

**STANDARD PERFORMANCE  
SPECIFICATION FOR  
NEWLY MANUFACTURED  
POLO HELMETS**

**NOCSAE DOC (ND) 050 – 11m11**

Prepared By



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

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## 1. Scope

- 1.1. This standard specification establishes performance requirements for new polo helmets as supplied by manufacturers.
- 1.2. ***All testing and requirements of this standard specification must be in accordance with NOCSAE DOC.001, except where modified herein.***
- 1.3. *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. STANDARD DROP TEST METHOD AND EQUIPMENT USED IN EVALUATING THE PERFORMANCE CHARACTERISTICS OF PROTECTIVE HEADGEAR, NOCSAE DOC.001

## 3. Specific Terminology

- 3.1. See Section 3, NOCSAE DOC.001.
- 3.2. High Temperature: Expose product to conditioned temperature of  $100^{\circ}\text{F} \pm 3^{\circ}\text{F}$  ( $39^{\circ} \pm 1^{\circ}\text{C}$ ) for at least four hours and a maximum of twenty-four (24) hours.

**NOTE:** When performing conditioned environment temperature testing, the first impact shall occur between the 1st and 2nd minute after removing the sample from the conditioning environment. The second impact shall occur 75 seconds ( $\pm 15$  sec) after the first impact, etc. If the sample cannot be tested within these time constraints, the sample must be returned to the conditioning environment for a minimum of 3 minutes for each minute the sample was out of the conditioning environment. Conditioning must be complete before testing can resume on that sample.

## 4. Sample Size

- 4.1. See Section 11, NOCSAE DOC.001
- 4.2. At least three (3) of each model in each critical size must be tested. Two (2) will be tested at ambient; one (1) tested at high temperature.
- 4.3. 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.
- 4.4. 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.

## 5. Helmet Preparation

- 5.1. See Section 10, NOCSAE DOC.001
- 5.2. Face Protectors - During all testing the helmets must be tested without the faceguard (mask) attached.

## 6. Testing Sequence

- 6.1. The retention and roll-off tests described below shall be performed prior to any of the impact tests.

## 7. Retention Testing (Neck Strap)

- 7.1. The subject helmet, while seated on a head shaped platform, shall be subjected to a dynamic strength retention test on the primary retention system using a Retention System Strength and Extension apparatus (see Figure 1). Said apparatus shall include two metal bars each with a diameter of  $0.5 \pm 0.02$  in ( $12.7 \pm 0.5$  mm) that have a center distance of  $3.0 \pm 0.04$  in ( $76.0 \pm 1$  mm).

The retention system fastening device shall be aligned with the strap fixture so that no part of the retention system fastening device shall contact the strap fixture prior to release of the drop mass. The entire dynamic test apparatus shall hang freely on the retention system. The entire mass of the support assembly, excluding drop weight, must be 15.5 lb (7.03 kg)  $\pm$  5%.

- 7.2. A  $9 \pm 0.2$  lb ( $4.1 \pm 0.08$  kg) drop mass shall be allowed to free-fall onto the stop anvil from a height of 2.0 feet  $\pm$  0.25 inch ( $61$  cm  $\pm$  6 mm). The retention system shall remain intact without elongating by more than 1.25 inches (31.75 mm).
- 7.3. A helmet conditioned at ambient temperature shall be subjected to this test.

## 8. Helmet Stability Testing

- 8.1. A helmet stability (roll-off) stand is depicted in Figure 2 and shall include a guide rod and stop anvil (see Figure 3) similar to that used in the Retention System test, minus the strap fixture (two rods). This guide apparatus shall weigh  $2.5 \pm 0.5$  lb ( $1.13 \pm 0.23$  kg).

A cable and attached hook connect the guide rod to the far edge of the helmet. The cable and hook shall weigh less than 0.45 lb (0.2 kg). The hook shall engage no less than  $\frac{1}{2}$  linear inches (12.7 mm) of the helmet edge.

