DIVISION: 06 00 00—WOOD, PLASTICS AND COMPOSITES
SECTION: 06 05 73.33—PRESERVATIVE WOOD TREATMENT

REPORT HOLDER:

CHEMCO, INC.

EVALUATION SUBJECT:

FRX AND THERMEX-FR FIRE-RETARDANT-TREATED WOOD PRODUCTS

“2014 Recipient of Prestigious Western States Seismic Policy Council (WSSPC) Award in Excellence”

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1.0 EVALUATION SCOPE

Compliance with the following codes:
- 2013 Abu Dhabi International Building Code (ADIBC)†

†The ADIBC is based on the 2009 IBC. 2009 IBC code sections referenced in this report are the same sections in the ADIBC.
- Other Codes (see Section 8.0)

Properties evaluated:
- Structural
- Durability
- Surface-burning characteristics
- Hygroscopic properties
- Corrosion

2.0 USES

Chemco, Inc., FRX and Thermex-FR fire-retardant-treated wood are used in interior and exterior applications (exposed to weather, damp or wet locations), as permitted by IBC Section 603.1 and IRC Section R802.

3.0 DESCRIPTION

3.1 General:

The Chemco, Inc., FRX and Thermex-FR fire-retardant-treated wood are solid sawn lumber and plywood pressure-impregnated with Chemco’s fire-retardant chemicals in accordance with approved quality control procedures at the facility listed in Section 5.8 of this report.

FRX and Thermex-FR fire-retardant-treated lumber may be one of the following species: structural-grade southern yellow pine, Douglas fir, white spruce, western red cedar or western hem-fir. The plywood is Structural I grade, exterior plywood complying with PS1.

3.2 Flame Spread:

FRX and Thermex-FR fire-retardant-treated lumber and plywood have a flame-spread index of 25 or less and a smoke-developed index of 450 or less when tested in accordance with ASTM E84 as modified by Section 2303.2 of the IBC, Section R802.1.5 of the 2018 and 2015 IRC, or Section R802.1.3 of the 2012, 2009, and 2006 IRC.

3.3 Structural Strength:

The structural performance of FRX and Thermex-FR fire-retardant wood products has been evaluated using ASTM D5516 and D6305 for plywood and ASTM D5664 and D6841 for lumber. The effects of the FRX and Thermex-FR fire-retardant-treated treatment on the strength of the treated lumber and plywood must be accounted for in the design of wood members and their connections.

3.3.1 Lumber:

The strength and stiffness design properties of lumber treated with FRX and Thermex-FR fire-retardant chemicals used in applications at ambient temperatures up to 100°F (38°C) are subject to the design value adjustment factors shown in Table 1.

The strength and stiffness design properties of lumber, when treated with FRX and Thermex-FR fire-retardant chemicals that are subject to elevated temperatures up to 150°F (66°C), are subject to the design value adjustment factors shown in Table 2.

3.3.2 Plywood:

The maximum allowable live loads and spans for FRX and Thermex-FR fire-retardant-treated plywood for roof applications given in Table 3 applicable to all species in Section 3.1.

3.4 Corrosion:

The corrosion rate of the metals specified in Section 2304.10.5 of the 2018 and 2015 IBC, Section 2304.9.5 of the 2012, 2009 and 2006 IBC, Section R317.3 of the 2018, 2015, 2012, and 2009 IRC, or Section R319.3 of the 2006 IRC, in contact lumber treated with FRX and Thermex-FR fire-retardant-treated wood products, is not increased by the treatment. For interior applications, where there is no potential moisture present, the products recognized in this evaluation report may be used with uncoated metals. For all other applications, where there is a potential of moisture, the products must be used with coated metals or as otherwise required by the applicable code.
4.0 DESIGN AND INSTALLATION

4.1 General:

Structural systems that include FRX and Thermex-FR fire-retardant-treated wood must be designed and installed in accordance with the applicable code, using the appropriate lumber design value adjustment factors and allowable total sheathing loads as set forth in this section (Section 4.1).

The effects of FRX and Thermex-FR fire-retardant treatment on the strength of the treated lumber and plywood must be accounted for in the design of wood members and their connections. Ventilation, when required, must be provided in accordance with the applicable code.

The strength and stiffness design properties of lumber, when treated with FRX and Thermex-FR chemicals and used in applications at service temperatures up to 100°F (38°C), are subject to the adjustment factors as set forth in Table 1.

