Life safety assurance for
modern building designs

CGC A USG COMPANY

Shaft Wall

Systems

SA-926

Walls that enclose elevator shafts, stairwells and other vertical shafts are the lifeline of a building. Should a fire occur, firefighters control the use of elevators, leaving stairwells as the only means for occupant egress or rescue within the building. Since these walls are an important part of the building, they must have the strength to withstand lateral loads and provide needed fire protection.

High-Performance Shaft Walls

User's Guide

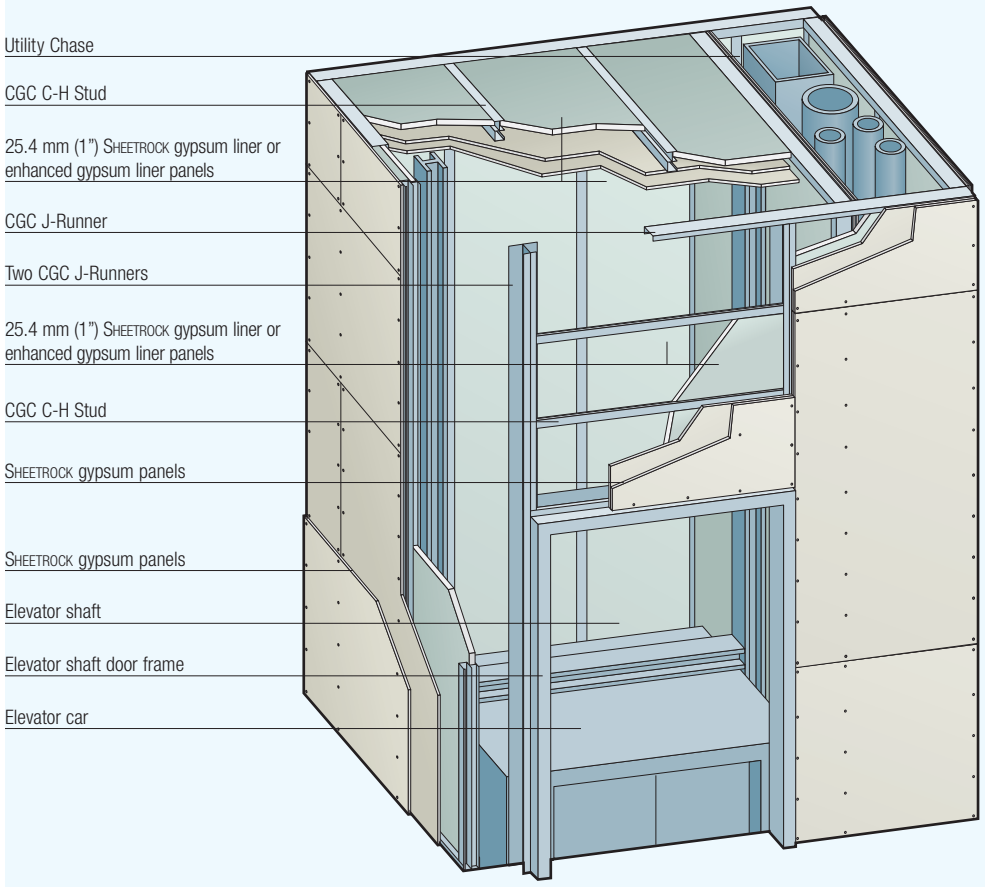
This brochure explains:

- What a shaft wall system comprises
- The different applications where shaft wall systems can be used
- How to select and specify the appropriate components of a shaft wall system

Overview

SHEETROCK Shaft Wall Systems are non-loadbearing gypsum wall partition assemblies constructed from outside the shaft at each floor. Shafts are enclosed early in construction, and the walls are finished later along with interior partitions. Installation is quick and easy, using components and application procedures familiar to mechanics. This system installs faster than other multilayer gypsum panel systems because it is installed from one side, leaving the shaft free of scaffolding. The assemblies are constructed of gypsum liner panels friction-fitted into C-H studs in a progressive manner, with gypsum panels, gypsum fibre panels or cement board applied to the face.

Typical Shaft Wall Assembly

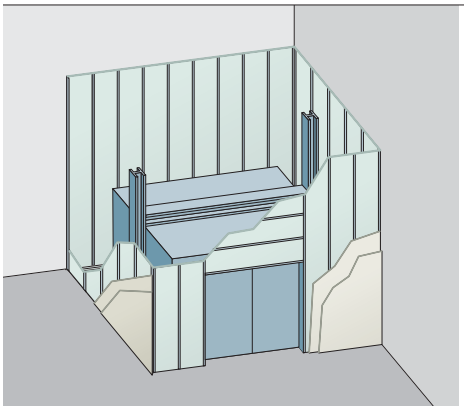


Applications

Use SHEETROCK Shaft Wall Systems to construct elevator shafts, mechanical shafts, stairwells, air return shafts and horizontal membranes. These shafts are vital for vertical communication, power, water, fresh air, exhaust, and a means of egress.

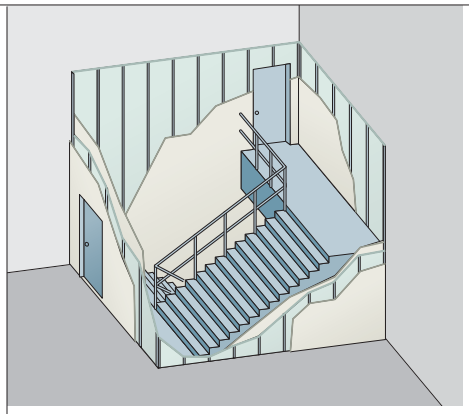
Walls

Intermittent Air Pressure Loads



Elevator shafts

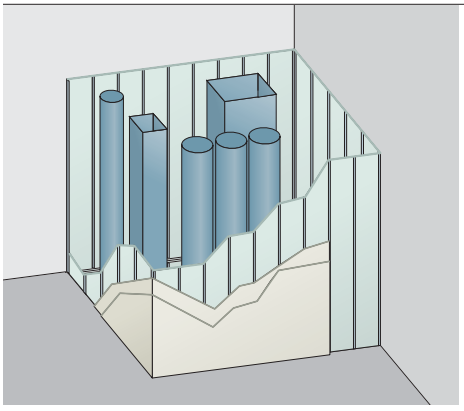
Ideal for elevator shafts since the walls can be constructed from one side, leaving the shaft free of scaffolding. This allows elevator equipment to be installed simultaneously.



Stair shafts

Accommodates stair shafts by allowing both sides of the wall to be finished when required. For added abuse resistance in stairwells, face layer panels can be substituted with FIBEROCK Abuse-Resistant Panels.

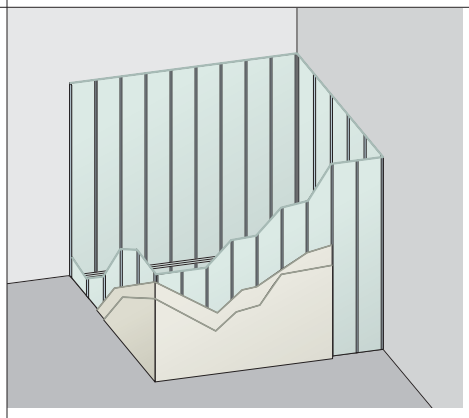
Intermittent Air Pressure Loads



Mechanical shafts

Vertical HVAC piping and ductwork can easily be contained within the system, as well as allowing for wall penetrations when required.

Sustained Pressure Loads



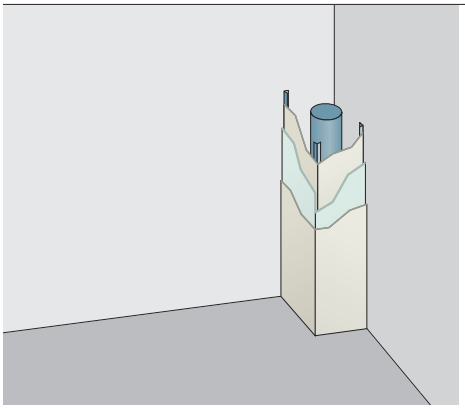
Air shafts (unlined)

The system can also be used for vertical air shafts within the building. Shafts can be unlined when specific conditions are met. Unlined shaft walls can accommodate sustained air pressure up to 49 kg/m^2 (10 psf).

Applications

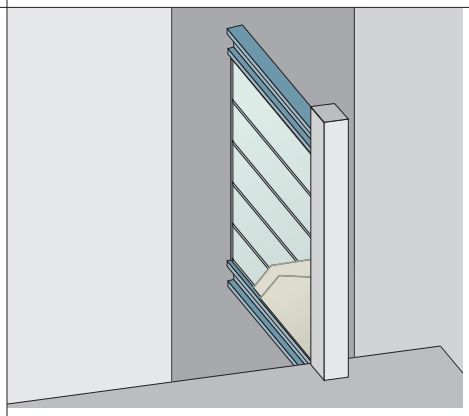
Walls

Solid Shafts



Solid shafts are normally used in areas where a small section of shaft wall is needed for a single vertical pipe penetration. The solid shaft is structurally limited to a height of 3600 mm (12 feet), since the system has no studs.

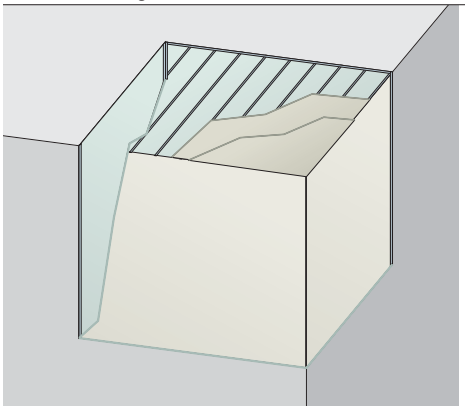
Horizontal Stud Shafts



For certain applications, equipment limitations sometimes make it difficult to install shaft liner panels and studs vertically. This is true for walls separating shafts when there is only a structural beam provided for supporting the wall.

Ceilings

Shaft Wall Ceiling Membrane



The system can also be installed horizontally when a horizontal fire-rated membrane is required. Refer to OBMEC authority #89-1-118 for further details.

Components

SHEETROCK Shaft Wall Systems have been comprehensively tested for fire resistance ratings only when all of the system components are used together. Substitutions of any of the components are not recommended and are not supported by CGC. Refer to the appropriate product material safety data sheet for complete health and safety information.

Gypsum Liner Panels

SHEETROCK® Gypsum Liner Panels

- High-performance panels have a noncombustible core encased in a water-resistant 100% recycled green face and back paper
- Underwriters Laboratories (UL)/Underwriters Laboratories Canada (ULC) Classified for fire resistance
- Panels are 25.4 mm (1″) thick and 610 mm (24″) wide with beveled edges
- Refer to product data sheet EWB-OW93 for more information

SHEETROCK Enhanced Gypsum Liner Panels

- High-performance panels have a noncombustible and moisture-resistant gypsum core enclosed in a mold- and water-resistant, 100% recycled blue face and back paper
- UL/ULC Classified for fire resistance
- Panels are 25.4 mm (1″) thick and 610 mm (24″) wide with beveled edges
- Refer to product data sheet WB2313 for more information
- May not be available in all geographic areas. Contact your CGC Sales Representative for further information.

Gypsum Panels and Cement Board

SHEETROCK FIRECODE® Core Gypsum Panels

- All of the advantages of regular panels with additional resistance to fire
- Available in 15.9 mm (5/8″) thickness, 1220 mm (4′) width
- Refer to product data sheet EWB-OW15 for more information

SHEETROCK FIRECODE C Core Gypsum Panels

- Provide improved fire resistance over standard FIRECODE panels because of additives that enhance integrity of the core under fire exposure
- Available in 15.9 mm (5/8″) and 12.7 mm (1/2″) thicknesses, 1220 mm (4′) width
- Refer to product data sheet EWB-OW15 for more information

HUMITEK® FIRECODE Core Gypsum Panels

- Panels have a noncombustible, moisture- and mold-resistant gypsum core encased in a moisture-resistant, 100% recycled blue face and brown back papers
- Tapered long edges for easy finishing
- Available in 15.9 mm (5/8″) thickness, 1220 mm (4′) width
- 15.9 mm (5/8″) panels are UL Classified for fire resistance
- Refer to product data sheet EWB-W109 for more information

Components

ULTRACODE® Core Gypsum Panels

– 19.1 mm (3/4″)-thick panels require fewer layers of gypsum panels in approved designs
– Available in 1220 mm (4′) width
– Refer to product data sheet WB2167 for more information

DUROCK® Cement Board

– Water-durable, mold-resistant substrate for high-moisture areas
– Suitable for application to wood or steel framing spaced 406 mm (16″) o.c. in new construction and remodeling
– Refer to product data sheet EDR-6295 for more information

FIBEROCK AQUA-TOUGH™ Gypsum Interior Panels

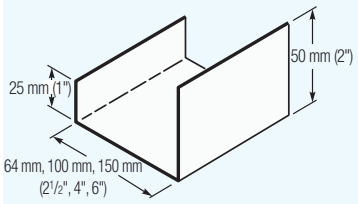
– Used only for wall designs
– Increased resistance to abrasion, indentation and penetration
– Made from 95% recycled materials
– Refer to product data sheet EWB-W118 for more information

GRAND PRIX® FIRECODE Core and FIRECODE C Core Gypsum Base

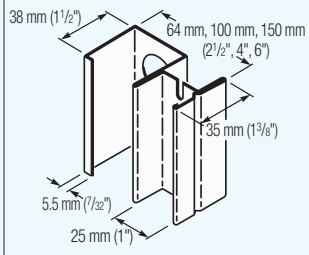
– Large size, rigid base for fire-rated gypsum veneer plaster systems
– Designed for direct or resilient attachment to wood or steel framing
– Multilayered laminated face paper to control water absorption and resist sag
– Refer to product data sheet EWB-1328 for more information

Steel Framing

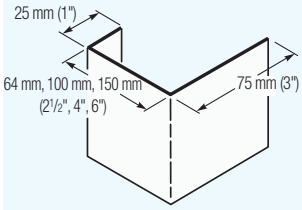
CGC Steel J-Runner (JR)



