

## Treatment process

BORASMART insect-and mold-resistant-treated lumber is produced using Boralife's high temperature dip-diffusion impregnation process of a concentrated aqueous solution of sodium borate, a recognized and effective wood preservative having a very low toxicity.

Sodium borate diffuses naturally through wood using water found in wood cells at various moisture contents. Our process takes full advantage of this behavior, minimizing the absorption of more external water that would then need to be evaporated by kiln drying the final product.

Graded kiln dried lumber is used as input for our process.

## Borate Retention

Treated wood meets requirements of American Wood Protection Association (AWPA) Standard U1-21; approved for Use Categories *UC1 Above ground, interior construction, dry* and *UC2 Above ground, interior construction, damp*.

These Use Categories define the associated degree of bio degradation hazard and product service life expectations for specific products and exposure conditions. Provided that exposure conditions are maintained, service life expectation is not limited.

For the NLGA S-P-F species combination, Southern Yellow Pine and Pochote (*Bombacopsis Quinata*) borate retention exceeds 4,5 kg/m<sup>3</sup> (0,28 pfc) (B<sub>2</sub>O<sub>3</sub>), as specified by the AWPA Standard U1-19 for exposure in areas subject to Formosan subterranean termite activity.

## Moisture Content

Moisture content of the final product is less than 19% (w/w).



## Mechanical Properties

BORASmart lumber is mostly composed of Balsam Fir and Eastern Spruce lumber all graded under *NLGA Standard Grade Rules for Canadian Lumber* meeting the provisions of PS20 and/or CSA O141, commonly referred to as ALS and/or CLS lumber. Balsam fir and Eastern spruce are produced and distributed under the NLGA Spruce-Pine-Fir species combination (S-P-F).

Design values for the S-P-F species combination and appropriate grade are available for use in Canada in the current edition *CSA O86 Engineering Design in Wood*. Design values are available for use in the USA in the current edition of the *National Design Specification for Wood Construction*. Design values are available for use in the EU in the current edition of *EN 1912 Structural Timber Strength Classes- Assignment of visual grades and species*.

As required by the various design standards, BORASmart lumber was evaluated under the following to confirm the treated wood factors.

*ASTM D5664-17 – Standard Test Method for Evaluating the Effects of Fire-Retardant Treatments and Elevated Temperature on Strength Properties of Fire-Retardant Treated Lumber*

*ASTM D6841-16- Standard Practice for Calculating Design Value Treatment Adjustment Factors for Fire-Retardant-Treated Lumber*

**Table 1 – BORASmart Design Value Adjustment Factors for temperature up to 150°F (66°C) Spruce-Pine-Fir**

	Zone 1a	Zone 1b	Zone 2
<b>Bending <math>F_b</math></b>	0,94	0,94	0,94
<b>Bending MOE</b>	0,98	0,98	0,98
<b>Tension Parallel to grain <math>F_t</math></b>	0,78	0,89	0,98
<b>Compression Parallel to grain <math>F_{c,  }</math></b>	0,78	0,89	0,98
<b>Shear parallel to grain <math>F_v</math></b>	0,78	0,89	0,92
<b>Compression Perpendicular to grain <math>F_{c,\perp}</math></b>	0,95	0,95	0,95
<b>Fastener/Connector</b>	0,78	0,89	0,90

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).

## Hygroscopic properties

Test procedure: ASTM D3201

Hygroscopic properties are in accordance with AWWA U1-19 Criteria (Interior Type A High Temperature (HT) products). Moisture Content equilibrium  $\leq 28\%$

## Corrosivity

Non-corrosive. Can be assembled with standard hardware.

## Packaging

Bundles wrapped in waterproof canvas.

## Conditions of use

1. All strength and stiffness calculations must be subject to the treatment design value adjustment factors shown in Table 1 of this technical specifications sheet.
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.
3. The design value adjustment factors in this specifications sheet must only be used for unincised dimension lumber of the species noted above.
4. BORASmart insect-and mold-resistant-treated lumber must not be installed where it will be permanently exposed to precipitation, direct wetting or regular condensation.
5. BORASmart insect-and mold-resistant-treated lumber must not be used in contact with the ground.
6. BORASmart insect-and mold-resistant-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.

**Conditions of use**

7. BORASmart insect-and mold-resistant-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.
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 are outside the scope of this specifications sheet.
9. BORASmart insect-and mold-resistant-treated lumber must be kept dry during storage. Exposure to precipitation must be avoided. Bundles must stay covered, and the material must be elevated to prevent ground contact.
10. Exposure to precipitation during installation must be avoided as much as practically possible. BORASmart insect-and mold-resistant-treated lumber must be covered and protected from rainfall as soon as possible. Limited exposure while unprotected during construction can be tolerated, but if the material becomes wet, it must be replaced, or allowed to dry to a 19 percent moisture content or less, prior to covering or enclosure by wallboard or other construction materials. The treatment is permanent for the life of the structure as long as the wood is used in dry conditions.

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