STANDARD PERFORMANCE SPECIFICATION FOR NEWLY MANUFACTURED FOOTBALL HELMETS

NOCSAE DOC (ND)002-17m19

Prepared By

NATIONAL OPERATING COMMITTEE
ON STANDARDS FOR ATHLETIC EQUIPMENT

Effective November 2019

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1. **Scope**

1.1 This standard specification establishes performance requirements for new football helmets as supplied by manufacturers. The requirements of this standard shall be subject to Level 3 compliance criteria unless otherwise stated herein.

1.2 **All testing and requirements of this standard specification must be in accordance with NOCSAE DOC (ND) 001, except where modified herein.**

1.3 **All testing and requirements of this standard specification must be in accordance with NOCSAE DOC (ND) 081, except where modified herein.**

1.4 *This standard does not purport to address all of the safety problems, 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. **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) 081: *Standard Pneumatic Ram Test Method and Equipment Used in Evaluating the Performance Characteristics of Protective Headgear And Faceguards*

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 four (4) of each model and size must be tested. Two helmets will be subjected to the drop test and two helmets will be subjected to the pneumatic ram test.

4. **Helmet Preparation**

4.1 See Section 10, NOCSAE DOC 001.

4.2 Face Guards: Helmets must be provided with face guards and face guard specific hardware when tested on the pneumatic ram and without face guards and face guard specific hardware when tested on the drop test system.

4.3 A separate set of samples shall be used for each test method.

4.4 To obtain a reasonable fit (as determined by the test technician) for testing purposes, helmets larger than size 7 5/8 ***may*** require "shim" pads to be inserted between the largest NOCSAE headform and the interior of the helmet, opposite from the impact site.

4.5 Helmets of a given model with a size smaller than 6 5/8 may not fit the smallest NOCSAE headform. In that event, testing of that size is waived so long as the other sizes of that

model have been tested and meet all requirements.

4.6 The jaw pads in the helmet may be replaced with a different thickness than originally supplied so that those pads firmly contact the headform jaw area, but without spreading the shell. This would be done prior to securing the chin strap to the chin of the headform.

4.7 High Temperature: Expose product to conditioned temperature of 100 ± 3°F (39±1°C) for at least four hours and a maximum of twenty-four (24) hours.

5. Impact Attenuation Tests

5.1 Drop Impact Test

5.1.1 Impact locations are described in Section 19, NOCSAE DOC 001. See Figures 1 and 2.

5.1.2 Impacts shall be conducted on the Test MEP pad (see Section 15.2.2, NOCSAE DOC 001).

5.1.3 Each submitted sample helmet shall be impacted in accordance with Table 1 below and as depicted in Figures 1 and 2. Helmets shall be tested at ambient temperature conditioning first and then the high temperature impacts are to be conducted on the locations that exhibited the highest severity index values during the ambient impacts.

TABLE 1

LOCATION - DROP velocities – ft/s (m/s)
(All drop velocities must be within +3% -0%)

	FRONT	SIDE	F. BOSS	R. BOSS	REAR	TOP	RANDOM
Ambient Temperature*	11.34 (3.46)	11.34 (3.46)	11.34 (3.46)	11.34 (3.46)	11.34 (3.46)	11.34 (3.46)	11.34 (3.46)
	13.89 (4.23)	13.89 (4.23)					
	16.04 (4.88)	16.04 (4.88)					
	17.94 (5.46)	17.94 (5.46)	17.94 (5.46)	17.94 (5.46)	17.94 (5.46)	17.94 (5.46)	17.94 (5.46)
	17.94 (5.46)	17.94 (5.46)	17.94 (5.46)	17.94 (5.46)	17.94 (5.46)	17.94 (5.46)	17.94 (5.46)
High Temperature**	17.94 (5.46)	17.94 (5.46)	17.94 (5.46)	17.94 (5.46)	17.94 (5.46)	17.94 (5.46)	17.94 (5.46)
	17.94 (5.46)	17.94 (5.46)	17.94 (5.46)	17.94 (5.46)	17.94 (5.46)	17.94 (5.46)	17.94 (5.46)

NOTES: * Impact locations requiring more than two (2) impacts must be conducted in sequence from the lowest drop velocity through the highest in accordance with section 19.3 of NOCSAE Doc ND 001.
** At least two, but no more than 4 impact locations shall be impacted at high temperature according to section 5.1.3 above.

