



Standard Specification for Helmets Used for Downhill Mountain Bicycle Racing¹

This standard is issued under the fixed designation F 1952; 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 approval. 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 F 1466, 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.*

2. Referenced Documents

2.1 ASTM Standards:

F 1446 Test Methods for Equipment and Procedures Used in Evaluating the Performance Characteristics of Protective Headgear²

2.2 Other Standards:

1995 Standard For Protective Headgear For Use with Motorcycles and Other Automotive Vehicles
Section C4. Chin Bar Test³

3. Labels and Warnings

3.1 Shall meet the requirements of Test Methods F 1446.

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 F 1446.

5. Conditioning and Number of Samples

5.1 Shall be in accordance with Test Methods F 1446.

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 F 1446 using a 4-kg drop mass from a height of 0.6 m.

6.3 The retention system shall remain intact, and the helmet must remain on the headform.

6.4 The hot, cold, and wet helmets shall be subjected to the dynamic strength retention test in accordance with Test Methods F 1446 using a 4-kg drop mass from a height of 0.6 m.

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

7. Impact Testing

7.1 The helmet can be impacted anywhere on or above the test line with the curbstone anvil in any horizontal orientation.

7.2 Use flat, hemispherical, and curbstone anvils in accordance with Test Methods F 1446, Figs. 7, 8, and 11.

7.3 The helmet shall be dropped onto the flat anvil to achieve an impact velocity of $6.2 \text{ m/s} \pm 3\%$ (corresponding to a theoretical drop height of 2.0 m).

7.4 The helmet shall be dropped onto the hemispherical and curbstone anvils to achieve an impact velocity of $5.6 \text{ m/s} \pm 3\%$ (corresponding to a theoretical drop height of 1.6 m).

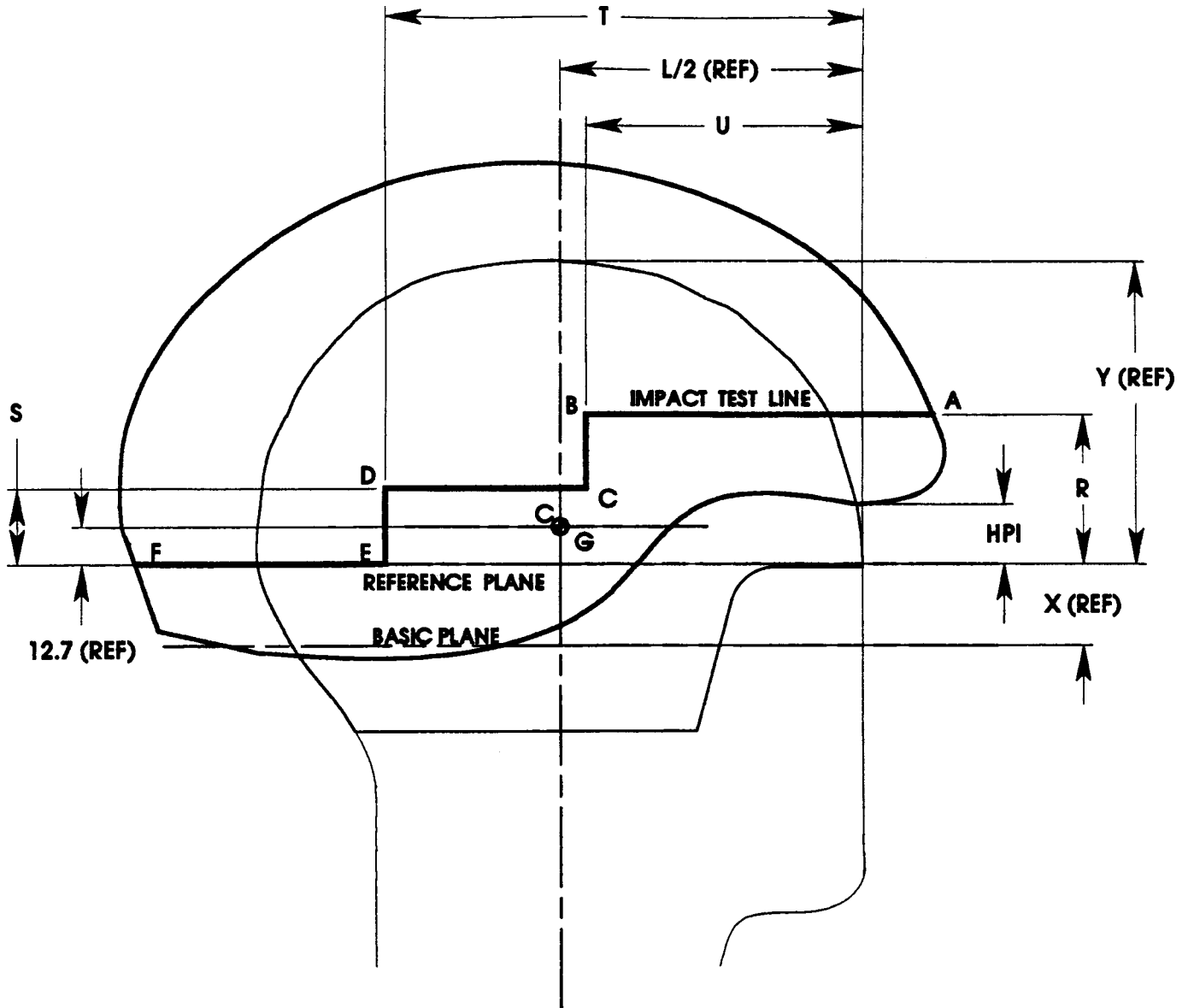
7.5 Each helmet shall be given two flat anvil impacts and one each hemispherical and curbstone anvil impact in any sequence.

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² *Annual Book of ASTM Standards*, Vol 15.07.

³ Available from Snell Memorial Foundation, 3628 Madison Avenue, Suite 11, North Highlands, CA 95660.



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	
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

7.6 Each impact shall be separated by a minimum of 120 mm on center.

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

8. Chin Bar Impact Testing (Applies to Full-Face Helmets Only)

NOTE 1—The equipment and procedures are described in 1995 Standard for Protective Headgear for Use with Motorcycles and Other Automotive Vehicles.

8.1 The ambient test helmet shall be subjected to the chin bar impact.

8.2 The helmet shall be firmly mounted on a rigid base so that the chin bar faces up and the reference plane is at $65 \pm 5^\circ$ from horizontal.

8.3 A mass of 5 ± 0.2 kg with a flat striking face of 0.01-m² minimum area shall be dropped in a guided fall so as to strike the central portion of the chin bar within 25 mm of the mid-sagittal plane.

8.4 The impact velocity shall be 2.8 m/s \pm 5 % (corresponding to a theoretical drop height of 0.4 m).

8.5 The maximum downward deflection of the chin bar must not exceed 60 mm.

9. Keywords

9.1 bicycle; downhill; helmets; mountain; racing

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