The strength and stiffness design properties of lumber, when treated with FRX and Thermex-FR chemicals and used in applications at service temperatures up to 150°F (66°C), are subject to the adjustment factors as set forth in Table 2.

The allowable load and span properties of plywood, when treated with FRX and Thermex-FR chemicals and used in roof applications at service temperatures up to 170°F (77°C), are subject to the span and load limitations as set forth in Table 3.

4.2 Fasteners:

Fasteners used with FRX and Thermex-FR chemicals and used in applications at service temperatures resulting from manufacturing or other processes which require special consideration in design, which is not within the scope of this report.

5.0 CONDITIONS OF USE

The FRX and Thermex-FR fire-retardant-treated wood products described in this report comply with, or are suitable alternatives to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:

5.1 The products are manufactured, identified and installed in accordance with this report and the manufacturer’s published installation instructions. If there are any conflicts between the manufacturer’s published installation instructions and this report, this report governs.

5.2 Strength calculations must be subject to the design value adjustment factors and span and load values shown in Tables 1, 2 and 3.

5.3 The design value adjustment factors and span and load values given in this report must only be used for unincised dimensional lumber and plywood of the species noted in this report.

5.4 The fire-retardant-treated wood must not be used in contact with the ground.

5.5 The fire-retardant-treated lumber must not be ripped or milled, since this will alter the surface-burning characteristics and invalidate the flame-spread classification.

5.6 Exposure to precipitation during storage or installation must be avoided. If material does become wet, it must be replaced or permitted to dry (maximum 19 percent moisture content for lumber and 15 percent moisture content for plywood) prior to covering or enclosure by wallboard or other construction materials (except for protection during construction).

5.7 The design value adjustment factors for lumber in Tables 1 and 2, and plywood allowable loads and spans in Table 3 of this report, are applicable under elevated temperatures resulting from cyclic climatic conditions. They are not applicable under continuous elevated temperatures resulting from manufacturing or other processes which require special consideration in design, which is not within the scope of this report.

5.8 The FRX and Thermex-FR lumber and plywood are treated in Ferndale, WA under a quality control program with inspections by ICC-ES and Fire Tech Services, Inc. (AA-641).

6.0 EVIDENCE SUBMITTED

Data in accordance with the ICC-ES Acceptance Criteria for Fire-retardant-treated Wood (AC66), dated June 2015 (editorially revised April 2018).

7.0 IDENTIFICATION

7.1 Lumber and plywood treated with FRX and Thermex-FR fire-retardant chemicals shall be identified by the structural grade mark of an approved agency. In addition, all treated lumber and plywood must be stamped with the name of the inspection agency (Fire Tech Services, Inc.); the Chemco, Inc. name and address; the name of the fire-retardant treatment; the species of wood treated; the flame-spread and smoke-developed indices; the treating date and method of drying after treatment; and the evaluation report number (ESR-1159). Additionally, the treated lumber and plywood must be identified with the words “Exterior” and/or “Interior” (see Figure 1 for typical labels).

7.2 The report holder’s contact information is the following:

CHEMCO, INC.
POST OFFICE BOX 875
FERNDALE, WASHINGTON 98248
(360) 366-3500
www.chemco.org
www.saferwood.com
info@chemco.us

8.0 OTHER CODE

8.1 Evaluation Scope:

In addition to the codes referenced in Section 1.0, the products described in this report were evaluated for compliance with the requirements of the 1997 Uniform Building Code™ (UBC). The products comply with the UBC as noted below.

8.2 Uses:

See Section 2.0, except use and application must be in accordance with Section 601 of the UBC.
8.3 Description:
See Section 3.0. FRX and Thermex-FR fire-retardant-treated lumber and plywood have a flame-spread index of 25 or less and a smoke developed index of 450 or less when tested in accordance with UBC Standard 8-1 and UBC Section 207.

