

A GUIDE TO FIRE & ACOUSTIC DATA FOR COLD-FORMED STEEL FLOOR, WALL & ROOF ASSEMBLIES

(Editorially Revised January 2025)



Supported By:







DISCLAIMER

The material in this guide has been prepared as a reference of fire and sound rated lightweight steel framed assemblies. While every effort has been taken to ensure that the material is technically correct, it only offers a brief description of the tested assemblies. It must not be used without first reviewing the source documents of the testing agencies for a full description of the assembly. The Steel Framing Industry Association, nor their organization's members, warrant or assume liability for the suitability of the material for any general or particular use.

Please note that some assemblies are constructed with proprietary products that may not be available in all geographical areas. Please consult the source documents of the testing agencies for these details. Where fire rated designs utilize a proprietary steel joist, fluted unit, light gauge steel truss or steel stud, the source column appears shaded and the word proprietary is in bold font to allow ease of identification for an assembly built with a proprietary cold-formed steel product.

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PREFACE

The purpose of this guide is to summarize fire and sound data for steel floor, wall and roof assemblies that are relevant to residential and light commercial construction. Fire data has been compiled from the following six sources:

Underwriters Laboratories of Canada www.ulc.ca	ULC
National Research Council of Canada Institute for Research in Construction www.nrc.canada.ca	NRCC
Underwriters Laboratories Inc. www.ul.com	UL
Gypsum Association www.gypsum.org	GA
Factory Mutual Global Research www.fmglobal.com	FM
Intertek Testing Services NA Inc. www.intertek.com	ITS

NOTES

- 1. ULC Design Numbers (published in the Fire Resistance Directory of Underwriters Laboratories of Canada) and NRCC Report/Assembly Numbers (research publications of the Institute for Research in Construction, National Research Council of Canada) should be referenced when considering steel floor, wall and roof assembly designs in Canadian Building Code jurisdictions.
- 2. For non-load bearing wall assemblies, steel stud thickness as per ASTM C 645, Standard Specification for Nonstructural Steel Framing Members, where minimum thickness is specified as 0.0179 in. (0.455 mm) before application of protective coating or in conformance with Section 9.
- 3. UL non-load bearing wall and load bearing wall assemblies provide stud material thickness with a Manufacturers' Standard Gauge (MSG) number. UL's "*BXUV.GuideInfo, Fire Resistance Ratings ANSI/UL 263*" provides the following thickness tables where an MSG is stated in the fire rated design.

For load-bearing steel studs:

MSG	Minimum bare metal thickness (in.)
20	0.0329
18	0.0428
16	0.0538
14	0.0677

For non-load bearing steel studs:

MSG	Minimum bare metal thickness (in.)
25	0.0179
22	0.0269
20	0.0329
18	0.0428
16	0.0538

- 4. Both the SFIA and the SSMA code compliance certification programs have developed minimum requirements that must be satisfied for a nonstructural stud to be considered an equivalent gauge stud (EQ stud). These criteria are to ensure that the EQ stud will perform as well or better than the stud it replaces. A nonstructural EQ stud must meet the following criteria:
- Have an allowable or nominal bending moment that is at least equal to that of their traditional stud counterpart as listed in ASTM C645, Table 2.
- Must have developed and published composite limiting height tables in accordance with ICC-ES AC86 2010.

- Must have published screw data (shear and pullout) that is equal or greater than the traditional ASTM C645 stud.
- Must pass the screw penetration test in ASTM C645.
- Must meet the corrosion protection requirements of ASTM C645.

Fire assemblies that have EQ studs listed within the assembly are indicated with the following symbol: EQ studs can also be used in assemblies if they meet the minimum physical requirements described within the assembly.

Products delivered to the jobsite with SFIA or SSMA labels on the packaging assure the user that the studs are code compliant, meet the requirements above, and were subjected to independent third party certification to these requirements.

5. Most sound data that has been incorporated into this guide were based on the following report:

Warnock, A.C.C., *Estimation of Sound Transmission Class and Impact Insulation Class Rating for Steel Framed Assemblies*, Report No. B3436.1 Revised, Institute for Research in Construction, National Research Council of Canada, Ottawa, Ontario, Canada, November 2008.

The above report has surveyed existing published sound test reports denoted in the source column by an alphanumeric acoustic test identifier. Letter prefixes in the identifier denote various acoustic testing laboratories. The report also provides numerous acoustic "estimates" and these have been noted with an asterisk that refers to the above report, i.e., Warnock (2008). The report is available as a Research Report (RP08-7) from the Cold-Formed Steel Engineers Institute (<u>https://www.cfsei.org/research-reports</u>) as a free download in the form of an Adobe Acrobat file. Acoustic estimates were made with an acoustic "SOund Classification RATing EStimator" called "Socrates".

Further information on "Socrates" is also available via the following website: <u>http://www.alfwarnock.info/sound/socindex.html</u>

Acoustic data in some cases appears with the following codes to denote a material:

AIR – a gap in the construction (a layer of air with thickness) CAR-UND – carpet and underpad CEMBRD – cement board (with thickness) CER-PAD – ceramic tile and rubber pad G – gypsum board (with thickness)

GFB – glass fiber batts (with thickness)

NI – no insulation

NRC – no resilient metal channels

RC - resilient metal channels

RFB – rock fiber (mineral wool) batts (with thickness)

Acoustic reports if available for floor/ceiling and wall assemblies are noted in source column with acronyms for sound testing agencies before report numbers. The acronyms refer to the following sound testing agencies:

ASL – Acoustic Systems Acoustical Research Facility

BBN – Bolt, Beranek, and Newman, Inc.

CK – Cedar Knolls Acoustical Laboratories (now Electrical Testing Laboratories, ETL)

NGC – National Gypsum Company's Gold Bond Laboratories (now NGC Testing Services)

NRCC – National Research Council of Canada (report numbers preceded by NRC TL, TLA, TLF or TL for Sound Transmission Class and IIF for Impact Insulation Class)

RAL – Riverbank Acoustical Laboratories

SA – Shiner & Associates

USG – USG Research & Technology Center

6. Information on UL fire rated cold-formed steel truss assemblies is available from the Cold-Formed Steel Council via the following webpage:

http://cfsc.sbcindustry.com/docs/Fire Assemblies SSC.pdf

7. Details of UL and ULC listings for fire rated floor, wall and truss assemblies can be downloaded from the website of UL and ULC by using the alphanumeric fire identifier within a keyword search. For example, on the UL website enter the following information:

- go to UL website at: <u>http://www.ul.com/global/eng/pages/</u>

- click on "Online Certifications Directory" located at the bottom, right side of webpage

- type in alphanumeric fire identifier, for example "L568" in keyword box and click on "Search"

- go to row with "Design No. L568" and click on "BXUV.L568"

Similarly, for the ULC website enter the following information:

- go to ULC website at: <u>http://ulc.ca/</u>

- click on "ULC Online Directories" located along right side of webpage under Useful Links

- in "Keyword" type in alphanumeric fire identifier, for example "M511" in keyword box and click on "Search"

- go to row with "Design No. M511" and click on "<u>BXUVC.M511"</u>

- 8. UL Floor and Load Bearing Wall Designs using cold-formed steel joists and studs can be used for Canadian application without a Load Restriction, i.e., a "Load Restricted Factor" equal to 1.00. Details regarding this restricted load use condition have been added to "*BXUV7.GuideInfo, Fire Resistance Ratings CAN/ULC-S101 Certified for Canada*". The percent load reductions in Table 1 of "*BXUV7.GuideInfo*" for typical assemblies are based upon loading calculated in accordance with the working stress design method as compared to loading calculated in accordance with the limit states design method. The fire resistance ratings for floors supported by cold-formed steel channels and walls supported by cold-formed steel studs do not have a Load Restriction Factor because the associated loads in Canada and the U.S. are based on the same standard: *CSA S136-16, "North American Specification for the Design of Cold-Formed Steel Structural Members*", and *ANSI/AISI S100-16, "North American Specification for the Design of Cold-Formed Steel Structural Members*".
- 9. As per UL's "BXUV.GuideInfo, Fire Resistance Ratings ANSI/UL 263" and ULC's "BXUVC GuideInfo, Fire Resistance Ratings (Guide No. 40 U18)" the dimensions and thickness (gauge) of steel studs and joists are minimums. The hourly ratings apply when the steel studs and joists are larger in thickness (heavier gauge) and/or have larger dimensions than specified in a design, or when the member spacing is less than what was tested.
- 10. In Canada, the 2015 edition of the National Building Code of Canada (NBCC) the sound insulation requirements for Group C residential occupancies are now given in terms of Apparent Sound Transmission Class (ASTC). Previous editions of the NBCC focused on the performance of the separating element only, with requirements given in terms of Sound Transmission Class (STC) ratings. The Code requires that a dwelling unit shall be separated from every other space in a building by an assembly (Walls of Floors/Ceilings) that will provide an ASTC rating not less than 47. ASTC considers the sound transmission via the direct path (i. e. through the separating wall or floor/ceiling) and via the flanking paths (e. g. via a shared floor or ceiling).

The National Research Council Canada (NRCC) was involved with several joint projects with Canadian industry. For example, a joint research project between the NRCC and the Canadian Sheet Steel Building Institute investigated the

sound transmission characteristics of cold-formed steel-framed constructions. The objective of the project was to provide data on direct and flanking sound transmission for common construction details in lightweight steel-framed mid-rise building construction market. Comprehensive results from the project are incorporated into the NRCC Research Report RR-337, "*Apparent Sound Insulation in Lightweight Steel-Framed Buildings*", published in 2016. Report RR-337 in addition to reporting on flanking sound transmission also presents direct sound transmission STC values measured for wall assemblies in Table 2.2.1 and floor assemblies in Table 2.3.1.

NRCC has also developed a soundPATHS web application for design professionals that provides a prediction tool for the calculation of direct and flanking sound transmission between adjacent rooms. The software uses the calculation procedure outlined in the 2015 edition of the NBCC. The application has been designed so that the results from the application can be used to determine compliance versus having to laboratory test a wall or floor/ceiling assembly. The soundPATHS software is via the following NRCC webpage: http://www.nrc-cnrc.gc.ca/eng/solutions/advisory/soundpaths/index.html

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Underwriters Laboratories of Canada

FLOOR/CEILING ASSEMBLIES

Source	Description	Fire Resistance Rating	Sound Transmiss Class	sion	Impact Insulation Class
ULC D500 NGC Testing Services™	 min. 90 mm concrete topping 152 mm by 152 mm MW18.7/MW18.7 welded steel wire mesh steel reinforcing bar with 40 mm concrete cover composite galvanized fluted units, proprietary ComSlab™ 210, 203 mm deep or ComSlab™ 225, 225 mm deep with a min. design thickness of 0.953 mm by Bailey Metal Products Ltd. furring channels spaced 406 mm o.c. 1 layer of 15.8 mm gypsum board on ceiling side * for steel deck span > 10 m ** for steel deck span ≤ 10m 	1-½ h *	56 0 (PEP 150mm	60 54 (PE	(CAR-UND)
ULC F909	 64 mm concrete topping for 1 h and 90 mm for 1½ h 152 mm by 152 mm MW18.7/MW18.7 welded steel wire mesh steel reinforcing bar with 40 mm concrete cover composite galvanized fluted units, proprietary ComSlab™ 210, 203 mm deep or ComSlab™ 225, 225 mm deep with a min. design thickness of 0.953 mm by Bailey Metal Products Ltd. steel deck span ≤ 10m 	2 II 1 h 1-½ h	CER-PAD)		PAD)

Source	Description	Fire Resistance Rating	Sound Transmission Class	Impact Insulation Class
ULC F918	 110 mm concrete topping 152 mm by 152 mm MW18.7/MW18.7 welded steel wire mesh 10 mm steel reinforcing bar with 40 mm concrete cover composite galvanized fluted units, proprietary ComSlab[™] 210, 203 mm deep with a min. design thickness of 0.953 mm by Bailey Metal Products Ltd. 			
		2 h	-	-
ULC 1523 a) TLF-02-051a b) IIF-02-032	 35 mm concrete 0.38 mm thick steel deck with 15.9 mm deep corrugations 203 mm deep steel joist with 1.15 mm material thickness and spaced at 406 mm o.c. or 610 mm o.c. optional resilient metal channels spaced 610 mm o.c. optional 90 mm mineral wool or glass fibre batt insulation 2 layers of 12.7 mm gypsum board on ceiling side 	r Spaced max 406 mm IC		
		1 h	610 mm jois	t spacing 29* (GEB RC)
			60* (NI RC)	30* (NI RC)
			406 mm jois	t spacing
				34 ^D (GFB RC)

* Estimated value as per Warnock (2008)

Source	Description	Fire Resistance Rating	Sound Transmission Class	Impact Insulation Class
ULC I525	 56 mm concrete above steel deck with 150 mm by 150 mm MW18.7 x MW18.7 welded wire fabric or engineered synthetic fibers on 18 mm deep 25 MSG steel deck 205 mm deep proprietary composite steel joist, TOTALJOIST[®] by iSPAN Systems LP spaced at 1220 mm o.c. resilient channels spaced 610 mm o.c. 1 layer of 16 mm gypsum board on ceiling side 			
		1 h 2 h	50 to 56	25 to 68
ULC I526	 subfloor of 19 mm thick tongue- and-groove cement-fibre board designated "Structo-Crete" 300 mm deep proprietary steel joist, TOTALJOIST[®] by iSPAN Systems LP and spaced at 600 mm o.c. resilient metal channels spaced 300 mm o.c. 92 mm thick glass-fibre batt insulation 1 layer of 15.9 mm gypsum board on ceiling side 		<u>56 to 64*</u>	

* Brunette, N.L., Airborne Sound Transmission Loss and Impact Sound Transmission Measurements Performed on One Floor Assembly, NRCC Client Report B-3454.1, National Research Council of Canada, Ottawa, Ontario, Canada, 2007.

Source	Description	Fire Resistance Rating	Sound Transmissio Class	Impact n Insulation Class
ULC I527	 subfloor of 19 mm thick tongue- and-groove cement-fibre board designated "Structo-Crete" topped with 12.7 mm thick gypsum board (System A) or 19 mm thick floor topping mixture (System B) 300 mm deep proprietary steel joist, TOTALJOIST[®] by iSPAN Systems LP and spaced at 600 mm o.c. resilient metal channels spaced 300 mm o.c. 92 mm thick glass-fibre batt insulation 2 layers of 15.9 mm gypsum board on ceiling side 		61*	
		∠ 11	01	-

* Brunette, N.L., Airborne Sound Transmission Loss and Impact Sound Transmission Measurements Performed on One Floor Assembly, NRCC Client Report B-3454.6, National Research Council of Canada, Ottawa, Ontario, Canada, 2007.

Floor/Ceiling - Underwriters Laboratories of Canada

Source	Description	Fire Resistance Rating	Sound Transmission Class	Impact Insulation Class
ULC I528	 1-½ hours - subfloor of 19 mm thick tongue-and-groove cement-fibre board designated "Structo-Crete" 2 hours - subfloor of 19 mm thick tongue-and-groove cement-fibre board designated "Structo Crete" topped with 12.7 mm thick gypsum board (System A) or 19 mm thick floor topping mixture (System B) 254 mm deep with 1.6 mm material thickness and spaced at 610 mm o.c. resilient metal channels spaced 305 mm o.c. 92 mm thick glass-fibre batt insulation 1 layer of 15.9 mm gypsum board on ceiling side * 96% load restriction 	* 1-½ h		
ULC I529	 subfloor of 19 mm thick tongue- and-groove cement-fibre board designated "Structo-Crete" 254 mm deep with 1.6 mm material thickness and spaced at 610 mm o.c. resilient metal channels spaced 305 mm o.c. 92 mm thick glass-fibre batt insulation 2 layers of 15.9 mm gypsum board on ceiling side * 96% load restriction 	2 II		

		Fire	Sound	Impact
Source	Description	Resistance	Transmission	Insulation
		Rating	Class	Class
ULC I530	 min. 25.4 mm floor topping mixture min. 14 mm deep, 20 MSG corrugated fluted steel deck 190 mm deep proprietary steel joist, TOTALJOIST[®] by iSPAN Systems LP spaced at 610 mm o.c. resilient metal channels spaced 305 mm o.c. 89 mm thick glass fibre insulation 1 layer of 16 mm gypsum board on ceiling side 		MANA	
		1½ h	59 to 62*	41 to 65*
ULC I532	 56 mm concrete above steel deck with 150 mm by 150 mm MW18.7 x MW18.7 welded wire fabric or engineered synthetic fibers on 14 mm deep 22 MSG steel deck 205 mm deep proprietary composite steel joist, TOTALJOIST[®] by iSPAN Systems LP spaced at 1220 mm o.c. resilient channels spaced 610 mm o.c. 1 layer of 16 mm gypsum board on ceiling side 	2 II	50 to 56	25 to 68
		2 h 3 h		

* STC and IIC ratings based on 254 mm deep joists and deeper. A range of STC and IIC ratings available depending on system type and finished floor type, contact iSPAN Systems LP for more information.

Floor/Ceiling - Underwriters Laboratories of Canada

Source	Description	Fire Resistance	Sound Transmission	Impact Insulation
		Rating	Class	Class
ULC M511	 subfloor of 15.9 mm plywood and finish floor of 15.9 mm wood structural panels 203 mm deep steel joist with 1.15 mm material thickness and spaced at 406 mm o.c. resilient metal channels spaced 406 mm o.c. 90 mm thick mineral wool batt insulation 1 layer of 15.9 mm gypsum board on ceiling side 	or of 15.9 mm plywood and floor of 15.9 mm wood ural panels im deep steel joist with 1.15 haterial thickness and d at 406 mm o.c. nt metal channels spaced im o.c. n thick mineral wool batt tion r of 15.9 mm gypsum on ceiling side		46*
	 subfloor of 19 mm plywood 203 mm deep steel joist with 1.15 mm material thickness and spaced at 610 mm o.c. resilient metal channels spaced 	27777777777		
	 406 mm o.c. 90 mm thick glass fibre batt insulation 2 layers of 12.7 mm gypsum board on ceiling side 	45 min	<u> </u>	
	 subfloor of 19 mm plywood 	45 11111	52	43
	 Subiloof of 19 min plywood 203 mm deep steel joist with 1.15 mm material thickness and spaced at 610 mm o.c. 2 layers of 12.7 mm gypsum board on ceiling side 			
		45 min	<40*	<40*
	 subfloor of 15.9 mm plywood 203 mm deep steel joist with 1.15 mm material thickness and spaced at 406 mm o.c. 2 layers of 12.7 mm gypsum board on ceiling side 			
		1 h	<40*	<40*

* Estimated value as per Warnock (2008)

Source	Description	Fire Resistance Rating	Sound Transmission Class	Impact Insulation Class
ULC M514 a) NGC5004021 b) NGC7004068 c) NGC7004069	 subfloor of 19 mm plywood 203 mm deep steel joist with 1.07 mm material thickness and spaced at 610 mm o.c. 4 layers of 15.9 mm Type X gypsum board on ceiling side resilient metal channels spaced 610 mm o.c. and applied perpendicular to joists over third layer of gypsum board 	2 h	48 ^a	37 ^b
ULC M518	 25 mm min. floor topping mixture with 25 MPa compressive strength 14 mm min. deep, 22 gauge corrugated steel deck 235 mm x 16 gauge steel joist spaced at 610 mm o.c. resilient channels spaced 305 mm o.c. 90 mm mineral wool or glass fiber batt insulation 1½ hour - 1 layer of 15.9 mm gypsum board on ceiling side 2 hour - 2 layers of 15.9 mm gypsum board on ceiling side 	1 h 1½ h 2h	<u></u>	

Source	Description	Fire Resistance Rating	Sound Transmission Class	Impact Insulation Class
ULC M520	 subfloor of 19 mm plywood or OSB with optional min. 19 mm floor topping mixture (System A). In lieu of plywood or OSB subfloor, 22 mm min. deep, 0.76 mm thick corrugated steel deck with min. 48 mm normal weight concrete (System C) min. 254 mm deep proprietary steel joist, TOTALJOIST[®] by iSPAN Systems LP and spaced at 610 mm o.c. resilient metal channels spaced 300 mm o.c. 75 mm thick mineral wool batt insulation 1 layer of 16 mm gypsum board on ceiling side 			
ULC M521	 subfloor of 19 mm plywood, OSB or tongue-and-groove cement-fibre board designated "Armoroc Panel" with optional min. 19 mm floor topping mixture min. 190 mm deep proprietary steel joist, TOTALJOIST[®] by iSPAN Systems LP and spaced at 610 mm o.c. resilient metal channels spaced 305 mm o.c. 89 mm thick glass fibre batt insulation 1 layer of 16 mm gypsum board on ceiling side 	1 n	50 TO 63*	38 to 72*

* STC and IIC ratings based on 254 mm deep joists and deeper. A range of STC and IIC ratings available depending on system type and finished floor type, contact iSPAN Systems LP for more information.

As per Technical Note no. 8, UL Floor/Ceiling and Load Bearing Wall assemblies using cold-formed steel joists and studs can be used for Canadian application. Details regarding this condition are given in "*BXUV7.GuideInfo, Fire Resistance Ratings - CAN/ULC-S101 Certified for Canada*". UL Floor/Ceiling assemblies that can be used for Canadian application as per BXUV7 are listed below and the relevant assemblies are noted with a <u>BXUV7</u> symbol in the 1st column of the section showing UL Floor/Ceiling assemblies (see pages 19 to 43).

The following pages present floor/ceiling assemblies fire tested at NRCC during two multi industry (steel, wood, gypsum and insulation) fire testing programs that are reported on in two fire test reports, namely IR No. 764 (May 1998) and RR No. 184 (March 2005). The fire test report nos. appear in the source column and are followed by a "FF" fire test no. used in the report. Relevant NRCC acoustic reports are also listed below and these reference documents deal with acoustic data, i.e., values of Sound Transmission Class and Impact Insulation Class that have been established as an estimated value or from an acoustic test where the acoustic test no. appears in the source column.

NRCC IR-764 data for FF22 to FF27 (see pages 13 and 14)

Reference (fire data):

Sultan, M.A., Séguin, Y.P. and Leroux, P., *Results of Fire Resistance Tests on Full-Scale Floor Assemblies, IRC Internal Report No. 764 (IR-764)*, National Research Council of Canada, Ottawa, Ontario, Canada, May 1998.

References (acoustic data):

Warnock, A.C.C. and Birta, J.A., Summary Report for Consortium on Fire Resistance and Sound Insulation of Floors: Sound Transmission Class and Impact Insulation Class Results, IRC Internal Report No. 766, National Research Council of Canada, Ottawa, Ontario, Canada, April 1998.

** Warnock, A.C.C., *Sound Transmission Estimates for Steel-Framed Floor Assemblies,* Institute for Research in Construction, National Research Council of Canada, Ottawa, Ontario, Canada, January 12, 2000.

* Warnock, A.C.C., *Estimation of Sound Transmission Class and Impact Insulation Class Rating for Steel Framed Assemblies*, Report No. B3436.1 Revised, Institute for Research in Construction, National Research Council of Canada, Ottawa, Ontario, Canada, November 2008.

Birta, J.A. and Warnock, A.C.C., *Airborne and Impact Sound Transmission Measurements Performed on Specimen B1363-1*, National Research Council of Canada, Ottawa, Ontario, Canada, 2001.

Birta, J.A. and Warnock, A.C.C., *Airborne and Impact Sound Transmission Measurements Performed on Specimen B1363-2*, National Research Council of Canada, Ottawa, Ontario, Canada, 2001.

NRCC RR-184 data for FF37 to FF74 (see pages 15 to 18)

Reference (fire data):

Sultan, M.A., Latour, J.C., Leroux, P., Monette, R.C., Séguin, Y.P. and Henrie, J.P., *Results of Fire Resistance Tests on Full-Scale Floor Assemblies – Phase II, Research Report No. 184 (RR-184)*, Institute for Research in Construction, National Research Council of Canada, Ottawa, Ontario, Canada, March 2005.

References (acoustic data):

Warnock, A.C.C., Summary Report for Consortium on Fire Resistance and Sound Insulation of Floors: Sound Transmission and Impact Insulation Data, Research Report No. 169 (RR-169), Institute for Research in Construction, National Research Council of Canada, Ottawa, Ontario, Canada, January 2005.

* Warnock, A.C.C., *Estimation of Sound Transmission Class and Impact Insulation Class Rating for Steel Framed Assemblies*, Report No. B3436.1 Revised, Institute for Research in Construction, National Research Council of Canada, Ottawa, Ontario, Canada, November 2008.