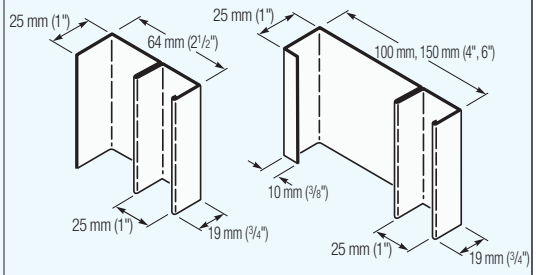
CGC Steel C-H Stud (CH)



CGC Steel Jamb-Strut (JS)



CGC Steel E-Stud (ES)



Thickness–Steel Framing[a] Components

	Design Thickness[b]		Minimum Thickness		
Style	**in.**	**mm**	**in.**	**mm**	**ga.**
CH, ES	0.0188	0.478	0.0179	0.455	25
JR	0.0239	0.607	0.0227	0.577	24
CH, ES, JR, JS	0.0359	0.912	0.0341	0.866	20

Structural Properties–Steel Framing Components

Component	Stud	Average Weight		Area		I_x		S_x[c]		Allow. Design Stress	
and Size	**Designation**	**kg/m**	**(lb/lin ft)**	**cm²**	**in²**	**(cm⁴)**	**(in⁴)**	**cm³**	**(in³)**	**MPa**	**(ksi)**
64 mm (2-1/2″) C-H Stud	212CH25	0.772	0.5186	0.9832	0.1524	5.369	0.129	1.524	0.093	136.51	19.8
	212CH22	1.282	0.861	—	—	8.658	0.208	2.489	0.1519	165.47	24.0
	212CH20	1.485	0.998	—	—	9.948	0.239	2.853	0.1741	165.47	24.0
102 mm (4″) C-H Stud	400CH25	0.911	0.6118	1.160	0.1798	15.942	0.383	2.655	0.162	136.51	19.8
	400CH20	1.850	1.243	—	—	30.385	0.730	5.211	0.318	165.47	24.0
152 mm (6″) C-H Stud	600CH20	2.033	1.366	2.727	0.4227	83.163	1.998	9.324	0.569	165.47	24.0
double 152 mm (6″) E-Stud	600ES25	2.301	1.546	2.569	0.3982	83.413	2.004	10.291	0.628	137.89	20.00
	600ES20	3.530	2.372		0.0840	141.519	3.400	17.927	1.094	137.89	20.00
64 mm (2-1/2″) J-Runner	212JR24	0.667	0.448	—	—	4.870	0.117	1.393	0.085	20.68	3.00
	212JR20	0.997	0.670	—	—	7.992	0.192	2.130	0.130	34.20	4.96
102 mm (4″) J-Runner	400JR24	0.853	0.573	—	—	14.610	0.351	2.671	0.163	20.68	3.00
	400JR20	1.276	0.857	—	—	23.892	0.574	4.211	0.251	34.20	4.96
152 mm (6″) J-Runner	600JR24	1.101	0.740	—	—	39.001	0.937	4.834	0.295	20.68	3.00
	600JR20	1.648	1.107	—	—	63.392	1.523	7.489	0.457	34.20	4.96
64 mm (2-1/2″) Jamb Strut	212JS20	1.218	0.818	—	—	9.407	0.226	2.343	0.143	20.68	3.00
102 mm (4″) Jamb Strut	400JS20	1.497	1.006	—	—	26.930	0.647	4.424	0.270	20.68	3.00
152 mm (6″) Jamb Strut	600JS20	1.869	1.256	—	—	69.636	1.673	7.948	0.485	20.68	3.00

Note

(a) Studs and runners comply with ASTM C645. (b) Properties of steel framing members have been calculated in conformance with ANSI Specification for the Design of Cold-Formed Steel Structural Members, 1996 edition. (c) Full section modulus to be used with corresponding design stress. For wind loads, design stress shown can be increased 33%.

Components

Interior Finishing Products

CGC All Purpose Joint Compound

– Versatile performer: tape, finish, texture, laminate, or skim coat
– Combines single-package, ready-mixed convenience with good taping and topping performance
– Refer to product data sheet EJC-1613 for more information

CGC/Synko* Lightweight All Purpose Joint Compounds

– Weighs up to 30% less than conventional compounds and sands with the ease of a topping compound
– With very low shrinkage, it requires only two coats over metal, such as corner beads and fasteners
– Refer to product data sheet EJC-1613/EJC-OJ55 (Synko*) for more information

Tuff-Hide™ Primer-Surfacer

– A high solids, vinyl, acrylic latex-based coating for interior spray application over new drywall
– Single spray application provides the same results achieved using a typical two-step process of skim coating surfaces with joint compound followed by a coat of primer (Level 5 finish)
– Saves time and money
– Refer to product data sheet EJC-OJ56 for more information

Sheetrock and Beadex** Paper Faced Metal Bead and Trim

– Cost-effective, problem-free, beautiful corners
– Superior solution to edge cracking and chipping
– Refer to product catalog EWB-5238/ETR-OT31 (Beadex**) for more information

Note
*Synko products available in Western Canada only
**Beadex products available in Western Canada only

Performance Testing

SHEETROCK Shaft Wall Systems provide superior safety and performance for a very important component of a building.

Performance Tests

SHEETROCK Shaft Wall Systems result from a program of extensive testing and continuous improvements to help you achieve the superior performance that your project demands. Systems provide up to 4-hour fire resistance and sound ratings up to 52 STC, and resist both sustained and intermittent lateral loads and fatigue under cyclic lateral loading.

Testing Methods

All CGC products and systems undergo exhaustive testing to ensure that they meet exacting standards. CGC's products are Classified as to fire resistance and fire-hazard properties. As part of this protocol, Underwriters Laboratories (UL) periodically audits production of these materials to ensure compliance with necessary properties. UL is an independent, not-for-profit organization that has tested products for public safety for over a century.

Products are manufactured and tested in accordance with recognized standards. ASTM International is one of the largest voluntary standards development organizations in the world, and is a trusted source for technical standards for materials, products, systems, and services.

These systems have been designed and tested using accepted engineering practices with deflection limits of L/120, L/240 and L/360. Additionally, limiting height tables listed herein account for flexural and shear stresses. A wide range of product and system combinations is available to meet performance requirements: intermittent and sustained air pressure loading of 0.24, 0.36, 0.48, 0.72 KPa.

Testing Results

Fire Protection

In the event of a fire, mechanical shafts and stairs are vital channels for communication, power, water, air, exhaust and egress—making the shafts the lifelines of the building. Since it is critically important that these walls protect occupants and necessary services from fire, SHEETROCK Shaft Wall Systems have been tested for fire endurance.

The primary attribute of SHEETROCK Shaft Wall Systems and its components is fire resistance. Testing supporting this attribute ensures that this critical performance component will not be compromised when properly installed.

This fire testing results in the following:

- UL/ULC Classification of all gypsum panel components
- UL/ULC fire-resistance Classifications for 1 to 4 hours
- UL/ULC system testing with all major elevator door manufacturers
- UL/ULC listing for fire damper installation
- Fire test data for electrical panels, call button boxes and other interfaces
- UL/ULC listing of shaft wall head of wall

See the Good Design Practices section for more information on fire resistance.

Sound Control

Sound control test data demonstrate the effectiveness of SHEETROCK Shaft Wall Systems in attenuating sound. When properly designed and installed, SHEETROCK Shaft Wall Systems will increase comfort levels by reducing unwanted noise from adjacent spaces.

The standard assembly offers 39 STC rating; 47 STC is achieved by adding 25 mm (1″) sound insulation within the partition cavity, and 52 STC with single-layer 19 mm (3/4″) ULTRACODE and 75 mm (3″) sound insulation.

Performance Testing

Testing Results

Moisture/Mold

The best way to minimize damage from moisture and mold is to minimize or eliminate exposure to water before, during and after construction. In all cases where moisture intrusion occurs, eliminate all sources of moisture immediately.

Both SHEETROCK Gypsum Liner Panels and SHEETROCK Enhanced Gypsum Liner Panels have water-resistant facings. In addition, SHEETROCK Enhanced Gypsum Liner Panels have mold-resistant paper and a water-resistant core. HUMITEK Gypsum Panels have a moisture- and mold-resistant gypsum core encased in moisture-resistant, 100% recycled face and back papers.

When used in conjunction with good construction practices, these products will minimize, but not eliminate, the risk of moisture damage. For more information on moisture control and mold, see WB2317, *Moisture, Mold, Mildew and Construction Practices,* and SA934, *Moisture-Resistant Assemblies*.

Sustainability

The LEED® (Leadership in Energy and Environmental Design) program is a guideline for building solutions established by the U.S. Green Building Council (USGBC) and endorsed by the Canada Green Building Council (CaGBC).

LEED's mission is to transform the building industry by establishing a common standard of measurement to define what constitutes a "green building." To this end, LEED provides a framework for assessing building performance and meeting sustainability goals. This framework assigns points for certain sustainability criteria, such as sustainable site development, water savings, energy efficiency, materials selection and indoor environmental quality.

Specific products cannot be LEED-certified, because there are many contingent factors on each project that must be considered. However, certain products may assist you in obtaining LEED points for your design solution. For example:

CaGBC LEED Credits	**MR 2**	
Construction Waste Management	2.1	Divert 50% of project waste (by weight or volume) from landfill (1 point)
	2.2	Divert another 25% of project waste (by weight or volume) from landfill (1 point)
Recycled Content	**MR 4**	
	4.1	If sum of project materials by value have 7.5% post-consumer or 15% post-industrial (1 point)
	4.2	If sum of project materials by value have 15% post-consumer or 30% post-industrial (1 point)
Local/Regional Materials	**MR 5**	
	5.1	If 10% of project materials are shipped less than 800 km (500 miles) by truck, or less than 2400 km (1500 miles) by rail (1 point)
	5.2	If 20% of project materials are shipped less than 800 km (500 miles) by truck, or less than 2400 km (1500 miles) by rail (1 point)
Low-Emitting Materials	**EQ .4**	
	4.2	Drywall installation (less than 50g/L per CSCAQM, Table 1) (1 point)

The following chart lists the products in SHEETROCK Shaft Wall Systems that may be eligible for LEED points. But using products with a high recycled content is only one part of the equation. Another key measure of sustainability is embodied energy, which assesses the total energy required to produce a particular material or building component and get it to a building site. For example, if you use a product with a high recycled content but need to ship it across the country, the embodied energy costs of transportation may outweigh any environmental advantages of using a recycled product. It may be more environmentally sound to ship products made of virgin material from a plant close to a job site.

CaGBC LEED Credits	MR 4.1 and 4.2				EQ 4		MR 5.2
Product Family	**Post-Consumer**	**Post-Industrial**	**Embodied Energy[a, b]**	**Density lbs./cu. ft.**	**VOC[c]**	**Mfg. Efficiency**	**Raw Materials (% by weight)**
SHEETROCK Panels—percent varies across 23 plants nationwide[d]	~5%	0%-95% 36.5% ave.	3.6 MJ/kg	43-50	none	95+%	95% gypsum, 5% paper, 1% starch; special panel with wax and glass fibre
SHEETROCK Paper Tape	0	0	.6 MJ/kg		none	95+%	Paper
SHEETROCK or BEADEX** Paper-Faced Bead	0	25%	40.8 MJ/kg		none		Steel, paper, & non-solvent organic adhesive
Joint Compound—Drying Type	0	0	3 MJ/kg	100	<2 g/L	98%	Limestone, latex & mica
Joint Compound—Setting Type	0	0	3 MJ/kg	100	none	98%	Plaster of paris, limestone & mica

Alternative Materials and Special Requirements

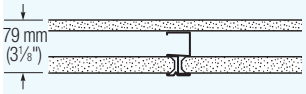
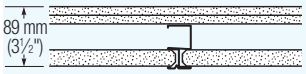
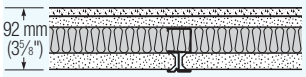
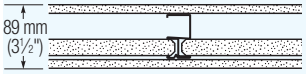
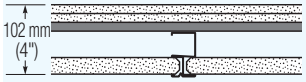
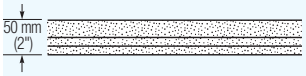
The following notes offer alternative methods of construction.

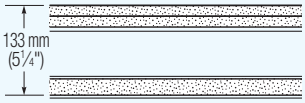
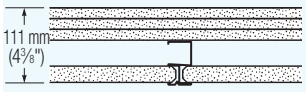
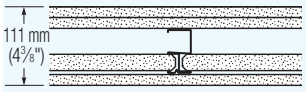
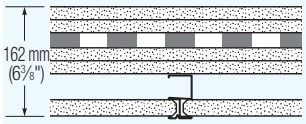
1. Where insulation is shown in assembly drawings, the specific type of product is required in the assembly to achieve the stated fire-resistance rating. Otherwise, mineral wool or glass fibre insulation may be incorporated into any assembly without compromising the fire-resistant rating.
2. Stud depths are minimum required for fire-resistance rating.
3. Use L/360 deflection criteria for limiting height/stud selection and 0.8 mm (20 ga.) minimum framing when applying DUROCK Cement Board. Refer to SA934, *Moisture-Resistant Assemblies,* for more information on application and related products.
4. 15.9 mm (5/8″) GRAND PRIX FIRECODE Core Gypsum Base, 15.9 mm (5/8″) HUMITEK FIRECODE Core Gypsum Panels or 15.9 mm (5/8″) FIBEROCK AQUA-TOUGH Gypsum Interior Panels may be substituted for 15.9 mm (5/8″) SHEETROCK FIRECODE Core Gypsum Panels.
5. 12.7 mm (1/2″) GRAND PRIX FIRECODE C Core Gypsum Base may be substituted for 12.7 mm (1/2″) SHEETROCK FIRECODE C Core Gypsum Panels.
6. 15.9 mm (5/8″) SHEETROCK FIRECODE Core Gypsum Panels, 15.9 mm (5/8″) GRAND PRIX FIRECODE Core Gypsum Base or 15.9 mm (5/8″) FIBEROCK Panels can be substituted for 12.7 mm (1/2″) SHEETROCK FIRECODE C Core Gypsum Panels.
7. Use 0.8 mm (20 ga.) minimum framing with FIBEROCK panels.
8. 25.4 mm (1″) SHEETROCK Enhanced Gypsum Liner Panels may be substituted for 25.4 mm (1″) SHEETROCK Gypsum Liner Panels in all systems.
9. For detailed information regarding UL Classified designs shown in the Performance Selector, please refer to the UL Fire-Resistance Directory — Volume One or visit www.UL.com.
10. For detailed information on ULC designs, please refer to the ULC “Listed Equipment and Materials, Fire Resistance” Manual, or visit www.ULC.ca.

