Dricon® and FRX®
Fire Retardant Wood
in Today’s Buildings
FRT wood products provide added building safety for existing and future structures
FRT Wood in Today’s Buildings

• Traditional applications
• New opportunities with engineered wood products (EWPs)
• Urban Wildland Interface requirements
• Retrofit of existing buildings
What is FRT wood?
How does FRT wood work?
What do the model codes require?
How is FRT wood manufactured?
What features are available in FRT wood?
Where can I use FRT wood?
How do I specify FRT wood?
Are there new design options?
Frequently Asked Questions about FRT wood
2303.2 Fire-retardant-treated wood. Fire-retardant-treated wood is any wood product which, when impregnated with chemicals by a pressure process or other means during manufacture, shall have, when tested in accordance with ASTM E 84 or UL 723, a listed flame spread index of 25 or less and show no evidence of significant progressive combustion when the test is continued for an additional 20-minute period. Additionally, the flame front shall not progress more than 101/2 feet (3200 mm) beyond the centerline of the burners at any time during the test.
Reasons for FRT Wood Specification

Meet building codes with an approved substitute for noncombustible material

- Limit damage in buildings with valuable contents
- Protect buildings remote from fire protection services
- Safety measure — increase escape time
- Avoid sprinklers (in specific areas)
- Bring existing buildings up to code
- Add fire protection to light construction
Typical Buildings

- Schools
- Hotels
- Airports
- Military bases
- Shopping centers
- Restaurants
- Sports stadiums
- Multi-family homes
- Museums
- Convention centers
• **Pressure-treated: Interior**
  - Must be shielded from direct precipitation
  - FR is water-soluble

• **Pressure-treated: Exterior**
  - Can be exposed to weather
  - Useful for meeting Urban Wildland Interface codes
Common Applications: Interior FRT Wood

- Trusses
- Roof sheathing
- Wall sheathing
- Interior framing
- Backing for mechanical panels
- Blocking for hand rails, wall fixtures
- Stairwell construction

Interior FRT wood should not be exposed to continual wetting.
Common Applications:

Exterior FRT Wood

- Exterior decks
- Balconies
- Stairways
- Shakes & shingles
- Siding
- Trim & molding
- Open air roof systems
- Soffit & fascia
- Construction staging
- Scaffolding

Exterior FRT wood should not be used in attic space environments or in ground contact
• Model codes permit use of FRT wood in cases where combustible materials are not permitted

• Type IV Heavy Timber (HT) construction permits untreated wood of sufficient dimensions
Authoritative Sources

Recognizing FRT Wood

• Code evaluation organizations
  ➢ ICC Evaluation Service
  ➢ Evaluation Service report

• American Wood Protection Association (AWPA)
  ➢ U1-15 Commodity Specification H: Fire Retardants
  ➢ Use Categories UCFA (interior) & UCFB (exterior)
  ➢ P49-15 Standard for Fire Retardant FR-1 (FR-1)
Model Code Requirements:
Pressure-Treated *Interior* FRT Wood

- Flame Spread index $\leq 25$ and no significant progressive combustion within 30 minutes
- Smoke Developed index $\leq 450$
- Pressure-impregnated
- Kiln dried after treatment
- Within hygroscopic limits
- Strength-tested at high temperatures
- Third-party inspection
Model Code Requirements: Pressure-Treated *Exterior* FRT Wood

- Flame Spread index ≤ 25 and no significant progressive combustion within 30 minutes
- Smoke Developed index ≤ 450
- Pressure-impregnated
- Kiln dried after treatment
- Within hygroscopic limits
- Third-party inspection
Model Code Requirements:

Pressure-Treated *Exterior* FRT Wood

- Flame Spread index ≤ 25 and no significant progressive combustion within 30 minutes
- Smoke Developed index ≤ 450
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After undergoing ASTM D 2898 Accelerated Weathering Test (800-inch rain test)
The Tunnel Test

Part of three similar protocols: ASTM E 2768-11 (30-minute test)
The Tunnel Test

Determines Flame Spread & Smoke Developed
Tunnel Test Determines Flame Spread Index

Untreated red oak

Examples of untreated wood:
- Engelmann Spruce: 55
- Western Red Cedar: 69
- Douglas Fir: 90
- Maple: 104
- Ponderosa Pine: 105

Asbestos cement board
Tunnel Test Determines Flame Spread Index

Flame Spread Index Determines Class

Wood must be Class A to substitute for noncombustible materials.

Class A  0-25
Class B  26-75
Class C  76-200
FRT wood has a **flame spread** rating. FRT wood does not, by itself, have an hourly **fire resistance** rating, however:

– can be used in place of untreated wood in tested assemblies

– can enable an assembly to meet code requirements
Flame Spread vs. Fire Resistance

Flame Spread
How quickly flame travels across the surface of a material

Determined by tunnel test of surface burning characteristics
Flame Spread vs. Fire Resistance

Fire Resistance

Hourly fire endurance rating of assemblies, such as doors, walls, ceilings, and floors

Determined by ASTM E 119 and E 136 tests

Many codes accept the Component Additive Method (CAM)
Using CAM

An example ...

<table>
<thead>
<tr>
<th>Component</th>
<th>Time/ Min.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Studs 16” on center</td>
<td>20</td>
</tr>
<tr>
<td>5/8” plywood – interior</td>
<td>15</td>
</tr>
<tr>
<td>Rockwool or slag mineral wool batts weighing not less than</td>
<td>15</td>
</tr>
<tr>
<td>¼ lb./sq. ft. of wall surface</td>
<td></td>
</tr>
<tr>
<td>½” gypsum board</td>
<td>15</td>
</tr>
</tbody>
</table>

Assembly Total 1 hour 5 min.

