

## Product Selection Guide and Architectural Assemblies



## The Georgia-Pacific Gypsum Product Line

Georgia-Pacific Gypsum constantly monitors and controls the manufacturing process to ensure gypsum product reliability and consistency. To support this commitment to customer satisfaction, Georgia-Pacific Gypsum warrants its gypsum products to be free of manufacturing defects. Products are certified through testing procedures with established designations for:

### ASTM Product Standards

### ASTM Application Standards

### CSA Standards

Additional testing has been performed on certain products indicated as:

#### UL Classified

#### ULC Classified

#### WHI Classified

#### CTC Tested

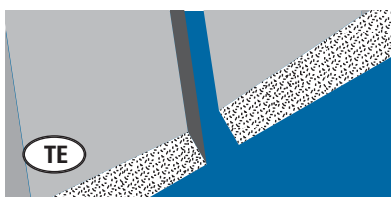
#### TPI Tested

#### FM Tested and Approved

Other classifications, designations and testing, which may have been performed on particular products, have been indicated where applicable in this directory.

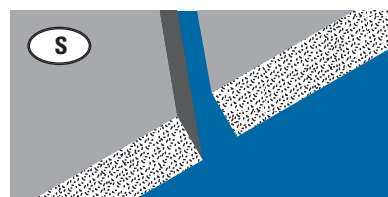
*\* The information contained in this directory is intended to be informative and accurate. However, it is to be used as a technical guideline and does not replace the judgments and designs of a qualified architect and/or engineer. Georgia-Pacific Gypsum is not responsible for product damage or defects resulting from incorrect application, storage, handling or abuse.*

### Gypsum Board Edge Details



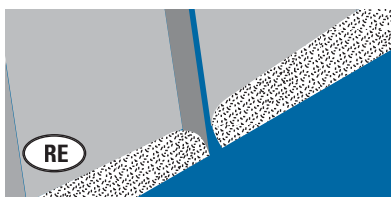
#### Tapered

The tapered edge was originally called the "recessed edge." This taper allows space for tape and joint treatment to be applied, so the completed job will be flat, smooth and monolithic. Width of taper is about 2".



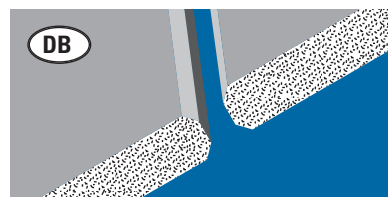
#### Square

Square edge was the original wallboard edge. Initially designed to be a base with a final covering such as wallpaper, paneling or tile. Now used primarily as sheathing and backer board.



#### Tapered with Round Edge

Round edge is designed to reduce the beading and ridging problems commonly associated with standard-type gypsum board. This edge formation provides a stronger joint when ToughRock® Setting Compound is used for all joint finishing steps.



#### Double Beveled

DensGlass™ Ultra Shaftliner panels are produced with double beveled edges to allow a quick, easy fit into the supporting grooves of metal shaftwall, stairwell and area separation walls.

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*Note: The data relating to fire and sound-tested assemblies is based on the characteristics, properties and performance of materials and systems obtained under controlled test conditions as set forth under the appropriate ASTM standard, such as E 119 (fire), E 90 (sound) or E 72 (structural).*

**CAUTION: For product fire, safety and use information, go to [gp.com/safetyinfo](http://gp.com/safetyinfo).**

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## ToughRock® Gypsum Board

Product	Dimensions			Edge					Standard		
	TH	W	L	TE	S	RE	B	DB	ASTM	FEDERAL	CSA
<b>ToughRock® Gypsum Board</b> – For interior walls and ceilings. Accommodates wide range of decorative treatments.	1/4" 3/8" 1/2"	4' 4' 4'	8' to 12' 8' to 12' 8' to 12'	• • •	• • •				C 36 C 1396	SS-L-30d Type III Grade R	A82.27 M
<b>ToughRock® Fireguard® Type X Gypsum Board</b> – Noncombustible* gypsum core. Interior wall, floor and ceiling applications. Can be used in fire-rated assemblies. Meets basic Type X requirements.	5/8"	4'	8' to 16'	•	•	•	•		C 36 Type X C 1396	SS-L-30d Type III Grade X	A82.27 M
<b>ToughRock® Fireguard® Type C Gypsum Board</b> – Use as described above. Appropriate for commercial applications requiring extended fire resistance ratings.	1/2" 5/8"	4' 4'	8' to 16' 8' to 16'	• •	• •	• •	• •		C 36 Type X Premium C 1396	SS-L-30d Type III Grade R	A82.27 M
<b>ToughRock® Moisture-Guard® (Greenboard)</b> – Water-resistant gypsum core and paper surfacing.	1/2"	4'	8', 10', 12'	•					C 630 C 1396	SS-L-30d Type VII Grade W	A82.27 M
<b>ToughRock® Fireguard® Type X Moisture-Guard®</b> – Use as described above. Available in 1/2" and 5/8" with fire-resistant Type X core.	1/2" 5/8"	4' 4'	8' to 12' 8' to 12'	• •					C 630 Type X C 1396	SS-L-30d Type VII Grade W, X	A82.27 M

## ToughRock® Specialty Products

Product	Dimensions			Edge					Standard		
	TH	W	L	TE	S	RE	B	DB	ASTM	FEDERAL	CSA
<b>ToughRock® 54" Wide Gypsum Board</b> – For interior walls and ceilings. Accommodates wide range of decorative treatments. Eliminates filler strip.	1/2" 5/8"	54" 54"	8' to 12' 8' to 12'	• •					C 36 C 1396	SS-L-30d Type III Grade R	A82.27 M
<b>ToughRock® CD® Ceiling Board</b> – Specially formulated core and paper ceiling board designed for water-based, textured ceiling applications. Sag resistant.	1/2"	4'	12'	•					C 1395 C 1396	SS-L-30d Type III Grade R	
<b>ToughRock® Fireguard® Type X Soffit Board</b> – Soffit board with treated paper face bonded to specially formulated core designed to resist sag and moisture. For exterior use such as outdoor building soffits, carports and outdoor applications where there is no direct exposure to weather.	1/2" 5/8"	4' 4'	8', 9', 10' 8', 9', 10'	• •					C 931 C 1396		A82.27 M
<b>ToughRock® Sound Deadening Board</b> – Use with 1/2" ToughRock Fireguard Type C or 5/8" ToughRock Fireguard Type X to meet requirements for sound and fire resistance. Manufactured in Edmonton, AB only.	1/4"	4'	8'	•					C 442 C 1396	SS-L-30d Type IV Grade R	A82.27 M
<b>ToughRock® FlexRoc® Gypsum Board</b> – High flex gypsum board designed for inside and outside radius curve installations including archways, columns, curved columns, curved partition walls and curved stairways.	1/4"	4'	8'	•					C 36 C 1396	SS-L-30d Type III Grade R	A82.27 M
<b>ToughRock® Fireguard® Type X Abuse Guard® Gypsum Board</b> – Abuse-resistant gypsum board for high traffic areas where surface durability and surface indentation are important. Specifically formulated to offer greater abrasion, rubbing, scraping and gouging resistance than regular paper-faced drywall.	5/8"	4'	12'	•					C 36 C 1396	SS-L-30d Type III Grade X	A82 M

\*As described and tested in accordance with ASTM E 136.

Note: Some products are not available at all plants or locations. Call sales office listed on back cover for specific product availability.

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## Dens™ Brand Fiberglass Mat Gypsum Panels

Product	Dimensions			Edge					Standard
	TH	W	L	TE	S	RE	B	DB	
<b>DensArmor Plus® High-Performance, and Abuse-Resistant panels are GREENGUARD Children &amp; Schools™ certified for low VOCs.</b>									
<b>DensArmor Plus® High-Performance Interior Panel</b> – Fiberglass mat gypsum interior panel consisting of moisture-resistant noncombustible* gypsum core with coated fiberglass mat facings front and back. Offers superior resistance to moisture and mold.	1/2"	4'	8' to 12'	•					C 1658, Applicable Sections of C 630, C 1396 and C 1177
<b>DensArmor Plus® Fireguard® Type X High-Performance Interior Panel</b> – Gypsum panel is UL and ULC classified, has fiberglass mat facings on front and back for superior resistance to moisture and mold.	5/8"	4'	8' to 12'	•					C 1658, Applicable Sections of C 630, C 1396 and C 1177
<b>DensArmor Plus Fireguard® Type C High-Performance Interior Panel</b> – Noncombustible Fireguard Type C gypsum core with fiberglass mat facings on front and back. Use as described above. Appropriate for commercial applications requiring extended fire resistance ratings and for added protection against mold growth in the wall cavity. UL and ULC Classified.	1/2"	4'	8' to 12'	•					C 1658, Applicable Sections of C 630, C 1396 and C 1177
<b>DensArmor Plus® Fireguard® Type X Abuse-Resistant Interior Panel</b> – Abuse-resistant paperless drywall panel for high traffic areas. Fiberglass mat and treated core offer superior resistance to moisture and mold. UL Classified.	5/8"	4'	8' to 12'	•					C 1658, Applicable Sections of C 630, C 1396 and C 1177
<b>DensArmor Plus® Fireguard® Type X Impact-Resistant Interior Panel</b> (formerly DensArmor Plus® High Impact) – Fiberglass mat interior gypsum panel specifically designed to resist high or continual impact and protect the stud cavity. Specially formulated core provides greater resistance to surface indentation and abuse. UL Classified.	5/8"	4'	8' to 12'	•					C 1658, Applicable Sections, of C 630, C 1396 and C 1629
<b>DensShield® Tile Backer</b> – Tile backer board for installing tile on interior walls, ceilings, floors and countertops. Superior moisture protection for permanent tile installations. Easily installed, light-weight and outperforms cement board.	1/4" 1/2" 1/2" 1/2"	4' 32" 4' 4'	4' 5' 8' 5'		• • • •				C 1178
<b>DensShield® Fireguard® Type X Tile Backer</b> – Use as described above. Patented tile backer with noncombustible core. Can be used in fire-rated assemblies. UL and ULC Classified.	5/8"	4'	8'		•				C 1178
<b>DensDeck® Roof Board</b> – Superior, nonstructural thermal barrier roof board for commercial roof and re-roof applications. Fiberglass mat facings with water-resistant treated core.	1/4" 1/2" 1/2"	4' 4' 4'	8' 4' 8'		• • •				C 1177
<b>DensDeck® Prime Roof Board</b> – Premium, non-structural roof board engineered with a proprietary, non asphaltic coating to enhance bonding in commercial roofing systems. Fiberglass mat facings with water-resistant, treated core.	1/4" 1/4" 1/2" 1/2"	4' 4' 4' 4'	4' 8' 4' 8'		• • • •				C 1177
<b>DensDeck® DuraGuard Roof Board</b> – An enhanced roof board incorporating a low perm, integrated coating for self-adhesive and built up roofing systems with all the features of DensDeck roof board.	1/4" 1/4" 1/2" 1/2"	4' 4' 4' 4'	4' 8' 4' 8'		• • • •				C 1177

**Note:** Some products are not available at all plants or locations. Call sales office listed on back cover for specific product availability.  
\*As described and tested in accordance with ASTM E 136.

