



Standard Practice for Calculating Design Value Treatment Adjustment Factors for Fire-Retardant-Treated Lumber¹

This standard is issued under the fixed designation D 6841; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This practice covers procedures for calculating treatment adjustment factors to be applied to design values for fire-retardant-treated lumber used at ambient temperatures [service temperatures up to 100°F (38°C)] and as framing in roof systems.

1.2 These design value treatment adjustment factors for the properties of extreme fiber in bending, tension parallel to grain, compression parallel to grain, horizontal shear and modulus of elasticity are based on the results of strength tests of matched treated and untreated small clear wood specimens after conditioning at nominal room temperatures [72°F (22°C)] and of other similar specimens after exposure at 150°F (66°C). The test data are developed in accordance with Test Method D 5664. Guidelines are provided for establishing adjustment factors for the property of compression perpendicular to grain and for connection design values.

1.3 Treatment adjustment factors for roof framing applications are based on computer generated thermal load profiles for normal wood roof construction used in a variety of climates as defined by weather tapes of the American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. (ASHRAE).² The solar loads, moisture conditions, ventilation rates and other parameters used in the computer model were selected to represent typical sloped roof designs. The thermal loads in this practice are applicable to roof slopes of 3 in 12 or steeper, to roofs designed with vent areas and vent locations conforming to national standards of practice and to designs in which the bottom side of the roof sheathing is exposed to ventilation air. For designs that do not have one or more of these base-line features, the applicability of this practice needs to be documented by the user.

1.4 The procedures of this practice parallel those given in Practice D 6305. General references and commentary in Practice D 6305 are also applicable to this practice.

1.5 This practice is written in inch-pound units with SI units provided in parentheses for information only.

1.6 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 ASTM Standards:

D 9 Terminology Relating to Wood³

D 5664 Test Method for Evaluating the Effects of Fire-Retardant Treatments and Elevated Temperatures on Strength Properties of Fire-Retardant-Treated Lumber³

D 6305 Practice for Calculating Bending Strength Design Adjustment Factors for Fire-Retardant-Treated Plywood Roof Sheathing³

3. Terminology

3.1 Definitions:

3.1.1 Definitions used in this practice are in accordance with Terminology D 9.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *bin mean temperature*—10°F (5.5°C) temperature ranges having mean temperatures of 105 (41), 115 (46), 125 (52), 135 (57), 145 (63), 155 (68), 165 (74), 175 (79) and 185°F (85°C).

3.2.2 *thermal load profile*—the cumulative time per year in each 10°F (5.5°C) temperature bin.

4. Summary of Practice

4.1 Test results developed in accordance with Test Method D 5664 are used in conjunction with computer generated thermal load profiles to calculate treatment factors that are applied to published design values for untreated lumber. These treatment adjustment factors account for the combined effect of fire-retardant-treatment and service temperatures.

5. Significance and Use

5.1 Fire-retardant-treatments are used to reduce the flame-spread characteristics of wood. Chemicals and redrying conditions employed in treatments are known to modify the strength properties of the wood product being treated. This practice

¹ This practice is under the jurisdiction of ASTM Committee D07 on Wood and is the direct responsibility of Subcommittee D07.07 on Fire Performance of Wood.

Current edition approved April 10, 2003. Published June 2003. Originally approved in 2002. Last previous edition approved in 2002 as D 6841-02.

² American Society of Heating, Refrigerating, and Air-Conditioning Engineers, Inc. (ASHRAE), 1791 Tullie Circle, NE, Atlanta, GA 30329.

³ *Annual Book of ASTM Standards*, Vol 04.10.