- 8.2. An ambient temperature helmet shall be affixed to the correct size NOCSAE headform in accordance with the manufacturer's instructions with only the primary retention system adjusted as described in those instructions. This helmet shall then be subjected to a positional stability test by allowing a 9 lb (4.08 kg) drop mass to pull on the back edge of the helmet when dropped from a height of 2 feet (0.61 m). During this test the headform will be canted downwards at a 45° angle from vertical and facing the floor. The helmet shall remain on the headform upon the completion of this test.

## 9. Impact Attenuation Tests

- 9.1. Impact locations are described in Section 19, NOCSAE DOC.001 and in Figure 4 attached.
- 9.2. The impact locations on helmets with a sun visor and or eye protector shall be obtained using the locator holes on the Positioner Adjuster and/or Stem which will allow an impact to be centered around the desired impact point on the helmet closest to the standard location which clears the visor (and eye protector) from contacting the Test MEP pad or anvil throughout the impact. Those helmets without visors must be tested in the standard NOCSAE locations.
- 9.3. The random location chosen cannot be less than 1 inch (25 mm) from the any previous impact
- 9.4. The first submitted sample helmet shall be impacted in accordance with Table 1 below and as depicted in Figure 5. The ambient conditioned helmet shall be impacted once in each of the standard positions plus a random position from a height of 60 inches onto either the hemispherical anvil (see Figure 6) or equestrian hazard anvil (see Figure 7) in any sequence but at least one impact must be made to each anvil.
- 9.5. The hemispherical anvil shall have a spherical surface with a radius of  $48 \pm 1$  mm. The spherical surface shall constitute one half of the surface of a sphere.
- 9.6. The circular portion of the equestrian hazard anvil shall have a radius of  $66.7 \pm 0.5$  mm, with facial surfaces inclined at an angle of  $45 \pm 2^\circ$ . The edge rail at the intersection of the facial surfaces shall have a radius of 0.4 mm maximum.

**TABLE 1**

**LOCATION - DROP velocities – ft/s (m/s)**

(All drop velocities must be within +3% -0%)

<b>Ambient Temperature</b>	<b>Anvil To Use</b>	<b>FRONT</b>	<b>RIGHT SIDE</b>	<b>RIGHT F. BOSS</b>	<b>RIGHT R. BOSS</b>	<b>REAR</b>	<b>TOP</b>	<b>RANDOM</b>
	Hemispherical and Equestrian	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)

- 9.7. The second submitted sample shall be tested as per Table 2 below and as also depicted in Figure 5. The  $\frac{1}{2}$ " Test MEP pad shall be used for these three impacts which shall be performed in the sequence shown for each position.

**TABLE 2**

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

	<b>FRONT</b>	<b>RIGHT SIDE</b>	<b>RIGHT F. BOSS</b>	<b>RIGHT R. BOSS</b>	<b>REAR</b>	<b>TOP</b>	<b>RANDOM</b>
<b>Ambient Temperature</b>	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)
	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)

9.8. The third submitted sample shall be tested as per Table 3 below and as also depicted in Figure 5. At least two (2) locations are selected by determining which two of the highest previous 60-inch ambient temperature locations tests (above) yielded the highest severity indexes. Again, the 1/2" Test MEP pad is used as the impact surface.

**TABLE 3**

**LOCATION - DROP HEIGHT - inches (cm)**  
(All drop heights must be  $\pm 1/8$ " )

	<b>FRONT</b>	<b>RIGHT SIDE</b>	<b>RIGHT F. BOSS</b>	<b>RIGHT R. BOSS</b>	<b>REAR</b>	<b>TOP</b>	<b>RANDOM</b>
<b>High Temperature</b>	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)

**10. Test Requirements**

- 10.1. The peak severity index of any impact shall not exceed 1200 SI.
- 10.2. The 11.34 ft/s impacts designated in Table 2 must not exceed 300 SI.
- 10.3. 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 4.4, the replacement or repositioning of shims is allowed.
- 10.4. 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.

