

Exposed Mass Timber Calculator Results

The result is shown, below. The suite you have constructed is shown after the results.

The following is the mass timber size requirements results

	Code-Compliant	Not Code-Compliant
Mass timber walls that have 1-sided fire exposure	The thickness of the mass timber wall complies with the required thickness as specified per the 2025 edition of the National Building Code of Canada.	
Mass timber ceiling	The thickness of the mass timber floor or ceiling complies with the required thickness as specified per the 2025 edition of the National Building Code of Canada.	

The following is the fire requirements results



These aspects are not code compliant

1. The design of the suite does not comply with required wall spacing for mass timber walls that face each other, as specified in the 2025 edition of the National Building Code of Canada.

According to the 2025 edition of the National Building Code of Canada, a mass timber wall must be separated from opposing or adjacent exposed surfaces of a different mass timber wall by a horizontal distance of at least 4.5 meters.

The following objects are not code-compliant (go to the 2D drawing and click on 'Show IDs' to see the objects' IDs):

Walls: 20000, 20001, 20002, 20003

2. The design of the suite does not comply with the allowable percentage of exposed mass timber as outlined in the 2025 edition of the National Building Code of Canada.

Please adjust the design to ensure that the combined exposed mass timber beams, columns and walls constitute no more than 35% of the total area of the suite perimeter walls, including

openings.

3. When exposing more than 25% of the mass timber ceiling within a suite, if mass timber walls are exposed, the exposed wall surfaces must face same direction, or the exposed wall surfaces are separated by a horizontal distance of not less than 4.5 m. Also, if any surface of the mass timber walls are exposed within the suite, the mass timber walls that are not otherwise permitted to be exposed within the allowable 35% (remaining 65%), are protected by a material or assembly of materials that provides an encapsulation rating of not less than 80 min.

Please adjust the design to ensure 65% of the exposed walls are protected by a material or assembly of materials that provides an encapsulation rating of not less than 80 min. If there is any remaining percentage from the allowable 35% for exposed walls that is protected by user choice, it can be protected with any level of encapsulation rating, 25, 50, or 80 mins.



Additional warning

- The 2025 edition of the National Building Code of Canada includes specific requirements regarding the flame-spread rating and the percentage of exposed mass timber. It is essential to ensure compliance with the applicable Code requirements for all exposed mass timber building elements.
- When exposing more than 25% of the mass timber ceiling within a suite, if mass timber walls are exposed, the exposed wall surfaces must face same direction, or the exposed wall surfaces are separated by a horizontal distance of not less than 4.5 m. Also, if any surface of the mass timber walls are exposed within the suite, the mass timber walls that are not otherwise permitted to be exposed within the allowable 35% (remaining 65%), are protected by a material or assembly of materials that provides an encapsulation rating of not less than 80 min.

If there is any remaining percentage from the allowable 35% for exposed walls that is protected by user choice, it can be protected with any level of encapsulation rating, 25, 50, or 80 mins.

Additional notes

Structural Mass Timber Elements: Structural timber elements may consist of any number of large cross-section timber products, such as solid-sawn timber, glued-laminated timber (glulam), structural composite lumber (SCL), cross-laminated timber (CLT), and nail-laminated timber (NLT).

The minimum dimensions required for structural timber elements in encapsulated mass timber construction were established so that such elements will exhibit the fire performance characteristics of mass timber rather than those of lightweight, small-dimensioned wood elements (e.g., lumber), including reduced-ignition propensity and reduced average rate of fuel contribution. Note that the dimensions stated in Table 3.1.6.3. do not reflect a specific fire-resistance rating; larger dimensions may be required to satisfy fire-resistance rating requirements.

Encapsulation of Mass Timber Elements: The general intent of Sentence 3.1.6.4.(1) is that all

exposed surfaces of the mass timber elements be encapsulated, including the upper surface of a mass timber floor assembly. However, the exposed surfaces in certain concealed spaces formed by or contained within mass timber elements are exempted from complying with this Sentence (see Sentences 3.1.6.3.(4), 3.1.6.16.(2) and 3.1.6.17.(2), and Articles 3.1.6.7. and 3.1.6.12.). Moreover, the upper surface of a mass timber roof assembly need not be encapsulated where there is no concealed space above it. As well, the exterior side of a mass timber exterior wall assembly need not be encapsulated; however, the provisions of Article 3.1.6.9. and Subsection 3.2.3. for exterior walls still need to be considered.

Fire-Resistance Rating of Mass Timber with Exposed Surfaces: Portions of mass timber elements required to have a fire-resistance rating are permitted to be exposed in accordance with the permissions stated in Sentences 3.1.6.4.(3) to (7); however, it is important to note that applying those permissions does not waive the requirement for these elements to have a fire-resistance rating.

Exposed Surfaces of Mass Timber Walls: The primary objective of encapsulating mass timber elements is to limit the probability that these elements will significantly contribute to fire spread and fire duration in the event of a fire. Since thick wood members require a source of imposed heat flux to burn, the stipulation in Clause 3.1.6.4.(4)(a) that the exposed surfaces of mass timber walls face the same direction within a suite is intended to reduce the potential of re-radiation between burning mass timber surfaces that face each other, which could sustain flaming combustion into the decay phase of a fire if the sprinkler system failed to operate or to control the fire. Additionally, the maximum percentage of exposed surface area stated in Article 3.1.6.4. is low so that it is not sufficient to sustain a ventilation-controlled fire that might provide the radiation required to sustain flaming combustion into the decay phase of a fire if the sprinkler system failed to operate or to control the fire.

Detailed calculations

- **Type of suite:** Suite
- **Total area of suite perimeter walls:** 6.87 ft²
- **Total area of suite ceiling area:** 89.55 ft²
- **Exposed beams and columns:** 0.00 ft² (0%)
- **Exposed walls:** 6.87 ft² (100%)
- **Wall area protected by 50 minutes encapsulation:** 0.00 ft² (0%)
- **Wall area protected by 80 minutes encapsulation:** 0.00 ft² (0%)
- **Exposed ceiling:** 89.55 ft² (100%)
- **Maximum FSR of exposed beams and columns:** Less than or equal to 75
- **Maximum FSR of exposed walls:** Less than or equal to 75
- **FSR of ceiling, if it is exposed:** Less than or equal to 75
- **Are there any exposed walls?:** Yes
- **Are there any exposed mass timber walls that are a horizontal distance of less than 4.5 metres apart?:** Yes
- **Which exposed walls are less than 4.5 metres apart? (IDs are shown. To see the IDs, go to the bottom of this report.):**
 - 20000 - 20001 (0")
 - 20000 - 20002 (0")
 - 20000 - 20003 (11' 8 5/8")
 - 20001 - 20002 (7' 3 5/8")
 - 20001 - 20003 (0")
 - 20002 - 20003 (0")

What's in your suite

Perimeter walls			
ID	Type	Dimensions	Properties
20000	Wall (Mass timber)	7' 10 7/8" x 2 1/8" (thickness: 3 7/8")	Not encapsulated. FSR: unknown
20001	Wall (Mass timber)	11' 8 3/4" x 2 1/8" (thickness: 3 7/8")	Not encapsulated. FSR: unknown
20002	Wall (Mass timber)	11' 10" x 2 1/8" (thickness: 3 7/8")	Not encapsulated. FSR: unknown
20003	Wall (Mass timber)	7' 3 5/8" x 2 1/8" (thickness: 3 7/8")	Not encapsulated. FSR: unknown

Objects inside the suite			
ID	Type	Dimensions	Properties

Ceiling: Thickness: 3 7/8", Height: 2 1/8", FSR: unknown, Not encapsulated.