Source	Description	Fire Endurance	Sound Transmission Class	Impact Insulation Class
NRCC IR-764 FF22	 subfloor of 15.9 mm plywood 203 mm deep steel joist with 1.22 mm material thickness and spaced at 406 mm o.c. resilient metal channels spaced 406 mm o.c. 2 layers of 12.7 mm Type X gypsum board on ceiling side 	74 min	<50*	<40* 60**
NRCC IR-764 FF23 a) TLF-01-003a b) TLF-01-005a c) IIF-00-036 d) IIF-01-001	 subfloor of 15.9 mm plywood 203 mm deep steel joist with 1.22 mm material thickness and spaced at 406 mm o.c. resilient metal channels spaced 406 mm o.c. 90 mm thick glass fibre insulation 2 layers of 12.7 mm Type X gypsym board on ceiling side 	68 min	49 ^a	
NRCC IR-764 FF24	 subfloor of 15.9 mm plywood 203 mm deep steel joist with 1.22 mm material thickness and spaced at 610 mm o.c. resilient metal channels spaced 406 mm o.c. 90 mm thick glass fibre insulation 			
	 2 layers of 12.7 mm Type X gypsum board on ceiling side 	69 min	49*	42* 62**
NRCC IR-764 FF25	 subfloor of 15.9 mm plywood 203 mm deep steel joist with 1.22 mm material thickness and spaced at 406 mm o.c. resilient metal channels spaced 406 mm o.c. 90 mm thick mineral fibre insulation 1 layer of 12.7 mm Type X 			
	gypsum board on ceiling side	46 min	45*	39* 64**

Estimated value as per Warnock (2008) ** With carpet and pad (Warnock, 2000)

Floor/Ceiling – National Research Council of Canada

 NRCC IR-764 FF26 a) TLF-97-109a b) IIF-97-049 a) TLF-97-109a b) IIF-97-049 b) IIF-97-049 corrugations resilient metal channels spaced 406 mm o.c. 2 layers of 12.7 mm Type X gypsum board on ceiling side NRCC IR-764 FF27 38 mm concrete topping subfloor of 15.9 mm plywood 203 mm deep steel joist with 1.22 mm material thickness and spaced 406 mm o.c. resilient metal channels spaced 406 mm o.c. 90 mm thick glass fibre insulation 	Source	Description	Fire Endurance	Sound Transmission Class	Impact Insulation Class
 NRCC IR-764 Subfloor of 15.9 mm plywood 203 mm deep steel joist with 1.22 mm material thickness and spaced 406 mm o.c. resilient metal channels spaced 406 mm o.c. 90 mm thick glass fibre insulation 	NRCC IR-764 FF26 a) TLF-97-109a b) IIF-97-049	 76 mm composite concrete slab with 152 mm by 152 mm MW3.8/MW3.8 welded steel wire mesh on 0.91 mm thick steel deck with 76 mm deep corrugations resilient metal channels spaced 406 mm o.c. 2 layers of 12.7 mm Type X gypsum board on ceiling side 	105 min	<u> </u>	36 ^b 70**
2 layers of 12.7 mm Type X gypsum board on ceiling side 60 min 66* 36*	NRCC IR-764 FF27	 38 mm concrete topping subfloor of 15.9 mm plywood 203 mm deep steel joist with 1.22 mm material thickness and spaced 406 mm o.c. resilient metal channels spaced 406 mm o.c. 90 mm thick glass fibre insulation 2 layers of 12.7 mm Type X gypsum board on ceiling side 	60 min	66*	36*

Estimated value as per Warnock (2008) ** With carpet and pad (Warnock, 2000)

Source	Description	Fire Endurance	Sound Transmission Class	Impact Insulation Class
NRCC RR-184 FF37	 2 layers of 15.9 mm plywood subfloor 203 mm deep steel joist with 1.22 mm material thickness and spaced at 406 mm o.c. resilient metal channels spaced 406 mm o.c. 1 layer of 15.9 mm Type X gypsum board on ceiling side 	38 min		
NRCC	• 2 layers of 15.9 mm plywood	50 mm	_	_
RR-184 FF38	 subfloor 203 mm deep steel joist with 1.22 mm material thickness and spaced at 406 mm o.c. resilient metal channels spaced 406 mm o.c. 178 mm thick rock fibre insulation 1 layer of 15.9 mm Type X gypsum board on ceiling side 	53 min	-	
NRCC RR-184 FF40 a) TLF-03-011a b) IIF-03-005	 35 mm concrete 0.38 mm thick steel deck with 15.9 mm deep corrugations 203 mm deep steel joist with 1.22 mm material thickness and spaced at 406 mm o.c. resilient metal channels spaced 406 mm o.c. 2 layers of 12.7 mm Type X gypsum board on ceiling side 			A 0 0
	gypsun board on cening side	75 min	62 ^a	32 ^b

Source	Description	FireSoundImpaEnduranceTransmissionInsulaClassClassClass		
NRCC RR-184 FF43 a) TLF-03-005a b) IIF-03-003	 35 mm concrete 0.38 mm thick steel deck with 15.9 mm deep corrugations 203 mm deep steel joist with 1.22 mm material thickness and spaced at 406 mm o.c. resilient metal channels spaced 406 mm o.c. 90 mm thick glass fibre insulation 2 layers of 12.7 mm Type X gypsum board on ceiling side 	68 min	<u>68</u> ª	T T 36 ^b
NRCC RR-184 FF44 a) TLF-02-051a b) IIF-02-032	 35 mm concrete 0.38 mm thick steel deck with 15.9 mm deep corrugations 203 mm deep steel joist with 1.22 mm material thickness and spaced at 406 mm o.c. resilient metal channels spaced 610 mm o.c. 89 mm thick glass fibre insulation 2 layers of 12.7 mm Type X gypsum board on ceiling side 	61 min	<u>66ª</u>	34 ^b
NRCC RR-184 FF50 a) TLF-04-029a b) IIF-04-016	 2 layers of 15.5 mm plywood subfloor 203 mm deep steel joist with 1.22 mm material thickness and spaced at 406 mm o.c. 91 mm thick cellulose fibre insulation on joist sides and 112 mm on underside of subfloor resilient metal channels spaced 406 mm o.c. 1 layer of 12.7 mm Type X gypsum board on ceiling side 	63 min	51ª	45 ^b

Source	Description	Fire Endurance	Sound Transmission Class	Impact Insulation Class
NRCC RR-184 FF51	 subfloor of 15.5 mm plywood 203 mm deep steel joist with 1.22 mm material thickness and spaced at 406 mm o.c. 2 layers of 12.7 mm Type X gypsum board on ceiling side 	66 min		
NRCC RR-184 FF52	 subfloor of 19 mm plywood 203 mm deep steel joist with 1.22 mm material thickness and spaced at 610 mm o.c. 89 mm thick glass fibre insulation resilient metal channels spaced 610 mm o.c. 2 layers of 12.7 mm Type X gypsum board on ceiling side 	52 min		
NRCC RR-184 FF53 a) TLF-03-007a b) IIF-03-004	 35 mm concrete 0.38 mm thick steel deck with 15.9 mm deep corrugations 203 mm deep steel joist with 1.22 mm material thickness and spaced at 406 mm o.c. resilient metal channels spaced 406 mm o.c. 89 mm thick rock fibre insulation 2 layers of 12.7 mm Type X gypsum board on ceiling side 	70 min	68ª	37 ^b
NRCC RR-184 FF54	 35 mm concrete 0.38 mm thick steel deck with 15.9 mm deep corrugations 203 mm deep steel joist with 1.22 mm material thickness and spaced at 610 mm o.c. 2 layers of 12.7 mm Type X gypsum board on ceiling side 	66 min		

Source	Description	Fire Endurance	Sound Transmission Class	Impact Insulation Class
NRCC RR-184 FF62	 subfloor of 19 mm plywood 203 mm deep steel joist with 1.22 mm material thickness and spaced at 610 mm o.c. 2 layers of 12.7 mm Type X gypsum board on ceiling side 	54 min	-	-
NRCC RR-184 FF65 a) TLF-04-011a b) IIF-04-007	 subfloor of 19 mm plywood 203 mm deep steel joist with 1.22 mm material thickness and spaced at 610 mm o.c. 100 mm thick cellulose fibre insulation on joist sides and 94 mm on underside of subfloor resilient metal channels spaced 610 mm o.c. 2 layers of 12.7 mm Type X gypsum board on ceiling side 	68 min	57ª	51°
NRCC RR-184 FF74	 35 mm concrete 0.38 mm thick steel deck with 15.9 mm deep corrugations 203 mm deep steel joist with 1.22 mm material thickness and spaced at 610 mm o.c. resilient metal channels spaced 406 mm o.c. 89 mm thick cellulose fibre insulation on joist sides and 38 mm on underside of subfloor 1 layer of 15.9 mm Type X gypsum board on ceiling side 	56 min	63*	29*

* Estimated value as per Warnock (2008)

Source	Description	Fire Resistance Rating	Sound Transmission Class	Impact Insulation Class
UL D504 NGC Testing Services™ BXUV7	 min. 3 ⁹/₁₆" concrete topping 6" by 6" W2.9/W2.9 welded wire fabric steel reinforcing bar with 1¹⁹/₃₂" concrete cover composite galvanized fluted units, proprietary 8" deep ComSlab™ 210 or ComSlab™ 225 with min. 20 MSG by Bailey Metal Products Ltd. furring channels spaced 16" o.c. 1 layer of ⁵/₈" gypsum board on ceiling side * for steel deck span > 32' - 9⁵/₈" 			
		1-½ h * 2 h **	56 6 60 (RFB 6" CER-PAD)	60 (CAR-UND) 54 (RFB 6" CER-PAD)
UL D930 BXUV7	 2 ½" concrete topping for 1 h, 3 ⁹/₁₆" for 1½ h and 4 ½" for 2 h 6" by 6" W2.9/W2.9 welded wire fabric steel reinforcing bar with 1¹⁹/₃₂" concrete cover composite galvanized fluted units, proprietary 8¼" deep COMSLAB™ 210 or COMSLAB™ 225 with a min. 20 MSG by Bailey Metal Products Ltd. steel deck span ≤ 32' - 95/8" 	1 h	-	
		1-½ h 2 h		

Source	Description	Fire Resistance Rating	Sound Transmission Class	Impact Insulation Class
UL D989 BXUV7	 4 ¼" concrete topping 6" by 6" W2.9/W2.9 welded wire fabric min. #4 steel reinforcing bar with 1¹⁹/₃₂" concrete cover composite galvanized fluted units, proprietary 8" deep COMSLAB™ 210 with a min. thickness of 0.0375" (20 MSG) by Bailey Metal Products Ltd. 	2 h		-
UL G533 BXUV7	 2" lightweight concrete with 3400 psi comp. strength welded wire fabric, 6" by 6", W1.4 x W1.4 0.018" thick steel deck with ¹⁹/₃₂" deep corrugations 7 ³/₁₆" x 18 MSG steel joist spaced at 24" o.c. 26 MSG furring channels spaced 24" o.c. 1" thick mineral wool batts 1 layer of ½" gypsum board on ceiling side 	2 h	-	
UL G534 BXUV7	 1½" min. lightweight concrete with 3400 psi comp. strength welded wire fabric, 6" by 6", 10/10 SWG 0.018" thick steel deck with ¹⁹/₃₂" deep corrugations 7 ³/₁₆" x 18 MSG steel joist spaced at 24" o.c. 26 MSG furring channels spaced 24" o.c. 1 layer of ½" gypsum board on ceiling side 	1 h		

Source	Description	Fire Resistance Rating	Sound Transmission Class	Impact Insulation Class
UL G535 BXUV7	 subfloor of ³/₄" thick tongue- and-groove cement-fibre board designated "Structo-Crete" ¹/₂" gypsum board or ³/₄" topping mixture on top of subfloor for 2 hour 9¹/₄" x 16 MSG proprietary steel joist (ClarkDietrich) spaced at 24" o.c. 3 ⁵/₈" glass fiber batt insulation resilient metal channels spaced 12" o.c. 1 layer of ⁵/₈" gypsum board on ceiling side 	1-½ h 2 h		
UL G536 BXUV7	 subfloor of ³/₄" thick tongue- and-groove cement-fibre board designated "Structo-Crete" 9¹/₄" x 16 MSG proprietary steel joist (ClarkDietrich) spaced at 24" o.c. 3 ⁵/₈" glass fiber batt insulation resilient metal channels spaced 12" o.c. 2 layers of ⁵/₈" gypsum board on ceiling side 	2 h	<u></u>	

Floor/Ceiling – Underwriters Laboratories Inc.

Source	Description	Fire Resistance	Sound Transmission	Impact
Course	Description	Rating	Class	Class
UL G537 BXUV7	 1½" min. lightweight or normal-weight concrete with 3400 psi and 3500 psi comp. strength, respectively welded wire fabric, 6" by 6", W1.4 x W1.4 expanded steel lath with 3%" rib 8" x 18 gauge steel joist spaced at 19" o.c. 3½" x 18 gauge ceiling joists spaced 16" o.c. insulation optional, 3½" mineral wool loose fill for 1 h and 3½" fibreglass required for 1-½ h 1 layer of ½" gypsum board on ceiling side 	1 h 1 1/ h		
UL G540 BXUV7 Intertek Architectural Testing a) G2276.01- 113-11 b) G2276.02- 113-11	 2" min. normal or lightweight concrete with 3000 psi comp. strength welded wire fabric, 6" by 6", 10/10 SWG expanded steel lath with 3%" rib proprietary pre-fabricated light gauge steel truss system, Ultra-Span by Aegis Metal Framing, spaced at 48" o.c. resilient or furring channels spaced 16" o.c. any thickness mineral wool or glass fiber insulation, optional for 1 h and omitted for 2 h 1 hour - 1 layer of 5%" gypsum board on ceiling side 2 hour - 2 layers of 5%" gypsum board on ceiling side 	1-72 II	56 ^a 56 ^b	34 ^a 37 ^b

Floor/Ceiling – Underwriters Laboratories Inc.

Source	Description	Fire Resistance	Sound Transmission	Impact Insulation
UL G541 BXUV7	 3½" min. lightweight concrete with 3400 psi comp. strength welded wire fabric, 6" by 6", 10/10 SWG 0.018" thick steel deck with ¹⁹/₃₂" deep corrugations 7 ³/₁₆" x 18 MSG steel joist, spaced at 24" o.c. No. 12 SWG hanger wire spaced 48" o.c. steel runners, cross tees, cross channels and wall angle framing members any thickness mineral wool or glass fiber insulation, optional 1 layer of ½" gypsum board on ceiling side 		Liass	
UL G542 BXUV7	 2" min. normal or lightweight concrete with 3000 psi comp. strength welded wire fabric, 6" by 6", 10/10 SWG expanded steel lath with %" rib proprietary pre-fabricated light gauge steel truss system, TrusSteel by TrusSteel, Division of ITW Building Components Inc., spaced at 48" o.c. resilient or furring channels spaced 16" o.c. any thickness mineral wool or glass fiber insulation, optional for 1 h and omitted for 2 h 1 hour - 1 layer of %" gypsum board on ceiling side 2 hour - 2 layers of %" gypsum board on ceiling side 	1 h 2 h		

Source	Description	Fire Resistance Rating	Sound Transmissio Class	Impact n Insulation Class
UL G543 BXUV7	 2" min. normal or lightweight concrete with 3000 psi comp. strength welded wire fabric, 6" by 6", 10/10 SWG expanded steel lath with %" rib proprietary pre-fabricated light gauge steel truss system, Amkey System by Allied Studco, spaced at 48" o.c. resilient channels spaced 16" o.c. any thickness mineral wool or glass fiber insulation, optional 1 layer of %" gypsum board on ceiling side 			
UL G549 a) TLF-02-051a b) IIF-02-032 BXUV7	 1 ³/₆" concrete 28 ga (0.015" thick) steel deck with ⁵/₈" deep corrugations 8" x 18 MSG steel joist spaced at 16" o.c. or 24" o.c. optional resilient metal channels spaced 24" o.c. optional 3 ¹/₂" mineral wool or glass fiber batt insulation 2 layers of ¹/₂" gypsum board on ceiling side 	Spaced max 24 in. C Spaced max 24 in. C Spaced max 24 in. C Spaced max 16 in. C 1 h 24" joist spacing 65* (GFB RC) 60* (NI RC) 16" joist spacing 66ª (GFB RC) 29* (GFB RC) 30* (NI RC) 16" joist spacing 66ª (GFB RC) 29* (GFB RC) 34 ^b (GFB RC) 29* (GFB RC) 20* (W R		

* Estimated value as per Warnock (2008)

Floor/Ceiling – Underwriters Laboratories Inc.

Source	Description	Fire Resistance Rating	Sound Transmission Class	Impact Insulation Class
UL G551 BXUV7	 1" min. floor topping mixture with 3500 psi comp. strength ⁹/₁₆" min. deep, 22 MSG corrugated fluted steel deck 9¹/₄" x 16 MSG proprietary steel joist (ClarkDietrich) spaced at 24" o.c. resilient metal channels spaced 12" o.c. 3 ¹/₂" mineral wool or glass fiber batt insulation 1 hour - 1 layer of ⁵/₈" gypsum board on ceiling side 2 hour - 2 layers of ⁵/₈" gypsum board on ceiling side 	1 h	<u></u>	
UL G552 BXUV7	 2" min. lightweight concrete with 3400 psi comp. Strength welded wire fabric, 6" x 6" – W1.4 x W1.4 0.018" thick steel deck with ¹⁹/₃₂" deep corrugations 7 ³/₁₆" x 18 MSG steel joist, spaced at 24" o.c. furring channels spaced 24" o.c. 1" mineral wool batt insulation 1 layer of ½" gypsum board on ceiling side 			

Source	Description	Fire Resistance Rating	Sound Transmission Class	Impact Insulation Class
UL G553 BXUV7	 1" min. floor topping mixture with 3500 psi comp. strength ⁹/₁₆" min. deep, 22 MSG corrugated fluted steel deck 9¹/₄" x 16 MSG proprietary steel joist (ClarkDietrich) spaced at 24" o.c. hanger wire 12 SWG at 48" o.c. resilient metal channels spaced 12" o.c. 3 ¹/₂" mineral wool or glass fiber batt insulation 1 hour - 1 layer of ⁵/₈" gypsum board on ceiling side 2 hour - 2 layers of ⁵/₈" gypsum board on ceiling side 		-	
UL G555 BXUV7	 2 ³/₁₆" concrete above steel deck with 6" by 6" W2.9 x W2.9 welded wire fabric or engineered synthetic fibers on 0.70" deep 25 MSG steel deck 8" deep proprietary composite steel joist, TOTALJOIST[®] by iSPAN Systems LP spaced at 48" o.c. resilient channels spaced 24" o.c. 1 layer of ⁵/₈" gypsum board on ceiling side 	1 h 2 h	50 to 56	25 to 68
Source	Description	Fire Resistance Rating	Sound Transmission Class	Impact Insulation Class
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UL G556 BXUV7	 subfloor of ³/₄" thick tongue- and-groove cement-fiber board designated "Structo-Crete" ¹/₂" gypsum board or ³/₄" topping mixture on top of subfloor for 2 h 10" x 16 MSG steel joist for 1-¹/₂ h and 6" x 18 MSG or 8" x 16 MSG for 1 h, spaced at 24" o.c. 3 ⁵/₈" glass fiber batt insulation resilient metal channels spaced 12" o.c. 1 layer of ⁵/₈" gypsum board on ceiling side 	1 h 1-½ h 2 h	-	-
UL G557 BXUV7	 subfloor of ³/₄" thick tongue- and-groove cement-fiber board designated "Structo-Crete" 10" x 16 MSG, 6" x 18 MSG or 8" x 16 MSG steel joist spaced at 24" o.c. 3 ⁵/₈" glass fiber batt insulation resilient metal channels spaced 12" o.c. 2 layers of ⁵/₈" gypsum board on ceiling side 	2 h	-	

Source	Description	Fire Resistance Rating	Sound Transmission Class	Impact Insulation Class
UL G558 BXUV7	 subfloor of ³/₄" thick tongue- and-groove cement-fiber board designated "Structo- Crete" 12" deep proprietary steel joist, TOTALJOIST[®] by iSPAN Systems LP and spaced at 24" o.c. resilient metal channels spaced 12" o.c. 31/₂" glass fiber batt insulation 1 layer of ⁵/₈" gypsum board on ceiling side 			
UL G559 BXUV7	 1" min. floor topping mixture with 3500 psi comp. strength ⁹/₁₆" min. deep, 22 MSG corrugated fluted steel deck 9¹/₄" x 16 MSG proprietary steel joist CEMCO Sure-Span spaced at 24" o.c. resilient metal channels spaced 12" o.c. 3 ¹/₂" glass fiber batt insulation 1 layer of ⁵/₆" gypsum board on ceiling side 	1 n	<u>56 t0 64</u> ^	

* Brunette, N.L., Airborne Sound Transmission Loss and Impact Sound Transmission Measurements Performed on One Floor Assembly, NRCC Client Report B-3454.1, National Research Council of Canada, Ottawa, Ontario, Canada, 2007.

Source	Description	Fire Resistance Rating	Sound Transmission Class	Impact Insulation Class
UL G560 BXUV7	 1" min. floor topping mixture with 3500 psi comp. strength 9/16" min. deep, 22 MSG corrugated fluted steel deck 91/4" deep steel joist with 0.055" material thickness and spaced at 24" o.c. resilient metal channels spaced 12" o.c. 31/2" mineral wool or glass fiber batt insulation 1 layer of 5/8" gypsum board on ceiling side 	2 h	<u></u>	
UL G562 BXUV7	 subfloor of ³/₄" thick tongue- and-groove cement-fiber board designated "Structo- Crete" topped with ¹/₂" thick gypsum board (System A) or ³/₄" thick floor topping mixture (System B) 12" deep proprietary steel joist, TOTALJOIST[®] by iSPAN Systems LP and spaced at 24" o.c. resilient metal channels spaced 12" o.c. 3¹/₂" glass fiber batt insulation 2 layers of ⁵/₈" gypsum board on ceiling side 	2 h	<u>61*</u>	-

* Brunette, N.L., Airborne Sound Transmission Loss and Impact Sound Transmission Measurements Performed on One Floor Assembly, NRCC Client Report B-3454.6, National Research Council of Canada, Ottawa, Ontario, Canada, 2007.

Source	Description	Fire Resistance Rating	Sound Transmission Class	Impact Insulation Class
UL G563 BXUV7	 1" min. floor topping mixture with 3500 psi comp. strength ⁹/₁₆" min. deep, 22 MSG corrugated fluted steel deck 9¹/₄" x 16 MSG proprietary steel joist (Marino\WARE) spaced at 24" o.c. resilient metal channels spaced at 12" o.c. 3¹/₂" glass fiber batt insulation 1 layer of ⁵/₈" gypsum board on ceiling side 			
UL G564 BXUV7	 11/8" min. floor topping mixture with 3500 psi comp. strength 9/16" min. deep, 22 MSG corrugated fluted steel deck 8" x 16 MSG steel joist spaced at 24" o.c. resilient metal channels spaced at 12" o.c. 31/2" mineral wool or glass fiber insulation 1 layer of 5/8" gypsum board on ceiling side 	1 h 2 h	<u>-</u>	-
UL G565 BXUV7	 1" min. floor topping mixture with 3500 psi comp. strength ⁹/₁₆" min. deep, 22 MSG corrugated fluted steel deck 9¹/₄" x 16 MSG steel joist spaced at 24" o.c. resilient channels spaced 12" o.c. 3 ¹/₂" mineral wool or glass fiber insulation 1 and 1¹/₂ hour - 1 layer of ⁵/₈" gypsum board on ceiling side 2 hour - 2 layers of ⁵/₈" gypsum board on ceiling side 	 		

Source	Description	Fire Resistance Rating	Sound Transmission Class	Impact Insulation Class
UL G567 BXUV7	 2" min. normal or lightweight concrete with 3000 psi comp. strength welded wire fabric, 6" by 6", 10/10 SWG expanded steel lath with %" rib trusses spaced a max, 48" o.c. proprietary pre-fabricated light gauge steel truss systems, 1. Ultra-Span by Aegis Metal Framing 2. Amkey System by Allied Studco 3. Truss by Steel Construction Systems Inc. 4. Strong-Span by Hexaport International Ltd. 5. TrusSteel by TrusSteel, Division of ITW Building Components Inc. resilient or furring channels spaced 16" o.c. any thickness mineral wool or glass fiber insulation, optional for 1 h and omitted for 2 h 1 hour - 1 layer of 5%" gypsum board on ceiling side 2 hour - 2 layers of 5%" gypsum board on ceiling side 	1 h 2 h		
UL G568 BXUV7	 1" min. floor topping mixture with 3500 psi comp. strength ⁹/₁₆" min. deep, 22 MSG corrugated fluted steel deck 9¹/₄" x 16 MSG steel joist spaced at 24" o.c. resilient metal channels spaced at 12" o.c. 3¹/₂" mineral wool or glass fiber insulation 1 layer of ⁵/₈" gypsum board on ceiling side 	1 h	-	

Source	Description	Fire Resistance Rating	Sound Transmission Class	Impact Insulation Class
UL G574 BXUV7	 floor topping mixture with 3000 psi comp. strength, 1" min. for two hours and 1½" min. for one hour when used with Acousti-Mat SD ⁹/₁₆" min. deep, 22 MSG corrugated fluted steel deck 9¼" x 16 MSG proprietary steel joist CEMCO Sure-Span spaced at 24" o.c. resilient metal channels spaced 12" o.c. 3 ½" glass fiber batt insulation 1 layer of 5%" gypsum board on ceiling side 	1 h 2 h	<u>-</u>	
UL G575 BXUV7 a)NGC7009087 b)NGC 5009051 c)NGC 7009080	 ³⁄₄" thick flooring system designated "DragonBoard" 10" x 16 MSG proprietary steel joist (Super Stud) spaced at 24" o.c. 3 1⁄₂" glass fiber batt insulation resilient metal channels spaced 12" o.c. 2 layers of 5⁄₈" gypsum board on ceiling side 	2 h -	64ª (CAR-UND, F 59 ^b (RC, GF 57° (RC, GF	RC,GFB 3½") FB 3½") FB 3½")
UL G577 BXUV7	 1" min. floor topping mixture with 3000 psi comp. strength ⁹/₁₆" min. deep, 22 MSG corrugated fluted steel deck 9¹/₄" x 16 MSG proprietary steel joist (Marino\WARE Type JR JoistRite) spaced at 24" o.c. resilient metal channels spaced 12" o.c. 3 ¹/₂" glass fiber batt insulation 1 layer of ⁵/₈" gypsum board on ceiling side 	2 h		

Source	Description	Fire Resistance Rating	Sound Transmission Class	Impact Insulation Class
UL G580 BXUV7	 1" min. floor topping mixture with 3000 psi comp. strength ⁹/₁₆" min. deep, 22 MSG corrugated fluted steel deck 9¹/₄" x 16 MSG proprietary steel joist CEMCO Sure-Span spaced at 24" o.c. resilient metal channels spaced 12" o.c. 3¹/₂" glass fiber batt insulation 1 layer of ⁵/₈" gypsum board on ceiling side 	2 h	\underline{N}	
UL G587 BXUV7	 min. 1" floor topping mixture ⁹/₁₆" min. deep, 20 MSG corrugated fluted steel deck 7¹/₂" proprietary steel joist, TOTALJOIST[®] by iSPAN Systems LP spaced at 24" o.c. resilient metal channels spaced 12" o.c. 3 ¹/₂" glass fibre insulation 1 layer of ⁵/₈" gypsum board on ceiling side 	1½ h 2 h	<u>59 to 62*</u>	L 41 to 65*

* STC and IIC ratings based on 10" deep joists and deeper. A range of STC and IIC ratings available depending on system type and finished floor type, contact iSPAN Systems LP for more information.

