Research Report:
Use of Fire-Retardant-Treated Wood in the USA and Canada

For Alberta Forest Products Association (AFPA), Alberta Wood WORKS!, and the Alberta Value-Added Wood Products Program

March 28, 2023

CHM Project No. 22041

CHM FIRE CONSULTANTS LTD.
858 Bank Street, Suite 103, Ottawa, ON, K1S 3W3

Research Report – Use of Fire-Retardant-Treated Wood in the USA and Canada
For Alberta Forest Products Association (AFPA), Alberta Wood WORKS!, and the Alberta Value-Added Wood Products Program

Prepared by:

CHM Fire Consultants
858 Bank Street, Suite 103
Ottawa, ON
K1S 3W

Revision	Date	Version	Prepared by	QC Checked	Authorized by
0	March 23, 2023	For submission	Richard Michels	Steve Craft	Steve Craft
1	March 28, 2023	Revised per comments received	Richard Michels	Steve Craft	Steve Craft

Prepared by:

Richard Michels, P.Eng
Fire Safety Engineer
CHM Fire Consultants Ltd.

Reviewed by:

Steve Craft, PhD, P.Eng
Principal
CHM Fire Consultants Ltd.

TABLE OF CONTENTS

ATTACHMENTS

1 EXECUTIVE SUMMARY

CHM Fire Consultants Ltd. has been retained by the Alberta Forest Products Association (AFPA), Alberta Wood WORKS!, and the Alberta Value-Added Wood Products Program to conduct a comparative study intended to assess the reason(s) behind the large discrepancy in demand for fire-retardant-treated wood (FRTW) in the United States (USA) and Canada. In particular, there is a large demand for FRTW in the USA compared to Canada. This study compares the building code requirements in the two countries as well as industry, political, and regulatory conditions that affect the use of FRTW in the USA and in the Canadian and Alberta construction market.

The objective of this study is to identify potential market opportunities for Canadian manufacturers of FRTW products.

FRTW refers to wood that is treated with chemicals in order to affect its burning characteristics. In particular, FRTW is pressure-impregnated with chemicals in a manufacturing plant that reduce the surface flammability characteristics of the material. FRTW does not meet the definition of a noncombustible material, but rather exhibits flame spread within a specific threshold. As the chemicals must be pressure-impregnated into the wood, wood with surface-applied products such as intumescent paints do not meet the definition of FRTW.

CHM reviewed the building code applicable in the USA, the International Building Code (IBC), as well as building codes in Canada, most notably the National Building Code of Canada (NBC), as well as select referenced standards, for requirements and permissions related to FRTW, summarized these provisions, and compared them to identify the reason for the larger demand in the USA compared to Canada. In addition, CHM reached out to industry representatives in the USA to get their perspective on the market in the USA.

In summary, the IBC contains significantly more provisions specifically permitting FRTW where materials would otherwise be required to be noncombustible than the NBC. The most significant of these relates to the use of FRTW in exterior wall assemblies. In addition to certain specific permissions for use in noncombustible (Type I and II) construction, the IBC includes a construction type, Type III, that permits larger and taller buildings of combustible construction provided exterior walls are constructed with FRTW or noncombustible materials. These types of buildings are common in the USA, and account for a very large demand for FRT lumber in particular. Type III construction can be used for any occupancy (e.g., residential, business, mercantile, industrial, etc.), each of which is subject to different limits on building height and area. In contrast, the NBC does not have such permissions for exterior walls, either permitting them to be of combustible construction (e.g., FRTW would not be required) or noncombustible construction (e.g., FRTW would not be permitted). Where noncombustible exterior walls are required in the NBC, combustible components are only permitted if the wall assembly has passed a large-scale fire test in accordance with CAN/ULC-S134.

Nevertheless, CHM has identified a number of possible market opportunities and recommendations for Canadian manufacturers of FRTW. In summary:

1. Consider improvements to the organization of industry information, and provide guidance to those wishing to source material so that there are manufacturers identified who can supply product.
2. Since the USA market is much more extensive than in Canada, pressure-treated wood manufacturers interested in investing in the production of FRTW may be interested in selling product into the USA market. Note that USA requirements for FRTW are currently more onerous than in Canada, and manufacturers would need to have their products tested and approved for use in the USA.
3. Explore the use of FRTW in cross-laminated timber (CLT). This is a unique opportunity since the CLT floor/ceiling panels make up both the structure as well as the interior finish.
4. Consider increasing the fire testing requirements for FRTW in Canada in order to harmonize with those in the USA.
5. Explore the use of FRTW for resiliency in areas where the hazard posed by wildfires is high.
6. Conduct an analysis of the current manufacturing capacity of FRTW in Canada, as well as the needs for new manufacturing plants or upgrades to existing plants to provide that capacity.

2 FORWARD

CHM Fire Consultants (CHM) is a consulting firm specialized in the practice of fire engineering with special emphasis on wood construction. With a combined 80 years of fire related research shared among the three founding members of CHM, the principals are highly regarded by both our clients and peers in providing sound professional advice and creative solutions in all areas of fire engineering and building codes.

Dr. Craft is an expert in the area of wood structures, fire safety, and wood science, having spent the last 20 years conducting research in the fire performance of wood structures. He holds a Ph.D. from Carleton University in Fire Safety Engineering and an undergraduate degree in Forest Engineering from the University of New Brunswick.

From 2006 to 2011, Dr. Craft was a Research Scientist and Senior Research Scientist in the Fire Group at Canada's national wood products laboratory (FPInnovations). Between 2010 and 2019, he was an Adjunct Professor at Carleton University, teaching a number of courses including Wood Engineering, Fire Dynamics, and Wood Structures and Fire Safety, in addition to supervising graduate students in the Fire Safety Engineering program. His expertise is recognized internationally having been appointed to the Editorial Advisory Board of the Fire and Materials Journal. He chairs a number of committees such as the ULC Fire Test Committee which develops and maintains fire test standards cited in the Canadian building and fire codes, and a task group under the Canadian Wood Design Standard, CSA O86 on Fire Resistance. He also recently chaired the National Research Council Committee that developed a National Guide for Wildland-Urban Interface Fires.

Dr. Craft has conducted dozens of fire tests on different types of construction. He conducted the very first fire resistance tests on Cross-laminated Timber (CLT) assemblies in North America and worked with industry on updating the adhesive requirements used in manufacturing CLT to improve the fire performance. Most recently, Dr. Craft led the effort to conduct a series of full-scale fire tests on a purpose-built mass timber structure in Ottawa. The project, known as the Mass Timber Demonstration Fire Test Project (MTDFTP) included five large-scale fire tests conducted in 2022.

