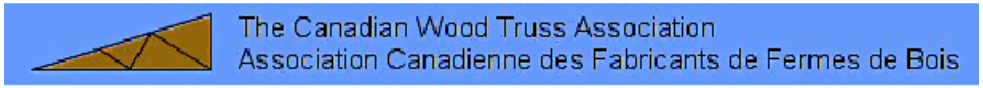
Online Tools for Wood Construction – CodeCHEK and FRR & STC

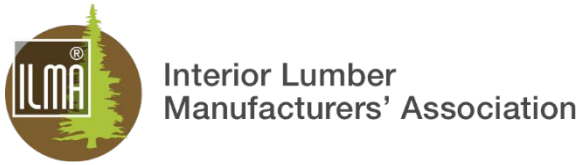
Marc Alam
Manager, Codes and Standards – Fire
Canadian Wood Council

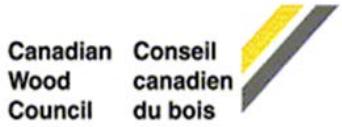
July 15, 2020

Canadian Wood Council

National federation of associations

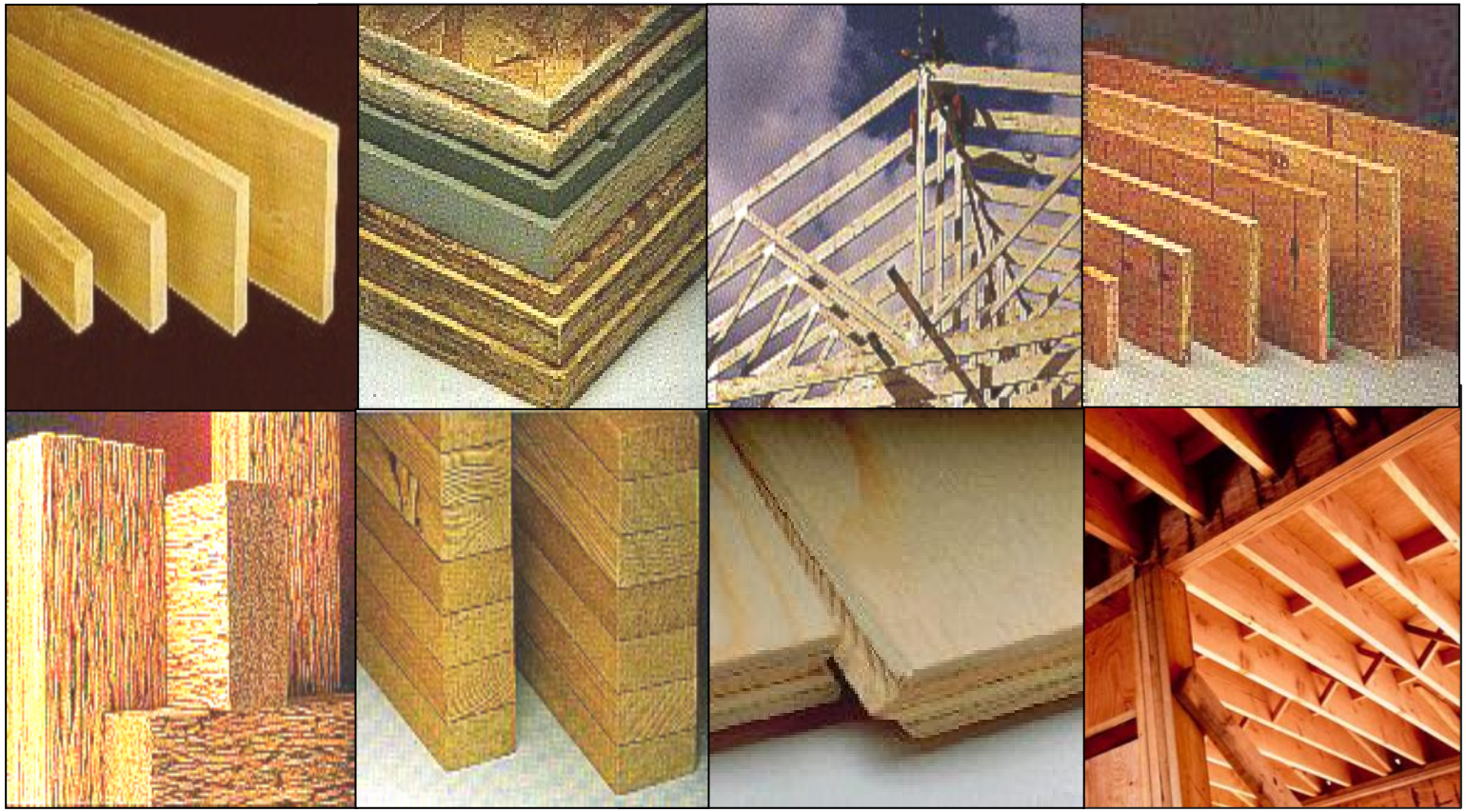






