ICC PEI LLC

AER-09038

ICC PEI LLC is an accredited **ISO Standard 17065** Product Certifier. This **Assembly Evaluation Report** represents a system that **ICC PEI LLC** has Evaluated. This **Assembly Evaluation Report** in no way implies warranty for these products or relieves **United States Gypsum Company** of their liabilities for their products and this system. This **AER** is an official document if it is within one year of the Initial or Re-Approvad date.

Initial Approval	Re-Approved
April, 2009	October, 2021

See all Reports at: www.p-e-i.com

Report Owner

United States Gypsum Company
550 West Adams Street
Chicago, IL 60661

For Evaluation Report Questions

usg4you@usg.com
USG Support: 800.USG4YOU

Assemblies

USG Shaft Walls, Stair Walls & Corridors

Assemblies Evaluated For

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

Code Compliance

2012 & 2015 International Building Code		
Section 403.2.3	Section 707.3.1	Section 713
Section 703.2	Section 707.3.2	Section 2203
Section 703.3	Section 707.5	Section 708, 1020.1

2018 International Building Code		
Section 403.2.3	Section 707.3.1	Section 713
Section 703.2	Section 707.3.2	Section 2202
Section 703.3	Section 707.5	Section 708, 1020.1

1. **USG Shaft & Stair Walls Systems** meet the requirements of 1-hour, 2-hour, and 3-hour fire resistive rated assemblies when tested in accordance with ASTM E119 and constructed in accordance with the requirements of the applicable UL Design Number (or equivalent).
2. Meets the requirements for structural integrity of exit enclosures and elevator hoist way enclosures for High-Rise Buildings (Section 403.2.3. of the 2012, 2015 and 2018 IBC) when installed in accordance with the abuse resistant assemblies listed on page two (2) of this **Assembly Evaluation Report** (**AER**). Approved abuse resistant assemblies have been tested in accordance with ASTM C1629.

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 A653 SS Grade 33 for 24ga. minimum thickness and ASTM A653 SS Grade 40 for 20ga minimum thickness. The galvanization coating shall be a G40 minimum. The available sizes are 2-1/2-in, 4-in and 6-in deep and a length of 16-ft in 24 or 20 gauge. Position steel J-runners at floor and ceiling with the 1-in leg towards the finished side of the wall. Securely attach the runners to the structure supports as design use describes.

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, except where Z-Clips are used as in UL Design HW-D-0609.

2. Steel Studs

USG Steel C-H and E Studs are manufactured from cold roll-formed light gauge steel conforming to ASTM A653 SS Grade 33 for 25ga thickness and ASTM A653 SS Grade 40 for 20ga minimum thickness. The galvanization coating shall be a G40 minimum. The available sizes are 2-1/2-in, 4-in and 6-in deep and a length of 16-ft in 25 or 20 gauge.

Cut the C-H Studs 3/8-in to 1/2-in 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. The C-H Studs must have a current evaluation report for use in any **USG** assemblies shown within this report.

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.
Control Joints: Install full length steel E-Stud or J-Runner at edges of control joints, to fully support gypsum panels.
C-H Studs: Based on stud size shown in Table 1 and Figure 7 of this **AER**.

Component Descriptions Continued

3. Gypsum Liner Panels

Tested for Composite Limiting Heights Tables 2, 3, & 4:

Sheetrock® Brand Gypsum Liner Panels- UL Type SLX, 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-in x 24-in wide x 8-ft to 14-ft long. Must meet the minimum requirements of ASTM C1396.

Alternatives for UL Fire Resistance:

Sheetrock® Brand Mold Tough™ Gypsum Liner Panels- UL Type SLX feature a non-combustible, moisture and mold-resistant gypsum core encased in moisture and mold-resistant, 100% recycled **blue** face and back papers. Available 1-in thick, 24-in wide and in lengths up to 14-ft. Must meet the minimum requirements of ASTM C1396.

Sheetrock® Brand Glass-Mat Liner Panel- UL Type SLX have a noncombustible, moisture- and mold-resistant gypsum core that is encased in moisture- and mold-resistant glass mat. Available 1-in thick, 24-in wide, and lengths up to 14-ft. Must meet the minimum requirements of ASTM C1658.

Note: All of these panels should be cut 1-in 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 must be UL/ULC classified for fire resistance and identified as Type SLX on the UL marking and UL Fire Resistance Directory.

4. Gypsum Wallboard

Tested for Composite Limiting Heights Tables 2, 3, & 4:

Sheetrock® Brand Firecode® C Panels-UL Type C have been tested to generate the shaft/stairwell limiting heights for wall assemblies shown in Figures 1, 2, 3, 4, and 5. Panels are available in 1/2-in and 5/8-in thicknesses, 48-in wide and lengths up to 14-ft. Product must be UL/ULC Classified for fire-rated construction (Type C) and must meet the requirements of ASTM C1396.

Sheetrock® Brand Firecode® X Panels- UL Type SCX have been tested to generate the shaft/stair wall limiting heights for the wall assembly described by Figure 6. Panels are available 5/8-in thick, 48-in or 54-in wide and lengths up to 14-ft. Product must be UL/ULC Classified for fire-rated construction (Type SCX) and must meet the requirements of ASTM C1396.

Alternatives for UL Fire Resistance and/or Abuse Resistance:

Sheetrock® Brand Mold Tough® Gypsum Panels, have a non-combustible, moisture-resistant gypsum core encased in moisture and mold-resistant, 100 percent recycled **green** face and **brown** back paper. Available in **Firecode** - UL Type SCX and **Firecode C** - UL Type C core formulations in the same widths, thicknesses and lengths listed above. The panels have been tested for use in abuse resistant assemblies in accordance with ASTM C 1629, Class 2 Impact Rating (Soft Body), Class 1 Impact Rating (Hard Body). Product must be UL/ULC Classified for fire-rated construction (Type C or Type SCX) and must meet the requirements of ASTM C1396.

