

**STANDARD PERFORMANCE  
SPECIFICATION FOR NEWLY  
MANUFACTURED BASEBALLS**

**NOCSAE DOC (ND) 027- 18**

Prepared By



**NATIONAL OPERATING COMMITTEE  
ON STANDARDS FOR ATHLETIC EQUIPMENT**

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## 1. Scope

- 1.1. This standard specification establishes performance requirements in the weight, compression deflection load, circumference, and coefficient of restitution for new baseballs as supplied by manufacturers. The requirements of this standard shall be subject to Level 3 compliance criteria unless otherwise stated herein.
- 1.2. This standard has three types of ball (Low, Medium, and High). The Low type ball is designated for children with the lowest skill level. The Medium type ball is designated for youths with moderate skill levels. The High type ball is designated for older athletes with advanced skill levels.
- 1.3. This standard does not purport to address all of the safety problems 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. Referenced Documents

- 2.1. NOCSAE DOC (ND) 001: *Standard Test Method and Equipment Used in Evaluating the Performance Characteristics of Headgear/Equipment*
- 2.2. NOCSAE DOC (ND) 021: *Standard Projectile Impact Test Method and Equipment Used in Evaluating the Performance Characteristics of Protective Headgear/Projectiles*
- 2.3. ASTM F 1888: *Standard test method for compression-displacement of baseballs and softballs*
- 2.4. ASTM F 1887: *Standard test method for measuring the coefficient of restitution (COR) of baseballs and softballs*

## 3. Test Sample Size

- 3.1. See Sections 6 and 11, NOCSAE DOC 001, for QC/QA protocol testing.
- 3.2. For any standalone test report; At least one dozen (12) balls of each model must be tested.

## 4. Conditioning

- 4.1 Prior to testing, condition each ball for a period of not less than 24 hrs. at laboratory conditions which shall be at a temperature of  $72 \pm 4$  °F and a relative humidity of  $50 \pm 20$  %. Record the temperature to the nearest degree and the relative humidity to the nearest percent at the time of testing on the report form for each test series.

## 5. Test Procedures

### 5.1 Ball Mass

- 5.1.1 Place the ball on the center of the scale with a minimum resolution of 0.005 oz. and record its weight.

### 5.2 Ball Circumference

- 5.2.1 Measure the circumference of each ball about three axes with a minimum tolerance of 0.005 inches. Record the average of the readings as the circumference of the ball.

### 5.3 Ball Compression Deflection (C-D)

- 5.3.1 Ball compression testing is to be conducted following the procedures in F1888 with the following exceptions.
- 5.3.2 Place the ball in the compression device to align the central axis of the device with the center of the ball. Randomly orient the ball so that compression occurs between ball seams.
- 5.3.3 For balls with an expected compression deflection value of less than 150 lbs (Low and Medium), activate the compression press until the upper plate is in contact with the ball with 1 lbs (+/- 1 oz) load applied to the ball.
- 5.3.4 For balls with an expected compression deflection value of more than 150 lbs (High), activate the compression press until the upper plate is in contact with the ball with 4 lbs (+/- 1 oz) load applied to the ball.
- 5.3.5 Set the compression displacement gage reading to zero.
- 5.3.6 Compress the ball to a displacement of  $0.25 \pm 0.01$  in 12 to 15 seconds, at a constant rate and record the load force applied.

### 5.4 Ball COR

- 5.4.1 Ball COR testing is to be conducted following the procedures in F1887 with the following exceptions:
  - 5.4.1.1 The ball-throwing device is set to deliver the ball at  $60.0 \pm 2$  mph to the strike plate. Each ball is propelled at the strike plate a minimum of 6 times and a maximum of 12 times with a 30 second rest time between impacts. The inbound reading and the rebound reading are recorded for each impact. Only those impacts with the inbound velocity within  $60.0 \pm 2$  mph, and not deviating greater than 6 inches while traveling through the light gates before and after impact with the strike plate shall be valid.

