

New Ontario Building Code Requirements for Mid-rise Wood Frame Buildings

Note: This information addresses complex issues in a summary fashion. Consideration should be given to the official version of the 2012 Building Code, as amended.

Ontario's Building Code

- The Building Code (the Code), a regulation under the Building Code Act, 1992 addresses new construction, renovations, change of use or demolition of buildings
- In effect since 1975, it sets uniform minimum standards for construction across Ontario to ensure a high level of public safety in buildings
- The Code sets minimum requirements for various building components including fire safety systems, structural systems, building envelope, plumbing, and heating ventilation and air-conditioning systems
- The Ministry of Municipal Affairs and Housing administers the Building Code Act, 1992 and develops the Building Code, while municipalities are responsible for enforcing the Building Code
- The current edition is the 2012 Building Code (O.Reg 332/12, as amended), which came into effect on January 1, 2014

Permitting mid-rise wood frame buildings

- Amendments to the Building Code took effect on January 1, 2015 (O.Reg. 191/14) that increase the permitted height of wood buildings from four to six storeys
- The changes allow certain five and six storey buildings to be constructed from combustible materials (e.g. light weight wood or heavy timber) as well as non-combustible materials (e.g. concrete or steel)
- These mixed use buildings:
 - May be residential or office buildings (“Group C” or “Group D” in the Building Code).
 - May include other “mixed use” occupancies, below the third floor, specifically “Group A-2”, “Group E” such as restaurants, grocery stores, as well as parking garages.
- Ontario already has high fire safety standards. The following safety measures are currently required in four storey wood frame buildings, and also be required in five and six storey wood buildings:
 - Building area that must be much smaller that of non-combustible buildings
 - Smoke alarms in all apartment suites and fire detectors in exit stairways and corridors
 - Fire hose cabinets on each floor and two independent sets of stairs
 - Automatic sprinklerring, and
 - One hour fire separations in floor and wall assemblies and between suites

Key 2012 Building Code changes for mid-rise wood buildings

- In addition to the above measures, five and six storey wood frame buildings must have:
 - Enhanced automatic sprinklering to the higher National Fire Protection Association (NFPA) 13 standard, as opposed to the lower NFPA13R standard. This applies generally to all large buildings, not just 5 and 6 storey wood buildings.
- Some of the additional requirements unique to five and six storey wood buildings are listed below:
 - Exit stairwells must have a 1.5 hour fire resistance rating and must be of non-combustible construction.
 - Building height limits. Top floor limited to 18m above first floor and 20m above the required fire access route.
 - Sprinklering of all balconies over 610mm (2 feet) deep.
 - All exterior cladding must be non-combustible or combustion resistant.
 - Roof covering must be combustion resistant class A, or non-combustible.
 - Large concealed spaces such as attics must have additional compartmentalization, even when sprinklered.
 - Plumbing must be combustion-resistant
 - At least 10% of the building perimeter must have a fire access route within 15 metres of building exterior.
 - No partial occupancy permits allowed; building must be complete and fire safety systems operational before occupancy.
 - If a five and six storey wood frame building is constructed in direct contact with an existing unsprinklered building, the firewall separating them must be masonry or concrete.
- Additional structural safety requirements
 - Mid-rise buildings must have the capacity to resist increased seismic loads

Mandatory balcony sprinklering

- Under the new amendments to the 2012 Building Code, mid-rise wood buildings are required to be sprinklered to the more robust NFPA 13 standard which applies to all buildings of this height (versus the NFPA 13R standard for four storey buildings)
- In addition, these buildings must meet enhanced balcony sprinklering requirements
- Fires on balconies are a common fire risk in mid-rise and high rise buildings
- Requiring all mid-rise wood balconies over 610 mm (2 feet) deep to be sprinklered helps to reduce this risk
- Exterior sprinkler system are readily available that do not expose water to risks of freezing

Building height limits

- Under the new amendments to the 2012 Building Code, the building height of five or six storey wood frame buildings is limited to 18 meters from ground floor to the top floor including any mezzanines
 - This ensures that ceiling heights remain reasonable and avoid the building becoming a “Tall building”, which has additional fire safety requirements
- In addition the building height is further restricted by limiting the height of the top floor to no more than 20 meters above the required fire access route
 - These height limits help to ensure that these buildings can benefit from external rescue and fire-fighting operations.

Non-combustible exterior cladding

- Under the new amendments to the 2012 Building Code, all five and six wood frame buildings are required to have non-combustible or combustion-resistant cladding
- Walls that are near the property line (where the required unobstructed openings are 10% or less) must have non-combustible cladding
- Walls set back further away from the property line may use combustion-resistant cladding that meets applicable standards
- These requirements recognize that fire can potentially spread from objects on the ground, a balcony or a window up an exterior wall
- Increasing the fire resistance of the exterior wall helps to the risk of fire spread on the exterior wall

Combustion-resistant roof covering

- Under the new amendments to the 2012 Building Code, all five and six wood frame buildings are required to have non-combustible or combustion-resistant “Class A” roof covering providing maximum fire resistance
- The requirement for combustion-resistant roof covering is intended to prevent the roof from catching fire as a result of flying embers from any nearby fires
- This requirement would apply regardless of the height of the roof
- In addition, roof structures over 25 meters would also need to either be of non-combustible construction or use fire retardant treated wood for their underlying structure
- In addition, roof assemblies - even if sprinklered - will be required to have a 1 hour fire resistance rating