Source	Description	Fire Resistance	Sound Transmissior	Impact Insulation
	·	Rating	Class	Class
UL G588 BXUV7	 subfloor of ³/₄" cement-fiber unit for 1 h and 1½ h ½" gypsum board or ³/₄" topping mixture on top of subfloor for 2 h 10" x 16 MSG steel joist spaced at 24" o.c. or proprietary steel joists spaced at 24" o.c. Marino\WARE 91/₄" deep x 16 MSG CEMCO Sure-Span 10" deep x 16 MSG or proprietary pre-fabricated light gauge steel truss systems (TrusSteel) spaced at 24" o.c. 3 1/₂" x 18 MSG ceiling steel joists spaced at 16" o.c. 3 1/₂" glass fibre insulation resilient metal channels spaced 12" o.c. 1 layer of ⁵/₈" gypsum board on ceiling side 	1 h 11/2 h 2 h		bery Structural ort Elements Section A-A
UL G589 BXUV7	 2 ³/₁₆" concrete above steel deck with 6" x 6" W2.9 x W2.9 welded wire fabric or engineered synthetic fibers on ⁹/₁₆" deep 22 MSG steel deck 8" deep proprietary composite steel joist, TOTALJOIST[®] by iSPAN Systems LP spaced at 48" o.c. resilient channels spaced 24" o.c. 1 layer of ⁵/₈" gypsum board on ceiling side 	1 h 2 h 3 h	50 to 56	25 to 68

Source	Description	Fire Resistance Rating	Sound Transmission Class	Impact Insulation Class
UL G591 BXUV7	 1" min. floor topping mixture with 3500 psi comp. strength ⁹/₁₆" min. deep, 22 MSG corrugated fluted steel deck 9¹/₄" x 16 MSG proprietary steel joist (ClarkDietrich Type TDJ or TDW) spaced at 24" o.c. resilient metal channels spaced 12" o.c. 3¹/₂" mineral wool or glass fiber insulation, optional for one hour, required for two hours 1 layer of ⁵/₈" gypsum board on 	1 h	<u></u>	
UL G595 BXUV7	 1" min. floor topping mixture with 3500 psi comp. strength ⁹/₁₆" min. deep, 22 MSG corrugated fluted steel deck 9¹/₄" x 16 MSG proprietary steel joist CEMCO Sure-Span spaced at 24" o.c. resilient metal channels spaced 12" o.c. 3¹/₂" glass fiber insulation 1 layer of ⁵/₈" gypsum board on ceiling side 	2 h		

Source	Description	Fire Resistance Rating	Sound Transmission Class	Impact Insulation Class	
UL G597 BXUV7	 floor topping mixture with 3000 psi comp. strength, 1" min. for two hours and 1½" min. for one hour when used with Acousti-Mat SD ⁹/₁₆" min. deep, 22 MSG corrugated fluted steel deck 9¼" x 16 MSG proprietary steel joist (Marino\WARE Type JR JoistRite) spaced at 24" o.c. resilient metal channels spaced 12" o.c. 3 ½" glass fiber batt insulation 1 layer of 5%" gypsum board on ceiling side 	Rating Class Class			
UL L524 a) USG760105 b) USG760106 d) USG760405 BXUV7	 Steel Beam – W8x15 min. size subfloor of ¹⁹/₃₂" plywood 7" x 18 MSG steel joist spaced at 24" o.c. 2 layers of ¹/₂" gypsum board on ceiling side a) Based on 9¹/₂" 16 gauge steel joists b) Based on 9¹/₂" 16 gauge steel joists and 3" mineral wool batt c) Based on 9¹/₂" 16 gauge steel joists and carpet pad d) Based on 9¹/₂" 16 gauge steel joists and carpet pad d) Based on 9¹/₂" 16 gauge steel joists and carpet pad d) Based on 9¹/₂" 16 gauge steel joists and carpet pad 		A		

		Fire	Sound	Impact
Source	Description	Resistance	Transmission	n Insulation
		Rating	Class	Class
UL L527 a) USG771101 b) SA781110 BXUV7	 subfloor of ³/₄" plywood 9 ³/₈" x 16 MSG steel joist spaced at 24" o.c. 24 ga metal resilient channels spaced 16" o.c. 2 layers of ⁵/₈" gypsum board on ceiling side 			
		1-½ h	48 ^a	<40*
UL L543 BXUV7	 subfloor of ²³/₃₂" plywood 8" x 18 MSG steel joist spaced at 19" o.c. 3 ¹/₂" x 18 MSG ceiling steel joists spaced at 16" o.c. 3 ¹/₂" mineral wool insulation 2 layers of ¹/₂" gypsum board on ceiling side 		51 ^b (CAR-UND)	70* (CAR-UND)
1.11		1 N	> 60*	> 50*
UL L549 BXUV7	 2 layer flooring system (9 types) proprietary pre-fabricated light gauge steel truss system, Ultra-Span by Aegis Metal Framing, spaced at 48" o.c. resilient or furring channels spaced 16" o.c. any thickness mineral wool or glass fiber insulation, optional 1 layer of 5%" gypsum board on ceiling side 	1 h		

Source	Description	Fire Resistance Rating	Sound Transmission Class	Impact Insulation Class
UL L551 BXUV7	 2 layer flooring system (9 types) proprietary pre-fabricated light gauge steel truss system, TrusSteel by TrusSteel, Division of ITW Building Components Inc., spaced at 48" o.c. resilient or furring channels spaced 16" o.c. any thickness mineral wool or glass fiber insulation, optional 1 layer of 5/8" gypsum board on ceiling side 			
UL L552 BXUV7	 2 layer flooring system (9 types) proprietary pre-fabricated light gauge steel truss system, Amkey System by Allied Studco, spaced at 48" o.c. resilient channels spaced 16" o.c. any thickness mineral wool or glass fiber insulation, optional 1 layer of 5/8" gypsum board on ceiling side 	1 h		
UL L556 a) NGC5004021 b) NGC7004068 c) NGC7004069 BXUV7	 subfloor of ³/₄" plywood 8" x 18 MSG steel joist spaced at 24" o.c. 4 layers of ⁵/₈" Type X gypsum board on ceiling side resilient metal channels spaced 24" o.c. and applied perpendicular to joists over third layer of gypsum board 	2 h		37 ^b 60 ^c (CAR-UND)

Source	Description	Fire Resistance	Sound Transmission	Impact Insulation
UL L559 BXUV7	 2 layer flooring system (9 types) proprietary pre-fabricated light gauge steel truss system, Strong-Span by Hexaport International Ltd., spaced at 48" o.c. resilient or furring channels spaced 16" o.c. any thickness mineral wool or glass fiber insulation, optional 1 layer of ⁵/₈" gypsum board on ceiling side 	Rating	Class	Class
UL L560 BXUV7	 2 layer flooring system (10 types) proprietary pre-fabricated light gauge steel truss system, Nutruss/Nutruss 3.0 by Nucor Building Systems, spaced at 48" o.c. resilient or furring channels spaced 16" o.c. any thickness mineral wool or glass fiber insulation, optional 1 layer of ⁵/₈" gypsum board on ceiling side 	1 h		
UL L564 BXUV7	 subfloor of ³/₄" cement-fiber unit 9¹/₄" x 16 MSG proprietary steel joist (ClarkDietrich) spaced at 24" o.c. resilient metal channels spaced 12" o.c. 3⁵/₈" mineral wool or glass fiber batt insulation 1 layer of ⁵/₈" gypsum board on ceiling side 	1 h	<u></u>	

		Fire	Sound	Impact
Source	Description	Resistance	Transmission	Insulation
		Rating	Class	Class
UL L565 BXUV7	 2 layer flooring system (6 types) trusses spaced a max. 48" o.c. proprietary pre-fabricated light gauge steel truss systems, 1. Ultra-Span by Aegis Metal Framing 2. Amkey System by Allied Studco 3. Strong Span by Hexaport International Ltd. 4. Truss by Steel Construction Systems Inc. 5. TrusSteel by TrusSteel, Division of ITW Building Components Inc. resilient or furring channels spaced 16" o.c. any thickness mineral wool or glass fiber insulation, optional 1 layer of ⁵/₈" gypsum board on ceiling side 	1 h		
UL L567 BXUV7	 subfloor of ³/₄" plywood 10" x 16 MSG proprietary "Type JR JoistRite" steel joist (Marino\WARE) spaced at 16" o.c. resilient metal channels spaced 16" o.c. 4" mineral wool or glass fiber insulation friction-fit to underside of plywood 2 layers of ¹/₂" gypsum board on ceiling side * 77% load restriction 			
		* 1 h	-	-

Source	Description	Fire Resistance Rating	Sound Transmission Class	Impact Insulation Class
UL L568 BXUV7	 subfloor of ⁵/₈" plywood and finish floor of ⁵/₈" wood structural panels 8" x 18 MSG steel joist spaced at 16" o.c. resilient metal channels spaced 16" o.c. 3 ¹/₂" mineral wool batt insulation 1 layer of ⁵/₈" gypsum board on ceiling side 			
	a subfloor of 3/" physicad	45 min	53*	46*
	 Subiloof of ⁷/₄ plywood 8" x 18 MSG steel joist spaced at 24" o.c. resilient metal channels spaced 24" o.c. 3 ¹/₂" glass fiber batt insulation 2 layers of ¹/₂" gypsum board on ceiling side 	45 min	<u>52*</u>	45*
	 subfloor of ³/₄" plywood 			
	 8" x 18 MSG steel joist spaced at 24" o.c. 2 layers of ½" gypsum board on ceiling side 			
		45 min	<40*	<40*
	 8" x 18 MSG steel joist spaced at 16" o.c. 2 layers of ½" gypsum board on ceiling side 			
		1 h	<40*	<40*

Source	Description	Fire Resistance Rating	Sound Transmission Class	Impact Insulation Class
UL L573 BXUV7	 subfloor of ¾" plywood 9 ¾" x 16 MSG steel joist spaced at 24" o.c. furring channels spaced 16" o.c. 2 layers of ⅛" gypsum board on ceiling side 			
UL L580 BXUV7	 subfloor of ³/₄" plywood 10" x 16 MSG proprietary steel joist (Marino\WARE) spaced at 16" o.c. resilient metal channels spaced 16" o.c. 4" mineral wool insulation friction-fit to underside of plywood 2 layers of ¹/₂" gypsum board on ceiling side * 70% load restriction 	1 h	-	

Source	Description	Fire	Sound	Impact
		Resistance	Transmission	Insulation
		Rating	Class	Class
UL M511 BXUV7	 subfloor of ³/₄" plywood or OSB with optional min. ³/₄" floor topping mixture (System A). In lieu of plywood or OSB subfloor, ⁷/₈" min. deep, 22 GA corrugated steel deck with min. 1⁷/₈" normal weight concrete (System C) min. 10" deep proprietary steel joist, TOTALJOIST[®] by iSPAN Systems LP and spaced at 24" o.c. resilient metal channels spaced 12" o.c. 3" mineral wool batt insulation 1 layer of ⁵/₈" gypsum board on ceiling side 		<u> </u>	
		1 h	50 to 63*	38 to 72*
UL M515 BXUV7	 subfloor of ³/₄" plywood, OSB or structural cement-fiber units designated "Armoroc Panel" with optional min. ³/₄" floor topping mixture min. 7.5" deep proprietary steel joist, TOTALJOIST[®] by iSPAN Systems LP and spaced at 24" o.c. resilient metal channels spaced 12" o.c. 31/₂" thick glass fibre batt insulation 1 layer of ⁵/₈" gypsum board on ceiling side 	1 h	<u></u>	43*

* STC and IIC ratings based on 10" deep joists and deeper. A range of STC and IIC ratings available depending on system type and finished floor type, contact iSPAN Systems LP for more information.

Source	Description	Fire Resistance Rating	Sound Transmission Class	Impact Insulation Class
GA FC 1141	 1³/₈" concrete 30 gage steel deck with ⁵/₈" deep corrugations 8" x 18 gage steel joist spaced at 16" o.c. resilient furring channels spaced 16" o.c. 2 layers of ¹/₂" Type X gypsum board on ceiling side 	1 h		
GA FC 1142	 1³/₈" concrete 30 gage steel deck with ⁵/₈ deep corrugations 8" x 18 gage steel spaced at 16" o.c. resilient furring channels spaced 16" o.c. 3¹/₂" thick glass fiber insulation 2 layers of ¹/₂" Type X gypsum board on ceiling side 	1 h	<u>INNN</u>	
GA FC 1143	 1³/₈" concrete 30 gage steel deck with ⁵/₈ deep corrugations 8 x 18 gage steel spaced at 16" o.c. resilient furring channels spaced 16" o.c. 3¹/₂" thick glass fiber or rock fiber insulation 2 layers of ¹/₂" Type X gypsum board on ceiling side 	1 h	<u>INNN</u>	
GA FC 1144	 1³/₈" concrete 30 gage steel deck with ⁵/₈ deep corrugations 8" x 18 gage steel spaced at 24" o.c. 2 layers of ¹/₂" Type X gypsum board on ceiling side 	1 h	<u></u>	

Source	Description	Fire Resistance	Sound Transmission	Impact Insulation
GA FC 1145	 2" lightweight concrete measured from top of flute 25 gage corrugated steel deck 6" x 15%" x 18 gage steel joist spaced at 24" o.c. resilient furring channels spaced at 24" o.c. 1 layer of ½" Type X gypsum board on ceiling side 	Rating	Class	Class
GA FC 2116	 2 ¹/₂" concrete 6" by 6" welded wire mesh No. 10 SWG steel wire 28 gage corrugated steel deck 7 ¹/₄" x 18 gage steel joist spaced at 24" o.c. 2 layers of ⁵/₈" Type X gypsum board on ceiling side 	2 h	-	
GA FC 4340 NRCC B-3163.2	 subfloor of ⁵/₈" plywood 8" x 18 gage steel joist spaced at 16" o.c. resilient furring channels spaced 16" o.c. 3¹/₂" thick glass fiber insulation 2 layers of ¹/₂" Type X gypsum board on ceiling side NOTE: STC tested with ¹/₄" carpet applied over ³/₈" foam pad 	1 h 50	to 54 (car-und)	69 (CAR-UND)

GA • subfloor of %" plywood • Rating Class C	Source	Description	Fire Resistance	Sound Transmission	Impact Insulation
GA • subfloor of ½" plywood FC 4490 • subfloor of ½" plywood • unspecified channel shaped steel joist spaced at 24" o.c. • 2 layers of %" Type X gypsum board on ceiling side NOTE: As per GA-600-2012 ceiling provides one hour fire resistance protection for framing. 1 h 35 to 39 GA • subfloor of %" plywood 1 h 35 to 39 FC 4502 • subfloor of %" plywood 7" x 18 gage steel joist spaced at 24" o.c. 1 h 35 to 39 GA • subfloor of %" plywood • 7" x 18 gage steel joist spaced at 24" o.c. 1 h 35 to 39 GA • subfloor of %" plywood • 7" x 16 gage steel joist spaced at 24" o.c. 1 h <50*	GA FC 4370 NRCC B-3163.1	 subfloor of ⁵/₈" plywood 8" x 18 gage steel joist spaced at 16" o.c. resilient furring channels spaced 16" o.c. 3¹/₂" thick glass fibre insulation 2 layers of ¹/₂" Type X gypsum board on ceiling side 			
GA • subfloor of 5%" plywood FC 4502 • 7" x 18 gage steel joist spaced at 24" o.c. • 2 layers of ½" Type X gypsum board on ceiling side GA GA FC 4503 • subfloor of 3/4" plywood • subfloor of 3/4" plywood • 6" x 16 gage steel joist spaced at 24" o.c. • 2 layers of ½" Type X gypsum board on ceiling side	GA FC 4490	 subfloor of ½" plywood unspecified channel shaped steel joist spaced at 24" o.c. 2 layers of 5⁄8" Type X gypsum board on ceiling side NOTE: As per GA-600-2012 ceiling provides one hour fire resistance protection for framing. 	1 h	45 to 49 35 to 39	39
GA • subfloor of ¾" plywood FC 4503 • 6" x 16 gage steel joist spaced at 24" o.c. • 2 layers of ½" Type X gypsum board on ceiling side	GA FC 4502	 subfloor of ⁵/₈" plywood 7" x 18 gage steel joist spaced at 24" o.c. 2 layers of ¹/₂" Type X gypsum board on ceiling side 	1 h	<50*	<40*
	GA FC 4503	 subfloor of ³/₄" plywood 6" x 16 gage steel joist spaced at 24" o.c. 2 layers of ¹/₂" Type X gypsum board on ceiling side 			

		Fire	Sound	Impact
Source	Description	Resistance	Transmission	Insulation
		Rating	Class	Class
GA FC 4504	 subfloor of ⁵/₈" plywood 8" x 18 gage steel joist spaced at 16" o.c. 2 layers of ¹/₂" Type X gypsum board on ceiling side 	1 h		
GA FC 4515	 2 layer flooring system (6 types) trusses spaced a max. 48" o.c. proprietary pre-fabricated light gauge steel truss systems, Ultra-Span by Aegis Metal Framing Amkey System by Allied Studco Strong Span by Hexaport International Ltd. Truss by Steel Construction Systems Inc. TrusSteel by TrusSteel, Division of ITW Building Components Inc. resilient channels spaced 12" o.c. optional mineral wool or glass fiber insulation 1 layer of 5/s" Type X gypsum board on ceiling side 			
		1 h	-	-

bfloor of ¾" plywood x 16 gage steel joist aced at 24" o c			
ayers of 5%" Type X gypsum ard on ceiling side silient metal channels aced 24" o.c. and applied rpendicular to joists over rd layer of gypsum board			
	2 h	48 ^a	37 ^b
a a a r	ayers of 5%" Type X gypsum ard on ceiling side silient metal channels aced 24" o.c. and applied rpendicular to joists over rd layer of gypsum board	ayers of 5%" Type X gypsum ard on ceiling side silient metal channels aced 24" o.c. and applied rpendicular to joists over rd layer of gypsum board 2 h	ayers of 5/8" Type X gypsum ard on ceiling side silient metal channels aced 24" o.c. and applied rpendicular to joists over rd layer of gypsum board 2 h 48 ^a

		Fire	Sound	Impact
Source	Description	Resistance	Transmission	Insulation
		Rating	Class	Class
FM FC 179	 2 1⁄2" concrete 6" by 6" welded wire mesh No. 10 SWG steel wire 28 ga. (0.016" thick) steel deck with ⁹/₁₆" deep corrugations 9 1⁄2" x 14 ga. (0.0785" thick) steel joist spaced at 24" o.c. 1 layer of 5⁄8" gypsum board on ceiling side 		adina mangana kana ang kana an	
		IN	-	-
FC 184	 subfloor of ¾ plywood 7 ¼ x 18 ga. (0.050" thick) steel joist spaced at 24" o.c. 1 layer of ⅛ gypsum board on ceiling side 			
		45 min	<50*	<40*
FM FC 196	 subfloor of ³/₄" plywood 7 ¹/₄" x 18 ga. (0.052" thick) steel joist spaced at 24" o.c. 2 layers of ¹/₂" gypsum board on ceiling side 	1 h	<50*	<40*
		In	<00	<40*
FC 218	 1 ½ Lite-Crete foam concrete 28 ga. (0.016" thick) steel deck with ⁹/₁₆" deep corrugations 7 ¼" x 18 ga. (0.053" thick) steel joist spaced at 24" o.c. 1 layer of ⁵/₈" gypsum board on ceiling side 	1 h	<50*	<40*
		1 11	V 00	<u>\40</u>

Floor/Ceiling – Factory Mutual Research

FM • 2 ½" concrete FC 224 • 6" by 6" welded wire mesh No. 10 SWG steel wire • 28 ga. (0.016" thick) steel deck with ⁹ / ₁₆ " deep corrugations • 7 ¼" x 18 ga. (0.052" thick) steel joist spaced at 24" o.c. • 2 layers of 5%" Type X gypsum board on ceiling side FM FC 245 • 2" lightweight concrete measured from top of the steel deck • 24 ga. (0.026" thick) steel deck • 24 ga. (0.026" thick) steel deck • 24 ga. (0.026" thick) steel joist spaced at 24" o.c. • Resilient furring channels spaced at 24" o.c. • 1 layer of ½" gypsum board on ceiling side	Source		Description	Fire Resistance Rating	Sound Transmission Class	Impact Insulation Class
FM • 2" lightweight concrete measured from top of the steel deck • 24 ga. (0.026" thick) steel deck with 1 5/16" deep corrugations • 6" x 18 ga. (0.05" thick) steel joist spaced at 24" o.c. • Resilient furring channels spaced at 24" o.c. • 1 layer of ½" gypsum board on ceiling side • 1 h • 1 h	FM FC 224	• • •	2 $\frac{1}{2}$ " concrete 6" by 6" welded wire mesh No. 10 SWG steel wire 28 ga. (0.016" thick) steel deck with $\frac{9}{16}$ " deep corrugations 7 $\frac{1}{4}$ " x 18 ga. (0.052" thick) steel joist spaced at 24" o.c. 2 layers of $\frac{5}{8}$ " Type X gypsum board on ceiling side			
 FM 2 lightweight concrete measured from top of the steel deck 24 ga. (0.026" thick) steel deck with 1 ⁵/₁₆" deep corrugations 6" x 18 ga. (0.05" thick) steel joist spaced at 24" o.c. Resilient furring channels spaced at 24" o.c. 1 layer of ½" gypsum board on ceiling side 			O" light up ight opporte recommed	2 h	50*	<40*
 Verify an (0.020° thick) steel deck with 1 ⁵/₁₆" deep corrugations 6" x 18 ga. (0.05" thick) steel joist spaced at 24" o.c. Resilient furring channels spaced at 24" o.c. 1 layer of ½" gypsum board on ceiling side 	FM FC 245	•	2" lightweight concrete measured from top of the steel deck 24 ga (0.026" thick) steel deck			
		•	with 1 ${}^{5}/{}_{16}{}^{"}$ deep corrugations 6" x 18 ga. (0.05" thick) steel joist spaced at 24" o.c. Resilient furring channels spaced at 24" o.c. 1 layer of ${}^{1}\!\!/_{2}{}^{"}$ gypsum board on ceiling side			

Floor/Ceiling – Intertek Testing Services NA Inc.

Source	Description	Fire Resistance Rating	Sound Transmission Class	Impact Insulation Class
ITS SGL/SFD 90-01 120-01	 min. 2½" concrete topping for 1½ h and min. 3½" concrete topping for 2 h with 4350 psi comp. strength 6" x 6" x 6 GA reinforcing mesh steel steel reinforcing bar 1½" from bottom of trough using support chairs. Size and load as per Steelform's Load Tables. proprietary 0.0394" or 0.0492" steel panels, 8" deep, UltraBond Composite Floor System by Steelform Group Ltd. 	1½ h 2 h	-	

NON-LOAD BEARING WALL ASSEMBLIES

Source	Description	Fire Resistance Rating	Sound Transmission Class	
ULC U202	 paper backed wire fabric 38 mm x 38 mm x 5 mm thick steel channel spaced at 600 mm o.c. clips vermiculite concrete 	4 h		
ULC U406 RAL-TL69-42	 64 mm x 33 mm x 0.5 mm thick steel studs spaced at 600 mm o.c. 38 mm mineral wool insulation 1 layer 12.7 mm gypsum board each side 			
ULC U412	 min. 152 mm proprietary steel studs, TOTALSTUD[®] by iSPAN Systems LP with min. 20 ga. material thickness and spaced at 610 mm o.c. and optional rectangular or square Hollow Structural Sections optional glass fiber or mineral wool insulation optional resilient metal channels spaced 610 mm o.c. 2 layers of 15.9 mm gypsum board on each side 	TH Th		
ULC U414	 92 mm x 41 mm x 0.83 mm thick proprietary steel studs (Bailey Metal Products Ltd.) spaced 610 mm o.c. optional glass fiber or mineral wool insulation optional resilient metal channels spaced 610 mm o.c. for exterior walls 12.7 mm and 15.9 mm gypsum sheathing interior gypsum board layers, thickness, and corresponding rating as shown 	INTERIE #Layer & Size 3 ³ / ₄ h 1-15.9 1 h 2-12.7 1 ¹ / ₂ h 2-15.9 2 h 3-12.7 2 h 2-19	IR SIDE	

Source	Description	Fire Resistance	Sound Transmission
ULC U420	 92 mm proprietary steel studs (Bailey Metal Products Ltd.) spaced 610 mm o.c. 1 layer of 15.9 mm gypsum board on each side 	1 h	
ULC W400	 64 mm x 35 mm x 0.5 mm thick steel studs spaced not less than 150 mm o.c. inner layer 6.4 mm gypsum board each side laminating compound outer layer 12.7 mm gypsum board on each side 	<u> </u>	
ULC W402	 64 mm x 35 mm x 0.5 mm thick steel studs spaced not less than 150 mm o.c. inner layer 9.5 mm gypsum board each side laminating compound outer layer 12.7 mm or 15.9 mm gypsum board on each side 	 1 h	<45* (G 12 7mm)
ULC W404 RAL-TL75-73	 64 mm x 35 mm x 0.5 mm thick steel studs spaced not less than 150 mm o.c. inner layer 12.7 mm or 15.9 mm gypsum board each side optional adhesive outer layer 15.9 mm gypsum board on each side 	2 h	47 (G 15.9mm)
ULC W406 a) CK654-40 b) USG800502 c) SA860932	 64 mm x 32 mm x 0.5 mm thick steel studs spaced 600 mm o.c. optional 38 mm mineral wool insulation 2 layers 12.7 mm gypsum board each side laminating adhesive between inner and outer layer 	2 h	54 ^a (RFB 40mm) 53 ^b (RFB 40mm) 52 ^c (RFB 40mm)

Source	Description	Fire Resistance Rating	Sound Transmission Class
ULC W407 RAL-TL92-239	 92 mm x 35 mm x 0.5 mm thick steel studs spaced 600 mm o.c. 1 layer of 15.9 mm gypsum board on each side 		
ULC W408 RAL-TL69-42	 64 mm x 35 mm x 0.5 mm thick steel studs spaced 600 mm o.c. 38 mm mineral wool insulation 1 layer of 12.7 mm gypsum board on each side 		
ULC W409	 63 mm x 31 mm x 0.6 mm thick steel studs spaced 600 mm o.c. 70 mm glass fibre insulation 1 layer of 15.9 mm gypsum board on each side 		
	** 45 min rating without insulation	1 h ** 45 min	49*
ULC W410	 41 mm x 32 mm x 0.5 mm thick steel studs spaced 600 mm o.c. inner layer of 9.5 mm gypsum board on each side outer layer of 12.7mm or 15.9 mm gypsum board on each side 	 1 h	27* (G 12.7mm) 29* (G 15.9mm)
ULC W412 a) RAL-TL69-42 b) USG 800506	 64 mm x 35 mm x 0.5 mm thick steel studs spaced 600 mm o.c. 38 mm mineral wool insulation 1 layer of 12.7 mm or 15.9 mm gypsum board on each side 	<u> </u>	<u>45^a (G 12.7mm)</u>

Source	Description	Fire Sound Resistance Transmissio Rating Class	
ULC W413	 64 mm x 35 mm x 0.5 mm thick steel studs spaced 600 mm o.c. 70 mm glass fibre insulation 1 layer of 12.7 mm gypsum board on each side 	<u>100</u> 45 min 47*	
ULC W414	 63 mm x 31 mm x 0.6 mm thick steel channel spaced 600 mm o.c. 2 layers 12.7 mm or 15.9 mm gypsum board each side outer layer laminated to inner layer with laminating compound 	<u> </u>	44* (G 12.7mm) 47* (G 15.9mm)
ULC W415 NRC TL-92-376	 92 mm x 35 mm x 0.5 mm thick steel studs spaced 600 mm o.c. 1 layer of 15.9 mm gypsum board on each side 		
ULC W417 a) SA 830113 b) SA 830112	 41 mm x 31 mm x 0.5 mm thick steel studs spaced 600 mm o.c. optional 38 mm mineral wool insulation 4 hours - 4 layers of 12.7 mm gypsum board on each side 3 hours – 3 layers of 12.7 mm gypsum board on each side 	1 h 38	
ULC W418	 41 mm x 32 mm x 0.53 mm thick steel studs spaced 600 mm o.c. 4 hours - 4 layers of 12.7 mm or 15.9 mm gypsum board on each side 3 hours – 3 layers of 12.7 mm or 15.9 mm gypsum board on each side 	C 3 h 4 h	50* (G 12.7mm) 46* (G 12.7mm)

Source	Description	Fire Resistance Rating	Sound Transmission Class
ULC W419	 92 mm x 32 mm x 0.5 mm thick steel studs spaced 400 mm o.c. 90 mm mineral wool insulation inner layer of 12.7 mm tile backer board each side outer layer of 5.2 mm ceramic tile each side, joints filled with wall grout 		
ULC W421	 38 mm x 40 mm x 0.6 mm channel studs spaced 1220 mm o.c. 1 layer 38 mm thick x 1.22 m wide mineral and fibre board each side 38 mm thick x 101.6 mm wide mineral and fibre board backing strips 	2 h	
ULC W423	 92 mm x 32 mm x 0.5 mm thick steel studs spaced 400 mm o.c. 90 mm mineral wool insulation inner layer of 12.7 mm tile backer board on one side, designated "Durock" outer layer of 5.2 mm ceramic tile, joints filled with wall grout 1 layer of 12.7 mm or 15.9 mm gypsum board on one side. 	<u>) () () () () () () () () () () () () ()</u>	51* (G 12.7mm) 52* (G 15.9mm)

Source	Description	Fire Resistance Rating	Sound Transmission Class
ULC W425	 92 mm x 35 mm x 0.9 mm thick steel studs spaced 305 mm o.c. 90 mm glass fibre insulation 38 mm x 12.7 mm x 1.2 mm thick channel bracing inserted in the knockouts and supported by angles 0.05 mm clear polyethylene 2 layers of 12.7 mm gypsum board on one side see ULC description for exterior insulation and stucco finish 		
	details	2 h	-
ULC W433 RAL-TL69-42	 64 mm x 35 mm x 0.5 mm thick steel studs spaced 600 mm o.c. 38 mm mineral wool insulation designated "Acoustical Fire Batts" 1 layer of 12.7 mm gypsum 	nnnnnnn	ากกฎกกุกกุกกุ
	board on each side	1 h	45
ULC W436	 Wall A – 90 mm x 35 mm x 0.62 mm thick steel studs spaced at 600 mm o.c. 76 mm mineral wool insulation 1 layer of 12.7 mm or 15.9 mm gypsum board on one side 1 layer of 12.7 mm reinforced cement board, designated "Perma Base" on each side 	Wall Const Wall Const	truction B truction A (Wall A, G 12.7mm)

