

**CHAPTER 107. MOTORCYCLE HELMETS**

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**Authority**

The provisions of this Chapter 107 issued under the Vehicle Code, 75 Pa.C.S. §§ 3525(c) and 4103, unless otherwise noted.

**Source**

The provisions of this Chapter 107 adopted September 30, 1977, effective October 1, 1977, 7 Pa.B. 2808, unless otherwise noted.

**Cross References**

This section cited in 17 Pa. Code § 21.112 (relating to snowmobiles); 17 Pa. Code § 21.113 (relating to all-terrain vehicles); and 17 Pa. Code § 21.114 (relating to motorized off-road vehicles).

**§ 107.1. Scope.**

This chapter establishes minimum performance requirements for helmets designed for use by motorcyclists and other motor vehicle users.

**§ 107.2. Purpose.**

The purpose of this chapter is to reduce deaths and injuries to motorcyclists and other motor vehicle users resulting from head impacts.

**§ 107.3. Application.**

This chapter shall apply to helmets designed for use by motorcyclists and other motor vehicle users. The requirements of this chapter shall apply to all helmets that can be placed on the size C headform using normal fitting procedures. Helmets that cannot be placed on the size C headform shall not be covered by this chapter until it is extended to those sizes by further amendment.

**Source**

The provisions of this § 107.3 amended December 21, 1979, effective December 22, 1979, 9 Pa.B. 4192.

**§ 107.4. Definitions.**

The following words and terms, when used in this chapter, have the following meanings, unless the context clearly indicates otherwise:

*Basic plane*—A plane through the centers of the right and left external ear openings and the lower edge of the eye sockets, as shown in Figure 1 of Appendix A, of a reference headform, as shown in Figure 2 of Appendix A or test headform.

*Helmet positioning index*—The distance in inches, as specified by the manufacturer, from the lowest point of the brow opening at the lateral midpoint of the helmet to the basic plane of a reference headform, when the helmet is firmly and properly positioned on the reference headform.

*Midsagittal plane*—A longitudinal plane through the apex of a reference headform or test headform that is perpendicular to the basic plane, as shown in Figure 3 of Appendix A.

*Reference headform*—A measuring device contoured to the dimensions of one of the four headforms described in Appendix A of this chapter with surface markings indicating the locations of the basic, midsagittal, and reference planes, and the centers of the external ear openings.

*Reference plane*—A plane above and parallel to the basic plane on a reference headform or test headform, as shown in Figure 2 of Appendix A, at the distance indicated in the Appendix A.

*Retention system*—The complete assembly by which the helmet is retained in position on the head during use.

*Test headform*—A test device contoured to the dimensions of one of the four reference headforms described in Appendix A for all surface areas that contact the helmet, with surface markings indicating the locations of the basic, midsagittal and reference planes.

#### Notes of Decisions

##### *Helmet Coverage*

A motorcycle helmet must cover at least to the center of the ear. *Commonwealth v. Hull*, 705 A.2d 911 (Pa. Super. 1998); appeal denied, 725 A.2d 179 (Pa. 1998).

##### *Vagueness*

Although the language of this regulation is complex, complicated and requires careful deliberation on the part of motorcyclists, the language is not vague. *Commonwealth v. Hull*, 705 A.2d 911 (Pa. Super. 1998).

### § 107.5. Requirements.

Each helmet shall meet the requirements of subsections (a)—(c) when subjected to any conditioning procedure specified in § 107.6(c) (relating to preliminary test procedures) and tested in accordance with § 107.7 (relating to test conditions).

(a) *Impact attenuation*. When an impact attenuation test is conducted in accordance with § 107.7(a), all of the following requirements shall be met:

- (1) peak accelerations shall not exceed 400g;

(2) accelerations in excess of 200g shall not exceed a cumulative duration of 2.0 milliseconds; and

(3) accelerations in excess of 150g shall not exceed a cumulative duration of 4.0 milliseconds.

(b) *Penetration.* When a penetration test is conducted in accordance with § 107.7(b), the striker shall not contact the surface of the test headform.

(c) *Retention system.* Requirements of the retention system shall be as follows:

(1) When tested in accordance with the provisions of § 107.7(c), all of the following apply:

(i) The retention system or its components shall attain the loads specified without separation.

(ii) The adjustable portion of the retention system test device may not move more than 1 inch measured between preliminary and test load positions.

