1/2" X 25 ga. CH Stud 8 ft. Wall Height - Dated 12/01/2003 - Stamped by a professional engineer.

A *Pei* test report No. 2003-1150 (B) - ICBO AC86 Limiting Height Test on a 2 Hour Shaftwall Using a 2-1/2" X 20 ga. CH Stud 8 ft. & 10 ft. Wall Heights - Dated 12/17/2003 - Stamped by a professional engineer.

A *Pei* test report No. 2003-1150 (C) - ICBO AC86 Limiting Height Test on a 2 Hour Shaftwall Using a 4" X 25 ga. CH Stud 8 ft. & 10 ft. Wall Heights - Dated 12/18/2003 - Stamped by a professional engineer.

A *Pei* test report No. 2003-1150 (D) - ICBO AC86 Limiting Height Test on a 2 Hour Shaftwall Using a 4" X 20 ga. CH Stud 8 ft. & 12 ft. Wall Heights - Dated 12/23/2003 - Stamped by a professional engineer.

A *Pei* test report No. 2003-1150 (E) - ICBO AC86 Limiting Height Test on a 2 Hour Shaftwall Using a 6" X 20 ga. CH Stud 8 ft. & 16 ft. Wall Heights - Dated 12/11/2003 - Stamped by a professional engineer.

A *Pei* test report No. 2003-1150 (F) - ICBO AC86 Limiting Height Test on a 2 Hour Stairwall Using a 2-1/2" X 25 ga. CH Stud 8 ft. Wall Heights - Dated 11/26/2003 - Stamped by a professional engineer.

A *Pei* test report No. 2003-1150 (G) - ICBO AC86 Limiting Height Test on a 2 Hour Stairwall Using a 2-1/2" X 20 ga. CH Stud 8 ft. & 10 ft. Wall Heights - Dated 12/17/2003 - Stamped by a professional engineer.

A *Pei* test report No. 2003-1150 (H) - ICBO AC86 Limiting Height Test on a 2 Hour Stairwall Using a 4" X 25 ga. CH Stud 8 ft. & 10 ft. Wall Heights - Dated 12/19/2003 - Stamped by a professional engineer.

A *Pei* test report No. 2003-1150 (I) - ICBO AC86 Limiting Height Test on a 2 Hour Stairwall Using a 4" X 20 ga. C-H Stud 8 ft. & 12 ft. Wall Heights - Dated 12/23/2003 - Stamped by a professional engineer.

A *Pei* test report No. 2003-1150 (J) - ICBO AC86 Limiting Height Test on a 2 Hour Stairwall Using a 6" X 20 ga. CH Stud 8 ft. & 16 ft. Wall Heights - Dated 12/11/2003 - Stamped by a professional engineer.

A *Pei* test report No. 2003-1150 (K) - ICBO AC86 Limiting Height Test on a 1 Hour Shaft/Stairwall Using a 2-1/2" X 25 ga. CH Stud 8 ft. Wall Heights - Dated 12/29/2003 - Stamped by a professional engineer.

A *Pei* test report No. 2003-1150 (L) - ICBO AC86 Limiting Height Test on a 1 Hour Shaft/Stairwall Using a 2-1/2" X 20 ga. CH Stud - Dated 12/18/2003 - Stamped by a professional engineer.

A *Pei* test report No. 2003-1150 (N) - ICBO AC86 Limiting Height Test on a 1 Hour Shaft/Stairwall Using a 4" X 20 ga. CH Stud on 8 ft. and 12 ft. Wall Heights - Dated 12/26/2003 - Stamped by a professional engineer.

A *Pei* test report No. 2003-1150 (O) - ICBO AC86 Limiting Height Test on a 1 Hour Shaft/Stairwall Using a 6" X 20 ga. CH Stud on 8 ft. and 16 ft. Wall Heights - Dated 12/10/2003 - Stamped by a professional engineer.

A *Pei* test report No. 2003-1150 (P) - ICBO AC86 Limiting Height Test on a 1 Hour Shaft/Stairwall Using a 2-1/2" X 20 ga. CH Stud on 8 ft. and 10 ft. Wall Heights - Dated 12/10/2003 - Stamped by a professional engineer.

ICC-ES Report NER-258 - **USG** Drywall Shaft Partition Systems - Dated April 1, 1991

Product Documentation

NYC Department of Buildings, Report MEA 309-03-M Volume 2 - Fire Rated Gypsum Panels, Non- Load Bearing Shaft Wall Assembly - Dated 4/23/2007

Test report No. Tz871, Book 22E - Fire Tests of One-Hour Cavity Shaft Wall System Having C-H Vented Studs - Dated 4/3/1975.

Test report for - Fire Resistance of United States Gypsum Company's 3-Hour Cavity Shaft Wall System - Dated 2/16/1972.

Test report for - Fire Tests of Two-Hour Cavity Shaft Wall System Having C-H Vented Studs - Dated 6/23/1975.

Wiss, Janney, Elstner Associates, Inc, report no. 2006.0351 - New York Local Law 26; Rule 32-05 Impact Resistance Testing for Stair and Elevator Enclosures using USG Shaft Wall System with FIBEROCK VHI and SHEETROCK Firecode Core Panels - Dated 2/16/2007.

Opinion Letter for USG's Shaft Wall Systems - Fire Resistance Classification - Dated 10/13/2010.