Fire Wall/Party Wall







Description



Solid-type



Cavity-type

USG Area Separation Fire Walls/Party Walls are used for constructing common walls with fire-resistive protection for adjacent properties. These lightweight, non-load-bearing gypsum drywall assemblies are designed as vertical fire barriers for fire walls and party walls separating occupancies in wood-frame apartments and townhouses. Large-size gypsum panels used in conjunction with steel studs and runners quickly become thin, space-saving walls offering excellent privacy. Their engineered performance and low labor and material costs make these systems superior to masonry construction.

Available in two basic systems both providing fire-resistant walls from ground level to roof:

Solid Type, with independently framed interior gypsum panel surfaces both sides of fire wall or party wall.

Cavity Type, with integral interior gypsum panel surfaces for commonly shared party walls between apartments.

Solid-Type Wall consists of two 1" thick SHEETROCK Brand Gypsum Liner Panels installed vertically between 2" USG Steel C-Runners. Panel edges are inserted in 2" USG Steel H-Studs spaced 24" o.c. C-runners are installed at top and bottom of wall and back-to-back between vertical panels at a convenient height above each intermediate floor. H-Studs are attached on both sides to adjacent wood framing at intermediate floors, the bottom chords of attic trusses, and at the roof line with 0.063" USG aluminum angle clips designed to break away when exposed to fire, thus permitting a fire-damaged structure to fail while the fire barrier remains intact. Refer to specifications for exact clip placement.

With aluminum angle clips attached on both sides of 25 gauge H-studs, the assemblies are suitable for spans (between clip angle supports) up to 10' under 5 psf lateral load without exceeding L/240 allowable deflection (for walls with exterior exposure, see section 3.4 of the specification).

With 2" THERMAFIBER Sound Attenuation Fire Blankets (SAFB) stapled each side of liner panels, the assembly has obtained a 3 hr. fire resistance rating allowing separate selection and construction of tenant walls.

Cavity-Type Wall consists of steel C-H Studs and SHEETROCK Brand Gypsum Liner Panels set in steel runners and faced both sides with SHEETROCK Brand Gypsum Panels, Water-Resistant, FIRECODE C Core. Liner panels, 1" thick, are erected vertically with ends set into 2-1/2" USG C-Runners and edges inserted into specially formed 2-1/2" USG Steel C-H Studs. C-runners are installed singly at top and bottom of wall and back-to-back between vertical liner panels on a line above each intermediate floor, the bottom chords of attic trusses, and at roof line. Aluminum clips, which attach the C-H Studs on both sides to adjacent wood framing, break away in the same fashion as with solid-type walls. To improve sound transmission loss, THERMAFIBER SAFB are inserted in the stud cavity and RC-1 Resilient Channels or equivalent may be used to isolate the face layer on the cavity side.

With aluminum angle clips attached on both sides of 212CH25 steel studs, the assemblies are suitable for spans (between clip angle supports) up to 10' under 5 psf lateral load without exceeding L/240 allowable deflection (for walls with exterior exposure see section 3.4 of the specification).

Components used in these systems are designed to permit temporary exposure to inclement weather during construction.

USG STEEL H-stud slides in place over SHEETROCK Brand Gypsum Liner Panels.



USG Steel C-Runner fits over studs and panels. Second C-runner is then screw-attached back-to-back to lower runner to hold next level of studs and liner panels.



USG Aluminum Breakaway Clip is screw-attached to studs and framing. Under fire exposure, clip breaks away, permits fire-damaged wall to fail, leaving separation wall intact.





Features

These systems may be used in buildings up to four stories high (44') and with all common floor-ceiling heights found in multi-family housing. Both cavity and solid types are suitable for exterior walls with appropriate weather-resistant cladding when building offsets are desired.

Fire Resistance: Both types of Separation Walls offer 2 hr. and 3 hr. fire ratings.