(2) When the retention system consists of components which can be independently fastened without securing the complete assembly, each such component shall independently meet the requirements of paragraph (1).

(d) *Configuration.* Each helmet shall have a protective surface of continuous contour at all points on or above the test line described in § 107.6(c). The helmet shall provide peripheral vision clearance of at least 105° to each side of the midsagittal plane, when the helmet is adjusted as specified in § 107.6(b). The vertex of these angles, shown in Figure 3 of Appendix A, shall be at the point on the anterior surface of the reference headform at the intersection of the midsagittal and basic planes. The brow opening of the helmet shall be at least one inch above all points in the basic plane that are within the angles of peripheral vision. See Figure 3 of Appendix A.

(e) *Projections.* A helmet shall not have any rigid projections inside its shell. Rigid projections outside any helmet's shell shall be limited to those required for operation of essential accessories, and shall not protrude more than 0.19 inch.

(f) *Labeling.* Each helmet shall be permanently and legibly labeled, in a manner such that the labels can be easily read without removing padding or any other permanent part, with the following:

(1) Name or identification of manufacturer.

(2) Precise model designation.

(3) Size.

(4) Month and year of manufacture. This may be spelled out, for example, June 1974, or expressed in numerals, for example, 6/74.

(5) The symbol "DOT," constituting the certification of the manufacturer that the helmet conforms to the applicable Federal Motor Vehicle Safety Standards. This symbol shall appear on the outer surface, in a color that contrasts

with the background, in letters at least 3/8 inch high, centered laterally approximately 1 1/4 inches from the bottom edge of the posterior portion of the helmet.

(6) Instruction to the purchaser as follows:

“Shell and liner constructed of (identify type(s) of materials).

“Helmet can be seriously damaged by some common substances without damage being visible to the user. Apply only the following: (Recommended cleaning agents, paints, adhesives, and so forth, as appropriate).

“Make no modifications. Fasten helmet securely. If helmet experiences a severe blow, return it to the manufacturer for inspection, or destroy and replace it.” On an attached tag, brochure, or other suitable means, any additional, relevant safety information should be supplied at the time of purchase.

(g) *Helmet positioning index*. Each manufacturer of helmets shall establish a positioning index for each helmet he manufactures. This index shall be furnished immediately to any person who requests the information, with respect to a helmet identified by manufacturer, model designation and size.

#### Notes of Decisions

##### *Violation Found*

Motorcyclists who readily admitted that his helmet did not have the required labeling information under this regulation could be convicted of violating 75 Pa.C.S. § 3525. *Commonwealth v. Hull*, 705 A.2d 911 (Pa. Super. 1998); appeal denied, 725 A.2d 179 (Pa. 1998).

##### *Violations*

Appellant could be charged and convicted of violating 75 Pa.C.S. § 3535 because his motorcycle helmet did not conform to the standards promulgated by the Department of Transportation in this regulation. *Commonwealth v. Hull*, 705 A.2d 911 (Pa. Super. 1998); appeal denied, 725 A.2d 179 (Pa. 1998).

#### § 107.6. Preliminary test procedures.

Before subjecting a helmet to the testing sequence specified in § 107.7 (relating to test conditions), prepare it according to the following procedures.

(a) *Reference marking*. Reference marking shall be conducted as follows:

(1) Use a reference headform that is firmly seated with the basic and reference planes horizontal. Place the complete helmet to be tested on the reference headform of the largest size specified in Appendix A whose circumference is not greater than the internal circumference of the headband when adjusted to its largest setting or, if no headband is provided, to the corresponding interior surface of the helmet.

(2) Apply a 10 pound static load normal to the apex of the helmet. Center the helmet laterally and seat it firmly on the reference headform according to its helmet positioning index.

(3) Maintaining the load and position described in paragraph (2), draw a line, hereinafter referred to as “test line,” on the outer surface of the helmet

coinciding with portions of the intersection of that surface with the following planes, as shown in Figure 2 of Appendix A:

(i) A plane 1 inch above and parallel to the reference plane in the anterior portion of the reference headform.

(ii) A vertical transverse plane 2.5 inches behind the point on the anterior surface of the reference headform at the intersection of the midsagittal and reference planes.

(iii) The reference plane of the reference headform.