Richard Michels is a fire safety engineer with 12 years of experience in fire protection engineering and code consulting. Richard has extensive experience in various aspects of code consulting throughout Canada including technical analyses; code reviews, reports and audits for new and existing buildings; and the development of alternative solutions.

Richard has a Master of Applied Science degree in Fire Safety Engineering from Carleton University (2009) and a Bachelor of Engineering (Civil) from Carleton University (2007) and is a Professional Engineer licensed in Ontario.

3 INTRODUCTION

CHM Fire Consultants Ltd. (CHM) has been retained by the Alberta Forest Products Association (AFPA), Alberta Wood WORKS!, and the Alberta Value-Added Wood Products Program to conduct a comparative study intended to assess the reason(s) behind the large discrepancy in demand for fire-retardant-treated wood (FRTW) in the USA and Canada. In particular, there is a large demand for FRTW in the USA compared to Canada. This study compares the building code requirements in the two countries as well as industry, political, and regulatory conditions that affect the use of FRTW in the USA and Canada.

The objective of this study is to identify potential market opportunities for Canadian manufacturers of FRTW products.

3.1 FIRE-RETARDANT-TREATED WOOD

As context for this study, it is considered important to introduce what fire-retardant-treated wood (FRTW) is, how it is made, and what the general material requirements are for the product in the USA and Canada. As it is, material that can be called FRTW in the USA may not meet the material standards or other requirements in Canada and vice versa. It is noted that the Alberta Building Code (ABC) is aligned with the National Building Code of Canada (NBC) as it relates to FRTW. This is discussed further in the Section 4 of this report.

FRTW refers to wood that is treated with chemicals in order to affect its burning characteristics. In particular, FRTW is pressure-impregnated with chemicals in a manufacturing plant that reduce the surface flammability characteristics of the material. FRTW does not meet the definition of a noncombustible material, but rather exhibits flame spread within a specific threshold. As the chemicals must be pressure-impregnated into the wood, wood with surface-applied products such as intumescent paints do not meet the definition of FRTW.

Building codes specify characteristics of different materials that can be used in construction of a new building, including requiring noncombustible materials in certain locations or buildings and imposing limits on flame-spread characteristics of certain materials. Flame-spread characteristics (called flame-spread index (FSI) in the USA and flame-spread rating (FSR) in Canada) are measured in a standard laboratory test.

In the USA, FRTW is tested in accordance with either ASTM E84, Standard Method for Surface Burning Characteristics of Building Materials, or UL 723, Test for Surface Burning Characteristics of Building Materials. In Canada, FRTW is tested in accordance with CAN/ULC-S102, Test for Surface Burning Characteristics of Building Materials and Assemblies. While similar, the tests in Canada and the USA are different and the results cannot be used interchangeably. As an example, CAN/ULC-S102 requires testing in triplicate (three tests) with the average values from the three tests reported, while ASTM E84 only requires a single test. For the purposes of this report, FRTW is generally required to have a FSI or FSR less than or equal to 25, allowing it to be used in specific locations. Building codes also specifically permit FRTW in certain locations where noncombustible materials are typically otherwise required.

In the USA, the IBC requires that the surface-burning test for FRTW be extended beyond the 10 minutes specified in ASTM E84 for a total of 30 minutes, and the flame front is not permitted to progress more than 10.5 ft beyond the centreline of the burners. This requirements means that the bar for being considered FRTW is more onerous in the USA than it is in Canada, as Canada does not similarly add to the flame-spread testing requirements.

We understand that the chemicals used in the treatment of FRTW are all currently manufactured in the USA and any manufacturers using these chemicals in Canada are currently purchasing them from the USA.

In Canada, FRTW must be pressure-impregnated in conformance with CAN/CSA O80 Series, “Wood Preservation”. This standard contains requirements for pressures, drying, and moisture content for the pressure impregnation process. Although the IBC does not reference a similar standard, it provides similar requirements for FRTW in Section 2303.2.

For exterior applications, both the NBC and the IBC require accelerated weathering prior to testing in accordance with ASTM D2898, “Standard Practice for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing”.

For the purposes of this report, there are three primary FRTW products that will be discussed:

- Fire-retardant-treated lumber (FRT lumber),
- Fire-retardant-treated plywood (FRT plywood), and
- Fire-retardant-treated interior finish (FRT finish).

Where possible and appropriate, use of these products will be differentiated for clarity.

Table 1 below provides details on the material requirements for FRTW in Canada and the USA.

Table 1: Material requirements for FRTW in Canada and the USA.

Aspect	Canada	USA
Material standard	CAN/CSA-O80, Wood Preservation	IBC 2303.2
Flame spread	Flame-spread rating of 25 or less per CAN/ULC-S102 or CAN/ULC-S102.2	Flame-spread index of 25 or less per ASTM E84 or UL 723. Test extended to 30 minutes and flame front shall not progress more than 10 ½ ft (3,200 mm)
Accelerated weathering for exterior use	ASTM D2898, *Standard Practice for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing*	ASTM D2898, *Standard Practice for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing.*
Lumber – moisture content	After treatment, material up to 38 mm thick to be air or kiln-dried to an average moisture content of 19% or less.	19% or less.
Treatment	Pressure treatment required.	Pressure process in closed vessels required. The treatment shall be an integral part of the manufacturing process and provide permanent protection to all surfaces. Use of paints, coating, stains, or other surface treatments are not approved.
Pressure limitations	Minimum 875 kPa Maximum depends on species.	Not less than 50 psig (345 kPa).
Plywood - General	Meet requirements for exterior grade plywood per CSA O121, CSA O151, CSA O153, and ANSI/HPVA HP-1.	
Plywood - moisture content	After treatment, air or kiln-dried to moisture content that approximates that during use. Dry to maximum moisture content of 15%	15% or less.
Air drying	When air drying, material not to be exposed to conditions that cause fire retardant leaching.	

Aspect	Canada	USA
Kiln drying	Dry bulb temperature of kiln shall not exceed 71°C. For exterior fire retardants, after drying to standard moisture content, permitted to use elevated temperature for curing not exceeding 99°C for up to 48 hrs.	Dry bulb temperature not to exceed 70°C (160°F) (per ASTM D5664 for lumber and ASTM D5516 for plywood) For exterior fire retardants, after drying to standard moisture content, permitted to use elevated temperature for curing not exceeding 99°C for up to 48 hrs.
Strength adjustments	Strengths must be adjusted to account for effects of the treatment process. The factor to be applied is to be based on appropriate tests and must account for the effects of time, temperature, and moisture content. For more information, refer to CSA O86, Engineering Design in Wood.	Design values shall be adjusted for FRTW based on an approved method that takes into consideration effects of temperature and humidity, type of treatment, and redrying procedures. ASTM D5516 (for plywood) and ASTM D664 (for lumber) apply. Manufacturers are required to publish modification factors for roof framing and maximum loads and spans for floor or roof sheathing.

