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PRODUCT: FRX, SAFERWOOD-FX, THERMEX-FX, MATAVERDE, FLAME REPEL
FIRE-RETARDANT-TREATED LUMBER

REPORT HOLDER: Chemco, Inc.

CONTACT DETAILS: 4191 Grandview Road
Ferndale, WA
98248 USA

CSI DIVISION: 06 00 00 – Wood, Plastics, and Composites

CSI SECTION: 06 05 73 - Wood Treatment
06 05 73.13 - Fire-Retardant Wood Treatment

APPLICABLE CODES: 2021, 2018, 2015 International Building Code (IBC)
2021, 2018, 2015 International Residential Code (IRC)
2022, 2019 California Building Code (CBC)
2022, 2019 California Residential Code (CRC)

EVALUATED: Ignition Resistance (Surface Burning Characteristics, Extended 20-minutes)
Weather Exposure
Strength Adjustments (Structural)
Moisture Content



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CODE EVALUATION REPORT

1.0 APPROVED FOR FOLLOWING:

APPROVED TYPES OF CONSTRUCTION:	Types I-V A/B
APPROVED USE:	Fire-retardant treated lumber.
APPROVED INSTALLATIONS:	Load-Bearing and Non-load Bearing Exterior and Interior Walls.

2.0 DESCRIPTION:

2.1 General:

FRX, Saferwood-FX, Thermex-FX, Mataverde, and Flame Repel are pressure impregnated fire-retardant treated lumber products complying with Section 2303.2 of the 2021 / 2018 / 2015 IBC and Section R802.1.5 of the 2021 / 2018 / 2015 IRC with a flame spread of 25 or less with no evidence of significant progressive combustion when tested in accordance with ASTM E84 extended for an additional 20-minutes (30-minute ASTM E84). Labeling of treated lumber and wood panels complies with Section 2303.2.4 of the 2021 / 2018 / 2015 IBC and Section R802.1.5.4 of the 2021 / 2018 / 2015 IRC.

FRX, Saferwood-FX and Thermex-FX lumbers are approved for exterior and interior applications, including exposure to weather with no increase in the listed classification when subjected to standard rain test (ASTM D2898). The noted products have a moisture content of less than 28% at 92% relative humidity when tested in accordance with ASTM D3201 for hygroscopicity and have a moisture content of 19% or less for lumber and 15% or less for wood structural panels after kiln drying.

Mataverde and Flame-Repel products are intended for use in exterior applications, including exposure to weather with no increase in the listed classification when subjected to standard rain test (ASTM D2898).

Fasteners intended for use with FRX, Saferwood-FX, Thermex-FX, Mataverde, and Flame Repel treated wood products, shall be hot-dipped zinc-coated galvanized steel, stainless steel, silicone bronze or copper in accordance with Section 2304.10.5.3 of the 2021 / 2018 / 2015 IBC and Section R318.3.3 of the 2021 / 2018 / 2015 IRC.

FRX, Saferwood-FX, Thermex-FX, Mataverde, and Flame Repel treated lumber has strength adjustments as outlined in Section 8.1 of this report determined in accordance with ASTM D6841 based on evaluation to ASTM D5664.

FRX, Saferwood-FX, Thermex-FX, Mataverde, and Flame Repel treatments are approved for the following lumber grades:

Table 1. FRX, Saferwood-FX, Thermex-FX, Mataverde, and Flame Repel Approved Lumber¹

LUMBER	Southern Yellow Pine (SYP), Douglas-fir (DF), Spruce-Pine-Fir (SPF), Western Red Cedar (WRC), Western Hemlock-Fir (HF)
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Note 1: Application of strength adjustment factors to other species shall be in accordance with Section 3.0 and 8.1 of this report. ASTM E84 extended for an additional 20-minutes (30-minute ASTM E84) as required by Section 2303.2 of the 2021 / 2018 / 2015 IBC and R802.1.5 of the 2021 / 2018 / 2015 IRC apply to species combinations in Table 1 and Section 8.1 of this report only.

FRX, Saferwood-FX, Thermex-FX, Mataverde, and Flame Repel treated lumbers are classified as *Ignition Resistant* per NFPA 1144 for use in reducing structure ignition hazard resulting from wildland fire.