**Dens Brand Fiberglass  
Mat Gypsum Boards  
continued next page**

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## Dens™ Brand Fiberglass Mat Gypsum Panels continued from previous page

Product	Dimensions			Edge					Standard		
	TH	W	L	TE	S	RE	B	DB	ASTM		
<b>DensDeck®, DensDeck® Prime and DensDeck® DuraGuard Fireguard® Type X Roof Board</b> – Use as described above. Can replace 5/8" Type X gypsum board under prefix "P" in UL Fire Resistance Directory. Qualifies for numerous 1- and 2-hour fire-rated assemblies.	5/8" 5/8"	4' 4'	4' 8'		• •				C 1177 C 1177		
<b>DensGlass™ Exterior Sheathing</b> (formerly DensGlass Gold® Exterior Sheathing) – Fiberglass mat exterior substrate panel for walls, ceilings and soffits. Ideal for EIFS, brick and other exterior cladding applications.	1/2"	4'	8', 9', 10'		•				C 1177		
<b>DensGlass™ Fireguard® Type X Exterior Sheathing</b> – Use as described above. Can replace 5/8" Type X sheathing in fire-rated wall assemblies. Qualifies for numerous 1- and 2-hour fire-rated assemblies. UL/ULC Classified.	5/8"	4'	8', 9', 10'		•				C 1177		
<b>DensGlass™ Ultra Shaftliner Panels</b> – For use with metal stud shaftwall, stairwell or area separation wall systems. Fiberglass mats increase weather resistance and resist the growth of mold. Patented product with moisture-resistant, treated, Type X core. Beveled edges facilitate fit into metal components. UL/ULC Classified.	1"	23-7/8"	8' to 12'					•	C 1658 Applicable Sections of C 442 and C 1396		

## Veneer Board

Product	Dimensions			Edge					Standard		
	TH	W	L	TE	S	RE	B	DB	ASTM	FEDERAL	CSA
<b>ToughRock® Veneer Plaster Base (Blue Board)</b> – Gypsum wallboard with high-suction face paper. Use in conjunction with DensArmor Cote™ Interior Veneer Plaster and PearlCote™ Interior Veneer Plaster.	1/2"	4'	8' to 16'	•					C 588 C 1396	SS-L-30d Type VI Grade R	A82.27
<b>ToughRock® Fireguard® Type X Veneer Plaster Base</b> – Use as described above. Increases fire rating to same level as ToughRock Fireguard Type X gypsum board. UL/ULC Classified.	5/8"	4'	8' to 16'	•					C 588 C 1396 Type X	SS-L-30d Type VI Grade X	A82.27 M
<b>ToughRock® Fireguard® Type C Veneer Plaster Base</b> – Use as described above. Noncombustible Fireguard Type C core. Increases fire rating to same level as ToughRock Fireguard Type C gypsum wallboard. UL and ULC Classified.	1/2"	4'	8' to 12'	•					C 588 C 1396 Type X	SL-L-30d Type III Grade R	A82 27n

## Textures and Plaster

Product	Package Size	Coverage	Standards
			ASTM
<b>PearlCote™ Interior Veneer Plaster</b> – A one-coat plaster application designed for commercial or residential use on walls or ceilings to resist abrasion or damage while maintaining moisture and mold resistance (when tested, as manufactured, per ASTM D 3273).	50-lb. bags	150 sq. ft. per bag	C 587
<b>ToughRock™ Regency Ceiling Textures/Polystyrene</b> – For spray application only. A high-quality aggregate finish with superior ceiling coverage. For use with gypsum board or concrete ceilings. Not recommended for high-moisture areas such as bathrooms.	35-lb. bags 40-lb. bags 50-lb. bags	250 sq. ft. per bag 285 sq. ft. per bag 350 sq. ft. per bag	
<b>ToughRock™ Wall and Ceiling Texture</b> – A decorative spray application for both walls and ceilings. Commonly used for splatter application, knock-down and orange peel type textures.	50-lb. bags	Up to 2,000 sq. ft. per bag depending on finish	

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\*When tested, as manufactured, per ASTM D 3273.

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## Joint Treatment Systems

Product	Package Size	Coverage	Standards
		<b>ASTM</b>	
<b>DensCote™ Joint Compound</b> – All purpose ready-mix formula—use for bedding tape, finishing joints, filling corner bead, spotting, skim coating and texturing.	61.7-lb. pails 48-lb. box	61.7 lbs. per 500 sq. ft.	C 475
<b>ToughRock® All-Purpose Dry Compound</b> – Use for bedding tape, finishing joints, filling corner bead, spotting, skim coating and texturing.	25-lb. bags	25-lbs. per 400 sq. ft. for joints; 15-50 lbs. per 1,000 sq. ft. for texturing	C 475
<b>ToughRock® Setting Compounds</b> – Allows complete taping and finishing in one day. Recommended for cold weather and slow drying conditions. Hardens by setting, not drying. Available 45- and 90-minute. Ideal products for patch and repair jobs.	33-lb. bags 15-kg. bags	1,800 sq. ft. per 33-lb. bag	C 475
<b>ToughRock® Sandable Setting Compounds</b> – Same use as ToughRock Setting Compounds. Applies and sands easier than ToughRock Setting Compounds. Available in 20-, 45- and 90-minute.	18-lb. bags 24-lb. bags 11-kg. bags	1,000 sq. ft. per 18-lb. bag 1,300 sq. ft. per 24-lb. bag	C 475
<b>ToughRock® Ready-Mix All-Purpose Joint Compound</b> – Pre-mixed, ready to use for bedding tape, finishing joints, skim coating and texturing.	12-lb. pails 61.7-lb. pails 48-lb. ctn. 20-kg. pails 28-kg. pails 27-kg. ctn.	61.7 lbs. per 500 sq. ft.	C 475
<b>ToughRock® Lightweight Joint Compound</b> – Pre-mixed, ready to use for finishing joints and cornerbead. Shrinks less and is easier to sand than All Purpose.	4.5-gallon cartons & pails 1-gallon pail 17-liter cartons	4.5 gallons per 500 sq. ft.	C 475
<b>ToughRock® Semi-Light Joint Compound</b> – Pre-mixed, ready to use for bedding tape, finishing joints, cornerbead and skim coating.	3.5 and 4.5-gallon cartons & pails 23-kg. cartons	4.5 gallons per 500 sq. ft.	C 475
<b>ToughRock® Ready-Mix Topping Compound</b> – Pre-mixed and ready to use. Finish applications only. Very white in color, easy to sand.	61.7-lb. pails 48-lb. cartons	40 lbs. per 500 sq. ft.	C 475
<b>ToughRock® Fire-Halt® Sealant</b> – A noncombustible fast-setting compound for use as a firestop sealant for penetrations such as pipes, conduit and telephone cables in fire-resistive assemblies; and as filler for the flutes in steel decks. Listed with Warnock Hersey International/Intertek Testing Services.	15-lb. pails 33-lb. bags	1 lb. powder mixed will fill 30 cubic inches	C 475
<b>ToughRock™ Tape</b> – Special 2-1/16" wide paper tape. Reinforces gypsum joints. Pre-creased for ease of application.	75-ft. rolls 250-ft. rolls 500-ft. rolls	400' per 1,000 sq. ft. of gypsum board	C 475

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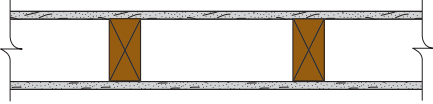
The following information in this catalog for wall partitions/wood studs, wall partitions/metal studs, and floor/ceiling assemblies has been organized for ease of reference. Installation details and technical data are located adjacent to each other. For more detailed information please reference the individual testing agencies' listings.

**"Est." in the following information means estimated results. Check with local code jurisdictions or design authority before using or including in plans. CAUTION: For product fire, safety and use information, go to [gp.com/safetyinfo](http://gp.com/safetyinfo).**

## Wood-Framed Wall Assemblies

### 45-Min. Fire Rating

Test Reference: UL U317, cUL U317

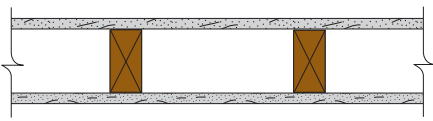


Partition Thickness: 4-5/8", Weight per Sq. Ft.: 6.0

1/2" ToughRock® Fireguard® Type C or 1/2" DensArmor Plus® Fireguard® Type C gypsum board applied parallel or at right angles to each side of 2 x 4 wood studs 16" o.c. with 1-5/8" cement coated nails spaced 7" o.c. Joints staggered.

### 1-Hour Fire Rating

Test Reference: UL U305, ULC W301, GA WP 3605, cUL U305



### 30-34 STC Sound Trans.

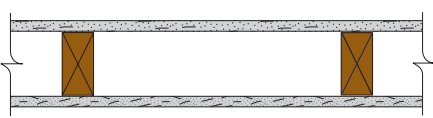
Test Reference: OR 64-8

Partition Thickness: 4-7/8", Weight per Sq. Ft.: 7.0

5/8" ToughRock Fireguard Type X or 5/8" DensArmor Plus Fireguard Type X gypsum board applied parallel or at right angles to each side of 2 x 4 wood studs 16" o.c. with 1-7/8" 6d coated nails spaced 7" o.c. Joints staggered.

### 1-Hour Fire Rating

Test Reference: FM WP 90, GA WP 3520



### 35-39 STC Sound Trans.

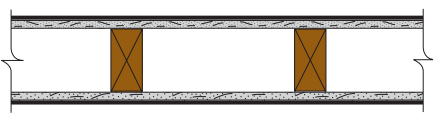
Test Reference: G&H NG-246FT

Partition Thickness: 4-7/8", Weight per Sq. Ft.: 7.0

5/8" ToughRock Fireguard Type X gypsum board or 5/8" DensArmor Plus Fireguard Type X gypsum board applied parallel to each side of 2 x 4 wood studs 24" o.c. with 1-7/8" 6d coated nails 7" o.c. at joints and top and bottom plates and 3/8" beads of adhesive at intermediate studs. Joints staggered.

### 1-Hour Fire Rating

Test Reference: UC, 1-12-66, GA WP 3620



### 30-34 STC Sound Trans.

Test Reference: G&H IBI-35FT

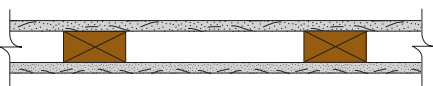
Partition Thickness: 4-7/8", Weight per Sq. Ft.: 7.0

**Sound Tested** without gypsum veneer plaster

1/2" ToughRock veneer base Type X applied at right angles to each side of 2 x 4 wood studs 16" o.c. with 1-3/4" 5d etched nails 8" o.c. 1/16" DensArmor Cote™ or Pearl Cote™ Interior Veneer Plaster applied over each face. Vertical joints staggered 16" and horizontal joints 12" on opposite sides.

### 1-Hour Fire Rating

Test Reference: UL U338, GA WP 3640



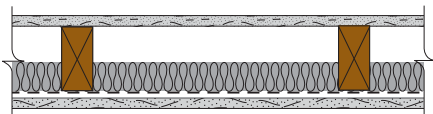
Partition Thickness: 2-7/8", Weight per Sq. Ft.: 7.0

5/8" ToughRock Fireguard Type X or 5/8" DensArmor Plus Fireguard Type X gypsum board applied parallel or at right angles to each side of 2 x 3 or 2 x 4 wood studs, turned flatwise 24" o.c. with 1-7/8" 6d cement coated nails 7" o.c. (non load-bearing).

**Wood-Framed Wall Assemblies continued**

**1-Hour Fire Rating**

Test Reference: OSU T-3127



**50-54 STC Sound Trans.**

Test Reference: RAL TL77-138

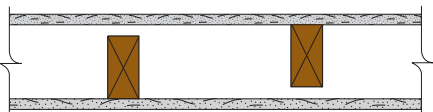
Partition Thickness: 5-1/4", Weight per Sq. Ft.: 7.0

**Sound Tested** with 3-1/2" fiberglass insulation

5/8" ToughRock® Fireguard Type X or 5/8" DensArmor Plus® Fireguard® Type X board applied parallel to resilient channels 24" o.c. with 1" Type S drywall screws at edges 6" o.c. and center row 12" o.c. at intermediate studs. End joints back-blocked with resilient channels. Resilient channels attached at right angles to 2 x 4 wood studs 16" o.c. with 1-7/8" 6d coated nails. 1/2" x 3" gypsum board filler strip attached to plate at floor line with 6d coated nails 16" o.c. 1-1/2" fiberglass 0.8 pcf attached to studs in stud space with 1/2" long staples. On opposite side, one layer 5/8" ToughRock Fireguard or 5/8" DensArmor Plus Fireguard Type X gypsum board applied at right angles to studs with 6d coated nails, 8" o.c. Stagger end joints 48" o.c. each side.