Sound Isolation: STC ratings up to 60 with the solid system and 57 with the cavity system are available. **Lightweight:** These drywall assemblies weigh at least 50% less than masonry walls, allowing rapid installation. **Space-Saving:** Use of these assemblies gains valuable floor space. Thickness is 3-1/2" to 4" for Cavity Type Walls, compared to 8" to 12" for a masonry wall without interior finish.

Weather Resistance: Moisture-resistant components permit temporary exposure to inclement weather during construction

Code Compliance: In compliance with fire resistance requirements under evaluation reports of BOCA Report No. 89-13 and SBCCI PST ES Report No. 9834.

Limitations

Non-load-bearing; max. frame spacing: 24"; not to be used for shear walls; max. wall height: 44'.

		Fire-rated Construction		Acous	tical Performance	
Test Data— Solid Walls	Fire Rating	Detail & Physical Data	Description & Test No.	STC	Description & Test No.	System Reference
	2 hr.*	3½"	Solid Area Separation Wall—two 1" SHEETROCK Brand Gypsum Liner Panels set betw USG H-Studs 24" o.c.— min. 3/4" air space both sides separating liner panels from adjacent framing— UL Des U336	N/A		А
	2 hr.*		Solid Area Separation Wall—two 1" SHEETROCK Brand	46	TL-88-353	В
			Gypsum Liner panels set in USG H-Studs 24" o.c.	54	Based on 2" THERMAFIB	
			2 x 4 wd studs 16" o.c. each side on 2 x 4 plates min. 3/4" from liner panels—optional 1/2" SHEETROCK Brand	58	on one side— TL-88-34 Based on 2 x 4s and	8
		11½"	Gypsum Panels—UL Des U336	50	2" SAFB on both	
					sides—TL-88-347	
		M		57	Based on 2 x 4s and 3" SAFB on one side	
		<u> </u>			—TL-88-351	
				60	Based on 2 x 4s and	
					3" SAFB both sides — TL-88-350	
				45	-1L-66-350 Based on 2 x 3s, 5/8"	
					gypsum panels, no	
				54	SAFB— BBN-730104	
				54	Based on 2 x 3s, 5/8" gypsum panels,	
					2" SAFB one side	
					—BBN-730103	
				57	Based on 2 x 3s, 5/8" gypsum panels,	
					2" SAFB both sides	
					BBN-730102	
	3 hr*.	<u> </u>	Solid Area Separation Wall—two 1" SHEETROCK Brand Gyp		N/A	С
		14"	Liner Panels set in USG H-Studs 24" o.c.—2" THERMAFIBE SAFB both sides—blikts appl horiz with joints stag and stap to liner panels— WHI-495-0393/0394			

 $^{{}^\}star \text{These}$ systems do not provide a fire rating for adjacent wood-stud wall construction.

		Fire-rated Construction	Acoustical Performance				
Test Data— Cavity Walls	Fire Rating	Detail & Physical Data	Description & Test No.	STC	Description & Test No.	System Reference	
	2 hr.	31/2"	Cavity Area Separation Wall—1/2" SHEETROCK Brand Gypsum Panels, FIRECODE C core, both sides—1" SHEETROCK Brand Gypsum Liner Panels in USG 25 ga. C-H Studs 24" o.c.—single layer panels ea side appl vert & screw att—joints of gypsum panels stag on opp sides & fin—perim caulked— UL Des U415 wt 9 width 3-1/2"		Based on 1" SAFB in cavity— BBN-750704	А	
	2 hr.	1 7	Cavity Area Separation Wall—1/2" SHEETROCK Brand Gypsum Panels, FIRECODE C core—1" SHEETROCK Brand Gypsum Liner Panels set in USG 25 ga. C-H Studs 24" o.c.—RC-1 chan or equivalent 24" o.c. screw att to side opp liner panels—1-1/2" THERMAFIBER SAFB optional for fire rating—single layer panels ea side appl vert & screw att—joints stag on opp sides & fin—perim caulked—UL Des U415 wt 10 width 4"	50	Based on 1-1/2" SAFB in cavity	В	
	3 hr.	4	Cavity Area Separation Wall—5/8" SHEETROCK Brand Gypsum Panels, FIRECODE C core—1" SHEETROCK Brand Gypsum Liner Panels in USG 25 ga. C-H Studs 24" o.c., one side—1-1/2" THERMAFIBER SAFB optional for fire ratir—RC-1 chan 24" o.c. screw att to side opp liner panels—2 layers of 5/8"SHEETROCK Brand Gypsum Panels, FIRECOD Core, screw att to RC-1 chan—joints fin—perim caulked—UL DES U415 wt 14 width 4-7/	DE C	Based on 1-1/2" SAFB in cavity BBN-730622	С	