Sheetrock® Brand Mold Tough® VHI (Very High Impact) AR (Abuse Resistant) Gypsum Panels- UL Type AR have a non-combustible, moisture-resistant core encased in moisture and mold-resistant, 100 percent recycled **green** face and **brown** back papers. A fiberglass reinforcing mesh is imbedded in the core adjacent to the back paper. Available in **Firecode** core formulation in the same widths, thicknesses, and lengths listed above. The panels have been tested for use in abuse resistant assemblies in accordance with ASTM C 1629, Class 3 Impact Rating (Soft Body), Class 3 Impact Rating (Hard Body). Product must be UL/ULC Classified for fire-rated construction (Type AR) and must meet the requirements of ASTM C1396.

Fiberock® Brand AR (Abuse-Resistant) Interior Panels- UL Type FRX-G are high performance abuse resistant panels. Available panels are 5/8-in thick x 48-in wide and available in lengths up to 12-ft. The panels have been tested for use in abuse resistant assemblies in accordance with ASTM C 1629, Class 3 Impact Rating (Soft Body) and Class 2 Impact Rating (Hard Body). Product must be UL/ULC Classified for fire-rated construction (Type FRX-G) and must meet the requirements of ASTM C1278 as well as ASTM C473.

Tested Abuse Resistant Assemblies:

1. Single layer of **5/8-in Fiberock VHI**- UL Type AR on 24-in o.c. 400CH20-34 Studs - Passed ASTM C1629 Hard Body Impact Level 2.
2. Single layer of **5/8-in Sheetrock Firecode Core Face**- UL Type SCX and a single layer of **5/8-in Fiberock VHI**- UL Type AR Base on 24-in o.c. 400CH20-34 Studs - Passed ASTM C1629 Hard Body Impact Level 3 and Soft Body Impact Level 2.
3. **Two layers of 5/8-in Fiberock VHI**- UL Type AR on 24-in o.c. 400CH20-34 Studs - Passed ASTM C1629 Hard Body Impact Level 3 and Soft Body Impact Level 2.

~ *Cavity Shaft Wall Systems* ~

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

1. A minimum 2-1/2" wide 24 gauge floor and ceiling J-runners, attached to structure as described above.
2. Apply one (1) layer, 5/8" thick Sheetrock® Brand Panels- UL Type C, SCX, AR or FRX-G 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. A minimum 2-1/2-in 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. 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- UL Type SLX, Friction-fitted in "H" portion of C-H studs.
5. For Fire Resistance details and construction methods, refer to UL Design #U415 System A and the **USG** installation instructions.

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

1. A minimum 2-1/2-in deep 24 gauge floor and ceiling J-runners, attached to structure as described above.
2. Apply two (2) layers, 1/2" thick Sheetrock® Brand **Firecode**® C Core Gypsum Panels - UL Type C. 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 to 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 vertically, 8" o.c. when applied horizontally. All joints between the base and face layers must be staggered.
3. A minimum 2-1/2-in deep **USG** C-H studs 25 gauge, spaced 24-in o.c., with the H-Section of the C-H stud towards the shaft side of the assembly. 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-in long Type S screws that are spaced 12-in o.c.).
4. 1-in thick Sheetrock® Brand Gypsum Liner Panel- UL Type SLX, Friction-fitted in "H" portion of C-H studs.
5. For Fire Resistance details and construction methods, refer to UL Design #U415 System B and the **USG** installation instructions.

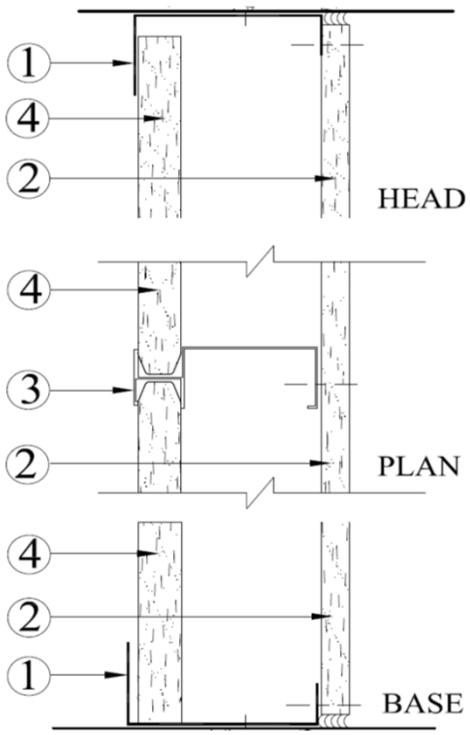


Figure 1 - One Hour Cavity Shaft Wall (Non-Load Bearing)

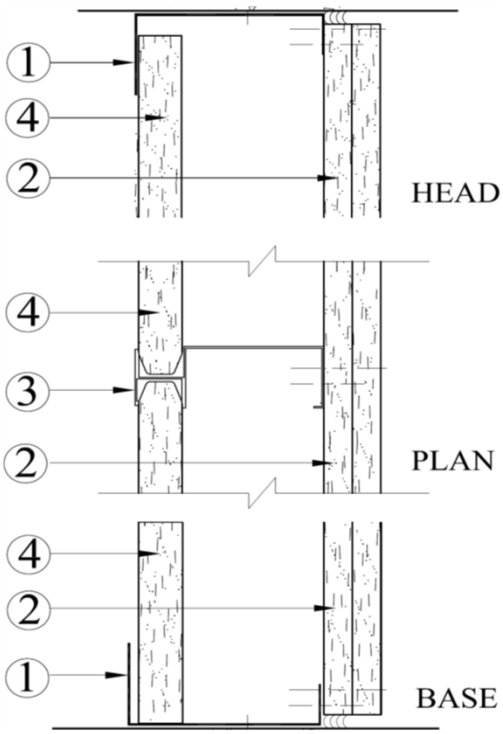


Figure 2 - Two Hour Cavity Shaft Wall (Non-Load Bearing)

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

1. A minimum 2-1/2" deep, 24 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-in o.c. center for a horizontal
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. 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-UL Type SLX Friction-fitted in "H" portion of C-H studs.
5. For Fire Resistance details and construction methods, refer to UL Design #U415 System E and the **USG** installation instructions.