Notes

(a) Megajoules per kilogram. (b) Transportation of gypsum board accounts for over 10% of the board's embodied energy, while mining accounts for less than 1%. (c) Section 01350 of the Material Specifications adopted by the Collaborative for High Performance Schools (CHPS) for VOC emissions. All FIBEROCK panels use FGD gypsum, but the FGD gypsum content of SHEETROCK panels changes from plant to plant and even day to day at any one plant, due to availability. The recycled contents above are approximate. While FGD gypsum is not available everywhere in Canada, CGC does have plants strategically located to meet your needs. Evaluation should be made for each job on the benefits of using FGD instead of natural gypsum.

Performance Selector

1 Hour Fire-rated Construction	Non-loadbearing		Acoustical Performance		Reference	
Construction Detail	**Description**	**Test Number**	**STC**	**Test Number**	**ARL**	**Index**
wt. 8 79 mm (3 1/8") 	• 15.9 mm (5/8″) Sheetrock Gypsum Firecode Core Panels, joints finished • 64 mm (2-1/2″) CGC C-H Studs 25 gauge 610 mm (24″) o.c. • 25.4 mm (1″) Sheetrock Gypsum Liner Panels	**ULC W452, System A** or **UL Des U415, System A** or **U469**	39	**USG-040901** Based on 100 mm (4″) C-H studs 25 gauge	SA926	**1**
2 Hour Fire-rated Construction						
wt. 9 89 mm (3 1/2") 	• 12.7 mm (1/2″) Sheetrock Firecode C Core Gypsum Panels, face layer joints finished • 64 mm (2-1/2″) CGC C-H Studs 25 gauge 610 mm (24″) o.c. • 25.4 mm (1″) Sheetrock Gypsum Liner Panels	**ULC W452, System B** or **UL Des U415, System B** or **U438**	38	**USG-040917**	SA926	**2**
			43	**USG-040912** Based on 100 mm (4″) C-H studs 25 gauge		
			48	**RAL-OT-04-022** Based on 25 mm (1″) sound batts in cavity		
			50	**RAL-OT-04-019** Based on 100 mm (4″) C-H studs 25 gauge with 75 mm (3″) mineral fibre insulation		
wt. 8 121 mm (4 3/4") 	• 19.1 mm (3/4″) Sheetrock Ultracode Core Gypsum Panels, joints finished • 100 mm (4″) CGC C-H Studs 25 gauge 610 mm (24″) o.c. – 75 mm (3″) SAFB • 25.4 mm (1″) Sheetrock Gypsum Liner Panels	**ULC W452, System C** or **UL Des U415, System C**	51	**RAL-OT-04-020** Based on 100 mm (4″) C-H studs with 75 mm (3″) Thermafiber SAFB insulation	SA926	**3**
wt. 10 92 mm (3 5/8") 	• 13 mm(1/2″) Durock Cement Board, joints finished • 15.9 mm (5/8″) Sheetrock Firecode Core Gypsum Panels • 64 mm (2-1/2″) CGC C-H Studs 20 gauge 610 mm (24″) o.c. – 38 mm (1-1/2″) SAFB • 25.4 mm (1″) Sheetrock Gypsum Liner Panels • Durock Cement Board screw attached and laminated to gypsum panel with 100 mm (4″) vertical strip ceramic tile mastic centered between studs	**ULC W452, System D** or **UL Des U415, System D**			SA926	**4**
wt. 9 89 mm (3 1/2") 	• 12.7 mm (1/2″) Sheetrock Firecode C Core Gypsum Panels • 64 mm (2-1/2″) CGC C-H Studs 25 gauge 610 mm (24″) o.c. • 25.4 mm (1″) Sheetrock Gypsum Liner Panels – joints finished both sides	**ULC W452, System E** or **UL Des U415, System E** or **U467**	44	**USG-040911** Based on 100 mm (4″) C-H studs 25 gauge	SA926	**5**
wt. 10 102 mm (4") 	• 12.7 mm (1/2″) Sheetrock Firecode C Core Gypsum Panels applied vertically, face layer joints finished – resilient channel 610 mm (24″) o.c. • 64 mm (2-1/2″) CGC C-H Studs 25 gauge 610 mm (24″) o.c. • 25.4 mm (1″) Sheetrock Gypsum Liner Panels	**ULC W452, System F** or **UL Des U415, System F**	53	**USG-040909** Based on 100 mm (4″) C-H studs 25 gauge with 75 mm (3″) mineral fibre insulation	SA926	**6**
			58	**USG-040910** Based on 100 mm (4″) C-H studs 25 gauge with additional layer on liner panel side and 75 mm (3″) mineral fibre insulation		
wt. 8 50 mm (2") 	– 25 x 51 mm (1″ x 2″) perimeter angles 25 gauge • 25.4 mm (1″) Sheetrock Gypsum Liner Panel, fastened to angles • 12.7 mm (1/2″) Sheetrock Firecode C Core Gypsum Panels • 12.7 mm (1/2″) Sheetrock Firecode C Core Gypsum Panels, joints finished	**UL Des U529**			SA926	**7**

2 Hour Fire-rated Construction	Non-loadbearing		Acoustical Performance		Reference	
Construction Detail	**Description**	**Test Number**	**STC**	**Test Number**	**ARL**	**Index**
	• 15.9 mm (5/8") SHEETROCK FIRECODE Core Gypsum Panels, face layer joints finished • 100 mm (4") CGC C-H Studs 20 gauge 610 mm (24") o.c. run horizontally and attached to vertical CGC J-Runners, 20 gauge • 25.4 mm (1") SHEETROCK Gypsum Liner Panels	**UL Des U437**			SA926	**8**
3 Hour Fire-rated Construction						
wt. 13 	• 15.9 mm (5/8") SHEETROCK FIRECODE C Core Gypsum Panels, face layer joints finished • 64 mm (2-1/2") CGC C-H Studs 25 gauge 610 mm (24") o.c. • 25.4 mm (1") SHEETROCK Gypsum Liner Panels	**ULC W452, System G** or **UL Des U415, System G**	45 51	**USG-040903** Based on 100 mm (4") C-H studs 25 gauge **RAL-0T04-018** Based on 100 mm (4") C-H Studs with 75 mm (3") mineral fibre insulation	SA926	**9**
wt. 13 	• 15.9 mm (5/8") SHEETROCK FIRECODE C Core Gypsum Panels, face layer joints finished • 64 mm (2-1/2") CGC C-H Studs 25 gauge 610 mm (24") o.c. • 25.4 mm (1") SHEETROCK Gypsum Liner Panels • 15.9 mm (5/8") SHEETROCK FIRECODE C Core Gypsum Panels, joints finished	**ULC W452, System H** or **UL Des U415, System H**	49	**USG-040902** Based on 100 mm (4") C-H studs	SA926	**10**
4 Hour Fire-rated Construction						
wt. 18 	• 19.1 mm (3/4") SHEETROCK ULTRACODE Core Gypsum Panels, on furring channel 610 mm (24") o.c., over 2 layers 19.1 mm (3/4") SHEETROCK ULTRACODE Core Gypsum Panels, face layer joints finished • 64 mm (2-1/2") CGC C-H Studs 25 gauge 610 mm (24") o.c. • 25.4 mm (1") SHEETROCK Gypsum Liner Panels – base layer over furring channel applied vertically **Note:** Stud size and gauge shown are minimums. Possible panels substitutions.	**ULC W452, System I** or **UL Des U415, System I**			SA926	**11**

Note
Stud size and gauge shown are minimums. Possible panel alternatives shown on Cross Reference of CGC Panels and UL/ULC Fire Ratings on page 7 of SA100, *Fire-Resistant Assemblies*.

Performance Selector

Wall Systems – Limiting Heights

SHEETROCK Shaft Wall Systems are engineered to withstand pressure loads and provide in-service impact resistance to ensure long-term performance and durability. Use this section to determine the size and gauge of framing for the system you select. You will need to know elevator pressures and other in-service demands.

Structural Performance

Impact-Resistant for Durability

Impacted with a 27 kg (60 lb.) sand bag, SHEETROCK Shaft Wall Systems proved durable. In the test, three impacts each were made at 20 joules, 41 joules, and each following 20 joule interval until failure. At 366 joules the test was stopped; while cracked, the wall was not penetrated. For additional information about abuse-resistant, secure or other hardened applications, contact CGC Inc. at 800 387.2690.

Flexing Resistance for In-Service Performance

Shaft walls are subjected to both positive and negative pressures as elevator cabs rise and descend. This piston effect of an elevator in its shaft causes continual flexing of the shaft wall. In tests, SHEETROCK Shaft Wall Systems were subjected to over one million full oscillation cycles to model wall performance through the life of the building. These tests showed that a 0.5 mm (25 ga.) J-Runner is inadequate at the top or bottom of a shaft wall. As the long runner leg is continually flexed from wall deflection, it can rupture and screws can strip out and fracture from the flexing. Oscillation tests showed 0.7 mm (24 ga.) J-Runners minimize these problems and are essential to long-term safety.

Limiting Heights

Maximum partition heights are shown for four different intermittent air pressure loads and three allowable deflections. The applied pressure load is selected by the designer based on elevator cab speed and the number of elevators per shaft. Instead of using only deflection criteria, this design data considers several additional factors in determining limiting partition heights.

A. **Bending stress**—the unit force exerted which will break or distort the stud.

B. **End reaction shear**—determined by the amount of force applied to the stud which will bend or shear the J-Runner or cripple the stud.

C. **Deflection**—the actual deflection under a load. Allowable deflection is based on the amount of bending under load that a particular wall can experience without exceeding a prescribed ratio related to partition height.

Elevator Shaft Pressures

The air pressure load on shaft walls depends upon the elevator cab speed and the number of elevators per shaft. The following recommendations are derived from United States Gypsum Company tests conducted in three high-rise buildings ranging in height from 17 to 100 stories.

Recommended Elevator Shaft Pressure Load

Elevator velocity m/sec	One or two elevators per shaft	Three or more elevators per shaft
0 to 0.9	0.24 KPa	0.24 KPa
0.9 to 3.5	0.36 KPa	0.24 KPa
3.5 to 8	0.48 KPa	0.36 KPa
8 to 10	0.72 KPa[a]	0.36 KPa

Note

(a) Single-cab high-speed elevator shafts may require special design considerations.

Wall Systems – Limiting Heights Table (m)

Intermittent Air Pressure Load (wind load)–KPa[a]

Stud Type and Size	Designation	Allowable deflection	Fire-rated system B, D, F, G, H, I 0.24	0.36	0.48	0.72	Fire-rated system E[b] 0.24	0.36	0.48	0.72
64 mm (2-1/2″) C-H Studs 	212CH-18	L/120	3.912(f)	3.175(f)	2.743(f)	2.261(f)	3.912(f)	3.175(f)	2.743(f)[e]	2.261(f)
		L/240	3.683(d)	3.175(f)	2.743(f)	2.261(f)	3.556(d)	3.099(d)	2.743(d)	2.261(f)
		L/360	3.226(d)	2.819(d)	2.565(d)	2.235(d)	3.099(d)	2.718(d)	2.438(d)	2.159(d)
	212CH-34	L/120	5.842(d)	4.801(f)	4.166(f)	3.404(f)	5.359(d)	4.674(d)	4.166(f)	3.404(f)
		L/240	4.648(d)	4.064(d)	3.683(d)	3.226(d)	4.267(d)	3.708(d)	3.378(d)	2.946(d)
		L/360	4.064(d)	3.531(d)	3.226(d)	2.819(d)	3.708(d)	3.251(d)	2.946(d)	2.591(d)
100 mm (4″) C-H Studs 	400CH-18	L/120	5.156(f)	4.216(f)	3.632(f)	2.642(v)[e]	5.131(f)	4.191(f)[e]	3.149(v)[e]	2.108(v)[e]
		L/240	5.156(f)	4.216(f)	3.632(f)	2.642(v)[e]	4.953(d)	4.191(f)[e]	3.149(v)[e]	2.108(v)[e]
		L/360	4.343(d)	3.785(d)	3.632(f)	2.642(v)[e]	4.343(d)	3.784(d)	3.149(v)	2.108(v)[e]
	400CH-34	L/120	6.959(d)	6.096(d)	5.537(d)	4.572(f)[e]	7.188(d)	6.274(d)	5.613(f)	4.572(f)[e]
		L/240	5.537(d)	4.826(d)	4.394(d)	3.835(d)	5.715(d)	5.081(d)	4.521(d)	3.962(d)
		L/360	4.826(d)	4.216(d)	3.835(d)	3.353(d)	4.978(d)	4.343(d)	3.962(d)	3.454(d)
150 mm (6″) C-H Studs	600CH-34	L/120	8.534(c)	8.407(d)	7.518(f)[e]	5.486(v)[e]	8.534(c)	8.052(d)[e]	7.315(d)[e]	5.486(v)[e]
		L/240	7.645(d)	6.681(d)	6.071(d)	5.309(d)[e]	7.315(d)	6.375(d)[e]	5.791(d)	5.081(d)[e]
		L/360	6.681(d)	5.842(d)	5.309(d)	4.623(d)	6.375(d)	5.588(d)	5.081(d)	4.419(d)
Double 150 mm (6″) E-Studs[d] 	600ES-34	L/120	8.534(c)	8.534(c)[e]	8.534(c)[e]	6.096(v)[e]	8.534(c)	8.534(c)[e]	8.534(c)[e]	6.096(v)[e]
		L/240	8.534(c)	8.001(d)[e]	7.315(d)[e]	6.096(v)[e]	8.534(c)	7.925(d)[e]	7.163(d)[e]	6.096(v)[e]
		L/360	8.001(d)	7.011(d)	6.401(d)[e]	5.563(d)[e]	8.001(d)	6.934(d)	6.248(d)[e]	5.486(d)[e]