**1-Hour Fire Rating**

Test Reference: UL U305, ULC W301,  
GA WP 5515



**40-44 STC Sound Trans.**

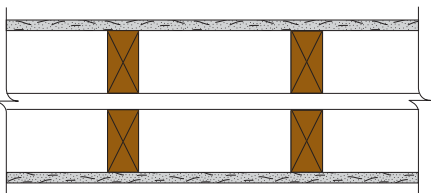
Test Reference: Est.

Partition Thickness: 7-3/4", Weight per Sq. Ft.: 8.0

5/8" ToughRock Fireguard Type X or 5/8" DensArmor Plus Fireguard Type X gypsum board applied parallel or at right angles to each side of 2 x 4 wood studs 16" o.c. staggered 8" o.c. on 2 x 6 wood plates with 1-7/8" 6d coated nails 7" o.c. Wallboard nailed to top and bottom plates 7" o.c. Stagger joints each side. Horizontal bracing required at mid height.

**1-Hour Fire Rating**

Test Reference: UL U305, ULC W301,  
GA WP 5512



**45-49 STC Sound Trans.**

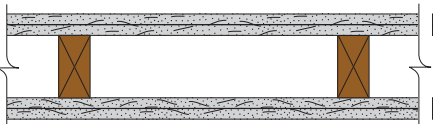
Test Reference: Est.

Partition Thickness: 9-1/4", Weight per Sq. Ft.: 8.0

5/8" ToughRock Fireguard Type X or 5/8" DensArmor Plus Fireguard Type X gypsum board applied parallel or at right angles to each side of double row of 2 x 4 wood studs 16" o.c. on separate plates 1" apart with 1-7/8" 6d coated nails 7" o.c. Wallboard nailed to top and bottom plates 7" o.c. Stagger joints each side. Horizontal bracing required at mid height.

**2-Hour Fire Rating**

Test Reference: UL U301, cUL U301



**40-44 STC Sound Trans.**

Test Reference: NGC-2363

Partition Thickness: 6-1/8", Weight per Sq. Ft.: 12.0

**Sound Tested** with studs 16" o.c. and with nails for base layer spaced 6" o.c.

Base Layer: 5/8" ToughRock Fireguard Type X or 5/8" DensArmor Plus Fireguard Type X gypsum board applied vertically or at right angles using 1-7/8" 6d coated nails 6" o.c. to each side of 2 x 4 wood studs 16" o.c.

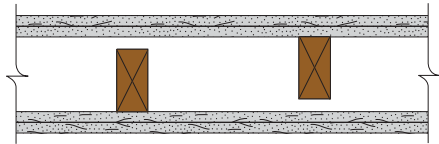
Face Layer: 5/8" ToughRock Fireguard Type X or 5/8" DensArmor Plus Fireguard Type X gypsum board applied vertically or at right angles to studs over base layer with 2-3/8" 8d coated nails 8" o.c. Stagger joints 16" o.c. each layer and side.



## Wood-Framed Wall Assemblies continued

**2-Hour Fire Rating**

Test Reference: FM WP 360, GA WP 3910

**50-54 STC Sound Trans.**

Test Reference: NGC-2377

Partition Thickness: 8", Weight per Sq. Ft.: 13.0

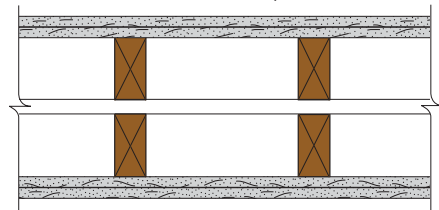
**Sound Tested** with nails for base layer spaced 6" o.c.

Base Layer: 5/8" ToughRock® Fireguard® Type X or 5/8" DensArmor Plus® Fireguard® Type X gypsum board applied at right angles to each side of 2 x 4 wood studs 16" o.c. staggered 8" o.c. on 2 x 6 wood plates with 1-7/8" 6d coated nails 24" o.c.

Face Layer: 5/8" ToughRock Fireguard Type X or 5/8" DensArmor Plus Fireguard Type X gypsum board applied at right angles to studs with 2-3/8" 8d coated nails 8" o.c. Stagger vertical joints 16" o.c. each layer and side. Horizontal bracing required at mid height.

**2-Hour Fire Rating**

Test Reference: FM WP 360, GA WP 3820

**55-59 STC Sound Trans.**

Test Reference: NGC-3056

Partition Thickness: 10-3/4", Weight per Sq. Ft.: 13.0

**Sound Tested** with 3-1/2" fiberglass insulation stapled to studs in stud spaces on one side.

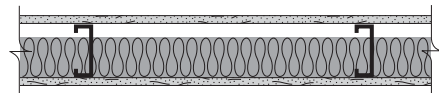
Base Layer: 5/8" ToughRock Fireguard Type X or 5/8" DensArmor Plus Fireguard Type X gypsum board applied at right angles to each side of double row of 2 x 4 wood studs 16" o.c. on separate plates 1" apart with 1-7/8" 6d coated nails 24" o.c.

Face Layer: 5/8" ToughRock Fireguard Type X or 5/8" DensArmor Plus Fireguard Type X gypsum board or 5/8" DensShield® Fireguard® Type X Tile Backer applied at right angles to each side with 2-3/8" 8d coated nails 8" o.c. Stagger vertical joints 16" o.c. each layer and side. Horizontal bracing required at mid height.

## Steel-Framed Wall Assemblies

**1-Hour Fire Rating**

Test Reference: ULC W412, GA WP 1070

**45-49 STC Sound Trans.**

Test Reference: RAL TL69-42

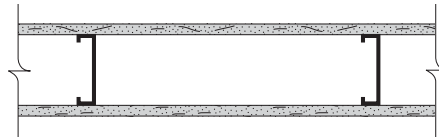
Partition Thickness: 3-1/2", Weight per Sq. Ft.: 5.0

**Sound Tested** with 2" mineral fiberglass insulation

1/2" ToughRock Fireguard Type C gypsum board applied parallel to each side of 2-1/2" steel studs 24" o.c. with 1" Type S drywall screws 8" o.c. at vertical joints and 12" o.c. at intermediate studs. 1-1/2" mineral fiber insulation, stapled to board in stud space. Joints staggered.

**1-Hour Fire Rating**

Test Reference: UL U465, ULC W415, GA WP 1081

**48 STC Sound Trans.**

Test Reference: RAL TL99-103

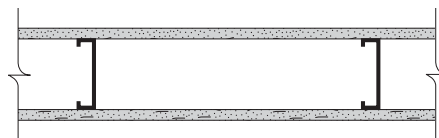
Partition Thickness: 4-7/8", Weight per Sq. Ft.: 5.0

**Sound Tested** with 3" mineral fiber, 2.5 pcf, in stud space.

5/8" ToughRock Fireguard Type X or 5/8" DensArmor Plus Fireguard Type X gypsum board applied vertically to each side of 3-5/8" steel studs 24" o.c. with 1" Type S drywall screws 8" o.c. at edges and 12" o.c. at intermediate studs.

**1-Hour Fire Rating**

Test Reference: UL V 450



Partition Thickness: 2-7/8", Weight per Sq. Ft.: 5.0

5/8" DensArmor Plus Fireguard Type X gypsum board applied vertically to each side of 3-5/8" UltraSTEEL® studs 24" o.c. with 1" Type S drywall screws 8" o.c. at edges and 12" o.c. at intermediate studs.

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**Steel-Framed Wall Assemblies continued**

**1-Hour Fire Rating**

Test Reference: UC 12-28-65, GA WP 1090



**45-49 STC Sound Trans.**

Test Reference: ACI 7-115 2019c

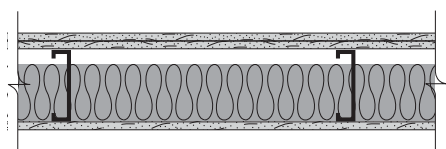
Partition Thickness: 3-1/8", Weight per Sq. Ft.: 7.0

Base Layer: 1/4" ToughRock® gypsum board applied parallel to each side of 1-5/8" steel studs 24" o.c. with 1" Type S drywall screws 24" o.c. at vertical joints and 36" o.c. at intermediate studs.

Face Layer: 1/2" ToughRock® Fireguard® Type C or 1/2" DensArmor Plus® Fireguard® Type C gypsum board applied parallel to each side with 1-5/8" Type S drywall screws 12" o.c. Stagger joints.

**1-Hour Fire Rating**

Test Reference: WHI 495-0614, GA WP 1023



**50-54 STC Sound Trans.**

Test Reference: RAL TL88-54

Partition Thickness: 5-5/8", Weight per Sq. Ft.: 7.0

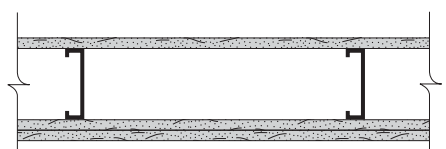
1/2" ToughRock Fireguard Type C or 1/2" DensArmor Plus Fireguard Type C gypsum board applied at right angles to one side of 3-5/8" steel studs 24" o.c. with 1" Type S drywall screws 8" o.c. to vertical joints and 12" o.c. to intermediate studs. Studs attached to top and bottom runner with Type S pan head screws.

Opposite Side Base Layer: 1/2" ToughRock Fireguard Type C or 1/2" DensArmor Plus Fireguard Type C gypsum board applied at right angles to studs with 1" Type S drywall screws 24" o.c.

Face Layer: 1/2" ToughRock Fireguard Type C or 1/2" DensArmor Plus Fireguard Type C gypsum board applied at right angles to framing with 1-5/8" Type S drywall screws 8" o.c. at end joints and 12" o.c. at perimeter and intermediate studs. Stagger vertical joints 24" o.c. Stagger horizontal joints 24" o.c. each layer and side. Fiberglass insulation, 2-3/4" thick, 0.30 pcf, friction fit in stud space.

**1-Hour Fire Rating**

Test Reference: OSU T-1770, GA WP 1052



**50-54 STC Sound Trans.**

Test Reference: NRCC 817-NV

Partition Thickness: 5-1/2", Weight per Sq. Ft.: 8.0

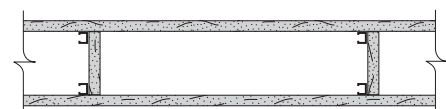
**Sound Tested** with 3-1/2" fiberglass insulation friction fit in stud space

5/8" ToughRock Fireguard Type X or 5/8" DensArmor Plus Fireguard® Type X gypsum board applied parallel or at right angles to each side of 3-5/8" steel studs 24" o.c. with 1" Type S drywall screws 8" o.c. at vertical joints and 12" o.c. at wall perimeter and intermediate studs. Studs attached to top and bottom runner with Type S pan head screws.

Face Layer: 5/8" ToughRock Fireguard Type X gypsum board or 5/8" DensArmor Plus Fireguard Type X gypsum board applied parallel or at right angles to one side with 1-5/8" Type S drywall screws 12" o.c.

**1-Hour Fire Rating**

Test Reference: UL U420, GA WP 5015, cUL U420



**50-54 STC Sound Trans.**

Test Reference: RAL TL76-155

Partition Thickness: 10-3/4", Weight per Sq. Ft.: 5.5

**Sound Tested** with 3-1/2" fiberglass insulation, stapled to one side in cavity

5/8" ToughRock® Fireguard® Type X or 5/8" DensArmor Plus Fireguard Type X gypsum board applied parallel to a double row of 1-5/8" steel studs 24" o.c. and not less than 1" apart with 1" Type S drywall screws 8" o.c. at edges and top and bottom runners, 12" o.c. in field. Stagger joints 24" each side. 5/8" gypsum board pieces 12" long x 4-1/2" wide located at 1/3 points used as cross braces fastened to stud pairs with three 1" Type S drywall screws at each end of brace. Optional 25-gauge, stud or runner pieces not less than 4-1/2" long may be used as cross braces and attached with two No. 8, 1/2" self-drilling steel screws at each end.