(iv) A vertical transverse plane 2.5 inches behind the center of the external ear opening in a side view.

(v) A plane one inch below and parallel to the reference plane in the posterior portion of the reference headform.

(b) *Helmet positioning.* Prior to each test, fix the helmet on a test headform in the position that conforms to its helmet positioning index. Secure the helmet so that it does not shift position prior to impact or to application of force during testing. In testing as specified in § 107.7(a) and (b), place the retention system in a position such that it does not interfere with free fall, impact or penetration.

(c) *Conditioning.* Immediately prior to conducting the testing sequence specified in § 107.7, condition each test helmet in accordance with any one of the following procedures:

(i) *Ambient conditions.* Expose to a temperature of 70° F and a relative humidity of 50% for 12 hours.

(ii) *Low temperature.* Expose to a temperature of 14° F for 12 hours.



- (iii) *High temperature.* Expose to a temperature of 122° F for 12 hours.
- (iv) *Water immersion.* Immerse in water at a temperature of 77° F for 12 hours.

If during testing, the time out of the conditioning environment for a test helmet exceeds 5 minutes, return the helmet to the conditioning environment for a minimum of 3 minutes for each minute out of the conditioning environment or 12 hours, whichever is less, prior to resumption of testing.

#### Cross References

This section cited in 67 Pa. Code § 107.5 (relating to requirements); and 67 Pa. Code § 107.7 (relating to test conditions).

### § 107.7. Test conditions.

(a) *Impact attenuation test.* Requirements for impact attenuation testing are as follows:

(1) Impact attenuation shall be measured by determining acceleration imparted to an instrumented test headform on which a complete helmet is mounted as specified in § 107.6(b) (relating to preliminary test procedures), when it is dropped in guided free fall upon fixed hemispherical and flat steel anvils.

(2) Each helmet shall be impacted at four sites with two successive, identical impacts at each site. Two of these sites shall be impacted upon a flat steel anvil and two upon a hemispherical steel anvil as specified in paragraphs (7) and (8). The impact sites shall be at any point on the area above the test line described in § 107.6(a)(3) and separated by a distance not less than 1/6 of the maximum circumference of the helmet.

(3) The guided free fall drop heights for the helmet and test headform combination onto the hemispherical anvil and flat anvil shall be 54.5 inches and 72 inches, respectively.

(4) Test headforms for impact attenuation testing shall be constructed of magnesium alloy, K-1A, and shall exhibit no resonant frequencies below 3,000 hertz.

(5) Weight of the drop assembly, as specified in Table I of Appendix A, shall be the combined weight of the instrumented test headform and supporting assembly for the drop test. The weight of the supporting assembly shall not exceed 20% of the weight of the drop assembly. The center of gravity of the combined test headform and supporting assembly shall lie within a cone with its axis vertical and forming a 10° included angle with the vertex at the point of impact.

(6) The acceleration transducer shall be mounted at the center of gravity of the combined test headform and supporting assembly with the sensitive axis aligned to within 5° of vertical when the test headform is in the impact posi-

tion. The acceleration data channel shall comply with SAE Recommended Practice J211 requirements for channel class 1,000.

(7) The flat anvil shall be constructed of steel with a 5 inch minimum diameter impact face, and the hemispherical anvil shall be constructed of steel with a 1.9 inch radius impact face.

(8) The rigid mount for both of the anvils shall consist of a solid mass of at least 300 pounds, the outer surface of which consists of a steel plate with minimum thickness of one inch and minimum surface area of 1 square foot.

(b) *Penetration test.* Requirements for penetration testing are as follows:

(1) The penetration test shall be conducted by dropping the penetration test striker in guided free fall, with its axis aligned vertically, onto the outer surface of the complete helmet, when mounted as specified in § 107.6(b), at any point above the test line, described in § 107.6(a)(3), except on a fastener or other rigid projection.

(2) Two penetration blows shall be applied at least 3 inches apart, and at least 3 inches from the centers of any impacts applied during the impact attenuation test.

(3) The height of the guided free fall shall be 118.1 inches, as measured from the striker point to the impact point on the outer surface of the test helmet.

(4) The contractable surfaces of the penetration test headforms shall be constructed of a metal or metallic alloy having a Brinell hardness number no greater than 55, which shall readily permit detection should contact by the striker occur. The surface shall be refinished if necessary prior to each penetration test blow to permit detection of contact by the striker.