In summary, whether in the USA or Canada, there are various requirements for a material to be permitted to bear the label FRTW. The material and testing standards may be similar but have enough differences that the manufacturing and approvals for the products north and south of the border will look different.

In order to enter the USA market, manufacturers will need to familiarize themselves with the USA material requirements and obtain testing and approvals as required for FRTW under the IBC.

4 BUILDING CODE ANALYSIS

Building codes represent the minimum requirements for construction of new buildings in the USA and Canada.

It is important to note that building codes are typically not intended to be applied retroactively, meaning that an existing building is not required to meet the current edition or amendment of the building code, but rather was required to meet the building code applicable at the time the designer applied for the original building permit. Renovations and changes to existing buildings require the application of building codes to various degrees, depending on the extent of changes, jurisdiction, local codes and by-laws, etc.

In order to maintain the fire safety in an existing building, fire codes, such as the International Fire Code (IFC) or NFPA 1, *Fire Code*, in the USA, and the National Fire Code of Canada (NFC), contain requirements applicable during the life of the building. These codes may reference building codes for certain features or under certain conditions, but in general require maintenance of existing fire protection features.

4.1 USA CODE ENVIRONMENT

The primary building code used in the USA is the International Building Code (IBC). The current edition of the IBC is 2021. However, many jurisdictions still use previous editions, such as 2018. For the purpose of this study, as it relates to the future of the FRTW market, the 2021 IBC is referenced.

In addition, the construction of one- and two-family dwellings in the USA is governed by the International Residential Code (IRC), the current edition of which is 2021. Similarly, references to the IRC are to the 2021 Edition.

This section provides a summary of the IBC provisions for FRTW. For a detailed table of provisions and their locations in the IBC, refer to Attachment A.

A summary of the construction types in the IBC is as follows:

- Types I and II: Noncombustible construction
- Type III: Exterior walls of noncombustible materials (or FRTW) and interior building elements of any material permitted by the IBC.
- Type IV: Mass Timber Construction (Types IV-A, IV-B, IV-C, and IV-HT are sub-types of mass timber construction)
- Type V: Combustible construction

Type III construction is a type of construction that is similar to combustible construction but with exterior walls that are either noncombustible or FRTW. This is a common building type in the USA that allows builders to construct typical combustible (e.g., light wood-frame) buildings with reduced restrictions with the relatively simple change to the exterior wall assembly. These buildings can be higher (up to 6 storeys depending on occupancy compared to a maximum of 4 storeys) and larger in area than Type V buildings. Type III construction can be used for any occupancy (e.g., residential, business, mercantile, industrial, etc.), each of which is subject to different limits on building height and area. It is common practice to use FRTW exterior walls on these buildings rather that noncombustible materials for consistency in the

building materials and construction methods. This is the permission in the IBC that has the largest impact on demand for FRTW.

Other locations where FRTW is required if wood is used for construction in the IBC, are below:

- In Type I or Type II construction (noncombustible):
  - Non-loadbearing partitions with fire-resistance rating (FRR) of 2 hrs or less.
  - Non-loadbearing exterior walls where no FRR is required.
  - Roofs, including girders, trusses, framing, and decking.
  - Balconies, porches, and decks not used as exits on buildings 3 storeys or less.
  - Certain partitions between tenants.
- Exterior walls in heavy timber buildings.
- Exterior wall cladding, under limited conditions.
- Balconies for combustible buildings or for noncombustible buildings up to three storeys.
- Bay and oriel windows.
- Awnings.
- Pedestrian walkways connecting buildings of noncombustible construction.
- Construction of penthouses in noncombustible construction, under limited conditions.
- Kiosks and similar structures in malls.
- Canopies for fuel dispensing.
- Permanent platforms, such as stages, in noncombustible buildings, under certain conditions.
- Play structures.

There are some smaller, specific locations that require FRTW where wood is used in the IBC. Refer to Attachment A for a detailed table of IBC permissions.

4.2 Canada Code Environment

Building codes in Canada are all generally based on the National Building Code of Canada (NBC), which serves as a model code. The current edition of the NBC is 2020. Each Province is responsible for adopting a building code, and the approaches differ between Provinces. Some Provinces, such as New Brunswick and Newfoundland adopt the NBC directly, some adopt the NBC with minor modifications, and some, such as Alberta, Ontario, and British Columbia, publish their own codes based on the NBC but with more significant modifications. The territories (Northwest Territories, Nunavut, and Yukon) adopt the NBC with some modifications and additions.

In addition to the Provincial building codes, Vancouver has its own building code that applies within the City, the Vancouver Building By-Law (VBBL), which is also based on the NBC.

It is noted that there are two means by which to demonstrate compliance with building codes in Canada. One is to meet the “acceptable solutions” of Division B of the applicable building code. This is typically referred to as the prescriptive solution and is most common. However, an alternative solution can also be used if a desired building feature does not directly comply with the acceptable solutions. In this case, a detailed report is typically needed that demonstrates that the performance of the proposed solutions meets the minimum performance requirements of the acceptable solution. The Authority Having

Jurisdiction (AHJ) must review and approve alternative solutions. This report presents a summary of the prescriptive requirements only as alternative solutions are project-specific.

As part of this study, CHM reviewed a number of Canadian building codes to determine if, and to what degree, there are differences between them with respect to permissions for use of FRTW. In particular, CHM reviewed:

- The 2010, 2015, and 2020 editions of the NBC,
- The 2012 OBC,
- The 2018 British Columbia Building Code (BCBC),
- The Manitoba Building Code (MBC) (the 2010 NBC with amendments),
- The Quebec Construction Code (QCC) (the 2015 NBC with amendments),
- The National Building Code – 2019 Alberta Edition (including Standata permitting encapsulated mass timber construction), and
- The 2019 Vancouver Building By-Law (VBBL).

Unless otherwise noted, references in this report are to Division B of the stated code.

In reviewing the Canadian building codes for uses of FRTW, it was found that the requirements and permissions are essentially identical in all reviewed codes. The provision numbering and locations vary, but the requirements are almost entirely the same. The only significant difference noted is that certain jurisdictions have not yet adopted the provisions introduced in the 2020 NBC permitting up to 12 storeys of encapsulated mass timber construction (EMTC). As such, FRTW provisions related to EMTC buildings are not present in these codes. However, it is expected that in time, the EMTC provisions will be adopted in these jurisdictions. As such, for the purposes of this report, where the NBC is discussed, the same provisions can currently be assumed to apply throughout Canada.

