



# Standard Test Method for Displacement Compression of Softball and Baseball Bat Barrels<sup>1</sup>

This standard is issued under the fixed designation F2844; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

## 1. Scope

1.1 This test method describes a comparative measurement method for determining the compression force of softball and baseball bat barrels as defined by a static compression displacement test.

1.2 This standard is not intended to define the performance of softball or baseball bats but to determine the intrinsic barrel compression of a specific bat.

1.3 This standard can be used to compare the relative barrel compression force of bats using a relatively slow, non-impact loading rate.

1.4 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.

1.5 *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.*

## 2. Terminology

2.1 *Definitions of Terms Specific to This Standard:*

2.1.1 *barrel compression, n*—the force reading to deflect the bat barrel by the specified distance.

2.1.2 *barrel deflection, n*—the displacement of the load head during the test.

2.1.3 *bat taper, n*—section of the bat where the barrel diameter begins to decrease to join the handle of a much smaller diameter.

2.1.4 *force, n*—the amount of resistance applied perpendicular to the surface of a bat barrel to cause the barrel to displace.

2.1.5 *non-solid bat, n*—a bat of hollow construction.

2.1.5.1 *Discussion*—Bat may be filled with inserts or flexible materials and still be considered a non-solid bat.

## 3. Significance and Use

3.1 This test method offers a means to compare the barrel compression of softball and baseball bats. This test is not intended for wood or solid bats.

## 4. Apparatus

4.1 *Compression Device*, to compress the test bat between two rigid cylindrical shapes to at most 0.070 in. (1.78 mm) net displacement. The device shall allow testing at any point along the barrel, to within 2 in. of the end cap. The compression device must be able to produce a load of at least 1000 lb (4459 N). The load heads shall be able to open more than 2.75 in. (69.9 mm). The width of the device needs to be sufficient so that the force shall be applied through the centerline of the barrel diameter and load cylinders. A means of centering the test bat is required so that the axis of the bat barrel is perpendicular ( $\pm 2^\circ$ ) with the cylindrical platens. The device should provide the ability to control the force to 1 lb (4.5 N) and deflection to 0.001 in. (0.025 mm).

4.2 *Load Heads*—A pair of cylindrical shapes with a radius of curvature of  $1.93 \pm 0.050$  in. ( $49 \pm 1.3$  mm) over a chord height of at least 0.20 in. (5 mm) (as shown in Fig. 1) made of steel or a material of equivalent stiffness. The heads are set with their centerline's within  $\pm 0.010$  in. ( $\pm 0.25$  mm), their cylindrical axis parallel within  $\pm 1^\circ$  and their curved surfaces in direct opposition to each other.

4.3 *Load Cell*, to measure the compressive load up to at least 1000 lb (4459 N) with a resolution of at least 1 lb (4 N).

4.4 *Displacement Gauge*, with a range of at least 1.0 in. (25.4 mm) and a resolution of no less than 0.001 in. (0.025 mm).

4.5 *Calibration Cylinder*—A 2.25-in. (57-mm) diameter hollow metal cylinder with a barrel compression between 200 and 300 lb. The cylinder's calibrated compression and calibration date shall be marked on the cylinder. The strength of the cylinder shall be sufficient not to permanently yield under a 0.07-in. (1.78-mm) displacement when tested in accordance with this standard.

<sup>1</sup> This test method is under the jurisdiction of ASTM Committee F08 on Sports Equipment, Playing Surfaces, and Facilities and is the direct responsibility of Subcommittee F08.26 on Baseball and Softball Equipment.

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