Details on CAM available from American Wood Council and others.
FRT Wood Increases Design Flexibility

~ Sprinklers ~

Section 8.15.1.2.11 of NFPA 13 Standard:
Concealed spaces in which the exposed materials are constructed entirely of fire-retardant treated wood as defined by NFPA 703 ... shall not require sprinkler protection.

NFPA 13 is referenced by IBC and satisfies the Life Safety Code.
FRT Wood Increases Design Flexibility

~ Parapets ~
FRT Wood Increases Design Flexibility

~ Parapets ~

IBC:
In Type III, IV, and V construction of R-3 dwellings, parapet not required if FRT panels extend 4’ on both sides of fire wall.

Allows for unbroken, continuous roof line.
How Does FRT Wood Work?

- Passive and automatic at temperatures below 450°F
- Convert combustible gases and tars to carbon char
- Release carbon dioxide and water vapor which dilute the combustible gases

Char insulates underlying wood and slows destruction.
At a wood-treating plant, common species of lumber, timbers, and plywood are loaded onto trams and pushed into a large horizontal treating cylinder.
Lumber and Plywood Sizes

- Size is limited only by treating plant’s ability to treat, dry, and handle
Several species can meet treating requirements
Typically only one or two are available in any particular area
Steps in the Treating Process

Step 1
Dry wood is loaded into cylinder

Step 2
Initial vacuum pulls out air

Step 3
Liquid fire retardant chemicals fill cylinder
Steps in the Treating Process

**Step 4**
Pressure forces fire retardant chemicals into wood

**Step 5**
Remaining liquid emptied for later use

**Step 6**
Final vacuum removes excess liquid
Codes require drying to a maximum moisture content.

This is especially important for exterior FRT wood — heat needed to lock chemical.
Dried After Treatment

- Sticks placed between layers to ensure air flow
- Temperature limits avoid damage to wood
- KDAT process is third-party monitored
- Strength values may differ for different brands (check with manufacturer)
Quality Control Programs

• Fire retardant chemical manufacturers
  ▪ Maintain QC programs
    – Compliance with UL Recognized Component Program
    – Highest quality of fire retardant chemicals

• FRT wood treaters
  ▪ Check retention, penetration, and drying schedules

• Third-party inspection agencies
  ▪ Monitor production process
  ▪ Required to meet codes
Use & Handling

• Proper Handling
  ▪ FRT wood & wood dust are no more hazardous than untreated wood

• Proper Use
  ▪ Should not be used in ground contact
  ▪ Exterior types should not be installed in attic environments

• Proper Storage
  ▪ Protect from physical damage
  ▪ Shield wood from precipitation

• Proper Disposal
  ▪ Dispose in accordance with regulations
  ▪ Typically, FRT wood is not considered a hazardous material and can be disposed of by regular means
FRT Wood & the Environment

- Basic material is wood, a sustainable natural resource
- Plentiful species grown on managed timberlands
- Low-energy requirements for production
- Absorption and sequestering of carbon – reduced generation of greenhouse gases
- Insulation value – thermal, acoustical, electrical
- Treatment extends service life of wood
• Currently no credits for treatment, unless treated wood is accepted as an Innovative Product
• Can be specified to be certified wood
• Other credits possible for wood attributes, particularly in Green Globes® and National Green Building Standard™
The following considerations can influence the specification of FRT wood:

- Building code requirements
- Fire concerns
- Architectural details, such as avoidance of sprinklers, parapets
- Strength values
- Material & installation costs
- Ease of jobsite modification & later repair/renovation
The following points can be included in a specification of FRT wood:

- Application, interior or exterior
- Qualification tests & ratings
- Third-party quality control
- Species
- Warranty
- Brand name

*Three-part model specs available on Internet from manufacturers*
Will FRT wood burn?

- If a fuel source is present, FRT wood will burn.
- The important fact to remember is that FRT wood will not support a fire.
What is the difference between flame spread vs. fire resistance?

- Flame spread is how quickly a fire travels across the surface; fire resistance is how fast a fire burns through the cross section.
- For calculating the fire resistance rating for an assembly, refer to the Component Additive Method (CAM).
Does a Class A rating require the extended 30-minute test?

- To qualify for Class A, a material must have a Flame Spread index of 0-25 and a Smoke Developed index of 0-450 in the 10-minute tunnel test. It does NOT have to undergo the 30-minute test.

- However, to meet model code requirements for FRT wood, a material must not exhibit progressive combustion in the extended 30-minute test.
Can it be painted or stained?

Yes. Follow the same procedures you would for painting or staining untreated wood. However, flammability of the finish should be considered before application. Follow manufacturers’ recommendations.
Is there a reduction in strength compared to untreated wood?

The pressure-treating and drying processes cause a reduction in strength that varies with treatment, species of wood, applications, and specific properties.
What type of fasteners should be used with FRT wood?

Galvanized steel hardware is recommended. Although the FR treatment does not increase the corrosion of bare steel, the galvanizing process provides an extra margin of safety, particularly in wet environments such as with exterior FRT wood.
Can I cut FRT wood?

Yes. Cutting lengths, drilling holes, and light sanding are permissible. It is not necessary to field-treat cut ends to maintain the flame spread rating. Most species of FRT lumber should not be ripped or milled. FRT plywood can be ripped or cross-cut.