Source	Description	Fire Resistance Rating	Sound Transmission Class
ULC W437	 Wall A – 90 mm x 35 mm x 0.62 mm thick steel studs spaced at 600 mm o.c. 76 mm mineral wool insulation 1 layer of 12.7 mm or 15.9 mm gypsum board on each side 1 layer of 12.7 mm reinforced cement board, designated "Perma Base" on one side 	<u>1 h</u>	Vall Construction B Vall Construction A Vall Construction A 52* (Wall A, G 12.7mm) 54* (Wall A, G 15.9mm)
ULC W438	 Wall A – 90 mm x 32 mm x 0.62 mm thick steel studs spaced at 600 mm o.c. 76 mm mineral wool insulation 1 layer of 15.9 mm gypsum board on one side 1 layer of 12.7 mm reinforced cement board, designated "Perma Base" on other side 		All Construction B
ULC W439	 Wall A – 90 mm x 32 mm x 0.62 mm thick steel studs spaced at 600 mm o.c. 89 mm mineral wool insulation 1 layer of 12.7 mm or 15.9 mm gypsum board on each side 1 layer of 12.7 mm reinforced cement board, designated "Perma Base" on each side 	2 h	Vall Construction A 55* (Wall A, G 12.7mm) 56* (Wall A, G 15.9mm)
ULC W440 USG910617	 89 mm x 32 mm x 0.5 mm thick steel studs spaced at 610 mm o.c. 76 mm mineral wool insulation 1 layer of 19.1 mm gypsum board on each side 	<u>100</u> 2 h	<u>1000000000000000000000000000000000000</u>

Source	Description	Fire Resistance Pating	Sound Transmission	
ULC W441 a) SA910507 b) USG910907	 64 mm x 32 mm x 0.5 mm thick steel studs spaced at 610 mm o.c. 50 mm mineral wool insulation 2 layers of 19.1 mm gypsum board on each side 	Kating Class 1000000000000000000000000000000000000		
ULC W442	 92 mm x 40 mm x 1.13 mm thick steel studs spaced at 400 mm o.c. 75 mm mineral fiber insulation 12.7 mm gypsum board on interior side 15.9 mm gypsum board on exterior side 50 mm polystyrene rigid insulation boards mechanical fastener system with 4 mm dia. x 100 mm long 			
	** Fire exposure from exterior side*** Fire exposure from interior side	1 h ** 1-½ h ***	-	
ULC W447	 92 mm x 32 mm x 0.53 mm thick steel studs spaced at 610 mm o.c. mineral wool insulation 1 layer of 15.9 mm gypsum board on each side 	<u>1 h</u>	<u>MMM</u>	
UL W448	 93 mm x 33 mm x 0.5 mm thick steel studs spaced at 406 mm o.c. nom. 76 mm mineral wool batts, min. 54 kg/m³, friction fit inner layer 12.7 mm mineral and fiber board designated made by Homasote Co. on each side outer layer 15.9 mm gypsum board on each side 	1 h		

Source	Description	Fir Resist Rat	re tance ing		Sound Transmission Class
ULC W451	 89 mm x 32 mm x 0.46 mm thick steel studs spaced at 610 mm o.c. optional mineral fiber insulation produced from rock, slag or glass 1 layer of 15.9 mm gypsum board on one side 3 layers of 15.9 mm gypsum board on other side 				
		2	h		-
ULC W453 a) SA870717 b) SA860620 c) RAL-TL90-166 d) USG860808 e) USG910617	 min. 0.46mm thick steel studs spaced at 610 mm o.c. mineral wool insulation optional except where required as noted by asterisk and described below 				
g) SA830112 g) SA830113	 stud depth, drywall layers, drywall thickness and 		# Layer	Stud Depth	
h) USG910907	corresponding rating as shown	1 h	1-15.9	89	49ª (RFB 76) 51 ^{b&c} (RFB 89) 40 ^d (NI)
	* 38 mm mineral wool	1 h	1-12.7	64*	
	insulation	1 h	1-19.1	41	
	** 76 mm mineral wool	2 N 2 h	2-12.7	41 11	
	insulation	2 h	1-19.1	4 1 89**	50 ^e
	*** 51 mm mineral wool	3 h	3-12.7	41	59 ^f (RFB 38)
	Insulation	3 h	2-19.1	41	
		3 h	3-15.9	41	
		4 N 4 h	4-15.9	41 41	629 (RFB 38)
		4 h	2-19.1	64***	56 ^h

		Fire	Sound
Source	Description	Resistance	Transmission
		Rating	Class
ULC W456	 92 mm x 40 mm x 0.92 mm thick steel studs spaced at 406 mm o.c. inner 2 layers of 15.9 mm Type X gypsum board 1 layer of 15.9 mm gypsum board on other side 150 mm max. thick polystyrene insulation boards components in exterior wall insulation and finish system by Durabond Products Ltd. 	2 h	
ULC W457	 102 mm x 63.5 mm x 1.802 mm thick steel studs spaced at 600 mm o.c. inner layer of 25 mm mineral and fibre board on each side outer layer of 9.5 mm steel skin cementitious panels designated "Durasteel" 	4 h	
ULC W458	 92 mm x 32 mm x 0.838 mm thick steel studs spaced at 600 mm o.c. optional mineral wool or glass fibre insulation 1 layer of 15.9 mm gypsum board on each side non-metallic plumbing system components attached to steel lumber bracing 	1 h	-
Source	Description	Fire Resistance Rating	Sound Transmission Class
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ULC W459	 89 mm x 38 mm x 0.56 mm steel stud spaced as follows: Configuration A: 406 mm or 610 mm o.c. 89 mm glass fiber insulation with nom. density of 15 kg/m³ 1 layer of 15.9 mm "QuietRock" soundproof drywall on each side 	Rating Class Vall Configuration A Vall Configuration A Vall Configuration B	
ULC W460 RAL TL07-069	 89 mm x 30 mm x 0.37 mm proprietary steel stud (ClarkDietrich) spaced as follows: Configuration A: 406 mm or 610 mm o.c. 89 mm glass fiber insulation with nom. density of 15 kg/m³ 1 layer of 15.9 mm "QuietRock" soundproof drywall on each side 	1 h	- guration A UNUE guration B UNUE guration C 55 (Configuration A)

Source	Description	Fire Resistance Rating	Sound Transmission Class
ULC W461	 63.5 mm x 41 mm x 1.802 mm thick steel studs spaced at 600 mm o.c. inner layer of 15 mm mineral and fibre board on each side outer layer of 6.4 mm steel skin cementitious panels designated "Durasteel" for 1½ hours outer layer of 9.5 mm steel skin cementitious panels designated "Durasteel" for 2 hours 	ищини и и и и и и и Г 1½ h 2 h	
ULC W462	 89 mm x 38 mm x 0.53 mm thick steel studs spaced at 610 mm o.c. glass fibre insulation 1 layer of 15.9 mm gypsum board on one side 1 layer of 12 mm mineral and fibre board and 15.9 mm gypsum board on other side 	1 h	MMM IN
ULC W464	 92 mm x 32 mm x 0.455 mm thick steel studs spaced at 406 mm o.c. 75 mm mineral wool insulation 1 hour – 1 layer of 15.9 mm gypsum board on one side and 12.7 mm, 15.9 mm, 19.1 mm or 25.4 mm mineral and fibre board on other side 2 hour – 2 layers of 15.9 mm gypsum board on one side and 1 layer of 15.9 mm gypsum board with 12.7 mm, 15.9 mm, 19.1 mm or 25.4 mm mineral and fibre board on other side 	1 h Conf 2 h Conf 1 h 2 h Conf	igura tion

		Fire	Sound
Source	Description	Resistance	Transmission
		Rating	Class
ULC	• 63.5 mm x 32 mm x 0.505 mm		
VV405	thick steel studs spaced at 610		
	minoral wool insulation		
	 2 lavers 15.9 mm gypsum board 	000000000000000000000000000000000000000	100000000000000000000000000000000000000
	on each side		
		2 h	_
ULC	• 63 mm x 31 mm x 0.6 mm thick	2 11	_
W467	steel studs spaced at 600 mm		
	O.C.		
	65 mm mineral wool insulation		
	 1 layer 12.7 mm gypsum board)00 01 000000000000000000000000000000000	000000000000000000000000000000000000000
	on each side		
		1 h	-
ULC	• 63 mm x 31 mm x 0.6 mm thick		
VV468	steel studs spaced at 600 mm		
	0.C. 2 layers 12 7 mm or 15 0 mm		
	avpsum board on each side		
	gypourn bourd off outon blad		
		2 h	-
	• 92 mm x 35 mm x 0.5 mm thick		
VV409			
	 1 laver 15 9 mm gypsum board 		
	on each side		
		1 h	-
	• 41 mm x 31 mm x 0.5 mm thick		
VV470	optional 38 mm mineral wool		
	insulation		
	 4 hours - 4 layers of 12.7 mm 		
	gypsum board on each side		
	• 3 hours – 3 layers of 12.7 mm	<u>ე ს</u>	
	gypsum board on each side	ی 1 ک	-

Source	Description	Fire Resistance	Sound Transmission
ULC W471	 89 mm x 38 mm x 0.48 mm thick steel studs spaced at 406 mm or 610 mm o.c. 76 mm mineral wool insulation 15.9 mm gypsum board on each side 		
ULC W472	 89 mm x 38 mm x 0.48 mm thick steel studs spaced at 406 mm or 610 mm o.c. 76 mm mineral wool insulation 2 layers 15.9 mm gypsum board on each side 	2 h	
ULC W477 EQ	 63.5 mm x 31.75 mm x 0.627 mm thick steel studs spaced at 610 mm o.c. optional glass fibre or mineral wool insulation optional resilient furring channels spaced 610 mm and 16 mm gypsum board on one side 3 layers 16 mm gypsum board on other side 	2 h	
ULC W478	 92 mm x 0.627 mm thick steel studs spaced at 610 mm o.c. optional glass fibre or mineral wool insulation 16 mm gypsum board on each side 	2 II 	-
ULC W479 EQ	 92 mm x 32 mm x 0.42 mm thick proprietary steel studs, Platinum Plus (Bailey Metal Products Ltd.) spaced at 610 mm o.c. optional glass fibre or mineral wool insulation 1 layer 15.9 mm gypsum board on each side 	 1 h	

		Fire	Sound
Source	Description	Resistance	Transmission
		Rating	Class
ULC W480	 92 mm x 0.381 mm for one hour and 64 mm x 0.381 mm for two hours thick proprietary steel studs (ClarkDietrich) spaced at 610 mm o.c. optional glass fibre or mineral wool insulation 1 hour - 1 layer of 16 mm gypsum board on each side 2 hours – 2 layers of 16 mm gypsum board on each side 	i h Conf 2 h Conf 1 h 2 h	iguration
ULC	• 41.3 mm x 30 mm x 0.63 mm	<u> </u>	
W482	 41.3 min x 30 min x 0.03 min thick steel studs spaced at 610 mm o.c. 2 layers of 16 mm gypsum board on each side 		
		2 h	-
ULC W484	 63.5 mm x 31.75 mm x 0.51 mm thick steel studs spaced at 610 mm o.c. 63 mm glass fibre insulation 1 layer 12.7 mm gypsum board on one side 2 layers 12.7 mm gypsum board on other side 	<u>1 h</u>	-
ULC	• 92 mm x 35 mm x 0.91 mm thick		
W490	 steel studs spaced at 610 mm o.c. mineral wool insulation 12 mm magnesium oxide panels designated as "Magnum Board" on each side 	1 h	-

Source	Description	Fire Resistance Rating	Sound Transmission Class
ULC W496	 92 mm x 38 mm x 22 MSG steel studs spaced at 610 mm o.c. optional glass fibre or mineral wool insulation optional resilient furring channels spaced 610 mm 1/2 hour - 1 layer of 15.9 mm gypsum board on each side 1 hour - 2 layers of 15.9 mm gypsum board on each side 	MINA	MANDA
	gypoan board on oach ciae	½ h 1 h	-
ULC W497	 92 mm x 38 mm x 22 MSG, for 1, 1½ and 2 hour, and 102 mm x 38 mm x 22 MSG, for 3 hour, steel studs spaced at 605 mm o.c. 76 mm mineral wool insulation for 1 and 1½ hour 102 mm mineral wool insulation for 2 and 3 hour 1 hour - 1 layer of 10 mm magnesium oxide panels designated as "Type Dragonboard" on each side 1½ and 2 hour – 1 layer of 14 mm magnesium oxide panels designated as "Type Dragonboard "on each side 3 hour - 1 layer of 14 mm over 75 mm wide strip of 14 mm magnesium oxide panels designated as "Type Dragonboard "on each side 3 hour - 1 layer of 14 mm over 75 mm wide strip of 14 mm magnesium oxide panels designated as "Type Dragonboard" on each side 	1 DR 1-1/2 HR 2 HR CONF 3 HR CONF 1 h 1½ h 2 h 3 h	CONFIGURATION IGURATION IGURATION IGURATION IGURATION IGURATION

Resistance Rating	Transmission
1 mm 610 n poard poard	<u>-</u>
n m x 0.5 aced at nsulation psum bo	in Resistance Rating im x 0.51 mm aced at 610 insulation ipsum board iypsum board ipsum board insulation ipsum board ipsum board

<u>NOTE</u>: ULC Certification Bulletin No. 2003-08 (dated August 21, 2003) provides an official ULC permission for ULC listed and package labelled mineral fibre building insulation (processed from rock, slag and glass only) to be used in ULC non-load bearing wall assembly designs consisting of gypsum wallboard and steel or wood studs with a fire resistance rating not exceeding 2 hours when illustrated without insulation, without detracting from the rating assigned to the assembly.

Source	Description	l Res R	Fire istance ating	Sound Transmission Class
ULC W446 a) Intertek 3123470EEV b) RAL 437362 1976	 System A 64 mm x 38 mm x 0.53 mm thick "I" shaped steel studs spaced at 610 mm o.c. 25.4 mm gypsum board on one side 2 layers of 12.7 mm or 15.9 mm gypsum board on other side optional resilient channels 	Image: Constraint of the system of the sy		* (G 12.7mm) * (G 15.9mm) B 95mm G 15.9mm RC)
	 System B 64 mm x 38 mm x 0.53 mm thick "I" shaped steel studs spaced at 610 mm o.c. inner layer of 25.4 mm gypsum board on one side 1 layer of 12.7 mm or 15.9 mm gypsum board on each side optional resilient channels 			a (GFB/RFB 95mm RC)
	 System C 64 mm x 38 mm x 0.53 mm thick "C-T" or "C-H" shaped steel studs spaced at 610 mm o.c. 1 layer 25.4 mm gypsum board on one side 2 layers of 12.7 mm or 15.9 mm gypsum board on other side optional resilient channels 			B 95mm G 15.9mm RC) FB/RFB 108mm)
	 System D 64 mm x 38 mm x 0.53 mm thick "C-T" or "C-H" shaped steel studs spaced at 610 mm o.c. inner layer of 25.4 mm gypsum board on one side, with 12.7 mm or 15.9 mm gypsum board outer layer 1 layer of 12.7 mm or 15.9 mm gypsum board on other side optional resilient channels 	2 h	50ª (G	FB/RFB 95mm RC)

Source	Description	Fire Resistance Rating	Sound Transmission Class
ULC W446 (cont.) a) Intertek 3123470EEV	 System E 64 mm x 38 mm x 0.53 mm thick "I" shaped steel studs spaced at 610 mm o.c. 1 layer 25.4 mm gypsum board on one side 1 layer of 15.9 mm gypsum board on other side 	1 h	42ª (CEB/PEB 80mm)
	System F	1 11	42° (GFB/RFB 80mm)
	 64 mm x 38 mm x 0.53 mm thick "C-T" or "C-H" shaped steel studs spaced at 610 mm o.c. 1 layer 25.4 mm gypsum board on one side 1 layer of 15.9 mm gypsum board on other side 		
		1 h	42 ^a (GFB/RFB 80mm)
	 System G 64 mm x 38 mm x 0.53 mm thick "I" shaped steel studs spaced at 610 mm o.c. 1 layer 25.4 mm gypsum board on one side 3 layers of 15.9 mm gypsum board on other side 		
	System H	3 11	-
	 64 mm x 38 mm x 0.53 mm thick "C-T" or "C-H" shaped steel studs spaced at 610 mm o.c. 1 layer 25.4 mm gypsum board on one side 3 layers of 15.9 mm gypsum board on other side 	E 3 h	

Source	Description	Fire Resistance Rating	Sound Transmission Class
ULC W446 (cont.)	 System I 64 mm x 38 mm x 0.53 mm thick "I" shaped steel studs spaced at 610 mm o.c. inner layer of 25.4 mm gypsum board on one side, with 15.9 mm gypsum board outer layer 2 layers of 15.9 mm gypsum board on other side 	3 h	
	 System J 64 mm x 38 mm x 0.53 mm thick "C-T" or "C-H" shaped steel studs spaced at 610 mm o.c. inner layer of 25.4 mm gypsum board on one side, with 15.9 mm gypsum board outer layer 2 layers of 15.9 mm gypsum board on other side 	3 h	
ULC W452	 System A 64 mm deep x 0.46 mm thick "C-H" shaped steel studs spaced at 610 mm o.c. 1 layer 25.4 mm gypsum liner board panels on one side 1 layer of 15.9 mm gypsum wallboard on other side 	 1 h	
	 System B 64 mm deep x 0.46 mm thick "C-H" shaped steel studs spaced at 610 mm o.c. 1 layer 25.4 mm gypsum liner board panels on one side 2 layers of 12.7 mm or 15.9 mm gypsum wallboard on other side 	2 h	

Source	Description	Fire Resistance Rating	Sound Transmission Class
ULC W452 (cont.)	 System C 102 mm deep x 0.46 mm thick "C-H" shaped steel studs spaced at 610 mm o.c. 75 mm min. mineral wool batts 1 layer 25.4 mm gypsum liner board panels on one side 1 layer of 19.1 mm gypsum wallboard on other side 	2 h	<u></u>
	 System D 64 mm deep x 0.84 mm thick "C-H" shaped steel studs spaced at 610 mm o.c. 1 layer 25.4 mm gypsum liner board panels on one side 38 mm min. mineral wool batts 1 layer of 15.9 mm gypsum wallboard and 1 layer of 12.7 mm or 15.9 mm mineral and fibre board designated "Durock" on other side 	ຊົດການອາການການການການການການການອີດອີດອີດອີດອີດອີດອີດອີດອີດອີດອີດອີດອີດອ	
	 System E 64 mm deep x 0.46 mm thick "C-H" shaped steel studs spaced at 610 mm o.c. 1 layer 25.4 mm gypsum liner board panels on one side 1 layer of 12.7 mm or 15.9 mm gypsum wallboard on each side 	2 h	
	 System F 64 mm deep x 0.46 mm thick "C-H" shaped steel studs spaced at 610 mm o.c. 1 layer 25.4 mm gypsum liner board panels on one side furring channels spaced at 610 mm o.c. 2 layers of 12.7 mm or 15.9 mm gypsum wallboard on other side 	2 h	

Source	Description	Fire Resistance Rating	Sound Transmission Class
ULC W452 (cont.)	 System G 64 mm deep x 0.46 mm thick "C-H" shaped steel studs spaced at 610 mm o.c. 1 layer 25.4 mm gypsum liner board panels on one side 3 layers of 15.9 mm gypsum wallboard on other side 	E 3 h	
	 System H 64 mm deep x 0.46 mm thick "C-H" shaped steel studs spaced at 610 mm o.c. 1 layer 25.4 mm gypsum liner board panels and 1 layer of 15.9 mm gypsum wallboard on one side 2 layers of 15.9 mm gypsum wallboard on other side 	2 L	
	 System I 64 mm deep x 0.46 mm thick "C-H" shaped steel studs spaced at 610 mm o.c. 1 layer 25.4 mm gypsum liner board panels on one side 4 layers of 19.1 mm gypsum wallboard on other side furring channels spaced at 610 mm o.c. and applied over second layer 	4 h	
ULC W481	 System A 63.5 mm deep x 0.627 mm thick "C-T" or "C-H" shaped steel studs spaced at 610 mm o.c. 1 layer 25 mm gypsum liner board panels on one side 2 layers of 16 mm gypsum board on other side optional mineral wool or glass fibre insulation 	<u>រកពាក់ក្រការការការការការការ</u> 2 h	

Source	Description	Fire Sound Resistance Transmissio Rating Class		
ULC W481 (cont.)	 System B 63.5 mm deep x 0.627 mm thick "C-T" or "C-H" shaped steel studs spaced at 610 mm o.c. 1 layer 25 mm gypsum liner board panels and 1 layer of 16 mm gypsum board on one side 1 layer of 16 mm gypsum board on other side optional mineral wool or glass fibre insulation 	<u> </u>	-	
ULC W506	 64 mm x 35 mm x 0.5 mm thick steel "C-H" shaped studs spaced at 600 mm o.c. 1 layer 25 mm gypsum board on one side 2 layers 12.7 mm gypsum board on other side 			
ULC W507	 64 mm x 35 mm x 0.5 mm thick steel "C-H" shaped studs spaced at 600 mm o.c. 1 layer 25 mm gypsum board on one side 2 layers 15.9 mm gypsum board on other side 	2 h	- - -	
ULC W508 USG910913	 100 mm x 38 mm x 0.5 mm thick steel "C-H" shaped studs spaced at 610 mm o.c. 76 mm mineral wool insulation 1 layer 25.4 mm gypsum board on one side 1 layer 19.1 mm gypsum board on other side 	2 h	52	

ULC • 64 mm deep x 0.5 mm thick "C-H" shaped steel studs spaced at 600 mm o.c. • 1 layer of 25 mm gypsum board on one side • 2 layers of 12.7 mm gypsum board on other side • 102 mm deep x 1.9 mm thick channel shaped studs fastened to 64 mm deep, 0.91 mm thick "C-H" shaped channel spaced at 600 mm o.c. • 102 mm deep x 1.9 mm thick • 11 layer of 25 mm mineral and fibre board liner panels with 15 mm thick cover strips on one side • 2 layers of mineral and fibre board liner panels, base layer 25 mm and 15 mm secondary layer and 9.5 mm steel skin	Source	Description	Fire Resistance Rating	Sound Transmission Class
 ULC W513 102 mm deep x 1.9 mm thick channel shaped studs fastened to 64 mm deep, 0.91 mm thick "C-H" shaped channel spaced at 600 mm o.c. 1 layer of 25 mm mineral and fibre board liner panels with 15 mm thick cover strips on one side 2 layers of mineral and fibre board liner panels, base layer 25 mm and 15 mm secondary layer and 9.5 mm steel skin 	ULC W512	 64 mm deep x 0.5 mm thick "C-H" shaped steel studs spaced at 600 mm o.c. 1 layer of 25 mm gypsum board on one side 2 layers of 12.7 mm gypsum board on other side 	2 h	
side 3 h -	ULC W513	 102 mm deep x 1.9 mm thick channel shaped studs fastened to 64 mm deep, 0.91 mm thick "C-H" shaped channel spaced at 600 mm o.c. 1 layer of 25 mm mineral and fibre board liner panels with 15 mm thick cover strips on one side 2 layers of mineral and fibre board liner panels, base layer 25 mm and 15 mm secondary layer and 9.5 mm steel skin cementitious panels on other side 	3 h	

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Source	Description	Fire Resistance Rating	Sound Transmission Class
ULC W436	 Wall B – pair of 41 mm x 32 mm x 0.66 mm thick steel studs spaced at 760 mm o.c. 76 mm mineral wool insulation 1 layer of 12.7 mm or 15.9 mm gypsum board on one side 1 layer of 12.7 mm reinforced cement board, designated "Perma Base" on each side 	↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓	truction A (Wall B, G 15.9mm)
ULC W437	 Wall B – pair of 41 mm x 32 mm x 0.66 mm thick steel studs spaced at 760 mm o.c. 76 mm mineral wool insulation 1 layer of 12.7 mm or 15.9 mm gypsum board on each side 1 layer of 12.7 mm reinforced cement board, designated "Perma Base" on one side 	001 ₩ 0000 0000000000000000000000000000	truction A (Wall B, G 12.7mm) (Wall B, G 15.9mm)
ULC W438	 Wall B – pair of 41 mm x 32 mm x 0.66 mm thick steel studs spaced at 760 mm o.c. 76 mm mineral wool insulation 1 layer of 15.9 mm gypsum board on one side 1 layer of 12.7 mm reinforced cement board, designated "Perma Base" on other side 	Vall Cons Wall Cons Wall Cons Wall Cons Wall Cons	truction A 55* (Wall B)
ULC W439	 Wall B pair of 41 mm x 32 mm x 0.66 mm thick steel studs spaced at 760 mm o.c. 89 mm mineral wool insulation 1 layer of 12.7 mm or 15.9 mm gypsum board on each side 1 layer of 12.7 mm reinforced cement board, designated "Perma Base" on each side 	Wall Cons Wall Cons Wall Cons 2 h 55* 57*	truction B (Wall B, G 12.7mm) (Wall B, G 15.9mm)

Source	Description	Fire Resistance Rating	Sound Transmission Class
ULC W454	 64 mm x 41 mm x 0.84 mm, for 1 hour, and 92 mm x 41 mm x 1.09 mm, for 2 hour, steel studs spaced at 406 mm o.c. 89 mm glass fibre insulation one one side of wall assembly 1 hour - 1 layer of 15.9 mm gypsum board on each side 2 hour - 2 layers of 15.9 mm gypsum board on each side 	1 h 2 h	- -
ULC W459	 89 mm x 38 mm x 0.56 mm steel stud spaced as follows: Configuration B: 203 mm or 305 mm o.c. Configuration C: 406 mm or 610 mm o.c. 89 mm glass fiber insulation with nom. density of 15 kg/m³ 1 layer of 15.9 mm "QuietRock" soundproof drywall on each side 	Vall Confi	Juration A
		1 h	-

Source	Description	Fire Resistance Rating	Sound Transmission Class	
ULC W460	 89 mm x 30 mm x 0.37 mm proprietary steel stud (ClarkDietrich) spaced as follows: Configuration B: 203 mm or 305 mm o.c. Configuration C: 406 mm or 610 mm o.c. 89 mm glass fiber insulation with nom. density of 15 kg/m³ 1 layer of 15.9 mm "QuietRock" soundproof drywall on each side 	Rating Class Vall Configuration A Vall Configuration A Vall Configuration B Vall Configuration B Vall Configuration C		
		1 h	56 [*] (Configuration B) 61 [*] (Configuration C)	
ULC W483	 63.5 mm x 41.3 mm x 0.627 mm steel studs spaced at 610 mm o.c. optional glass fibre insulation on one or both rows of studs 1 hour - 1 layer of 16 mm gypsum board on each side 2 hour - 2 layers of 16 mm gypsum board on each side 	1 h 2 h		
ULC W486	 63.5 mm x 31.8 mm x 0.46 mm steel studs spaced at 610 mm o.c. 63 mm glass fibre insulation to fill both wall cavities 1 layer of 12.7 mm gypsum board on each side 	<u>20</u> 2020000 2020000 3⁄4 h	<u>innn</u> <u>innn</u>	

* Estimated value (see www.guietsolution.com/acousticfireassemblies.pdf)

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		Fire	Sound	
Source	Description	Resistance	Transmission	
		Rating	Class	
ULC W311	 Firewall (max. height – 13400 mm) 51 mm x 35 mm x 0.53 mm thick "H" shaped steel studs spaced at 610 mm o.c. 2 layers of 25.4 mm thick gypsum wallboard liner panels 89 mm x 38 mm wood studs spaced at 610 mm o.c. 1 layer 12.7 mm gypsum board aluminum attachment clips 	FIRE SIDE		
		2 h	_	
ULC W312	 Firewall (max. height – 13400 mm) 54 mm x 38 mm x 0.457 mm thick "H" shaped steel studs spaced at 610 mm o.c. 2 layers of 25 mm thick gypsum wallboard liner panels 89 mm x 38 mm wood studs spaced at 610 mm o.c. 1 layer 12.7 mm gypsum board aluminum attachment clips optional glass fibre or mineral wool insulation 	i 19 mn AIR SPACE	FIRE SIDE	
		CONFIGUR Exposed to fire	ATION B FROM EITHER SIDE	
		Z 11	-	

Source	Description	Fire Resistance Rating	Sound Transmission Class
ULC W314	 Firewall (max. height – 13400 mm) 51 mm x 35 mm x 0.46 mm thick "H" shaped steel studs spaced at 610 mm o.c. 2 layers of 25.4 mm thick gypsum wallboard liner panels 89 mm x 0.84 mm thick steel studs spaced at 610 mm o.c. for Bearing Wall Rating 89 mm x 32 mm x 0.46 mm thick steel studs spaced at 610 mm o.c. for Nonbearing Wall Rating (Configuration B only) 1 layer 12.7 mm gypsum board aluminum attachment clips 	i 19 mm AIR SPACE	FIRE SIDE ALUMINUM ATTACHMENT CLIPS CLIPS CLIPS CLIPS ALUMINUM ATTACHMENT CLIPS
		2 h	-
ULC W320	 Firewall (max. height – 13400 mm) 51 mm x 35 mm x 0.53 mm thick "H" shaped steel studs spaced at 610 mm o.c. 2 layers of 25.4 mm thick gypsum wallboard liner panels 89 mm x 0.8 mm thick steel studs spaced at 610 mm o.c. for Bearing Wall Rating 89 mm x 31.75 mm x 25 MSG mm thick steel studs spaced at 610 mm o.c. for Nonbearing Wall Rating (Configuration B only) 1 layer 12.7 mm gypsum board aluminum attachment clips 	i 19 mm AIR SPACE EXPOSED TO FIRE FROM DNE i 19 mm AIR SPACE i 19 mm AIR SPACE i 19 mm AIR SPACE CONFIGUE EXPOSED TO FIRE 2 h	FIRE SIDE

<u>NOTE</u>: ULC Certification Bulletin No. 2003-08 (dated August 21, 2003) provides an official ULC permission for ULC listed and package labelled mineral fibre building insulation (processed from rock, slag and glass only) to be used in ULC non-load bearing wall assembly designs consisting of gypsum wallboard and steel or wood studs with a fire resistance rating not exceeding 2 hours when illustrated without insulation, without detracting from the rating assigned to the assembly.