## 11. Labels and Warnings

11.1. See Section 9, NOCSAE DOC.001 and NOCSAE DOC.021.

11.2. 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**

**DO NOT USE THIS HELMET IF THE SHELL IS CRACKED OR DEFORMED; OR IF THE INTERIOR PADDING IS DETERIORATED. SEVERE HEAD OR NECK INJURY, INCLUDING PARALYSIS OR DEATH MAY OCCUR TO YOU DESPITE USING THIS HELMET. NO HELMET CAN PREVENT ALL HEAD INJURIES OR ANY NECK INJURIES A PLAYER MIGHT RECEIVE WHILE PARTICIPATING IN POLO.**

11.3. 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](http://www.nocsae.org) to obtain the latest version of a standard.*

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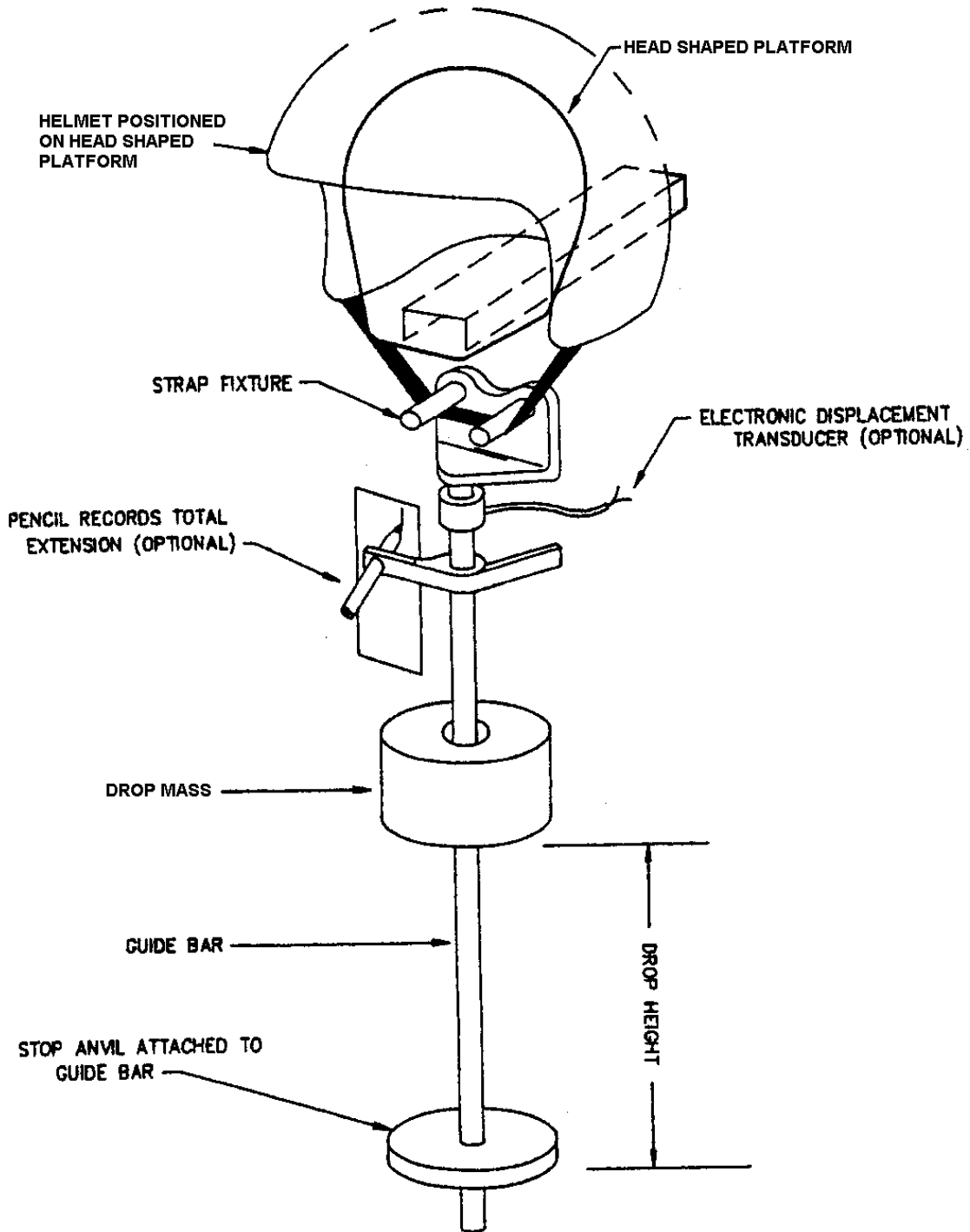


