

# ICC-ES Evaluation Report

**ESR-4156**

Reissued November 2023


This report also contains:

Subject to renewal November 2024

- LABC Supplement
- CBC Supplement
- FBC Supplement

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<p><b>DIVISION: 06 00 00 — WOOD, PLASTICS AND COMPOSITES</b></p> <p><b>Section: 06 05 73.13 — Fire-Retardant Wood Treatment</b></p>	<p><b>REPORT HOLDER: TECHNOLOGIES BORALIFE INC.</b></p>	<p><b>EVALUATION SUBJECT: BORAFLAME</b></p>	
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## 1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2018 and 2015 [International Building Code® \(IBC\)](#)
- 2018 and 2015 [International Residential Code® \(IRC\)](#)

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-retardant-treated wood.

## 3.0 DESCRIPTION

### 3.1 General:

BORAFLAME fire-retardant-treated lumber is produced using Boralife’s high temperature dip diffusion impregnation process of a concentrated aqueous solution of sodium borate. BORAFLAME Fire-Retardant-Treated lumber is produced from Spruce-Pine-Fir species combination (NLGA SPF).

### 3.2 Flame Spread:

BORAFLAME fire-retardant lumber has a flame spread index of 25 or less and smoke developed index of 450 or less, when subjected to ASTM E84 tests, and shows no evidence of significant progressive combustion when the tests are continued for an additional 20-minute period, nor does the flame front progress more than 10½ feet (3200 mm) beyond the centerline of the burners at any time during the tests.

### 3.3 Structural Strength and Durability:

BORAFLAME fire-retardant-treated lumber was tested and evaluated in accordance with ASTM D5664 and ASTM D6841 for determination of the treated wood adjustment factors shown in [Table 1](#). The factors in [Table 1](#) are applicable for service temperatures up to 150°F (66°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*.

### 3.4 Corrosion:

The corrosion rate of carbon steel is not increased by the BORAFLAME fire-retardant-treated lumber when used as recommended by the manufacturer.

### 3.5 Hygroscopicity:

BORAFLAME fire-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.

## 4.0 DESIGN AND INSTALLATION

### 4.1 General:

Structural systems that include BORAFLAME fire-retardant-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.

Ventilation must be provided in accordance with the applicable codes.

### 4.2 Elevated Temperature:

BORAFLAME fire-retardant-treated lumber must only be 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](#) are applicable under elevated temperature resulting from cyclic climatic conditions.

### 4.3 Fasteners:

Fasteners used in BORAFLAME fire-retardant-treated lumber must meet the requirements of Section 2304.10.5 of the IBC or Section R317.3 of the IRC. When BORAFLAME fire-retardant-treated lumber is used and installed in code-compliant interior enclosed dry applications, not exposed to dampness and wetting, uncoated carbon steel fasteners may be used.

## 5.0 CONDITIONS OF USE:

The BORAFLAME fire-retardant-treated lumber described in this report complies with, or is a suitable alternative to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:

- 5.1 All strength and stiffness calculations must be subject to the treatment design value adjustment factors shown in [Table 1](#) of this report.
- 5.2 The treatment design value adjustment factors of [Table 1](#) are to be applied cumulatively with all other applicable adjustment factors from the NDS, including the NDS temperature factor.
- 5.3 The design value adjustment factors in this report must only be used for unincised dimension lumber of the species noted in this report.
- 5.4 BORAFLAME fire-retardant-treated lumber must not be installed where it will be exposed to precipitation, direct wetting or regular condensation.
- 5.5 BORAFLAME fire-retardant-treated lumber must not be used in contact with the ground.
- 5.6 BORAFLAME fire-retardant-treated lumber must not be ripped or milled as this will alter the surface-burning characteristics and invalidate the flame spread classification. Framing end cuts, holes, joints such as tongue and groove, bevel scarf and lap may be used.
- 5.7 BORAFLAME fire-retardant-treated lumber must only be used in areas (including attic spaces) where the lumber is exposed to temperatures of 150°F (66°C) or less.
- 5.8 The treatment design value adjustment factors noted in [Table 1](#) are applicable under elevated temperature resulting from cyclic climatic conditions and are not applicable for continuous elevated temperatures resulting from manufacturing or other processes. Such conditions require special consideration in design and are outside the scope of this report.