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

1. A minimum 2-/12" deep 24 gauge floor and ceiling J-runners, attached to the structure as described in the Figure 4.
2. Apply three (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-in 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. 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-UL Type SLX Friction-fitted in "H" portion of C-H studs.
5. For Fire Resistance details and construction methods, refer to UL Design #U415 System G and the **USG** installations instructions.

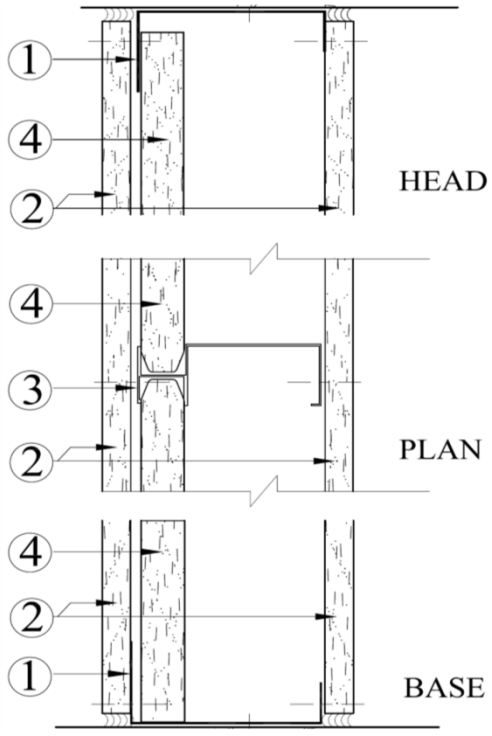


Figure 3 - Two Hour Cavity Stair Wall (Non-Load Bearing)

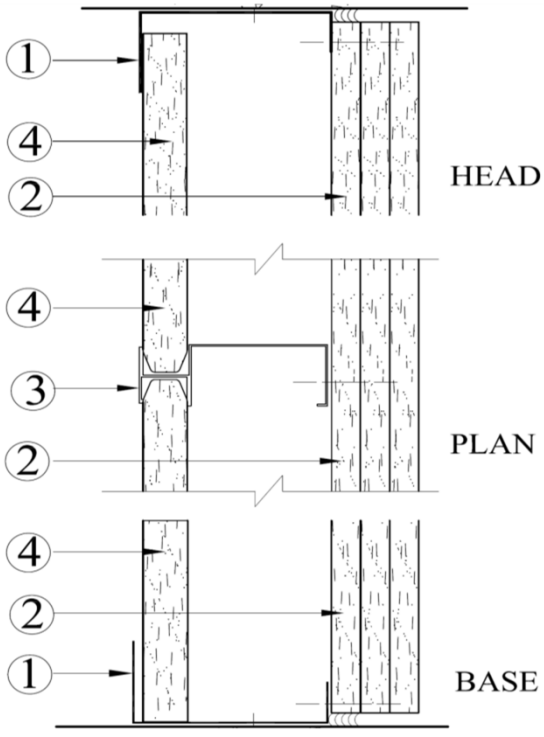


Figure 4 - Three Hour Cavity Shaft Wall (Non-Load Bearing)

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

1. A minimum 2-1/2" deep 24 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, and one (1) layer over the flange of the "H" section of the stud. The Base layer on the "room" side and the single layer of the "shaft" side shall be attached with a 1" long Type S screw spaced 24" o.c. in the field and at the edges when installed vertically, or 16" o.c. when installed horizontally. The face layer on the "room" side shall be attached with 1-5/8" long Type S steel screws spaced 16" o.c. when installed vertically, or 12" o.c. when installed horizontally with screws offset 6" from the base layer. Vertical joints are centered over the studs and staggered 24" o.c. on adjacent layers. Horizontal joints on adjacent layers are staggered a minimum of 12" 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. 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- UL Type SLX Friction-fitted in "H" portion of C-H studs.

5. For Fire Resistance details and construction methods, refer to UL Design #U415 System H and the **USG** installation instructions.

Two-Hour Horizontal Stud 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 - UL Type SCX, AR, or FGX-G 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 with the "C" section of the studs facing down. Studs cut to length to allow a 3/8" to 1/2" maximum gap at each end of the wall. As an option, the studs may be screw attached to the side J-Runners with (4) total 1/2" long pan head Type S screws. One at each end of the stud on each side of the wall.

4. 1" thick Sheetrock® Brand Gypsum Liner Panel- UL Type SLX Friction-fitted in "H" portion of C-H studs.

5. Horizontal Stud Wall Assembly - The wall width is limited to the length of the Gypsum Liner Panel.

6. For Fire Resistance details and construction methods, refer to UL Design #U437 and the **USG** installation instructions.

