



Designation: D 6109 – 97^{ε1}

Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastic Lumber¹

This standard is issued under the fixed designation D 6109; 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.

ε¹ NOTE—Editorially corrected 1.1 in April 2002.

1. Scope

1.1 These test methods cover the determination of flexural properties of plastic lumber with rectangular or square cross-sections. 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 materials in the edgewise or “joist” position.

1.4 Plastic lumber is currently made predominately with recycled plastics where the product is non-homogeneous in the cross-section. However, this test method would also be applicable to similar manufactured plastic products made from virgin resins or other plastic composite materials.

1.5 The values stated in inch–pound units are to be regarded as the standard. The values given in parentheses are 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 regulator limitations prior to use.*

NOTE 1—There is no similar or equivalent ISO standard.

2. Referenced Documents

2.1 ASTM Standards:

D 198 Methods of Static Tests of Lumber in Structural Sizes²

D 618 Practice for Conditioning Plastics for Testing³

D 883 Terminology Relating to Plastics³

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

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

³ *Annual Book of ASTM Standards*, Vol 08.01.

D 4000 Classification System for Specifying Plastic Materials⁴

D 5033 Guide for the Development of Standards Relating to the Proper Use of Recycled Plastics⁵

D 5947 Test Methods for Physical Dimensions of Solid Plastics Specimens⁵

E 4 Practices for Force Verification of Testing Machines⁶

3. Terminology

3.1 *Definitions*: Definitions of terms applying to these test methods appear in Terminology D 883 and Guide D 5033.

3.1.1 *plastic lumber, n*—a manufactured product composed of more than 50 weight percent resin, and in which the product generally is rectangular in cross-section and typically supplied in board and dimensional lumber sizes, may be filled or unfilled, and may be composed of single or multiple resin blends.

3.1.2 *plastic shape, n*—a manufactured product composed of more than 50 weight percent resin, and in which the product generally is not rectangular in cross-section, may be filled or unfilled, and may be composed of single or multiple resin blends.

3.1.3 *resin, n*—solid or pseudosolid organic material often of high molecular weight, that exhibits a tendency to flow when subjected to stress, usually has a softening or melting range, and usually fractures conchoidally. (See Terminology D 883.)

3.1.3.1 *Discussion*—In a broad sense, the term is used to designate any polymer that is a basic material for plastics.

4. Summary of Test Method

4.1 A specimen of rectangular cross section is tested in flexure as a beam as follows:

4.1.1 The bar rests on two supports and is loaded at two points (by means of two loading noses), each an equal distance from the adjacent support point. The distance between the loading noses (that is, the load span) is one-third of the support span (see Fig. 1).

⁴ *Annual Book of ASTM Standards*, Vol 08.02.

⁵ *Annual Book of ASTM Standards*, Vol 08.03.

⁶ *Annual Book of ASTM Standards*, Vol 03.01.