Canadian Wood Council

Represents Over 1000 Manufacturers



CWC - Principle Activities

Research

Concordia University

uOttawa

Carleton University

CMHC SCHL

Canadian Home Builders' Association

University of the Fraser Valley

UBC

Université Laval

FPInnovations

WoodWORKS!

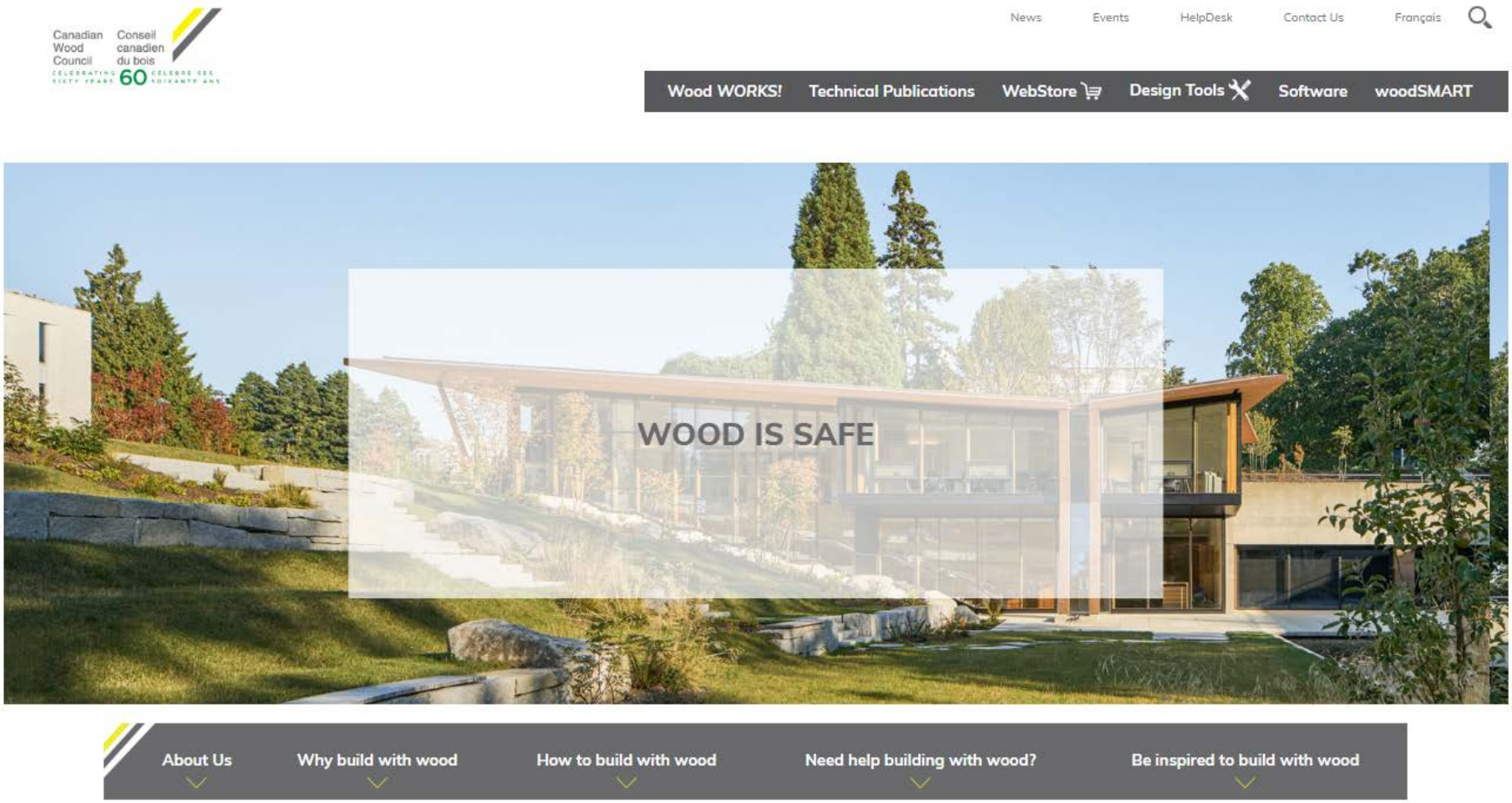
Canadian Wood Council / Conseil canadien du bois