(5) The weight of the penetration striker shall be 6 pounds, 10 ounces.

(6) The point of the striker shall have an included angle of 60°, a cone height of 1.5 inches, a tip radius of 0.019 inch, standard 0.5 millimeter radius and a minimum hardness of 60 Rockwell, C-scale.

(7) The rigid mount for the penetration test headform shall be as described in subsection (a)(8).

(c) *Retention system test.* Requirements for retention system testing are as follows:

(1) The retention system test is conducted by applying a static tensile load to the retention assembly of a complete helmet, which is mounted, as described in § 107.6(b), on a stationary test headform as shown in Figure 4 of Appendix A, and by measuring the movement of the adjustable portion of the retention system test device under tension.

(2) The retention system test device consists of both an adjustable loading mechanism by which a static tensile load is applied to the helmet retention assembly and a means for holding the test headform and helmet stationary. The retention assembly is fastened around two freely moving rollers, both of which have a 0.5 inch diameter and a 3 inch center-to-center separation, and which



are mounted on the adjustable portion of the tensile loading device, as shown in Figure 4 of Appendix A. The helmet is fixed on the test headform as necessary to ensure that it does not move during the application of the test loads to the retention assembly.

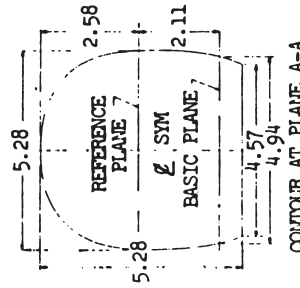
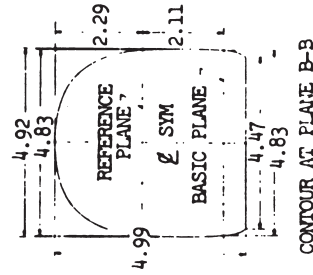
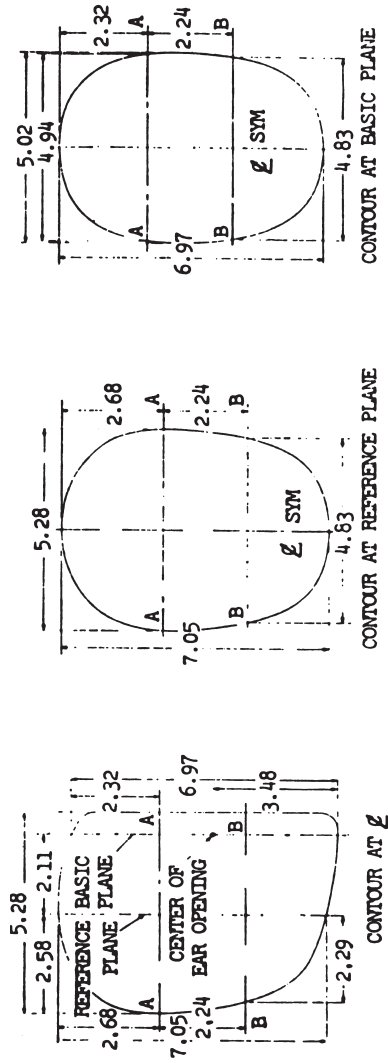
(3) A 50 pound preliminary test load is applied to the retention assembly, normal to the basic plane of the test headform and symmetrical with respect to the center of the retention assembly for 30 seconds, and the maximum distance from the extremity of the adjustable portion of the retention system test device to the apex of the helmet is measured.

(4) An additional 250 pound test load is applied to the retention assembly, in the same manner and at the same location as described in paragraph (3), for 120 seconds, and the maximum distance from the extremity of the adjustable portion of the retention system test device to the apex of the helmet is measured.

#### **Cross References**

This section cited in 67 Pa. Code § 107.5 (relating to requirements); and 67 Pa. Code § 107.6 (relating to preliminary test procedures).

