Designation: F1952 – 15

An American National Standard

Standard Specification for Helmets Used for Downhill Mountain Bicycle Racing[1]

This standard is issued under the fixed designation F1952; 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 used by downhill mountain bicycle riders. Studies have shown higher risk to the head and face for this sport as compared to recreational street riding; hence, this specification requires greater impact protection and provides performance criteria for chin bars on full-face helmets, but does not require full-face helmets. This specification recognizes the desirability of lightweight construction and ventilation; however, it is a performance specification and is not intended to restrict design.

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

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

1.4 Headgear designed to comply with this and other standards may proclaim uses as certified by the manufacturer.

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

1.6 The following safety caveat applies to the chemical, mechanical, or physical, or a combination thereof, test methods described herein and is meant specifically for those performing the tests (in an effort to provide them with notice to take the appropriate precautions when conducting the tests): *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:*[2]

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

3. Labels and Warnings

3.1 Shall meet the requirements of Test Methods F1446.

3.2 Shall have the words “For downhill mountain bicycle racing.”

4. Marking the Test Line

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

5. Conditioning and Number of Samples

5.1 Conditioning of the samples to be tested shall be in accordance with the section entitled “Conditioning Environments” in Test Methods F1446.

5.2 For helmets with a chin bar, five sample helmets are required for each shell-liner size combination.

5.3 For helmets without a chin bar, four sample helmets are required for each shell-liner size combination.

6. Retention System Testing

6.1 Retention system tests shall be performed before impact testing.

6.2 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.

6.3 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.

6.4 The retention system shall remain intact without elongating more than 30 mm.

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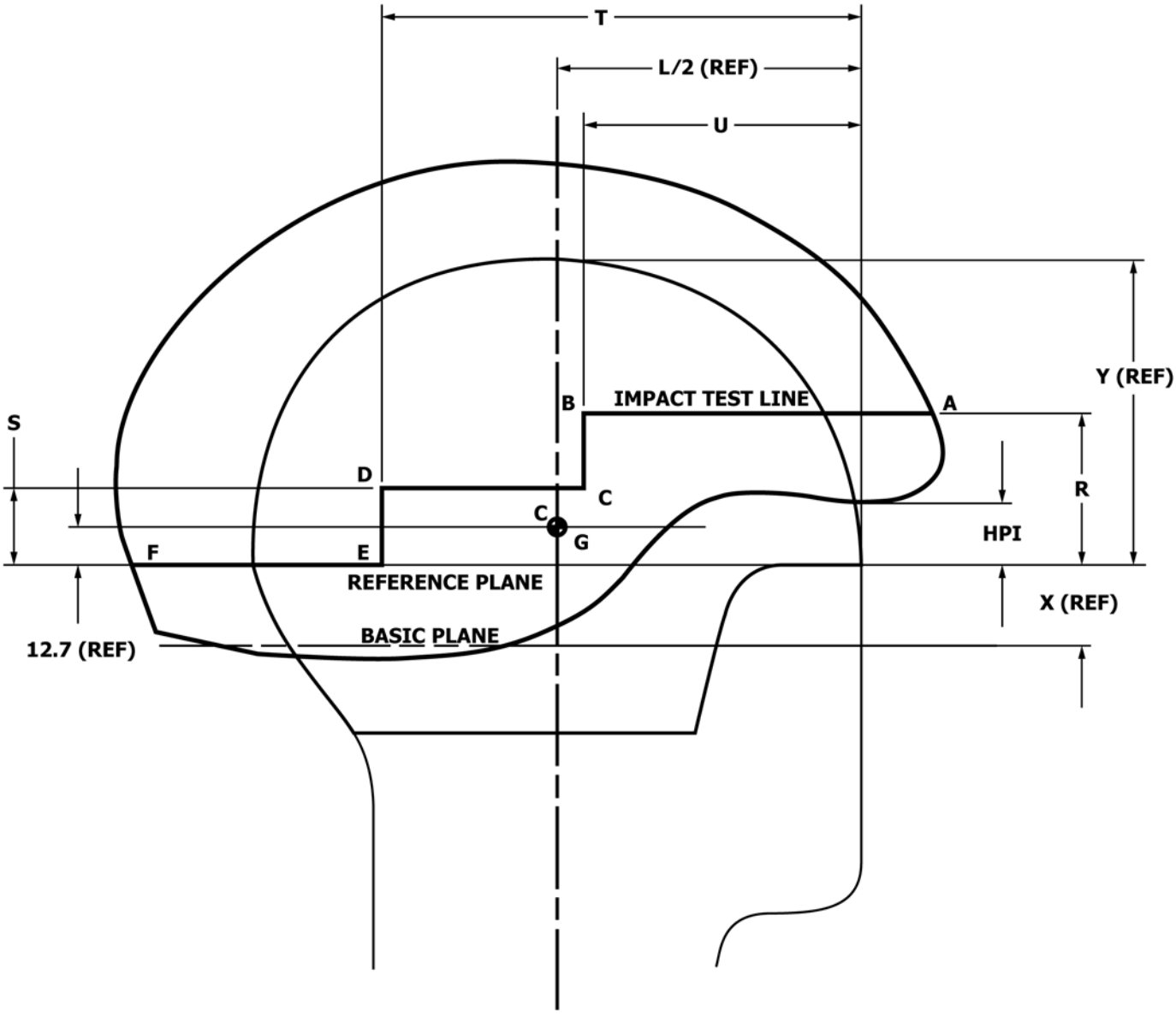
[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard’s Document Summary page on the ASTM website.