CWC - Principle Activities

Technical Information

CWC - Principle Activities

Technical Information: www.cwc.ca



Online Tools for Wood Construction

New free online tools:

- **CodeCHEK**
  - codechek.ca
- **FRR & STC Tool**
  - frr-stc.cwc.ca

Online Tools for Wood Construction

CodeCHEK

- Check conformance to fire protection requirements in Canadian Codes
- Determine if and when WF, HT or EMTC can be used
- Provides information on what can be done if wood construction is not permitted

Online Tools for Wood Construction

CodeCHEK

- Input building characteristics
  - Building code
  - Major occupancy
  - Sprinklers/Street facing
  - Area
  - Height
- Outputs the applicable code reference(s)
  - Articles 3.2.2.20 to 3.2.2.90

CodeCHEK

Welcome to CodeCHEK, a tool for checking conformance to Canadian building codes.

CodeCHEK was developed under the Wood Works! Program by the Canadian Wood Council, with funding support from Forestry Innovation Investment, to assist designers to determine if and when lightweight wood-frame, heavy timber, mass timber and/or encapsulated mass timber construction can be used, and to determine what are the applicable construction requirements related to fire safety.

If the evaluation results show that lightweight wood-frame, heavy timber and/or encapsulated mass timber construction is permitted, the least restrictive requirements and applicable code reference(s) are displayed on the screen. Additional options with more restrictive requirements permitting lightweight wood-frame, heavy timber and/or encapsulated mass timber construction are accessible via the Code Articles button on the evaluation screen.

If the evaluation determines that lightweight wood-frame, heavy timber and/or encapsulated mass timber construction is not permitted under a particular building code's acceptable solutions with the user's input choices, information is provided regarding:

- possible changes that can be made to the project characteristics that may permit the building to be of some form of wood construction;
- references that may be of assistance in the development of an alternative solution; and,
- the wood elements permitted in a building required to be of noncombustible construction.

To get started, please enter your profession, and select province you are located in. Then click "Next".

Profession | Province | Next

CodeCHEK

Building Code Evaluator

Select
Alberta Building Code 2014
British Columbia Building Code 2018
British Columbia Building Code 2018 Jurisdiction Specific
City of Vancouver Building By-Law 2019/2020
Manitoba Building Code 2011
National Building Code 2010
National Building Code 2015
Nova Scotia Building Code 2017
Ontario Building Code Compendium 2012
Quebec Construction Code 2015
Saskatchewan National Building Code 2015 Amendments

Ontario Building Code Compendium 2012

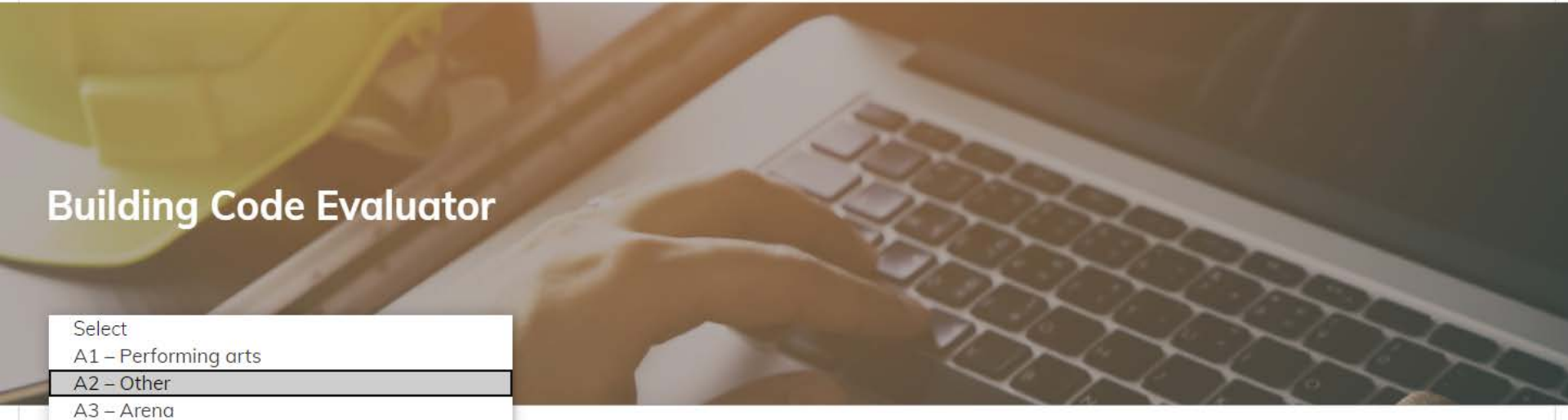
diction for your building.