5.2 Pneumatic Ram Tests

5.2.1 Impact locations are described in NOCSAE DOC 081, Section 8.

5.2.2 Impacts shall be conducted using the equipment described in NOCSAE DOC 081.

5.2.3 Each submitted sample helmet designated for pneumatic ram testing shall be impacted in accordance with Table 2 below.

5.2.3.1 Helmets designated by the manufacturer as “Youth” may be impacted in accordance with Table 3.

TABLE 2
Pneumatic Ram Impact Location
Velocity - ft/s (m/s) +/- 3%

Side	Rear Boss CG	Rear Boss Non Centric	Rear	Front Boss	Random*
19.7 (6.0)	19.7 (6.0)	19.7 (6.0)	19.7 (6.0)	19.7 (6.0)	19.7 (6.0)

TABLE 3
Pneumatic Ram Impact Location - Youth
Velocity - ft/s (m/s) +/- 3%

Side	Rear Boss CG	Rear Boss Non Centric	Rear	Front Boss	Random*
17.1 (5.2)	17.1 (5.2)	17.1 (5.2)	17.1 (5.2)	17.1 (5.2)	17.1 (5.2)

NOTE**: ***Random location specified in NOCSAE DOC. 081, Section 9.3

6. Test Requirements

6.1 The peak severity index of any impact shall not exceed 1200 SI.

6.2 The 11.34 ft/s impacts designated in Table 1 must not exceed 300 SI♦.

6.3 The peak severity index of any pneumatic ram test shall not exceed 1200 SI.

6.4 The peak rotational acceleration of any pneumatic ram test conducted on the medium headform shall not exceed 6,000 rad/s^2♦♦.

6.5 Helmet repositioning during testing is anticipated. Any structural changes or other changes that take place during impact testing which result in un-restorable, loosening of the fit (see Section 20, NOCSAE DOC 001) shall be cause for failure. In the case of helmets “shimmed” as per section 3.3, the replacement or repositioning of shims is allowed.

6.6 A passing helmet model is able to withstand all impacts at an acceptable SI and meets all other requirements when tested in accordance with this performance specification.

7. Labels and Warnings

7.1 See Section 9, NOCSAE DOC 001.

7.2 Helmets certified under the youth pneumatic ram impact level must be clearly, legibly,

♦ This requirement shall be subject to Level 2 compliance criteria.
♦♦ This requirement shall be exempt from the requirements set forth in NOCSAE DOC. 001, Section 6.4.1.

and permanently labeled “Youth” on the exterior of the helmet. Manufactures shall define what level of play or age or other restrictions apply to the “Youth” designation. This information shall be affixed to the helmet in accordance with the requirements of Section 9.2.3 of NOCSAE DOC 001.

7.3 Each helmet shall have permanently affixed to the exterior of the shell a clearly legible statement which can be easily read without removal of any decal tape, other temporary material or permanent part, which contains language which effectively communicates to the purchaser and user the following information, using the same or similar language:

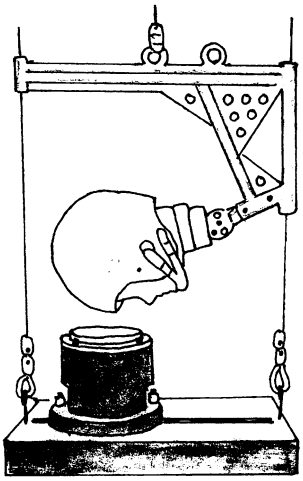
WARNING
NO HELMET CAN PREVENT ALL HEAD OR ANY NECK INJURIES A PLAYER MIGHT RECEIVE WHILE PARTICIPATING IN FOOTBALL. HELMETS CANNOT PREVENT CONCUSSION/BRAIN INJURY. SEEK MEDICAL ADVICE BEFORE RETURNING TO PLAY IF YOU SUSPECT ANY INJURY.

DO NOT USE THIS HELMET TO BUTT, RAM OR SPEAR AN OPPOSING PLAYER. THIS IS IN VIOLATION OF THE FOOTBALL RULES AND SUCH USE CAN RESULT IN SEVERE HEAD OR NECK INJURIES, PARALYSIS OR DEATH TO YOU AND POSSIBLE INJURY TO YOUR OPPONENT.