HEADFORM SIZE	DIMENSION X	L/2	Y	R	S	T	U
A	24.0	88.0	89.7	47.5	23.0	142.0	84.0
C	25.0	91.0	92.7	48.0	23.5	146.5	86.0
E	26.0	94.5	96.0	49.0	24.0	151.0	88.0
J	27.5	101.0	102.5	50.5	25.0	160.0	92.0
M	29.0	106.0	107.0	52.0	27.0	166.0	96.0
O	30.0	108.5	110.0	53.0	27.0	170.0	97.0

FIG. 1 Marking the Test Line

7. Impact Sites and Projections

7.1 Impact sites are described in Test Methods F1446.

7.2 *Projections*—Any unfaired projection extending more than 7 mm from the helmet's outer surface shall break away or collapse when impacted with forces equivalent to those produced by applicable impact-attenuation tests described in Section 9.

7.2.1 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.

8. Impacting Schedule

8.1 All impacting shall be performed in accordance with Test Methods F1446, using the variable mass drop assembly configuration.

8.2 Helmets shall be impacted with the anvils centered on or above the test line described in Fig. 1.

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

8.4 For full face helmets with a chin bar, a fifth ambient helmet shall be tested in accordance with Section 10.

9. Impact Testing

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

9.2 The helmet can be impacted such that the theoretical center of impact described in Test Methods F1446 is anywhere on or above the test line with the curbstone anvil in any horizontal orientation.

9.3 Anvils to be used are the flat, hemispherical, and curbstone anvils in Test Methods F1446.

9.4 The helmet shall be dropped onto the flat anvil to achieve an impact velocity of 6.2 m/s ± 3 % (corresponding to a theoretical drop height of 2.0 m).

9.5 The helmet shall be dropped onto the hemispherical and curbstone anvils to achieve an impact velocity of 5.6 m/s ± 3 % (corresponding to a theoretical drop height of 1.6 m).

9.6 Each helmet shall be given two flat anvil impacts and one each hemispherical and curbstone anvil impact in any sequence.

9.7 The theorretical center of each impact site shall be separated from the theoretical center of other impact sites by a minimum of 120 mm.

9.8 The peak acceleration of each impact shall not exceed 300 *g*.

10. Chin Bar Rigidity Test

10.1 The chin bar rigidity test applies to helmets with a chin bar only.

10.2 If a chin bar is present, it shall be tested in accordance with the procedures in Test Methods F1446, Chin Bar Rigidity Test, with an impact velocity of 2.8 m/s ± 5 % (corresponding to a theoretical drop height of 0.4 m), using a fifth ambient sample that has not been subjected to any other impact testing. The maximum deflection of the chin bar shall not exceed 60 mm.

11. Keywords

11.1 bicycle; downhill; helmets; mountain; racing