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3.0 DESIGN:

FRX, Saferwood-FX, Thermex-FX, Mataverde, and Flame Repel treated lumbers are to be designed in accordance with the appropriate code referenced methodology, considering the strength adjustments outlined in Section 8.1 of this report for the respective wood species and anticipated service temperatures and humidities. The lowest strength adjustment of each noted mechanical property for Southern Yellow Pine, Douglas-fir, and Spruce-Pine-Fir species grades can be applied to other commercially available North American softwood lumber grades. Compliance with Section 2303.2 of the 2021 / 2018 / 2015 IBC and Section R802.1.5 of the 2021 / 2018 / 2015 IRC with a flame spread of 25 or less with no evidence of significant progressive combustion when tested in accordance with ASTM E84 extended for an additional 20-minutes (30-minute ASTM E84) is applicable to species outlined in Table 1 and Section 8.1 only.

4.0 INSTALLATIONS:

4.1 General:

FRX, Saferwood-FX, Thermex-FX, Mataverde, and Flame Repel treated lumber products must comply with the manufacturer's published installation instructions, this report, and the applicable code(s). Where conflicts exist, this report and the applicable building code shall govern.

FRX, Saferwood-FX, Thermex-FX, Mataverde, and Flame Repel treated lumber products are to be installed in accordance with the applicable code for application in which the products are used.

FRX, Saferwood-FX, Thermex-FX, Mataverde, and Flame Repel treated lumber products can be installed in exterior or interior conditions. The noted products can be exposed to weather. FRX, Saferwood-FX, Thermex-FX, Mataverde, and Flame Repel treated lumber products are not intended for storage in or exposure to standing water.

Fasteners for use with FRX, Saferwood-FX, Thermex-FX, Mataverde, and Flame Repel treated lumber shall be hot-dipped zinc-coated galvanized steel, stainless steel, silicone bronze or copper in accordance with Section 2304.10.5.3 of the 2021 / 2018 / 2015 IBC and Section R318.3.3 of the 2021 / 2018 / 2015 IRC.



5.0 LIMITATIONS

- FRX, Saferwood-FX, Thermex-FX, Mataverde, and Flame Repel treated lumber products must comply with the manufacturer's published installation instructions, this report, and the applicable code(s). Where conflicts exist, this report and the applicable building code shall govern.
- Strength design must include consideration of strength adjustment factors outlined in Section 8.1 of this report for anticipated temperature and humidity exposures, as applicable.
- FRX, Saferwood-FX, Thermex-FX, Mataverde, and Flame Repel interior treated lumber products are not intended for long-term exposure to elements or standing water exposure. Where exposed to water for these products intended for interior applications, the affected wood product is required to be dried to moisture content of $\leq 19\%$ for lumber as required by Section 2303.2.8 of the 2021 / 2018 / 2015 IBC or replaced prior to installation of coverings.
- Fasteners for use with FRX, Saferwood-FX, Thermex-FX, Mataverde, and Flame Repel treated lumber are to be in accordance with Section 4.1 of this report and Section 2304.10.5.3 of the 2021 / 2018 / 2015 IBC and Section R318.3.3 of the 2021 / 2018 / 2015 IRC.
- FRX, Saferwood-FX, Thermex-FX, Mataverde, and Flame Repel treated lumber fire-retardant applies to finished (uncut) surfaces only.
- FRX, Saferwood-FX, Thermex-FX, Mataverde, and Flame Repel treated lumber products are manufactured by approved treatment facilities located in Ferndale, WA State, and Maple Ridge, BC with inspections by QAI Laboratories.

6.0 SUPPORTING INFORMATION:

The following data has been evaluated for FRX, Saferwood-FX, Thermex-FX, Mataverde, and Flame Repel treated lumber products:

- Data outlining compliance to ASTM E84 extended for an additional 20-minutes (30-minute ASTM E84) with a flame spread of < 25 , with maximum flame progression of ≤ 10.5 ft (3.2 m) beyond the burners at any time during testing, with no evidence of significant progressive combustion after weathering exposure per ASTM D2898 *Standard Practice for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing*.
- Data outlining determination of strength adjustment factors for fire-retardant treated lumber per ASTM D5664 Standard Test Method for Evaluating the Effects of Fire-Retardant Treatments and Elevated Temperatures on Strength Properties of Fire-Retardant Treated Lumber.
- Determination of modification factors for lumber in accordance with ASTM D6841 Standard Practice for Calculating Design Value Treatment Adjustment Factors for Fire-Retardant-Treated Lumber.
- Evaluation of hygroscopicity per ASTM D3201 *Standard Test Method for Hygroscopic Properties of Fire-Retardant Wood and Wood-Based Products*.
- Evaluation of moisture content for fire-retardant treated lumber products.
- Evaluation of corrosion in accordance with AWWA E12 *Standard Method of Determining Corrosion of Metal in Contacted with Treated Wood*.