Figure 1

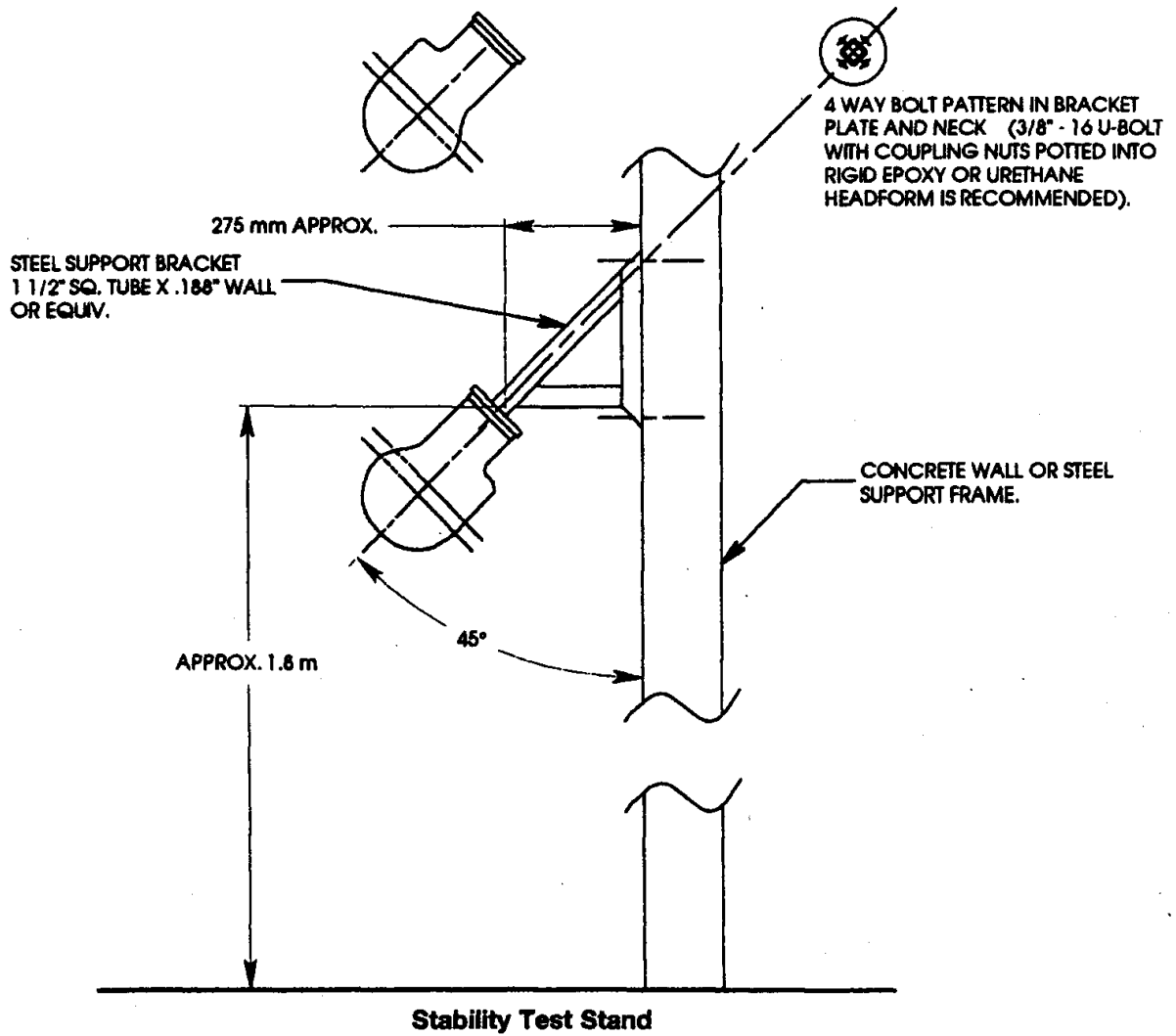


Figure 2