Stud type and Size	Designation	Allowable deflection	Fire-rated system C[c] 0.24	0.36	0.48	0.72	Fire-rated system A[c] 0.24	0.36	0.48	0.72
64 mm (2-1/2″) C-H Studs 	212CH-18	L/120	—	—	—	—	3.683(d)	3.175(f)	2.743(d)[e]	1.829(v)[e]
		L/240	—	—	—	—	2.972(d)	2.591(d)	2.362(d)[e]	1.829(v)[e]
		L/360	—	—	—	—	2.591(d)	2.261(d)	2.057(d)	1.803(d)
	212CH-34	L/120	—	—	—	—	5.232(d)	4.471(f)	3.886(f)	3.175(f)
		L/240	—	—	—	—	4.267(d)	3.734(d)	3.378(d)	2.946(d)
		L/360	—	—	—	—	3.683(d)	3.251(d)	2.743(d)	2.591(d)
100 mm (4″) C-H Studs 	400CH-18	L/120	5.131(f)	4.191(f)	3.149(v)[e]	1.854(v)[e]	5.131(f)	4.191(f)	3.149(v)[e]	1.854(v)[e]
		L/240	4.826(d)	4.064(d)	3.149(v)[e]	1.854(v)[e]	4.826(d)	4.064(d)	3.149(v)[e]	1.854(v)[e]
		L/360	4.064(d)	3.556(d)	3.149(v)[e]	1.854(v)[e]	4.064(d)	3.556(d)	3.149(v)[e]	1.854(v)[e]
	400CH-34	L/120	6.706(d)	5.867(d)	5.334(d)[e]	4.572(f)[e]	6.706(d)	5.867(d)	5.334(d)[e]	4.572(f)[e]
		L/240	5.334(d)	4.648(d)	4.242(d)	3.708(d)[e]	5.334(d)	4.648(d)	4.242(d)	3.708(d)[e]
		L/360	4.648(d)	4.064(d)	3.708(d)	3.226(d)[e]	4.648(d)	4.064(d)	3.708(d)	3.226(d)[e]
150 mm (6″) C-H Studs	600CH-34	L/120	8.534(c)	8.128(d)[e]	6.147(v)[e]	4.115(v)[e]	8.534(c)	8.128(d)[e]	6.147(v)[e]	4.115(v)[e]
		L/240	7.391(d)	6.452(d)[e]	5.867(d)[e]	4.115(v)[e]	7.391(d)	6.452(d)[e]	5.867(d)[e]	4.115(v)[e]
		L/360	6.452(d)	5.639(d)	5.105(d)[e]	4.115(v)[e]	6.452(d)	5.639(d)	5.105(d)[e]	4.115(v)[e]
Double 150 mm (6″) E-Studs[d] 	600ES-34	L/120	8.534(c)	8.534(c)[e]	8.534(c)[e]	6.096(v)[e]	8.534(c)	8.534(c)[e]	8.534(c)[e]	6.096(v)[e]
		L/240	8.534(c)	7.544(d)	6.858(d)[e]	6.096(v)[e]	8.534(c)	7.544(d)	6.858(d)[e]	6.096(v)[e]
		L/360	7.696(d)	6.629(d)	5.944(d)	5.258(d)[e]	7.696(d)	6.629(d)	5.944(d)	5.258(d)[e]

Notes

Runner fasteners should withstand 858 N single shear and 889.6 N bearing force; attachment spacing should not exceed 610 mm (24″) o.c. See the Performance Selector for system references and rated assembly details. L/180 data available upon request from CGC Inc. Limiting criteria: f–bending stress, d–deflection, v–end reaction shear, c–practical limitation. (a) Stud spacing of 610 mm (24″) for all values. (b) For assembly with single-layer board both sides of studs. (c) For assembly with single-layer board attached to studs. (d) Attachment of CGC Steel Double 150 mm (6″) E-Stud for SHEETROCK Shaft Wall Systems. The studs are to be attached back-to-back (web to web) with pairs of 13 mm (1/2″) type S-12 pan head screws installed in two rows, spaced as widely apart as possible. The first and last pairs of fasteners shall start within 150 mm (6″) of each end of the studs. They shall then be spaced at a maximum of 300 mm (12″) on center throughout the body of the entire stud. (e) Use JR20 runner for this height.

Performance Selector

Wall Systems – Limiting Heights

Unlined Shafts

Gypsum shaft walls have been used for many years for vent and air shafts. Their fire-resistant features and economical dry construction make them ideal for this use. To function properly, vent and air shaft systems should be designed with the following performance provisions:

1. Gypsum board surface temperature does not exceed 52 °C (125 °F).
2. Separate approved liners should be installed in areas subject to continuous moisture overspray, condensation or air stream temperature over 52 °C (125 °F).
3. Air stream dew point temperatures are maintained below gypsum board surface temperature.
4. The assembly is constructed to withstand sustained design uniform air pressure loads not exceeding 0.48 KPa (10 psf). Startup surge loads should not be greater than 1-1/2 times the design static load. (See table below for limiting heights.)
5. To ensure airtight construction, select appropriate sealants and apply where required.

Sustained pressure load–KPa

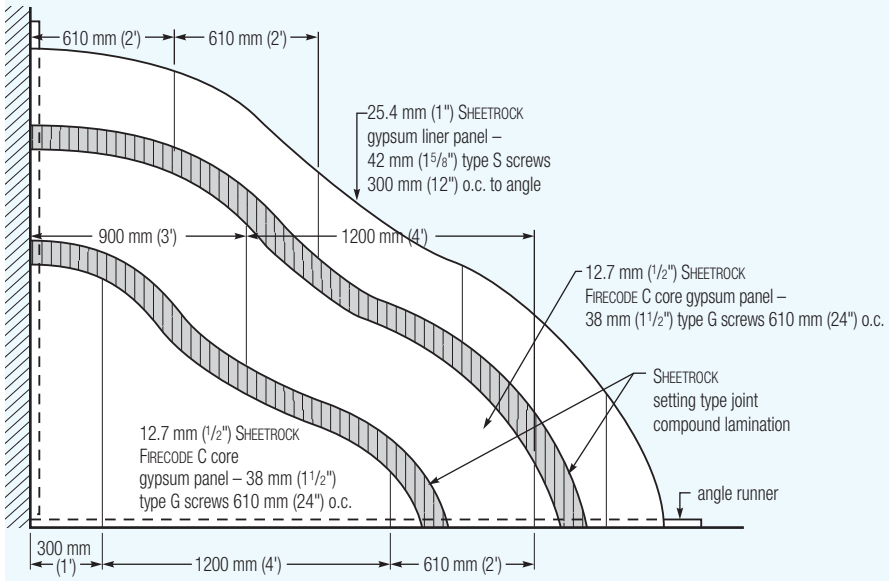
				2-hr. fire-rated system		1-hr. fire-rated system	
Stud Type and Size	**Designation**	**Stud Spacing**	**Allowable deflection**	**0.24**	**0.48**	**0.24**	**0.48**
64 mm (2-1/2″) C-H Studs 	212CH-18	610 mm (24″)	L/120	3.175 m	2.261 m	3.175[a] m	1.829[a] m
			L/240	3.175 m	2.261 m	2.591 m	1.829[a] m
			L/360	2.819 m	2.261 m	2.261 m	1.803[a] m
	212CH-34	610 mm (24″)	L/120	4.471 m	3.175 m	4.471 m	3.175 m
			L/240	4.064 m	3.226 m	3.708 m	2.946 m
			L/360	3.531 m	2.819 m	3.251 m	2.515 m
100 mm (4″) C-H Studs 	400CH-18	610 mm (24″)	L/120	4.216 m	2.946[a] m	4.191[a] m	2.108[a] m
			L/240	4.216 m	2.946[a] m	4.064 m	2.108[a] m
			L/360	3.785 m	2.946[a] m	3.556 m	2.108 m
	400CH-34	610 mm (24″)	L/120	6.096 m	4.572[a] m	5.867 m	4.572[a] m
			L/240	4.826 m	3.835 m	4.648 m	3.708[a] m
			L/360	4.216 m	3.353 m	4.064 m	3.226[a] m
150 mm (6″) C-H Studs	600CH-34	610 mm (24″)	L/120	8.407 m	5.486[a] m	8.128[a] m	4.115[a] m
			L/240	6.681 m	5.309[a] m	6.451 m	4.115[a] m
			L/360	5.842 m	4.623 m	5.639 m	4.115[a] m
Double 150 mm (6″) E-Studs 	600ES-34	610 mm (24″)	L/120	8.534 m	6.096[a] m	8.534[a] m	6.096[a] m
			L/240	8.001 m	6.096[a] m	7.544 m	6.096[a] m
			L/360	7.011 m	5.563[a] m	6.629 m	5.258[a] m

Notes
Runner fasteners should withstand 858 N single shear and 889.6 N bearing force; attachment spacing should not exceed 610 mm (24″) o.c. (a) Use JR20 runner for this height.

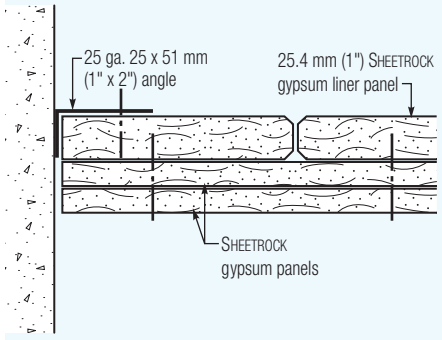
Wall Systems – Solid Shaft Wall

SHEETROCK Shaft Wall Systems can be used as a vent enclosure for vertical shafts with a 2 hr. fire rating per UL Design U529. This shaft assembly is particularly suited for structures having a number of relatively small and separated mechanical, service and ventilator shafts.

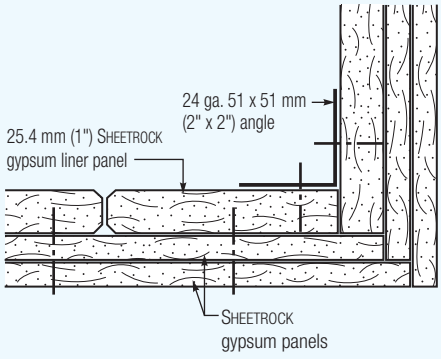
Vent Shaft Elevation



Wall Intersection



Corner



Note
Limiting height of system is 300 mm (12.0″). Install panels vertical and full height only.

Performance Selector

Ceiling System – Limiting Spans

Horizontal Assemblies

SHEETROCK Shaft Wall Systems installed horizontally provide economical construction for fire-resistive duct enclosures, corridor ceilings and stairway soffits.

Triple Layer

With 25.4 mm (1″) liner panels inserted in CGC C-H Studs 610 mm (24″) o.c. and triple-layer 12.7 mm (1/2″) SHEETROCK FIRECODE C Core Gypsum Panels screw-attached to studs, the system provides 2-hour protection from fire.

Double Layer

With double-layer 12.7 mm (1/2″) SHEETROCK FIRECODE C Core Gypsum Panels screw-attached to studs, the assembly provides 2-hour fire-resistive ceiling construction for corridors and stair soffits (see Design Details).

Single Layer

With single-layer 15.9 mm (5/8″) SHEETROCK FIRECODE C Core Gypsum Panels screw-attached to studs, the assembly provides one-hour fire-resistive ceiling construction for corridors and stair soffits.

Limitations

1. CGC C-H Studs are not designed to carry live loads or mechanical equipment or provide material storage area.
2. Maximum stud spacing is 610 mm (24″) o.c.; maximum spans are shown in table below.

Limiting Spans—Horizontal Shaft Walls[a]

2-Hr. Horizontal Membrane or Metal Duct Enclosure

Triple-layer 12.7 mm (1/2″) gypsum panels[b]	Maximum Span (m)
212CH-18	1.956
212CH-34	2.515
400CH-18	2.591
400CH-34	3.658
600CH-34	3.861

2-Hr. Corridor Ceilings and Stair Soffits

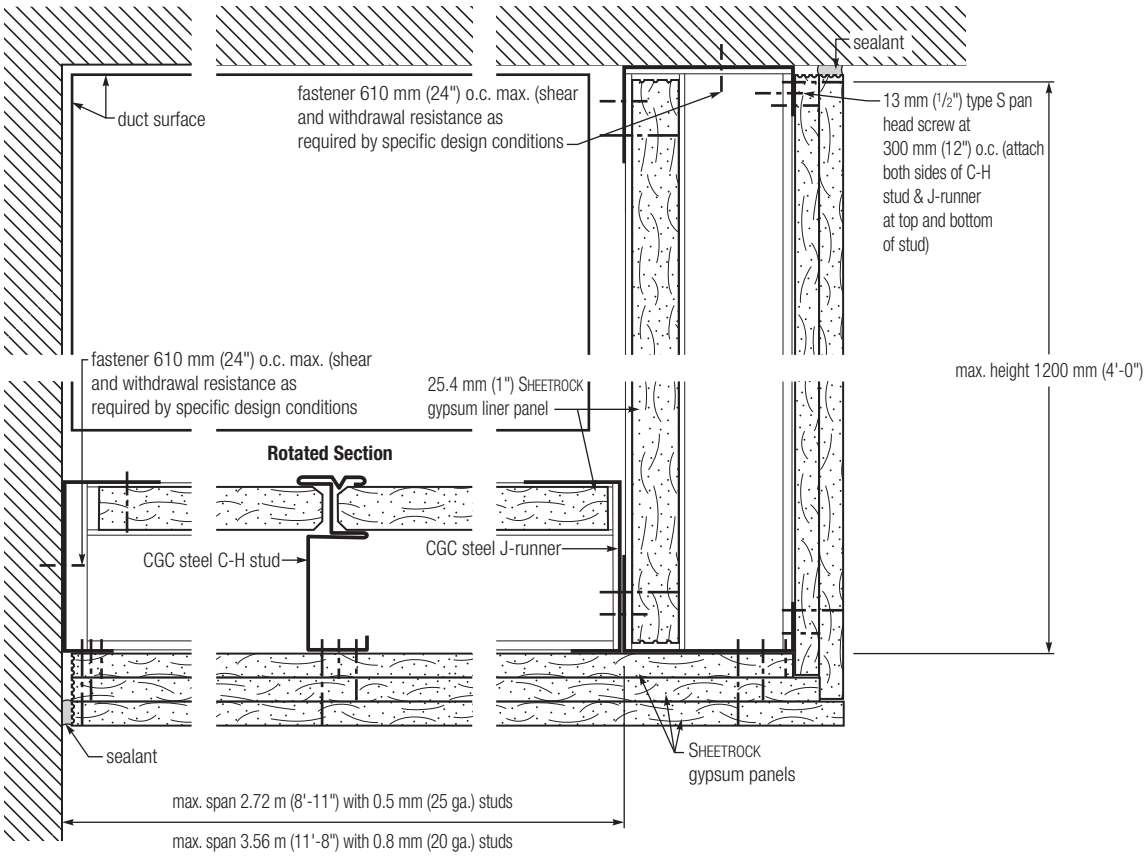
Double-layer 12.7 mm (1/2″) gypsum panels[c]	Maximum Span (m)
212CH-18	1.829
212CH-34	2.794
400CH-18	2.388
400CH-34	4.013
600CH-34	4.826
1-Hr. Single-layer 15.9 mm (5/8″) gypsum panels[c]	**Maximum Span (m)**
212CH-18	2.007
212CH-34	3.124
400CH-18	2.642
400CH-34	4.419
600CH-34	5.309

Note
(a) Based on L/240 allowable deflection with studs at 610 mm (24″) o.c. and JR24 runner. (b) Full steel stress allowed based on ASTM E119. (c) Allowable steel stress reduced 50%.