Where RC-1 Resilient Channel is indicated, RC-1 or an equivalent may be used. Where insulation is shown in assembly drawings, the specific product is required in the assembly to achieve the stated fire rating. Glass fiber insulation cannot be substituted for THERMAFIBER Insulation.

Sound
Transmission
Loss

Solid Wall Sound Transmission Loss—db

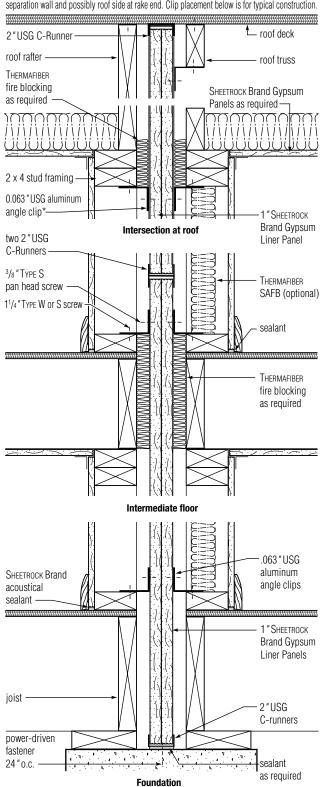
	Band center frequency—Hz																	
Test no.	Method	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	STC
TL-88-350	Lab	40	45	50	49	53	53	55	57	62	65	67	69	72	70	68	71	60
TL-88-347	Lab	34	40	48	48	50	52	55	56	61	64	66	69	72	70	69	73	58
BBN-730102	Lab	36	38	46	52	53	56	57	56	59	59	59	60	59	57	58	66	57
TL-88-351	Lab	36	36	45	47	51	52	54	56	61	64	66	69	72	71	69	73	57
BBN-730103	Lab	34	33	43	51	52	54	57	56	60	60	58	60	60	57	58	66	54
TL-88-348	Lab	31	33	42	45	48	49	52	54	59	63	65	68	70	68	67	71	54
TL-88-346	Lab	29	32	44	45	49	49	50	51	57	62	65	68	71	69	67	69	53
TL-88-344	Lab	29	29	37	43	46	44	47	49	55	61	64	66	70	70	69	71	50
TL-88-234	Lab	31	28	31	34	38	42	44	49	52	55	58	60	61	62	61	63	47
TL-88-353	Lab	26	25	29	35	39	45	47	52	58	61	65	69	71	67	67	70	46
BBN-730104	Lab	28	24	28	37	40	46	50	53	58	60	59	60	58	57	59	66	45

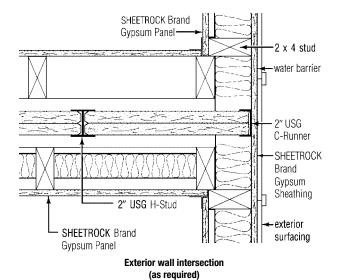
Cavity Wall Sound Transmission Loss—db

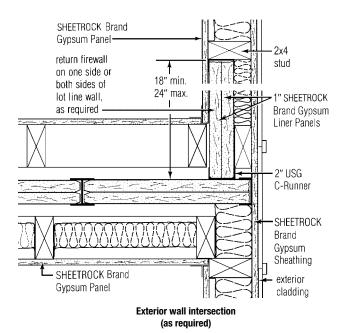
	Band cei	and center frequency—Hz																
Test no.	Method	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	STC
BBN-730622	Lab	35	38	44	50	51	55	56	55	61	63	62	65	65	60	57	64	57
BBN-750411	Lab	26	32	42	44	48	51	53	54	58	60	59	61	61	57	56	60	50
BBN-750704	Lab	23	26	35	39	43	48	49	51	54	58	58	60	60	55	51	53	47

