



Standard Specification for Helmets Used for BMX Cycling¹

This standard is issued under the fixed designation F 2032; 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 in BMX cycling. Studies have shown higher risk to the head and face for this sport as compared to recreational street riding; therefore this specification requires impact protection over a larger area of the head than Specification F 1447 and the CPSC standard. This specification also provides performance criteria for helmets equipped with chin bars.

1.2 All testing and requirements of this specification shall be in accordance with Test Methods F 1446 except where noted herein.

2. Referenced Documents

2.1 *ASTM Standards:*

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

F 1447 Specification for Protective Headgear Used in Bicycling²

2.2 *Other Documents:*

1995 Standard for Protective Headgear for Use with Motorcycles and Other Automotive Vehicles, Section C 4, 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 BMX bicycle riding and 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.

6.1.1 The ambient helmet shall be subjected to the Positional Stability (Roll-Off) Test of Test Methods F 1446 using a 4 kg drop mass from a height of 0.6 m.

6.1.2 The retention system shall remain intact and the helmet shall remain on the headform.

6.1.3 The hot, cold, and wet helmets shall be subjected to the Dynamic Strength Retention Test of Test Methods F 1446 using a 4 kg drop mass from a height of 0.6 m.

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

7. Impact Testing

7.1 The helmet can be impacted such that the theoretical center⁴ of impact is anywhere on or above the test line with the curbstone anvil in any horizontal orientation.

7.2 Anvils to be used are the flat, hemispherical, and curbstone anvils from Test Methods F 1446 (see Figs. 7, 8, and 11 of Test Methods F 1446).

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 Hemi and curbstone anvil impacts shall achieve an impact velocity of $4.8 \text{ m/s} \pm 3\%$ (corresponding to a theoretical drop height of 1.2 m).

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

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

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

8. Chin Bar Impact Testing

8.1 The chin bar test applies to full face helmets only. See 2.2 for equipment and procedures.

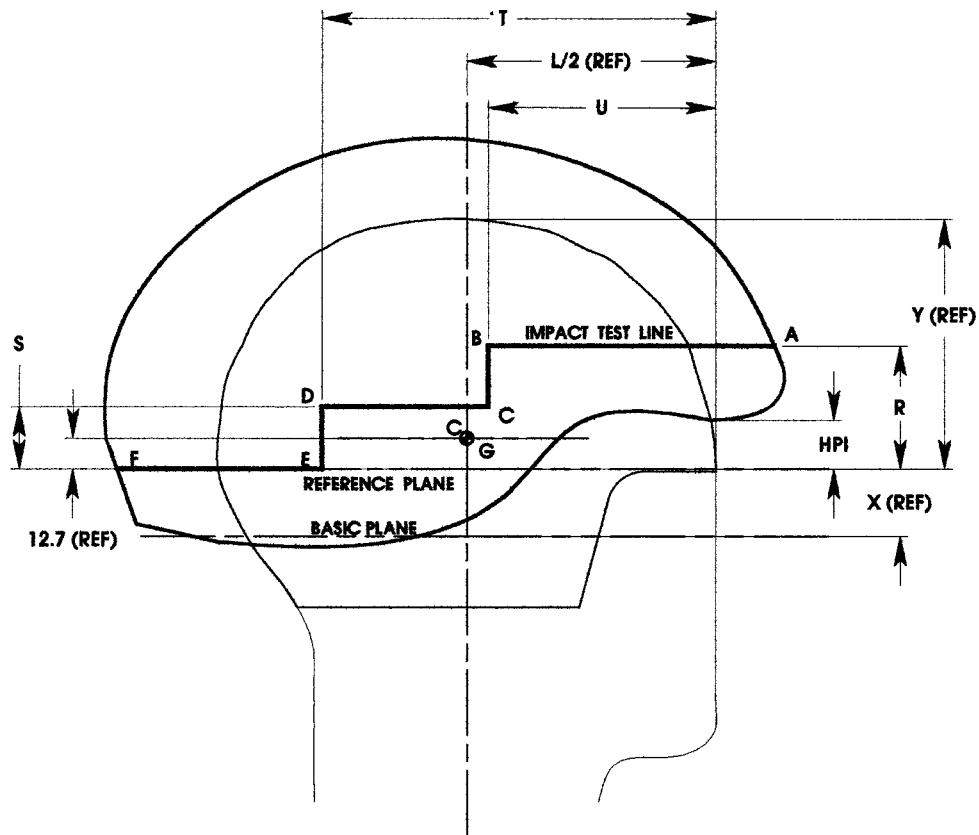
¹ This specification is under the jurisdiction of ASTM Committee F08 on Sports Equipment and Facilities and is the direct responsibility of Subcommittee F08.53 on Headgear and Helmets.

Current edition approved June 10, 2000. Published August 2000.

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

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

⁴ The theoretical center of impact is the point of intersection of the Z axis and the outer surface or projected surface of the helmet at $x = 0$, $y = 0$ (see X1.1 of Test Methods F 1446).



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

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

8.3 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.

8.4 A rigid mass of 5 ± 0.2 kg with a flat metal striking face of 0.01 m^2 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.

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

8.6 The maximum downward deflection of the chin bar shall not exceed 60 mm.

9. Keywords

9.1 bicycle; BMX; helmets

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