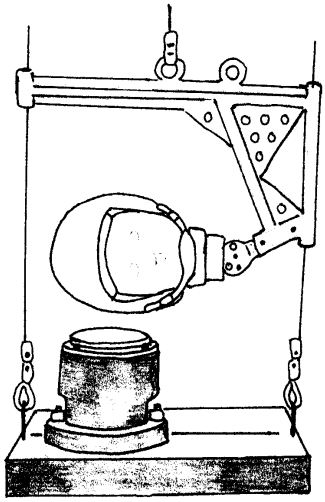
7.4 A permanent, exact replica of this seal must appear legibly on the exterior of the shell.

NOTE: You must have an executed, valid license agreement with NOCSAE to use any of the NOCSAE logos at any time. NOCSAE, the NOCSAE seals/logos, and the National Operating Committee on Standards for Athletic Equipment are registered marks and the exclusive property of the Committee. Use of the marks in any manner is prohibited without prior written permission of the NOCSAE Board of Directors.

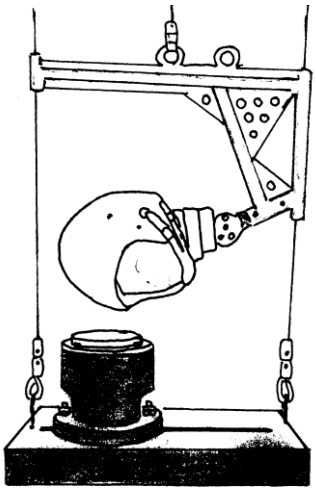
This standard is subject to revision at any time by the responsible technical authority and must be reviewed every five years and if not revised either reapproved or withdrawn. Your comments are invited either for revision, modification or creation of additional standards and should be addressed to NOCSAE’s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