This section provides a summary of the NBC provisions for FRTW. For a detailed table of provisions and their locations in the NBC and other Canadian codes, refer to Attachment B.

The NBC recognizes three types of construction: combustible construction, noncombustible construction, and encapsulated mass timber construction (EMTC). There is no equivalent in Canada to Type III construction in the USA, which allows for larger buildings of combustible construction, provided the exterior walls are constructed using FRTW. The NBC does permit buildings of combustible construction up to 6 storeys, but exterior wall requirements in 5-6 storey buildings are no different than for noncombustible buildings, and in particular, FRTW is not called out as a permitted material. If FRTW is to be used in an exterior wall in such a building, it would need to be included in an assembly that is tested to CAN/ULC-S134, a large-scale fire test for exterior wall assemblies.

For buildings required to be of noncombustible construction, the NBC includes permissions to use combustible materials such as wood for interior finishes. In particular, up to 25-mm-thick wood is permitted for interior wall finishes and up to 10% of ceiling finishes. In addition, 100% of the ceiling is permitted to be finished with up to 25-mm-thick combustible material with a flame-spread rating not more than 25, such as FRTW.

Other locations where FRTW is required if wood is used for construction in the NBC, are below:

- Decorative wood cladding on marquees and canopies.
- Wall finishes on wood stud partitions in EMTC buildings.
- Interior finishes in exits.
- Roofs:
    - Roof decks (additional testing to CAN/ULC-S126, *Standard Method of Test for Fire Spread Under Roof-Deck Assemblies*, applies).
    - For certain 1-storey buildings, FRR of the roof assembly can be waived if constructed of FRTW (CAN/ULC-S126 test applies).
    - For 5-6 storey combustible buildings, if the roof is higher than 25 m and is wood, FRTW is required.

In addition, the NBC Appendix D includes a small number of exterior wall assemblies with combustible components that are deemed to pass the CAN/ULC-S134 test. This means that these exterior wall assemblies are permitted on noncombustible or EMTC buildings (with certain restrictions). Two of these wall assemblies include FRT plywood, either as sheathing with a noncombustible cladding, or as the cladding. Both wall assemblies include non-treated wood studs.

There are some smaller, specific locations that require FRTW where wood is used in the NBC. Refer to Attachment B for a detailed table of NBC permissions.

4.3 COMPARISON

The permissions for the use of FRTW are significantly different between the USA and Canadian Codes. In general, there are many more scenarios in the USA where FRTW is specifically required and accepted in locations where wood is used which results in a much larger market for FRTW.

The difference that has the largest affect on the quantity of FRTW sold is in the permissions for exterior walls under the IBC. As discussed above, the IBC includes an entire construction type that is based on the use of either noncombustible materials or FRTW in exterior walls (Type III construction). This is a common construction type in the USA, allowing builders to construct larger and taller buildings of combustible construction (e.g., light wood-frame) with the relatively simple change in using FRTW as part of the exterior wall assembly.

There are also other conditions for which FRTW is specifically permitted in exterior walls, such as in Type I or II (noncombustible) construction (e.g., where no fire-resistance rating is required), exterior walls in heavy timber buildings, and certain quantities of exterior cladding. This approach to the materials permitted in exterior walls is different than in Canadian codes, which require exterior walls in most large or tall buildings (including larger 5-6 storey combustible buildings) to be either noncombustible or, if combustible materials are included, tested in accordance with CAN/ULC-S134. In smaller buildings permitted to be of combustible construction, exterior wall assemblies are generally permitted to be combustible unless otherwise required due to spatial separation conditions (e.g., proximity to property lines or other buildings on the same site). Where combustible materials are permitted, FRTW is not necessary as untreated wood is permitted. In addition, wall assemblies that are tested to CAN/ULC-S134

typically have noncombustible insulation or other materials protecting the combustible materials beneath, and as such the inclusion of FRTW rather than untreated wood would make little difference to the assembly's chance of successfully passing the test.

There are no specific permissions for the use of FRTW for exterior walls in Canadian codes, except in special conditions that come up less frequently (e.g., decorative cladding for marquees or canopies or in certain conditions for spatial separation purposes). The IBC also includes more of these specific conditions on the exterior than Canadian codes include, such as balconies and certain types of windows.

One recent addition to the NBC relating to exterior walls is notable. Under Appendix D, Section D-6, there are two exterior wall assemblies that include FRTW that are deemed to satisfy the testing requirements for CAN/ULC-S134 (and as such are permitted for use where noncombustible exterior walls are otherwise required). One of these wall assemblies (EXTW-1) is a wood stud assembly that includes 12.7 mm FRTW plywood cladding. The other assembly (EXTW-3) is a wood stud assembly that includes 15.9 mm FRTW plywood sheathing beneath noncombustible cladding. These wall assemblies can be used as-is, or can be helpful in developing an alternative solution, by demonstrating that a wall assembly would be expected to pass the CAN/ULC-S134 test with FRTW sheathing or cladding.

For interior wall and ceiling finishes, the use of FRTW in Canada and the USA are essentially the same. Untreated wood can be used for wall finishes in both cases in most locations. In the USA, wall and ceiling finishes have generally the same requirements, and as such, untreated wood can be used on ceilings in most areas (examples of areas wood ceilings are not permitted include exits in most occupancies, and in unsprinklered buildings with certain higher hazard occupancies). However, Canada differentiates between wall and ceiling finishes, and untreated wood is only permitted for up to 10% of a ceiling area (based on the flame-spread rating). FRTW is specifically permitted as a ceiling finish provided it is not more than 25 mm thick or it consists of FRTW battens. This is a potential advantage in the Canadian codes for the use of FRTW.

Both Canadian and USA codes include a small number of provisions related to FRTW in roofs. However, these provisions are limited and quite specific, and are unlikely to result in a significant demand for FRTW. In addition, the use of FRTW in roofs is generally limited as truss manufacturers have historically not used FRTW in truss construction due to challenges with wood strength properties from the treating process and the connection plates method of attachment. See Section 4.4 below for more information on this.

The IBC also contains various other specific locations where FRTW is permitted, such as for pedestrian walkways, kiosks in malls, canopies for fuel dispensing, permanent platforms, shelving in liquid storage rooms, and for play structures. In Canada, there is no equivalent to these uses. While they may be specific and limited in scope, the cumulative effect of these permissions likely adds up to additional demand for FRTW in the USA where it is readily available.