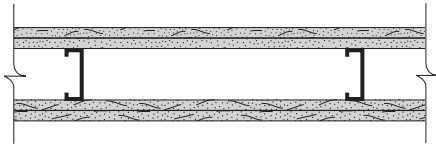
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## Steel-Framed Wall Assemblies continued

**2-Hour Fire Rating**

Test Reference: UL U411, cUL U411

**50-54 STC Sound Trans.**

Test Reference: WHI 218-1

Partition Thickness: 5-1/8", Weight per Sq. Ft.: 10.0

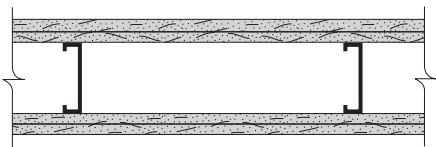
**Sound Tested** with 2-1/2" fiberglass insulation

Base Layer: 5/8" ToughRock® Fireguard® Type X or 5/8" DensArmor Plus® Fireguard® Type X gypsum board applied parallel to each side of 2-1/2" steel studs 24" o.c. with 1" Type S screws 16" o.c.

Face Layer: 5/8" ToughRock Fireguard Type X or 5/8" DensArmor Plus Fireguard Type X gypsum board applied parallel to each side with drywall adhesive or secured with 1-5/8" Type S screws 12" o.c. at top and bottom track, 16" o.c. at edge joints and intermediate framing. Stagger joints 24" each layer and side.

**2-Hour Fire Rating**

Test Reference: UL U411, cUL U411, GA WP 1522

**55-59 STC Sound Trans.**

Test Reference: NRCC 818-NV

Partition Thickness: 6-1/8", Weight per Sq. Ft.: 10.0

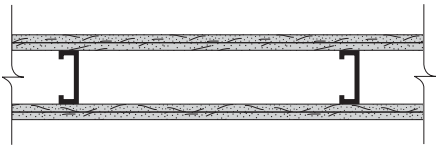
**Sound Tested** with 3-1/2" fiberglass insulation, friction fit in 3-5/8" stud space

Base Layer: 5/8" ToughRock Fireguard Type X or 5/8" DensArmor Plus Fireguard Type X gypsum board applied parallel to each side of 2-1/2" steel studs 24" o.c. with 1" Type S screws 16" o.c.

Face Layer: 5/8" ToughRock Fireguard Type X or 5/8" DensArmor Plus Fireguard Type X gypsum board applied parallel to each side with drywall adhesive or secured with 1-5/8" Type S screws 12" o.c. at top and bottom track, 16" o.c. at edge joints and intermediate framing. Stagger joints 24" each layer and side.

**2-Hour Fire Rating**

Test Reference: V450



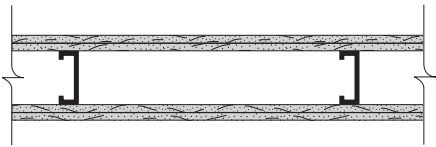
Partition Thickness: 48-1/8", Weight per Sq. Ft.: 10.0

Base Layer: 5/8" ToughRock Fireguard Type X or 5/8" DensArmor Plus Fireguard Type X gypsum board applied at right angles to each side of 1-5/8" UltraSTEEL® studs 24" o.c. with 1-1/4" Type S screws 24" o.c.

Face Layer: 5/8" ToughRock Fireguard Type X or 5/8" DensArmor Plus Fireguard Type X gypsum board applied at right angles to each side with 1-5/8" Type S screws 8" o.c. at end joints and 12" o.c. at perimeter. Stagger joints 12" each layer.

**2-Hour Fire Rating**

Test Reference: UL U412

**45-49 STC Sound Trans.**

Test Reference: NGC 2250

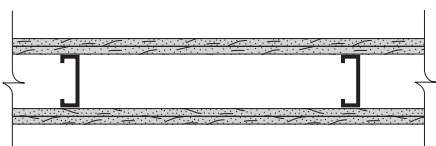
Partition Thickness: 4-1/2", Weight per Sq. Ft.: 9.0

Base Layer: 1/2" ToughRock® Fireguard® Type C or 1/2" DensArmor Plus Fireguard Type C gypsum board applied parallel to each side of 1-5/8" steel studs 24" o.c. with 1" Type S drywall screws 24" o.c.

Face Layer: 1/2" ToughRock Fireguard Type C or 1/2" DensArmor Plus Fireguard Type C gypsum board applied parallel to each side with 1-5/8" Type S drywall screws 12" o.c. Joints staggered 24" each layer and side.

**2-Hour Fire Rating**

Test Reference: ULC W414, GA WP 1546

**50-54 STC Sound Trans.**

Test Reference: NRCC 798-NV

Partition Thickness: 4-1/2", Weight per Sq. Ft.: 9.0

**Sound Tested** with 2-1/2" fiberglass insulation stapled in stud space

Base Layer: 1/2" ToughRock Fireguard Type C or 1/2" DensArmor Plus Fireguard Type C gypsum board applied parallel to each side of 2-1/2" steel studs 24" o.c. with 1" Type S drywall screws 24" o.c.

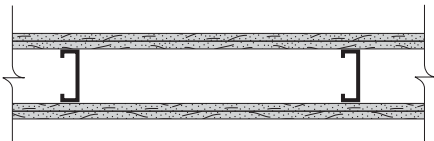
Face Layer: 1/2" ToughRock Fireguard Type C or 1/2" DensArmor Plus Fireguard Type C gypsum board applied parallel to each side with 1-5/8" Type S drywall screws 12" o.c. Joints staggered 24" each layer and side.

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**Steel-Framed Wall Assemblies continued**

**2-Hour Fire Rating**

Test Reference: ULC W414, GA WP 1546



**55-59 STC Sound Trans.**

Test Reference: NRCC 815-NV

Partition Thickness: 4-1/2", Weight per Sq. Ft.: 9.0

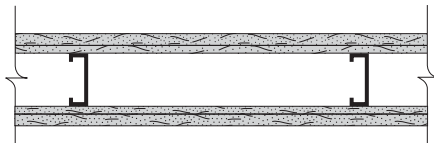
**Sound Tested** with 3-1/2" fiberglass insulation, friction fit in 3-5/8" stud cavity

Base Layer: 1/2" ToughRock® Fireguard® Type C or 1/2" DensArmor Plus® Fireguard® Type C gypsum board applied parallel to each side of 2-1/2" steel studs 24" o.c. with 1" Type S drywall screws 24" o.c.

Face Layer: 1/2" ToughRock Fireguard Type C or 1/2" DensArmor Plus Fireguard Type C gypsum board applied parallel to each side with 1-5/8" Type S drywall screws 12" o.c. Joints staggered 24" each layer and side.

**2-Hour Fire Rating**

Test Reference: ULC W404, GA WP 1505



**55-59 STC Sound Trans.**

Test Reference: DRC 70-18-2

Partition Thickness: 4-3/4", Weight per Sq. Ft.: 10.0

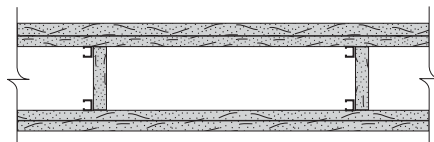
**Sound Tested** with adhesive attachment and 2-1/2" fiberglass insulation, friction fit in stud space

Base Layer: 1/2" ToughRock Fireguard Type C gypsum board applied at right angles to each side of 2-1/2" steel studs 24" o.c. with 1" Type S drywall screws 12" o.c.

Face Layer: 5/8" ToughRock Fireguard Type X gypsum board applied parallel to each side. Vertical joints midway between studs. Face layer attached to base layer only with 1-1/2" Type G drywall screws 12" o.c. at vertical joints and center line of face layer gypsum board. 3/8" to 1/2" diameter adhesive beads around the perimeter of face board, 2" from each edge and end, and in the form of an X joining the corners of the perimeter beads are optional. Joints staggered 24" each layer and side.

**2-Hour Fire Rating**

Test Reference: UL U420, GA WP 5105, cUL U420



**55-59 STC Sound Trans.**

Test Reference: RAL TL76-156

Partition Thickness: 12", Weight per Sq. Ft.: 10.0

**Sound Tested** with 3-1/2" fiberglass insulation stapled in stud space

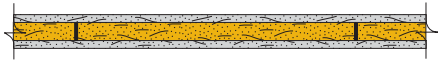
Base Layer: 5/8" ToughRock Fireguard Type X or 5/8" DensArmor Plus® Fireguard® Type X applied parallel to a double row of 1-5/8" steel studs 24" o.c. and not less than 1" apart with 1" Type S drywall screws 8" o.c. at edges and 12" o.c. at intermediate studs. 5/8" gypsum board pieces 12" long x not less than 4-1/2" wide located at 1/3 points used as cross braces fastened to stud pairs with three 1" Type S drywall screws at each end of brace. Optionally 25-gauge stud or runner pieces, not less than 4-1/2" long, may be used as cross braces and attached with two No. 8 x 1/2" self-drilling steel screws at each end. Where total cavity depth exceeds 9-1/2", cross braces shall be fabricated with 25-gauge stud or runner pieces.

Face Layer: 5/8" ToughRock Fireguard Type X or 5/8" DensArmor Plus Fireguard Type X applied parallel to each side with 1-5/8" Type S drywall screws 8" o.c. at joints and floor and ceiling runners and 12" o.c. at intermediate studs.

## Steel-Framed Wall Assemblies continued

**2-Hour Fire Rating**

Test Reference: OSU T-1339

**35-39 STC Sound Trans.**

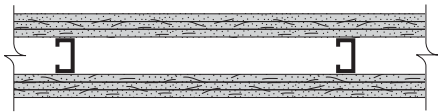
Test Reference: NGC 2359

Partition Thickness: 2", Weight per Sq. Ft.: 9.0

1/2" ToughRock® Fireguard® Type C or 1/2" DensArmor Plus® Fireguard® Type C gypsum board applied parallel to each side of 1" DensGlass™ Ultra Shaftliner Fireguard Type X with laminating compound combed over entire surface. Floor and ceiling track of wood or steel runners. Joints staggered.

**3-Hour Fire Rating**

Test Reference: WHI-495-0785 &amp; 0789

**50-54 STC Sound Trans.**

Test Reference: WEAL 87-118

Partition Thickness: 4-5/8", Weight per Sq. Ft.: 13.0

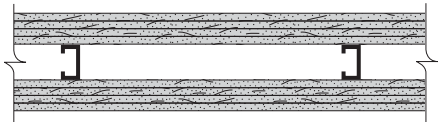
Base Layer: 1/2" ToughRock Fireguard Type C gypsum board applied parallel to each side of 1-5/8" metal studs 24" o.c. with joints staggered 24" each side using 1" Type S drywall screws 12" o.c.

Second Layer: 1/2" ToughRock Fireguard Type C gypsum board applied parallel to each side with joints 8" from studs staggered 24" each side attached to studs with 1-5/8" Type S drywall screws 24" o.c. and to base layer with 1-1/2" Type G drywall screws 12" o.c. spaced 1-1/2" from vertical edges.

Face Layer: 1/2" ToughRock Fireguard Type C gypsum board applied at right angles to each side joints offset 24" and attached to studs with 2" Type S drywall screws 12" o.c. and with 1-1/2" Type G drywall screws 24" o.c. and 1-1/2" from horizontal joints at midpoint between studs. Sound tested with 1-1/2" fiberglass insulation.

