



Designation: D5664 – 17

Standard Test Method for Evaluating the Effects of Fire-Retardant Treatments and Elevated Temperatures on Strength Properties of Fire- Retardant Treated Lumber¹

This standard is issued under the fixed designation D5664; 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 test method covers procedures for obtaining data to assess the initial adjustments to allowable design stresses for lumber treated with candidate commercial fire-retardant (FR) formulations and further procedures for obtaining data to assess the effect of extended exposure to elevated temperature of $66 \pm 2^\circ\text{C}$ ($150 \pm 4^\circ\text{F}$).

1.2 *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.*

1.3 *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:²

- [D9 Terminology Relating to Wood and Wood-Based Products](#)
- [D143 Test Methods for Small Clear Specimens of Timber](#)
- [D1165 Nomenclature of Commercial Hardwoods and Softwoods](#)
- [D3500 Test Methods for Structural Panels in Tension](#)
- [D4761 Test Methods for Mechanical Properties of Lumber and Wood-Base Structural Material](#)
- [D5516 Test Method for Evaluating the Flexural Properties of Fire-Retardant Treated Softwood Plywood Exposed to](#)

¹ This test method 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 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.

Elevated Temperatures

[D6841 Practice for Calculating Design Value Treatment Adjustment Factors for Fire-Retardant-Treated Lumber](#)

[E84 Test Method for Surface Burning Characteristics of Building Materials](#)

[E176 Terminology of Fire Standards](#)

2.2 Other Standards:

[AWPA C20 Lumber—Fire Retardant Treatment by Pressure Processes](#)³

[NFPA 703 Standard for Fire Retardant Impregnated Wood and Fire Retardant Coatings for Building Materials](#)⁴

[U.S. Product Standards PS 20 American Softwood Lumber Standard](#)⁵

3. Terminology

3.1 *Definitions*—Definitions used in this test method are in accordance with Terminologies [D9](#) and [E176](#) and Nomenclature [D1165](#).

4. Summary of Test Method

4.1 The general objectives of this test method are to develop data to adjust allowable design stresses of FR-treated lumber for the initial effects for the tested FR-formulation(s) and to develop data on in-service thermal stability after extended exposure to environmental conditions up to $66 \pm 2^\circ\text{C}$ ($150 \pm 4^\circ\text{F}$) and $\geq 50\%$ relative humidity.

4.2 *Procedure 1*—This procedure uses small clear specimens cut from end-matched nominal 2 by 4 (38 by 89-mm) dimension lumber (see [Fig. 1](#)) to compare the initial effects of fire-retardant treatments to untreated controls for bending, tension parallel, compression parallel, and horizontal shear properties.

4.3 *Procedure 2*—This procedure uses small clear specimens cut from end matched nominal 2 by 4 (38 by 89-mm)

³ Available from American Wood Protection Association (AWPA), P.O. Box 361784, Birmingham, AL 35236-1784, <http://www.awpa.com>.

⁴ Available from National Fire Protection Association (NFPA), 1 Batterymarch Park, Quincy, MA 02169-7471, <http://www.nfpa.org>.

⁵ Available from American Lumber Standard Committee, Incorporated (ALSC), P.O. Box 210, Germantown, MD 20875-0210, <http://www.alsc.org>.