Solid System

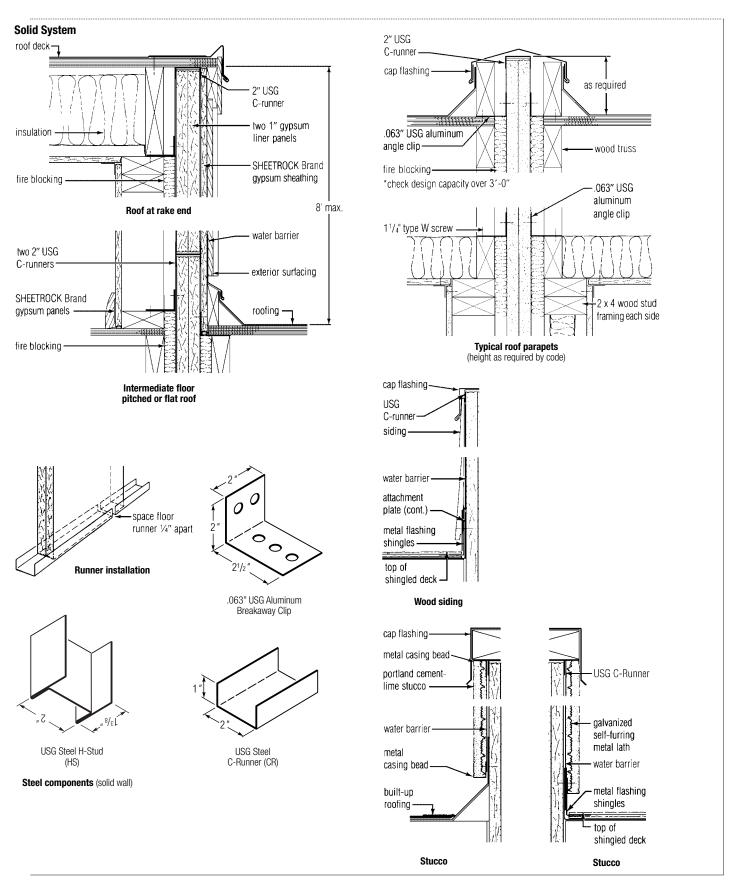
Note: As required by code, ⁵/₈" SHETROCK Brand gypsum panels, FIRECODE core, may be used as underlayment to untreated roof sheathing with panels extending 4' on both sides of area separation wall and possibly roof side at rake end. Clip placement below is for typical construction.



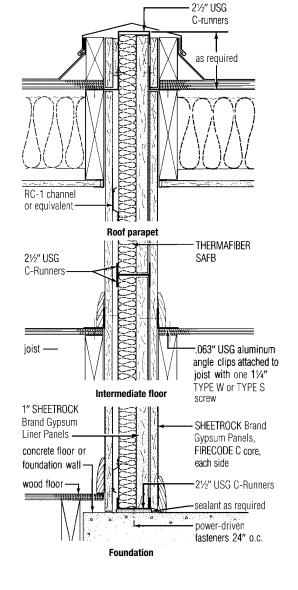




*Note: See illustration on p. 8 for clip spacing requirements.