The following page presents non-load bearing wall assemblies fire tested at NRCC during two multi industry (steel, wood, gypsum and insulation) fire testing programs that are reported on in two fire test reports, namely IR No. 674 (December 1994) and IR No. 675 (December 1994). The fire test report nos. appear in the source column and are followed by a "F" fire test no. used in the report. A relevant NRCC acoustic report is also listed below and this reference document deals with acoustic data, i.e., values of Sound Transmission Class that have been established as an estimated value or from an acoustic test where the acoustic test no. appears in the source column.

NRCC IR-674 data for F03 and F05 and IR-675 data for F07 to F11 (see page 80)

References (fire data):

Sultan, M.A., Lougheed, G.D., Denham, E.M.A., Monette, R.C. and MacLaurin, J.W., *Temperature Measurements in Full-Scale Fire Resistance Tests on Non-Insulated Regular Gypsum Board Wall Assemblies, IRC Internal Report No. 674 (IR-674)*, National Research Council of Canada, Ottawa, Ontario, Canada, December 1994.

Sultan, M.A., MacLaurin, J.W., Denham, E.M.A. and Monette, R.C., *Temperature Measurements in Full-Scale Insulated and Non-Insulated (1x2) Gypsum Board Protected Wall Assemblies with Steel Studs, IRC Internal Report No. 675 (IR-675)*, National Research Council of Canada, Ottawa, Ontario, Canada, December 1994.

Reference (acoustic data):

* Warnock, A.C.C., *Estimation of Sound Transmission Class and Impact Insulation Class Rating for Steel Framed Assemblies*, Report No. B3436.1 Revised, Institute for Research in Construction, National Research Council of Canada, Ottawa, Ontario, Canada, November 2008.

Non-Load Bearing Walls – National Research Council of Canada

Source	Description	Fire Endurance	Sound Transmission Class
NRCC IR-674 F03 F05 USG840817	 90 mm x 30 mm x 0.46 mm thick steel studs spaced at 600 mm o.c. 2 layers 12.7 mm gypsum board on each side NOTE: Density of gypsum board varies between two tests; F03=7.35kg/m² F05=7 80 kg/m² 	F03 = 63 min	50
NRCC IR-675 F07 TLA-02-013a	 90 mm x 30 mm x 0.46 mm thick steel studs spaced at 600 mm o.c. 1 layer 12.7 mm gypsum board on one side 2 layers 12.7 mm gypsum board on other side 	FUS = 69 min	41
NRCC IR-675 F09 F10 F10B F11 a) NRC TL-92-411 b) TL-93-027	 90 mm x 30 mm x 0.46 mm thick steel studs spaced at 600 mm o.c. 1 layer 12.7 mm gypsum board on one side 2 layers 12.7 mm gypsum board on other side 90 mm thick insulation as follows: 		
	F09 - glass fibre F10 - 584 mm wide mineral fibre F10B - 615 mm wide mineral fibre F11 – cellulose	F09 = 65 min F10 = 60 min F10B = 100 min F11 = 62 min	52° 52* 52* 53 ^b

		Fire	Sound		
Source	Description	Resistance Transmissio			
		Rating Class			
	• 3 % x 1 ¼ x 25 gauge steel				
0403	studs spaced at 24 0.C.				
EQ	fiber insulation				
	 2 lavers 5%" thick gypsum board 				
	on one side				
	• 1 layer ⁵ ⁄ ₈ ", 1 layer ¹ ⁄ ₂ " and 1 layer	RRARAR	RRRRRRR		
	¹ ⁄ ₄ " or ³ ⁄ ₈ " thick gypsum board on				
	other side	2 h	58*		
UL	• 3 ¹ / ₂ " x 20 MSG steel studs	<u> </u>			
U404	spaced at 16" o.c.				
	 3" mineral wool insulation 				
	1 layer ½" or ⁵ ⁄ ₈ " cementitious				
	board on one side				
	• Trayer 78 thick gypsum board on other side				
		1 h	_		
	• 3 ¹ / ₂ " x 20 MSG steel studs		L		
	spaced at 16" o.c.				
	• 3" mineral wool insulation				
	• 2 layers % gypsum board on				
	 inner laver of ⁵/₄" thick gypsum 				
	outer layer of ½" or ⁵⁄s"	Configure			
	cementitious board on other side				
		2 11	-		
	• 3 ½ x 20 MSG steel studs				
	 3" mineral wool insulation 				
	 2 lavers ½" or 5/4" cementitious 				
	board on one side	$\left[\begin{array}{c} 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 $	000000000		
	2 layers ⁵ ⁄ ₈ " thick gypsum board				
	on other side	Configur	nation B		
		2 h	-		

Source	Description	Fire Resistance	Sound Transmission		
UL U407 EQ USG 840321	 3 ¹/₂" x 20 MSG steel studs spaced at 16" o.c. 3" mineral wool insulation ⁵/₈" cementitious board, ceramic tiles and exterior finish on either side 	Rating Class			
		1 h	48		
UL U408 EQ	 3 ¹/₂" x 1 ¹/₄" x 25 MSG steel studs spaced at 24" o.c. optional glass fibre or mineral wool insulation 1 layer ⁵/₈" gypsum board on one side 3 layers ⁵/₈" gypsum board on other side 	NRNNN			
		2 h	-		
UL U411 EQ NRC TL-93-037	 2 ¹/₂" x 1 ¹/₄" x 25 MSG steel studs spaced at 24" o.c. optional mineral wool or glass fiber insulation 2 layers ⁵/₈" gypsum board on each side 	<u>2 h</u>			
UL U412 EQ	 1 ⁵/₈" x 1 ¹/₄" x 25 MSG steel studs spaced at 24" o.c. optional glass fibre or mineral wool insulation 2 layers ¹/₂" gypsum board on each side 	2 II <u> <u> </u> </u>			

Source	Description	R	Fire esistar	nce	Sound Transmission
UL U419 EQ a) SA870717 b) SA860620	 min 25 MSG steel studs with 1 ¼" flanges, spaced at 24" o.c. mineral wool insulation optional except where 				
c) RAL-TL90-166 d) USG860808 e) USG910617 f) SA830112 g) SA830113 h) USG910907	 and described below stud depth, gypsum board layers, gypsum board thickness, and corresponding rating as shown 	1 h 1 h 1 h	& Size 1-5/8 1-1/2 1-3/4	Depth 3½ 2½ * 15%	49 ^a (RFB 3") 51 ^{b&c} (RFB 3½") 40 ^d (NI)
	 * 1½" mineral wool insulation ** 3" mineral wool insulation *** 2" mineral wool insulation 	2 h 2 h 3 h 3 h 4 h 4 h	$\begin{array}{c} 1-74\\ 2-1/2\\ 2-5/8\\ 1-3/4\\ 3-1/2\\ 2-3/4\\ 3-5/8\\ 4-5/8\\ 4-5/8\\ 4-1/2\end{array}$	15% 15% 31/2 ** 15% 15% 15% 15% 15% 15%	50 ^e 59 ^f (RFB 1½") 62 ^g (RFB 1½")
UL U421	 2 ½" or 35/8" deep x 1 ¼" x 25 MSG steel studs spaced at 24" o.c. See UL listing for alternate proprietary steel studs optional steel resilient channels spaced 24" o.c. for use on the single layer side only optional glass fibre or mineral wool insulation 1 layer 5/8" gypsum board on one side 3 layers 5/8" gypsum board on other side 	4 h	<u> 2-¾</u>	<u>21/2</u> ***	- 56 ^h

Source	Description	Fire Resistance Rating	Sound Transmission Class		
UL U424	 3 ¹/₂" x 1 ¹/₂" x 20 MSG steel stud spaced at 24" o.c. optional glass fiber or mineral wool insulation optional steel resilient channels spaced 24" o.c. gypsum board on interior side (rating listed for thickness of gypsum and number of layers 	INTERIOR SIDE			
	 1 layer of ¹/₂" or ⁵/₈" gypsum board on exterior side NOTE: Exposed to fire on interior face only 	45 min for 1 layer 5‰ in. 1 h for 2 layers ½ in. 1-½ h for 2 layers 5‰ in. 2 h for 3 layers ½ in. 2 h for 2 layers ⅔ in.			
UL U431 EQ	 3 ⁵/₈" x 1 ¹/₄" x 25 MSG steel studs spaced at 16" o.c. metal lath, diamond mesh, expanded steel 3.4 lb. per sq. yd. ³/₄" thick plaster on each side spray-applied fire resistive material sprayed in stud cavity 				
UL U432	 3 ¹/₂" x 20 MSG steel studs spaced at 24" o.c. optional glass fiber or mineral wool insulation ⁵/₈" gypsum board on each side 	4 h	- MMMA		
UL U435 EQ a) SA830112 b) SA830113	 1 ⁵/₈" x 1 ¹/₄" x 25 MSG steel studs spaced at 16" or 24" o.c. optional mineral wool insulation 4 layers ¹/₂" gypsum board on each side for 4 h 3 layers ¹/₂" or 2 layers ³/₄"gypsum board on each side for 3 h 	<u></u>	59ª (RFB 1½") 62 ^b (RFB 1½")		

Source	Description	Fire Resistance Rating	Sound Transmission Class
UL U442	 21/2" x 1 1/4" x 20 MSG steel studs spaced at 16" o.c. 21/2" mineral wool insulation 1/2" or 5%" cementitious board and 1/4" ceramic tile on each side 	1 h	
	 Alternate Construction 2¹/₂" x 1 ¹/₄" x 20 MSG steel studs spaced at 16" o.c. 2¹/₂" mineral wool insulation ⁵/₈" gypsum board on one side ¹/₂" or ⁵/₈" cementitious board and ¹/₄" ceramic tile on other side 	1 h	-
UL U443 SA851028	 3 5/s" x 1 1/4" x 20 MSG steel studs spaced at 24" o.c. 3" min "Thermafiber" insulation inner layer 1/2" gypsum board on each side 1 layer 1/2" or 5/s" cementitious board on each side outer layer 1/4" ceramic tile on each side 	Alternate C 2 h	CEMBRD 1/2")
		2 11 *see UL listing for Alternate design	56 (CEMBRD ½)
UL U449	 3 ⁵/₈" x 1 ³/₈" x 20 MSG steel studs spaced at 16" o.c. 3 ⁵/₈" insulation having min 3.5 pcf 2 layers ⁵/₈" gypsum board on one side inner layer of ⁷/₁₆ " mineral and fiber board, and outer layer of ceramic tile on other side 	<u>1-½ h</u>	<50*

Source	Description	Fire Resistance Rating	Sound Transmission Class
UL U450 EQ	 2 ¹/₂" x 1 ¹/₄" x 25 MSG (1 h), 3 ⁵/₈" x 1 ¹/₄" x 25 MSG (3 h) and 3 ⁵/₈" x 1 ¹/₄" x 18 MSG (4 h) steel studs spaced at 16" o.c. spray-applied fire resistive material sprayed in stud cavity 		
	 gypsum wallboard layers, wallboard thickness and corresponding rating as shown 	#Layer <u>& Size</u> 1 h 1-⁵‰ 3 h 2-⁵‰ 4 h 3- ⁵‰	-
UL U451 EQ	 2 ½" x 1 ¼" x 25 MSG steel studs spaced at 24" o.c. 1 ½" min "Thermafiber" insulation steel resilient channel, 25 MSG on one side spaced at 24" o.c. 1 layer of ½" or 5⁄8" gypsum board on each side 	<u>1 h</u>	-
UL U452 RAL-TL83-215	 3 ¹/₂" x 1 ¹/₄" x 20 MSG steel studs spaced at 24" o.c. 3" min "Thermafiber" insulation 2 layers ¹/₂" gypsum board on one side steel resilient channels, 25 ga, spaced at 24" o.c. 1 layer ¹/₂" gypsum board on other side 	1-½ h	58
UL U453	 3 ¹/₂" x 1 ¹/₄" x 20 MSG steel studs spaced at 24" o.c. 3" min "Thermafiber" insulation 1 layer of ¹/₂" gypsum board on one side steel resilient channels, 25 ga, spaced at 24" o.c. 2 layers of ¹/₂" gypsum board on other side 	2 h	

Source	Description	Fire Resistance Rating	Sound Transmission Class
UL U454 EQ	 2 ¹/₂" x 1 ¹/₄" x 25 MSG steel studs spaced at 24" o.c. 1 " min "Thermafiber" mineral wool insulation steel resilient channel, 25 MSG on one side spaced at 24" o.c. 2 layers of ¹/₂" gypsum board on each side 	2 10 2 h	
UL U455	 3 ¹/₂" x 1 ¹/₄" x 20 MSG steel studs spaced at 24" o.c. 3" min "Thermafiber" insulation 3 layers of ¹/₂" gypsum board on one side steel resilient channels, 25 MSG spaced at 24" o.c. 2 layers of ¹/₂" gypsum board on other side 	 10000000 	
UL U457 USG840222	 3 ⁵/₈" x 1 ¹/₄" x 20 MSG steel studs spaced at 16" o.c. 1 layer ⁵/₈" gypsum board on one side 3" min "Thermafiber" insulation inner layer of ¹/₂" rigid polystyrene insulation (optional), and outer layer of ¹/₂" or ⁵/₈" cementitious board on other side 		
UL U463 EQ	 1 ⁵/₈" x 1 ¹/₄" x 25 MSG steel studs spaced at 16" or 24" o.c. optional 1¹/₂" thick batts and blankets or spray applied cellulose insulation 4 layers ¹/₂" gypsum board on each side for 4 h 3 layers ¹/₂" gypsum board on each side for 3 h 	<u>,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,</u>	- 3U (CEMBRD ½ [*])

Source	Description	Fire Resistance Rating	Sound Transmission Class
UL U465 a) SA870717 b) SA860620 c) RAL-TL90-166	 3 ⁵/₈" x 1 ¹/₄" x 25 MSG steel studs spaced at 24" o.c. optional mineral wool or glass fiber insulation optional steel resilient channels, 25ga, spaced at 24" o.c. 	1 h	49 ^a (RFB 3")
	 1 layer % gypsum board on each side 		51 ^{b & c} (RFB 3½") 51*(RFB 3½" RC)
UL U471 EQ	 3 ⁵/₈" x 1 ¹/₄" x 25 MSG steel studs spaced at 24" o.c. 3 ¹/₄" min mineral wool batt insulation having min 4 pcf or spray applied cellulose insulation 1 layer 0.591" mineral and fiber board, designated "Promat-H" on each side 	1-14 h	MMM
UL U475 EQ	 min 25 MSG (1, 2 and 3 h), and 18 MSG (4 h) steel studs with x 1 ¼" legs, spaced at 16" o.c. metal lath, diamond mesh, expanded steel 3.4 lbs per sq. yd. stud depth, min thickness of material applied to metal lath, and corresponding rating as shown cementitious mixture, spray- applied fire resistive material sprayed or vermiculate concrete in stud cavity 2 layers 5%" gypsum board on each side for 1, 2 and 3 h and 3 layers 5%" gypsum board on each side for 4 h 	Cavity Stud 1 h 2 2 h 2- ³ ⁄ ₄ 3 h 3- ¹ ⁄ ₄ 4 h 4	

Source	Description	Fire Resistance Rating	Sound Transmission Class
UL U478 EQ	 1 ⁵/₈" x 1 ¹/₄" x 25 MSG steel studs spaced at 24" o.c. optional mineral wool or spray applied cellulose insulation filling stud cavity 3 layers ¹/₂" gypsum board on one side inner 2 layers ¹/₂" thick gypsum board and outer layer ¹/₂" or ⁵/₈" cementitious board on other side 		
UL U484	 2 ¹/₂" x 1¹/₄" x 20 MSG steel stud spaced at 16" o.c. optional "Thermafiber" 	511	<u> </u>
	 optional "mermaniser" insulation 1 layer ³/₈" gypsum board on each side metal lath and ³/₄" plaster on each side 		
1.11		2 h	<50*
UL U488	 2 ¹/₂" x 1¹/₄" x 20 MSG steel stud spaced at 16" o.c. 1" min. "Thermafiber" insulation 1 layer ³/₈" gypsum board on each side ⁷/₁₆" plaster on each side 		
		1 h	<50*
UL U490 EQ USG910907	 2 ¹/₂" x 1¹/₄" x 25 MSG steel stud spaced at 24" o.c. 2" nominal "Thermafiber" insulation 2 layers ³/₄" gypsum board on each side 		<u>56</u>
		4	50

Source	Description	Fire Resistance Rating	Sound Transmission Class
UL U491 EQ USG910617	 3 ¹/₂" x 1¹/₄" x 25 MSG steel stud spaced at 24" o.c. 3" nominal "Thermafiber" insulation 1 layer ³/₄" gypsum board on each side 		
UL U494 EQ	 2 ½" x 1¼" x 25 MSG steel stud spaced at 16" or 24" o.c. 2 ½" glass fiber batts 1 layer 5⁄8" gypsum board on each side 	2 h	50
UL U495 EQ a) SA860620 b) RAL-TL90-166	 3 ⁵/₈" x 1 ¹/₄" x 25 MSG steel studs spaced at 24" o.c. optional mineral wool or glass fiber insulation 1 hour - 1 layer ⁵/₈" or ³/₄" gypsum board on each side 2 hour - 2 layers ⁵/₈" gypsum board on each side 	1 h 2 h	- 51 ^{a&b} (G 5%"RFB 3½") 53* (G 34" RFB 3½") 58* (RFB 3½")
UL U496 EQ	 1 ⁵/₈" x 1¹/₄" x 25 MSG steel studs spaced at 24" o.c. optional mineral wool batts filling stud cavity ³/₄" gypsum board on each side 	<u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u>	
UL V401	 2 ¹/₂" x 1³/₈" x 25 ga steel stud spaced at 24" o.c. 2" mineral wool insulation with UL Classification Marking 1 layer ¹/₂" gypsum board on each side 	<u>1 h</u>	<u>1111111111</u> 111

Source	Description	Fire Resistance	Sound Transmission
UL V410 EQ	 1 ⁵/₈" x 1¹/₄" x 25 MSG steel studs spaced at 24" o.c. optional mineral wool or glass fiber batts filling stud cavity 1[/]₂" "building unit" gypsum board on each side 1[/]₂" gypsum board on each side 	Rating	Class
UL V412 EQ	 3 ¹/₂" x 1¹/₄" x 25 MSG steel stud spaced at 24" o.c. 3" nominal mineral wool batts ³/₄" "building unit" gypsum board on each side 		11111111111111111111111111111111111111
UL V414	 3 ⁵/₈" x 1 ⁵/₈" x 20 MSG steel studs spaced at 16" o.c. 3 ¹/₂" glass fiber insulation 1 layer ⁵/₈" gypsum board on one side 1 layer 2" foamed plastic board on other side 4" brick veneer 	2 h	
UL V416 EQ USG860808	 3 ⁵/₈" x 1 ¹/₄" x 25 MSG steel studs spaced at 24" o.c. optional mineral wool or glass fiber insulation 1 layer ⁵/₈" or ³/₄" gypsum board on each side 	1 h Exterior	40 (G ⁵ ⁄ ₈ " NI) 43* (G ³ ⁄ ₄ " NI) 53* (G ³ ⁄ ₄ " RFB 3½")

Source	Description	Fire Resistance Rating	Sound Transmission Class
UL V417 EQ	 3 ⁵/₈" x 1 ¹/₄" x 25 MSG steel studs spaced at 24" o.c. mineral wool batts filling stud cavity optional steel resilient channels, 25 MSG, spaced at 24" o.c. 1 layer ⁵/₈" gypsum board on each side 	1 h	
UL V418 EQ	 1 ⁵/₈" x 1 ¹/₄" x 25 MSG steel studs spaced at 24" o.c. mineral wool batts filling stud cavity 2 layers ¹/₂" gypsum board on each side 	<u>ງທຸ</u> ກາງທາງ 2 h	
UL V419 EQ	 2 ¹/₂" x 1¹/₄" x 25 MSG steel stud spaced at 24" o.c. mineral wool batts filling stud cavity 2 layers ⁵/₈" gypsum board on each side 	2 h	<u>NNN</u>
UL V420	 3 ½" x 20 MSG steel stud spaced at 24" o.c. min 3" thick and max 2' wide precast autoclaved aerated concrete panels on one side ¼" furring channels spaced 24" o.c. on one side 2 layers of ⁵%" gypsum board on other side 	2 h	
UL V425 EQ	 2 ½" x 1 ¼" x 25 MSG steel studs spaced at 16" o.c. 1 ½" spray-applied fire resistive material sprayed in stud cavity 1 layer 5%" gypsum board on each side 	1 h	

Source	Description • 3 ⁵ ⁄ ₈ " x 1 ¼" x 25 MSG steel studs	Fire Resistance Rating	Sound Transmission Class
V435 EQ	 spaced at 24" o.c. mineral wool batts filling stud cavity with min. 2.5 pcf density steel resilient channels, 25 MSG, spaced at 24" o.c. on one side 1 layer ⁵/₈" gypsum board on one side 2 layers of ⁵/₈" gypsum board on other side 		
UL V438 EQ	 min 25 MSG steel studs with 1¼" flanges, spaced at 24" o.c. mineral wool insulation optional except where required as noted by asterisk and described below stud depth, gypsum board layers, gypsum board thickness, and corresponding rating as shown * 2" mineral wool insulation 	$\begin{array}{c c c c c c c c c c c c c c c c c c c $	-
UL V443 EQ	 3 ⁵/₈" x 1 ¹/₄" x 25 MSG steel studs spaced at 16" o.c. metal lath, diamond mesh, expanded steel 3.4 lbs per sq. yd. vermiculate concrete pumped into stud cavity ³/₄" plaster (sand & unfibered gypsum) on one side ³/₄" portland cement plaster (cement, lime & sand) on other side 	4 h	

Source	Description	Fire Resistance Rating	Sound Transmission Class
UL V444 EQ	 3 ⁵/₈" x 1 ¹/₄" x 25 MSG steel studs spaced at 24" o.c. optional mineral wool or glass fiber batts optional steel resilient channels, 25 MSG, spaced at 24" o.c. 1 layer ⁵/₈" gypsum board on each side 		
	 non-metallic plumbing system components in stud cavity attached to horizontal cross bracing (steel or lumber) 	1 h	<u>nnn (n</u>
UL	• 3 ⁵ / ₈ " x 1 ¹ / ₄ " x 25 MSG steel studs		
V448	spaced at 16" o.c.		
EQ	 nom. 3" mineral wool batts, min. 3.4 pcf. friction fit 		
	 inner layer ½" mineral and fiber board designated "Homasote Type 440-32" on each side outer layer 5⁄8" gypsum board on each side 	MALANA	MMIMM
		1 h	-
UL V449 EQ	 3 ¹/₂" x 1 ¹/₄" x 25 MSG steel studs spaced at 24" o.c. 1 layer ⁵/₈" gypsum board on one side 3 layers ⁵/₈" gypsum board on other side 		
		2 n	-

		Fire	Sound
Source	Description	Resistance	Transmission
UL V450 EQ RAL-TL05-078	 3 ⁵/₈" (1 hour), 2¹/₂" (2 or 2¹/₂ hour) and 1 ⁵/₈" (2 hour) proprietary steel stud (ClarkDietrich) with 0.0150" thickness spaced at 24" o.c. 1 hour - 1 layer of ⁵/₈" gypsum board on each side 2 and 2¹/₂ hour – 2 layers of ⁵/₈" gypsum board on each side optional glass fiber or mineral wool insulation friction fit in 	Raung	
	 stud cavities optional steel resilient channel, 25 MSG on one side spaced at 24" o.c. 	1 h 2 h 2½ h	39 (NI) 48 (GFB 35⁄s") 52 (GFB 35⁄s" RC) 61 (GFB 35⁄s" RC) -
UL V452 EQ	 3 ⁵/₈" x 1 ¹/₄" x 25 MSG steel studs spaced at 16" o.c. nom. 3" mineral wool batts, min. 2.6 pcf, friction fit 1 layer ¹/₂", ⁵/₈", ³/₄ or 1" cementitious backer units on one side 1 layer ⁵/₈" thick gypsum board on other side 	FIND TO THE	
	 3 ⁵/₈" x 1 ¹/₄" x 25 MSG steel studs spaced at 16" o.c. nom. 3" mineral wool batts, min. 2.6 pcf, friction fit 2 layers ¹/₂" gypsum board on one side inner layer of ¹/₂" thick gypsum, outer layer of ¹/₂", ⁵/₈", ³/₄ or 1" cementitious backer units on other side 	1 h	- MNNONN
Source	Description	Fire Resistance Rating	Sound Transmission Class
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UL V453	 6" x 1 ¼" x 20 MSG steel studs spaced at 24" o.c. 6¼" glass fibre insulation 1 layer ¾" thick gypsum board on each side 	11/2 h -	
UL V454	 3 ½" x 20 MSG steel studs spaced at 24" o.c. optional glass fiber or mineral wool insulation filling stud cavity 1 layer ⁵⁄₈" gypsum board on each side 1 layer max 4" foamed plastic board on one side 		C E E I L I L I I L I I C E E C E E C E E C E E C E E C E E C E E C E E C E E C E E C E E C E E C E E C E C E C E E C E
UL V463	 3 ½" x 1 ½" x 25 MSG steel stud spaced as follows: Configuration A: 16" or 24" o.c. 3 ½" glass fiber insulation with nom. density of 0.95 pcf 1 layer of %" "QuietRock" soundproof drywall on each side 	1 h J J J Wall Configuration A J J J J J Wall Configuration B J	