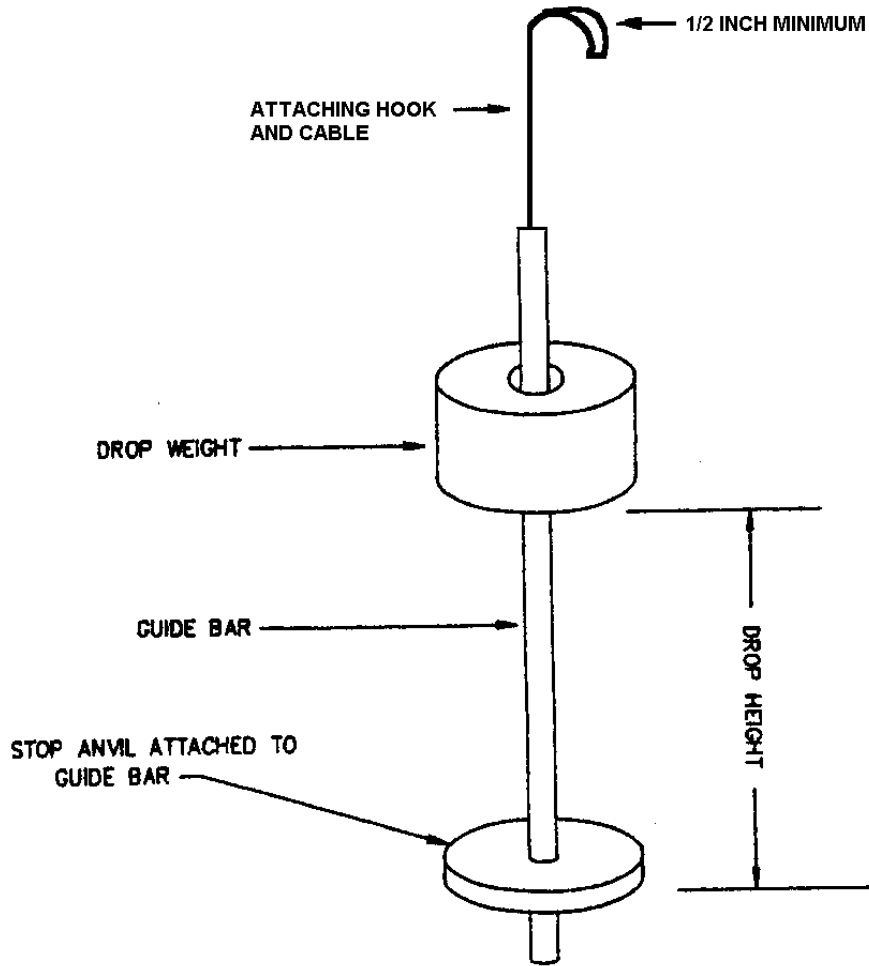
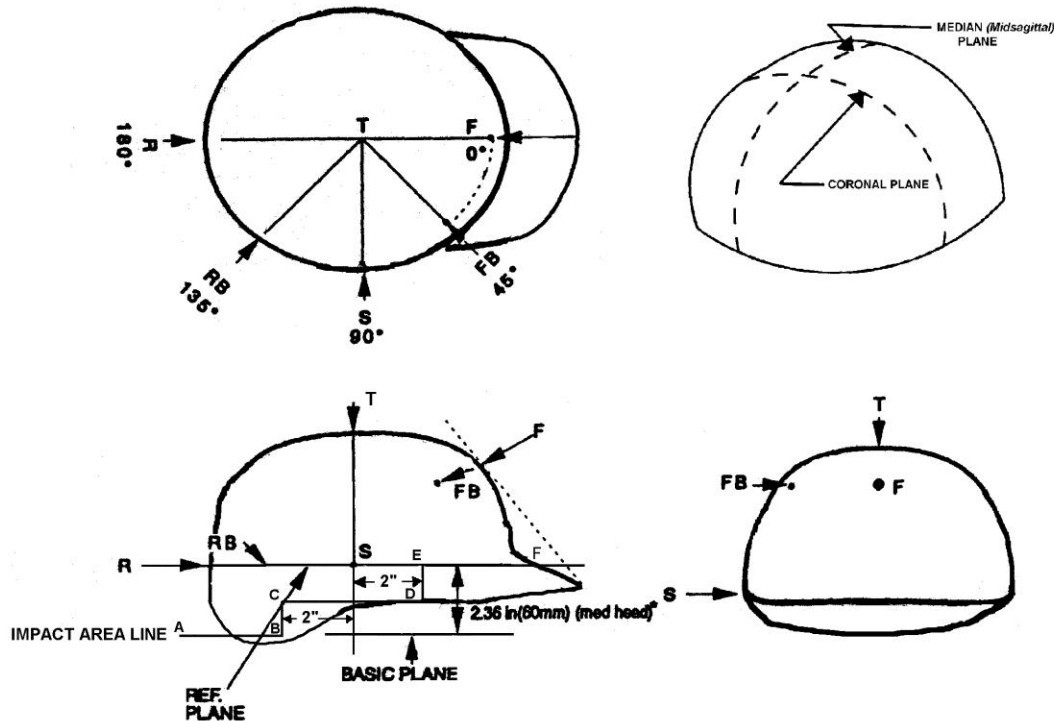