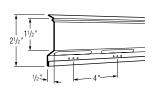


Cavity System ½" x 3" gypsum panel roofing 21/2" USG C-runner water barrier exterior RC-1 resilient surfacing channel or equivalent 8' max. Roof at rake end two 21/2" USG C-runners roofing Roof offset exterior cladding SHEETROCK Brand Gypsum Sheathing-21/2" USG C-Runner

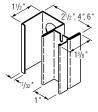


Steel Components (cavity wall)

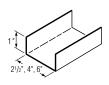
Exterior wall intersection (as required)



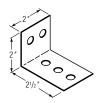
RC-1 Resilient Channel (or equivalent)



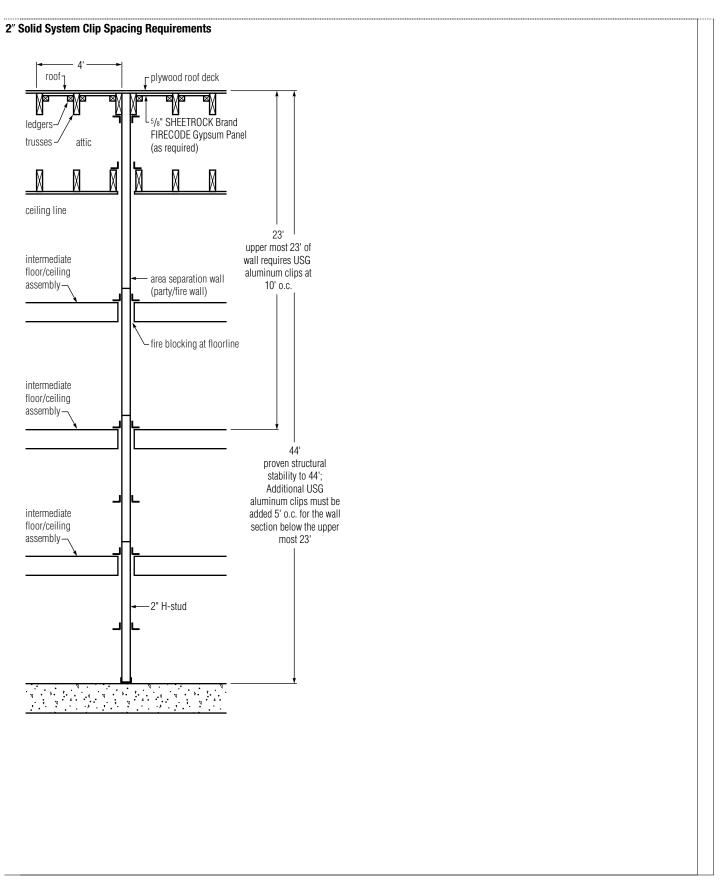
USG Steel C-H Stud (CH)



USG Steel C-Runner (CR)



