Designation: D6109 – 13

Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastic Lumber and Related Products[1]

This standard is issued under the fixed designation D6109; 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 These test methods are suitable for determining the flexural properties for any solid or hollow manufactured plastic lumber product of square, rectangular, round, or other geometric cross section that shows viscoelastic behavior. The test specimens are whole "as manufactured" pieces without any altering or machining of surfaces beyond cutting to length. As such, this is a test method for evaluating the properties of plastic lumber as a product and not a material property test method. Flexural strength cannot be determined for those products that do not break or that do not fail in the extreme outer fiber.

1.2 *Test Method A*—designed principally for products in the flat or "plank" position.

1.3 *Test Method B*—designed principally for those products in the edgewise or "joist" position.

1.4 Plastic lumber currently is produced using several different plastic manufacturing processes. These processes utilize a number of diverse plastic resin material systems that include fillers, fiber reinforcements, and other chemical additives. The test methods are applicable to plastic lumber products where the plastic resin is the continuous phase, regardless of its manufacturing process, type or weight percentage of plastic resin utilized, type or weight percentage of fillers utilized, type or weight percentage of reinforcements utilized, and type or weight percentage of other chemical additives.

1.4.1 Alternative to a single resin material system, diverse and multiple combinations of both virgin and recycled thermoplastic material systems are permitted in the manufacture of plastic lumber products.

1.4.2 Diverse types and combinations of inorganic and organic filler systems are permitted in the manufacturing of plastic lumber products. Inorganic fillers include such materials as talc, mica, silica, wollastonite, calcium carbonate, and so forth. Organic fillers include lignocellulosic materials made or derived from wood, wood flour, flax shive, rice hulls, wheat straw, and combinations thereof.

1.4.3 Fiber reinforcements used in plastic lumber include manufactured materials such as fiberglass (chopped or continuous), carbon, aramid and other polymerics; or lignocellulosic-based fibers such as flax, jute, kenaf, and hemp.

1.4.4 A wide variety of chemical additives are added to plastic lumber formulations to serve numerous different purposes. Examples include colorants, chemical foaming agents, ultraviolet stabilizers, flame retardants, lubricants, anti-static products, biocides, heat stabilizers, and coupling agents

1.5 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that 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 and health practices and determine the applicability of regulator limitations prior to use.*

NOTE 1—There is no known ISO equivalent to this standard.

2. Referenced Documents

2.1 *ASTM Standards:*[2]

D618 Practice for Conditioning Plastics for Testing

D883 Terminology Relating to Plastics

D2915 Practice for Sampling and Data-Analysis for Structural Wood and Wood-Based Products

D5033 Guide for Development of ASTM Standards Relating to Recycling and Use of Recycled Plastics (Withdrawn 2007)[3]

D5947 Test Methods for Physical Dimensions of Solid Plastics Specimens

E4 Practices for Force Verification of Testing Machines

E691 Practice for Conducting an Interlaboratory Study to

[1] These test methods are under the jurisdiction of ASTM Committee D20 on Plastics and are the direct responsibility of Subcommittee D20.20 on Plastic Lumber (Section D20.20.01).

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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.

[3] The last approved version of this historical standard is referenced on www.astm.org.

***A Summary of Changes section appears at the end of this standard**

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