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# Eco-friendly, fire-retardant-treated lumber

Information to designers





BORAFLAME / Information to designers v1.11 / March 2021

Boralife has developed a new technology to produce what is technically called **fire-retardant-treated wood** in the industry.

Our innovative dip-diffusion impregnation process produces fireretardant-treated wood equivalent to that obtained usually by the pressure treatment process, but in a much greener way.

Our process is **simpler**, **faster** and consumes **ten times less energy and water** than the other method.

Our BORAFLAME FRT lumber is now available .

# What is fire-retardant-treated wood?



#### 2018 International Building Code® (IBC), Section 2303.2:

"Fire-retardant-treated wood is any wood product that, when impregnated with chemicals by pressure process or other means during manufacture, shall have, when tested in accordance with ASTM E84 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 10½ feet (3200 mm) beyond the centerline of the burners at any time during the test."

BORAFLAME simply meets the above definition, as "other mean during manufacture".

#### And since it is not a paint, stain or surface coating, it also meets the following:

**"2303.2.2 Other means during manufacture.** For wood products impregnated with chemicals by other means during manufacture, the treatment shall be an integral part of the manufacturing process of the wood product. The treatment shall provide permanent protection to all surfaces of the wood product. The use of paints, coating, stains or other surface treatments is not an approved method of protection as required in this section."



#### ES FOLLUATION

**ICC-ES Evaluation Report** 

Issued November 2020 Revised February 2021 This report is subject to renewal November 2021

3.4 Corrosion

4.1 General: Structural systems that i treated lumber must

3.5 Hygroscopicity:

4.0 DESIGN AND INSTALLATION

evidence of significant progressive combustion when the tests are continued for an additional 20-minute period, nor does the fisme front progress more than  $10^{10}_{\rm 2}$  feet (3200 mm) beyond the centerline of the burners at any time during the tests.

3.3 and between a setting of the Derestriky. BCRAFLABE for elevationative stated lumber was tested and evaluated in accordance with ASTM DS564 and ASTM D8541 for determination of the treated wood adjustment factors show in Table 1. The factors in Table 1 are applicable for service temperatures up to 150°F (65°C). These adjustment factors are used in conjunction with, and

are applied cumulatively to, the applicable design value adjustments required by the National Design Specification<sup>®</sup> for Wood Construction (NDS), Design values for SPF lumber are provided in the current NDS Supplement.

BORAFLAME Ine-retardant-treated lumber qualifies as Interior Type A High Temperature (HT) fire-retardant-treated lumber under the American Wood Protection Association (AWPA) U1, Commodity Specification H, Use Category UCFA.

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3.3 Structural Strength and Durability:

The corrosion rate of carbon steel is not in BORAFLAME fire-retardant-treated lumber recommended by the manufacturer.

ESR-4156

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VISION: 05 00 00-WOOD, PLASTICS AND COMPOSITES action: 06 05 73.13- Fire-Retardant Wood Treatment REPORT HOLDER

TECHNOLOGIES BORALIFE INC.

EVALUATION SUBJECT: BORAFLAME

1.0 EVALUATION SCOPE Compliance with the following codes 2018 and 2015 (nternational Building Code<sup>®</sup> (IBC))

 2018 and 2015 International Residential Code<sup>®</sup> (IRC) For evaluation for compliance with codes adopted by Los Angeles Department of Building and Safety (LADBS), see ESR-4156 LABC and LARC Supplement.

Properties evaluated:

Flame spread Structural

 Corrosion Hygroscopicity

2.0 USES

BORAFLAME fire-retardant-treated lumber is used in interior applications that are not exposed to the weather or wetting where the code permits the use of wood or fire-retardiant-treated wood.

#### 3.0 DESCRIPTION 3.1 General:

treated lumber must be designed and installed in accordance with the design value adjustment factors from Table 1 of this report and the design values and applicable adjustment values required by the applicable code. 3.1 veneration: BORAFLAME fire-relardant-treated lumber is produced using Boralife's high temperature dip diffusion impregnation process of a concentrated aqueous solution of solitum borate. BORAFLAME Fire-Relardant-Treated lumber is produced from Spruce-Pine-Fir species combination (NLGA SPF). Ventilation must be provided in accordance with the applicable codes 4.2 Elevated Temperature:

3.2 Flame Spread:

BORAFLAME fire-retardant-treated lumbe used in areas (including attic spaces) where the lumber is exposed to temperatures of 150°F (66°C) or less. The design value adjustment factors provided in Table 1 applicable applicable under elevated temperature resulting from cyclic BORAFLAME fire-retardant lumber has a fiame spread index of 25 or less and smoke developed index of 450 or less, when subjected to ASTM E84 tests, and shows no

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## **Fire-retardant-treated lumber ICC-ES Evaluation Report: ESR-4156**

Technologies Boralife Inc. has received confirmation from ICC Evaluation Service, LLC (ICC-ES), that its BORAFLAME Fire-Retardant-Treated lumber complies with the provisions of the codes listed below.