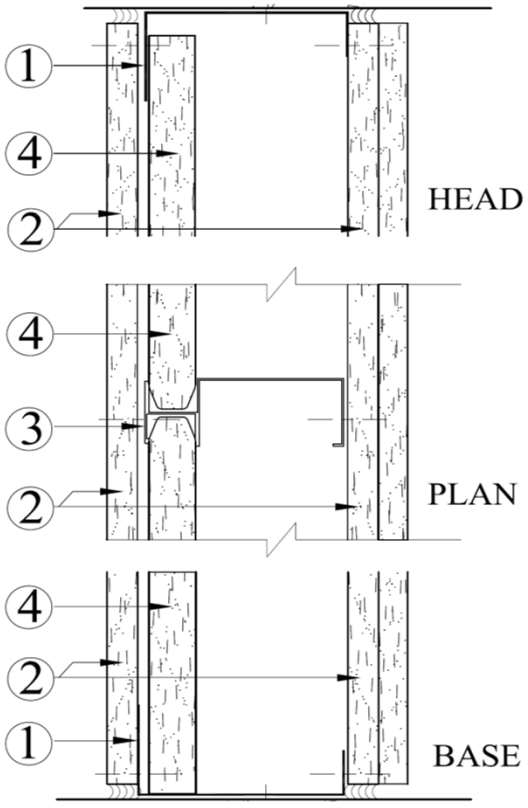


Figure 5 - Three Hour Cavity Stair Wall (Non-Load Bearing)

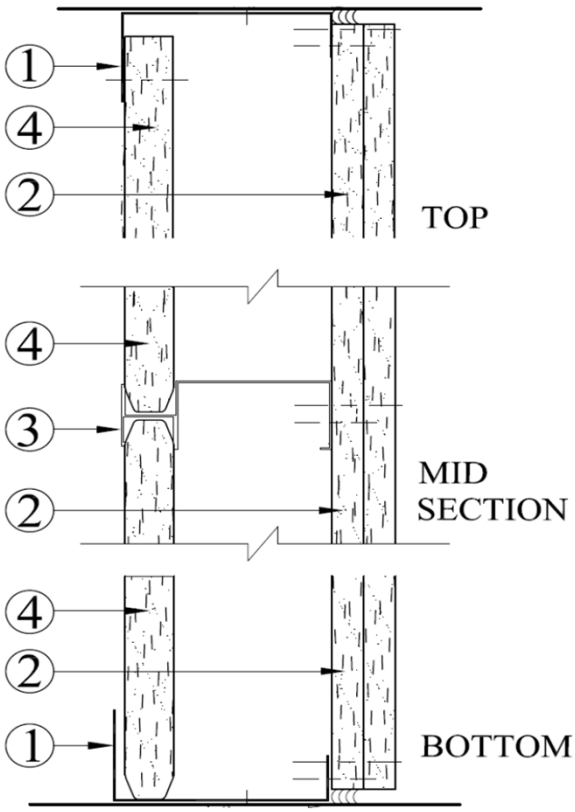


Figure 6 - Two Hour Horizontal Stud Shaft Wall Assembly (Non-Load Bearing)

Table 1 - Nominal C-H Stud Dimensions[1] (inches)

Stud Designation	A	B	C	D	E	F[2]
212CH25-18	2 1/2	1 3/8	1 29/64	31/32	7/32	25ga
212CH20-34	2 1/2	1 3/8	1 29/64	31/32	7/32	20ga
400CH25-18	4	1 3/8	1 29/64	31/32	7/32	25ga
400CH20-34	4	1 3/8	1 29/64	31/32	7/32	20ga
600CH20-34	6	1 3/8	1 29/64	31/32	7/32	20ga

Notes:

1. Refer to Figure 7 for location of tabulated dimensions.
2. Dimension "F" refers to the minimum steel thickness and is shown as the minimum nominal gauge thickness of the material allowable.

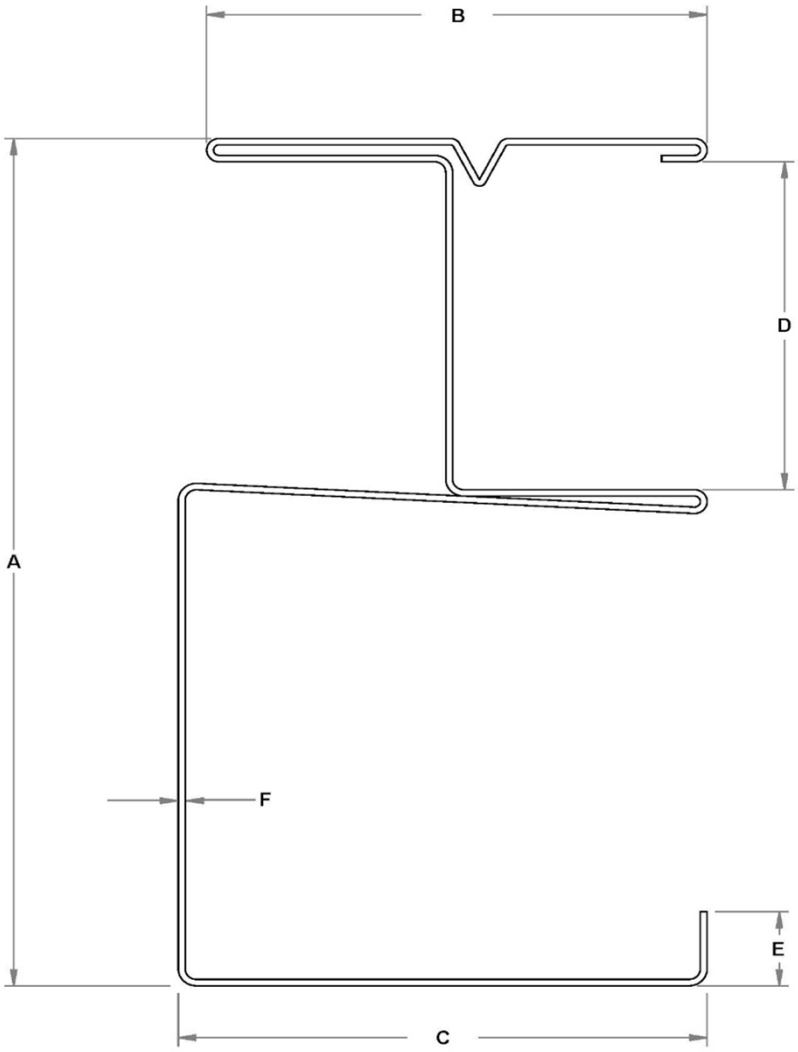


Figure 7 - Nominal C-H Stud Dimension Locations
(See Table 1 for Values)