Definitions

Next

Contact Us

CodeCHEK



Building Code Evaluator

Select
A1 – Performing arts
A2 – Other
A3 – Arena
A4 – Open air
B1 – Detention
B2 – Treatment
B3 – Care
C – Residential
D – Offices
E – Mercantile
F1 – High-hazard industrial
F2 – Medium-hazard industrial
F3 – Low-hazard industrial

A2 – Other

Definitions

hich the building is intended.

Back Next

CodeCHEK

Building Code Evaluator

Definitions

Please indicate if the building is sprinklered.

Additional Notes

Building Sprinklered?

- [x] Yes
- [ ] No

Back Next

CodeCHEK

Building Code Evaluator

Definitions

Building Area.

Additional Notes

Building Area :

1000

Back Next

CodeCHEK

Building Code Evaluator

Definitions

Please indicate Actual Number of Storeys.

Additional Notes

Number of storeys :

2

Back Next

CodeCHEK

Building Code Evaluator

Definitions

Spatial Separation – Maximum Area of Unprotected Openings (% of Exposing Building Face Area)

Spatial separation :

5

15

25

70

Back Next Skip

CodeCHEK

Building Code Evaluator

Previous Step | Back to Start

Definitions Print

Your Inputs

Building Code : Ontario Building Code Compendium 2012

Major Occupancy : A2 – Other

Building Sprinklered? Yes

Building Area : 1000 m^2

Number of storeys : 2

Spatial separation : 1) 5% **2)** 15% **3)** 25% **4)** 70%

Based on the inputs provided, Article **3.2.2.26.** is applicable.

Based on the inputs provided, Article **3.2.2.26.** is applicable.

3.2.2.26.

1) Outputs

- The maximum building area permitted for 2 storeys: 2400m^2
- The applicable sprinkler standard is NFPA 13-2013, "Installation of Sprinkler Systems".
- The floor assemblies must be fire separations with a fire-resistance rating of at least 45 min.
- Mezzanines must have a fire-resistance rating of at least 45 min.
- Loadbearing walls, columns, and arches must have a fire-resistance rating that is not less than that required for the supported assembly.

2) Spatial Separation – Maximum Area of Unprotected Openings Permitted (% of Exposing Building Face Area)

- Exposing Building Face 1 :
  - The exterior wall or exposing building face is required to have a fire-resistance rating of 1 h.
  - The exterior wall or exposing building face is required to be of Noncombustible construction.
  - The cladding on the exterior wall or exposing building face is required to be of Noncombustible construction.

- Exposing Building Face 2 :
  - The exterior wall or exposing building face is required to have a fire-resistance rating of 1 h.
  - The exterior wall or exposing building face is required to be of Combustible or Noncombustible construction.
  - The cladding on the exterior wall or exposing building face is required to be of Noncombustible construction.

- Exposing Building Face 3 :
  - The exterior wall or exposing building face is required to have a fire-resistance rating of 1 h.
  - The exterior wall or exposing building face is required to be of Combustible or Noncombustible construction.
  - The cladding on the exterior wall or exposing building face is required to be of Noncombustible construction.

- Exposing Building Face 4 :
  - The exterior wall or exposing building face is required to have a fire-resistance rating of 45 min.
  - The exterior wall or exposing building face is required to be of Combustible or Noncombustible construction.
  - The cladding on the exterior wall or exposing building face is required to be of Combustible or Noncombustible construction.

