



Standard Specification for Evaluation of Duration of Load and Creep Effects of Wood and Wood-Based Products¹

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1. Scope

1.1 This specification provides a procedure for testing and evaluating duration of load and creep effects of wood and wood-based materials relative to an accepted duration of load adjustment model. This specification was created for products that are currently covered by a consensus standard (for example, lumber, structural composite lumber and structural-use panels). This procedure is intended to demonstrate the engineering equivalence to the duration of load and creep effects of visually graded lumber as specified in Practice D 245 for a product under evaluation used in dry service conditions. This procedure is not intended to evaluate the performance of products under impact loading. Quantification of specific duration of load or creep factors is beyond the scope of this specification. For further guidance regarding the applicability of this specification refer to X1.1 in the Commentary.

1.2 Use of the procedure in this specification to determine equivalence to the Practice D 245 duration of load relationship is limited to solid wood and wood-based products whose long term load behavior is similar to that of solid wood. Equivalence demonstrated in this specification is dependent upon evaluation of a product's 90-day (minimum) creep-rupture performance. In this evaluation, three criteria must be satisfied: (1) adequate strength over a 90-day period, (2) decreasing creep rate, and (3) limited fractional deflection. A summary of the development of these criteria and the underlying assumptions behind them is provided in the Commentary in Appendix X1 and Appendix X2.

1.3 Long term degradation phenomena not described by a creep-rupture model are not addressed in this standard (see Commentary X1.2.4).

2. Referenced Documents

2.1 ASTM Standards:

D 9 Terminology Relating to Wood²

¹ This specification is under the jurisdiction of ASTM Committee D07 on Wood and is the direct responsibility of Subcommittee D07.01 on Fundamental Test Methods and Properties.

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² *Annual Book of ASTM Standards*, Vol.

D 198 Test Methods of Static Tests of Lumber in Structural Sizes²

D 245 Practice for Establishing Structural Grades and Related Allowable Properties for Visually Graded Lumber²

D 1037 Test Methods for Evaluating Properties of Wood-Base Fiber and Particleboard Panel Materials²

D 2915 Practice for Evaluating Allowable Properties for Grades of Structural Lumber²

D 3043 Test Methods for Structural Panels in Flexure²

D 4442 Test Methods for Direct Moisture Content Measurement of Wood and Wood-Base Materials²

D 4761 Test Methods for Mechanical Properties of Lumber and Wood-Base Structural Material²

D 5457 Specification for Computing the Reference Resistance of Wood-Based Materials and Structural Connections for Load and Resistance Factor Design²

E 4 Practices for Force Verification of Testing Machines²

E 6 Terminology Relating to Methods of Mechanical Testing²

E 177 Practice for Use of the Terms Precision and Bias in ASTM Test Methods²

3. Terminology

3.1 *Definitions*—See Terminologies D 9 and E 6, and Practices E 4 and E 177 for definitions of terms used in this specification.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *breadth*—the dimension of the test specimen in the direction perpendicular to the span and perpendicular to the direction of an applied bending load.

3.2.2 *creep*—the time-dependent increase of deformation of the test material under a constant load.

3.2.3 *creep deflection*—total measured deflection at a specific time minus the initial deflection.

3.2.4 *creep rate*—the change in creep deflection over time.

3.2.5 *creep-rupture*—a failure phenomenon described by a relationship between applied stress and time-to-failure.

3.2.6 *depth*—the dimension of the test specimen in the direction perpendicular to the span and parallel to the direction of an applied bending load.