Table 2 - Limiting Heights Vertical Shaft Walls[1,2]

		1-hr Shaft Wall / Stair Wall			
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	13 10	9 4	7 0	4 8
	L/240	11 0	9 4	7 0	4 8
	L/360	9 7	8 4	7 0	4 8
212CH20-34	L/120	16 0	14 0	12 9	11 1
	L/240	12 9	11 1	10 1	8 8
	L/360	11 1	9 8	8 8	7 5
400CH25-18	L/120	10 6	7 0	5 3	3 6
	L/240	10 6	7 0	5 3	3 6
	L/360	10 6	7 0	5 3	3 6
400CH20-34	L/120	22 3	19 5	17 8	14 3
	L/240	17 8	15 5	14 0	12 3
	L/360	15 5	13 6	12 3	10 8
600CH20-34	L/120	30 11	21 5	16 1	10 8
	L/240	24 6	21 5	16 1	10 8
	L/360	21 5	18 8	16 1	10 8

Notes:

1. See Figure 1 for vertical stud installation details within shaft/stair wall.
2. Tabulated limiting heights are based upon the tested composite behavior of the 1 hour wall assemblies described in this **AER** only. Alternative designs are outside the scope of this **AER**.

Table 3 - Limiting Heights - Shaft Walls with Vertical & Horizontal Stud Orientation[1,2,3]

		2-hr Stair Wall								2-hr Shaft Wall							
Stud Description	Allowable Deflection	5psf design (ft - in)		7.5psf design (ft - in)		10psf design (ft - in)		15psf design (ft - in)		5psf design (ft - in)		7.5psf design (ft - in)		10psf design (ft - in)		15psf design (ft - in)	
212CH25-18	L/120	14	4	12	6	10	5	6	11	14	6	12	8	10	5	6	11
	L/240	11	4	9	11	9	0	6	11	11	6	10	0	9	1	6	11
	L/360	9	11	8	8	7	10	6	10	10	0	8	9	8	0	6	11
212CH20-34	L/120	19	0	16	7	14	7	12	3	17	1	14	11	13	6	11	10
	L/240	14	7	12	3	10	10	9	3	13	6	11	10	10	9	9	4
	L/360	12	3	10	4	9	3	7	10	11	10	10	4	9	4	7	10
400CH25-18	L/120	19	0	15	7	13	2	8	9	18	4	15	0	13	0	8	9
	L/240	17	4	14	7	12	11	8	9	16	1	14	1	12	9	8	9
	L/360	14	7	12	3	10	11	8	9	14	1	12	4	11	2	8	9
400CH20-34	L/120	23	0	23	0	21	0	17	4	23	0	21	0	19	1	16	5
	L/240	21	0	17	7	15	8	13	3	19	1	16	8	15	2	13	3
	L/360	17	7	14	11	13	3	11	3	16	8	14	7	13	3	11	7
600CH20-34	L/120	31	0	29	3	21	11	14	7	31	0	27	4	21	11	14	7
	L/240	28	0	23	10	21	4	14	7	25	8	22	5	20	5	14	7
	L/360	23	10	20	5	18	3	14	7	22	5	19	7	17	10	14	7

Notes:

1. See Figure 2 and 3 for vertical stud installation details within shaft/stair wall.
2. See Figure 6 for horizontal stud installation details within shaft/stair wall. The horizontal wall width is limited to the length of the Gypsum Liner Panel and only 400CH20-34 and 600CH20-34 steel studs are permitted for horizontal stud installations.
3. Tabulated limiting heights are based upon the tested composite behavior of the 2 hour wall assemblies described in this **AER** only. Alternative designs are outside the scope of this **AER**.