4.4 FRTW IN ROOFS

In both the USA and Canada, there are permissions to use FRTW for the construction of roofs under certain conditions. However, from discussions with representatives in the industry, it is our understanding that truss manufacturers are not manufacturing trusses with FRT lumber. This is primarily due to the reduction in strength of the lumber caused by the pressure impregnation process of the fire-retardant chemicals. Although the manufacturer of the lumber is required to test the product for overall strength, even the reduced strength values of the lumber cannot be used for trusses since truss production relies on metal plate fasteners that do not penetrate deep into the lumber. This means that the strength of the lumber in the depth of the treatment is critically important, and this is the location that sees the degradation of strength. This has created challenges for truss manufacturers which, to our knowledge, have not been overcome by industry.

As such, the use of FRTW in roof assemblies is limited in both Canada and the USA. There may be applications where a noncombustible roof assembly can be sheathed with FRT plywood, but this represents a less significant use of FRTW where permitted in roofs than may otherwise be possible.

4.5 NFPA 13 – SPRINKLER REQUIREMENTS

Sprinkler systems both in the USA and Canada must meet the requirements of NFPA 13, *Standard for the Installation of Sprinkler Systems*. In general, in buildings requiring sprinkler systems, concealed spaces that include combustible materials must be protected, either by the sprinkler system or by other means (such as filling with noncombustible insulation). NFPA 13 includes certain permissions for sprinklers to be omitted where FRTW is used. These include (references are to 2019 edition):

- Concealed spaces in which the exposed materials are constructed entirely of FRTW (9.2.1.12).
- Exterior projections (canopies, roofs, balconies, decks, and similar) constructed of FRTW (9.2.3.2).
- Roof or ceiling spaces where the exposed combustible sheathing is FRTW (10.2.6.1.4.6).

NFPA 13 references NFPA 703, Standard for Fire Retardant-Treated Wood and Fire-Retardant Coatings for Building Materials, as the material standard for FRTW. NFPA 703 has the same general requirements for FRTW as the IBC.

While these permissions may represent an opportunity in the market for the use of FRTW, the requirements are the same in Canada and the USA, and as such do not form part of the discrepancy in the market between the two countries.

4.6 WILDLAND-URBAN INTERFACE GUIDELINES

In recent decades as wildfires have become more frequent and problematic, a number of guidelines have been developed for fire protection in wildland-urban interface (WUI) areas in the USA and Canada. The most prominent and relevant of these include:

- National Guide for Wildland-Urban Interface Fires[1] in Canada.
- International Wildland-Urban Interface Code (IWUIC) in the USA.
- California Building Code (CBC), Chapter 7A: Materials and Construction Methods for Exterior Wildfire Exposure.
- 2023 Alberta Wildland Urban Interface Guidelines[2].

It should be noted that the adoption of these guidelines is not consistent. In Canada, these guidelines have not been adopted as of this writing in any jurisdiction. Whereas in California, the CBC provisions are included in their building code and are more commonly applied in areas where WUI fires are a risk.

The Canadian WUI guide, under its Construction Measures section, includes the use of FRTW materials as possible solutions to exterior cladding and supporting construction for raised or elevated buildings where WUI fires may be a risk.

The basic requirement for California under the CBC is that the exterior of the structure be ignition-resistant and able to resist the entry of flying embers and radiative heat during a wildfire. FRTW is an option for exterior wall cladding, decks, porches, balconies and stairs within 10 ft of a building. FRTW is considered an "ignition-resistant material" for the purposes of applying these provisions.

The IWUIC similarly contains provisions for the use of FRTW on the exterior of buildings to reduce the effects of wildfires on a building.

The Alberta Guidelines serve more as a response guideline to WUI fires rather than providing construction provisions for resilience against WUI fires, and as such do not contain provisions for FRTW.

4.7 MARKET OPPORTUNITIES

It is clear from the discussion in Section 4.3 that the larger market in the USA for FRTW is due to the significantly larger number of provisions in the IBC that specifically permit FRTW under certain conditions than there are in the Canadian codes. In particular, permissions for use as the structural material in both loadbearing and non-loadbearing exterior wall assemblies, including construction Type III, creates a significant opportunity that is not present in the Canadian codes.

---

[1] Bénichou N., Adelzadeh M., Singh J., Gomaa I., Elsagan N., Kinateder M., Ma C., Gaur A., Bwalya A., and Sultan M. (2021). National Guide for Wildland-Urban Interface Fires. National Research Council Canada: Ottawa, ON. 192 pp.

[2] Ministry of Public Safety and Emergency Services and the Ministry of Forestry, Wildlife, Parks, and Tourism. 2023 Alberta Wildland Urban Interface Guidelines. January 31, 2023.

Based on this, it is our opinion that the current market opportunity for Canadian manufacturers is to provide a product that meets the material standards in the USA, and can be exported there, where there is higher demand. In order to do this, for a given product, a manufacturer would have to:

1. Conduct an ASTM E84 flame-spread test, extended to 30 minutes, and meet the criteria of the IBC (Note this extended test is more onerous than the Canadian requirements).
2. Ensure the pressure impregnation process is conducted at the pressures and conditions required in the USA.
3. Determine strength adjustments per ASTM D5516 (for plywood) or ASTM D664 (for lumber) and publish modification factors for roof framing and maximum loads and spans for floor or roof sheathing.
4. Work with a certification organization to demonstrate compliance for market acceptance.

In addition to the above, CHM has identified potential opportunities for growth in the markets within the Canadian code environment. It is possible that architects and other designers may be able to make more use of FRTW within the existing provisions than they currently do. In particular, the following is noted:

1. NFPA 13 exempts sprinkler protection from combustible concealed spaces provided the exposed combustible materials are FRTW. There are opportunities to combine FRTW with mass timber to satisfy this requirement since the alternative is gypsum board, mineral wool insulation or sprinklering the concealed space.
2. FRTW not more than 25 mm thick is permitted as an interior ceiling finish in most locations in all buildings. Architects are often looking to the USA to source FRTW for interior finishes given the lack of Canadian production.
3. The NBC Table D-6.1.1. provides an example of an exterior wall assembly clad with 12.7 mm thick FRT plywood siding that is deemed to satisfy the criteria of Clause 3.1.5.5.(1)(b) when tested in accordance with CAN/ULC-S134, and as such is permitted to be used on a building of noncombustible construction. This wall assembly could be used on most buildings in Canada, subject to other requirements such as for spatial separation. In addition, this demonstrates that FRTW plywood does not result in significant flame spread on an exterior wall under the test conditions, which could be used as information in support of an alternative solution for a similar exterior wall assembly clad with FRTW.
4. The construction site fire safety provisions in the NFC for mass timber building are quite onerous and create practical challenges in implementation. There may be opportunities with FRTW and mass timber to satisfy both flame spread requirements in buildings as well as concerns about construction fire safety.
5. Development and use of Wildland-Urban Interface (WUI) guidelines (and specifically the newly developed Canadian guidelines) are relatively new and limited. It may be worth exploring the use of FRTW for resiliency in areas where the hazard posed by wildfires is high.

