



Designation: D6841 – 21

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

This standard is issued under the fixed designation D6841; 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 adjustment factors that account for the effects of fire-retardant treatment on design properties of lumber. The adjustment factors calculated in accordance with this practice are to be applied to design values for untreated lumber in order to determine 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.

NOTE 1—This analysis focuses on the relative performance of treated and untreated materials tested after equilibrating to ambient conditions following a controlled exposure to specified conditions of high temperature and humidity. Elevated temperature, moisture, load duration, and other factors typically accounted for in the design of untreated lumber must also be considered in the design of fire-retardant-treated lumber, but are outside the scope of the treatment adjustments developed under this practice.

1.2 These adjustment factors for the design properties 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 D5664. 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 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 D6305. General references and commentary in Practice D6305 are also applicable to this practice.

1.5 The values stated in inch-pound units are to be regarded as standard. The SI units listed in parentheses are provided for information only and are not considered standard.

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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.7 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*³

D9 Terminology Relating to Wood and Wood-Based Products

D5664 Test Method for Evaluating the Effects of Fire-Retardant Treatments and Elevated Temperatures on Strength Properties of Fire-Retardant Treated Lumber

D6305 Practice for Calculating Bending Strength Design Adjustment Factors for Fire-Retardant-Treated Plywood Roof Sheathing

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.

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² Available from American Society of Heating, Refrigerating, and Air-Conditioning Engineers, Inc. (ASHRAE), 1791 Tullie Circle, NE, Atlanta, GA 30329, <http://www.ashrae.org>.

³ For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.