



Standard Test Method for Shock-Attenuation Characteristics of Protective Headgear for Football¹

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1. Scope

1.1 This test method covers the determination of the shock-attenuation characteristics of protective headgear for football.²

1.2 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

1.3 *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. Referenced Documents

2.1 *ASTM Standards:*³

F717 Specification for Football Helmets

2.2 *SAE Document:*

J221 JUN 80 Instrumentation for Impact Tests, Requirements for Channel Class 1000⁴

2.3 *ISO Standard:*

ISO/DIS 6220 Headforms For Use in the Testing of Protective Helmets⁵

3. Terminology

3.1 *Definitions of Terms Specific to This Standard:*

¹ This test method is under the jurisdiction of ASTM Committee F08 on Sports Equipment, Playing Surfaces, and Facilities and is the direct responsibility of Subcommittee F08.53 on Headgear and Helmets.

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² Performance requirements for football helmets are found in Specification F717.

³ For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

⁴ Available from the Society of Automotive Engineers, 400 Commonwealth Dr., Warrendale, PA 15096.

⁵ Available from American National Standards Institute, 11 W. 42nd St., 13th Floor, New York, NY 10036.

3.1.1 *basic plane*—an anatomical plane that includes the superior rims of the auditory meatuses (the upper edges of the external openings of the ears) and the notches of the inferior orbital ridges (the bottom of the eye sockets). See Fig. 1.

3.1.2 *coronal plane*—a vertical plane that is perpendicular to the median and reference planes and passes through the crown of the headform (lateral plane).

3.1.3 *crown*—a point in the median plane which is equal chord lengths from the anterior and posterior intersections of the median and reference planes.

3.1.4 *drop height*—the vertical distance between the lowest point (impact point) of the elevated helmet and the apex of the impact surface.

3.1.5 *g*—dimensionless ratio of the acceleration of the headform during impact to the acceleration due to gravity.

3.1.6 *g_{max}*—the maximum value of *g* encountered during impact.

3.1.7 *median plane*—a vertical plane that passes through the headform from front to back and divides it into right and left halves (mid-sagittal plane).

3.1.8 *protective headgear*—the assembled device and accessories as supplied by the manufacturer primarily intended to protect the wearer's head while participating in football.

3.1.9 *reference plane*—a plane that is located at a specified distance above and parallel to the basic plane.

4. Summary of Test Method

4.1 A headgear is mounted on a headform that is oriented in different positions and is dropped at a specific velocity onto an impact surface. A linear accelerometer mounted at the center of gravity of the headform monitors the acceleration and the time history of impact which are recorded with appropriate instrumentation.

5. Significance and Use

5.1 Maximum acceleration and time duration data obtained by the specified procedures are intended to determine the shock attenuation characteristics of a headgear.