Design Details

Ceiling Membrane

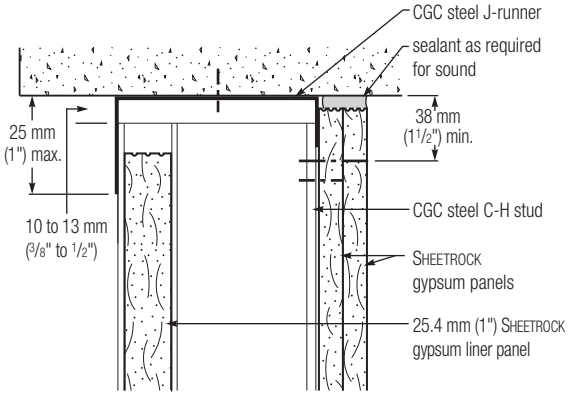
2-Hr. Rated Assembly – Horizontal Membrane or Metal Duct Enclosure



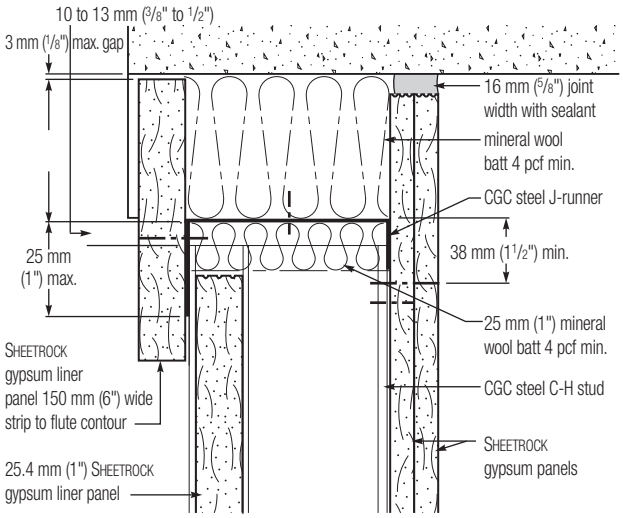
Design Details

Basic Interfaces – System B

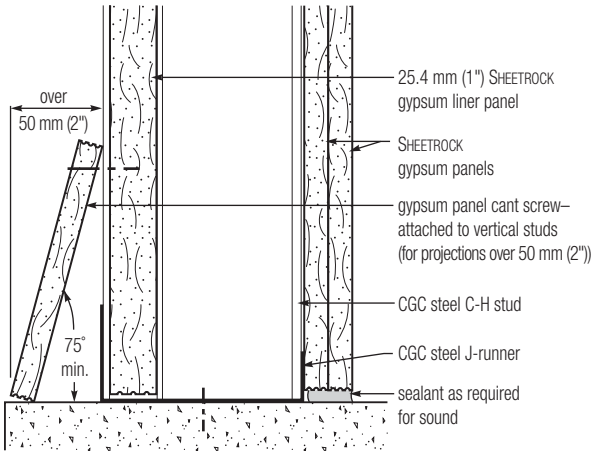
Head Section



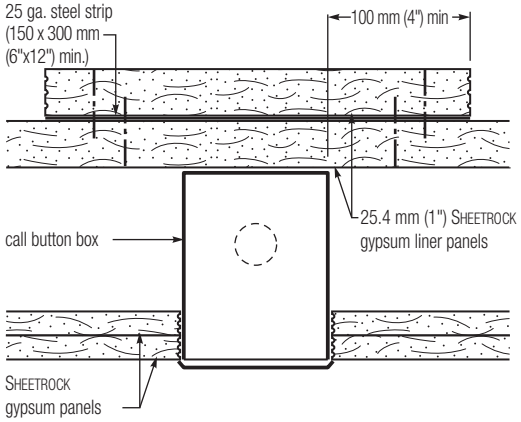
Dynamic Head Section (UL Design HW-D-0372)



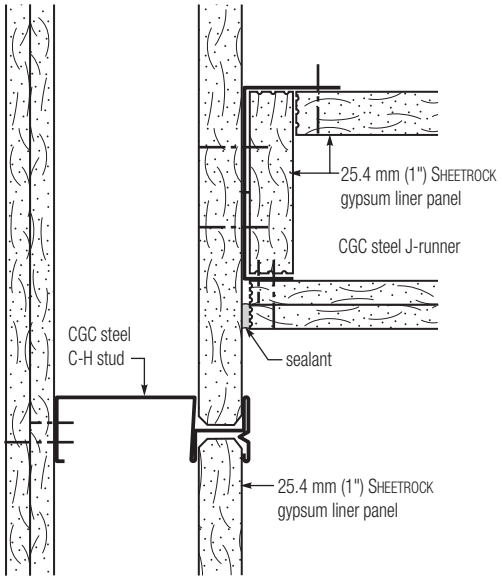
Base Section



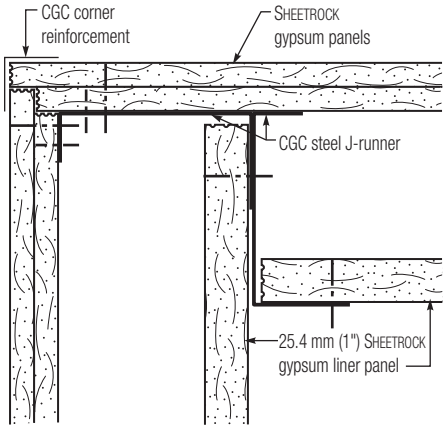
Call Button Box



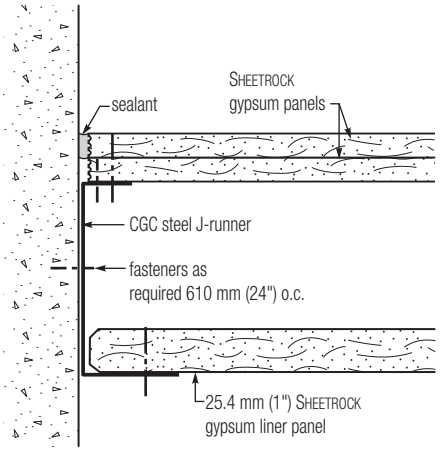
Wall Junction



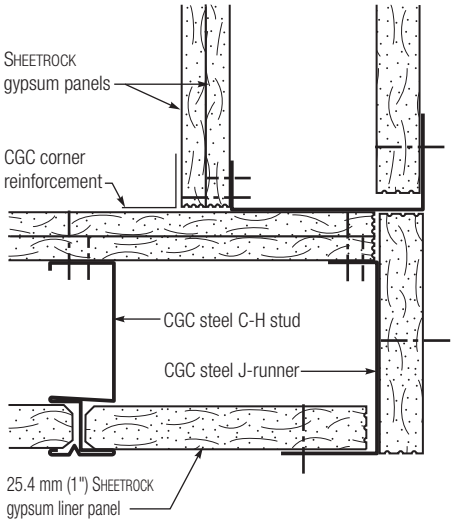
Outside Corner



Wall Intersection



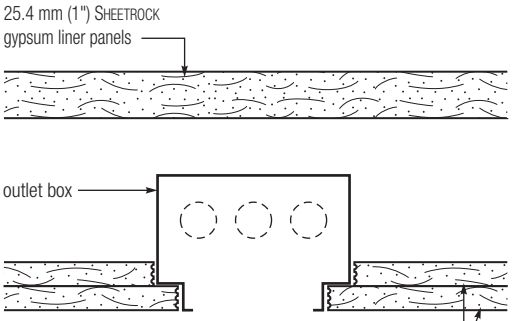
Inside Corner



Design Details

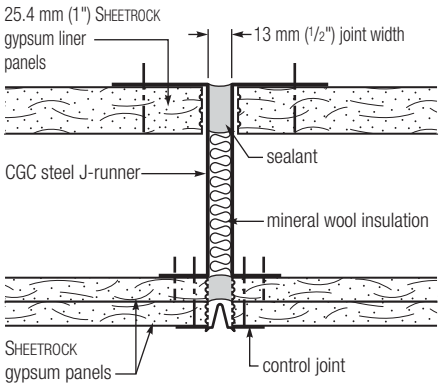
Basic Interfaces – System B

Outlet/Switch Box

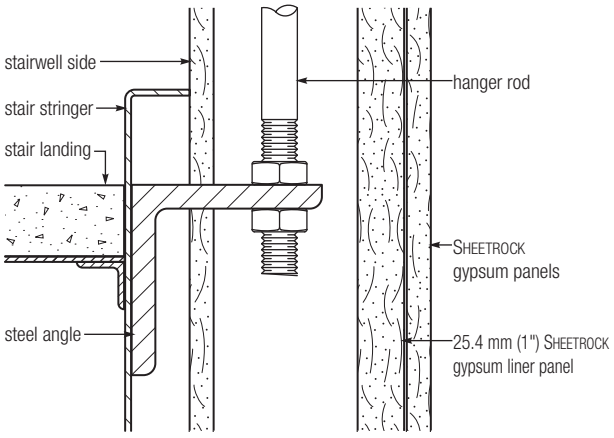


Note: The surface area of individual outlet or switch boxes shall not exceed 0.01 sq m. The aggregate surface area of all boxes shall not exceed 0.0645 sq m. (per UL Fire Resistance Directory)