.063" USG Aluminum Angle Clip



Good Design Practices		This section is an overview of design, application, installation and safety concerns that should be addressed when USG's products and systems are used at professional constructions sites or at home in do-it-yourself projects. This section is not intended to be a comprehensive review but instead outline some major issues. No attempt is made at completeness. We recommend that architects and contractors seek the assistance of safety professionals, especially at the professional construction site, because there are many factors to be considered that are not included here. In addition for more detailed information and references, please refer to Chapter 13 of the USG Gypsum Construction Handbook, Centennial Edition.
Solid and Cavity Systems	1 System Performance	United States Gypsum Company will provide certification for published fire, sound and structural data covering systems designed and constructed according to its published specifications. Tests are conducted on USG products manufactured and assembled to meet performance requirements of established test procedures specified by various agencies. System performance following substitution of materials or compromise in assembly design cannot be certified; failure may result under critical conditions.
	2 Clip Attachment	Both solid and cavity area separation wall systems require attachment of aluminum breakaway clips to adjacent wood framing on both sides of the H-Stud or CH-Stud. Clips are attached to each stud and vertical C-Runners (not resilient channel) with one 3/8" TYPE S screw, and to adjacent framing with one 1-1/4" TYPE W or TYPE S screw. These systems may be stacked to a maximum height of 44', and normally require a vertical clip spacing of 10' o.c max. However, when the solid area separation wall has a stacked height exceeding 23', clip spacing along each stud below the 23' stacked height must be reduced to 5' o.c. max. (see illustration on p. 8). When the solid or cavity area separation wall system is used as an exterior wall, with adjacent wood framing on only one side, clips must be spaced as noted in Section 3.4 of the specifications. Note, for this case, that two 3/8" TYPE S screws are required for clip attachment to the vertical steel framing members.
	3 Sound Control Construction	For maximum sound control with both the solid and cavity wall systems, seal the entire perimeter and between the horizontal, back-to-back C-Runners at the intermediate levels with a minimum 1/4" bead of SHEETROCK Brand Acoustical Sealant. Carefully seal around all gaps and cutouts for lights, cabinets, pipes, ducts, electrical boxes, etc. to minimize sound leakage. Back-to-back penetrations of the gypsum panel diaphragm and flanking paths should be eliminated.
	4 Fixture Attachment	Lightweight fixtures and trim should be installed using expandable anchors for screw attachment. Medium and heavyweight fixtures are not recommended on resilient surfaces, but, if required, they should be supported from the primary framing.
	5 Additional Information	See technical folders in this series: <i>Construction Selector</i> SA100 for fire and sound-rated systems; <i>Gypsum Panels and Accessories</i> Folder SA927 for information on systems components; <i>Textures and Finishing Products</i> Folder SA933 for texturing information; <i>Thermafiber Life-Safety Fire Containment Systems</i> Folder SA707 for insulation specifications.
Specifications		
Part 1: General	1.1 Scope	Specify to meet project requirements.
	1.2 Qualifications	 A All materials, unless otherwise indicated, shall be manufactured by United States Gypsum Company, and shall be installed in accordance with its current printed directions. B System must be built in accordance with applicable model code research reports.
	1.3 Delivery and Storage of Materials	All materials shall be delivered in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises. Installed panels should be protected from the environment and dry before enclosing the wall. Warning: Store all Sheetrock Brand Gypsum Panels flat. Panels are heavy and can fall over, causing serious injury or death. Do not move unless authorized.
	1.4 Environmental Conditions	In cold weather during gypsum panel joint finishing, temperature within the building shall be maintained within the range of 55 to 70 °F (13 to 21 °C). Adequate ventilation shall be provided to carry off excess moisture.

Part 2: Products

2.1 Materials

- A Gypsum Board—48" wide, (1/2") (5/8") thick (Regular) SHEETROCK Brand (Water-Resistant) (FIRECODE C) (FIRECODE) Gypsum Panels—lengths as required.
- B Liner Panel—24" wide, 1" SHEETROCK Brand Gypsum Liner Panels, beveled edge, lengths as required.
- **c** USG Steel H-Studs (200HS25), hot-dipped galvanized, lengths as required.
- **D** USG Steel C-H Studs (212CH25) (212CH20), hot-dipped galvanized, lengths as required.
- **E** USG Steel C-Runners (200CR25) (212CR25), hot-dipped galvanized, x 10' length.
- F USG Aluminum Angle Clip—2" x 2-1/2" x 0.063" Aluminum Breakaway Clips.
- **G** Joint Treatment—(select a United States Gypsum Company Joint System).
- H Fasteners—Screws (1-1/4" Type W) (1", 1-1/4", 1-5/8" Type S) (3/8" Type S, pan head) (Galvanized staples, 9/16" crown, 1-1/2" leg).
- I RC-1 Resilient Channel or equivalent.
- J THERMAFIBER Sound Attenuation Fire Blankets (1") (1-1/2") (2") (3") x 16" or 24" x 48".
- **K** SHEETROCK Brand Acoustical Sealant.