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7.0 MARKING:

FRX, Saferwood-FX, Thermex-FX, Mataverde, and Flame Repel treated wood panel product labels are outlined below:

Figure 2a. Example of SaferWood Fire-Retardant Treated Lumber Labeling

<p>Chemco, Inc. Ferndale, Washington SaferWood Pressure Treated Fire-Retardant Lumber ICC ES Report ESR-1159 ESL 1021</p> <p> CERus-1031</p> <p>MIL-L-19140E Specification FR-12-X Type II Category 2 Classification: Exterior Species: Douglas Fir Tested per ASTM E84 / UL 723 Extended for 30 min, no increase in listed Classification when subjected to standard rain test (ASTM D2898) KDAT</p> <p>FSI: 25 or less SDI: 45 or less</p> <p>Treated (Month / Year): <input type="text" value="CUT-OUT"/></p> <p>QAI LABORATORIES IAS Report No.AA-635</p>	<p>Chemco, Inc. Ferndale, Washington SaferWood Pressure Treated Fire-Retardant Lumber ICC ES Report ESR-1159 ESL 1021</p> <p> CERus-1031</p> <p>Classification: Interior Species: Douglas Fir Tested per ASTM E84 / UL 723 There was evidence of significant progressive combustion when the test was extended for 30 min. KDAT</p> <p>FSI: 25 or less SDI: 45 or less</p> <p>Treated (Month / Year): <input type="text" value="CUT-OUT"/></p> <p>QAI LABORATORIES IAS Report No.AA-635</p>	<p>Chemco, Inc. Ferndale, Washington SaferWood Pressure Treated Fire-Retardant Lumber ICC ES Report ESR-1159 ESL 1021</p> <p> CERus-1031</p> <p>Classification: Exterior Species: WRC Tested per ASTM E84 / UL 723 Extended for 30 min, no increase in listed Classification when subjected to standard rain test (ASTM D2898) KDAT</p> <p>FSI: 25 or less SDI: 45 or less</p> <p>Treated (Month / Year): <input type="text" value="CUT-OUT"/></p> <p>QAI LABORATORIES IAS Report No.AA-635</p>	<p>Chemco, Inc. Ferndale, Washington SaferWood Pressure Treated Fire-Retardant Lumber ICC ES Report ESR-1159 ESL 1021</p> <p> CERus-1031</p> <p>Classification: Interior Species: WRC Tested per ASTM E84 / UL 723 There was evidence of significant progressive combustion when the test was extended for 30 min. KDAT</p> <p>FSI: 25 or less SDI: 45 or less</p> <p>Treated (Month / Year): <input type="text" value="CUT-OUT"/></p> <p>QAI LABORATORIES IAS Report No.AA-635</p>
<p>Chemco, Inc. Ferndale, Washington SaferWood Pressure Treated Fire-Retardant Lumber ICC ES Report ESR-1159 ESL 1021</p> <p> CERus-1031</p> <p>Classification: Exterior Species: SPF Tested per ASTM E84 / UL 723 Extended for 30 min, no increase in listed Classification when subjected to standard rain test (ASTM D2898) KDAT</p> <p>FSI: 25 or less SDI: 45 or less</p> <p>Treated (Month / Year): <input type="text" value="CUT-OUT"/></p> <p>QAI LABORATORIES IAS Report No.AA-635</p>	<p>Chemco, Inc. Ferndale, Washington SaferWood Pressure Treated Fire-Retardant Lumber ICC ES Report ESR-1159 ESL 1021</p> <p> CERus-1031</p> <p>Classification: Interior Species: SPF Tested per ASTM E84 / UL 723 There was evidence of significant progressive combustion when the test was extended for 30 min. KDAT</p> <p>FSI: 25 or less SDI: 45 or less</p> <p>Treated (Month / Year): <input type="text" value="CUT-OUT"/></p> <p>QAI LABORATORIES IAS Report No.AA-635</p>	<p>Chemco, Inc. Ferndale, Washington SaferWood Pressure Treated Fire-Retardant Lumber ICC ES Report ESR-1159 ESL 1021</p> <p> CERus-1031</p> <p>Classification: Exterior Species: SYP Tested per ASTM E84 / UL 723 Extended for 30 min, no increase in listed Classification when subjected to standard rain test (ASTM D2898) KDAT</p> <p>FSI: 25 or less SDI: 45 or less</p> <p>Treated (Month / Year): <input type="text" value="CUT-OUT"/></p> <p>QAI LABORATORIES IAS Report No.AA-635</p>	<p>Chemco, Inc. Ferndale, Washington SaferWood Pressure Treated Fire-Retardant Lumber ICC ES Report ESR-1159 ESL 1021</p> <p> CERus-1031</p> <p>Classification: Exterior Species: Douglas Fir Tested per ASTM E84 / UL 723 Extended for 30 min, no increase in listed Classification when subjected to standard rain test (ASTM D2898) KDAT</p> <p>FSI: 25 or less SDI: 45 or less</p> <p>Treated (Month / Year): <input type="text" value="CUT-OUT"/></p> <p>QAI LABORATORIES IAS Report No.AA-635</p>