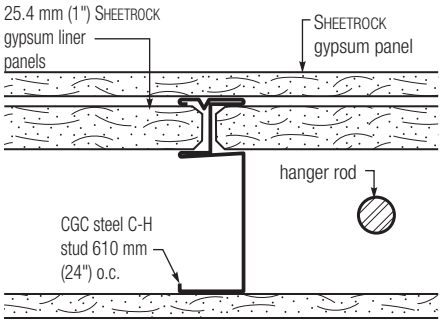
Control Joint



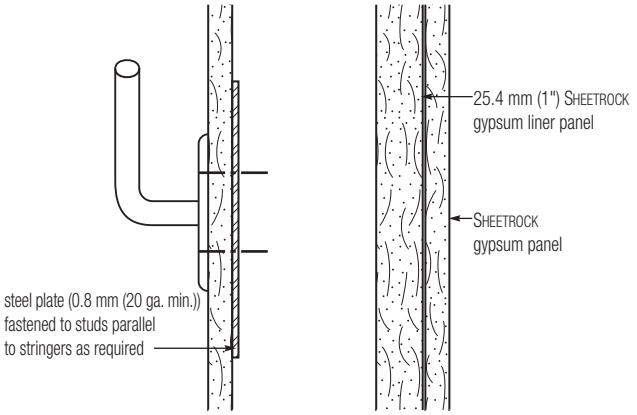
Stair Hanger and Rod Application



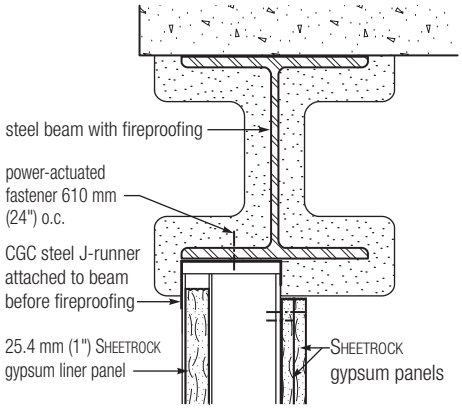
Cross Section at Stair Hanger



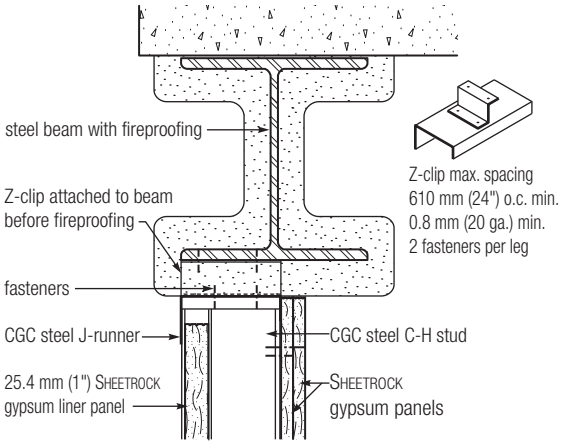
Handrail Application



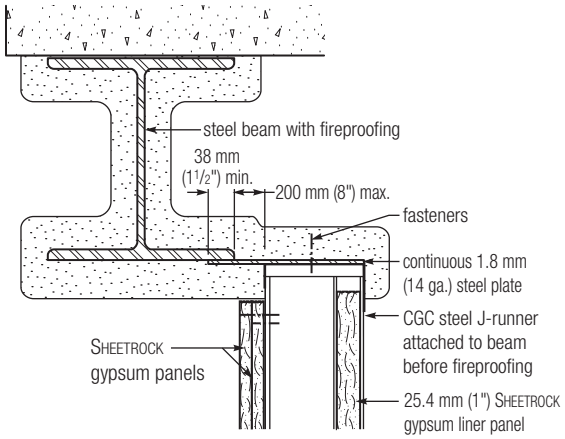
Steel Beam



Steel Beam with Z-Clip



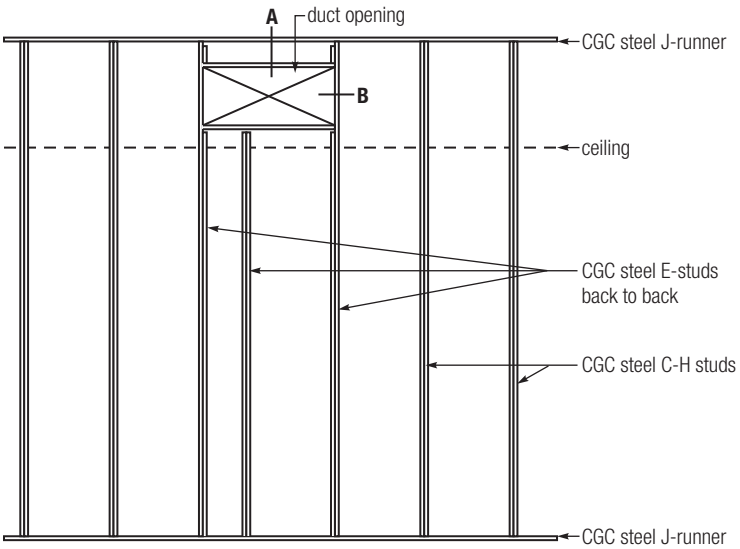
Steel Beam with Offset



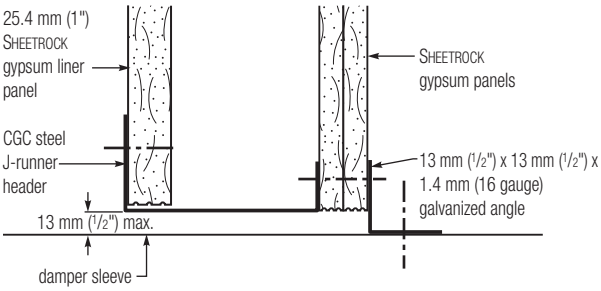
Design Details

Fire Damper

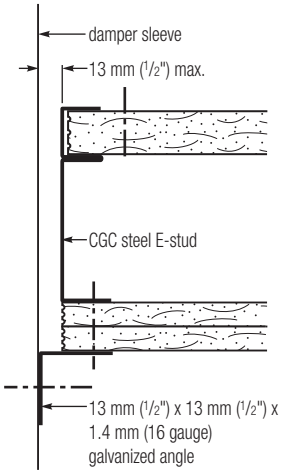
Typical Penetrations Elevation at Duct Opening



Section A
1-1/2 Hr. Fire Damper Tested per UL R13479

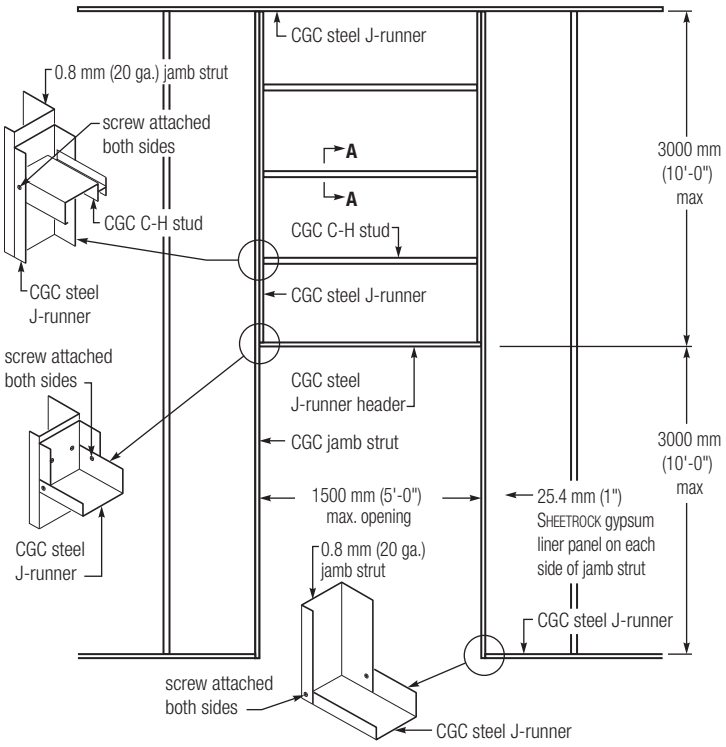


Section B
1-1/2 Hr. Fire Damper Tested per UL R13479

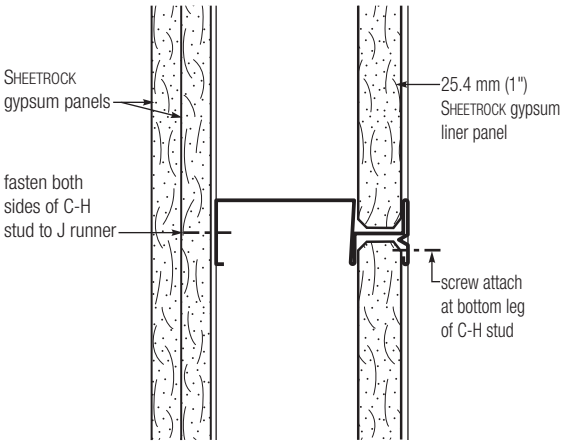


Elevator Door Framing

Elevator Door Rough Opening



Section A-A Detail



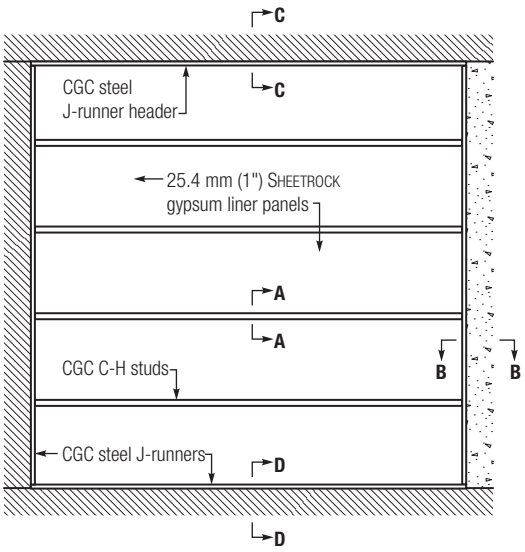
Notes

1. Framing at elevator door shall be a minimum 100 mm (4″) studs and runners 0.8 mm (20 gauge).
2. Horizontal placement of liner panel and C-H Studs per UL Design U437.
3. Flanges of the jamb strut must be continously braced by screw connections to the liner and face panels 300 mm (12″) o.c.
4. For doors greater than 1500 mm (5′) wide and/or transom heights greater than 1200 mm (4′), reinforce the 400JS-34 with a nested 400ES-34.

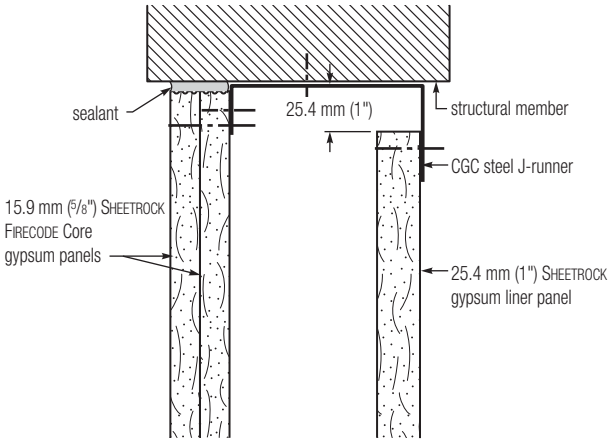
Design Details

Wall Systems – Horizontal C-H Studs

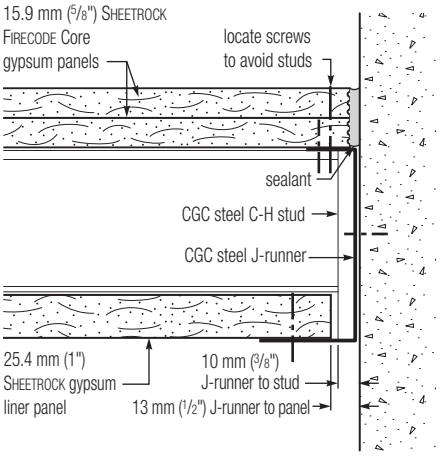
Horizontal Shaftwall Elevation



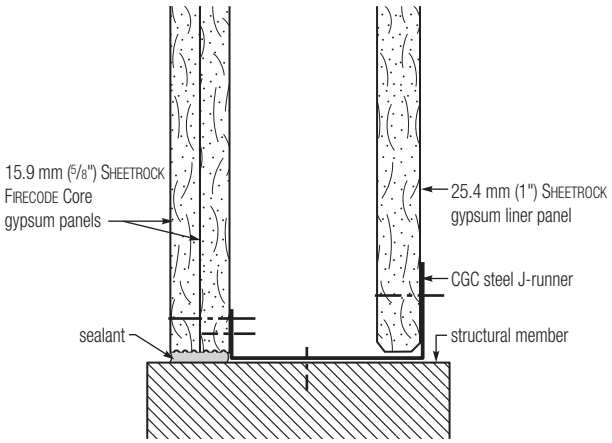
Section C-C Head Section



Section B-B Wall Intersection



Section D-D Base Section



Note
Horizontal framing shall be a minimum 100 mm (4″) C-H Studs and runners 0.8 mm (20 gauge).

Good Design Practices

Use this section as a reference if questions arise during the design or application of SHEETROCK Shaft Wall Systems.

This section is an overview of good design, application, installation and safety considerations that should be addressed when CGC's products and systems are used. This section outlines some major issues, but is not intended to be comprehensive.

We recommend that architects and contractors seek the assistance of safety professionals, especially at the construction site, because there are many factors to consider that are not included here. For more detailed information on safety and material handling, please refer to Chapter 13 of *The Gypsum Construction Handbook, Centennial Edition.*

1 System Performance

CGC Inc. conducts tests on products and systems to meet performance requirements specified by various agencies. Upon written request we will provide test certification for published fire, sound, structural and other pertinent data covering systems designed and constructed according to our published specifications. Substitutions of any of the components are not recommended and are not supported by CGC Inc.

Standards

The following standards apply:

ASTM C36/1396: Standard Specification for Gypsum Board

ASTM C475: Standard Specification for Joint Treatment Materials for Gypsum Wallboard Construction

ASTM C645: Standard Specification for Non-Load (Axial) Bearing Steel Studs, Runners (Track), and Rigid Furring Channels for Screw Application of Gypsum Board

ASTM C754: Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Board, Backing Board, or Water-Resistant Backing Board

ASTM C840: Standard Specification for Application and Finishing of Gypsum Board

ASTM C1002: Standard Specification for Steel Drill Screws for the Application of Gypsum Board

ASTM C1047: Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base

2 Fire Resistance

Use fire test data to compare and select materials and assemblies, and to secure acceptance by the authority having jurisdiction. SA100, *Fire-Resistant Assemblies,* shows tested fire resistance for various systems.

For assemblies tested at Underwriters Laboratories Inc. (UL), ratings are specific to the designs tested, and do not necessarily apply to alternate products or construction. For example, insulation may not be added to floor- or roof-ceiling assemblies, unless described in the UL design. Addition of insulation in the concealed space between the ceiling membrane and the floor or roof structure may reduce the hourly rating of an assembly by causing premature disruption of the ceiling membrane and/or higher temperatures on structural components under fire exposure conditions.

Increasing the size or gauge of the stud (e.g., 64 mm (2-1/2″) C-H Stud 0.5 mm (25 gauge) to 100 mm (4″) C-H Stud 0.8 mm (20 gauge)) does not affect the fire resistance rating of the assembly.

For more detailed information, refer to the system fire resistance Performance Selector on pages 14-15.

Good Design Practices

3	**Structural Criteria**	Structure design must take into account the conditions that will exist and the resulting stresses and movements. Loadbearing walls include the exterior walls of a building and some interior walls. These structures must be designed to carry the weight of the structure, its components, and other loads that occur once the building is occupied. The amount of axial load that structural members can bear will vary with the amount of lateral load (pressure from wind or other horizontal stresses) that the final assembly may incur. Manufacturers of structural components, particularly steel framing (studs, runners, joists) provide tables that identify the maximum allowable loads for various components under specific conditions. Interior non-bearing partitions such as CGC Shaft Wall are not designed to carry axial loads. Limiting heights are based on stress or deflection limits for given lateral loads. Height limitations depend on the gauge of the steel used, dimensions of the stud, stud spacing, and the allowable deflection limit. For limiting height tables, see page 17; for horizontal shaft wall span table, see page 20; and for limiting heights, unlined return air shafts, see page 18. Note: Size and gauge availability is based upon limiting heights tables. Other sizes and gauges have not been evaluated for performance.
4	**Control Joints — Building Movement**	Locating control joints is the responsibility of the design professional/architect. Integrate these suggestions with project conditions when determining specific locations for control joints. "Control joint" is a general term for methods used to minimize (not eliminate the potential for) cracking in partitions and ceilings. Specifically, a control joint minimizes cracking in the face of a partition or ceiling. At the perimeter of a partition or ceiling, it is called a perimeter relief joint. A control joint is effective in minimizing cracking caused by tensile or compressive movement in a membrane resulting from thermal, hygrometric and structural movement. Isolate shaft wall surfaces with control joints or other means where: – construction changes within the plane of the shaft wall – shaft wall run exceeds 9 m (30′) – expansion or control joints occur through the building itself – in stairwells at each floor level Ceiling-height door frames may be used as control joints. Less-than-ceiling-height door frames should have control joints extending to ceiling from both corners on both sides of the partition. Treat window openings in same manner as doors. Zinc control joints, when properly insulated and backed by gypsum panels, have been fire-endurance tested for use in one- and two-hour fire-rated walls. Proper installation of control joints in partitions and ceilings requires breaking the gypsum panels or lath behind the control joint. In ceiling construction, the framing should also be broken. In partitions, separate studs are used on each side of the joint with the runner track separated at that location.
5	**Pressure Loads — Minimizing Wind Noise**	Where shaft walls enclose elevator and return air vents, and intermittent pressures up to 0.72 KPa (15 psf) are expected, Acoustical Sealant is recommended at intersections with floors, ceilings, columns, ducts, etc. to seal peripheries and penetrations and minimize whistling and dirt accumulation due to air movement. Sealant selection including joint treatment, surface coatings and details to seal the wall under these sustained pressures must be provided by the designer. See pages 16-17 for information on evaluating pressure loading and selecting the appropriate framing components based upon these design criteria.