Table 4 - Limiting Heights Vertical Shaft Walls[1,2] - Applicable to Fig. 4 & 5

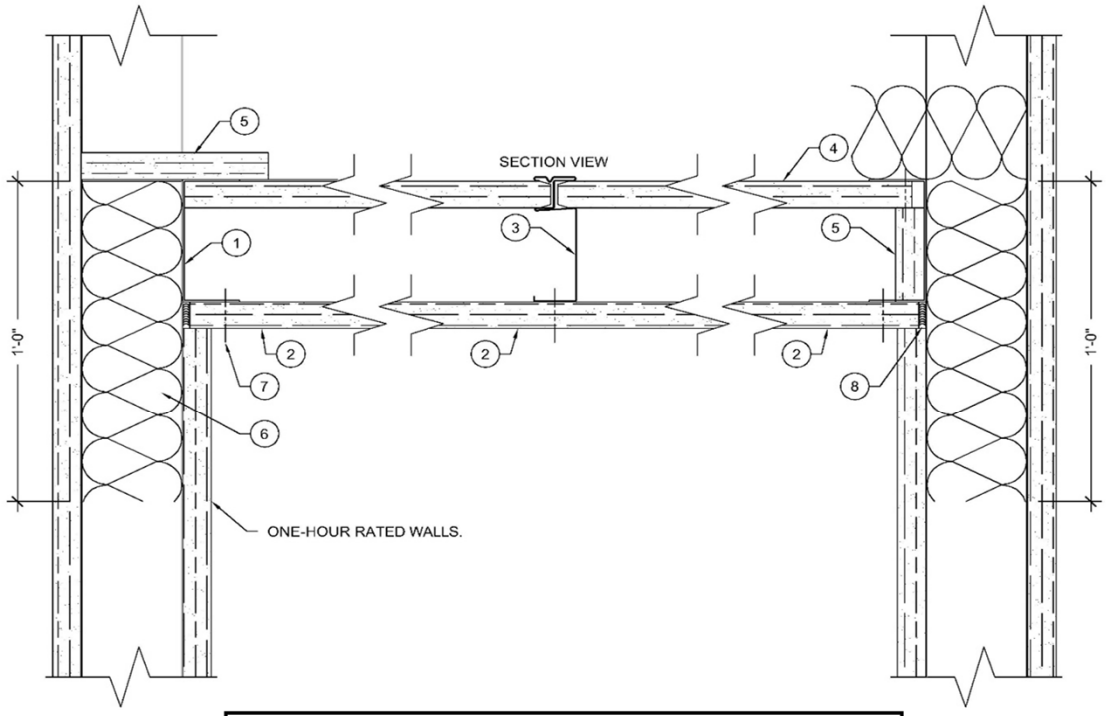
		3-hr Stair Wall								3-hr Shaft Wall							
Stud Description	Allowable Deflection	5psf design (ft - in)		7.5psf design (ft - in)		10psf design (ft -in)		15psf design (ft - in)		5psf design (ft - in)		7.5psf design (ft - in)		10psf design (ft - in)		15psf design (ft - in)	
212CH25-18	L/120	14	4	12	6	10	5	6	11	14	6	12	8	10	5	6	11
	L/240	11	4	9	11	9	0	6	11	11	6	10	0	9	1	6	11
	L/360	9	11	8	8	7	10	6	10	10	0	8	9	8	0	6	11
212CH20-34	L/120	19	0	16	7	14	7	12	3	17	1	14	11	13	6	11	10
	L/240	14	7	12	3	10	10	9	3	13	6	11	10	10	9	9	4
	L/360	12	3	10	4	9	3	7	10	11	10	10	4	9	4	7	10
400CH25-18	L/120	19	0	15	7	13	2	8	9	18	4	15	0	13	0	8	9
	L/240	17	4	14	7	12	11	8	9	16	1	14	1	12	9	8	9
	L/360	14	7	12	3	10	11	8	9	14	1	12	4	11	2	8	9
400CH20-34	L/120	23	0	23	0	21	0	17	4	23	0	21	0	19	1	16	5
	L/240	21	0	17	7	15	8	13	3	19	1	16	8	15	2	13	3
	L/360	17	7	14	11	13	3	11	3	16	8	14	7	13	3	11	7
600CH20-34	L/120	31	0	29	3	21	11	14	7	31	0	27	4	21	11	14	7
	L/240	28	0	23	10	21	4	14	7	25	8	22	5	20	5	14	7
	L/360	23	10	20	5	18	3	14	7	22	5	19	7	17	10	14	7

Notes:

1. See Figure 4 and 5 for vertical stud installation details within shaft/stair wall.
2. Tabulated limiting heights are based upon the tested composite behavior of the 3 hour wall assemblies described in this **AER** only. Alternative designs are outside the scope of this **AER**.

One-Hour Corridor Assembly, See Figure 8

1. A minimum 2-1/2" deep 24 gauge J-runner attached horizontally to perimeter or boundary walls with a power actuated fasteners.
2. Gypsum Wall Board:
   a. For a one (1) hour assembly: Attach one (1) layer of 5/8" thick Sheetrock® Brand Panel - UL Type C, SCX, AR or FRX-G 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.
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 - UL Type SLX Friction-fitted in "H" portion of C-H studs.
5. Ripper Board:
   a. Where the liner panel (item 4) is cut short to be installed, gaps must be filled by using a strip of 1" thick Sheetrock® Brand Gypsum Liner Panel - UL Type SLX.
   b. As an alternative you can use mineral fiber insulation to prevent exposure to the top leg of the J-runner that forms the ceiling.
   c. Where the wall section extends above the corridor ceiling, above corridor height a rip of board must be used to cap the opening between studs and a strip of mineral fiber insulation as described in item 6 must be used.
6. In order to prevent the passage of heat and gases, a 12" minimum long strip of mineral fiber insulation must be used to fill in the stud cavity of the walls.
7. Liner panel fastened to J section with 1-5/8" Type S screw @ 12" o.c.
8. **USG** Sheetrock® Brand **Firecode®** Smoke-Sound Sealant, USG Sheetrock® Brand Acoustical Sealant or equivalent.



1-Hour Corridor	
Single layer 5/8-in gypsum panels	Max. Span between Studs
212CH25-18<2>	8-ft - 6-in
212CH20-34<3>	10-ft - 4-in
400CH25-18<2>	9-ft - 3-in
400CH20-34<3>	14-ft - 11-in
600CH20-34<3>	20-ft - 10-in

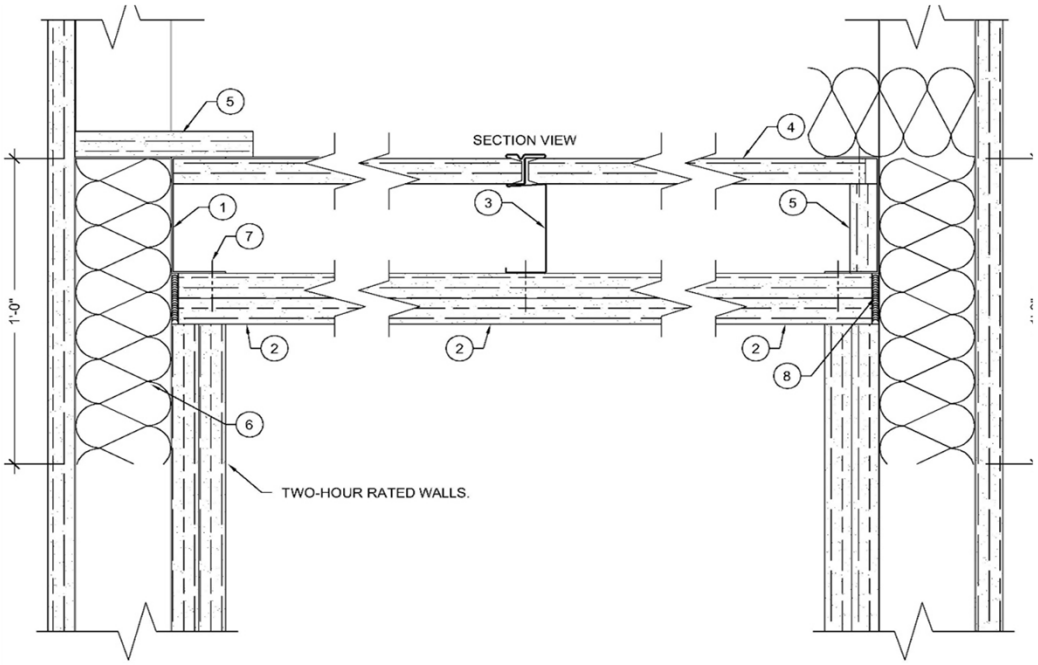
Notes:

1. Based on L/240 allowable deflection, full length studs only at 24-in o.c.max spacing and JR24 runner. Calculated allowing for gypsum panel and framing weight only.
2. J-Runner connection to wall/building must meet or exceed 189-lbs capacity at every stud location (24-in o.c.).
3. J-Runner connection to wall/building must meet or exceed 386-lbs capacity at every stud location (24-in o.c.).
4. C-H studs are not designed to carry live loads, mechanical equipment or provide material storage area. See USG SA926.

Figure 8 - One Hour Corridor Assembly and Limiting Spans

Two Hour Corridor Assembly, See Figure 9

1. A minimum 2-1/2" deep 24 gauge J-runner attached horizontally to perimeter or boundary walls with a power actuated fasteners.
2. Gypsum Wall Board:
   a. 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-runner 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 of 1/2" long Type S-12 screws, one on each side.
4. 1" thick Sheetrock® Brand Gypsum Liner Panel - UL Type SLX Friction-fitted in "H" portion of C-H studs.
5. Ripper Board:
   a. Where the liner panel (item 4) is cut short to be installed, gaps must be filled by using a strip of 1" thick Sheetrock® Brand Gypsum Liner Panel- UL Type SLX.
   b. As an alternative you can use mineral fiber insulation to prevent exposure to the top leg of the J-runner that forms the ceiling.
   c. Where the wall section extends above the corridor ceiling, above corridor height a rip of board must be used to cap the opening between studs and a strip of mineral fiber insulation as described in item 6 must be used.
6. In order to prevent the passage of heat and gases, a 12" minimum long strip of mineral fiber insulation must be used to fill in the stud cavity of the walls.
7. Liner panel fastened to J section with 1-5/8" Type S screw @ 12"o.c.
8. **USG** Sheetrock® Brand **Firecode®** Smoke-Sound Sealant, USG Sheetrock® Brand Acoustical Sealant or equivalent.



2-Hour Corridor	
Double layer 1/2-in gypsum panels	Max. Span between Studs
212CH25-18<2>	7-ft - 10-in
212CH20-34<3>	9-ft - 8-in
400CH25-18<2>	7-ft - 7-in
400CH20-34<3>	14-ft - 0-in
600CH20-34<3>	19-ft - 7-in

Notes:

1. Based on L/240 allowable deflection, full length studs only at 24-in o.c.max spacing and JR24 runner. Calculated allowing for gypsum panel and framing weight only.
2. J-Runner connection to wall/building must meet or exceed 189-lbs capacity at every stud location (24-in o.c.).
3. J-Runner connection to wall/building must meet or exceed 386-lbs capacity at every stud location (24-in o.c.).
4. C-H studs are not designed to carry live loads, mechanical equipment or provide material storage area. See USG SA926.

Figure 9 - Two-Hour Corridor Assembly and Limiting Spans

Two Hour Horizontal Gypsum Duct Enclosure, See Figure 10

1. A minimum 2-1/2-in deep 24 gauge J-runners attached horizontally to the perimeter or boundary wall, with power actuated fasteners. Connection of the vertical C-H stud to the top J-runner and connection of the top J-runner to the structure shall be capable of carrying the weight of the duct enclosure and verified by a registered design professional.