5 INDUSTRY CONDITIONS

CHM reached out to industry representatives in the USA to try to better understand market size and drivers. As it turns out, there is no industry association for the fire-retardant wood industry and the environment between manufacturers is very competitive. Therefore, information such as market size, market growth, and specific company production or sales information are all highly confidential.

The success of the USA industry can largely be pointed to the success which certain manufacturers have had over the years in seeking code acceptance of FRTW. Because there is no industry association, individual companies (and one in particular) put significant effort in codes and standards development, which is ongoing. In Canada, there is no such lobby to push for such code acceptance of FRTW. Note that the wood industry and the FRTW industry are not always aligned in positions on standards and code development.

Another aspect which has some influence on the use of FRTW in Canada is the size of the market. Since there is such a small market for FRTW in Canada, when an architect or general contractor attempt to source product for a project, it can be very difficult to obtain. It is not uncommon for FRTW to be sourced from USA suppliers due to difficulty finding the equivalent product in Canada.

Should interest exist in the industry to add manufacturing capacity of FRTW in Canada, it would be helpful to conduct an analysis of the current capacity in Canada, as well as the needs for new manufacturing plants or upgrades to existing plants to provide that capacity.

6 CONCLUSION

The FRTW market size difference between Canada and the USA can be attributed to the differences in the building codes between the two countries.

The differences in product standards, and the resulting fire performance between FRTW in Canada and the USA means the requirements for FRTW in the USA are more onerous than in Canada.

6.1 RECOMMENDATIONS

The following recommendations are made in consideration of the analysis presented in this report:

1. While this is likely a symptom of low demand, it can be difficult to source FRTW in Canada. Perhaps a start would be to better organize the industry information and provide guidance to those wishing to source material so that there are manufacturers identified who can supply product.

2. The differentiation between the USA and Canadian markets lies in differences in the building codes. Therefore, any effort to get greater acceptance of FRTW in Canada, such as in the NBC, will require participation by someone with technical expertise in fire safety of buildings. The approach would be similar to that of the Canadian Wood Council's technical representatives who participate in the development of Canadian codes and standards.

3. Pressure-treated wood manufacturers interested in further investing in the production of FRTW may be interested in selling product into the USA market. Since the market is much more extensive than in Canada (on account of specific building code differences), the market potential is orders of magnitude greater than in Canada. Having production in Canada would also potentially help with supplying Canadian market needs when they arise. Note that USA requirements for FRTW are currently more onerous than in Canada, and manufacturers would need to have their products tested and approved for use in the USA.

4. There is interest in using fire-retardant treated wood with cross-laminated timber (CLT) production. This is a unique opportunity since the CLT floor/ceiling panels make up both the structure as well as the interior finish. A product which is fire-retardant treated on the bottom surface could potentially save costs by avoiding the use of gypsum board or other treatments for concealed spaces (for example, dropped ceilings are common in mass timber buildings). There is currently a mass timber project in Toronto where FRTW is being specified as the bottom layer on CLT panels.

5. There may be merit in seeking to increase the fire testing requirements for FRTW in Canada in order to harmonize with those in the USA. By harmonizing requirements between Canada and the USA, there may be greater access to the USA market by Canadian manufacturers. Developing a manufacturing base in Canada would likely facilitate further development of the market in Canada through the building codes.

6. Development and use of Wildland-Urban Interface (WUI) guidelines (and specifically the newly developed Canadian guidelines) are relatively new and limited. It may be worth exploring the use of FRTW for resiliency in areas where the hazard posed by wildfires is high.

7. Should interest exist in the industry to add manufacturing capacity of FRTW in Canada, it would be helpful to conduct an analysis of the current capacity in Canada, as well as the needs for new manufacturing plants or upgrades to existing plants to provide that capacity.

Attachment A – IBC Code Provisions

Building Element	Provision Summary	IBC Ref	Product(s) Affected
General			
Type I or II construction (Noncombustible construction)	FRTW permitted in place of noncombustible materials in: - Non-loadbearing partitions with fire-resistance rating (FRR) 2 hr or less. - Non-loadbearing exterior walls where no FRR is required. - Roof construction, including girders, trusses, framing and decking. - Balconies, porches, decks and exterior stairways not used as exits on buildings 3 storeys or less. - Partitions dividing portions of stores, offices, or other spaces occupied by one tenant and not creating a corridor and serving an occupant load not more than 30. Requires 1 hr FRR. Exceptions: - Not permitted to be used for roofs in Type 1A buildings exceeding 2 storeys where distance from upper floor to roof is < 20 ft. - In Group I-s, FRTW in a roof must be covered by Class A roof covering or roof assembly.	603.1 603.1.3.11	FRT lumber FRT plywood
Wood partitions	Table 721.1(2) includes various partitions providing FRRs. Three partitions – 14-1.4, 14-1.6, and 15-1.6 – use FRTW studs.	Table 721.1(2)	FRT lumber
Exterior walls (and related)			
Type III construction exterior walls	**FRTW permitted in exterior walls requiring an FRR of 2 hr or less.** **Otherwise for Type III, exterior walls are required to be noncombustible.**	**602.3**	**FRT lumber** **FRT plywood**
Type IV-HT exterior walls	FRTW permitted in exterior walls requiring an FRR of 2 hr or less. Otherwise, exterior walls required to be noncombustible or cross-laminated timber (CLT). If CLT is used, exterior side must be protected – one option is 12 mm thick FRTW sheathing.	602.4.4	FRT lumber FRT plywood
Wood veneers (cladding)	For Type I, II, III, or IV construction – using FRTW allows the height of the veneer (cladding) to be max 60 ft where otherwise, if wood, it would be maximum 40 ft. Veneers to be minimum 1” thick, 0.438” exterior hardboard siding, or 0.375” exterior-type wood structural panels or particleboard.	1404.5	FRT plywood FRT cladding (siding)
Exterior walls: combustible materials on exterior side	For Type I, II, III, or IV construction – exterior wall coverings permitted to be combustible subject to limitations. If FRTW is used, area is no longer limited where spatial separation is less than 5 ft (otherwise limited to 10%) and max 60 ft height permitted where otherwise 40 ft.	1405.1.1	FRT plywood FRT finish
Balconies	Balconies and similar projections of combustible construction require the FRR for floor construction unless they are FRTW or heavy timber. Also, on Type I or II (noncombustible) buildings three storeys or less, FRTW is permitted for balconies, porches, decks and exterior stairways not used as required exits.	705.2.3.1	FRR lumber FRR plywood