This confirmation, as evidence in ICC-ES evaluation report ESR-4156, provides guidance to code officials faced with approving the use of BORAFLAME under these codes. The evaluation report is available online at: https://icc-es.org/report-listing/esr-4156/

BORAFLAME complies with the provisions of the following codes:

- 2018 and 2015 International Building Code® (IBC)
- 2018 and 2015 International Residential Code® (IRC) •
- 2020 City of Los Angeles Building Code (LABC)
- 2020 City of Los Angeles Residential Code (LSRC)
- 2019 California Building Code (CBC)
- 2019 California Residential Code (CRC)
- 2020 and 2017 Florida Building Code Building •
- 2020 and 2017 Florida Building Code Residential



All due testing and quality control qualification have been performed for Boralife by *Intertek* at its York, Pennsylvania, facilities.

- ASTM E84-19b, Standard Test Method for Surface Burning Characteristics of Building Materials
- ASTM E2768-11 (2018), Standard Test Method for Extended Duration Surface Burning Characteristics of Building Materials (30 min Tunnel Test)
- ASTM D5664-17 Standard Test Method for Evaluating the Effects of Fire-Retardant Treatments and Elevated Temperatures on Strength Properties of Fire-Retardant Treated Lumber
- ASTM D3201-13, Standard Test Method for Hygroscopic Properties of Fire-Retardant Wood and Wood based Products
- AWPA E12-08, Corrosion Resistance (720 hours)
- AWPA A40-18, Standard Methods for Determination of Boron Trioxide in Treating Solutions and Treated Wood by Potentiometric Titration with Sodium Hydroxide
- AWPA A65-15, Standard Method to Determine the Amount of Boron in Treated Wood Using Azomethine-H or Carminic Acid











**BORAFLAME fire-retardant-reated lumber** is produced from Spruce-Pine-Fir species combination (NLGA SPF).

Design Value Adjustment Factors for temperature up to 150°F (66°C) Spruce-Pine-Fir (ASTM D6841)

	Zone 1a	Zone 1b	Zone 2
Bending F <sub>b</sub>	0,94	0,94	0,94
Bending MOE	0,98	0,98	0,98
Tension Parallel to grain F <sub>t</sub>	0,78	0,89	0,98
Compression Parallel to grain Fc <sub>//</sub>	0,78	0,89	0,98
Shear parallel to grain $F_v$	0,78	0,89	0,92
Compression Perpendicular to grain $Fc_1$	0,95	0,95	0,95
Fastener/Connector	0,78	0,89	0,90



Zone 1: Where minimum roof live load or maximum ground snow load ≤20 psf (960 Pa).

Zone 1A: Southwest Arizona and Southeast Nevada (Area bound by Las Vegas, Yuma, Phoenix, and Tucson).

Zone 1B: All other qualifying areas.

Zone 2: Where maximum ground snow load >20 psf (960 Pa).

We use only **pure sodium borate** as impregnation chemical. This low toxicity water soluble boron compound is well known and recognized as very effective for wood protection and fire retardancy. Our process ensures that just enough borate is used in a uniform application.

### **Naturally green and convenient**

Boralife's impregnation uses **10 times less water and energy** than pressure treatment which needs subsequent kiln drying (KDAT).





## **Naturally efficient**

Our process hardly increases the moisture content of wood as opposed to the pressure treatment process that impregnates wood with water. In fact, with standard pressure treatment, wood must be kiln dried twice, at the sawmill and after the treatment.

With our process, no subsequent kiln drying is required.

We produce dry treated lumber in one step.

It's simpler, greener and more efficient !

# BORĂLIFE<sup>™</sup>

#### Technologies Boralife Inc.

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Canadian patent N° 2,948,194 U.S. Patent N° 10,933,555