

**Characterization of Fire and Structural Performance and
Fire Retardant Treated Oriented Strand Board**

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ABSTRACT

A series of single-layer, randomly oriented strandboard panels were evaluated for their physical, mechanical, and fire performance. The experimental strandboards were made using a single resin type, a single resin loading level, and four fire-retardant-treatment levels. The fire retardant (FR) evaluated was a pH-buffered combination of boric acid and organic phosphate. Siberian larch strands were separated into five batches. One batch of strands served as the untreated control group and was not treated with water or FR; the four other batches were individually treated using a vacuum-pressure-soak process of the strands in water or three progressively higher concentrations of FR solutions. Targeted water- or FR-loading levels were no FR (0% FR-weight gain, water-treated control), 32 kg/m³ FR (~5% weight gain), 64 kg/m³ FR (~10% weight gain), and 96 kg/m³ FR (~15% weight gain). All water- or FR-treated strands were redried to less than 8% moisture content prior to diphenylmethane diisocyanate (MDI) resin application in rotary blenders using an aerosol sprayer. Three replicate specimens for each treatment level of 12.5-mm-thick, randomly oriented strandboard at a density of 650 kg/m³ were evaluated. FR-treated strandboard had higher dry- and wet-internal bond strength and lower flexural strength than matched untreated strandboard. A "Class B" flame-spread rating was achieved near 10% FR-loading. These results suggest that better ratings seem possible at higher loadings and with improved treatment and composite processing.

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