Source	Description	FireSoundResistanceTransmissionRatingClass	
UL V464 RAL TL07-069	 3 ⁵/₈" proprietary steel stud (ClarkDietrich) with 0.0150" thickness and spaced as follows: Configuration A: 16" or 24" o.c. 3 ¹/₂" glass fiber insulation with nom. density of 0.95 pcf 1 layer of ⁵/₈" "QuietRock" soundproof drywall on one side and 1 layer of ⁵/₈" Type X gypsum board on other side 	Wall Config	Juration A
UL V475	 3 ⁵/₈" x 1 ¹/₄" x 25 MSG steel studs spaced at 16" o.c. metal lath, diamond mesh, expanded steel 3.4 lbs per sq. yd. ³/₄" thick plaster on each side spray-applied fire resistive material sprayed in stud cavity 	1 n	55 (Configuration A)
UL V476 EQ	 min 25 MSG (1, and 3 h), and min 18 MSG (4 h) steel studs with 1 ¼" legs, spaced at 16" o.c. metal lath, diamond mesh, expanded steel 3.4 lbs per sq. yd. stud depth, gypsum board layers, gypsum board thickness and corresponding rating as shown spray-applied fire resistive material sprayed in stud cavity 	# Layer Stud 1 h 1 - 5% 35% or 2 3 h 2 - 5% 35% 4 h 3 - 5% 35%	

Source	Description	Fire Resistance Rating	Sound Transmission Class
UL V480	 3 ¹/₂" x 20 MSG steel studs spaced at 24" o.c. optional glass fiber or mineral wool insulation ⁵/₈" gypsum board on each side 		<u>NNN</u>
UL V482	 3⁵/₈" x 1¹/₂" x 18 MSG steel stud spaced at 16" o.c. 1¹/₂" max. spray-applied polyurethane foam plastic in steel cavity 1 layer ⁵/₈" gypsum board on one side 1 layer ¹/₂" to 3" foamed plastic board on other side 4" brick veneer 	1 h	-
UL V483	 3 ¹/₂" x 1¹/₂" x 25 MSG steel stud spaced at 24" o.c. 3" mineral wool insulation ⁵/₈" Type X gypsum board on one side ⁵/₈" "SoundBreak" gypsum board on other side 	1 h	<u>MMM</u>
UL V484	 3 ½" x 1½" x 25 MSG steel stud spaced at 24" o.c. 3" mineral wool insulation two 5⁄8" gypsum board on each side 	2 h	-
UL V485 EQ	 3 ⁵/₈" x 1¹/₄" x 0.0156" steel stud spaced at 24" o.c. optional glass fibre or mineral wool insulation one layer ⁵/₈" gypsum board on each side 	 1 h	

Source	Description	FireSoundResistanceTransmissionRatingClass
UL V486 EQ	 3 ⁵/₈" (1 hour), 2¹/₂" (2 or 2¹/₂ hour) and 1 ⁵/₈" (2 hour) steel studs spaced at 24" o.c. 1 hour - 1 layer of ⁵/₈" gypsum board on each side 2 and 2¹/₂ hour - 2 layers of ⁵/₈" gypsum board on each side optional glass fiber or mineral wool insulation friction fit in stud cavities 	
	 optional resilient furring channels, 25 MSG spaced at 24" o.c. 	1 h - 2 h 2½ h
UL V487 EQ	 1⁵%" x 1³/₁₆" x 25 MSG steel stud spaced at 24" o.c. 2 layers of ⁵%" gypsum board on each side 	
UL V489 EQ	 min 25 MSG steel studs with 1¼" flanges, spaced at 24" o.c. mineral wool insulation optional except where required as noted by asterisk and described below 	
	 stud depth, gypsum board layers, gypsum board thickness, and corresponding rating as shown 21(" arigged produced by the state of the st	#Layer Stud Depth - & Size - - 1 h 1-5% 35% * 1 h 1-1/2 21/2 or 35% **
	** 1 ¹ / ₂ " mineral wool insulation	$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$

Source	Description	Fire	Sound
Source	Description	Rating	Class
UL V498	 JL /498 min 25 MSG steel studs spaced at 24" o.c. See UL listing for alternate proprietary steel studs mineral wool insulation optional except where required as noted by asterisk and described below stud depth, gypsum board layers, gypsum board thickness, and corresponding rating as shown 11/2" mineral wool insulation 3" mineral wool insulation ** 2" mineral wool insulation 	#Layer Stud & Size Depth	-
		$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	
UL W401	 21/2" x 25 MSG steel studs spaced at 24" o.c. 21/2" glass fibre insulation 1 layer 1/2" gypsum board on one side 2 layers 1/2" gypsum board on other side 	1 h	-
UL W403	 3½" x 1½" x 20 MSG steel studs spaced at 16" o.c. 1 hour - 1 layer of ⁵/₈" gypsum board on each side 2 hour - 2 layers of ⁵/₈" gypsum board on each side optional glass fiber or mineral wool insulation 	1 h 2 h	-

Source	Description	Fire Resistance Rating	Sound Transmission Class
UL W405	 3⁵/₈" x 25 MSG steel studs spaced at 24" o.c. 2 layers of ³/₈" gypsum board on each side optional glass fiber or mineral wool insulation 	1 h	-
UL W406	 3 ½" (1 hour) and 2½" (2 hour) steel studs spaced at 24" o.c. 1 hour - 1 layer of ½" gypsum board on each side 2 hour - 2 layers of ½" gypsum board on each side optional glass fiber insulation 	1 h	NNNN -
UL W410	 3⁵/₈" x 1¹/₄" x 20 MSG steel studs spaced at 16" o.c. 1 layer of ⁵/₈" gypsum board on each side optional glass fiber or mineral wool insulation 	2 h	MNIM
UL W411 EQ	 3 ⁵/₈" x 25 MSG steel studs spaced at 24" o.c. 1/₂ hour - 1 layer of ⁵/₈" gypsum board on each side 1 hour - 2 layers of ⁵/₈" gypsum board on each side optional glass fiber or mineral wool insulation optional resilient furring channels, 25 MSG spaced at 24" o.c. 	1 H 1/2 h 1 h	- MMMMM Valida de la constante de la const -

Source	Description	FireSoundResistanceTransmissRatingClass	
UL W412	 2 ¹/₂" x 25 MSG (³/₄ hour) and 3⁵/₈" x 25 MSG (1 hour) steel studs spaced at 24" o.c. ³/₄ hour - 1 layer of ⁵/₈" gypsum board on each side 1 hour - 1 layer of ⁵/₈" gypsum board on each side 3¹/₂" glass fiber insulation for 1 hour and optional for ³/₄ hour 	3⁄4 h 1 h	<u></u>
UL W431	 min. 6" proprietary steel studs, TOTALSTUD[®] by iSPAN Systems LP with min. 20 ga. material thickness and spaced at 24" o.c. and optional rectangular or square Hollow Structural Sections optional glass fiber or mineral wool insulation optional resilient metal channels spaced 24" o.c. 2 layers of ⁵/₈" gypsum board on each side 	1 h	TURNIN TU
UL W432	 3 ⁵⁄₈" x 25 MSG steel stud spaced at 24" o.c., optional proprietary steel studsl, 1. Viper 25[™] by Marion\WARE 2. CD ProSTUD by ClarkDietrich 3" nominal mineral wool insulation 1 layer ³⁄₄" gypsum board on each side 	2 h	-
UL W435	 3 ⁵/₈" proprietary steel stud, Platinum Plus by Bailey Metal Products Ltd. spaced at 24" o.c. one layer ⁵/₈" gypsum board on each side 	 1 h	-

Source	Description	Fire Sound Resistance Transmission Rating Class
UL W440	 1¼" wide, 25 MSG steel studs spaced at 24" o.c. v496 mineral wool or glass fiber insulation optional except where required as noted by asterisk and described below stud depth, gypsum board layers, gypsum board thickness, and corresponding rating as shown 1½" mineral wool insulation 	$\begin{array}{c c c c c c c c c c c c c c c c c c c $
UL W443	 3 ⁵/₈" x 1¹/₄" x 25 MSG steel stud spaced at 24" o.c., optional proprietary steel stud, Viper 25™ by Marion\WARE three layers of ⁵/₈" gypsum board on one side of steel studs 	L L 1 h 11 ^{/2} h

Non-Load Bearing Suspended Shaft Wall Ceiling – Underwriters Laboratories Inc.

		Fire	Sound	Impact
Source	Description	Resistance	Transmission	Insulation
		Rating	Class	Class
UL G586	 min. 8 gauge steel hangar wire spaced 24" C shaped channel, min. 6" deep, min. no. 25 MSG steel J shaped track, min. 4" wide, min. no. 20 MSG steel "C-T" shaped steel studs, min. 4" deep, min. no. 20 MSG steel 1" thick gypsum board 5%" thick gypsum board applied in three layers nominal 2" thick by 6" wide pieces of mineral wool 	HANGA WIRE		JPPORTING TRUCTURE

Source	Description	Fire Resistance Rating	Sound Transmission Class
UL U415	 System A 2 ¹/₂" x 25 MSG "C-H" shaped studs spaced at 24" o.c. 1 layer 1" gypsum liner board panels on one side 1 layer of ⁵/₈" gypsum wallboard on other side 		
	 System B 2 ½" x 25 MSG "C-H" shaped studs spaced at 24" o.c. 1 layer 1" gypsum liner board panels on one side 2 layers of ½" or ⁵⁄₈" gypsum wallboard on other side 	E 2 h	
	 System C 4" x 25 MSG "C-H" shaped studs spaced at 24" o.c. 3" min. mineral wool batts 1 layer 1" gypsum liner board panels on one side 1 layer of ³/₄" gypsum wallboard on other side 	2 h	
	 System D 2 ¹/₂" x 20 MSG "C-H" shaped studs spaced at 24" o.c. 1 layer 1" gypsum liner board panels on one side 1 ¹/₂" min. mineral wool batts 1 layer of ⁵/₈" gypsum wallboard and 1 layer of ¹/₂" or ⁵/₈" cementitious board designated "Durock" on other side 	2 h	-

		Fire	Sound
Source	Description	Resistance	Transmission
		Rating	Class
UL U415 (cont.)	 System E 2 ¹/₂" x 25 MSG "C-H" shaped studs spaced at 24" o.c. 1 layer 1" gypsum liner board panels on one side 1 layer of ¹/₂" or ⁵/₈" gypsum wallboard on each side 	2 h	
	System F		
	 2 ½" x 25 MSG "C-H" shaped studs spaced at 24" o.c. 1 layer 1" gypsum liner board panels on one side furring channels spaced at 24" o.c. 2 layers of ¼" or 5⁄4" gypsum 		
	wallboard on other side		
		2 h	-
	 System G 2 ¹/₂" x 25 MSG "C-H" shaped studs spaced at 24" o.c. 1 layer 1" gypsum liner board panels on one side 3 layers of ⁵/₈" gypsum wallboard on other side 	E 3 h	
	System H	011	
	 2 ½" x 25 MSG "C-H" shaped studs spaced at 24" o.c. 1 layer 1" gypsum liner board panels on one side 2 layers of ⁵⁄₈" gypsum wallboard on other side 	3 h	

Source	Description	Fire Resistance Rating	Sound Transmission Class
UL U415 (cont.)	 System I 2 ¹/₂" x 25 MSG "C-H" shaped studs spaced at 24" o.c. 1 layer 1" gypsum liner board panels on one side 4 layers of ³/₄" gypsum wallboard on other side furring channels spaced at 24" o.c. and applied over second layer 	4 h	
UL U417 a) Intertek 3123470EEV b) RAL 437362 1976	 System A 2½" x 1½" x 25 MSG "I" shaped steel studs spaced at 24" o.c. 1" gypsum board on one side 2 layers of ½" or 5%" gypsum board on other side 	2 h 50ª (GFB 50 ^b	39* (G ½") 41* (G %") %/RFB 3¾" G 5%" RC) (GFB/RFB 4¼")
	 System B 2½" x 1½" x 25 MSG "I" shaped steel studs spaced at 24" o.c. inner layer of 1" gypsum board on one side 1 layer of ½" or 5%" gypsum board on each side 	2 h 50ª (G	FB/RFB 3¾" RC)
	 2½" x 1½" x 25 MSG "C-T" or "C-H" shaped steel studs spaced at 24" o.c. 1 layer 1" gypsum board on one side 2 layers of ½" or 5%" gypsum board on other side 	2 h 50ª (GFB 50 ^b	/RFB 3¾" G 5%" RC) (GFB/RFB 41⁄4")

* Estimated value as per Warnock (2008)

Source	Description	Fire Resistance	Sound Transmission
		Rating	Class
UL U417 (cont.) a) Intertek 3123470EEV	 System D 2¹/₂" x 1¹/₂" x 25 MSG "C-T" or "C-H" shaped steel studs spaced at 24" o.c. inner layer of 1" gypsum board on one side, with ¹/₂" or ⁵/₈" gypsum board outer layer 1 layer of ¹/₂" or ⁵/₈" gypsum board on other side 	2 h	50° (GEB/REB 3 ³ /," PC)
	System F	<u>۲۱۱</u>	
	 2½" x 1½" x 25 MSG "I" shaped steel studs spaced at 24" o.c. 1 layer 1" gypsum board on one side 1 layer of 5%" gypsum board on other side 		
		1h	42 ^a (GFB/RFB 3 ¹ / ₈ ")
	 System F 2½" x 1½" x 25 MSG "C-T" or "C-H" shaped steel studs spaced at 24" o.c. 1 layer 1" gypsum board on one side 1 layer of 5%" gypsum board on other side 	1 h	42ª (GFB/RFB 31%")
	 System G 2½" x 1½" x 25 MSG "I" shaped steel studs spaced at 24" o.c. 1 layer 1" gypsum board on one side 3 layers of 5%" gypsum board on other side 		
		3 h	50ª (GFB/RFB 4¾" <u>R</u> C)

Source	Description	Fire Resistance Rating	Sound Transmission Class
UL U417 (cont.) a) Intertek 3123470EEV c) NGC Testing 2006038	 System H 2½" x 1½" x 25 MSG "C-T" or "C-H" shaped steel studs spaced at 24" o.c. 1 layer 1" gypsum board on one side 3 layers of 5%" gypsum board on other side 	3 h	50° (GFB/RFB 4%"
	 System I 2¹/₂" x 1¹/₂" x 25 MSG "I" shaped steel studs spaced at 24" o.c. inner layer of 1" gypsum board on one side, with ⁵/₈" gypsum board outer layer 2 layers of ⁵/₈" gypsum board on other side 	3 h	
	 System J 2½" x 1½" x 25 MSG "C-T" or "C-H" shaped steel studs spaced at 24" o.c. inner layer of 1" gypsum board on one side, with 5%" gypsum board outer layer 2 layers of 5%" gypsum board on other side 	3 h	52° (GFB/RFB 4¾")
UL V433	 System A 2 ½" x 1 ½" x 25 MSG "I"-shaped steel studs spaced 24" o.c. with 3⁄4" wide by 2 ¼" high holding tabs 1" gypsum board on one side 2 layers of ½" or 5⁄8" gypsum board on other side 	I 2 h	

Source	Description	Fire Resistance Rating	Sound Transmission Class
UL V433 (cont.)	 System B 2 ½" x 1 ½" x 25 MSG "I"-shaped steel studs spaced 24" o.c. with ¾" wide by 2 ¼" high holding tabs inner layer of 1" gypsum board on one side 1 layer of ½" or 5⁄s" gypsum board on each side 	2 h	
	 System C 2 ½" x 1 ½" x 25 MSG "I"-shaped steel studs spaced 24" o.c. with ³⁄₄" wide by 2 ¼" high holding tabs 1" gypsum board on one side 1 layer of ⁵⁄₈" gypsum board on other side 	1 h	
UL V472	 2½" x 15%" x 25 MSG "C-T" or "C-H" shaped steel studs spaced at 24" o.c. inner layer of 1" gypsum board on one side, with ½ or 5%" gypsum board outer layer 1 layer of ½" or 5%" gypsum board on other side optional glass fiber or mineral wool insulation 	<u> </u>	-
UL V473	 System A 2½" x 25 MSG "C-T" or "C-H" shaped steel studs spaced at 24" o.c. 1" gypsum board on one side 1 layer of 5%" gypsum board on other side optional glass fiber or mineral wool insulation 	<u>ນດາມ</u> ນາດດາດດາດ 1 h	<u></u>

Source	Description	Fire Resistance Rating	Sound Transmission Class
UL V473 (cont.)	 System B 2½" x 25 MSG "C-T" or "C-H" shaped steel studs spaced at 24" o.c. 1" gypsum board on one side 2 layers of ⁵/₈" gypsum board on other side optional glass fiber or mineral wool insulation 	2000 000000000000000000000000000000000	-
	 2½" x 25 MSG "C-T" or "C-H" shaped steel studs spaced at 24" o.c. inner layer of 1" gypsum board on one side, with 5%" gypsum board outer layer 1 layer of 5%" gypsum board on other side optional glass fiber or mineral wool insulation 	ນເກ ມ ິນເຫັນເຫັນແຫ່ນ 2 h	-
UL V481	 System A 2½" x 1½" x 25 MSG "I" shaped steel studs spaced at 24" o.c. 1" gypsum board on one side 2 layers of ½" or 5%" gypsum board on other side optional glass fiber or mineral wool insulation 	2 h	
	 System B 2½" x 1½" x 25 MSG "I" shaped steel studs spaced at 24" o.c. inner layer of 1" gypsum board on one side 1 layer of ½" or 5%" gypsum board on each side optional glass fiber or mineral wool insulation 	2 h	

Source	Description	Fire Resistance Rating	Sound Transmission
UL V481 (cont.)	 System C 2½" x 1½" x 25 MSG "C-T" or "C-H" shaped steel studs spaced at 24" o.c. 1 layer 1" gypsum board on one side 2 layers of ½" or 5%" gypsum board on other side optional glass fiber or mineral 		
	wool insulation	2 h	-
	 System D 2¹/₂" x 1¹/₂" x 25 MSG "C-T" or "C-H" shaped steel studs spaced at 24" o.c. inner layer of 1" gypsum board on one side, with ¹/₂" or ⁵/₈" gypsum board outer layer 1 layer of ¹/₂" or ⁵/₈" gypsum board on other side optional glass fiber or mineral wool insulation 	2 h	
	Svstem E		
	 2½" x 1½" x 25 MSG "I" shaped steel studs spaced at 24" o.c. 1 layer 1" gypsum board on one side 1 layer of 5%" gypsum board on other side optional glass fiber or mineral wool insulation 	1 h	
	System F		
	 2½" x 1½" x 25 MSG "C-T" or "C-H" shaped steel studs spaced at 24" o.c. 1 layer 1" gypsum board on one side 1 layer of 5/4" gypsum board on 		
	other side		T -
	 optional glass fiber or mineral wool insulation 	1 h	-

Source	Description	Fire Resistance Rating	Sound Transmission Class
UL V481 (cont.)	 System G 2¹/₂" x 1¹/₂" x 25 MSG "I" shaped steel studs spaced at 24" o.c. 1 layer 1" gypsum board on one side 3 layers of ⁵/₈" gypsum board on other side optional glass fiber or mineral wool insulation 	Е З h	
	 System H 2½" x 1½" x 25 MSG "C-T" or "C-H" shaped steel studs spaced at 24" o.c. 1 layer 1" gypsum board on one side 3 layers of 5%" gypsum board on other side optional glass fiber or mineral 		
	wool insulation	3 h	-
UL W402	 4" x 14 gauge channel shaped studs fastened to 2½" x 20 gauge "C-H" shaped channel spaced at 235%" o.c. 1 layer of 1" mineral and fibre board liner panels with ⁹/₁₆" cover strips on one side 2 layers of mineral and fibre board liner panels, base layer 1" and ⁹/₁₆" secondary layer and ³/₈" steel skin cementitious panels on other side 	3 h	
UL W409	 System A 2½" x 1½" x 25 MSG "C-T" shaped steel studs spaced at 24" o.c. 1 layer 1" gypsum liner board panels on one side 2 layers of ½" or 5%" gypsum board on other side 	2 h	

Source	Description	Fire Resistance Rating	Sound Transmission Class
UL W409 (cont.)	 System B 2½" x 1½" x 25 MSG "C-T" shaped steel studs spaced at 24" o.c. 1 layer 1" gypsum liner board panels on one side 1 layer of ½" or 5%" gypsum wallboard on each side 	2 h	
	 System C 2½" x 1½" x 25 MSG "C-T" shaped steel studs spaced at 24" o.c. 1 layer 1" gypsum liner board panels on one side 1 layer of %" gypsum wallboard on other side 	 1 h	
	 System D 2½" x 1½" x 25 MSG "C-T" shaped steel studs spaced at 24" o.c. 1 layer 1" gypsum liner board panels on one side 3 layers of ⁵%" gypsum wallboard on other side 	E. 3 h	
	 System E 2¹/₂" x 1¹/₂" x 25 MSG "C-T" shaped steel studs spaced at 24" o.c. 1 layer 1" gypsum liner board panels and 1 layer of ⁵/₈" gypsum wallboard on one side 2 layers of ⁵/₈" gypsum wallboard on other side 	E 3 h	

		Fire	Sound
Source	Description	Resistance	Transmission
		Rating	Class
UL W414	 21/2" x 11/2" x 25 MSG "I" shaped steel studs spaced at 24" o.c. 1 layer 1" gypsum board on one side 3 layers of 5%" gypsum board on other side 		
		3 h	-

Source	Description	Fire Resistance	Sound Transmission
UL U420 EQ	 1 ⁵/₈" x 25 MSG steel studs spaced at 24" o.c. steel (4¹/₄" long) or gypsum (9¹/₂" long) bracing in stud cavity optional glass fiber insulation, 2¹/₂" max. for 2 hour and 3¹/₂" max. for 1 hour 1 hour - 1 layer of ⁵/₈" gypsum board on each side 2 hour - 2 layers of ⁵/₈" gypsum board on each side 	Rating ວັນ L ກາກການການ <u>.</u> ທ L ກາກການການ 1 h 2 h	
UL U436 EQ	 1 ⁵/₈" x 1" x 25 MSG steel studs spaced at 24" o.c. steel truss members in cavity between steel studs optional glass fiber or mineral wool insulation gypsum wallboard layers, wallboard thickness and corresponding rating as shown 	$ \begin{array}{c} $	
UL U444 EQ	 1 ⁵/₈" x 1¹/₄" x 20 MSG steel studs spaced at 16" o.c. steel or gypsum bracing in stud cavity min. 1¹/₂" mineral wool insulation ¹/₂" gypsum board, ¹/₂" or ⁵/₈" cementitious board and ¹/₄" ceramic tile on each side 	ວັບບັນ ເ ບັບບັນນັ້ນ <u>ກາດຄາ</u> ເ ນາດຄາງ 2 h	- -

Source	Description	Fire Resistance Rating	Sound Transmission Class
UL U444 (cont.)	 Alternate Construction 1⁵/₈" x 1¹/₄" x 20 MSG steel studs spaced at 16" o.c. steel or gypsum bracing in stud cavity min. 1¹/₂" mineral wool insulation 2 layers ¹/₂" gypsum board on one side ¹/₂" gypsum board, ¹/₂" or ⁵/₈" cementitious board and ¹/₄" ceramic tile on other side 	້ ມີບັບເປີ ⊑ັບບັບບັບ ມີເມີດເຊີ 2 h	-
UL U445	 1 ⁵/₈" x 1¹/₄" x 20 MSG steel studs spaced at 16" o.c. steel or gypsum bracing in stud cavity min. 1¹/₂" mineral wool insulation 1[']/₂" or ⁵/₈" cementitious board and 1[']/₄" ceramic tile on each side 	້ ມີນານີ້ ⊑ ນນີ້ນັ້ນ ມີນານ 1 h	- - -
	 Alternate Construction 1 ⁵/₈" x 1¹/₄" x 20 MSG steel studs spaced at 16" o.c. steel or gypsum bracing in stud cavity min. 1¹/₂" mineral wool insulation 1 layer ⁵/₈" gypsum board on one side 1¹/₂" or ⁵/₈" cementitious board and 1¹/₄" ceramic tile on other side 	ວັບບັບ ⊑ ບບບບັບ <u>ມານາ</u> ນ 1 h	- 20000 - 20000 20000 - 20000
UL U466 EQ	 1 ⁵/₈" x 1 ¹/₄" x 25 MSG steel studs spaced at 24" o.c. optional glass fiber or mineral wool batts and blankets or spray applied cellulose insulation 2 layers ⁵/₈" gypsum board on one side 1 layer ⁵/₈" gypsum board on other side 	 ທີ່ L ທີ່ທີ່ບັນບັນບັ ມີ ມີ ມີ ມີ ມີ ມີ	<u>-</u>

Source	Description	Fire Resistance Rating	Sound Transmission Class
UL U493 EQ	 2 ¹/₂" x 1 ⁵/₈" x 25 MSG steel studs spaced at 24" o.c. 3 ¹/₂" glass fiber insulation on one side of wall assembly with nom. density of 0.5 pcf 1 hour - 1 layer ⁵/₈" or ³/₄" gypsum board on each side 2 hour - 2 layers ⁵/₈" gypsum board on each side 	1 h	- NNNIN
	board on each side	2 h	
UL V437 EQ	 1 ⁵/₈" x 1 ¹/₄" x 25 MSG steel studs spaced at 24" o.c. mineral wool or glass fiber batts 2 layers ⁵/₈" gypsum board on each side steel runners or stud bracing, cavity width, spaced 48" o.c. 		
		1 h	-
UL V442	 2½" x 1%" x 22 MSG steel studs spaced at 24" o.c. glass fiber insulation steel or gypsum bracing in stud cavity 1 hour - 1 layer %" gypsum board on each side 2 hour - 2 layers %" gypsum board on each side 	L 1 h 2 h	-

Source	Description	Fire Resistance Rating	Sound Transmission Class
UL V463	 3 ½" x 1 ½" x 25 MSG steel stud spaced as follows: Configuration B: 8" or 12" o.c. Configuration C: 16" or 24" o.c. 3 ½" glass fiber insulation with nom. density of 0.95 pcf 1 layer of 5⁄8" "QuietRock" soundproof drywall on each side 	Rating Class Wall Configuration A Wall Configuration B Wall Configuration B	
		Wall Config	guration C
UL V464 EQ	 3 ⁵/₈" proprietary steel stud (ClarkDietrich) with 0.0150" thickness and spaced as follows: Configuration B: 8" or 12" o.c. Configuration C: 16" or 24" o.c. 	Wall Config	guration A
 3 ½" glass finom. density 1 layer of 5% soundproof and 1 layer board on other states. 	 3 ¹/₂" glass fiber insulation with nom. density of 0.95 pcf 1 layer of ⁵/₈" "QuietRock" soundproof drywall on one side and 1 layer of ⁵/₈" Type X gypsum board on other side 	V V V V V V V V V V V V V V V V V V V	JUNION B
	board on other side	V LOUNS V LOUNS Wall Config	JANNA MANA Juration C
		1 h	56* (Configuration B) 61* (Configuration C)

* Estimated value (see www.guietsolution.com/acousticfireassemblies.pdf)

Source	Description	Fire Resistance Rating	Sound Transmission Class
UL V469	 2 ¹/₂" x 1 ⁵/₈" x 25 MSG steel studs spaced at 24" o.c. optional glass fiber insulation on one or both rows of studs 1 hour - 1 layer ⁵/₈" gypsum board on each side 2 hour - 2 layers ⁵/₈" gypsum board on each side 	1 h 2 h	-
UL V488 EQ	 2 ¹/₂" x 1 ⁵/₈" x 25 MSG steel studs spaced at 24" o.c. optional glass fiber insulation on one or both rows of studs 1 hour - 1 layer ⁵/₈" gypsum board on each side 2 hour - 2 layers ⁵/₈" gypsum board on each side 	1 h 2 h	-
UL V490	 2 ½" x 1 5/8" x 25 MSG steel studs spaced at 24" o.c. optional glass fiber insulation on one or both rows of studs 1 hour - 1 layer 5/8" gypsum board on each side 2 hour - 2 layers 5/8" gypsum board on each side 	1 h 2 h	
UL V496	 2 ½" x 1 5%" x 25 MSG steel studs spaced at 24" o.c. See UL listing for alternate proprietary steel studs optional glass fiber insulation on one or both rows of studs 1 hour - 1 layer 5%" gypsum board on each side 2 hour - 2 layers 5%" gypsum board on each side 	1 h 2 h	

Source	Description	Fire Resistance Rating	Sound Transmission Class
UL W407	 2 ¹/₂" x 1 ⁵/₈" x 25 MSG steel studs spaced at 24" o.c. optional glass fiber insulation on one or both rows of studs 1 hour - 1 layer ⁵/₈" gypsum board on each side 2 hour - 2 layers ⁵/₈" gypsum board on each side 	1 h 2 h	

Non-Load Bearing Area Separation Walls – Underwriters Laboratories Inc.

