



Durability of Structural Lumber Products after Exposure at 82C and 80% Relative Humidity

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Material: LSL (Laminated Strand Lumber)
LVL (Laminated Veneer Lumber)
Solid-sawn Heavy Timber

Topic: Mechanical Properties
Moisture

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Douglas-Fir
Modulus of Elasticity
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Southern Pine
Poplar
Relative Humidity
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Research Status: Complete

Summary:

Solid-sawn lumber (Douglas-fir, southern pine, Spruce– Pine–Fir, and yellow-poplar), laminated veneer lumber (Douglas-fir, southern pine, and yellow-poplar), and laminated strand lumber (aspen and yellow-poplar) were heated continuously at 82°C (180°F) and 80% relative humidity (RH) for periods of up to 24 months. The lumber was then reconditioned to room temperature at 20% RH and tested in edgewise bending. Little reduction occurred in modulus of elasticity (MOE) of solid-sawn lumber, but MOE of composite lumber products was somewhat reduced. Modulus of rupture (MOR) of solid-sawn lumber was reduced by up to 50% after 24 months exposure. Reductions in MOR of up to 61% were found for laminated veneer lumber and laminated strand lumber after 12 months exposure. A limited scope study indicated that the results for laminated veneer lumber in edgewise bending are also applicable to flatwise bending. Comparison with previous results at 82°C (180°F)/25% RH and at 66°C (150°F)/20% RH indicate that differences in the permanent effect of temperature on MOR between species of solid-sawn lumber and between solid-sawn lumber and composite lumber products are greater at high humidity levels than at low humidity levels. This report also describes the experimental design of a program to evaluate the permanent effect of temperature on flexural properties of structural lumber, with reference to previous publications on the immediate effect of temperature and the effect of moisture content on lumber properties.

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