6	**Pressure Loads — Air Handling**	Shaft walls may be used for air handling with sustained pressures up to 0.48 KPa (10 psf). When air pressure exceeds 0.48 KPa (10 psf), air handling should be contained with a metal duct. See pages 18-19 for information about air handling and vent shaft enclosures.
7	**Penetrations**	Penetrations of the shaft wall, such as door frames and duct openings, require additional reinforcement at corners to distribute concentrated stresses if a control joint is not used. Penetrations greater than 100 mm (4″) wide require supplemental support for the shaft wall at the opening. Where access panels or large duct penetrations occur in shafts having pressure loads, headers, sills and adjacent channels may require reinforcing to properly distribute these loads.
8	**Sound Control**	Use sound test data to compare and select materials and constructions. These data frequently are essential for securing compliance by the agency having jurisdiction. See SA200, *Acoustical Assemblies,* for acoustical performance. Sound control refers to the ability to attenuate sound passing through a partition. The Sound Transmission Class (STC) is a widely used rating of sound attenuation performance. It is relatively accurate for speech sounds but not for music, mechanical equipment noise or any sound with substantial low-frequency energy. It is tested per ASTM E90 and rated per ASTM E413. See the Performance Selector for the STC ratings for CGC Shaft Wall Systems. Sound tests are conducted under ideal laboratory conditions per ASTM procedures. CGC products are assembled in a specific manner to meet the requirements of these ASTM procedures. Substitution of materials other than those tested or deviation from the specified construction may adversely affect performance. Field performance depends on building design and careful attention to detailing and workmanship. Where these partitions are used for sound control, seal the partition perimeter with 6 mm (1/4″) min. round bead of Acoustical Sealant. Seal around all penetrations.
9	**Moisture and Mold**	Understanding water and mold and their impact on the construction process and building materials are integral to good design and construction practices. CGC offers references and additional sources that reinforce good design, construction and maintenance practices. These practices are generally recognized as necessary to minimize moisture-related problems and the growth of mold in a building environment. If you have additional questions please contact those sources or CGC. The best way to address mold is to make sure that building materials do not get wet before and during installation and are not exposed to moisture inside the finished building. See Moisture/Mold in the Performance Testing section for more information.
10	**Air and Water Infiltration**	Flashing and sealants as shown in the construction documents and as selected by the architect and/or structural engineer should be provided to resist air and water infiltration. The flashing and sealants selected shall be installed in a workmanlike manner in appropriate locations to maintain continuity of air/water barriers, particularly at windows, doors and other penetrations of exterior wall.
11	**Vapor Retarders**	Water vapor control must always be considered in the design of exterior wall systems. Humidity and temperature conditions may require the installation of a vapor retarder to prevent moisture condensation within the wall and the resulting damage. To determine the necessity and location of vapor retarders, a water vapor transmission and dew point analysis of the layered wall assembly should be conducted by a qualified engineer.

Good Design Practices

12	**Product Handling and Storage**	**Gypsum Panels** Protect all gypsum products from exposure to excessive or continuous moisture and the elements elements before, during and after installation. Eliminate sources of moisture immediately. **Metal Framing Protection** Give light gauge metal components such as steel studs and runners, furring channels and resilient channels adequate protection in the warehouse and on the jobsite against rusting caused by moisture. In marine areas where chloride and sea salt are present in combination with excessively high humidity, use of components which offer increased protection against corrosion is recommended.
13	**Application**	**Call Button Floor Indicator and Electric Boxes** Shaft walls will accommodate outlet boxes with depths up to the stud width. See page 24 for details. **Framing Attachment** Runners and studs attached to beams or columns may need to be installed before steel is spray-fireproofed. Excess fireproofing should be removed from runners and studs before installing shaft wall liner and sealant. **SHEETROCK Gypsum Liner Panel Application – Butt Joints** When an installation of CGC Shaft Wall height exceeds maximum available panel length it is necessary to incorporate a butt joint between two liner panels. Stagger butt joints in adjacent panels top and bottom to prevent a continuous horizontal joint. Joint should be located in top or bottom third of wall. Per UL evaluation of CGC Shaft Wall Systems, joints may be butted together or reinforced with horizontal C-H stud cut to fit between adjacent vertical studs.
14	**Painting Systems**	Painting products and systems should be used which comply with recommendations and requirements in Appendixes of ASTM C840. For priming and decorating with paint, texture or wall covering, follow manufacturer's directions. All surfaces, including applied joint compound, must be thoroughly dry, dust-free, and not glossy. Prime with an undiluted, interior latex flat paint with high-solids content. Allow to dry before decorating. To improve fastener concealment, where gypsum panel walls and ceilings will be subjected to severe artificial or natural side lighting and decorated with a gloss paint (egg shell, semi-gloss or gloss), the gypsum panel surface should be skim coated with joint compound to equalize suction and texture differences between the drywall face paper and the finished joint compound before painting. TUFF-HIDE Primer-Surfacer skims and primes in a single application.
15	**Screws**	TYPE S Screws are suitable for gypsum panel or gypsum base attachment to 0.5 and 0.8 mm (25 and 20 ga.) steel studs. TYPE S-12 screws should be specified for other applications to steel heavier than 0.8 mm (20 ga.) Screw lengths should be 25 mm (1″) for base layer (30 mm (1-1/4″) when 19 mm (3/4″) ULTRACODE is used) and 42 mm (1-5/8″) for face layer and at least 10 mm (3/8″) longer than the total thickness for other applications. Walls over 4800 mm (16′) high should have studs screw-attached to runners.
16	**Steel Door Frames**	Ordered separately, should be at least 1.4 mm (16 ga.) steel, shop primed, and have throats accurately formed to overall thickness of the shaft wall plus 2.4 mm (3/32″) minimum. They should be anchored at floor with 1.4 mm (16 ga.) steel plates welded to trim flanges, with provision for two power-driven anchors or equal per plate. Jamb anchors should be 1.1 mm (18 ga.) steel welded in jamb and screw-attached to anchors. CGC Inc. reserves the right to make changes or improvements in the design of all catalogued items without notice and without obligation to incorporate these changes or improvements in items already manufactured.

Application Guide Specifications

This guide specification is provided to assist you in specification of CGC Shaft Wall Systems. If you have additional questions or would like more information regarding this or other CGC products and systems, please contact CGC at 800 387.2690.

Part 1: General

1.1 Related Documents

Drawings and general provisions of the project contract, including General and Supplementary Conditions and Division 1 Specification Sections apply to this Section. CGC System Folder SA926 – CGC Shaft Wall Systems.

1.2 Scope

Specify the appropriate CGC Shaft Wall System to meet project requirements for fire resistance, structural performance, sound control and aesthetics.

1.3 Summary

A. This section includes the following CGC Shaft Wall Systems

1. Vertical shaft enclosures
2. Stair enclosures
3. Horizontal assemblies
4. Vent shaft enclosures

B. Related Sections

1. Division 9 SHEETROCK Gypsum Panels and Assemblies
2. Division 9 GRAND PRIX Plaster Base and veneer plaster assemblies

1.4 Definitions

A. Shaft Wall: An assembly of steel framing, gypsum boards and other materials used to enclose elevator shafts, stairways, air shafts and mechanical components.

B. Gypsum Board Construction Terminology: Refer to ASTM C11 for definition of terms for gypsum board construction not defined in this document.

1.5 Performance Requirements

A. The systems are UL/ULC Listed for fire resistance

B. System fire-resistance testing with elevator door manufacturer at UL/ULC

C. Fire-resistance tested penetration details for call button boxes and position indicators

D. Oscillation tested to one million cycles to ensure performance of the life of the building

E. UL/ULC Listed fire damper application

F. **Air Pressure Loads**—Select based on project requirements. See details in this brochure for CGC Shaft Wall system data.

G. **Deflection Limit**—Select based on project requirements. See details in this brochure for CGC Shaft Wall system data.

H. **STC Rating**—Select based on project requirements.

1.6 Submittals

A. Product and System Data – Submit system folder SA926, which can be downloaded at www.cgcinc.com.

B. Submit certification of manufacturer compliance with fire and sound requirements indicated.

C. Fire rating compliance shall include verification of compatibility with labeled elevator door frame installation and test verification of call box and similar penetrations.

Application Guide Specifications

1.7 Delivery, Storage and Handling of Materials

A. Deliver materials in their original unopened packages bearing manufacturer identification.

B. Protect materials from wetting and damage from weather, direct sunlight, surface contamination, corrosion, construction traffic and other causes.

C. **Warning:** Store all SHEETROCK Gypsum Panels flat. Panels are heavy and can fall over, causing serious injury or death. Do not move unless authorized.

1.8 Project Conditions

A. All materials shall be suitably protected from the weather during installation to prevent damage to the shaft wall.

B. Install gypsum panels following environmental conditions, room temperatures and ventilation specified in CGC's *The Gypsum Construction Handbook.*

1.9 Quality Assurance

A. Protect CGC Shaft Wall System and components from moisture before, during and after installation. Eliminate sources of moisture immediately.

B. Fire-Resistance Rated Assemblies: Provide UL/ULC Design Number (e.g., U415) for basic systems.

C. **Sound-Rated Assemblies (STC)**—Provide sound-rated system whose materials and construction comply with requirements of ASTM E90 and are classified according to ASTM E413 by a qualified testing agency.

D. Preinstallation Conference – Conduct conference at project site. Review methods and procedures for work related to CGC Shaft Wall System assemblies.

Part 2: Products

2.1 Manufacturer

A. Supply materials manufactured by or for CGC Inc. which comply with requirements of fire-resistance rated assemblies indicated in System Folder SA926.

B. **Basis of Design**—CGC Shaft Wall System

2.2 Materials

A. **Gypsum Liner Panels**—ASTM C442, C1396, 25.4 mm (1″) SHEETROCK Gypsum Liner Panels, 100% recycled green face and back paper, beveled edge, 610 mm (24″) wide, lengths as required. Stamped with UL/ULC Classification label documenting UL/ULC Classifications for fire resistance, surface burning characteristics, and noncombustibility. Panels should also be identified with the following language: "SHEETROCK Gypsum Liner Panel, A Component of CGC Inc. Fire Rated Systems."

B. **Enhanced Gypsum Liner Panels**—ASTM C442, C1396, 25.4 mm (1″) SHEETROCK Enhanced (e+) Gypsum Liner Panels, 100% recycled blue face and back paper, beveled edge, 610 mm (24″) wide, lengths as required. Stamped with UL/ULC Classification label documenting UL/ULC Classifications for fire resistance, surface burning characteristics, and noncombustibility. Panels should also be identified with the following language: "SHEETROCK Enhanced e+ Gypsum Liner Panel, A Component of CGC Inc. Fire Rated Systems."

C. **Wallboard**—(12.7 mm (1/2″)) (15.9 mm (5/8″)) (19.1 mm (3/4″)) (select thickness), 1220 mm (4′) wide, tapered edge, SHEETROCK Gypsum Panels, (FIRECODE Core) (FIRECODE C Core) (ULTRACODE Core) (HUMITEK FIRECODE Core) (FIBEROCK AQUA-TOUGH Interior Panel), lengths as required. Identified with UL/ULC Classification label.

D. **Gypsum Base for Gypsum Veneer Plaster**—(12.7 mm (1/2″)) (15.9 mm (5/8″)) (select thickness), 1220 mm (4′) wide, GRAND PRIX Gypsum Base (FIRECODE Core) (FIRECODE C Core) (select core type), lengths as required.

E. **Cement Board**—DUROCK Cement Board, 12.7 mm (1/2″) and 15.9 mm (5/8″) thickness, 1220 mm width x 2440 mm length (48″ width x 96″ length).

F. **Gypsum Wallboard and Gypsum Base Joint Treatment Materials**—select a CGC/SYNKO* Interior Finishing System.

G. **Fasteners**—Screws: (10 mm (3/8″)) (13 mm (1/2″)) Type (S) (S-12) pan head; 16 mm (5/8″) TYPE S-12 low profile head; (25 mm (1″)) (42 mm (1-5/8″)) (56 mm (2-1/4″)) TYPE S bugle head. DUROCK Steel Screws: 42 mm (1-5/8″). Type G Screws: 38 mm (1-1/2″).

H. **Metal Trim**—No. (200A) (200B) (401) (402) (701B) (801B).

I. SHEETROCK/BEADEX** Paper Faced Metal Bead and Trim.

J. Steel Furring Channels.

K. Resilient Channels.

L. CGC Steel C-H Studs, (212CH-18) (212CH-34) (400CH-18) (400CH-34) (600CH-34) hot-dipped galvanized, lengths as required (select from tables).

M. CGC Steel E-Studs, (400ES-34) (600ES-34) hot-dipped galvanized, lengths as required (select from tables).

N. CGC Steel J-Runners, (212JR-23) (400JR-23) (600JR-23) (212JR-34) (400JR-34) (600JR-34) hot-dipped galvanized.

O. Steel Angle Clips 20 gauge, (50 x 50 x 50 mm (2″ x 2″ x 2″)) (50 x 50 x 100 mm (2″ x 2″ x 4″)) (horizontal shaft wall only)

P. CGC Steel Jamb Struts, (212JS-34) (400JS-34) (600JS-34) hot-dipped galvanized

Q. Runner fasteners, power-driven type, to withstand required single shear and bearing force when driven through structural head or base and without exceeding allowable design stress in runner, fastener or structural support (obtain locally).

R. Acoustical Sealant.

S. Sound Batts – (25 mm (1″)) (38 mm (1-1/2″)) (75 mm (3″)).

T. Zinc Control Joint #093.

Part 3: Execution

3.1 Examination

Examine substrates and abutting assemblies with installer present. Proceed with installation after conditions determined to be satisfactory.