Building Element	Provision Summary	IBC Ref	Product(s) Affected
Projections close to property line	Projections extending within 5 ft of line used for spatial separation permitted to be FRTW. Otherwise required to be NC, provide a 1-hr FRR, or heavy timber. The IRC contains similar permissions for houses.	705.3 IRC R302.1	FRT lumber FRT plywood
Bay and Oriel Windows	Bay and Oriel windows permitted to be of FRTW for Type I, II, III, or IV buildings three storeys or less.	705.2.4	FRT lumber FRT plywood
Parapets	Parapets required for exterior walls of buildings, except in a number of conditions. One exception is for Type III, IV, and V construction in Group R-2 and R-3 with Class C roof covering provided the roof sheathing or deck is noncombustible or FRTW for a distance of 4 ft.	705.11.5	FRT lumber FRT plywood
Awnings	FRTW is an option for framing of awnings.	3105.2	FRT lumber
Roofs			
Roofs	In Type I, II, III, and V construction, where roof is 20 ft or more above the floor below, no FRR is required and if wood is used, it must be FRTW. Cannot be applied in F-1, H, M, and S-1 occupancies.	601 See footnote b to Table 601	FRT lumber FRT plywood
Parapets - Firewalls	Minimum 30" parapet required except under a number of conditions. One exception is for Type III, IV, and V if roof sheathing or deck is FRTW for 4 ft on both sides of the wall and there are no openings within 4 ft and roof has minimum Class B roof covering.	706.6.4	FRT plywood
Parapets – Townhouses	Minimum 30" parapet required unless roof covering has minimum Class C rating and roof decking or sheathing is noncombustible or FRTW for a distance of 4 ft on each side of the wall or walls.	IRC R302.2.4	FRT plywood
Shingles and Shakes	FRTW shakes and shingles shall be treated with full-cell vacuum-pressure process per AWPA C1. Also, must have minimum Grade 1 per CSSB grading rules. This provision also includes requirements for marking/labeling.	1505.6 1507.9.6 IRC R902.2	FRT shingles/shakes
Other Permitted Uses			
Pedestrian walkways	FRTW permitted for the roof of pedestrian walkways where connected buildings are noncombustible construction.	3104.3	FRT lumber FRT plywood
Penthouse construction	For Type I, 2 storeys or less, or Type II, exterior walls and roofs of penthouses with spatial separation between 5-20 ft require 1 hr FRR and permit FRTW. If distance > 20 ft, FRTW permitted (no FRR required). There are also similar permission for Types III, IV or V.	1511.2.4	FRT lumber FRT plywood
Kiosks	Kiosks and similar structures in an open or covered mall building are permitted to be constructed of FRTW.	402.6.2	FRT lumber FRT plywood
Canopies for fuel dispensing	Canopies for fuel dispensing permitted to be noncombustible, FRTW, or heavy timber	406.7.2	FRT lumber FRT plywood
Permanent platforms	FRTW permitted under certain conditions in Type I, II, and IV construction. Platforms must be less than 30" above the floor, less than 1/3 of the room floor area and not more than 279 m^2. If space beneath is used for storage, requires 1 hr FRR.	410.3	FRT lumber FRT plywood

Building Element	Provision Summary	IBC Ref	Product(s) Affected
Liquid storage rooms	Shelving, racks and wainscotting permitted, if wood, must be either FRTW or less than 1" thick.	415.11.6.2	FRT lumber
Play structures	If wood, required to be FRTW.	424.2	FRT lumber FRT plywood
Dropped ceilings	Hangers or assembly members of dropped ceilings below horizontal fire-resistance-rated floors or roofs are required to be noncombustible. This is exempted for Type III and V (combustible) buildings if FRTW is used.	803.15.2.1	FRT lumber
NFPA 13R sprinkler systems	Protection is required for attics where NFPA 13R is used. One option in Type III, IV, or V construction where roof is more than 55 ft high is constructing with FRTW. Also an option for Group R-4, Condition 2 occupancy. Other options are sprinklering the attic, constructing with noncombustible construction or filling the attic with noncombustible insulation.	903.3.1.2.3	FRT lumber FRT plywood
Mechanical equipment screens	Permission for combustible materials for mechanical equipment screens for Types I, II, III, or IV under certain conditions. Use of FRTW allows screen to be higher above the roof deck. For Type V construction, no other conditions if FRTW is used.	1511.6.2 1511.6.3	FRT plywood
Standards and Quality			
FRTW - General	FRTW is any wood product that, when impregnated with chemicals, has flame-spread index of 25 or less per ASTM E84 or UL 723. The test shall be continued for a 30-minute period and the flame front shall not progress more than 10.5 ft beyond centreline of the burners. Various other requirements apply for manufacturing, strength, and moisture conditions.	2303.2 IRC R802.1.5	FRTW - general
Interior finishes	Since FRTW provides a flame-spread index of 25 or less, it is classified as Class A, which allows it to be used as an interior wall or ceiling finish essentially anywhere in buildings.	803.1.2	FRT interior finish
Roof coverings	FRTW roof coverings shall be tested per ASTM D2898.	1505.1	FRT plywood
Fasteners	General requirements for fasteners for FRTW under this provision. Also includes requirements for wet or damp locations and interior applications.	2304.10.6 IRC R317.3	
Stress adjustments	Stresses for FRTW, including fasteners, to be from approved method considering effects of temperature and humidity, type of treatment, and redrying process.	2306.1.3 IRC R803.2.1.2	

