



Standard Specification for Computing the Reference Resistance of Wood-Based Materials and Structural Connections for Load and Resistance Factor Design¹

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INTRODUCTION

Load and resistance factor design (LRFD) is a structural design method that uses concepts from reliability theory and incorporates them into a procedure usable by the design community. The basic design equation requires establishing a reference resistance based on several material property parameters. A standard method for calculating the required material property input data is critical so that all wood-based structural materials can be treated equitably. This specification provides the procedures that are required for the generation of reference resistance for LRFD.

1. Scope

1.1 This specification covers procedures for computing the reference resistance of wood-based materials and structural connections for use in load and resistance factor design (LRFD). The reference resistance derived from this specification applies to the design of structures addressed by the load combinations in ASCE 7-88.

1.2 A commentary to this specification is provided in Appendix X1.

2. Referenced Documents

2.1 ASTM Standards:

D 9 Terminology Relating to Wood²

D 143 Method of Testing Small Clear Specimens of Timber²

D 198 Methods of Static Tests of Timbers in Structural Sizes²

D 1037 Test Methods of Evaluating the Properties of Wood-Base Fiber and Particle Panel Materials²

D 1761 Method of Testing Mechanical Fasteners in Wood²

D 1990 Practice for Establishing Allowable Properties for Visually-Graded Dimension Lumber From In-Grade Tests of Full-Size Specimens²

D 2718 Test Method for Structural Panels in Planar Shear (Rolling Shear)²

D 2719 Test Methods for Structural Panels in Shear Through-the-Thickness²

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

D 3043 Methods of Testing Structural Panels in Flexure²

D 3500 Test Method for Structural Panels in Tension²

D 3501 Methods of Testing Plywood in Compression²

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

D 5055 Specification for Establishing and Monitoring Structural Capacities of Prefabricated Wood I-Joists²

E 105 Practice for Probability Sampling of Materials³

2.2 ASCE Standard:

ASCE 7-88 Minimum Design Loads for Buildings and Other Structures⁴

3. Terminology

3.1 *Definitions*—For general definitions of terms related to wood, refer to Terminology D 9.

3.1.1 *coefficient of variation*, CV_w —a relative measure of variability. For this specification, the calculation of CV_w is based on the shape parameter of the 2-parameter Weibull distribution. It is not the traditional sample standard deviation of the data divided by the sample mean.

3.1.2 *data confidence factor*, Ω —a factor that is used to adjust member reference resistance for sample variability and sample size.

¹ This specification is under the jurisdiction of ASTM Committee D07 on Wood and is the direct responsibility of Subcommittee D07.02 on Lumber and Engineered Wood Products.

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² *Annual Book of ASTM Standards*, Vol 04.10.

³ *Annual Book of ASTM Standards*, Vol 14.02.

⁴ Available from American Society of Civil Engineers, 345 East 47th Street, New York, NY 10017-2398.

