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An American National Standard

Standard Specification for Protective Headgear Used in Electric Personal Assistive Mobility Devices[1]

This standard is issued under the fixed designation F2416; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope*

1.1 This specification covers performance requirements for helmets manufactured for users of electric personal assistive mobility devices.

1.2 All testing and requirements of this specification shall be in accordance with Test Methods F1446, except where noted in this specification.

1.3 Partial utilization of this specification is prohibited. Any statement of compliance with this specification shall be a certification that the product meets all of the requirements of the specification in its entirety. A product that fails to meet any one of the requirements of this specification is considered to have failed the specification and should not be sold with any indication that it meets parts of the specification.

2. Referenced Documents

2.1 *ASTM Standards:*[2]

F1446 Test Methods for Equipment and Procedures Used in Evaluating the Performance Characteristics of Protective Headgear

3. Terminology

3.1 *Definitions of Terms Specific to This Standard:*

3.1.1 *electric personal assistive mobility device, n*—electrically-driven wheeled device for personal mobility with a speed limited to no more than 22.5 kph (14 mph).

4. Headforms

4.1 Headforms to be used in this specification are as specified in Test Methods F1446. The appropriate size headform shall be selected for the helmet to be tested as specified in Test Methods F1446.

5. Anvils and Impact Velocities

5.1 Anvils to be used for impact tests in this specification are the flat, hemispherical, and curbstone anvils described in Test Methods F1446.

5.2 The helmet shall be dropped onto the flat anvil to achieve an impact velocity of 6.2 m/s.

5.3 The helmet shall be dropped onto the hemispherical and curbstone anvils to achieve an impact velocity of 4.8 m/s.

5.4 The impact velocity shall be measured during the last 40 mm of free-fall for each test and shall be within ±3 % of the velocities specified in 5.2 and 5.3.

6. Marking the Test Line (Area of Required Coverage)

6.1 The test line is shown in Fig. 1 and shall be marked in accordance with Test Methods F1446.

7. Conditioning, Number of Samples, and Laboratory Environment

7.1 The test normally requires eight samples of each shell/liner combination.

7.2 Conditioning of the samples to be tested is described in Test Methods F1446.

8. Retention System Testing

8.1 The ambient helmet shall be subjected to the positional stability (roll-off) test in accordance with Test Methods F1446, using a 4 kg drop mass from a height of 0.6 m.

8.2 The hot, cold, and wet helmets shall be subjected to the dynamic strength retention test in accordance with Test Methods F1446, using a 4 kg drop mass from a height of 0.6 m. The retention system shall remain intact without elongating more than 30 mm.

8.3 Retention system testing shall be completed prior to impact testing.

9. Impact Sites and Projections

9.1 Impact sites are described in Test Methods F1446.

9.2 *Projections*—Any unfaired projection extending more than 7 mm from the helmet's outer surface shall break away or

[1] This specification is under the jurisdiction of ASTM Committee F08 on Sports Equipment and Facilitiesand is the direct responsibility of Subcommittee F08.53 on Headgear and Helmets.

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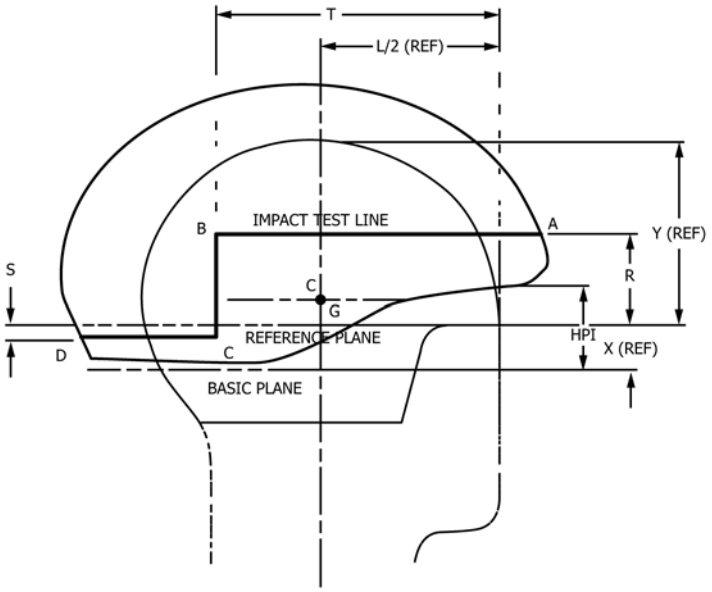
[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

***A Summary of Changes section appears at the end of this standard**



NOTE 1—The center of impact can be anywhere on or above the test line.

FIG. 1 Marking the Test Line

Headform Size	Dimension					
	X	L/2	Y	R	S	T
A	24.0	88.0	89.7	47.5	7.0	142.0
E	26.0	94.5	96.0	49.0	8.0	151.0
J	27.5	101.0	102.5	50.5	8.0	160.0
M	29.0	106.0	107.0	52.0	8.0	166.0
O	30.0	108.5	110.0	53.0	9.0	170.0

collapse when impacted with forces equivalent to those produced by applicable impact-attenuation tests in Section 5. There shall be no fixture on the helmet's inner surface projecting more than 2 mm into the helmet interior except occipital stabilizers and foam fit pads.

10. Impacting Schedule

10.1 All impacting shall be performed in accordance with Test Methods F1446.

10.2 Helmets shall be impacted with the anvils centered on or above the test line described in Section 6.

10.3 The test anvils can be oriented in any horizontal, centered position.

10.4 One each hot, cold, wet, and ambient helmet shall be impacted using the flat and hemispherical anvils only.

10.5 The curbstone anvil shall be used to impact one time each of the second set of four samples, one conditioned under each of the four conditioning environments.

11. Peak Acceleration Requirements

11.1 The peak acceleration (g, max) of the impulse during the impact shall be measured with equipment described in Test Methods F1446.

11.2 The peak acceleration of any impact shall not exceed 300 g.

12. Labels and Warnings

12.1 In addition to the labeling requirements outlined in Test Methods F1446, the helmet shall have one of the following inscriptions on an interior permanent label: For use while operating an electric personal assistive mobility device for recreational or other use at speeds not to exceed 14 mph.

13. Keywords

13.1 electric personal assistive mobility device; helmet; protective headgear

SUMMARY OF CHANGES

Committee F08 has identified the location of selected changes to this standard since the last issue, F2416 – 04, that may impact the use of this standard. (Approved May 1, 2006.)

(1) Revised Fig. 1.