**4-Hour Fire Rating**

Test Reference: WHI-495-0786 &amp; 0787

**55-59 STC Sound Trans.**

Test Reference: WEAL 87-119

Partition Thickness: 5-5/8", Weight per Sq. Ft.: 18.0

Base Layer: 1/2" ToughRock Fireguard Type C gypsum board applied parallel to each side of 1-5/8" metal studs 24" o.c. with joints staggered 24" each side using 1" Type S drywall screws 12" o.c.

Second Layer: 1/2" ToughRock Fireguard Type C gypsum board applied parallel to each side with joints staggered 24" each side attached to studs with 1-5/8" Type S drywall screws 12" o.c.

Third Layer: 1/2" ToughRock Fireguard Type C gypsum board applied parallel to each side with joints offset 8" from studs and staggered 24" each side, attached to studs with 2" Type S drywall screws 24" o.c. and with 1-1/2" Type G drywall screws 12" o.c. between studs 1-1/2" from joints.

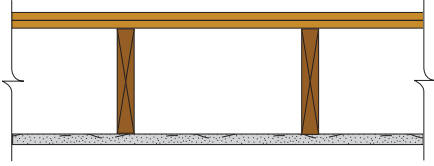
Face Layer: 1/2" ToughRock Fireguard Type C gypsum board installed at right angles on each side with joints staggered 24" o.c. Install 2-1/2" Type S drywall screws 12" o.c. to studs and track and 1-1/2" Type G drywall screws 24" o.c. and 1-1/2" from horizontal joints at midpoint between framing. Sound tested with 1-1/2" fiberglass insulation.



## Floor/Ceiling Wood-Framed Assemblies

### 1-Hour Fire Rating

Test Reference: UL L501, ULC M500,  
GA FC 5420



### 35-39 STC Sound Trans.

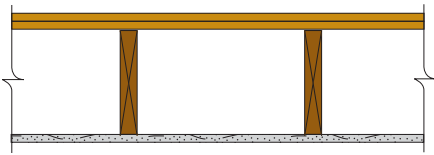
**IIC 32** Test Reference: NGC 5032

Weight per Sq. Ft.: 2.5

5/8" ToughRock® Fireguard® Type X gypsum board applied at right angles to 2 x 10 wood joists 16" o.c. with 1-7/8" 6d nails 6" o.c. Wood joists supporting 1" nominal wood sub and 1" nominal finish floor, or 19/32" plywood finished floor with long edges T&G and 15/32" interior plywood with exterior glue subfloor perpendicular to joists with joints staggered.

### 1-Hour Fire Rating

Test Reference: UL L503, ULC M502,  
GA FC 5410, cUL L503



### 35-39 STC Sound Trans.

**IIC 32** Test Reference: NGC 4024

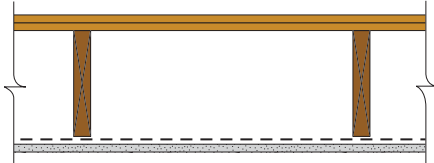
**IIC 66 with carpet and pad** Test Reference: NGC 5032

Weight per Sq. Ft.: 2.0

1/2" ToughRock Fireguard Type C or 1/2" DensArmor Plus® Fireguard® Type C gypsum board applied at right angles to 2 x 10 wood joists 16" o.c. with 5d nails 1-5/8" long, 0.099" shank, 1/4" heads, 6" o.c. Wood joists supporting 1" nominal T&G wood sub and 1" nominal finish floor, or 19/32" plywood finished floor with long edges T&G and 15/32" interior plywood with exterior glue subfloor perpendicular to joists with joints staggered. Nails placed 3/4" from board end joints and 1/2" from board end joints.

### 1-Hour Fire Rating

Test Reference: UL L502, ULC M501,  
GA FC 5250, cUL L502



### 45-49 STC Sound Trans.

Test Reference: RAL TL64-155

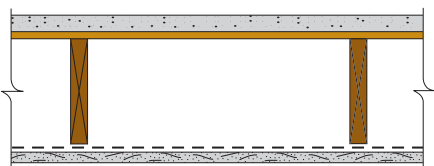
**IIC 67 with carpet and pad** Test Reference: CK 6512-6

Weight per Sq. Ft.: 2.0

1/2" ToughRock Fireguard Type C or 1/2" DensArmor Plus Fireguard Type C gypsum board applied at right angles to resilient channels 24" o.c. with 1" Type S drywall screws 12" o.c. Gypsum board end joints located midway between continuous channels and attached to additional pieces of channels 60" long with screws 12" o.c. Resilient channels applied at right angles to 2 x 10 wood joists 16" o.c. with 2" 6d coated nails. Wood joists supporting 1" nominal wood subfloor and 1" nominal wood finish floor, or 19/32" plywood finished floor with long edges T&G and 15/32" interior plywood with exterior glue subfloor perpendicular to joist with joints staggered.

### 1-Hour Fire Rating

Test Reference: UL L502, GA FC 5105,  
cUL L502



### 55-59 STC Sound Trans.

Test Reference: G&H BW-10 MT

**IIC 73 with carpet and pad** Test Reference: G&H BW-10 MT

Weight per Sq. Ft.: 2.0

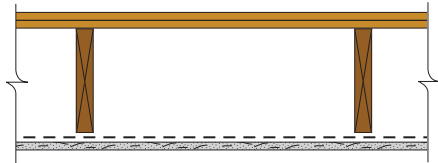
**Sound Tested** with 3-1/2" fiberglass insulation in joist spaces and with carpet and pad (2nd layer of drywall needed with insulation)

1/2" ToughRock Fireguard Type C or 1/2" DensArmor Plus Fireguard Type C gypsum board applied at right angles to resilient channels 24 o.c. with 1" Type S drywall screws 12" o.c. Gypsum board end joints located midway between continuous channels and attached to additional pieces of channels 60" long with screws 12" o.c. Resilient channels applied at right angles to 2 x 10 wood joists 16" o.c. with 6d common nails. Wood joists supporting 19/32" plywood and 1" proprietary sanded gypsum underlayment.

## Floor/Ceiling Wood-Framed Assemblies continued

**1-Hour Fire Rating**

Test Reference: GA FC 5240, ULC M501

**45-49 STC Sound Trans.****IIC 39****IIC 67 with carpet and pad**

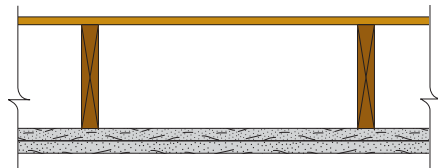
Test Reference: CK 6512-6, 7

Weight per Sq. Ft.: 3.0

1/2" ToughRock® Fireguard® Type C or 1/2" DensArmor Plus® Fireguard® Type C gypsum board applied at right angles to resilient channels 24 o.c. with 1" Type S drywall screws 12" o.c. Gypsum board end joints located midway between continuous channels and attached to additional pieces of channels 54" long with screws 12" o.c. Resilient channels applied at right angles to 2 x 10 wood joists 16" o.c. with 1-1/4" Type W drywall screws. Wood joists supporting 1" nominal T&G wood subfloor and 1" nominal wood finish floor, or 19/32" plywood finished floor with long edges T&G and 15/32" interior plywood with exterior glue subfloor perpendicular to joists with joints staggered.

**1-Hour Fire Rating**

Test Reference: FM FC 172, GA FC 5406

**35-39 STC Sound Trans.**

Test Reference: Est.

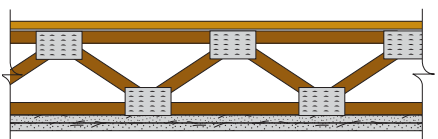
Weight per Sq. Ft.: 5.0

Base Layer: 5/8" ToughRock Fireguard Type X or 5/8" DensArmor Plus Fireguard Type X gypsum board applied at right angles to 2 x 10 wood joists 24" o.c. with 1-1/4" drywall screws 24" o.c.

Face Layer: 5/8" ToughRock Fireguard Type X or 5/8" DensArmor Plus Fireguard Type X gypsum board applied at right angles to joists through base layer with 1-7/8" Type W or S screws 12" o.c. at joints and intermediate joists. Face layer joints offset 24" from base layer joints, 1-1/2" Type G drywall screws placed 2" back on either side of face layer end joints 12" o.c. Wood joist supporting 1/2" plywood with exterior glue applied at right angles to top of joists with 8d nails. **Ceiling provides one-hour fire resistance protection for framing, including trusses.**

**1-Hour Fire Rating**

Test Reference: FM FC214, GA FC 5512



Weight per Sq. Ft.: 4.0

Ceiling Base Layer: 1/2" ToughRock Fireguard Type C or 1/2" DensArmor Plus Fireguard Type C gypsum board applied perpendicular to wood trusses 24" o.c. with 1-1/4" Type S drywall screws 24" o.c.

Face Layer: 1/2" ToughRock Fireguard Type C or 1/2" DensArmor Plus Fireguard Type C gypsum board applied perpendicular to trusses with 1-7/8" Type S drywall screws 12" o.c. and 1-1/2" Type G drywall screws 12" o.c. placed 3" back from either side of end joints. Joints offset 24" from base layer joints.

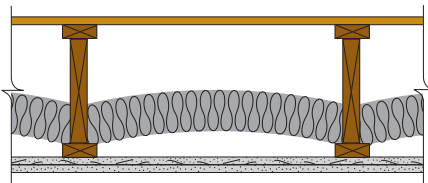
Trusses: Chord and web members fabricated from 2 x 4 lumber with 20-gauge steel connector plates having a minimum tooth length of 5/16". Plate design values based upon safety factor of 4. Trusses have a minimum depth of 12".

Flooring: 19/32" T&G plywood with exterior glue applied at right angles to top of trusses with 6d common nails 6" o.c. Plywood end joints staggered 48".

**Floor/Ceiling Wood-Framed Assemblies continued**

**1-Hour Fire Rating**

Test Reference: WHI 694 0090



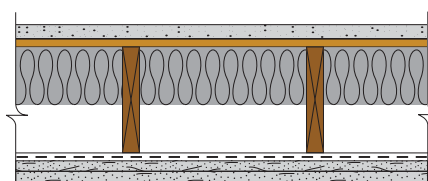
Weight per Sq. Ft.: 4.0

Base Layer: 1/2" ToughRock® Fireguard® Type C gypsum board applied perpendicular to 11-3/8" deep, W143, wood I joists 24" o.c. with 1-1/4" Type S screws 16" o.c.

Face Layer: 1/2" ToughRock Fireguard Type C gypsum board applied perpendicular to joists with 1-7/8" Type S screws 12" o.c. at all joists. Stagger joints 24" o.c. At end joints place additional 1-1/2" Type G screws 12" o.c. and 2" in from each side of end joints. Wood I joists support 3/4" T&G plywood perpendicular to joists with 1/4" bead construction adhesive and 2-1/2" 8d nails 8" o.c. Cavity at lower chord filled with 3-1/2" fiberglass insulation supported by wire insulation supports.

**1-1/2-Hour Fire Rating**

Test Reference: UL L532, GA FC 5600



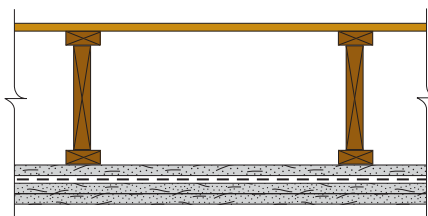
Weight per Sq. Ft.: 5.0

Base Layer: 5/8" ToughRock® Fireguard® Type X or 5/8" DensArmor Plus® Fireguard® Type X gypsum board applied at right angles to 25-gauge drywall rigid furring channels 16" o.c. with 1" Type S screws 12" o.c. Drywall end joints located midway between continuous channels and attached to additional pieces of channel 60" long with 1" Type S screws 8" o.c. Rigid furring channels 16" o.c. at right angles to 2 x 10 wood joists 16" o.c. attached with 1-7/8" 6d cooler or box nails or 1-7/8" Type S screws, two per joist.