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Chemco, Inc.
Ferndale, Washington
SaferWood Pressure Treated
Fire-Retardant Lumber

ICC ES Report ESR-1159
ESL 1021



Classification: Exterior
Species: Hem Fir

Tested per ASTM E84 / UL 723
Extended for 30 min, no increase in listed
Classification when subjected to standard
rain test (ASTM D2898) KDAT

FSI: 25 or less

SDI: 45 or less

Treated

(Month / Year):

QAI LABORATORIES
IAS Report No. AA-635



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8.0 RESULTS / RATINGS:

8.1 FRX, Saferwood-FX, Thermex-FX, Mataverde, and Flame Repel Treated Lumber Properties

Table 2: FRX, Saferwood-FX, Thermex-FX, Mataverde, and Flame Repel Treated Lumber Allowable Design Properties Service Temperature Service $\leq 100^{\circ}\text{F}$ (38°C)

PROPERTY	DOUGLAS-FIR	SPRUCE-PINE-FIR	SOUTHERN YELLOW PINE	WESTERN RED CEDAR	REDWOOD	HEMLOCK-FIR
Extreme fiber stress in bending MOR, Fb	0.99	0.94	0.81	0.81	0.81	0.81
Tension parallel to grain, Ft	0.80	0.88	0.76	0.76	0.76	0.76
Compression parallel to grain, F _{CI}	1.00	0.94	1.00	0.94	0.94	0.94
Horizontal shear, Fu	0.95	0.89	0.95	0.89	0.89	0.89
Modulus of elasticity, E	1.00	1.00	0.97	0.97	0.97	0.97
Compression perpendicular to grain, F _{CI}	0.95	0.95	0.95	0.95	0.95	0.95
Fastener Connections	0.90	0.89	0.90	0.89	0.89	0.89

Table 3: FRX, Saferwood-FX, Thermex-FX, Mataverde, and Flame Repel Treated Lumber Allowable Design Properties Service Temperature Service $> 100^{\circ}\text{F}$ (38°C) $\leq 150^{\circ}\text{F}$ (66°C)

PROPERTY	DOUGLAS-FIR			SPRUCE-PINE-FIR			SOUTHERN YELLOW PINE			WESTERN RED CEDAR/REDWOOD/HEMLOCK-FIR		
	1A ¹	1B ²	2 ³	1A ¹	1B ²	2 ³	1A ¹	1B ²	2 ³	1A ¹	1B ²	2 ³
Extreme fiber stress in bending MOR, Fb	0.84	0.90	0.97	0.76	0.84	0.91	0.24	0.47	0.73	0.24	0.47	0.73
Tension parallel to grain, Ft	0.80	0.80	0.80	0.65	0.77	0.87	0.34	0.54	0.71	0.34	0.54	0.71
Compression parallel to grain, F _{CI}	0.84	0.92	0.99	0.70	0.82	0.94	0.56	0.78	0.96	0.56	0.78	0.94
Horizontal shear, Fu	0.83	0.91	0.98	0.65	0.77	0.89	0.51	0.73	0.91	0.51	0.73	0.89
Modulus of elasticity, E	0.95	0.99	1.00	0.99	1.0	1.0	0.94	0.95	0.97	0.94	0.95	0.97
Compression perpendicular to grain, F _{CI}	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Fastener Connections	0.83	0.90	0.90	0.65	0.88	0.89	0.51	0.73	0.91	0.51	0.73	0.89