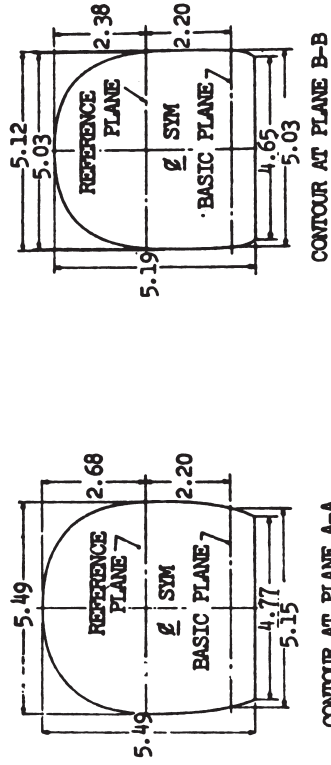
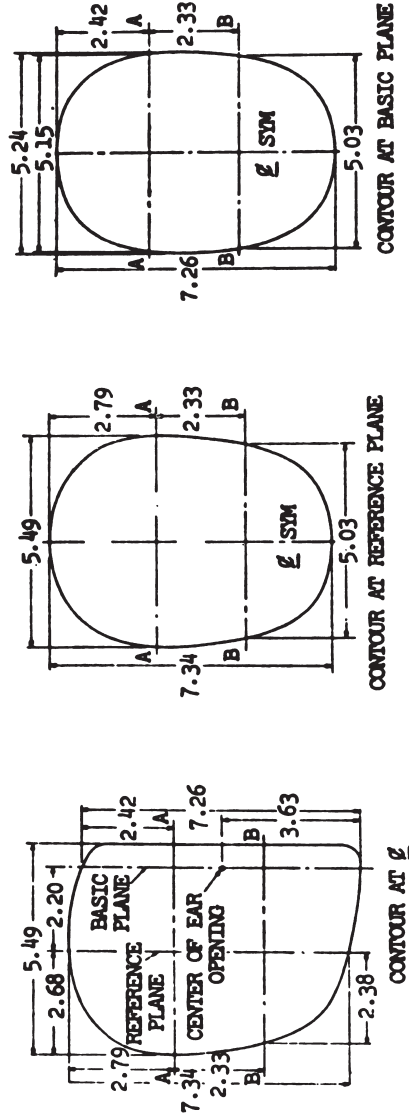
APPENDIX A



ALL DIMENSIONS IN INCHES

HEADFORM A

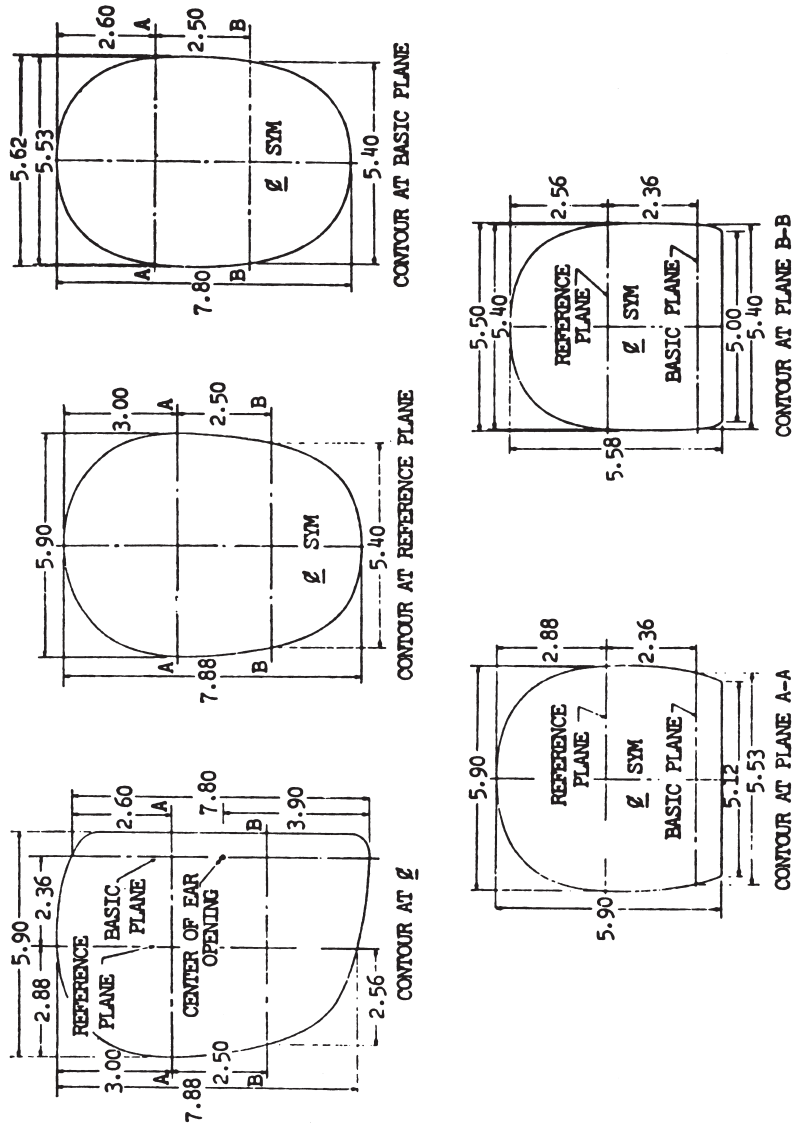
APPENDIX A (Continued)