Face Layer: 5/8" ToughRock Fireguard Type X or 5/8" DensArmor Plus Fireguard Type X gypsum board applied at right angles to resilient channels through base layer with 1-7/8" Type S screws 12" o.c. Face layer wallboard end joints attached to continuous channels through base layer with 1-7/8" Type S screws 8" o.c. Face layer wallboard edge joints staggered 18" minimum from base layer edge joints; end joints staggered 8" min. from base layer joints. Wood joists supporting 5/8" interior plywood with exterior glue subfloor and 1-1/2" lightweight concrete reinforced with galvanized hexagonal wire mesh over film or felt or 1" sanded gypsum floor underlayment. 3-1/2" unfaced fiberglass insulation, nom. 0.6 pcf, R-11 supported against subfloor by wire rods 12" o.c. Alternately, insulation may be 3-1/2" faced fiberglass insulation stapled in place against subfloor.

**2-Hour Fire Rating**

Test Reference: UL L538



Weight per Sq. Ft.: 8.0

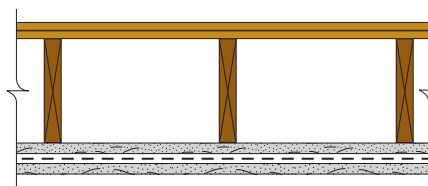
Base Layer: 5/8" ToughRock Fireguard Type C gypsum board applied at right angles to I-shaped wood joists or wood and steel trusses, spaced 19.2" o.c. maximum, with 1-5/8" Type S drywall screws, 8" o.c. Resilient channels attached 16" o.c. through base layer at right angles to joists or trusses with 1-7/8" Type S drywall screws.

Middle Layer: 5/8" ToughRock Fireguard Type C gypsum board applied at right angles to resilient channels with 1" Type S drywall screws 8" o.c. Screws located 1-1/2" to 2" and 5/8" - 3/4" from side and end joints respectively.

Face Layer: 5/8" ToughRock Fireguard Type C gypsum board applied at right angles to channels with 1-5/8" Type S drywall screws, 8" o.c. Joints in the face layer are offset 16" from those in the middle layer. 5/8" T&G plywood floor at right angles to joists with adhesives and 8d cement coated nails 12" o.c.

**2-Hour Fire Rating**

Test Reference: UL L505, ULC M503, GA FC 5724



Weight per Sq. Ft.: 6.0

Base Layer: 5/8" ToughRock Fireguard Type C gypsum board applied at right angles to 2 x 10 wood joists 16" o.c. with 2-1/2" 8d cement coated nails 7" o.c. Resilient channel 24" o.c. applied at right angles to wood framing through base layer with 2-1/2" long screws. Double channel installed at face layer end joints.

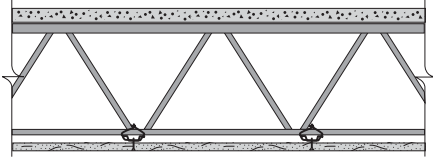
Face Layer: 5/8" ToughRock Fireguard Type C gypsum board applied at right angles to resilient channels with 1" Type S screws 12" o.c. Wood joists supporting 1" nominal T&G wood subfloor and 1" nominal wood finish floor or 15/32" plywood subfloor and 19/32" plywood finish floor applied at right angles to joists with joints staggered.

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## Floor/Ceiling Steel-Framed Assemblies

### 1-1/2-Hour Fire Rating

Test Reference: UL G502, ULC I510,  
GA FC 1110

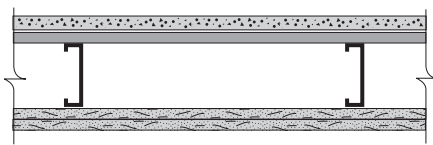


Weight per Sq. Ft.: 2.0

1/2" ToughRock® Fireguard® Type C or 1/2" DensArmor Plus® Fireguard® Type C gypsum board applied at right angles to rigid resilient channels 24" o.c. with 1" Type S screws 12" o.c. in field. Drywall end joints located midway between continuous channels and attached to additional pieces of channel 52" long with screws 8" o.c. Furring channels wire tied to open web steel joists 24" o.c. supporting 3/8" rib steel lath or 9/16" deep 28-gauge corrugated steel and 2" concrete slab measured from top of flute. (Passed 90-minute fire test restrained and unrestrained.)

### 2-Hour Fire Rating

Test Reference: FM FC 224-2, GA FC 2116



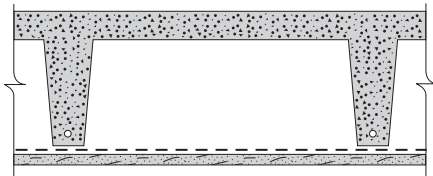
Weight per Sq. Ft.: 5.0

Base Layer: 5/8" ToughRock Fireguard Type X gypsum board applied at right angles to channel, minimum 7-1/4" deep, 18-gauge galvanized steel joists 24" o.c. with 1" Type S-12 drywall screws 12" o.c. End joints located midway between joists and staggered between rows.

Face Layer: 5/8" ToughRock Fireguard Type X gypsum board applied at right angles to joists with 1-7/8" Type S-12 drywall screws 12" o.c. placed 2" from edges and 1-1/2" Type G drywall screws 12" o.c. placed 2" back on either side of end joints. End joints located midway between joists and all joints offset 24" from base layer joints. Joists supporting 28-gauge corrugated steel deck and 2-1/2" concrete slab measured from the bottom of the flutes. Joists braced at midspan with continuous 2" wide, 18-gauge, galvanized steel straps attached to the bottom flange of each joist with one 3/8" Type S-12 panhead screw.

### 2-Hour Fire Rating

Test Reference: PCA 1281-1, GA FC 2120

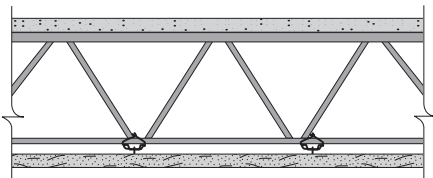


Weight per Sq. Ft.: 3.0

5/8" ToughRock Fireguard Type X gypsum board applied at right angles to resilient channels 24" o.c. with 1" Type S drywall screws 8" o.c. Gypsum board end joints located over continuous channels and attached to additional pieces of channel 54" long located midway between continuous channels at end joints. Resilient channels 24" o.c. suspended from 2-1/2" precast reinforced concrete joists 35" o.c. with 21-gauge galvanized steel hanger straps fastened to sides of joists. Joist leg depth, 10".

### 2-Hour Fire Rating

Test Reference: UL G505, ULC I512,  
GA FC 2130

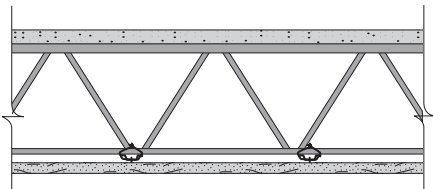


Weight per Sq. Ft.: 2.5

5/8" ToughRock Fireguard Type C gypsum board applied at right angles to rigid furring channels 24" o.c. with 1" Type S drywall screws 12" o.c. Drywall end joints located midway between continuous channels and attached to additional pieces of channel 62" long with screws 12" o.c. Furring channels attached with 18-gauge wire ties to open web steel joists 24" o.c. supporting 3/8" rib steel lath and 2" concrete slab. (Two hours restrained and unrestrained.)

### 2-Hour Fire Rating

Test Reference: UL G504, ULC I507



Weight per Sq. Ft.: 2.0

1/2" ToughRock Fireguard Type C or 1/2" DensArmor Plus Fireguard Type C gypsum board applied at right angles to resilient channels 24" o.c. with 1" Type S drywall screws 12" o.c. in field. Drywall end joints located midway between continuous channels and attached to additional pieces of channel 54" long with screws 8" o.c. Resilient channels wire tied 24" o.c. to open web steel joists supporting 3/8" rib steel lath or 9/16" deep 28-gauge corrugated steel and 2-1/2" concrete slab measured from top of flute.

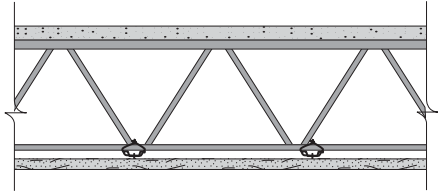
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## Floor/Ceiling Steel-Framed Assemblies continued

### 2-Hour Fire Rating

Test Reference: ULC I511, GA FC 2030



### 50-54 STC Sound Trans.

Test Reference: NGC 4075

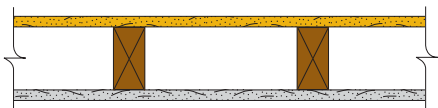
Weight per Sq. Ft.: 2.0

1/2" ToughRock® Fireguard® Type C or 1/2" DensArmor Plus® Fireguard® Type C gypsum board applied at right angles to rigid furring channel 24" o.c. with 1" Type S drywall screws 12" o.c. Gypsum board end joints located midway between continuous channels and attached to additional pieces of channel 54" long with screws at 12" o.c. Furring channels 24" o.c. attached with 18-gauge wire tied 48" o.c. to open web steel joists 24" o.c. supporting 9/16" deep 28-gauge corrugated steel and 2-1/2" concrete slab. Furring channels may be attached to 1-1/2" cold rolled channels 48" o.c. suspended from joists by 8-gauge wire hangers not more than 48" o.c. (Two hour restrained and unrestrained.)

## Exterior Wood-Framed Wall Assemblies

### 1-Hour Fire Rating

Test Reference: UL U305, cUL U305, ULC W 301



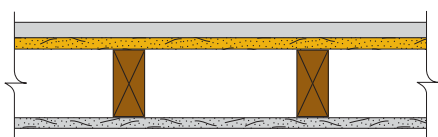
Partition Thickness: 4-3/4, Weight per Sq. Ft.: 7.5

Exterior Side: 5/8" DensGlass™ Fireguard® Type X Exterior Sheathing (formerly DensGlass Gold® Exterior Sheathing) applied parallel or at right angles to 2 x 4 wood studs 16" o.c. with 1-3/4" galvanized roofing nails 7" o.c. Exterior surface covered with weather exposed cladding or finish system.

Interior Side: One layer 5/8" ToughRock Fireguard Type X or 5/8" DensArmor Plus Fireguard Type X gypsum board applied parallel or at right angles to studs with 1-7/8" 6d coated 7" o.c. Stagger joints each side.

### 1-Hour Fire Rating

Test Reference: UL U309, GA WP 8109, cUL U309



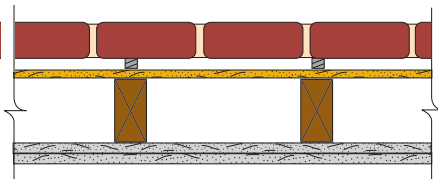
Partition Thickness: Varies, Weight per Sq. Ft.: 9.0

Exterior Side: 5/8" DensGlass Fireguard Type X Exterior Sheathing applied parallel or at right angles to 2 x 4 wood studs 24" o.c. with 1-7/8" galvanized roofing nails 7" o.c. Joints of gypsum sheathing may be left untreated. Exterior cladding to be attached through sheathing to studs.

Interior Side: 5/8" ToughRock Fireguard Type X or 5/8" DensArmor Plus Fireguard Type X gypsum board applied parallel or at right angles to studs with 1-7/8" 6d coated nails 7" o.c.

### 2-Hour Fire Rating

Test Reference: UL U302, ULC U302, GA WP 8410



Wall Thickness: 10-1/8

Interior Base Layer: 5/8" ToughRock Fireguard Type X or 5/8" DensArmor Plus Fireguard Type X gypsum board applied parallel or at right angles to 2 x 4 wood studs 16" o.c. with 1-7/8" 6d coated nails 8" o.c.

Face Layer: 5/8" ToughRock Fireguard Type X or 5/8" DensArmor Plus Fireguard Type X gypsum board applied parallel or at right angles to studs with 2-3/8" 8d coated nails 8" o.c.