Part 3: Execution

3.1 Solid Wall

- A Foundation—Position 2" C-Runner and securely attach to foundation with power-driven fasteners at both ends and spaced 24" o.c. Space adjacent runner sections 1/4" apart. When specified, caulk under runner at foundation with min. 1/4" bead of acoustical sealant.
- **B** First Floor—Install H-studs and liner panels to a convenient height (max. 2') above the floor line. Install two thicknesses of 1" liner panels vertically in C-Runner with long edges in H-Stud. Erect H-Studs and liner panels alternately until wall is completed. Cap top of panels with horizontal C-Runner. Fasten C-Runner flanges at all corners both sides with 3/8" Type S screws.
- C Intermediate Floors and Bottom of Trusses—Cap top of liner panels and H-Studs with C-Runner. Attach C-Runner for next row of panels to the C-Runner below with end joints staggered at least 12". Fasten the C-Runners together with double 3/8" screws at ends and 24" o.c. Attach all H-Studs to adjacent framing with an aluminum breakaway clip. Clips attaching H-Studs and vertical C-Runners to adjacent wood framing on both sides require attachment to the H-Stud and C-Runner with one 3/8" Type S screw. Clips attaching H-Studs and vertical C-Runners to adjacent wood framing on only one side and with exterior exposure on the other side require attachment to the H-Stud and C-Runner with two 3/8" Type S screws. Attachment to the wood framing is with one 1-1/4" Type W or Type S screw. Locate horizontal C-Runner joint within 2' of the intermediate floor. Install fire blocking between the solid wall system and adjacent framing at floor lines, bottom of truss line, and any other locations required by the applicable code.
- D Roof—Continue erecting H-Studs and liner panels for succeeding stories as described. Cut the liner panels and H-Studs to roof pitch and length as necessary to follow the roof pitch. At roof, cap liner panels and H-Studs with C-Runner. Attach all H-Studs to adjacent framing with an aluminum breakaway clip. Clips attaching H-Studs and vertical C-Runners to adjacent wood framing on only one side and with exterior exposure on the other side require attachment to each vertical framing member with two 3/8" Type S screws.
- **E** Sound Attenuation Fire Blankets For direct attachment to 1" liner panels, install blankets with joints staggered and attach blankets with seven staples driven through each blanket. Blanket installation within cavities is friction fit between stud framing.
- **F** Interior Finish—Apply specified gypsum panels to wood studs and joists in conventional manner.

3.2 Cavity Wall

- A Foundation—Position 2-1/2" C-Runner at floor and attach to foundation with power-driven fasteners at both ends and spaced 24" o.c. When specified, caulk under runner at foundation with min. 1/4" bead of SHEETROCK Brand Acoustical Sealant.
- **B** First Floor—Install 1" liner panels and steel studs to a convenient height (max. 2') above floor line. Erect liner panels vertically in C-Runner with long edges in groove of C-H stud. Install C-H Studs between panels. Cap top of panels with horizontal C-runner, and cap ends of the wall with C-Runner. Fasten C-Runner flanges at all corners on both sides with 3/8" Type S screws both sides.