Related Case Studies

Online Tools for Wood Construction

FRR & STC Tool

- Determines generic fire-resistance rating designs of LWF wall, floor, and roof assemblies
  - ➢2015 NBC Appendix D-2.3 Component Additive Method

- Provides sound transmission class value for each wall or floor assembly
  - ➢2015 NBC Part 9 tables 9.10.3.1.-A and -B

Online Tools for Wood Construction

FRR & STC Tool

Appendix D-2.3 “Component Additive Method”

1) Membrane protection
   - Type X gypsum board
   - Lath and plaster
2) Framing members
   - Light wood frame
   - Light steel frame
3) Additional protective measures
   - Insulation
   - Reinforcement for a membrane

Online Tools for Wood Construction

FRR & STC Tool

Appendix D-2.3 “Component Additive Method”

1) Membrane protection

Table D-2.3.4.-B
Time Assigned to Gypsum Board Membranes on Fire-Exposed Side of Floors

Description of Finish	Resilient Metal Channels[1]	Time, min	
		Floors with Wood or Steel Joists	Floors with Open-Web Steel Joists
12.7 mm Type X gypsum board	Spaced ≤ 400 mm o.c.[2]	25[3]	—
15.9 mm Type X gypsum board		40	—
12.7 mm Type X gypsum board	—	25[4]	25
15.9 mm Type X gypsum board		40[4]	40
Double 12.7 mm Type X gypsum board	Spaced ≤ 400 mm o.c.[5]	50[3]	—
Double 12.7 mm Type X gypsum board	Spaced at 600 mm o.c.[6]	45[3]	—
Double 15.9 mm Type X gypsum board	Spaced ≤ 600 mm o.c.[6]	60[3]	—

Online Tools for Wood Construction

FRR & STC Tool

Appendix D-2.3 “Component Additive Method”

1) Membrane protection
   - Type X gypsum board
   - Lath and plaster
2) Framing members
   - Light wood frame
   - Light steel frame
3) Additional protective measures
   - Insulation
   - Reinforcement for a membrane

Online Tools for Wood Construction

FRR & STC Tool

Appendix D-2.3 “Component Additive Method”

2) Framing members

Table D-2.3.4.-E
Time Assigned for Contribution of Wood-Framed or Cold-Formed-Steel-Framed Walls

Description of Frame	Time, min	
	Loadbearing Walls	Non-Loadbearing Walls
Wood studs spaced ≤ 400 mm o.c.	20	
Wood studs spaced ≤ 600 mm o.c.	15	
Cold-formed-steel studs spaced ≤ 400 mm o.c.	10	
Cold-formed-steel studs spaced ≤ 600 mm o.c.	10	–

Online Tools for Wood Construction

FRR & STC Tool

Appendix D-2.3 “Component Additive Method”

1) Membrane protection
   - Type X gypsum board
   - Lath and plaster
2) Framing members
   - Light wood frame
   - Light steel frame
3) Additional protective measures
   - Insulation
   - Reinforcement for a membrane

Online Tools for Wood Construction

FRR & STC Tool

Appendix D-2.3 "Component Additive Method"