Zone Definitions per ASTM D6841:

- (1) Zone 1A: Minimum roof live load or maximum ground snow load ≤ 20 psf (≤ 958 Pa) (Southwest Arizona and Southeast Nevada (Area bound by Las Vegas, Yuma, Phoenix, Tucson).
- (2) Zone 1B: Minimum roof live load or maximum ground snow load ≤ 20 psf (≤ 958 Pa) (All other areas).
- (3) Zone 2: Minimum ground snow load > 20 psf (> 958 Pa).



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9.0 SUPPLEMENTAL CODES

9.1 2022 California Building Code, 2022 California Residential Code:

FRX, Saferwood-FX, Thermex-FX, Mataverde, and Flame Repel comply with the requirements of Section 2303.2 of the 2022 / 2019 California Building Code and Section R802.1.5 of the 2022 / 2019 California Residential Code for use as *fire-retardant treated wood* as outlined in Sections 2 through 8 of this report.

Where used in areas identified by the state as a *Fire Hazard Severity Zone* or any *Wildland-Urban Interface (WUI)* designated by the enforcing agency, FRX, Saferwood-FX, Thermex-FX, Mataverde, and Flame Repel treated lumber and engineered panel products are approved for use in exterior design and construction as fire-retardant treated wood in accordance with Section 703A.5.2.1 of the 2022 / 2019 CBC and as *ignition resistant material* determined in accordance with Section 704A of the 2022 / 2019 CBC as outlined in this report.

10.0 MULTIPLE LISTEES

The following manufacturing facilities have been evaluated and approved for FRX, Saferwood-FX, Thermex-FX, Mataverde, and Flame Repel treatment of lumber products:

FSR Treatment Inc.
9486 288th Street
Maple Ridge, British Columbia
V2W 1L1 Canada



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11.0 ELIGIBILITY OF REPORT

QAI's Code Evaluation Report complies with the 2021 / 2018 / 2015 IBC Section 104.11 *Alternative materials, design and methods of construction and equipment* subsection 104.11.1 *Research Reports*. Supporting data has been evaluated by QAI for compliance of the noted materials and assemblies to the applicable code by QAI, and *approved* source as detailed below.

The attached report has been reviewed by a QAI Registered Professional Engineer approved by the specific state Board of Professional Engineers noted on the specific P.E. seal(s).

Per section 1703 of the IBC, QAI is an independent third-party testing, inspection and certification agency accredited by the International Accreditation Service, Inc. (IAS) for this specific scope (see IAS PCA-118). QAI can confirm that based on its IAS accreditation it meets IBC Section 1703.1 on Independence, Section 1703.1.2 on Equipment and Section 1703.1 on Personnel.

This Evaluation report has been designed to meet the performance requirements of IBC Section 1703.4 and contains the required information to show the product, material or assembly meets the applicable code requirements.

The product is labeled per section IBC 1703 and subject to follow-up inspection per IBC 1703.6 using QAI IAS accredited ISO/IEC 17020 inspection program (see IAS AA-723).

For more information regarding QAI Laboratories, please visit www.qai.org.



The above is an example of the QAI registered Listing mark. The Listing mark may only be used by the Report Holder per the QAI service agreement on products defined in this report. The 'us' indicator in the 8 o'clock position indicates the product complies with the properties evaluated with limitations outlined in this report for use in the US market. A 'c' indicator in the 4 o'clock position indicates the product has been evaluated for use in the Canadian market.





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11.0 REFERENCED STANDARDS

ASTM E84 *Standard Test Method for Surface Burning Characteristics of Building Materials.*

ASTM D2898 *Standard Practice for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing.*

ASTM D3201 *Standard Test Method for Hydrosopic Properties of Fire-Retardant Wood and Wood-Based Products.*

ASTM D6841 *Standard Practice for Calculating Design Value Treatment Adjustment Factors for Fire-Retardant-Treated Lumber.*

ASTM D5664 *Standard Test Method for Evaluating the Effects of Fire-Retardant Treatments and Elevated Temperatures on Strength Properties of Fire-Retardant Treated Lumber.*

AWPA E12 *Standard Method of Determining Corrosion of Metal in Contact with Treated Wood.*