Attachment B – NBC and other Canadian Code Provisions

Location	Requirement/Permission	2020 NBC Reference	Other Code References	Products Affected
Exterior Walls				
Marquees or canopies	On buildings required to be of noncombustible construction, decorative wood FRT cladding is permitted on fascias and soffits of marquees or canopies provided the storey has direct access to a street and it has been subjected to accelerated weathering.	3.1.5.24.(1)	2015 NBC – 3.1.5.24.(1) 2010 NBC 3.1.5.21.(1) OBC – 3.1.5.25.(1) ABC – 3.1.5.24.(1) BCBC – 3.1.5.24.(1) VBBL – 3.1.5.24 QCC – 3.1.5.24	FRT cladding
Pre-approved S134-tested walls	Table D-6.1.1 includes wall assemblies deemed pass CAN/ULC-S134 testing, and as such are permitted on buildings of noncombustible construction. Both of these wall assemblies include wood stud structural members that are not required to be fire-retardant-treated: - Wall EXTW-1 includes 12.7 mm FRTW plywood as the cladding. - Wall EXTW-3 includes 15.9 mm thick FRTW plywood sheathing with a noncombustible cladding.	Appendix D, Table D-6.1.1	ABC – Included in Standata – Table 5 VBBL – D-6	FRT plywood FRT cladding
Interior Finishes				
Interior ceiling finishes – Noncombustible buildings and EMTC buildings	FRTW ceiling finishes are permitted in a building required to be of noncombustible construction, provided they are not more than 25 mm thick or are exposed FRTW battens.	3.1.5.12.(4) 3.1.6.14.(4)	2015 NBC – 3.1.5.12.(4) (No EMTC) 2010 NBC - 3.1.5.10.(3) (same requirement but different presentation) (No EMTC) OBC – 3.1.5.10.(4), 3.1.6.14.(4) ABC – 3.1.5.12.(4), Standata 2.37 BCBC – 3.1.5.12.(4), 3.1.18.12.(4) VBBL – 3.1.5.12.(4), 3.1.18.12.(4) QCC – 3.1.5.12.(4)	FRT interior finish FRT lumber
Interior partitions – EMTC building	Solid wood partitions or wood stud partitions with cavities filled with noncombustible insulation are permitted in an EMTC building if each face is protected with 19 mm thick FRTW. ½" Type X gypsum another option. Not permitted in exits or vertical service spaces.	3.1.6.15.(1)	2010 NBC – N/A (no EMTC) 2015 NBC – N/A (no EMTC) OBC – 3.1.6.15.(1) ABC – Standata 2.38 BCBC – 3.1.18.13.(1) VBBL – 3.1.18.13.(1)	FRT finish

Location	Requirement/Permission	2020 NBC Reference	Other Code References	Products Affected
Exits – Noncombustible buildings and EMTC buildings	Flame-spread cut-through requirements do not apply to FRTW in exits. Cut-through requirement means that flame-spread ratings apply to any surface that would be exposed by cutting through the material in any direction.	3.1.13.8.(1) 3.1.13.12.(1)	2010 NBC – 3.1.13.8.(1) (No EMTC) 2015 NBC - 3.1.13.8.(1) (No EMTC) OBC – 3.1.13.8.(1), 3.1.13.12.(1) ABC – 3.1.13.8.(1), Standata 3.10 BCBC – 3.1.13.8.(1), 3.1.13.12.(1) VBBL – 3.1.13.8.(1), 3.1.13.12.(1) QCC – 3.1.13.8.(1)	FRT finish
Roofs				
Roofs	If FRTW roof system used, roof deck shall meet conditions of acceptance of CAN/ULC-S126, *Standard Method of Test for Fire Spread Under Roof-Deck Assemblies*. Support for roof deck must also be FRTW, heavy timber, or noncombustible construction.	3.1.14.1	2010 NBC – 3.1.14.1 2015 NBC – 3.1.14.1 OBC – 3.1.14.1 ABC – 3.1.14.1. BCBC – 3.1.14.1 VBBL – 3.1.14.1 QCC – 3.1.14.1	FRT lumber FRT plywood
Roof FRR	FRR of some roofs of small, 1-storey buildings permitted to be waived if constructed of FRTW. In these cases, roof decks must pass a test in accordance with CAN/ULC-S126, *Test for Fire Spread Under Roof-Deck Assemblies*. Supports, if wood, must be FRTW.	3.2.2.25 3.2.2.32 3.2.2.62 3.2.2.68 3.2.2.78 3.2.2.85	2010 NBC – 3.2.2.25, 32, 58, 64, 74, 81 2015 NBC – 3.2.2.25, 32, 60, 66, 76, 83 OBC – 3.2.2.25, 32, 53, 59, 70, 76 ABC – 3.2.2.25, 32, 60, 66, 76, 83 BCBC – 3.2.2.25, 32, 60, 66, 76, 83 VBBL – 3.2.2.25, 32, 60, 66, 76, 83 QCC – 3.2.2.25, 32, 60, 66, 76, 83	FRT lumber FRT plywood
Roof – Mid-rise combustible building	If roof higher than 25 m in mid-rise building of combustible construction (typically 4-6 storeys), roof, if wood, must be FRTW.	3.2.2.51 3.2.2.60	2010 NBC – N/A – pre-mid-rise. 2015 NBC – 3.2.2.50, 58 OBC – 3.2.2.43A, 50A ABC – 3.2.2.50, 58 BCBC – 3.2.2.50, 58 VBBL – 3.2.2.50, 58 QCC – Does not have this as mid-rise not permitted above 25 m.	FRT lumber FRT plywood

Location	Requirement/Permission	2020 NBC Reference	Other Code References	Products Affected
Other				
Spatial separation	Some relaxation for noncombustible cladding permitted under certain conditions if FRTW used. This applies where: - Permitted area of unprotected openings between 25-50%, - Limiting distance greater than 5 m, - Building and all combustible attic or roof space are sprinklered. Similar relaxations are provided for Part 9 buildings (houses and small buildings)	3.2.3.7.(4) 9.10.14.5.(3) 9.10.15.5.(3)	2010 NBC – 3.2.3.7.(4) 2015 NBC – 3.2.3.7.(4) OBC – 3.2.3.7.(5) ABC – 3.2.3.7.(4) BCBC – 3.2.3.7.(4) VBBL – 3.2.3.7.(4) QCC – 3.2.3.7.(4)	FRT plywood FRT cladding
Standards and Quality				
FRTW requirements	Pressure-impregnated in conformance with CAN/CSA-O80 Series, “Wood Preservation”, and FSR not more than 25.	3.1.4.5	2010NBC – 3.1.4.5 2015NBC - 3.1.4.5 OBC – 3.1.4.5 ABC – 3.1.4.5 BCBC – 3.1.4.5 VBBL – 3.1.4.5 QCC – 3.1.4.5	FRT - General
Combustible cladding	If a combustible exterior wall assembly is used that includes FRTW cladding in a location where an S134 test is required, the FRTW shall be tested after being subjected to accelerated weathering per ASTM D2898, “Standard Practice for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing”	3.1.4.8.(3), 3.1.5.5.(3), 3.1.6.9.(6)	2010NBC – 3.1.5.5.(5) 2015NBC – 3.1.4.8.(2), 3.1.5.5.(3) OBC – 3.1.5.5.(3), 3.1.6.9.(6), 3.2.3.7.(7) – no 3.1.4.8.(3) ABC – 3.1.4.8.(2), 3.1.5.5.(3), Standata for EMTC BCBC – 3.1.4.8.(2), 3.1.5.5.(3), EMTC - 3.1.18.7.(6) VBBL – 3.1.4.8.(2), 3.1.5.5.(3), EMTC - 3.1.18.7.(6) QCC – 3.1.5.5.(3) – No 3.1.4.8.(2)	FRT plywood FRT cladding