- 5.9 Exposure of BORAFLAME fire-retardant-treated lumber to precipitation during storage or installation must be avoided. If the material becomes wet, it must be replaced.
- 5.10 Treatment is at Technologies Boralife Inc., Sorel-Tracy, Québec, CANADA, under a quality control program with inspections by ICC-ES and Intertek (AA-647).

## 6.0 EVIDENCE SUBMITTED

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

## 7.0 IDENTIFICATION

- 7.1 Lumber treated with BORAFLAME fire-retardant chemicals must be identified by the structural grade mark of an approved agency. In addition, all treated lumber must be stamped with the company name and location; the production plant identification; labeling information in accordance with Section 2303.2.4 of the IBC or Section R802.1.5.4 of the IRC; and the evaluation report number (ESR-4156). Refer to [Figure 1](#).
- 7.2 The report holder's contact information is the following:

**TECHNOLOGIES BORALIFE INC.**  
**2811, GUILLAUME-LE BRETON**  
**QUÉBEC (QUÉBEC) G1W2A7**  
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**(418) 684-8484**  
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**TABLE 1—DESIGN VALUE ADJUSTMENT FACTORS FOR BORAFLAME FIRE RETARDANT TREATED LUMBER COMPARED TO UNTREATED LUMBER APPLICABLE AT SERVICE TEMPERATURES UP TO 150°F (66°C) <sup>1</sup>**

DESIGN VALUE ADJUSTMENT FACTORS	SPECIES		
	Spruce-Pine-Fir (SPF)		
	Climate Zone		
	1A	1B	2
Bending, $F_b$	0.94	0.94	0.94
Bending, E	0.98	0.98	0.98
Tension Parallel to Grain, $F_t$	0.78	0.89	0.98
Shear Parallel to Grain, $F_v$	0.78	0.89	0.92
Compression Parallel to Grain, $F_c$	0.78	0.89	0.98
Compression Perpendicular to Grain, $F_{c\perp}$	0.95	0.95	0.95
Fasteners/Connectors, Z	0.78	0.89	0.90

<sup>1</sup> Climate Zone definitions:

Zone 1: Where minimum roof live load or maximum ground snow load  $\leq 20$  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).



**FIGURE 1—LUMBER STAMP**

DIVISION: 06 00 00—WOOD, PLASTICS AND COMPOSITES  
Section: 06 05 73.13—Fire-Retardant Wood Treatment

**REPORT HOLDER:**

TECHNOLOGIES BORALIFE INC.

**EVALUATION SUBJECT:**

BORAFLAME

**1.0 REPORT PURPOSE AND SCOPE****Purpose:**

The purpose of this evaluation report supplement is to indicate that BORAFLAME fire-retardant-treated lumber described in ICC-ES evaluation report [ESR-4156](#), has also been evaluated for compliance with the codes noted below as adopted by the Los Angeles Department of Building and Safety (LADBS).

**Applicable code editions:**

- 2020 *City of Los Angeles Building Code* (LABC)
- 2020 *City of Los Angeles Residential Code* (LARC)

**2.0 CONCLUSIONS**

The BORAFLAME fire-retardant-treated lumber, described in Sections 2.0 through 7.0 of the evaluation report [ESR-4156](#), complies with the LABC Chapter 23, and the LARC, and is subject to the conditions of use described in this supplement.

**3.0 CONDITIONS OF USE**

The BORAFLAME fire-retardant-treated lumber described in this evaluation report supplement must comply with all of the following conditions:

- All applicable sections in the evaluation report [ESR-4156](#).
- The design, installation, conditions of use and identification of the BORAFLAME fire-retardant-treated lumber is in accordance with the 2018 *International Building Code*® (IBC) provisions noted in the evaluation report [ESR-4156](#).
- The design, installation and inspection are in accordance with additional requirements of LABC Chapters 16 and 23 as applicable.
- Under the LARC, an engineered design in accordance with LARC Section R301.1.3 must be submitted.