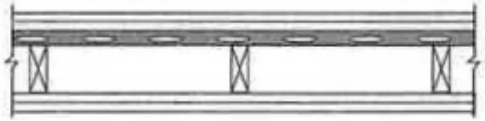
3) Additional protective measures

Description of Additional Protection	Time, min
Add to the fire-resistance rating of wood stud walls, sheathed with gypsum board or lath and plaster, if the spaces between the studs are filled with preformed insulation of rock or slag fibres conforming to CAN/ULC-S702, "Mineral Fibre Thermal Insulation for Buildings," and with a mass per unit area of not less than 1.22 kg/m^2 of wall surface	15[1]
Add to the fire-resistance rating of non-loadbearing wood stud walls, sheathed with gypsum board or lath and plaster, if the spaces between the studs are filled with preformed insulation of glass fibres conforming to CAN/ULC-S702, "Mineral Fibre Thermal Insulation for Buildings," and having a mass per unit area of not less than 0.6 kg/m^2 of wall surface	5[2]
Add to the fire-resistance rating of loadbearing wood stud walls sheathed with gypsum board if the spaces between the studs are filled with insulation of cellulose fibres conforming to CAN/ULC-S703, "Cellulose Fibre Insulation for Buildings," and having a density of not less than 50 kg/m^3	10
Add to the fire-resistance rating of plaster on gypsum lath ceilings if 0.76 mm diam wire mesh with 25 mm by 25 mm openings or 1.57 mm diam diagonal wire reinforcing at 250 mm o.c. is placed between lath and plaster	30
Add to the fire-resistance rating of plaster on gypsum lath ceilings if 76 mm wide metal lath strips are placed over joints between lath and plaster	10
Add to the fire-resistance rating of plaster on 9.5 mm thick gypsum lath ceilings (Table D-2.3.4.-D) if supports for lath are 300 mm o.c.	10
Add to the fire-resistance rating of floor assemblies if the spaces between the structural members are filled with preformed insulation of rock or slag fibres conforming to CAN/ULC-S702, "Mineral Fibre Thermal Insulation for Buildings," and having a mass per unit area of not less than 1.22 kg/m^2 of floor surface	5[2]
Add to the fire-resistance rating of floor assemblies if the spaces between the structural members are filled with wet-blown cellulose fibres conforming to CAN/ULC-S703, "Cellulose Fibre Insulation for Buildings," and having a density of not less than 50 kg/m^3	5[2][3]
Add to the fire-resistance rating of floor assemblies where the floor topping on the unexposed side of the floor assemblies consists of concrete not less than 38 mm thick	5[2]

Online Tools for Wood Construction

FRR & STC Tool

Tables 9.10.3.1.-A and -B “Fire and Sound Resistance”

Wall Number	Description	Fire-Resistance Rating[2][3]		Typical *Sound Transmission Class*[2][4][5]
		Loadbearing	Non-*Loadbearing*	
W6	• 38 mm x 89 mm studs spaced 400 mm or 600 mm o.c. • with or without absorptive material • resilient metal channels on one side • 2 layers of gypsum board on each side	 GG00037A		
W6a	W6 with • studs spaced 400 mm or 600 mm o.c. • 89 mm thick absorptive material[6] • resilient metal channels spaced 400 mm o.c. • 15.9 mm Type X gypsum board[7]	1.5 h	2 h	55
W6b	W6 with • studs spaced 400 mm or 600 mm o.c. • 89 mm thick absorptive material[6] • resilient metal channels spaced 600 mm o.c. • 15.9 mm Type X gypsum board[7]	1.5 h	2 h	58
W6c	W6 with • studs spaced 400 mm o.c. • 89 mm thick absorptive material[6] • resilient metal channels spaced 400 mm o.c. • 12.7 mm Type X gypsum board[7]	1 h	1.5 h	53

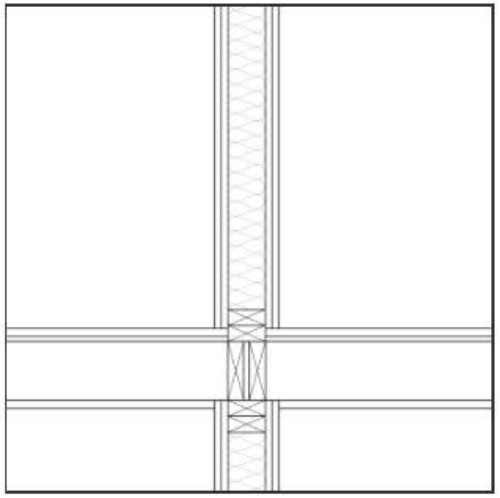
Canadian Wood Council | Conseil canadien du bois