Exterior Base Layer: 1/2" DensGlass™ Exterior Sheathing (formerly DensGlass Gold® Exterior Sheathing) applied parallel or at right angles to studs with 1-3/4" galvanized roofing nails 6" o.c.

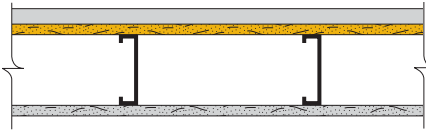
Face Layer: 2" x 4" x 8" clay brick with 1" air space between brick and exterior sheathing. 20-gauge galvanized wire ties attached to each stud with 2-3/8" 8d coated nails, located at every sixth course of bricks.



## Exterior Steel-Framed Wall Assemblies

### 1-Hour Fire Rating

Test Reference: SWRI 01-4409-003,  
GA WP 8122



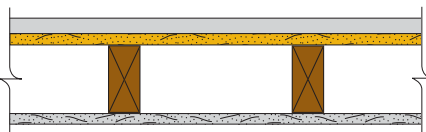
Partition Thickness: 6"-7" Varies based on insulation thickness  
Weight per Sq. Ft.: 7.0

Exterior Side: 5/8" DensGlass™ Fireguard® Type X Exterior Sheathing (formerly DensGlass Gold® Exterior Sheathing) applied parallel to 3-5/8" 18-gauge steel studs 16" o.c. with #6 x 1-1/4" self-drilling, corrosion-resistant, bugle head, drywall screws 8" o.c. at edges and ends and 8" o.c. at intermediate studs. Proprietary polymer modified exterior insulation and finish system applied over sheathing. 2" maximum foam-plastic thickness.

Interior Side: 5/8" ToughRock® Fireguard® Type X or 5/8" DensArmor Plus® Fireguard® Type X gypsum board applied parallel to studs with #6 x 1-1/4" self-drilling, bugle head drywall screws 8" o.c. at edges and ends and 12" o.c. at intermediate studs.

### 1-Hour Fire Rating

Test Reference: SWRI 01-4409-001,  
GA WP 8123



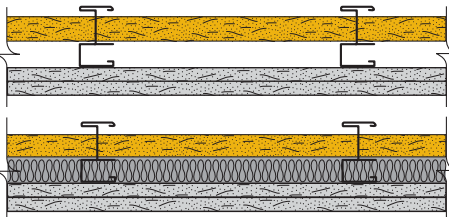
Partition Thickness: 6-9" Varies based on insulation thickness  
Weight per Sq. Ft.: 7.0

Exterior Side: 5/8" DensGlass Fireguard Type X Exterior Sheathing applied parallel to 3-5/8" 18-gauge steel studs 24" o.c. with #6 x 1-1/4" self-drilling, corrosion-resistant, bugle head drywall screws 8" o.c. at edges and ends and 8" o.c. at intermediate studs. Polymer-based exterior insulation and finish system applied over sheathing. 4" maximum foam-on-plastic thickness.

Interior Side: One layer 5/8" ToughRock Fireguard Type X or 5/8" DensArmor Plus Fireguard Type X gypsum board applied parallel to studs with #6 x 1-1/4" self-drilling, bugle head drywall screws 8" o.c. at edges and ends and 12" o.c. at intermediate studs.

## Design Summary Vertical – Shaftwall Assemblies

### UL V473



STC = 47 based on RAL TL 89 – 379

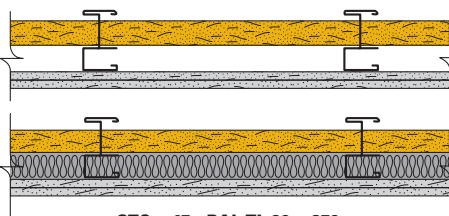
Test Reference: UL V473

Approx. Weight: 10 psf

Fiberglass sound insulation thickness is 1", 2-1/2" and 3-1/2" for C-T or C-H studs of 2-1/2", 4" and 6" respectively. Finished one side. Components: 1" DensGlass™ Fireguard® Type X Exterior Shaftliner panel, C-T or C-H studs and two layers of 5/8" DensArmor Plus® Fireguard® Type X or 5/8" ToughRock® Fireguard® Type X gypsum board installed horizontally for base layer and vertically for face layer. Edges and ends offset 24" o.c.

C-T or C-H Stud	2-1/2"	4"	6"
Wall Thickness	3-3/4"	5-1/4"	7-1/4"

### Series 620 2-Hour Fire Rating



STC = 47 RAL TL 89 – 379

Test Reference: GA File # WP 7074, WHI Design, GP/WA 120-01

Approx. Weight: 9 psf

Fiberglass sound insulation thickness is 1", 2-1/2" and 3-1/2" for C-T, C-H or I studs of 2-1/2", 4" and 6" respectively. Finished one side. Components: 1" DensGlass™ Fireguard Type X Ultra Shaftliner panel, C-T studs and two layers of 1/2" DensArmor Plus® Fireguard® Type C or 1/2" ToughRock® Fireguard® Type C gypsum board installed horizontally for base layer and vertically for face layer. Edges and ends offset 24" o.c.

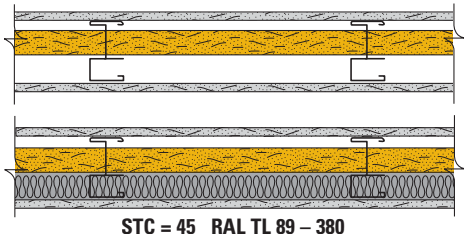
C-T, C-H or I Stud	2-1/2"	4"	6"
Wall Thickness	3-1/2"	5"	7"

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## Design Summary Vertical – Shaftwall Assemblies

### Series 621 2-Hour Fire Rating



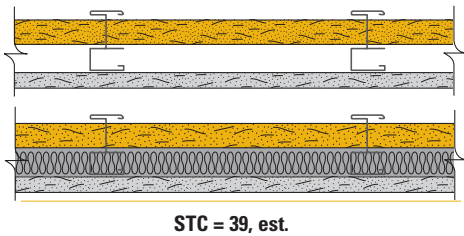
Test Reference: GA File # WP 7073, WHI Design, GP/WA 120-02

Approx. Weight: 9 psf

Fiberglass sound insulation thickness is 1", 2-1/2" and 3-1/2" for C-T, C-H or I studs of 2-1/2", 4" and 6" respectively. Finished both sides with 1/2" DensArmor Plus® Fireguard Type C or 1/2" ToughRock® Fireguard® Type C gypsum board installed horizontally or vertically. Edges and ends offset 24" o.c.

C-T, C-H or I Stud	2-1/2"	4"	6"
Wall Thickness	3-1/2"	5"	7"

### Series 622 1-Hour Fire Rating



Test Reference: GA File # WP 7001, WHI Design, GP/WA 60-01

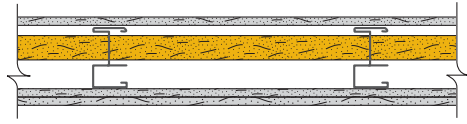
Approx. Weight: 7 psf

Fiberglass sound insulation thickness is 1", 2-1/2" and 3-1/2" for C-T, C-H or I studs of 2-1/2", 4" and 6" respectively. Finished one side. Components: 1" DensGlass™ Fireguard Type X Ultra Shaftliner panel, studs and one layer of 5/8" ToughRock Fireguard or 5/8" DensArmor Plus Fireguard Type X gypsum board installed vertically.

C-T, C-H or I Stud	2-1/2"	4"	6"
Wall Thickness	3-1/8"	4-5/8"	6-5/8"

## Design Summary Horizontal – Shaftwall Assemblies

### Series 623 2-Hour Fire Rating

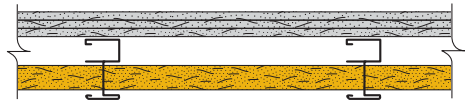


Test Reference: WHI-495-PSH-0128

Approx. Weight: 11 psf

Designed for ceiling or duct shaft and composed of 1" DensGlass™ Fireguard® Type X Ultra Shaftliner (formerly DensGlass Ultra® Shaftliner) panel supported by 2-1/2", 4" or 6" C-T studs and three layers of 1/2" ToughRock® Fireguard® Type C or 1/2" DensArmor Plus® Fireguard® Type C gypsum board.

### Series 624 2-Hour Fire Rating

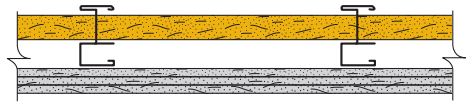


Test Reference: WHI-495-PSH-0153 & WHI-495-PSH-0197

Approx. Weight: 11 psf

Designed to separate a room from structure or space above and composed of 1" DensGlass Fireguard Type X Ultra Shaftliner panel supported by 2-1/2", 4" or 6" C-T studs and three layers of 1/2" ToughRock Fireguard Type C or 1/2" DensArmor Plus Fireguard Type C gypsum board.

### Series 627 2-Hour Fire Rating

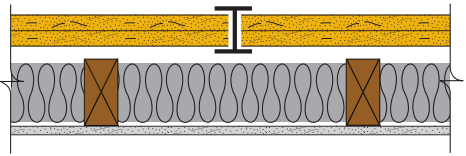
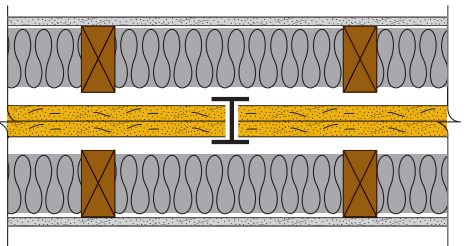
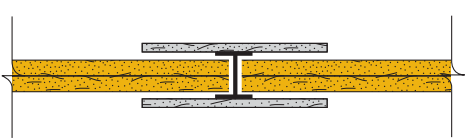


Test Reference: WHI-495-PSH-0183 & WHI-495-PSH-0196, WHI Design GP/CC 120-01

Approx. Weight: 11 psf

Designed to separate a room from structure or space above and composed of 1" DensGlass Fireguard Type X Ultra Shaftliner panel supported by 2-1/2", 4" or 6" C-T studs and three layers of 1/2" ToughRock Fireguard Type C or 1/2" DensArmor Plus Fireguard Type C gypsum board.

## System Assemblies – 2-Hour Ratings – Area Separation Walls

Construction Detail	Assembly Components	STC	Test Reference
	Two layers 1" DensGlass™ Fireguard® Type X Ultra Shaftliner inserted in H-Studs 24" o.c. Min. 3/4" air space between liner panels and adjacent wood or metal framing.	<b>60</b>	UL U373 ULC W312 WHI GP/WA 120-03 RAL TL89-383
	Two layers 1" DensGlass Fireguard Type X Ultra Shaftliner inserted in H-Studs 24" o.c. Min. 3/4" air space on both sides must be maintained between liner panels and adjacent framing.  <b>Sound Tested</b> with 2 x 4 stud wall with 1/2" DensArmor Plus® interior panels each side of assembly and 3-1/2" fiberglass insulation in stud space both sides.	<b>60</b>	UL U373 ULC W312 WHI GP/WA 120-04 Based on RAL TL89-383
	Part. Thickness: 3" Weight per Sq. Ft.: 9.5  Two layers 1" DensGlass Fireguard Type X Ultra Shaftliner inserted in H-Studs 24" o.c. Metal covered using 6" wide 1/2" DensArmor Plus Fireguard® Type C Interior Panel or 1/2" ToughRock® Fireguard Type C gypsum board.	<b>38 est.</b>	WHI 495-0743

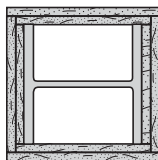
## Column Fire-Resistant Assemblies

ToughRock gypsum board provides a fast, efficient and economical method of protecting steel columns. Fire-resistant assemblies with two-, three- and four-hour ratings are obtainable for heavyweight columns, and a four-hour rating for lightweight columns, depending upon the number of layers of 5/8" ToughRock® Fireguard® Type X or 1/2" ToughRock Fireguard Type C gypsum board used. These layers are held in place by a combination of screws and steel studs.