Compartmentalization of large concealed spaces

- Fire can spread through concealed spaces in apartment buildings
- Under the new amendments to the 2012 Building Code, all five and six storey wood buildings are required to provide for additional compartmentalization
- Large concealed spaces such as attics are already required to be sprinklered, and would also be required to have further compartmentalization
- This means dividing these large spaces into smaller compartments divided by fire separations usually constructed with drywall
 - Alternatively, small spaces can be filled with non-combustible insulation
- This change will help to further reduce the risk of fire spread

Combustion-resistant plumbing

- The new amendments to the 2012 Building Code will, in all five and six storey wood buildings restrict the use of combustible (plastic) plumbing, tubing and associated adhesives
- Only fire-resistant plumbing products that have a flame resistance rating of 25 or less would be permitted
 - Exceptions are provided for certain small plumbing elements
- The change helps to prevent or limit the spread of fire along plumbing and tubing systems
- This change also further addresses the risk of fire spread in concealed spaces

10% of building perimeter to be near fire access

- Sprinklered buildings are only required to face one street (or fire access route)
- The 2012 Building Code currently has no requirement for a minimum percentage of the building that has to face a street
- Under the new amendments to the 2012 Building Code, all five and six storey wood buildings would be required to maintain at least 10% of the building perimeter within 15 meters of a fire access route
- These changes help emergency responders to access the building exterior and interior in order to fight fires and assist in the quick evacuation of building occupants
- This requirement recognizes the way properties are laid out in many urban areas
- The other fire safety requirements for five and six storey wood frame buildings provide additional measures to increases in safety
- It is also probable that municipal zoning by-laws may affect the amount and location of fire access relative to the building; it is therefore likely that in most cases, the frontage would exceed the 10% minimum in the amendments to the 2012 Building Code

Non-combustible exit stairwell enclosures

- The new amendments to the 2012 Building Code allow five and six storey buildings to be constructed of wood
- Exit stairwells, however, must be constructed of non-combustible materials with a 1.5 hour fire rating
- This requirement provides an additional margin of safety for residents to leave the building and for fire service personnel to combat a fire

Enhanced provisions to resist earthquake loads

- Under the new amendments to the 2012 Building Code, all five and six storey wood buildings are required to resist seismic loads that are 20% greater those that would apply to other buildings
- In addition, mid-rise building designs will be required to meet requirements for the alignment of “shear walls”, which resist lateral loads such as those imposed by an earthquake
- While the flexibility of wood frame buildings generally gives them an advantage in resisting seismic loads, the additional requirement for mid-rise wood buildings provides an additional safety margin in regard to these types of loads.

Occupancy permits

- New occupancy permit provisions for mid-rise wood frame buildings are more robust than current occupancy permit provisions for large buildings.
- Current occupancy permit provisions for large buildings allow occupancy to occur on some floors while the rest of the building is under construction. Fire safety systems need to be complete only on the occupied floors.
- The “made-in-Ontario” model for mid-rise wood buildings requires a final inspection confirming that key building systems are complete in the entire building before an occupancy permit can be issued.
- Examples of systems that must be complete in the entire building:
 - all required fire separations and closures
 - all required exits are fire separated including self-closing devices
 - required lighting in corridors, stairways and exits are completed and operational
 - required standpipe, sprinkler, and fire alarm systems are complete and operational
 - required smoke alarms, carbon monoxide detectors are complete and operational
 - required fire extinguishers have been installed
 - building envelope (e.g. cladding, roofing, fire rated assemblies) are complete.

Fire walls adjacent to non-sprinklered buildings

- Fire walls separate buildings by a 2 or 4 hour fire separation to limit the spread of fire. Under certain circumstances, they can be of non-combustible construction; for instance layers of fire-rated drywall over steel framing.
- Under the new amendments to the 2012 Building Code, fire walls requirements for mid-rise wood frame buildings are increased if the adjacent building is not sprinklered
 - a 2 hour masonry or concrete fire wall would be required between the mid-rise wood frame building and an adjacent unsprinklered building
- If the adjacent building is sprinklered, the new amendments to the 2012 Building Code permit the use a 2 hour non-combustible fire walls (even if that adjacent building is not a high rise building).

Safety during construction guideline

- Construction site safety is a major concern for all construction projects, in particular those that involve wood construction such as mid rise wood frame buildings.
- Completed buildings have many operational fire safety systems including smoke alarms, fire detectors, automatic sprinklers, fire separations, and standpipes.
- In the case of buildings that are under construction, these fire safety systems may not be installed and fully operational on all floors.
- As a result, all buildings are vulnerable to fire during construction.
- Special construction site safety and security measures are necessary to minimize risk during construction resulting from accidents or intentional acts.
- That is why it is important to address construction site safety issues that go beyond construction worker safety.
- A guideline on construction site safety is being developed specifically for mid-rise wood frame buildings.

Questions?

Please visit www.ontario.ca/buildingcode
for further information

Or

Contact your local municipal building department