3.2 Preparation

A. Check that system components are available to construct CGC Shaft Wall System

- SHEETROCK Gypsum Liner Panels
- SHEETROCK Enhanced Gypsum Liner Panels
- SHEETROCK FIRECODE, FIRECODE C, or ULTRACODE Core Gypsum Panels
- HUMITEK FIRECODE Core Gypsum Panels
- DUROCK Cement Board
- FIBEROCK AQUA-TOUGH Gypsum Interior Panel
- GRAND PRIX FIRECODE Core or FIRECODE C Core Gypsum Base
- CGC Steel Framing Components (C-H Studs, J-Runner, E-Studs, Jamb Struts)

B. Other Fire-Resistive Elements/Materials: Coordinate installation of CGC Shaft Wall assembly with sprayed fire-resistive materials and other fire-resistive elements so that both elements remain complete and undamaged.

Application Guide Specifications

3.3 Shaft Wall Installation

A. CGC Steel Framing and SHEETROCK Gypsum Liner Panels

1. Position steel J-runners at floor and ceiling with the short leg toward finish side of wall.
2. Securely attach runners to structural supports with powder actuated fasteners at both ends and max. 610 mm (24″) o.c.
3. For attachment to steel frame construction install floor and ceiling J-Runners and J-Runners or E-Studs on columns and beams before steel is fireproofed.
4. For attachment to structural steel use Z-shaped stand-off clips secured to structural steel before fireproofing application.
5. Remove spray-fireproofing from J-Runners and E-Studs before installing gypsum liner panels.
6. For wall heights less than maximum available panel height cut gypsum liner panels no more than 25 mm (1″) less than floor-to-ceiling height and erect vertically between J-Runners.
7. Where shaft wall height shaft exceed maximum available panel length pieces of gypsum liner panel must be butted together at factory cut ends.
   a. Position gypsum liner panel end joints within upper and lower third points of wall.
   b. Stagger joints top and bottom in adjacent panels.
   c. Screw studs to runners on walls over 4800 mm (16′).
8. Cut C-H Studs 10 mm (3/8″) to not more than 13 mm (1/2″) less than floor-to-ceiling height.
9. Install C-H Studs between gypsum liner panels with liner securely engaged.
10. Terminations: Install full-length steel E-Studs or J-Runners vertically at T-intersections, corners, door jambs, and columns.
11. Openings: Frame with vertical E-Stud or J-Runner at vertical edges, horizontal J-Runner at head and sill. Reinforce as shown in this brochure. Suitably frame all openings to maintain structural support for wall.
12. Elevator Door Frames: Install jamb struts each side of elevator door frames to act as strut-studs.
13. Steel Hinged Door Frames: Install floor-to-ceiling steel E-Studs each side to act as strut-studs.
14. Attach strut-stud (see 3.2.A.12 or 3.2.A.13) to floor and ceiling runners with two 10 mm (3/8″) TYPE S-12 pan head screws. Attach strut-studs to jamb anchors with 13 mm (1/2″) TYPE S-12 screws. Over steel doors, install a cut-to-length section of J-Runner and attach to strut-studs with 10 mm (3/8″) TYPE S-12 screws.

B. Resilient Channels

1. Install Resilient Channels horizontally to face of studs, within 150 mm (6″) of floor and ceiling.
2. Apply Resilient Channels a maximum of 610 mm (24″) o.c. vertically (with open face up).
3. Attach Resilient Channels to studs with 10 mm (3/8″) TYPE S screws driven through holes in mounting flange.
4. Splice channel by nesting directly over stud; screw-attach through both flanges. Reinforce with screws at both ends of splice.
5. Install 13 x 75 mm (1/2″ x 3″) wide continuous gypsum filler strips to top and bottom runner.
6. Gypsum Panel application with Resilient Channel: Apply base layer horizontally to resilient channels with end joints staggered. Fasten with 25 mm (1″) TYPE S screws 300 mm (12″) o.c. Apply face layer vertically with joints staggered; attach to channels with 42 mm (1-5/8″) TYPE S screws 300 mm (12″) o.c.

C. SHEETROCK Gypsum Panels

Gypsum panels and fastening must be per the corresponding fire-resistance design number that is the basis of design. See the Performance Selector in this brochure for specific fire-resistance design numbers. The System references below correspond to the Performance Selector found on pages 14-15.

Per ULC Design W452 and UL Design U415 SHEETROCK Gypsum Panels may be applied vertically or horizontally in all of the systems below except System F. Please note appropriate fastener spacing.

System A—ULC Design W452 and U415 Design or U469, 1 hour fire-resistance rating. Apply one layer 15.9 mm (5/8″) SHEETROCK FIRECODE Core Gypsum Panels to studs and runners with 25 mm (1″) TYPE S or S-12 (typical) Screws. Fastener Spacing – Space screws 300 mm (12″) o.c. for vertical panel application, 200 mm (8″) o.c. for horizontal panel application.

System B—ULC Design W452, or W506, or UL Design U415, 2 hour fire-resistance rating. Apply two layers of 12.7 mm (1/2″) SHEETROCK FIRECODE C Core Gypsum Panels. (ULC Design W507 utilizes two layers of 15.9 mm (5/8″) SHEETROCK FIRECODE X Core Gypsum Panels). Apply base layer to studs with 25 mm (1″) TYPE S or S-12 (typical) screws. Space screws 610 mm (24″) o.c. along edges and in the field of the panels for vertical application, 400 mm (16″) o.c. for horizontal application. Apply face layer to studs and J-Runners with 42 mm (1-5/8″) TYPE S or S-12 (typical) screws. Space screws 300 mm (12″) along the edges and in the field when applied vertically, 200 mm (8″) o.c. when applied horizontally. Stagger all joints between base and face layers.

System C—ULC Design W452, ULC W508, or UL Design U415, 2 hour fire-resistance rating. Apply one layer SHEETROCK ULTRACODE 19.1 mm (3/4″) thick Gypsum Panels, with long edges parallel or perpendicular to framing, secured with 32 mm (1-1/4″) long TYPE S screws spaced 203 mm (8″) along the long edges, and 305 mm (12″) in the field when installed parallel, or 203 mm (8″) along the butt ends and in the field when installed perpendicular. Joints perpendicular to framing need not be backed by steel framing. Screws along side joints offset 102 mm (4″). Requires minimum 102 mm (4″) deep framing. Requires minimum 76 mm (3″) thick mineral fibre batts from rock or slag.

System D—ULC Design W452, or UL Design U415, 2 hour fire-resistance rating. Install 38 mm (1-1/2″) SAFB mineral wool batts in stud cavity. Apply base layer of 15.9 mm (5/8″) SHEETROCK FIRECODE C Core Gypsum Panels using 25 mm (1″) TYPE S or S-12 (typical) screws spaced 610 mm (24″) o.c. when applied vertically. Space screws 400 mm (16″) o.c. when board applied horizontally. Apply face layer of 13 mm (1/2″) DUROCK Cement Board to C-H Studs with 42 mm (1-5/8″) Screws spaced 200 mm (8″) o.c.

System E—ULC Design W452, or UL Design U415, 2 hour fire-resistance rating. Apply one layer 12.7 mm (1/2″) SHEETROCK FIRECODE C Core Gypsum Panels to both sides of C-H Studs. Fasten with 25 mm (1″) TYPE S or S-12 (typical) screws. Space screws 300 mm (12″) o.c. along the edges and in the field for vertical panel application, 200 mm (8″) o.c. for horizontal.

System F—ULC Design W452, or UL Design U415, 2 hour fire-resistance rating. Apply base layer 12.7 mm (1/2″) SHEETROCK FIRECODE C Core Gypsum Panels to resilient channels with 25 mm (1″) TYPE S or S-12 (typical) screws spaced 610 mm (24″) o.c. Stagger end joints. Apply face layer 12.7 mm (1/2″) SHEETROCK FIRECODE C Core Gypsum Panels with 42 mm (1-5/8″) TYPE S or S-12 (typical) screws spaced 300 mm (12″) o.c.

System G—ULC Design W452, or UL Design U415, 3 hour fire-resistance rating. Apply two layers of 15.9 mm (5/8″) SHEETROCK FIRECODE C Core Gypsum Panels using TYPE S or S-12 (typical) screws spaced 300 mm (12″) o.c. Apply first and second (inner) layers vertically or horizontally over room side of steel C-H Studs. When applied vertically, center joints between panels over studs. Stagger all joints a minimum 610 mm (24″). When panels are applied horizontally stagger joints a minimum 300 mm (12″). Apply third layer of 15.9 mm (5/8″) SHEETROCK FIRECODE C Core Gypsum Panels vertically or horizontally over room side of steel C-H Studs using 56 mm (2-1/4″) TYPE S or S-12 (typical) screws. Space screws 400 mm (16″) o.c when board is applied vertically, 300 mm (12″) o.c. when board is applied horizontally.

System H—ULC Design W452, or UL Design U415, 3 hour fire-resistance rating. Alternate to System G above. Apply third layer of 15.9 mm (5/8″) SHEETROCK FIRECODE C Core Gypsum Panels to other side of steel C-H Studs.

Horizontal (Ceiling) Assemblies—2 hour fire-resistance rating. Install three layers of 12.7 mm (1/2″) SHEETROCK FIRECODE C Core Gypsum Panels to horizontally installed C-H and/or E-Studs. Apply the base layer with 25 mm (1″) TYPE S or S-12 (typical) screws spaced 610 mm (24″) o.c. Apply the mid layer in the same manner with joints offset 610 mm (2′) and attached with 42 mm (1-5/8″) TYPE S or S-12 (typical) screws spaced 300 mm (12″) o.c. Apply the face layer attached with 56 mm (2-1/4″) TYPE S or S-12 (typical) screws spaced 300 mm (12″) o.c. Place face layer end joints between studs and secure with 38 mm (1-1/2″) Type G screws 200 mm (8″) o.c.

Horizontal Stud Shaft Wall (Walls with studs placed horizontally) UL Design U437

1. Attach horizontal J-Runners at the floor and top of wall and vertical J-Runners to structural supporting elements with powder actuated fasteners located not greater than 50 mm (2″) from ends and spaced no more than 610 mm (24″) on center with short leg of J-Runner toward the finish side of the wall.
2. Install Gypsum Liner Panels horizontally without butt joints, which limits the width of the wall to the available length of the Liner Panels.
3. Cut Gypsum Liner Panels 25 mm (1″) less than the width of the wall, and center the panels between the vertical J-Runners. The top edge of the uppermost Liner Panel to be cut 25 mm (1″) less than the wall height to clear the 25 mm (1″) leg of the top J-Runner.
4. Free edge of the uppermost and lower Liner Panels attached to the long leg of the top and bottom J-Runners with 42 mm (1-5/8″) long Type S or S-12 steel screws spaced no greater than 300 mm (12″) on centers.
5. Cut C-H Studs to maintain a 10 to 13 mm (3/8″ to 1/2″) gap at each end of the wall.
6. Install C-H Studs horizontally with the open “C” section of the studs facing down, and spaced 610 mm (24″) on center.
7. Steel Angles should be minimum 0.8 mm (20 gauge), 50 x 50 x 50 mm (2″ x 2″ x 2″) for 100 mm (4″) C-H Studs, and 50 x 50 x 100 mm (2″ x 2″ x 4″) for 150 mm (6″) C-H Studs. Clips are centered under and tight to the web of the C-H Studs, but not attached to the studs. Clips are attached through the web of the vertical J-Runners to the underlying structural supporting element with a minimum of two 13 mm (1/2″) Type S-12 pan head screws.
8. As an alternative to the preceding Angle Clip, fasten each end of the horizontal C-H Stud to the vertical J-Runner legs with 13 mm (1/2″) Type S-12 pan-head steel screws on both sides of the wall.
9. End reactions of the horizontal C-H Studs must be accommodated by the structural element required at the ends of the wall, and must be determined by a licensed professional engineer.
10. The allowable height of the wall is predicated on the structural adequacy of the vertical structural elements.

D. **SHEETROCK Gypsum Panels (for vertical and horizontal shaft walls)**

Vent Shaft Enclosure—U529, 2-hour fire-resistance rating. Install 25 x 50 x 0.5 mm (1″ x 2″ x 25 ga.) galvanized steel angles as runners on floor, ceilings, and partition ends. Fasten runners or angles securely to structure with suitable fasteners spaced 610 mm (24″) o.c. max. Install 12.7 mm (1/2″) SHEETROCK FIRECODE C Core Gypsum Panels vertically. Fasten to angles with 25 mm (1″) TYPE S or S-12 (typical) screws spaced 300 mm (12″) o.c. Apply DURABOND Setting-Type or CGC Lightweight Setting-Type Joint Compound on back side of liner panel and sheet-laminate to shaft-side board with vertical joints offset 300 mm (12″) from inner board joints. Also screw to shaft side board with 38 mm (1-1/2″) long Type G screws spaced 610 mm (24″) o.c. in both directions. Laminate face board to liner panels in similar manner. Install face boards vertically with joints offset 300 mm (12″) from liner panel joints. Apply pressure when placing boards to ensure good adhesive bond and fasten to liner panel with 38 mm (1-1/2″) Type G screws, spaced 610 mm (24″) o.c.

3.4 Accessory Application

A. **Gypsum Panel Joints**—Finish all face layer joints and internal angles with a CGC Interior Finishing System installed according to manufacturer’s directions.

B. **Corner Bead**—Reinforce all vertical and horizontal exterior corners with SHEETROCK/BEADEX** Paper Faced Bead. See product folders EWB-5238/ETR-OT31 for detailed recommendations.

C. **Metal Trim**—Where shaft wall terminates against masonry or other dissimilar material, apply SHEETROCK/BEADEX** Paper Faced Bead and Trim over face layer edge.

Note
*SYNKO products available in Western Canada only
**BEADEX products available in Western Canada only

About the cover:

Project

Skybridge at One North Halsted

Chicago, IL

Recipient of the 2004 AIA Honor Award

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Metric Specifications
CGC Inc., 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, *Fire-Resistant Assemblies,* for additional information and a Table of Metric Equivalents.

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Follow good safety and industrial hygiene practices during handling and installation of 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.

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EWB-W142/rev. 12-06