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An American National Standard

# Standard Test Method for
# Compression-Displacement of Baseballs and Softballs[1]

This standard is issued under the fixed designation F 1888; 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 ($\varepsilon$) indicates an editorial change since the last revision or reapproval.

## 1. Scope

1.1 This test method describes a comparative measurement method for baseballs and softballs as defined by a static compression displacement test.

1.2 This test method is based on a slow rate force-displacement measurement.

1.3 This procedure is for baseballs and softballs meeting standards established by the sports' governing bodies.

NOTE 1—Since the compression-displacement of baseballs and softballs can influence the performance characteristics, this test provides a simple method to compare and categorize such balls based on force levels in a standardized compression-displacement test.

1.4

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~~ Referenced Documents

2.1 *ASTM Standards:*[2]

E 177  Practice for Use of the Terms Precision and Bias in ASTM Test Methods

E 691  Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method

## 3. Terminology

3.1 *Definitions of Terms Specific to This Standard:*

2.1.1

3.1.1 *baseballs and softballs*, n—any such ball defined by the rules of the game as published by the sports' governing bodies.

2.1.2

3.1.2 *compression-displacement*, n—the reduction in ball diameter under a specified compressive load between two flat plates. Synonymous with *compression-deflection*.

2.1.3

3.1.3 *force*, n—the resistance to displacement. The interaction between test machine and ball during compression.

## 3.Summary of Test Method

3.1 The baseball or softball is placed between two flat-plate surfaces of a compression machine and then compressed to a standard displacement of 6.35-mm (0.25-in.). The compression load (force) applied at the standard displacement is recorded.

3.1.4 *four seams*, n—plane passing through the middle of the ball intersecting four stitch lines.

3.1.5 *two seams*, n—plane passing through the middle of the ball intersecting two stitch lines.

## 4. Significance and Use

4.1 The static compression-displacement of a baseball or softball is a mechanical property which can correlate to dynamic properties.

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4.2This test method is suitable for obtaining data in research and development, quality control, and classifying balls by the compression-displacement.

4.3Sports associations can use compression-displacement standards in specifications for official baseballs and softballs standards in specifications for official baseballs and softballs for purposes of consistency of performance.

4.4This same test procedure can be utilized with other compressive forces and the specified force is not necessarily the same as experienced in actual use. Summary of Test Method

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## 6. Apparatus

5.1

6.1 *Compression Device*, to compress the test ball between two flat plates to 6.35 mm (0.25 in.)0.25 in. (6.35 mm) displacement. Compressive force to 3560 N (800 lb)800 lb (3560 N) is sufficient. A means of centering the test ball so that the vertical axis of the ball aligns with the vertical axis of the compression device piston.

5.26.2 *Compression Force Gauge*, to measure the compressive load in newtons or pounds. Device must be able to measure at least 4448 N (1000 lb).1000 lb (4448 N).

5.36.3 *Compression-Displacement Gauge* , to measure the displacement at the prescribed level of 6.35 mm (0.25 in.).0.25 in. (6.35 mm).

5.46.4 *Motor, Drive, and Speed Control* , to drive the compression device to 6.35 mm (0.25 in.) displacement in a time of 12 to 18 s at a constant rate.

**6., to drive the compression device to 0.25 in. (6.35 mm) displacement in a time of 12 to 18 s at a constant rate.**

6.5 *A Steel Tape*, 0.25 in. (6.35 mm) wide, suitable for measuring lengths to the nearest 0.0625 in. (1.5875 mm).

## 7. Conditioning

6.1*Ball Conditioning*

7.1 *Ball Conditioning and Test Room Conditions*:

6.1.1Store test balls at the test environmental conditions for at least 24 h prior to testing.

6.1.2Maintain test environment temperature at 22 ± 2°C (72 ± 4°F).

6.1.3Maintain test environment relative humidity at 50 ± 10%.

6.2*Test Room Conditions*:

6.2.1Maintain test room temperature at 22 ± 2°C (72 ± 4°F).

6.2.2Maintain test room relative humidity between 20 and 60%.

7.

7.1.1 Test balls shall be stored in an environmentally controlled space for at least 14 days immediately before testing.

7.1.2 Temperature is to be maintained at 72 ± 4°F (22 ± 2°C).

7.1.3 Relative humidity is to be maintained at between 40 and 60 %.

7.1.4 Temperature and humidity are to be measured and recorded hourly within ±0.5°F (±0.3°C) and ±2 % RH over conditioning and test duration.

## 8. Procedure

7.1

8.1 Wrap the steel tape around the middle of the ball to measure the circumference twice over two seams (each measurement taken 90° apart) and once over four seams. Record data to the nearest 0.0625 in. (1.5875 mm). Average the three measurements to obtain the final size measurement.

8.2 Orient the ball in the compression press to align the vertical axis of the ball with the vertical axis of the compressing piston, and orient the ball so that compression occurs between ball seams.

7.2Activate8.3 Activate the compression press until the upper plate is in contact with the ball with a 4.45-N (1-lb)1-lb (4.45-N) preload for expected compression values less than 667.5 N (150 lb)150 lb (667.5 N) ± 5 % and a 17.8-N (4-lb)4-lb (17.8-N)