8.4 Installation:
See Section 4.0, except fasteners must comply with UBC Section 2304.3.

8.5 Conditions of Use:
See Section 5.0.

8.6 Evidence Submitted:
See Section 6.0.

8.7 Identification:
See Section 7.0.

### TABLE 1—DESIGN VALUE ADJUSTMENT FACTORS FOR FRX AND THERMEX-FR FIRE-RETARDANT-TREATED LUMBER COMPARED TO UNTREATED LUMBER [APPLICABLE AT SERVICE TEMPERATURES UP TO 100°F (38°C)]

<table>
<thead>
<tr>
<th>PROPERTY</th>
<th>SOUTHERN YELLOW PINE, WESTERN RED CEDAR</th>
<th>DOUGLAS FIR</th>
<th>WHITE SPRUCE, WESTERN HEM-FIR</th>
</tr>
</thead>
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<td>Compression parallel to grain, Fc</td>
<td>1.0</td>
<td>1.0</td>
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</tr>
<tr>
<td>Horizontal shear, Fv</td>
<td>0.95</td>
<td>0.95</td>
<td>0.89</td>
</tr>
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<td>Tension parallel to grain, Ft</td>
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<td>Bending: modulus of elasticity, E</td>
<td>0.97</td>
<td>1.05</td>
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<td>Bending: extreme fiber stress, Fb</td>
<td>0.81</td>
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<tr>
<td>Compression Perpendicular to grain, Fc⊥</td>
<td>0.95</td>
<td>0.95</td>
<td>0.95</td>
</tr>
<tr>
<td>Fasteners/connectors</td>
<td>0.90</td>
<td>0.90</td>
<td>0.89</td>
</tr>
</tbody>
</table>

*Duration of load adjustments for snow loads, seven-day (construction) loads, and wind loads specified in the IBC are permissible.

### TABLE 2—DESIGN VALUE ADJUSTMENT FACTORS FOR FRX AND THERMEX-FR FIRE-RETARDANT-TREATED LUMBER COMPARED TO UNTREATED LUMBER [APPLICABLE AT SERVICE TEMPERATURES UP TO 150°F (66°C)]

<table>
<thead>
<tr>
<th>PROPERTY</th>
<th>SOUTHERN YELLOW PINE, WESTERN RED CEDAR</th>
<th>DOUGLAS FIR</th>
<th>WHITE SPRUCE, WESTERN HEM-FIR</th>
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<td>Compression parallel to grain, Fc</td>
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<td>Tension parallel to grain, Ft</td>
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<td>0.71</td>
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<td>Bending: modulus of elasticity, E</td>
<td>0.94</td>
<td>0.95</td>
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<td>Bending: extreme fiber stress, Fb</td>
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<tr>
<td>Fasteners/connectors</td>
<td>0.51</td>
<td>0.73</td>
<td>0.91</td>
</tr>
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</table>

**Climate Zone definitions:**
- Zone 1—Where minimum roof live load or maximum ground snow load ≤ 20 psf (960 Pa)
- Zone 1A—Southwest Arizona, southeast Nevada (Las Vegas, Yuma-Phoenix-Tucson triangle)
- Zone 1B—All other qualifying areas on the continental United States
- Zone 2—Minimum ground snow load ≥ 20 psf (960 Pa)
TABLE 3—ALLOWABLE LIVE LOADS FOR ROOF SHEATHING (PSF) FOR
FRX AND THERMEX-FR FIRE-RETARDANT-TREATED PLYWOOD
APPLICABLE UP TO 170°F (77°C)

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For SI: 1 inch = 25.4 mm, 1 psf = 47.9 N/m²

NOTES:
1. Fastener size and spacing must be as required in the applicable code for untreated plywood of the same thickness.
2. Plywood must be Structural I grade, exterior plywood.
3. Live loads in table are based on plywood panel size of 4’ by 8’ with plywood face grain across (perpendicular to) the supports.
4. Tabulated loads are based on bending. Live loads for Zone 1A are based on duration of load adjustment for 7-day (construction loads) of 1.25.
5. A dead load of 10 psf was used to determine the allowable live loads.
6. Span not to exceed pre-treatment span rating.
7. Chemco does not recommend 1/16" or 1/8" panel thicknesses for roofing applications.

Climate Zone definitions:
- Zone 1—Where minimum roof live load or maximum ground snow load ≤ 20 psf (960 Pa)
- Zone 1A—Southwest Arizona, southeast Nevada (Las Vegas, Yuma-Phoenix-Tucson triangle)
- Zone 1B—All other qualifying areas on the continental United States
- Zone 2—Minimum ground snow load ≥ 20 psf (960 Pa)
FIGURE 1—TYPICAL LABELS FOR FRX AND THERMEX-FR FIRE-RETARDANT LUMBER AND PLYWOOD