- **Fire Resistant** – For three-hour fire rating, two layers of 1/2" ToughRock Fireguard Type C gypsum board can be used. Design No. X513 3-hour. Two-hour fire rating can be obtained using one layer of 1/2" ToughRock Fireguard Type C gypsum board. Design No. X520 2-hour. These are for heavyweight columns (14 WF 228).
- **Lighter** – Compared to other types of column fire-resistant assemblies, a dead-load savings from 50% to 75% can be realized with ToughRock gypsum board.
- **Faster to Erect** – ToughRock gypsum board can be installed quickly and easily when used for column fire proofing following Georgia-Pacific Gypsum details. Minimum amount of wire and adhesives are used.

### 1-Hour Fire Rating

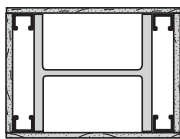
Test Reference: NBS 303



Base Layer: 1/2" ToughRock® gypsum board tied to W10 x 49 column 1 hr. with 18-gauge wire 15" o.c.  
Face Layer: 1/2" ToughRock gypsum board applied with laminating compound over entire contact surface.

### 2-Hour Fire Rating

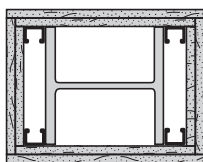
Test Reference: UL X520, GA CM 2110, cUL X520



1/2" ToughRock Fireguard Type C or 1/2" DensArmor Plus® Fireguard Type C gypsum board attached to 1-5/8" steel studs with 1" Type S drywall screws 12" o.c. Studs located at each corner of heavy steel W14 x 288 column. 1-1/4" steel corner bead crimp-attached at 6" intervals.

### 2-Hour Fire Rating

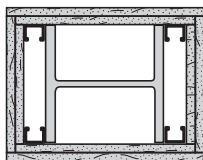
Test Reference: UL X517, ULC Z503



Two layers of 5/8" ToughRock Fireguard Type X or 5/8" DensArmor Plus® Fireguard Type X gypsum board screw-attached to 1-5/8" steel studs located at each corner of W10 x 49 column with 1" Type S screws 24" o.c. for base layer and 1-5/8" Type S drywall screws 12" o.c. for face layer. 1-1/4" steel beads at corners attached with 6d coated nails 1-3/4" long, 0.0915" shank, 1/4" heads, 12" o.c.

### 3-Hour Fire Rating

Test Reference: UL X513, GA CM 3130, cUL X513



Two layers of 1/2" ToughRock Fireguard Type C gypsum board or 1/2" DensArmor Plus Fireguard Type C.  
Base Layer: Screw-attached to 1-5/8" steel studs located at corners of heavy steel W14 x 228 column with 1" Type S screws 24" o.c.  
Face Layer: Attached with 1-5/8" Type S drywall screws 12" o.c. into studs. 1" corner bead applied each corner with 1-3/8" 4d coated nails 12" o.c.

### Abbreviations

ACI	Acoustical Consultants Inc.
CK	Cedar Knolls Acoustical Laboratories (Noise Unlimited, Inc.)
cUL	Underwriters Laboratories Inc. (Canadian Listed)
DRC	Domtar Research Centre
FM	Factory Mutual Research Corporation
GA	Gypsum Association
G&H	Geiger and Hamme
IIC	Impact Insulation Class
KAL	Kodaras Acoustical Laboratories
NBS	National Bureau of Standards
NGC	NGC Testing Services
NRCC	National Research Council of Canada
OR	Ohio Research Corporation
OSU	Ohio State University
PCA	Portland Cement Association
RAL	Riverbank Acoustical Laboratories
STC	Sound Transmission Class
SWRI	Southwest Research Institute
UC	University of California
UL	Underwriters Laboratories Inc.
ULC	Underwriters' Laboratories of Canada
WEAL	Western Electro Acoustical Laboratory, Inc.
WHI	Warnock Hersey International (ITS)

### COMMONLY USED METRIC CONVERSIONS

#### Gypsum Panel Thickness

1/4 in. – 6.4 mm
1/2 in. – 12.7 mm
5/8 in. – 15.9 mm
1 in. – 25.4 mm

#### Gypsum Panel Width

2 ft. – 610 mm
4 ft. – 1219 mm
32 in. – 813 mm

#### Gypsum Panel Length

4 ft. – 1219 mm
5 ft. – 1524 mm
8 ft. – 2438 mm
9 ft. – 2743 mm
10 ft. – 3048 mm
12 ft. – 3658 mm

#### Framing Spacing

16 in. – 406 mm
24 in. – 610 mm

#### Fastener Spacing

2 in. – 51 mm
2.5 in. – 64 mm
7 in. – 178 mm
8 in. – 203 mm
12 in. – 305 mm
16 in. – 406 mm
24 in. – 610 mm

#### Temperature

40°F – 5°C
50°F – 10°C
125°F – 52°C

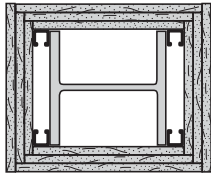
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## Column Fire Protection Assemblies continued

**3-Hour Fire Rating**

Test Reference: UL X509, ULC Z502



Three layers of 5/8" ToughRock® Fireguard® Type C gypsum board, screw-attached to 1-5/8" steel studs located at each corner of W10 x 49 column.

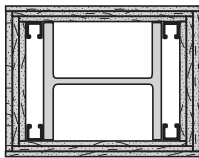
Base Layer: Attached with 1" Type S drywall screws 24" o.c.

Second Layer: Attached with 1-5/8" Type S drywall screws 12" o.c. and 18-gauge wire tied 24" o.c.

Face Layer: Attached with 2-1/4" Type S drywall screws 12" o.c. and 1-1/4" corner bead at each corner nailed with 1-7/8" 6d coated nails 12" o.c.

**3-Hour Fire Rating**

Test Reference: UL X528, cUL X528



Three layers of 1/2" ToughRock Fireguard Type C or 1/2" DensArmor Plus® Fireguard® Type C gypsum board, screw-attached to 1-5/8" steel studs located at each corner of W10 x 49 column.

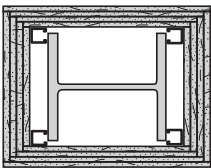
Base Layer: Attached with 1" Type S drywall screws 24" o.c.

Second Layer: Attached with 1-5/8" Type S drywall screws 24" o.c.

Face Layer: Attached with 2-1/4" Type S drywall screws 12" o.c. and 1-1/4" corner bead at each corner nailed with 4d coated nails. Joint compound 1/16" thick applied over corner bead and entire outer layer of drywall.

**4-Hour Fire Rating**

Test Reference: UL X501, cUL X501



Four layers of 5/8" ToughRock Fireguard Type C gypsum board covering W10 x 49 steel column.

Inner Layer: Attached to steel studs with 1" long self-drilling, self-tapping screws spaced vertically 24" o.c.

Second Layer: Attached to steel studs with 1-5/8" long self-drilling, self-tapping screws spaced vertically 24" o.c.

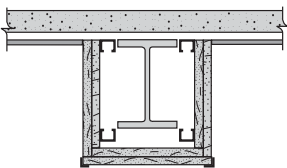
Third Layer: Attached to sheet-metal angles with 1" long, self-drilling, self-tapping screws spaced vertically 12" o.c.

Outer Layer: Gypsum board attached to the sheet metal angles with 1-5/8" long self-drilling, self-tapping screws spaced vertically 12" o.c.

## Beam Fire-Resistant Assemblies

**2-Hour Fire Rating**

Test Reference: UL, N502, ULC Q502, GA BM 2130



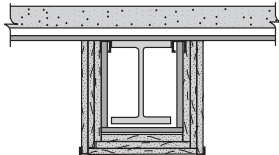
Two layers of 5/8" ToughRock Fireguard Type X or 5/8" DensArmor Plus Fireguard Type X gypsum board around beam.

Base Layer: Attached with 1-1/4" Type S drywall screws 16" o.c.

Face Layer: Attached with 1-3/4" Type S drywall screws 8" o.c. to horizontally installed U-shaped steel channels (25-gauge steel 11-1/16" wide with 1" legs) located not less than 1/2" from beam flanges. Upper channels secured to steel deck units with 1/2" Type S pan-head screws spaced 12" o.c. U-shaped brackets formed of steel channels spaced 24" o.c. suspended from the upper channels with 1/2" Type S pan-head screws and supported steel channels installed at lower corners of brackets. Outside corners of gypsum board protected by 0.020" thick steel corner beads crimped or nailed. (Two-hour restrained or unrestrained beam.)

**3-Hour Fire Rating Restrained Beam****2-Hour Fire Rating Unrestrained Beam**

Test Reference: UL N505



Three layers of 5/8" ToughRock Fireguard Type X or 5/8" DensArmor Plus Fireguard Type X gypsum board around minimum W 8 x 24 beam.

Base Layer: Attached with 1" Type S drywall screws 16" o.c.

Middle Layer: Attached with 1-5/8" Type S drywall screws 12" o.c.

Face Layer: Attached with 2-1/4" Type S drywall screws 5/8" o.c. to horizontally installed steel channels (25-gauge steel 11-1/16" wide with 1" legs) located not less than 1/2" from beam flanges. Upper channels secured to steel deck units with 1/2" Type S pan-head screws spaced 12" o.c. Brackets formed of steel channels spaced 24" o.c. suspended from the upper channels with 1/2" Type S pan-head screws and supported steel channels installed at lower corners of brackets. 20-gauge hexagonal steel mesh fitted between middle and face layers of gypsum board along bottom and extending 1-1/2" onto sides. Outside corners of gypsum board protected by steel corner beads crimped or nailed to the gypsum board. 1-1/2" fluted steel deck units welded to top of beam and supporting minimum 2-1/2" concrete. (Three-hour restrained or two-hour unrestrained beam.)

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<b>DensShield® Tile Backer</b>	Acrylic-coated tile backer stops moisture at the surface. Lightweight and strong, built for speed on the job site. IBC/IRC Code Compliant. GREENGUARD listed for microbial resistance.
<b>DensDeck® Roof Boards</b>	Fiberglass mat coverboard with a track record of resistance <i>against</i> wind uplift, hail, foot traffic, fire, moisture and mold, in a broad range of applications. Look for green DensDeck® Prime and DensDeck® DuraGuard too.
<b>DensGlass™ Ultra Shaftliner</b>	Specially-designed panels for moisture-prone vertical or horizontal shafts, interior stairwells and area separation wall assemblies. 12-month weather exposure limited warranty. GREENGUARD listed for microbial resistance.
<b>DensArmor Plus® High-Performance Interior Panel</b>	High-performance interior panel that accelerates scheduling because it can be installed before the building is dried-in. Six-month weather exposure limited warranty. GREENGUARD Indoor Air Quality Certified® for low VOC emissions. GREENGUARD listed for microbial resistance.
<b>DensArmor Plus® Abuse-Resistant Interior Panel</b> (formerly DensArmor Plus® Abuse Guard®)	Same benefits as DensArmor Plus® High-Performance Interior Panel with added resistance to scuffs, abrasions and surface indentations. Ideal for healthcare facilities and schools. GREENGUARD Indoor Air Quality Certified® for low VOC emissions. GREENGUARD listed for microbial resistance.
<b>DensArmor Plus® Impact-Resistant Interior Panel</b> (formerly DensArmor Plus® High Impact)	Even greater durability with an embedded impact-resistant mesh for the ultimate performance in high traffic areas. Ideal for healthcare facilities, schools and correctional institutions.



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Georgia-Pacific Gypsum LLC Technical Hotline  
U.S.A. and Canada: **1-800-225-6119**



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