Figure 3

## 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 impact area but not closer than 1 inch (25mm) from the edge of the helmet nor less than 1 inch (25 mm) from any previous impact.

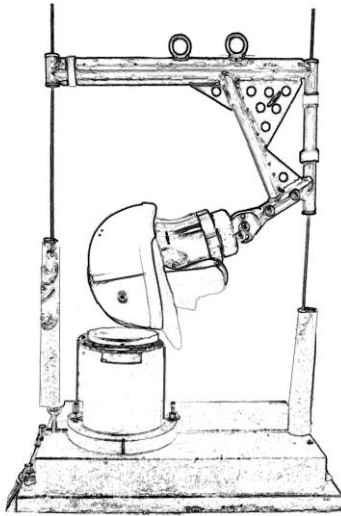
Random locations must allow rotator assembly to be locked in the position selected.

The impact area must include all locations on the head above the IMPACT AREA LINE

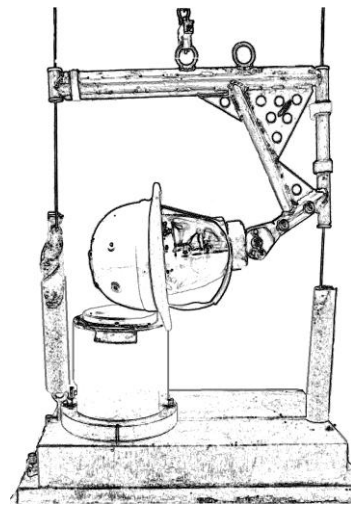
The impact area must include all locations on the head above the IMPACT AREA LINE (line A,B,C,D,E,F).  
 For a helmet that is to be tested on the medium\* headform. Point A is at the rearward intersection of the BASIC PLANE and MEDIAN PLANE. Point B is 2 inches rear of the intersection of the BASIC PLANE and CORONAL PLANE on the BASIC PLANE. Point C is 2 inches to the rear of the intersection of the BASIC PLANE and CORONAL PLANE and one half the distance from the REFERENCE to the BASIC PLANE. Point D is 2 inches forward of the intersection of the BASIC PLANE and CORONAL PLANE and one half the distance from the REFERENCE to the BASIC PLANE. Point E is on the REFERENCE PLANE 2 inches forward of the intersection of the BASIC PLANE and CORONAL PLANE. Point F is on the front intersection of the REFERENCE and MEDIAN PLANE.