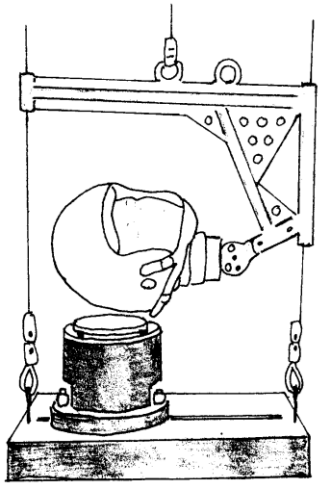
Front Impacts



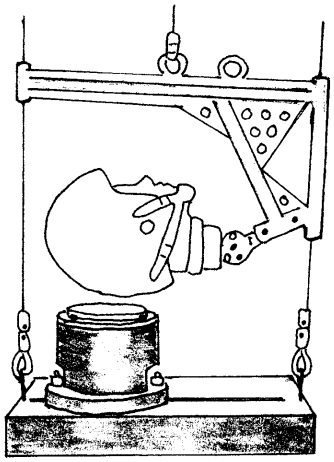
Side Impacts



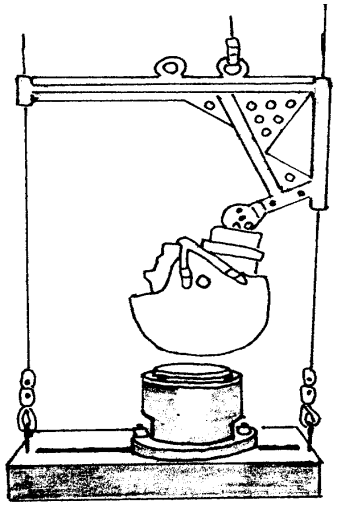
Front Boss Impacts



Rear Boss Impacts



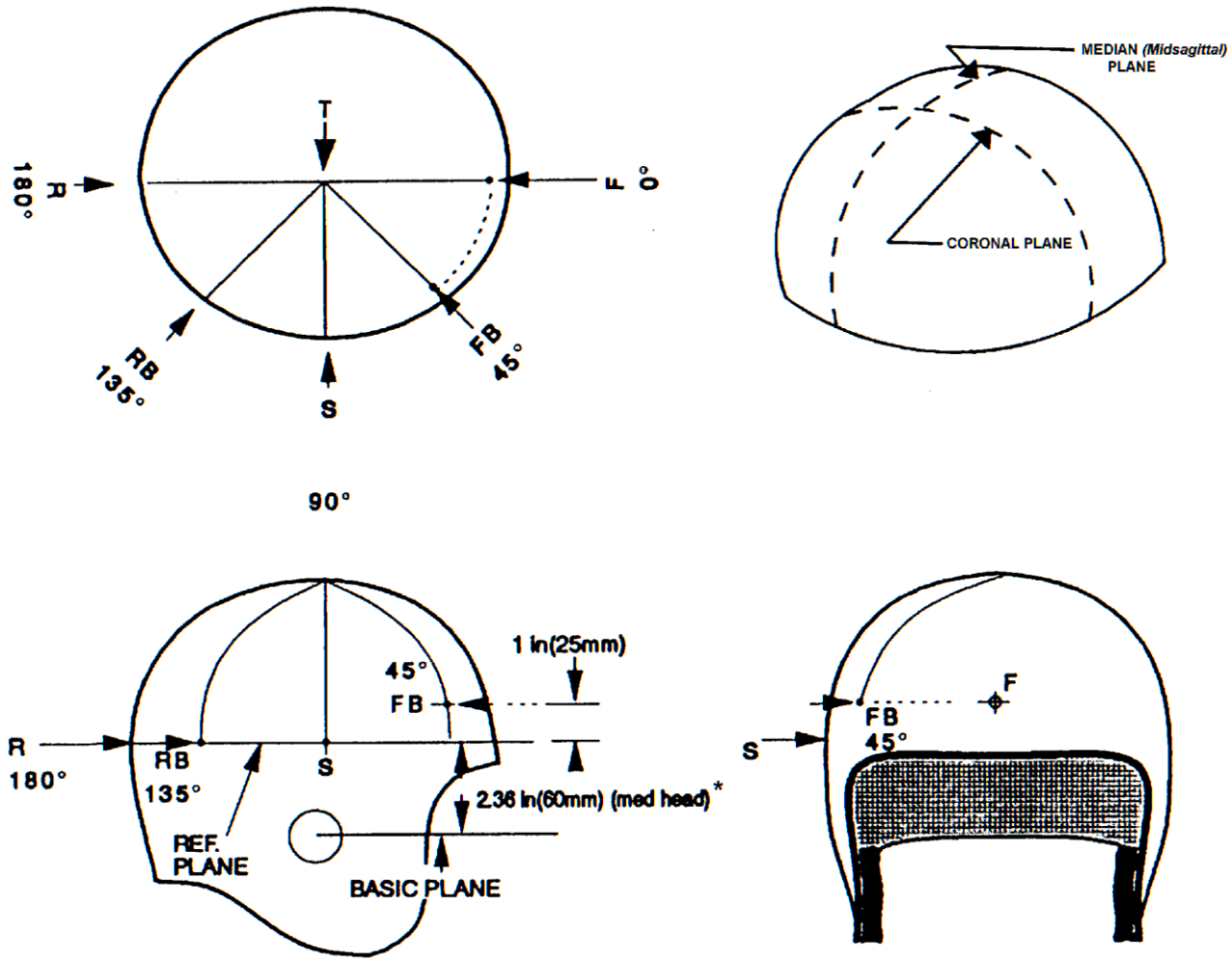
Rear Impacts



Top Impacts

Figure 1

APPROXIMATE IMPACT LOCATIONS



* For the small headform the REFERENCE PLANE is 2.16 inches above the BASIC PLANE. For the large headform the REFERENCE PLANE is 2.48 inches above the BASIC PLANE.

The random location may be selected from any point within the allowed impact area but not closer than 1 inch (25 mm) from the edge of the helmet nor less than 1 inch (25 mm) from any previous impact.

Random locations chosen must allow the rotator assembly to be locked in the position selected.

Impact Area - for a helmet that is to be tested on the medium headform*, the impact area must include all locations on the headform above the BASIC PLANE rearward of a location 2.5 inches (64 mm) forward of where the BASIC PLANE intersects with the CORONAL PLANE and any point on or above the REFERENCE PLANE in front of that same intersection.

* For the small headform use 2.25 inches (57 mm) and for the large headform use 2.75 inches (70 mm).

Figure 2

JANUARY 2017 MODIFICATIONS/REVISIONS

- REVISION: Added pass/fail criteria of 1200 SI for the pneumatic ram test.
- REVISION: Removed rotational acceleration pass/fail criteria for the 6 $^{5}/_{8}$ and 7 $^{5}/_{8}$ headform sizes.

FEBRUARY 2017 MODIFICATIONS/REVISIONS

- Changed “linear impactor” to “pneumatic ram” in section 2.2

JULY 2017 MODIFICATIONS/REVISIONS

- Changed effective date from July 1, 2018 to November 1, 2018
- Added tolerance of +/-3% to pneumatic ram impact velocities

JULY 2018 MODIFICATIONS/REVISIONS

- Changed effective date from to November 2018 to May 2019

JANUARY 2019 MODIFICATIONS/REVISIONS

- Changed effective date from May 2019 to November 2019