FRR & STC Tool

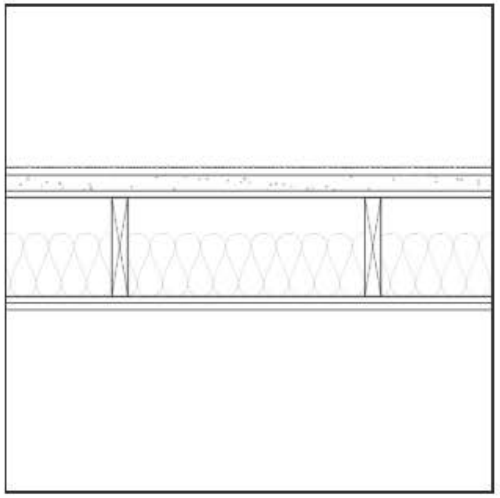
FIRE RESISTANCE & SOUND TRANSMISSION CLASS

HOME

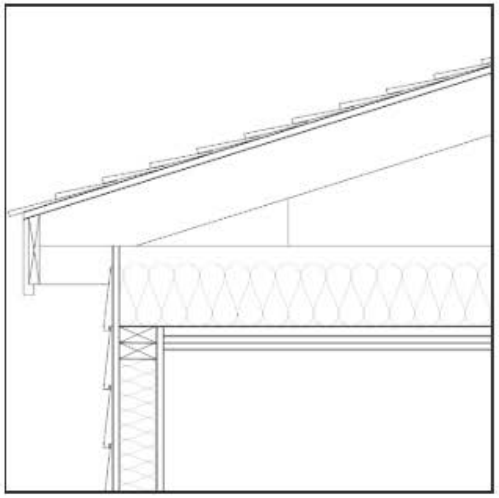
I'm looking for...



WALLS



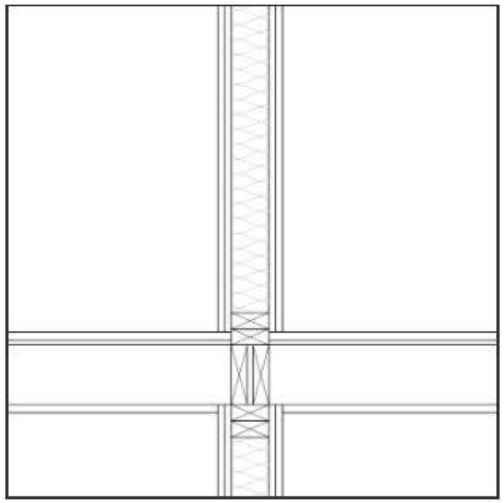
FLOORS



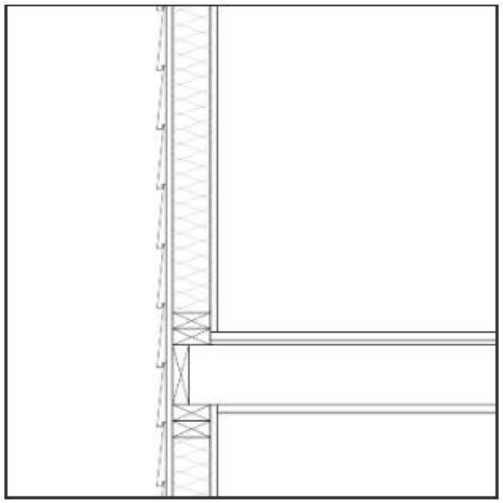
ROOFS

Back

Select the type of wall



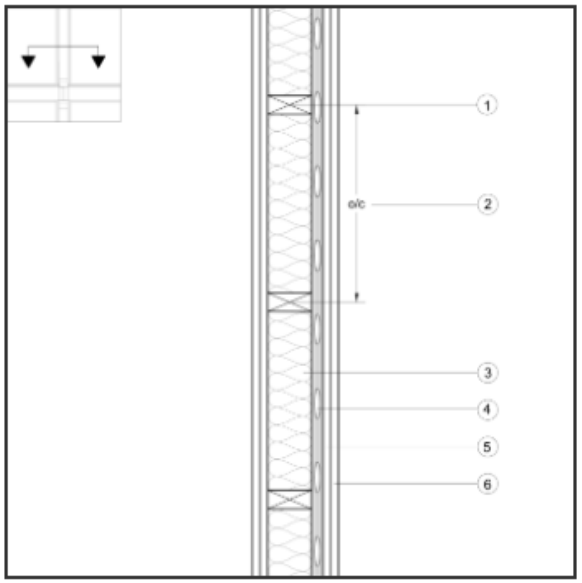
INTERIOR



EXTERIOR

Back

Wall Assemblies:



Fire Resistance Rating

No minimum

Sound Transmission Classification

No minimum

STRUCTURE

☑ Loadbearing ☐ Non Loadbearing

1. Framing: Wood Studs
2. Spacing: 400 mm o/c
3. Insulation: No Insulation

4. Resilient Metal Channels: 400 mm o/c

PROTECTIVE LAYERS

5. Layer 1: Type X Gypsum Board — 12.7 mm
6. Layer 2: Type X Gypsum Board — 12.7 mm

SEARCH

Canadian Wood Council | Conseil canadien du bois

FRR & STC Tool

FIRE RESISTANCE & SOUND TRANSMISSION CLASS

HOME

Back

Showing 1 assemblies:

Name	Wall Type	Stud Spacing	Protection Layer 1	Thickness 1	Insulation Type	RMC Spacing
53	Loadbearing	400 mm o/c	Type X Gypsum Board	12.7 mm	No Insulation	400 mm o/c

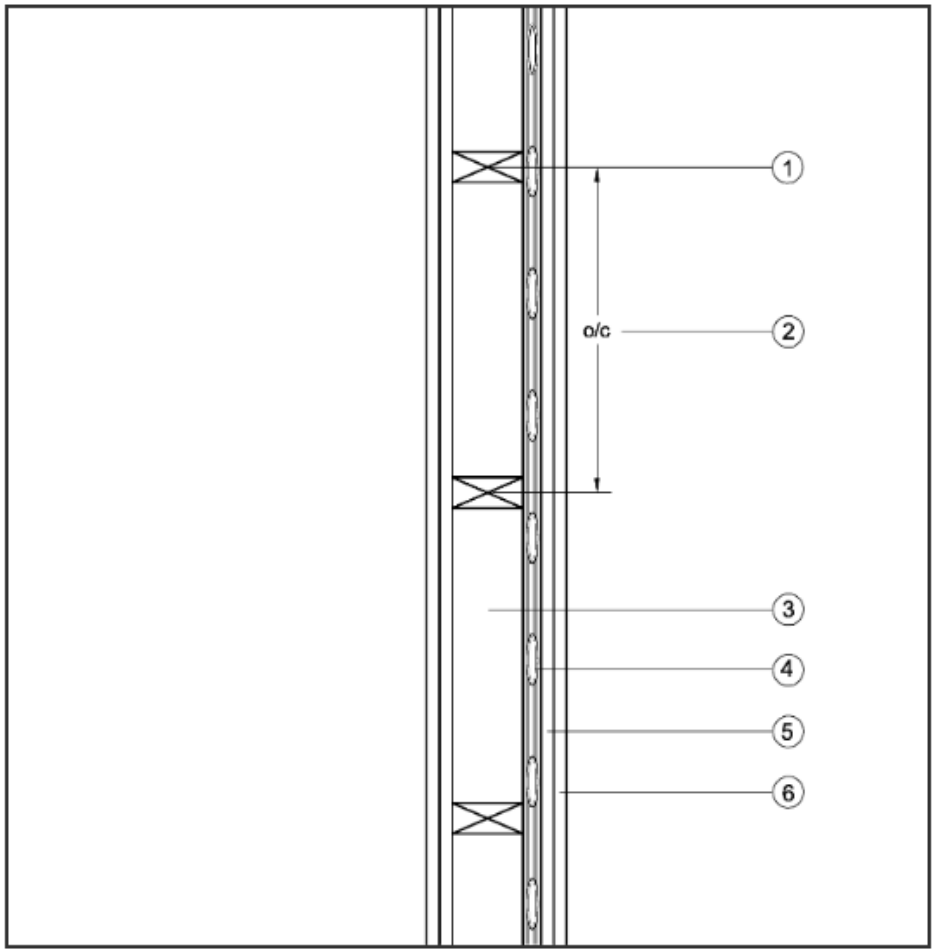
Wall Assembly Details

Name	Wall Type	Wall Location	Stud Spacing	Protection Layer 1	Thickness 1	Protection Layer 2	Thickness 2	Insulation Type	RMC
53	Loadbearing	Interior	400 mm o/c	Type X Gypsum Board	12.7 mm	Type X Gypsum Board	12.7 mm	No Insulation	400 mm o/c

View as PDF

Fire Resistance Rating: 70 min

Sound Transmission Classification: 46



1. Wood Studs
2. Framing at 400 mm o/c
3. No Insulation
4. 400 mm o/c Resilient Metal Channels
5. 12.7 mm Type X Gypsum Board
6. 12.7 mm Type X Gypsum Board

Thank You

Contact Us:

Marc Alam - Manager, Codes & Standards – Fire

Email: helpdesk@cwc.ca

Stay connected by following CWC on Twitter @CdnWoodFacts and LinkedIn (Canadian Wood Council)

Visit our website for more information
www.cwc.ca/design-tools/