\* For the small headform use 1.75 inches (44 mm) and for the large headform use 2.25 inches (57 mm).

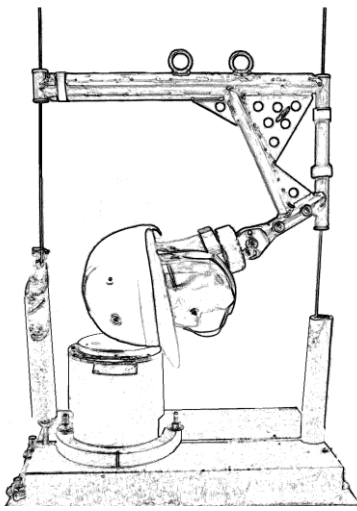
Figure 4



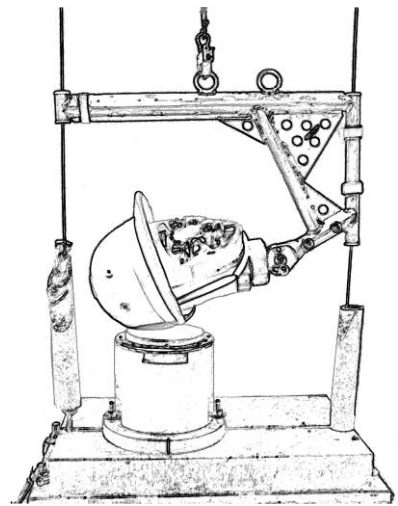
**Front**



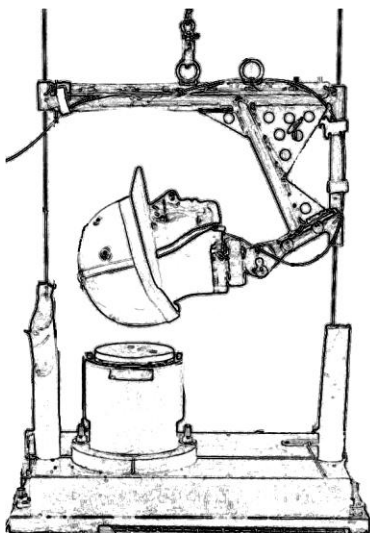
**Right Side**



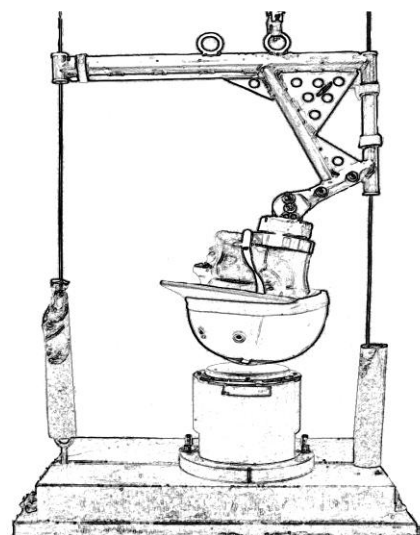
**Rear**



**Right Rear Boss**



**Rear**



**Top**

**Figure 5**

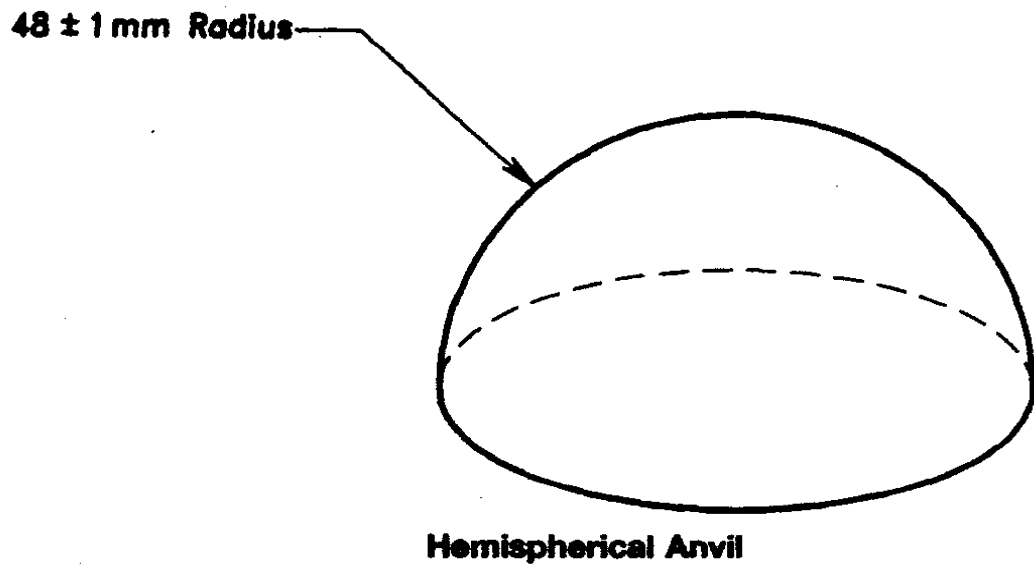


Figure 6

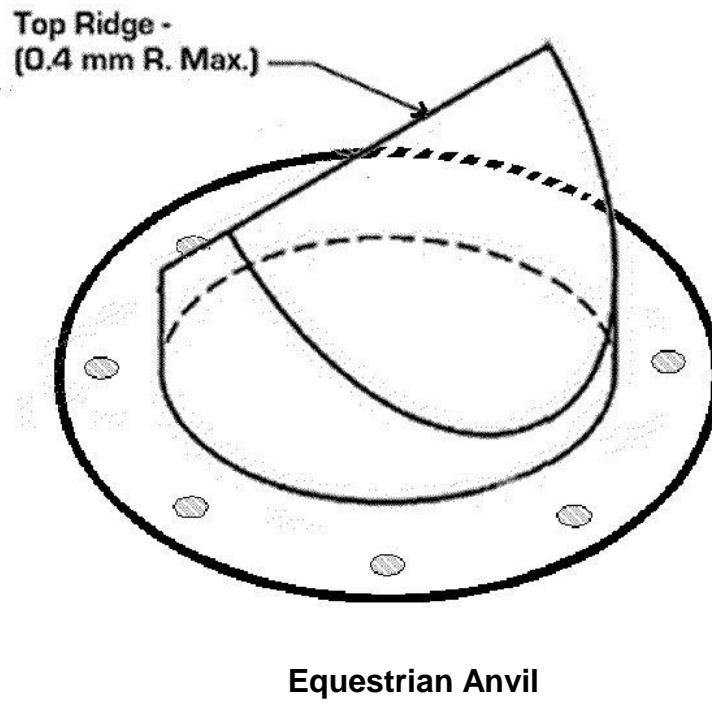


Figure 7

**DECEMBER, 2004 MODIFICATIONS/REVISIONS**

- **Revision-** Changed section 7 Retention Testing (Neck Strap) drop mass free fall to 2.0 ft and omitted drop mass free fall of 3.0 ft.
- **Revision-** Changed section 9.5 and Table 1 to omit second 60-inch impact onto the hazard anvils.

**FEBRUARY 2011, MODIFICATIONS/REVISIONS**

- **REVISION-** Change drop heights to drop velocities. Moved test requirements to section 10. Clarified test requirements.