ALL DIMENSIONS IN INCHES

HEADFORM B

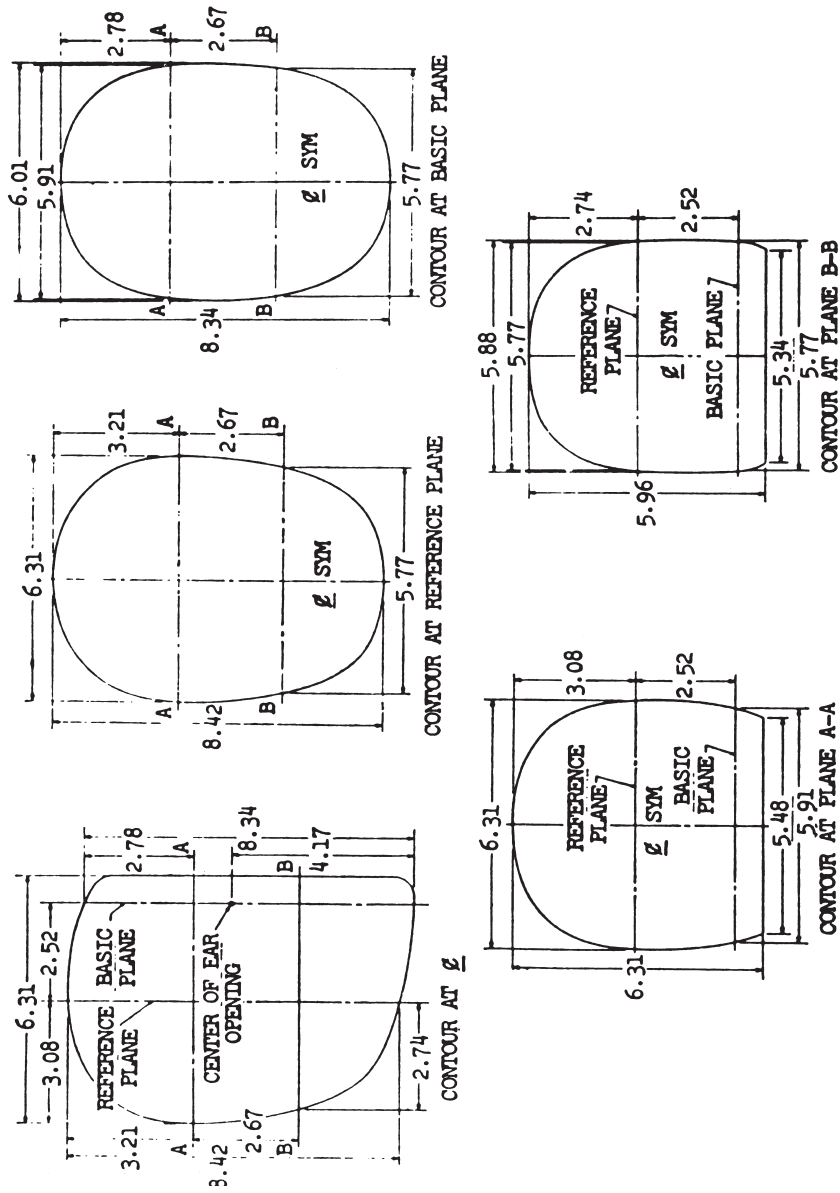
APPENDIX A (Continued)



ALL DIMENSIONS IN INCHES

HEADFORM C

APPENDIX A (Continued)