This supplement expires concurrently with the evaluation report, reissued November 2023.

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**Section: 06 05 73.13—Fire-Retardant Wood Treatment**

**REPORT HOLDER:**

TECHNOLOGIES BORALIFE INC.

**EVALUATION SUBJECT:**

BORAFLAME

**1.0 REPORT PURPOSE AND SCOPE****Purpose:**

The purpose of this evaluation report supplement is to indicate that BORAFLAME fire-retardant-treated lumber described in ICC-ES evaluation report ESR-4156, has also been evaluated for compliance with the codes noted below.

**Applicable code editions:**

- 2019 *California Building Code* (CBC)

For evaluation of applicable chapters adopted by the California Office of Statewide Health Planning and Development (OSHPD) aka: California Department of Health Care Access and Information (HCAI) and the Division of State Architect (DSA), see Sections 2.1.1 and 2.1.2 below.

- 2019 *California Residential Code* (CRC)

**2.0 CONCLUSIONS****2.1 CBC:**

The BORAFLAME fire-retardant-treated lumber described in Sections 2.0 through 7.0 of the evaluation report ESR-4156, complies with the CBC Chapter 23, provided the design and installation are in accordance with the 2018 *International Building Code*® (IBC) provisions, as applicable, noted in the evaluation report, and the additional requirements of Chapters 16 and 23 as applicable.

**2.1.1 OSHPD:**

The applicable OSHPD Sections of the CBC are beyond the scope of this supplement.

**2.1.2 DSA:**

The applicable DSA Sections of the CBC are beyond the scope of this supplement.

**2.2 CRC:**

The BORAFLAME fire-retardant-treated lumber, described in Sections 2.0 through 7.0 of the evaluation report ESR-4156, complies with the CRC, provided the design and installation are in accordance with the 2018 *International Residential Code*® (IRC) provisions noted in the evaluation report.

This supplement expires concurrently with the evaluation report, reissued November 2023.

**DIVISION: 06 00 00—WOOD, PLASTICS AND COMPOSITES**  
**Section: 06 05 73.13—Fire-Retardant Wood Treatment**

**REPORT HOLDER:**

**TECHNOLOGIES BORALIFE INC.**

**EVALUATION SUBJECT:**

**BORAFLAME**

**1.0 REPORT PURPOSE AND SCOPE**

**Purpose:**

The purpose of this evaluation report supplement is to indicate that BORAFLAME fire-retardant-treated lumber, described in ICC-ES evaluation report ESR-4156, has also been evaluated for compliance with the codes noted below.

**Applicable code editions:**

- 2020 and 2017 *Florida Building Code—Building*
- 2020 and 2017 *Florida Building Code—Residential*

**2.0 CONCLUSIONS**

The BORAFLAME fire-retardant-treated lumber, described in Sections 2.0 through 7.0 of ICC-ES evaluation report ESR-4156, complies with the 2020 and 2017 *Florida Building Code—Building* or the 2020 and 2017 *Florida Building Code—Residential*, provided the design requirements are determined in accordance with the *Florida Building Code—Building* or the *Florida Building Code—Residential*, as applicable. The installation requirements noted in ICC-ES evaluation report ESR-4156 for the 2018 and 2015 *International Building Code*® and 2018 and 2015 *International Residential Code*® meet the requirements of the *Florida Building Code—Building* or the *Florida Building Code—Residential*, as applicable.

Use of the BORAFLAME fire-retardant-treated lumber has also been found to be in compliance with the High-Velocity Hurricane Zone provisions of the *Florida Building Code—Building* or the *Florida Building Code—Residential*.

For products falling under Florida Rule 61G20-3, verification that the report holder's quality assurance program is audited by a quality assurance entity approved by the Florida Building Commission for the type of inspections being conducted is the responsibility of an approved validation entity (or the code official when the report holder does not possess an approval by the Commission).

This supplement expires concurrently with the evaluation report, reissued November 2023.