5.4.2.1 Ball COR is calculated as the rebound velocity divided by the inbound velocity. The average of six valid COR for each ball is used to determine the individual ball COR.

## 6. Performance Requirements

### 6.1 Low (Lowest Skill Level)

- 6.1.1 The weight value must be within 5.0 to 5.25 oz.
- 6.1.2 The circumference value must be within 9.0 to 9.25 in.
- 6.1.3 The C-D at 0.25 in displacement is not to exceed 45 lbs.
- 6.1.4 The COR values must be within 0.45 to 0.555.

### 6.2 Medium (Moderate Skill Level)

- 6.2.1 The weight value must be within 5.0 to 5.25 oz.
- 6.2.2 The circumference value must be within 9.0 to 9.25 in.
- 6.2.3 The C-D at 0.25 in displacement must be within 75 to 150 lbs.
- 6.2.4 The COR values must be 0.50 to 0.555.

### 6.3 High (Advanced Skill Level)

- 6.3.1 The weight value must be within 5.0 to 5.25 oz.
- 6.3.2 The circumference value must be within 9.0 to 9.25 in.
- 6.3.3 The C-D at 0.25 in displacement must be within 200 to 350 lbs.
- 6.3.4 The COR values must be 0.50 to 0.555.

## 7. Labels and Warnings

- 7.1 See Section 9.2 of NOCSAE DOC 021.
- 7.2 A permanent, exact replica of the NOCSAE seal must appear legibly on the exterior of the packaging.



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- 7.3 The type (Low, Medium, or High) shall be permanently indicated on each ball and on the exterior of the packaging.
- 7.4 The approximate (intended) circumference shall be permanently indicated on the ball and on the exterior of the packaging.
- 7.5 The approximate (intended) weight of the ball shall be permanently indicated on the ball and on the exterior of the packaging.

*This standard is subject to revision at any time by the responsible technical authority and must be reviewed every five years and if not revised either reapproved or withdrawn. Your comments are invited either for revision, modification or creation of additional standards and should be addressed to NOCSAE's Executive Director. Check the web at [www.nocsa.org](http://www.nocsa.org) to obtain the latest version of a standard.*

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### **JUNE 2005 MODIFICATIONS/REVISIONS**

- Modified labeling section to reference Section 9.7 on NOCSAE Doc. 021
- Added note to Section 7.2
- Modified NOCSAE contact information

### **DECEMBER 2006 MODIFICATIONS/REVISIONS**

- Added language to clarify tolerances in section 5.1.1 and 5.2.1
- Clarified references in 5.3 and 5.4

### **MAY 2012 MODIFICATIONS/REVISIONS**

- Clarified Section 3 for standalone test report

### **DECEMBER 2012 MODIFICATIONS/REVISIONS**

- REVISION: Changed ambient conditioning temperature range for consistency.

### **OCTOBER 2014 MODIFICATIONS/REVISIONS**

- Replaced references to level of performance with ball type Low, Medium and High
- Updated document to include level of compliance requirements.
- Added Date specification becomes effective
- Updated title name of NOCSAE DOC. 001
- Added SEI Certification NOCSAE Logo to Section 7, "Labels and Warnings"

### **JUNE 2015 MODIFICATIONS/REVISIONS**

- Updated NOCSAE seal/logo artwork

### **JUNE 2017 MODIFICATIONS/REVISIONS**

- Removed "Youth" from the title and last sentence of Section 1.2
- Corrected formatting

### **JULY 2017 MODIFICATIONS/REVISIONS**

- Adjusted compression press preload values in Section 5.

### **FEBRUARY 2018 MODIFICATIONS/REVISIONS**

- REVISION: Revised Section 5.2 to allow multiple methods of circumference measurement.
- REVISION: Increased COR limit from 0.55 to 0.555 in Section 6
- Removed "youth" from Scope
- Removed "less than" from Section 5.3.
- Corrected mph tolerance in Section 5.4.1.1
- Changed skill level nomenclature in Section 6
- Corrected reference in Section 7.1