- C Intermediate Floors and Bottom of Trusses—Cap top of liner panels and CH-Studs with C-Runner and fasten CH-Studs to the C-Runner flanges on alternate sides with 3/8" Type S screws. Attach C-Runner for next row of panels to the C-Runner below with end joints staggered at least 12" o.c. Fasten the C-Runners together with double 3/8" screws at ends and 24" o.c. Attach all CH-Studs to adjacent framing with an aluminum breakaway clip. Clips attaching CH-Studs to adjacent wood framing on both sides require attachment to the CH-Stud (not the resilient channel) with one 3/8" Type S screw. Clips attaching CH-Studs and vertical C-Runners to adjacent wood framing on only one side and with exterior exposure on the other side require attachment to the CH-Stud and C-Runner (not the resilient channel) with two 3/8" Type S screws. Attachment to the wood framing is with one 1-1/4" Type W or Type S screw. Locate horizontal C-Runner joint within 2' of the intermediate floor. As required by the applicable code, install fire blocking in the wall cavity at floor lines, bottom-of-truss line, and any other required locations.
- D Roof—Continue erecting CH-Studs and liner panels for succeeding stories as described. Cut the liner panels and CH-Studs to roof pitch and length as necessary to follow the roof pitch. At roof, cap liner panels and CH-Studs with C-Runner. Attach all CH-Studs and vertical C-Runners to adjacent framing with an aluminum breakaway clip. Clips attaching CH-Studs and C-Runner to adjacent wood framing on only one side and with exterior exposure on the other side require attachment to the CH-Stud and vertical C-Runner (not the resilient channel) with two 3/8" Type S screws.
- E Sound Attenuation Fire Blankets—When specified, install blankets in cavity butting blankets closely and filling all voids
- **F Resilient Channels**—When specified, install RC-1 Resilient Channels or equivalent horizontally to face side of studs, 6" below ceiling joists and max. 24" o.c. Attach channels to C-H Studs with 3/8" Type S screws driven through holes in mounting flange. Extend channels to ends of runs and attach to C-Runners. Splice channel by nesting directly over stud; screw-attach through both flanges. Reinforce with screws at both ends of splice.
- G Gypsum Panels—Apply 1/2" SHEETROCK Brand Gypsum Panels, FIRECODE C Core, vertically to both sides of C-H Studs. Stagger joints on opposite partition sides. Fasten panels with 1" Type S screws spaced 12" o.c. in field and along edges and runner flanges.
- H Resilient Single-layer—Apply 1/2" SHEETROCK Brand Gypsum Panels, FIRECODE C Core vertically to resilient channels and fasten with 1-1/4" Type S screws placed 6" from C-H Studs and 12" o.c. Do not place screws directly over C-H Studs.
- Resilient Double-layer—Apply 5/8" SHEETROCK Brand Gypsum Panels, FIRECODE C Core base layer perpendicular to resilient channels with joints staggered; fasten with 1-1/4" Type S screws placed 6" away from stud and 12" o.c. Apply 5/8" gypsum panel face layer vertically over base layer with edge joints staggered and attach with 1-5/8" Type S screws spaced 12" o.c. and staggered from those in base layer.

3.3 Accessory Application

- A Joint System—Finish all face panel joints and internal angles with a United States Gypsum Company Joint System installed according to manufacturer's directions. Treat exposed fasteners on face layers and finish corner bead, control joints, and trim as required.
- **B** Metal Trim—Where partition or ceiling terminates against masonry or other dissimilar material, apply metal trim over drywall edge; fasten with nails or galvanized staples 9" o.c.
- **c** Control Joints—Gap gypsum panels behind joint and back with double framing. Attach control joint on the face layer with nails, screws, or 9/16" galvanized staples spaced 6" o.c. on both flanges along entire length of joint.

3.4 Exterior Wall

Both solid and cavity systems are suitable for exterior walls with an appropriate water barrier installed over the system and under an exterior cladding. Exterior exposure is limited to 15 psf wind load and requires vertical clip spacing of 4' o.c. maximum. Exterior exposure requires attachment of the aluminum breakaway clips to each vertical steel framing member (do not attach clips to resilient channels) with two 3/8" Type S screws. Attachment of the clips to adjacent wood framing is with one 1-1/4" Type W or Type S screw. Uppermost clips should be placed as close to the roof line as practical attachment allows.



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Metric Specifications

USG Corporation, through its operating subsidiaries, will provide metric conversions on its products and systems to help specifiers match metric design sizes. In addition, some products are available in metric dimensions from selected manufacturing plants. Refer to SA100 Construction Selector for additional information and a Table of Metric Equivalents.

Trademarks

The following trademarks used herein are owned by United States Gypsum or a related company: USG, FIRECODE, SHEETROCK.
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Notice

We shall not be liable for incidental and consequential damages, directly or indirectly sustained, nor for any loss caused by application of these goods not in accordance with current printed instructions or for other than the intended use. Our liability is expressly limited to replacement of defective goods. Any claim shall be deemed waived

unless made in writing to us within thirty (30) days from date it was or reasonably should have been discovered.

Note

All products described here may not be available in all geographic markets. Consult your local sales office or representative for information.

Safety First!

Follow good safety and industrial hygiene practices during handling and installing all products and systems. Take necessary precautions and wear the appropriate personal protective equipment as needed. Read material safety data sheets and related literature on products before specification and/or installation.