		Fire	Sound
Source	Description	Resistance	Transmission
		Rating	Class
UL U336	 Separation Wall (max. height – 66 ft) 2" x 1 ³/₈" x 25 MSG "H" shaped metal studs spaced at 24" o.c. 2 layers of 1" thick gypsum board liner panels Protected Wall (Bearing or Nonbearing Wall) 3 ¹/₂" x 20 MSG steel studs spaced at 24" o.c. for Bearing Wall Rating 3 ¹/₂" x 1 ¹/₄" x 25 MSG steel studs spaced at 24" o.c. for Nonbearing Wall Rating Wall Rating (Configuration B 	i 3/4' AIR SPACE CONFIGUR EXPOSED TO FIRE FROM AREA i 3/4' AIR SPACE 3/4' AIR SPACE	ALUMINUM ATTACHMENT CLIPS RATION A SEPARATION WALL SIDE ONLY 4 4 3/4' AIR SPACE ALUMINUM ATTACHMENT CLIPS
	only)		ATION B
	 aluminum attachment clips 	2 h	
UL U366	 Separation Wall (max. height – 44 ft) 2" x 1 %" x 25 MSG "H" shaped metal studs spaced at 24" o.c. 2 layers of 1" thick gypsum board liner panels Protected Wall 	3/4' AIR SPACE T	ALUMINUM ATTACHMENT CLIPS RATION A
	 (Bearing or Nonbearing Wall) 4" x 2" wood studs spaced at 24" 1 layer ½" gypsum board aluminum attachment clips 	EXPOSED TO FIRE FROM AREA	SEPARATION WALL SIDE ONLY
		i 3/4' AIR SPACE	ALUMINUM ATTACHMENT CLIPS
		CONFIGUE Exposed to fire	KATILIN B FROM EITHER SIDE
		2 h	_

Non-Load Bearing Area Separation Walls – Underwriters Laboratories Inc.

Source	Description	Fire Resistance	Sound
Source	Description	Rating	Class
UL U373	 Separation Wall (max. height – 44 ft) 21/s" x 11/2" x 25 MSG "H" shaped metal studs spaced at 24" o.c. 2 layers of 1" thick gypsum board liner panels 	T	T
	 Protected Wall (Bearing or Nonbearing Wall) 3 ¹/₂" x 20 MSG steel studs spaced at 24" o.c. for Bearing Wall Rating 	3/4' AIR SPACE J	ALUMINUM ATTACHMENT CLIPS ATTOCHMENT CLIPS ATTION A SEPARATION WALL SIDE ONLY
	 3 ¹/₂" x 1 ¹/₄" x 25 MSG steel studs spaced at 24" o.c. for Nonbearing Wall Rating (Configuration B only) 1 layer ¹/₂" gypsum board optional glass fiber or mineral 	3/4' AIR SPACE J	ALUMINUM ATTACHMENT CLIPS RATION B
	wool insulationaluminum attachment clips	EXPOSED TO FIRE	FROM ĒIŤHĒR SIDE
UL U375	 Separation Wall (max. height – 66 ft) 2" x 1 %" x 25 MSG "H" shaped metal studs spaced at 24" o.c. 2 layers of 1" thick gypsum board liner panels 	Z II	ALUMINUM ATTACHMENT CLIPS
	 Protected Wall (Bearing or Nonbearing Wall) 3 ¹/₂" x 20 MSG steel studs spaced at 24" o.c. for Bearing Wall Rating 3 ¹/₂" x 1 ¹/₄" x 25 MSG steel studs spaced at 24" o.c. for Nonbearing Wall Rating 1 layer ¹/₂" gypsum board aluminum attachment clips 	EXPOSED TO FIRE FROM AREA	ATION A SEPARATION WALL SIDE ONLY
		2 h	_

Non-Load Bearing Area Separation Walls – Underwriters Laboratories Inc.

Source	Description	Fire Resistance	Sound Transmission
		Rating	Class
UL U437	 4" x 1½" x 20 MSG "C-H" shaped steel studs spaced at 24" o.c. 1 layer of 1" thick gypsum board liner panels on one side 1 hour - 1 layer 5%" gypsum board on other side 2 hour - 2 layers 5%" gypsum board on other side optional glass fiber or mineral wool insulation 	1 h 2 h	-

Non-Load Bearing Walls – Gypsum Association

Source	Description	Fire Resistance Rating	Sound Transmission Class
GA WP1041 ASL AS-TL1510	 3 ⁵/₈" x 20 gage steel studs spaced at 24" o.c. inner layer ¹/₂" Type X gypsum board and outer layer ¹/₄" fiber-cement board on each side 		
		1 h	50 to 54
WP1051	 2 ½² steel studs spaced at 24" o.c. 2" gloss fiber insulation 		
NGC 2318	 2 glass liber insulation inner layer ¼" gypsum board and outer layer ½" Type X gypsum board on each side 	MUUUU	<u>MANA</u> M
		1 h	50 to 54
GA WP1082 NGC 2099015	 3 ⁵/₈" x 25 gage steel studs spaced at 16" o.c. 3" mineral fiber insulation 1 layer ⁵/₈" Type X gypsum board on one side 1 layer ¹/₂" cementitous board on other side 	1 h	15 to 40
GA	• 3 ¹ / ₂ " x 20 gage steel stude	î n	45 to 49
WP1470 RAL TL83-214	 3 ½ X 20 gage steel studs spaced at 24" o.c. 3" mineral fiber insulation 2 layers ½" Type X gypsum board on one side resilient channels spaced 24" o.c. and 2 layers ½" Type X gypsum board on other side 		
		2 h	55 to 59

Non-Load Bearing Walls – Gypsum Association

		Fire	Sound
Source	Description	Resistance	Iransmission
GA WP8122	 3 ⁵/₈" x 18 gage steel studs spaced at 16" o.c. 1 layer ⁵/₈" Type X gypsum board on one side inner layer of ⁵/₈" Type X gypsum board and outer layer of 2" expanded polystyrene on other side 	Rating	
GA WP8123	 3 ⁵/₈" x 18 gage steel studs spaced at 24" o.c. 1 layer ⁵/₈" Type X gypsum board on one side inner layer of ⁵/₈" Type X gypsum board and outer layer of 4" expanded polystyrene on other side 		
	Side	2 h	-
GA WP8202	 3 ⁵/₈" x 18 gage steel studs spaced at 16" o.c. 2 layers ⁵/₈" Type X gypsum board on one side 2 layers of ⁵/₈" Type X gypsum board and 4" expanded polystyrene on other side 		
		2 h	-
GA WP8250	 3 [*]/₈" x 20 gage steel studs spaced at 16" o.c. 3" mineral fiber insulation 1 layer ⁵/₈" foil backed Type X gypsum board on one side ¹/₂" gypsum board with stucco finish on other side 	2 h	<u>IIII</u>

Non-Load Bearing Walls – Factory Mutual Research

Source	Description	Fire Resistance Rating	Sound Transmission Class
FM Wall 1 USG810519	 3 ⁵/₈" x 22 ga steel studs spaced at 24" o.c. 1 layer ⁵/₈" gypsum board on each side 		
		1 h	40
FM Wall 7 BBN760808	 3 ⁵/₈" x 22 ga steel studs spaced at 24" o.c. 2 layers ⁵/₈" gypsum board on each side 		
		2 h	48

Source	Description	Fire Resistance	Sound Transmission
000100	Beconption	Rating	Class
ITS CD/WA 60-01	 1½" wide by 2½" deep "C-T" shaped proprietary steel stud (ClarkDietrich) with 0.019 thickness* spaced at 24" o.c. 1 layer 1" Type X gypsum shaft liner on one side 1 layer 5%" Type X gypsum board on other side 	 1 h	35 (as shown) 39 (RFB 1")
ITS CD/WA 120-01	 1½" wide by 2½" deep "C-T" shaped proprietary steel stud (ClarkDietrich) with 0.019" thickness* spaced at 24" o.c. 1 layer 1" Type X gypsum shaft liner on one side 2 layers ½" gypsum board on other side 	2 h	38 (as shown) 44 (RFB 1½") 53 (RFB 1½" RC)
ITS CD/WA 120-02	 1½" wide by 2½" deep "C-T" shaped proprietary steel stud (ClarkDietrich) with 0.019" thickness* spaced at 24" o.c. 1 layer 1" Type X gypsum shaft liner and 1 layer ½" gypsum board on one side 1 layer ½" gypsum board on other side 	2 h	39 (as shown) 43 (RFB 1½") 51 (RFB 1½" RC)
ITS CD/WA 120-03	 1½" wide by 2" deep "H" shaped proprietary steel stud (ClarkDietrich) with 0.018" thickness* spaced at 24" o.c. 2 layers 1" gypsum shaft liner aluminum attachment clips 1 layer ½" gypsum board on either side 2" x 4" wood studs spaced at 16" o.c. 	RODM	SIDE I' AIR SPACE ALUMINUM ATTACHMENT CLIPS SIDE

Source	Description	Fire Resistance Rating	Sound Transmission Class
ITS CD/WA 120-04	 1½" wide by 2" deep "H" shaped proprietary steel stud (ClarkDietrich) with 0.018" thickness* spaced at 24" o.c. 2 layers 1" gypsum shaft liner on one side aluminum attachment clips 1 layer ½" gypsum board on other side 2" x 4" wood studs spaced at 24" o.c. 	RDDM ALUMINUM ATTACHMENT CLIPS FIRE 2 h	SIDE
ITS MW/WA 60-01	 1½" wide by 2½" deep "C-T" shaped proprietary steel stud (Marino\WARE) with 25 gauge thickness* spaced at 24" o.c. 1 layer 1" Type X gypsum shaft liner on one side 1 layer 5%" Type X or ½" Type C gypsum board on other side 	 1 h	
ITS MW/WA 60-02 60-04 EQ TL08-119 Western Electro – Acoustic Laboratory	 3 ⁵⁄₈", 4" or 6" depth proprietary steel stud (Marino\WARE) designated as VIPERSTUD25[™] with 0.0155" thickness* spaced at 24" o.c. 1 layer ⁵⁄₈" Type X gypsum board on each side 	1 h	41
ITS MW/WA 60-03 60-05	 two rows of 3 ⁵/₈", 4" or 6" depth proprietary steel stud (Marino\WARE) designated as VIPERSTUD25[™] with 0.0155" thickness* spaced at 24" o.c. min 1" spacing between studs from each row 1 layer ⁵/₈" Type X gypsum board on each side 	L L 1 h	

ITS MW/WA 120-01 • 1½" wide by 2½" deep "C-T" shaped proprietary steel stud (Marino/WARE) with 25 gauge thickness* spaced at 24" o.c. • Rating Class • 1 layer 1" Type X gypsum shaft liner on one side • 2 layers %" Type X or ½" Type C gypsum board on other side • 1 • 1½" wide by 2½" deep "C-T" shaped proprietary steel stud (Marino/WARE) with 25 gauge spaced at 24" o.c. • 1 • 1 • 1 layer 1" Type X gypsum shaft liner and 1 layer %" Type X or ½" Type C gypsum board on one side • 1 • • • 1 layer 5" Type X or ½" Type C gypsum board on other side • • • • • 1 layer 5" Type X or ½" Type C gypsum board on other side • • • • • 1 layer 5" Type X or ½" Type C gypsum board on other side • • • • • 1 layer 5" Type X or ½" Type C gypsum board on other side • • • • • 1 layer 5" Type X or ½" Type C gypsum board on other side • • • • • 1 layer 5" Type X or ½" Type C gypsum board on other side • • • • • 1 layer 5" Type X or ½" Type X gypsum wallboard liner panels • • Protected Wall (Bearing or Nonbearing Wall) • • • • • 1 layer ½" Type C gypsum board at 24" o.c. • • • • • 1 layer ½" Type C gypsum board at 24" o.c. • • • • • 1 layer ½" Type C gypsum board at 24" o.c. • • • • • 1 layer ½" Type C gypsum board at 24" o.c. • •<	Source	Description	Fire Resistance	Sound Transmission
ITS MWWWA 120-01 • 1½" wide by 2½" deep "C-T" shaped proprietary steel stud (Marino)WARE) with 25 gauge thickness* spaced at 24" o.c. • 1 layer 1" Type X gypsum shaft liner on one side • 2 layers %" Type X or ½" Type C gypsum board on other side • 1½" wide by 2½" deep "C-T" shaped proprietary steel stud (Marino)WARE) with 25 gauge spaced at 24" o.c. • 1 • 1 layer 1" Type X gypsum shaft liner and 1 layer %" Type X or ½" Type C gypsum board on other side • 1 ITS MW/WA 120-02 • 1 layer %" Type X or ½" Type C gypsum board on other side • 1 ITS MW/WA 120-03 • 1 layer %" Type X or ½" Type C gypsum board on other side • 1 ITS MW/WA 120-03 Firewall (max. height – 50 feet) • 2 layers of 1" thick Type X gypsum wallboard liner panels Protected Wall (Bearing or Nonbearing Wall) • min. 3½" depth steel stud spaced at 24" o.c. • 1 layer ½" Type C gypsum board • 1 layer ½" Type C gypsum board •			Rating	Class
 ITS MW/WA 120-02 1 1/2" wide by 2½" deep "C-T" shaped proprietary steel stud (Marino/WARE) with 25 gauge spaced at 24" o.c. 1 layer 1" Type X gypsum shaft liner and 1 layer 5/2" Type X or 1/2" Type C gypsum board on one side 1 layer 5/2" Type X or 1/2" Type C gypsum board on other side Firewall (max. height – 50 feet) 2" deep "H" shaped proprietary steel stud (Marino/WARE) with 25 gauge thickness* spaced at 24" o.c. 2 layers of 1" thick Type X gypsum wallboard liner panels Protected Wall (Bearing or Nonbearing Wall) min. 31/2" depth steel stud spaced at 24" o.c. 1 layer 1/2" Type C gypsum board aluminum attachment clips 	ITS MW/WA 120-01	 1½" wide by 2½" deep "C-T" shaped proprietary steel stud (Marino\WARE) with 25 gauge thickness* spaced at 24" o.c. 1 layer 1" Type X gypsum shaft liner on one side 2 layers ½" Type X or ½" Type C gypsum board on other side 	2 h	
ITS Firewall (max. height – 50 feet) • 2" deep "H" shaped proprietary steel stud (Marino\WARE) with 25 gauge thickness* spaced at 24" o.c. • 2 layers of 1" thick Type X gypsum wallboard liner panels Protected Wall (Bearing or Nonbearing Wall) • min. 3½" depth steel stud spaced at 24" o.c. • 1 layer ½" Type C gypsum board • aluminum attachment clips	ITS MW/WA 120-02	 1½" wide by 2½" deep "C-T" shaped proprietary steel stud (Marino\WARE) with 25 gauge spaced at 24" o.c. 1 layer 1" Type X gypsum shaft liner and 1 layer 5%" Type X or 1/2" Type C gypsum board on one side 1 layer 5%" Type X or 1/2" Type C gypsum board on other side 		
 Firewall (max. height – 50 feet) 2" deep "H" shaped proprietary steel stud (Marino\WARE) with 25 gauge thickness* spaced at 24" o.c. 2 layers of 1" thick Type X gypsum wallboard liner panels Protected Wall (Bearing or Nonbearing Wall) min. 3½" depth steel stud spaced at 24" o.c. 1 layer ½" Type C gypsum board aluminum attachment clips 	177.0		2 h	-
 Protected Wall (Bearing or Nonbearing Wall) min. 3½" depth steel stud spaced at 24" o.c. 1 layer ½" Type C gypsum board aluminum attachment clips 	11S MW/WA 120-03	 Firewall (max. height – 50 feet) 2" deep "H" shaped proprietary steel stud (Marino\WARE) with 25 gauge thickness* spaced at 24" o.c. 2 layers of 1" thick Type X gypsum wallboard liner panels 		
2 h -		 Protected Wall (Bearing or Nonbearing Wall) min. 3¹/₂" depth steel stud spaced at 24" o.c. 1 layer ¹/₂" Type C gypsum board aluminum attachment clips 	EXPOSED TO FIRE FROM SE	ALUMINUM ATTACHMENT CLIPS PARATION WALL SIDE ONLY

Source	Description	Fire Resistance Rating	Sound Transmission Class
ITS MW/WA 120-04 120-05 EQ TL08-124 Western Electro – Acoustic Laboratory	 1 ⁵⁄₈", 2 ¹⁄₂", 3 ⁵⁄₈", 4" or 6" depth proprietary steel stud (Marino\WARE) designated as VIPERSTUD25[™] with 0.0155" thickness* spaced at 24" o.c. 2 layers ⁵⁄₈" Type X gypsum board on each side NOTE: Optional 3¹⁄₂" fibreglass insulation required with resilient channel for STC=61 and using 3 ⁵⁄₈" steel stud. 		
ITS MW/WA 120-06 120-07 EQ	 1 5⁄8", 2 1⁄2", 3 5⁄8", 4" or 6" depth proprietary steel stud (Marino\WARE) designated as VIPERSTUD25™ with 0.0155" thickness* spaced at 24" o.c. min 1" spacing between studs from each row 2 layers 5⁄8" Type X gypsum board on each side 	2 h	61
		2 h	-
LOAD BEARING WALL ASSEMBLIES

Source	Description	Fir Resist Rati	re tance ing	Sound Transmission Class
ULC U412	 min. 152 mm proprietary steel studs, TOTALSTUD[®] by iSPAN Systems LP with min. 20 ga. material thickness and spaced at 610 mm o.c. and optional rectangular or square Hollow Structural Sections optional glass fiber or mineral wool insulation optional resilient metal channels spaced 610 mm o.c. 2 layers of 15.9 mm gypsum board on each side 	1 h		
ULC U413	 92 mm x 41 mm x 0.83 mm thick proprietary steel stud (Bailey Metal Products Ltd.) spaced at 610 mm o.c. optional glass fiber or mineral wool insulation optional steel resilient channels spaced 610 mm o.c. gypsum board on each side (rating listed for thickness of gypsum and number of layers applied) * 50 mm mineral wool insulation 	45 min 1 h 1½ h 2 h 2 h 2 h 2 h 2 h 2 h 2 h	# Layer & Size 1-12.7 1-15.9 2-12.7 2-15.9 2-15.9 3-12.7 2-10	- -
ULC U414	 92 mm x 41 mm x 0.83 mm thick proprietary steel studs (Bailey Metal Products Ltd.) spaced 610 mm o.c. optional glass fiber or mineral wool insulation optional resilient metal channels spaced 610 mm o.c. for exterior walls 12.7 mm and 15.9 mm gypsum sheathing interior gypsum board layers, thickness, and corresponding rating as shown 	2 H 3¼ h 1 h 1½ h 2 h 2 h	# Layer & Size 1-15.9 2-12.7 2-15.9 3-12.7 2-19	SIDE MANALA -

Source	Description	Fire Resistance Rating	Sound Transmission Class
ULC U415 Interior Walls	 92 mm x 41 mm x 0.83 mm thick proprietary steel studs (Bailey Metal Products Ltd.) spaced 610 mm o.c. optional glass fiber or mineral wool insulation optional steel resilient channels spaced 610 mm o.c. gypsum board on each side (rating listed for thickness of gypsum and number of layers applied) * 80% of Design Load 	45 min for 1 layer 12.7 mm 1 h for 1 layer 15.9 mm 1-½ h for 2 layers 12.7 mm 2 h for 2 layers 15.9 mm 2 h for 3 layers 12.7 mm 2 h for 2 layers 19 mm	-
ULC U415 Exterior Walls	 92 mm x 41 mm x 0.83 mm thick proprietary steel studs (Bailey Metal Products Ltd.) spaced 610 mm o.c. glass fiber or mineral wool insulation optional steel resilient channels spaced 610 mm o.c. gypsum board on interior side (rating listed for thickness of gypsum and number of layers applied) 1 layer of 12.7 mm or 15.9 mm exterior gypsum sheathing on exterior side NOTE: Exposed to fire on interior face only. 	INTERIOR VARIABLE EXTE 45 min for 1 layer 15.9 mm 1 h for 2 layers 12.7 mm 1-½ h for 2 layers 15.9 mm 2 h for 3 layers 12.7 mm 2 h for 2 layers 19 mm	SIDE SIDE

Source	Description	Fire Resistance Rating	Sound Transmission Class
ULC U418	 90 mm x 0.83 mm thick or 92 mm x 41 mm x 0.83 mm thick proprietary steel studs (Bailey Metal Products Ltd.) spaced 610 mm o.c. optional glass fiber or mineral wool insulation optional steel resilient channels spaced 610 mm o.c. gypsum board on each side (rating listed for thickness of gypsum and number of layers 	45 min for 1 layer 12.7 mm	- -
* 80% of Design Load	applied) * 80% of Design Load	1 h for 1 layer 15.9 mm 1-½ h for 2 layers 12.7 mm * 2 h for 2 layers 15.9 mm 2 h for 3 layers 12.7 mm	
ULC U419 Exterior Walls	 90 mm x 0.83 mm thick or 92 mm x 41 mm x 0.83 mm thick proprietary steel studs (Bailey Metal Products Ltd.) spaced 610 mm o.c. glass fiber or mineral wool insulation optional steel resilient channels spaced 610 mm o.c. gypsum board on interior side (rating listed for thickness of gypsum and number of layers applied) 1 layer of 12.7 mm or 15.9 mm exterior gypsum sheathing on 	y Is NIERIOR SIDE	
	exterior gypsum sneatning on exterior side NOTE: Exposed to fire on interior face only.	45 min for 1 layer 15.9 mm 1 h for 2 layers 12.7 mm 1-½ h for 2 layers 15.9 mm 2 h for 3 layers 12.7 mm	-

Source	Description	Fire Resistance Rating	Sound Transmission Class
ULC W424 a) USG810519 b) BBN760808	 92 mm x 35 mm proprietary steel stud (Bailey Metal Products Ltd.), 0.9 mm thick spaced at 600 mm o.c. 1 layer of 15.9 mm Type X gypsum board (Canadian Gypsum Company, Sheetrock Firecode C) on each side 	1 h	40 ^a
	 92 mm x 35 mm proprietary steel stud (Bailey Metal Products Ltd.), 0.9 mm thick spaced at 600 mm o.c. 2 layers of 15.9 mm Type X gypsum board (Canadian Gypsum Company, Sheetrock Firecode C) on each side ** 60% of Design Load 	 ** 2 h	<u>48</u> ^b
	 92 mm x 35 mm proprietary steel stud (Bailey Metal Products Ltd.), 0.9 mm thick spaced at 600 mm o.c. 2 layers of 12.7 mm Type X gypsum board (Canadian Gypsum Company, Sheetrock Firecode C) on each side ** 85% of Design Load 		
	 92 mm x 35 mm proprietary steel stud (Bailey Metal Products Ltd.), 0.9 mm thick spaced at 600 mm o.c. 3 layers of 12.7 mm Type X gypsum board (Canadian Gypsum Company, Sheetrock Firecode C) on each side ** 60% of Design Load 	** 1-½ h	<50*
		** 2 h	50*

Load Bearing Walls – Underwriters Laboratories of Canada

		Fire	Sound
Source	Description	Resistance	Transmission
	·	Rating	Class
ULC W445	 double wall system with min 7 mm space between each 92 mm x 41 mm x 0.80 mm thick steel stud spaced at 400 mm o.c. 2 layers of 12.7 mm gypsum board on each side 		
		1-½ h	54*
ULC W449	 double wall system with 89 mm x 41 mm x 0.86 mm thick steel stud spaced at 610 mm o.c. any glass fibre insulation with ULC Listing Mark with min. density of 8.0 kg/m³ 1 or 2 layers of 15.9 mm gypsum board on each side 	N L MMA N L MMA	MMMIN MMMIN
	** 80% of Design Load	**1 h for 1–15.9mm	58* (AIR 25mm) 59* (AIR 50mm)
		2 h for 2-15.9mm	68* (AIR 25mm) 69* (AIR 50mm)
ULC W485	 92 mm x 41 mm x 0.836 mm thick steel studs spaced at 406 mm o.c. inner 2 layers of 12.7 mm gypsum board 1 layer of 15.9 mm Type X gypsum board on other side 150 mm max. thick polystyrene insulation boards components in exterior wall insulation and finish system by Durabond Products Ltd. 	FIRE	SIDE

Load Bearing Walls – Underwriters Laboratories of Canada

		Fire	Sound
Source	Description	Resistance	Transmission
		Rating	Class
ULC	• 92 mm x 41 mm x 0.836 mm		
W489	thick steel studs spaced at 610		
	mm o.c.		
	• inner 1 layer of 12.7 mm gypsum		
	board		
	 1 layer of 15.9 mm Type X 		
	gypsum board on other side		
	• 150 mm max. thick polystyrene	FIRE	SIDE
	insulation boards		
	 components in exterior wall 		
	insulation and finish system by		
	Durabond Products Ltd.		datatatatatatatatatatatatatatata
		1 h	-

As per Technical Note no. 8, UL Floor/Ceiling and Load Bearing Wall assemblies using cold-formed steel joists and studs can be used for Canadian application. Details regarding this condition are given in "*BXUV7.GuideInfo, Fire Resistance Ratings - CAN/ULC-S101 Certified for Canada*". UL Load Bearing Wall assemblies that can be used for Canadian application as per BXUV7 are listed below and the relevant assemblies are noted with a <u>BXUV7</u> symbol in the 1st column of the section showing UL Load Bearing Wall assemblies (see pages 147 to 155).

U407	U462	V446
U418	U473	V454
U423	U477	V457
U424	U485	V458
U425	U487	V465
U426	U490	V471
U432	V420	V478
U434	V432	V479
U440	V434	V480
U460		

The following pages present load bearing wall assemblies fire tested at NRCC during a multi industry (steel, wood, gypsum and insulation) fire testing program that is reported on in a fire test report, namely A-4222.2 (February 2002), and later issued as RR-343 (2013). The fire test report no. appears in the source column and is followed by a "F" fire test no. used in the report. A relevant NRCC acoustic report is also listed below and this reference document deals with acoustic data, i.e., values of Sound Transmission Class that have been established as an estimated value or from an acoustic test where the acoustic test no. appears in the source column.