HEADFORM D  
 [38 FR 22391, Aug. 20, 1973, as amended at 39 FR 3654, Jan. 28, 1974]  
 ALL DIMENSIONS IN INCHES

APPENDIX A (Continued)

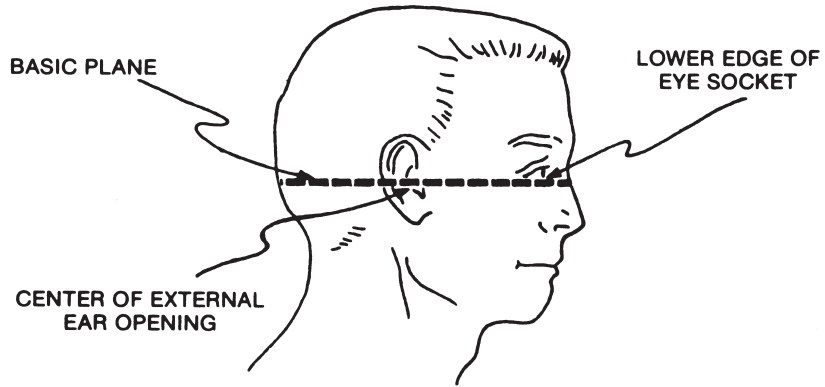


Figure 1

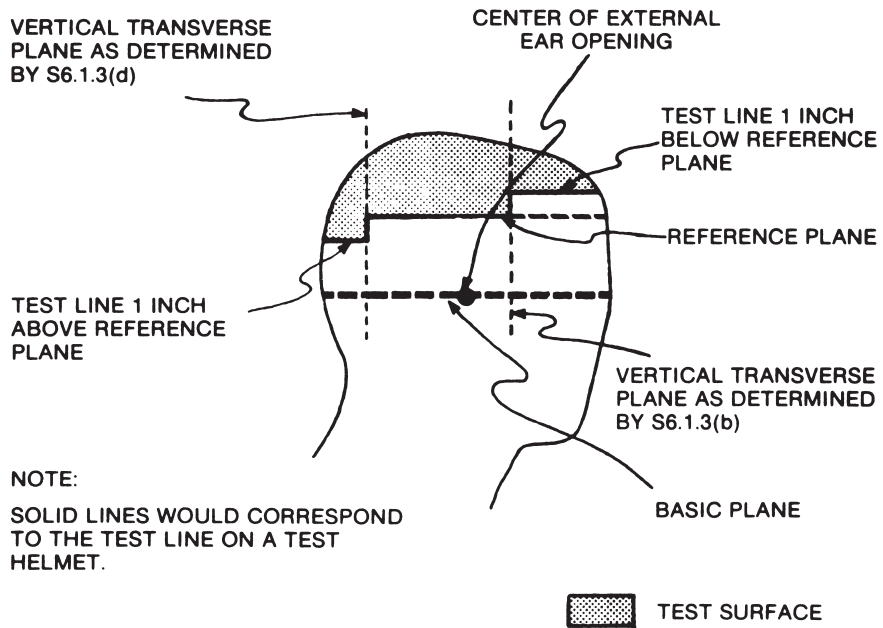


Figure 2

APPENDIX A (Continued)