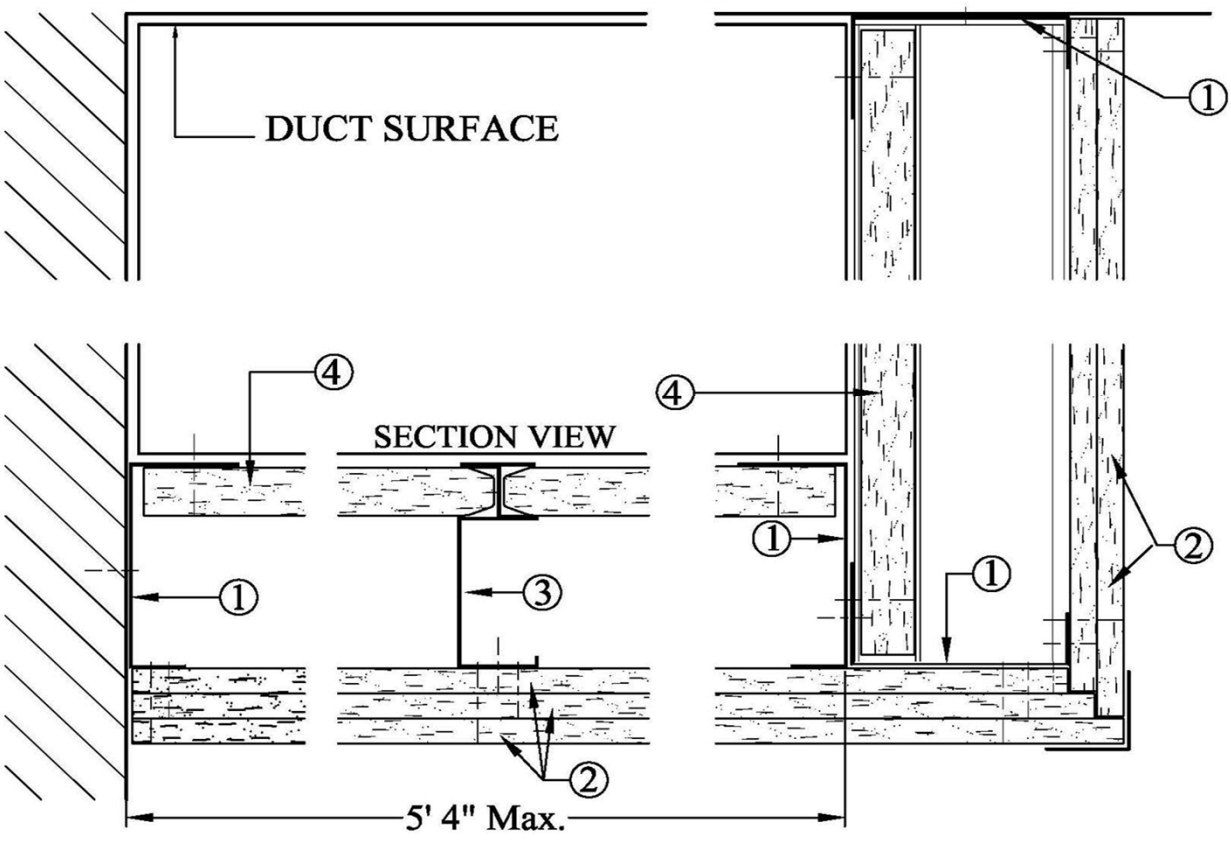
2. Apply three (3) layers of 1/2-in Sheetrock® Brand **Firecode®** C Core Gypsum Panels - UL Type C to the underside "ceiling" side of the assembly. The base layer is attached parallel to the C-H studs with 1-in long Type S Screws that are spaced 24-in o.c. in the field and at the edges. The second layer is attached parallel to the C-H studs with 1-5/8-in long Type S screws that are spaced 12" o.c. in the field and edges, with all the joints staggered 24-in o.c. from the base layer. The face layer is applied perpendicular to the C-H studs and attached with 2" long Type S screws spaced 12-in o.c., starting 1-in and 6-in from the paper edge with the butt joints located mid-span between the C-H studs and attached with 1-1/2-in long Type G screws spaced 8-in o.c. and spaced 3-in. on each side of butt joint. Butt joints in the face layer staggered a minimum of 24".

3. Install the C-H studs perpendicular to the J-runners, spacing them 24-in 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-in. long Type S-12 screws, connecting the C-section to the 1-in leg of the J-runner, one on each end. A 2-1/2-in. wide, 30 gauge flat metal strap is attached perpendicular and at the mid-span to the H-section of the C-H stud on the shaft side with 1/2-in. long Type S-12 screws, one at each C-H stud and one screw to the 2-1/4-in. long leg of J-runner at each end.

4. 1-in thick Sheetrock® Brand Gypsum Liner Panel - Friction-fitted in "H" portion of C-H studs and screw attached to the 2-1/4-in leg of the J-runner with 1-5/8-in Type S screws spaced 12-in o.c., spaced 6-in away from C-H stud.

5. Install the boundary wall side of the assembly in accordance with the "Two-Hour Cavity Shaftwall" as shown in Figure 2. Drive 1-5/8" Type S screws 24" o.c. (max) through the shaftliner at the corner and abutments.

6. For more details on construction methods, including fasteners the **USG** installation instructions shall be followed.



2-Hour Metal Duct Enclosure	
Triple layer 1/2-in gypsum panels	Maximum Span
All Stud Sizes	5-ft - 4-in

Notes:

1. Horizontal membrane maximum span based upon the maximum 5-ft - 4-in span tested in accordance with ASTM E119.
2. J-Runner connection to vertical C-H Stud shall consist of two #8 screws (or equivalent). J-Runner connection to wall/building shall meet the same requirements as the ceiling applications in Figures 8 and 9.

Figure 10 - Two Hour Horizontal Duct Enclosure Assembly and Limiting Span

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** Application Guide Specifications.

2. The **USG** SHEETROCK® Brand Cavity Shaftwall system is designed to enclose stair walls, 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 are limited to fire-resistance only. Structural and other requirements shall be in accordance with pertinent building code and manufacturer's requirements.

Product Labeling

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

Gypsum Board & Liner Panels:

1. **USG** Name
2. Product Name
3. Plant Identifier & Date Code
4. UL/ULC Classification (or equivalent) label for Firecode Resistance, surface burning characteristics and non-combustibility.

Steel C-H Studs:

1. Each bundle of steel studs contains a label with the steel gauge and yield strength.
2. Each stud is identified at a maximum spacing of 96-in with the manufacturer name, product code, minimum thickness, and yield strength.

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 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)

ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials

ASTM C473-10 - Standard Specification for Gypsum Board, Section 5 Gypsum Wallboard, Predecorated Gypsum Board and Laminated Gypsum Wallboard.

ASTM C1278-17 - Standard Specification for Fiber-Reinforced Gypsum Panel.

ASTM C1629-06 - Standard Classification for Abuse-Resistant Nondecorated Interior Gypsum Panel Products and Fiber-Reinforced Cement Panels.

Product Documentation

An Assembly Evaluation Service Agreement between *Pei* **Evaluation Service®** and **United States Gypsum Company**

USG Drywall Shaft Partition System Product Installation Guidelines - SA926-USA-ENG - Revised: 2/2017

Various Test Reports, Opinion Letters, & Third Party Product Listings Used as Verification of Fire Resistance, Abuse Resistance, and Transverse Load Capacity.

Various Engineering Calculations for Limiting Heights and Horizontal Spans.