NRCC A-4222.2 & RR-343 data for F26 to F39 (see pages 144 to 146)

Reference (fire data):

Kodur, V.K.R., Sultan, M.A., Latour, J.C., Leroux, P. and Monette, R.C., *Fire Resistance Tests on Gypsum Board-Protected Loadbearing Steel Stud Walls, IRC Client Report No. A-4222.2*, National Research Council of Canada, Ottawa, Ontario, Canada, February 2002.

Reference (fire data):

Kodur, V.K.R., Sultan, M.A., Latour, J.C., Leroux, P. and Monette, R.C., *Experimental Studies on the Fire Resistance of Load-bearing Steel Stud Walls, Research Report No. RR-343,* National Research Council of Canada, Ottawa, Ontario, Canada, May 2013.

Reference (acoustic data):

* Warnock, A.C.C., *Estimation of Sound Transmission Class and Impact Insulation Class Rating for Steel Framed Assemblies*, Report No. B3436.1 Revised, Institute for Research in Construction, National Research Council of Canada, Ottawa, Ontario, Canada, November 2008.

Source	Description	Fire Endurance	Sound Transmission Class
NRCC A4222.2 RR-343 F26	 double wall system with 92 mm deep x 0.91 mm thick steel stud spaced at 406 mm o.c. 39 mm wide diagonal strap bracing with 101 x 101 x 0.912 mm gusset plates 90 mm mineral fibre insulation 2 layers of 12.7 mm Type X gypsum board on each side 	0	 64*
NRCC A4222.2 RR-343 F27 F31 F38	 92 mm deep steel stud with 0.91 mm thickness spaced at 406 mm o.c. 39 mm wide diagonal strap bracing with 101 x 101 x 0.912 mm gusset plates steel resilient channels spaced 406 mm o.c. insulation (see below) 2 layers of 12.7 mm Type X gypsum board on each side F27 - 90 mm glass fibre insulation F31 - 90 mm cellulose insulation F38 – 90 mm mineral fibre insulation 	F27 = 56 min F31 = 71 min	55* 54*
NRCC A4222.2 RR-343 F28	 92 mm deep steel stud with 0.91 mm thickness spaced at 610 mm o.c. 39 mm wide diagonal strap bracing with 101 x 101 x 0.912 mm gusset plates steel resilient channels spaced 406 mm o.c. 90 mm mineral fibre insulation 2 layers of 12.7 mm Type X gypsum board on each side 	74 min	54

Source	Description	Fire Endurance	Sound Transmission Class
NRCC A4222.2 RR-343 F30 F30R TLA-01-019a	 double wall system with 92 mm deep x 0.91 mm thick steel stud spaced at 406 mm o.c. 39 mm wide diagonal strap bracing with 101 x 101 x 0.912 mm gusset plates 2 layers of 12.7 mm Type X gypsum board on each side NOTE: F30R used to measure the repeatability of the results. 	F30 -100 min F30R -102 min	ـــــــــــــــــــــــــــــــــــــ
NRCC A4222.2 RR-343 F35 F36	 92 mm deep steel stud with 0.84 mm thickness spaced at 406 mm o.c. 39 mm wide diagonal strap bracing with 101 x 101 x 0.912 mm gusset plates steel resilient channels spaced 406 mm o.c. 90 mm glass fibre insulation 2 layers of 12.7 mm Type X gypsum board on each side NOTE: Applied load varies between two tests; F35=78.4kN, F36=70.9kN 	F35 = 68 min F36 = 63 min	55*
NRCC A4222.2 RR-343 F37	 92 mm deep steel stud with 0.91 mm thickness spaced at 406 mm o.c. 39 mm wide diagonal strap bracing with 101 x 101 x 0.912 mm gusset plates steel resilient channels spaced 406 mm o.c. 2 layers of 12.7 mm Type X gypsum board on each side 	77 min	46*

Load Bearing Walls – National Research Council of Canada

Source		Description	Fire Endurance	Sound Transmission Class
NRCC A4222.2 RR-343 F39	•	 92 mm deep steel stud with 0.91 mm thickness spaced at 406 mm o.c. 39 mm wide diagonal strap bracing with 101 x 101 x 0.912 mm gusset plates 2 layers of 12.7 mm Type X gypsum board on each side 		
		577	83 min	<50*

Source	Description	Fire Resistance	Sound Transmission
UL U407 ^{USG840321} BXUV7	 3 ½" x 20 MSG steel studs spaced at 16" o.c. 3" mineral wool insulation 5⁄8" cementitious board, ceramic tiles and exterior finish on either side 		
		1 h	48
UL U418 BXUV7	 3 ¹/₂" or 5 ¹/₂" x 1 ¹/₂" x 18 GSG (0.051" thick) steel stud spaced at 24" o.c. 3 ¹/₂" glass fiber batts gypsum board on interior side (rating listed for thickness of gypsum and number of layers applied) 		IR SIDE
	• 1 layer of ½" gypsum sheathing on exterior side	Z VARIABLE EX	KTERIOR FACINGS
	NOTE: Exposed to fire on interior face only	45 min for 1 layer ⁵ ⁄ ₂ in. 1 h for 2 layers ½ in. 2 h for 3 layers ½ in.	- - -
UL U423 a) USG810518 b) USG810519 c) USG811006 BXUV7	 3 1⁄2" x 20 MSG steel stud spaced at 24" o.c. optional glass fiber or mineral wool insulation optional steel resilient channels spaced 24" o.c. gypsum board on each side (rating listed for thickness of gypsum and number of layers applied) * 80% of Design Load. ** 2" mineral wool insulation 	45 min for 1 layer ½ in. 1 h for 1 layer ½ in. 1-½ h for 2 layers ½ in. * 2 h for 2 layers ½ in. ** 2 h for 2 layers ½ in. 2 h for 3 layers ½ in. 2 h for 3 layers ¾ in.	41ª (RFB 2") 40 ^b (NI) - 48 ^c (RFB 2") - - -

Source	Description	Fire Resistance Rating	Sound Transmission Class
UL U424 BXUV7	 3 ¹/₂" x 1 ¹/₂" x 20 MSG steel stud spaced at 24" o.c. optional glass fiber or mineral wool insulation optional steel resilient channels spaced 24" o.c. gypsum board on interior side (rating listed for thickness of gypsum and number of layers applied) 	INTERIOR SIDE	
	 1 layer of ½" or 5%" gypsum board on exterior side NOTE: Exposed to fire on interior face only 	45 min for 1 layer ⁵ ⁄ ₈ in. 1 h for 2 layers ½ in. 1-½ h for 2 layers ⁵ ⁄ ₈ in. 2 h for 3 layers ½ in. 2 h for 2 layers ¾ in.	- - - -
UL U425 Interior Walls	 3 ¹/₂" x 20 MSG steel stud spaced at 24" o.c. optional glass fiber or mineral wool insulation optional steel resilient channels 		
a) USG811009 b) USG811006	 spaced 24" o.c. gypsum board on each side (rating listed for thickness of gypsum and number of layers applied) * 80% of Design Load 	45 min for 1 layer ½ in. 1 h for 1 layer % in. 1-½ h for 2 layers ½ in. * 2 h for 2 layers % in. 2 h for 3 layers ½ in. 2 h for 2 layers ¾ in.	- 49ª (RFB 2") 48 ^b (RFB 2") - -
UL U425 Exterior Walls a) USG811009 b) USG811006 BXUV7	 3 ¹/₂" x 20 MSG steel stud spaced at 24" o.c. glass fiber or mineral wool insulation optional steel resilient channels spaced 24" o.c. gypsum board on interior side (rating listed for thickness of gypsum and number of layers applied) 		IR SIDE
	 1 layer of ½" or 5/8" exterior gypsum sheathing on exterior side NOTE: Exposed to fire on interior face only. 	45 min for 1 layer % in. 1 h for 2 layers ½ in. 1-½ h for 2 layers % in. 2 h for 3 layers ½ in. 2 h for 2 layers ¾ in.	49ª (RFB 2") 48 ^b (RFB 2") - -

		Fire	Sound
Source	Description	Resistance	Transmission
		Rating	Class
UL	• 3 ½" x 20 MSG steel stud		
0420	spaced at 24 o.c.		
BXIIV7	optional mineral wool or spray applied collulose insulation		
BAGVI	• A layers of ¹ / ₂ " avosum board on) 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	$) \bigcirc \bigcirc$
	each side		
		2 h	_
1.0	2 1/" x 20 MCC steel stud	3 11	_
	• 3 1/2 X 20 MISG Steel Stud		
0402	 optional glass fiber or mineral 		
BXUV7	wool insulation	$\bigcirc \square \bigcirc \square \bigcirc \bigcirc \square \bigcirc \bigcirc$	$\square \square $
	• 5%" gypsum board on each side	1000000000000000000000000000000000000	
	5,1		
		1 h	-
UL	• 3 ¹ / ₂ " x 20 MSG steel stud		
U434	spaced at 24" o.c.		
	optional glass fiber or mineral		
	WOOI Insulation		
	 78 gypsull board off one side motal lath and 2 coat 7/") 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0) 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	 Inclainatin and 2 coat 78 portland cement plaster 	la na su automatica de la la seconda de s	an na harana ang baratan na harang katalan na manakana katalan na harang katalan na harang katalan na harang ka
	portana coment plaster	1 h	<50* (RFB 3½")
UL	• 3 ¹ / ₂ " x 20 MSG steel stud		
U440	spaced at 24" o.c.		
a) USC 911000	optional steel resilient channels		
b) SA840715	spaced 24" o.c.		
	optional mineral wool insulation	$\{ i \in \mathcal{N} : i \in N$	
BXUV7	• 2 layers of ½" gypsum board on		
	each side	1 6	
		1 [1	$49^{\circ} (\text{NRC RFB } 2^{\circ})$ $51^{\circ} (\text{one BC NI})$

Source	Description	Fire Resistance Rating	Sound Transmission Class
UL U460 BXUV7	 3 1/2" x 20 MSG steel stud spaced at 24" o.c. 3 1/2" mineral wool insulation 5/8" gypsum board on interior side 5/8" gypsum sheathing on exterior side 1" rigid polystyrene or polyisocyanurate insulation on exterior side 1/2" plywood sheathing on exterior side 	1 h	
UL U462 BXUV7	 3 ¹/₂" x 20 MSG steel stud spaced at 24" o.c. optional mineral wool insulation 4 layers of ¹/₂" gypsum board on each side 		
UL U473 BXUV7	 3 ¹/₂" x 20 MSG steel stud spaced at 16" o.c. min 3" insulation 1 layer ⁵/₈" gypsum board on one side 1 layer ⁵/₈" gypsum board and 1 layer ¹/₂" or ⁵/₈" cementitious board on other side 	3 n	-
UL U477 BXUV7	 3 ⁵/₈" x 1 ⁵/₈" x 20 MSG steel stud spaced at 24" o.c. 3¹/₂" mineral wool or spray applied cellulose insulation 2 layers ⁵/₈" gypsum board on one side 1 layer 0.591" (15 mm) thick mineral and fiber board on other side 	2 h	

Source	Description	Fire Resistance Rating	Sound Transmission Class
UL U485 BXUV7	 3 ¹/₂" x 20 MSG steel studs spaced at 16" o.c. 3" min "Thermafiber" insulation inner layer ¹/₂" or ⁵/₈" cementitious board and outer layer ⁵/₈" thick gypsum board on either side 	1 h	-
UL U487 BXUV7	 3 ⁵/₈" x 1 ⁵/₈" x 20 MSG steel stud spaced at 24" o.c. 3" mineral wool insulation 2 layers ⁵/₈" gypsum board on one side 1 layer 17 mm thick mineral and fiber board on other side 	MM	MMM
		1 h	<50*
UL U490 BXUV7	 3 ¹/₂" x 1⁵/₈" x 20 MSG steel stud spaced at 24" o.c. 3" mineral wool insulation for 3h 3" mineral wool insulation with minimum 4 pcf for 4h 2 layers ³/₄" gypsum board on 	MANNA	MMM
	each side	3 h 4 h	<50* <50*
UL V420 BXUV7	 3 ¹/₂" x 20 MSG steel stud spaced at 24" o.c. min 3" thick and max 2' wide precast autoclaved aerated concrete panels on one side 7/₈" furring channels spaced 24" o.c. on one side 2 layers of ⁵/₈" gypsum board on other side 	2 h	

Load Bearing Walls – Underwriters Laboratories Inc.

		Fire	Sound
Source	Description	Resistance	Transmission
		Rating	Class
UL	• 3 ¹ / ₂ " x 20 MSG steel stud spaced		
V432	at 24" o.c.		
	 glass fiber or mineral wool 		
BX0V7	insulation		
	 5%" gypsum sheathing on exterior side 		
	• optional min ⁷ / ₁₆ " wood structural	VAR	IABLE EXTERIOR FACINGS
	panel sheathing on exterior side		
	• 5/8" gypsum board on interior side		
) 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0) 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	NOTE: Exposed to fire on interior	INTERII	JR SIDE
		1 h	-
UL	• 3 ¹ / ₂ " x 20 MSG steel stud spaced		
V434	at 24" o.c.		
	• 3 ¹ / ₂ " glass fiber or mineral wool	· • · · · · · · · · · · · · · · · · · ·	b b .
BXUV7	insulation		
	 1 layer ⁵/₈" gypsum board on one 		
	side	R R	I N
	• 1 layer max 2" foamed plastic		G
	board on other side	<u> </u>	
	• 4" brick veneer	1 h	-
UL	• double wall system with 3 ¹ / ₂ " x		
V446	1 ^s %" x 0.034" thick galv steel stud		
	spaced at 24" o.c.		
BXUV7	• any glass fiber insulation with UL		
	Classification Marking with min.	$\cap \square \cap \cap \cap \cap \cap \cap \cap$	$\bigcirc \bigcirc $
	density of 0.5 pcf	1000000000000000000000000000000000000	
	• 1 or 2 layers of % gypsum board		
		**1 h for 1 - %"	58* (AIR 1")
	** 80% of Design Load		59* (AIR 2")
		2 h tor 2 - ¾"	68* (AIR 1")
			69 [^] (AIR 2")

Source	Description	Fire Resistance Rating	Sound Transmission Class
UL V454 BXUV7	 3 ½" x 20 MSG steel studs spaced at 24" o.c. optional glass fiber or mineral wool insulation filling stud cavity 1 layer 5%" gypsum board on each side 1 layer max 4" foamed plastic board on one side 		Exterior facings
UL V457 BXUV7	 3 ⁵/₈" x 1 ⁵/₈" x 20 MSG proprietary steel studs (Marino\WARE) spaced at 24" o.c. 3 ¹/₂" glass fiber insulation with min. density of 1.0 pcf 1 hour - 1 layer ⁵/₈" gypsum board on each side 2 hour - 2 layers ⁵/₈" gypsum board on each side 	1 h 2 h	-
UL V458 BXUV7	 3 ⁵/₈" x 18 MSG steel studs spaced at 24" o.c. 3 ¹/₂" mineral wool insulation with min. density of 3.5 pcf 1 layer ⁵/₈" gypsum board on each side for exterior walls add ⁵/₈" gypsum sheathing to exterior side 		R WALL R SIDE R WALL

Source	Description	Fire Resistance Rating	Sound Transmission Class
UL V465 BXUV7	 3 1/2" x 15/8" x 20 MSG steel stud spaced at 24" o.c. 3 1/2" nominal thickness glass fibre insulation friction fit in stud cavity 3/4" thick structural cement-fibre units, designated "Structo-Crete", one layer on each side and two layers on each side of stud top wall 5/8" gypsum board, face layer on each side Alternate Installation 3/4" thick structural cement-fibre units, designated "Structo Crete" 		
	 one layer on each side 5%" gypsum board, entire face layer on each side 	Vertical Se	ternate stallation ction -
UL V471 BXUV7	 6" x 1⁵/₈" x 18 MSG steel stud spaced at 24" o.c. 5 ¹/₂" nominal thickness glass fibre insulation friction fit in stud cavity ³/₄" thick structural cement-fibre units, designated "Structo-Crete", one layer on each side and two layers on each side of stud top wall ⁵/₈" gypsum board, face layer on each side Alternate Installation ³/₄" thick structural cement-fibre units, designated "Structo-Crete", one layer on each side 	Vertical Se	Iternate stallation

Source	Description	Fire Resistance Rating	Sound Transmission Class
UL V478 BXUV7	 3 ½" x 20 MSG steel stud spaced at 24" o.c. optional glass fiber or mineral wool insulation optional on one or both sides, steel resilient channels spaced 24" o.c. gypsum board on each side (rating listed for thickness of gypsum and number of layers applied) * 80% of Design Load. ** 2" mineral wool insulation 	45 min for 1 layer 1/2 1 h for 1 layer 5/8 ii 1-1/2 h for 2 layers 1/2 * 2 h for 2 layers 5/8 ** 2 h for 2 layers 5/8 2 h for 3 layers 1/2 2 h for 3 layers 3/4	2 in n in in in in in in in
UL V479 BXUV7	 3 ½" x 1 ½" x 20 MSG steel stud spaced at 24" o.c. optional glass fiber or mineral wool insulation optional steel resilient channels spaced 24" o.c. gypsum board on interior side (rating listed for thickness of gypsum and number of layers applied) 1 layer of ½" or 5%" gypsum board on exterior side NOTE: Exposed to fire on interior face only 	45 min for 1 layer 5/2 1 h for 2 layers 1/2 2 h for 3 layers 1/2 2 h for 2 layers 3/4	IR SIDE
UL V480 BXUV7	 3 ¹/₂" x 20 MSG steel studs spaced at 24" o.c. optional glass fiber or mineral wool insulation ⁵/₈" gypsum board on each side 	1 h	<u> </u>

Source	Description	Fire Resistance Rating	Sound Transmission Class
UL W431	 min. 6" proprietary steel studs, TOTALSTUD[®] by iSPAN Systems LP with min. 20 ga. material thickness and spaced at 24" o.c. and optional rectangular or square Hollow Structural Sections optional glass fiber or mineral wool insulation optional resilient metal channels spaced 24" o.c. 2 layers of %" gypsum board on each side 		
	each side	1 h	-

Load Bearing Walls – Gypsum Association

Source	Description	Fire Resistance Rating	Sound Transmission Class
GA WP1417	 3 ¹/₂" x 20 gage steel stud spaced at 16" o.c. 3" mineral fiber insulation 1 layer ⁵/₈" Type X gypsum board on one side 1 layer ¹/₂" cementitious board on other side 	MALIN	MNNN
		1 h	-
GA WP1716 NGC 2250	 3 ¹/₂" x 20 gage steel stud spaced at 24" o.c. 2 layers ⁵/₈" Type X gypsum board on each side 		
		2 h	40 to 44

ROOF/CEILING ASSEMBLIES

Source	Description	Fire Resistance Rating
ULC R500	 roof covering foamed plastic insulation boards, 1" for 1h, 2" for 1½ h & 4" for 2h gypsum sheathing min. 12.7 mm thick steel roof deck corrugated or fluted, min. 0.76 mm thick trusses spaced a max. 1220 mm o.c. proprietary pre-fabricated light gauge steel truss system, Ultra- Span by Aegis Metal Framing resilient or furring channels spaced 406 mm o.c. 1 & 1½ hour - 1 layer of 15.9 mm gypsum board on ceiling side 2 hour - 2 layers of 15.9 mm gypsum board on ceiling side 	1 h 1-½ h 2 b
ULC R501	 roof covering nom. 18 mm thick wood structural panels trusses spaced a max. of 1220 mm o.c. proprietary pre-fabricated light gauge steel truss system, Ultra- Span by Aegis Metal Framing min. 241 mm thick glass fibre insulation for 1½h, any thickness mineral wool or glass fibre insulation for 1 h, optional resilient or furring channels spaced 406 mm o.c. 1 hour - 1 layer of 15.9 mm gypsum board on ceiling side 1½ hours - 2 layers of 15.9 mm gypsum board on ceiling side 	1 h 1-½ h

Source	Description	Fire Resistance Rating
UL P511	 crushed stone & roof covering insulating concrete, min. 2" foamed plastic insulation boards, thickness 1" to 8" 28 MSG roof deck, ⁹/₁₆" deep 7¹/₄" x 18 MSG steel roof joist spaced 24" o.c. furring channels spaced 24" o.c. 2 layers of ¹/₂" gypsum board 	
	• roof covering	1 N
P512	 Proof covering 2 layers of 2 ⁷/₁₆" mineral & fiber boards gypsum sheathing ¹/₂" thick 28 MSG roof deck, ⁹/₁₆" deep 7¹/₄" x 18 MSG steel roof joist spaced 24" o.c. 2 layers of ¹/₂" gypsum board 	
		1 h
UL P515	 roof covering foamed plastic, mineral wool, glass fiber or perlite insulation boards, 1" min. thickness and no limit on max. overall thickness gypsum sheathing ½" thick steel roof deck corrugated or fluted, min. 28 MSG trusses spaced a max. 24" or 48" o.c. truss chord & web sections designed to AISI Specifications resilient or furring channels spaced 24"o.c. 2 layers of 5%" gypsum board on ceiling side 	1 h

Source	Description	Fire Resistance Rating
UL P518	 roof covering gypsum sheathing ½" thick 28 MSG roof deck, ⁹/₁₆" deep 8" x 18 MSG steel roof joist spaced at 24" o.c. 8" thick glass fiber insulation 2 layers of ½" gypsum board 	1 h
UL P521	 roof covering foamed plastic insulation boards, 1" for 1h, 2" for 1½ h & 4" for 2h gypsum sheathing min. ½" thick steel roof deck corrugated or fluted, min. 22 MSG trusses spaced a max. 48" o.c. proprietary pre-fabricated light gauge steel truss system, Ultra- Span by Aegis Metal Framing resilient or furring channels spaced 16"o.c. 1 & 1½ hour - 1 layer of 5%" gypsum board on ceiling side 2 hour - 2 layers of 5%" gypsum board on ceiling side 	1 h 1-½ h 2 h

Source	Description	Fire Resistance Rating
UL P523	 roof covering nom. ²³/₃₂" thick wood structural panels trusses spaced a max. of 48" o.c. proprietary pre-fabricated light gauge steel truss system, Ultra-Span by Aegis Metal Framing min. 9½" thick glass fiber insulation for 1½h, any thickness mineral wool or glass fiber insulation for 1 h, optional resilient or furring channels spaced 16"o.c. 1 hour - 1 layer of ⁵/₈" gypsum board on ceiling side 1½ hours - 2 layers of ⁵/₈" 	1 h 1-½ h
UL P525	 roof covering foamed plastic insulation boards, no minimum for 1h, 2" for 1½ h & 4" for 2h gypsum sheathing min. ½" thick steel roof deck corrugated or fluted, min. 22 MSG trusses spaced a max. 48" o.c. proprietary pre-fabricated light gauge steel truss system, TrusSteel by TrusSteel, Division of ITW Building Components Inc. resilient or furring channels spaced 16"o.c. 1 & 1½ hours - 1 layer of 5%" gypsum board on ceiling side 2 hours - 2 layers of 5%" gypsum board on ceiling side 	1 h 1 h 1 h 1 -1/2 h 2 h

Source	Description	Fire Resistance Rating
UL P526	 roof covering nom. ²³/₃₂" thick plywood sheathing trusses spaced a max. 24" or 48" o.c. proprietary pre-fabricated light gauge steel truss system, TrusSteel by TrusSteel, Division of ITW Building Components Inc. resilient or furring channels spaced 16"o.c. min. 9½" thick mineral wool or glass fiber insulation for 1½h, any thickness mineral wool or glass fiber insulation for 1 h, optional 1 hour – 1 layer of ⁵/₈" gypsum board on ceiling side 1½ hours - 2 layers of ⁵/₈" 	1 h
UL P527	 roof covering foamed plastic insulation boards, no minimum for 1h & 2" for 1½ h gypsum sheathing min. ½" thick steel roof deck corrugated or fluted, min. 22 MSG trusses spaced a max. 48" o.c. proprietary pre-fabricated light gauge steel truss system, Amkey System by Allied Studco resilient channels spaced 16"o.c. 1 layer of %" gypsum board on ceiling side 	1 h 1-½ h

Source	Description	Fire Resistance Rating
UL P528	 roof covering nom. ²³/₃₂" thick plywood sheathing trusses spaced a max. 24" or 48" o.c. proprietary pre-fabricated light gauge steel truss system, Amkey System by Allied Studco resilient channels spaced 16"o.c. mineral wool or glass fiber insulation 1 layer of 5%" gypsum board on ceiling side 	
UL P535	 Truss Configuration A 24 MSG metal roof deck panels installed above steel purlin assembly per metal roof deck manufacturer's specifications Truss Configuration B roof covering 1 layer min. 1-⁷/₈" mineral and fiber board with optional cementitious backer units optional foam plastic insulation trusses spaced a max. 24", 36" or 48" o.c. truss chord & web sections designed to AISI Specifications 25 MSG resilient or furring channels spaced 24" o.c. 1 layer of ⁵/₈" gypsum board on ceiling side 	Truss Configuration A Truss Configuration B

Source	Description	Fire Resistance Rating
UL P540	 roof covering foamed plastic, mineral wool, glass fiber or perlite insulation boards, no min. thickness and no limit on max. overall thickness gypsum sheathing min. ½" thick steel roof deck corrugated or fluted, min. 22 MSG trusses spaced a max. 48" o.c. proprietary pre-fabricated light gauge steel truss systems, 1. Ultra-span by Aegis Metal Framing Amkey System by Allied Studco Truss by Steel Construction Systems Inc. Strong-Span by Hexaport International Ltd. TrusSteel by TrusSteel, Division of ITW Building Components Inc. resilient or furring channels spaced 16"o.c. any thickness mineral wool or glass fiber insulation 1 layer of %" gypsum board on ceiling side 	I h

Source	Description	Fire Resistance Rating
UL P541	 roof covering foamed plastic, mineral wool, glass fiber or perlite insulation boards, 1" min. thickness and no limit on max. overall thickness gypsum sheathing ½" thick steel roof deck corrugated or fluted, min. 28 MSG trusses spaced a max. 24" or 48" o.c. truss chord & web sections designed to AISI Specifications resilient channels spaced 24"o.c. 2 layers of %" gypsum board on ceiling side 	
UL P546	 roof covering foamed plastic insulation boards, 1" min. thickness and no limit on max. overall thickness gypsum board ½" or 5%" thick 22 MSG roof deck, 9/16" deep 9¼" x 16 MSG proprietary steel joists spaced at 24" o.c. 1. ClarkDietrich 2. Marino\WARE 3. CEMCO resilient channels spaced 12" o.c. any glass fiber insulation, min. 3½" and max. 6¼" thick 1 layer of 5%" gypsum board on ceiling side 	1 h

Source	Description	Fire Resistance Rating
UL P562	 roof covering any polyisocyanurate foamed plastic insulation boards, 1" min. thickness and no limit on max. overall thickness ³⁄₄" structural cement-fibre panels 10" x 16 MSG, 6" x 18 MSG with span ≤ 8' and 8" x 16 MSG steel joists spaced at 24" o.c. or proprietary steel joists spaced at 24" o.c. or. 1. CEMCO 10" x 16 MSG 2. ClarkDietrich 91⁄₄" x 16 MSG or proprietary pre-fabricated light gauge steel truss systems (TrusSteel) spaced at 24" o.c. resilient channels spaced 12" o.c. glass fiber insulation, min. 31⁄₂" thick 1 layer of 5%" gypsum board on ceiling side 	
		1 11