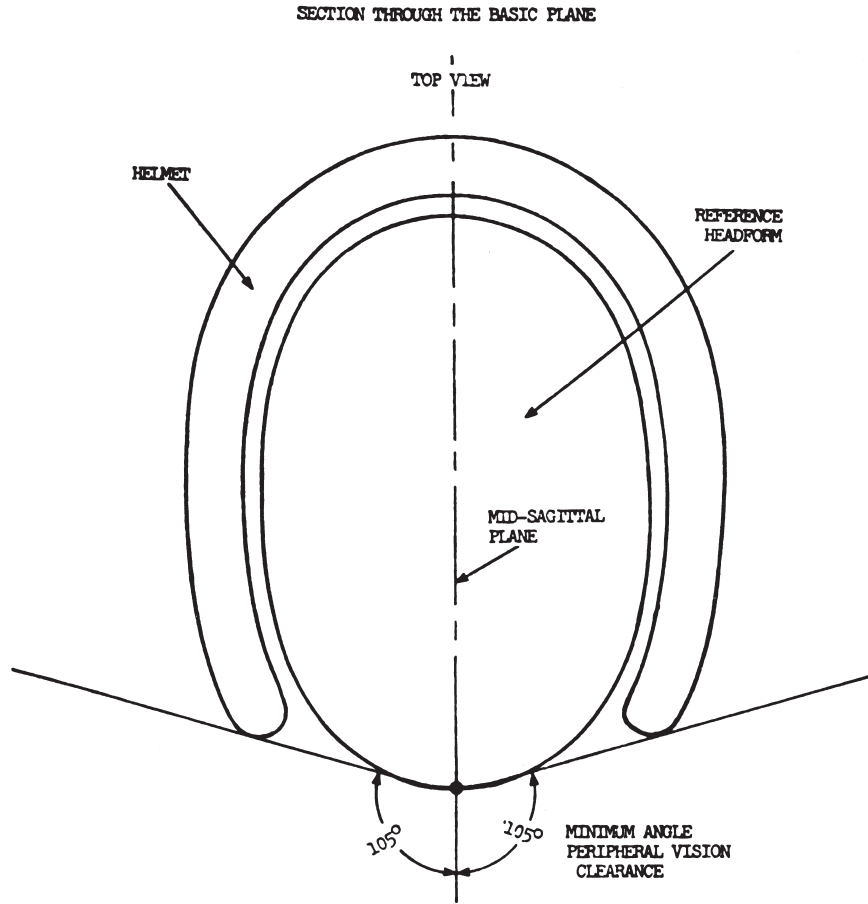


Figure 3

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APPENDIX A (Continued)

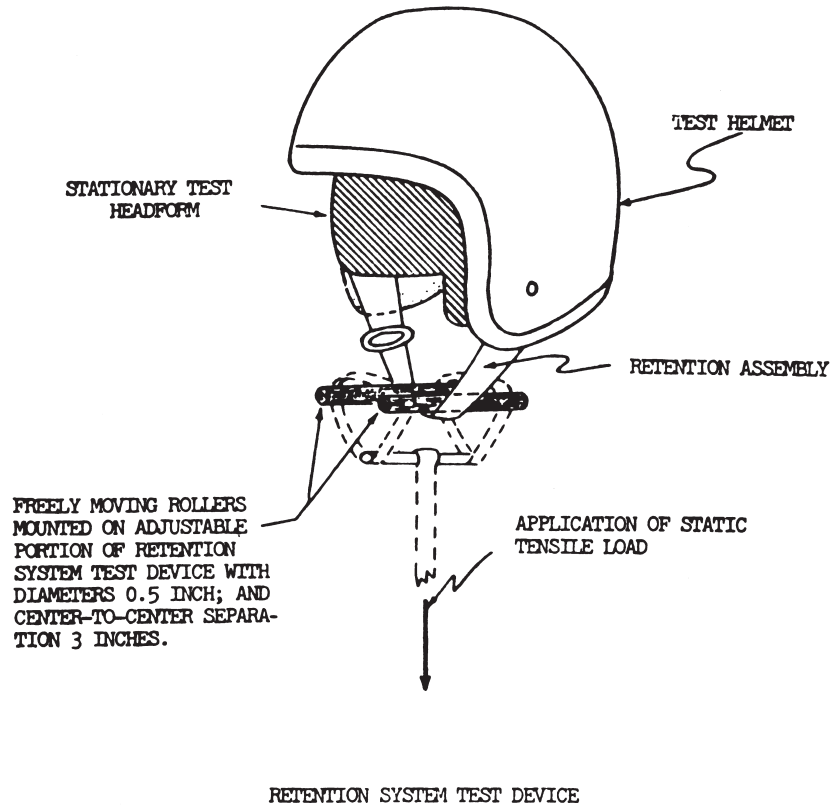


Figure 4

TABLE I.—Weights for impact attenuation test drop assembly

Reference headform size:	<i>Weight (lbs)*</i>
A .....	7.8
B .....	8.9
*Combined weight of instrumented test headform and supporting assembly for drop test.	
Reference headform size:	<i>Weight (lbs)*</i>
C .....	11.0
D .....	13.4



**Cross References**

This appendix cited in 67 Pa. Code § 107.4 (relating to definitions); 67 Pa. Code § 107.5 (relating to requirements); 67 Pa. Code § 107.6 (relating to preliminary test procedures); and 67 Pa. Code § 107.7 (relating to test conditions).

[Next page is 109-1.]

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