



Standard Test Methods for Compressive and Flexural Creep and Creep-Rupture of Plastic Lumber and Shapes¹

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1. Scope

1.1 These test methods cover the determination of the creep and creep-rupture properties of plastic lumber and shapes, when loaded in compression or flexure under specified environmental conditions. Test specimens in the “as-manufactured” form are employed. As such, these are test methods for evaluating the properties of plastic lumber or shapes as a product and not material property test methods.

1.2 Plastic lumber and plastic shapes are currently made predominantly with recycled plastics. However, this test method would also be applicable to similar manufactured plastic products made from virgin resins where the product is non-homogenous in the cross-section.

1.3 The values stated in inch–pound units are to be regarded as the standard. The values given in parentheses are for information only.

1.4 *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.*

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

2. Referenced Documents

2.1 ASTM Standards:

D 543 Test Method for Resistance of Plastics to Chemical Reagents²

D 883 Terminology Relating to Plastics²

D 2990 Standard Test Methods for Tensile, Compressive, and Flexural Creep and Creep Rupture of Plastics³

D 4000 Classification System for Specifying Plastics³

D 5033 Guide for the Development of Standards Relating to the Proper Use of Recycled Plastics⁴

D 5947 Test Methods for Physical Dimensions of Solid Plastics Specimens⁴

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 08.01.

³ *Annual Book of ASTM Standards*, Vol 08.02.

⁴ *Annual Book of ASTM Standards*, Vol 08.03.

E 4 Practices for Load Verification of Testing Machines⁵

3. Terminology

3.1 Definitions:

3.1.1 *compression*—in a compressive creep test, the decrease in length produced in the gage length or the total length of a test specimen.

3.1.2 *creep modulus*—the ratio of initial applied stress to creep strain.

3.1.3 *creep strain*—the total strain, at any given time, produced by the applied stress during a creep test.

3.1.3.1 *Discussion*—The term creep, as used in this test method, reflects current plastics engineering usage. In scientific practice, creep is often defined to be the nonelastic portion of strain. However, this definition is not applicable to existing engineering formulas. Plastics have a wide spectrum of retardation times, and elastic portions of strain cannot be separated in practice from nonelastic. Therefore, wherever “strain” is mentioned in these test methods, it refers to the sum of elastic strain plus the additional strain with time.

3.1.4 *deflection*—in a flexural creep test, the change in mid-span position of a test specimen.

3.1.5 *deformation*—a change in shape, size or position of a test specimen as a result of compression, deflection, or extension:

3.1.6 *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.

3.1.7 *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.

3.1.8 *resin, n*—a solid or pseudo-solid 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.)

⁵ *Annual Book of ASTM Standards*, Vol 03.01.