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An American National Standard

Standard Specification for Eye and Face Protective Equipment for Hockey Players[1]

This standard is issued under the fixed designation F513; 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 and test methods for face protectors marketed, sold, and intended for ice hockey.

1.2 The intent of this specification is to reduce the risk of injury to the face without compromising the form or appeal of the game. To do so, the face protector shall be used:

1.2.1 As intended within the rules of the game and

1.2.2 In accordance with the manufacturer's instructions.

1.3 Ice hockey is a sport with intrinsic hazards associated with the normal conduct of the game. Participation in ice hockey implies the acceptance of some risk of injury. Use of a face protector certified to this specification will not prevent all injuries.

1.4 This specification has been prepared after careful consideration of the frequency and mechanisms associated with facial and eye injuries that can potentially occur within the rules of the game of ice hockey.

1.5 Requirements and the corresponding test methods, where appropriate, are given for the following:

1.5.1 Construction,

1.5.2 Puck impact resistance,

1.5.3 Penetration,

1.5.4 Field of vision, and

1.5.5 Marking and information.

1.6 Face protection is intended for use by players, goalkeepers, and certain functionaries (for example, referees and coaches). Types of protectors considered under this specification are:

1.6.1 *Type B1*—A full-face protector intended for use by persons older than ten years of age, other than goaltenders;

1.6.2 *Type B2*—A full-face protector intended for use by persons ten years of age or younger, other than goaltenders; and

1.6.3 *Type C (Visor)*—A visor intended for use by person in the junior age category and older, other than goaltenders.

1.7 *Units*—The values stated in SI units are to be regarded as the standard. No other units of measurement are included in this standard.

1.8 Use of the singular does not exclude the plural (and vice versa) when the sense allows.

1.9 Although the intended primary application of this specification is stated in this scope, note that it remains the responsibility of the users of this specification to judge its suitability for their particular purpose.

1.10 *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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.11 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

D1003 Test Method for Haze and Luminous Transmittance of Transparent Plastics

D2240 Test Method for Rubber Property—Durometer Hardness

2.2 *CSA Standard:*

CSA Z262.6-02 Specifications for Facially Featured Headforms[3]

3. Terminology

3.1 *Definitions:*

3.1.1 For the purposes of this specification, the following definitions apply.

3.1.2 *chip, n*—readily visible particle missing from the protector with an area bigger than 9 mm^2.

[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 F08.15 on Ice Hockey.

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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.

[3] Available from the Canadian Standards Association, 5060 Spectrum Way, Suite 100, Mississauga, Ontario L4W 5N6 Canada.

3.1.3 *collimated light source (source of illumination), n*—quartz halogen lamp (17 lx or 1.58 footcandles) producing a 100-mm beam at 6-m distance that is centered on the pupils of the eyes of the headform or the midpoint between the pupils of the eyes of the headform; this centering is maintained at all times during the optical quality test.

3.1.4 *combination, n*—combined unit of a full-face protector or visor placed on a hockey helmet with which it is designed to be used.

3.1.5 *computer interface, n*—linkage between the computer, the goniometer, and the sensors that enables a fully automated measurement process via a menu-driven operation during the optical quality test.

3.1.6 *dioptre, n*—measure of the power of a lens or a prism equal to the reciprocal of its focal length expressed in metres.

3.1.7 *field of vision, n*—projection outward of all retinal points (the nervous layer of the eye) at which visual sensations can be initiated (see Fig. 1).

3.1.7.1 *inferior (downward), adv*—refers to an angle in the vertical plane measured downwards from the horizontal.

3.1.7.2 *nasally, adv*—refers to an angle in the horizontal plane measured from the primary position of gaze to the left for the right eye and from the primary position of gaze to the right for the left eye.

3.1.7.3 *superior (upward), adv*—refers to an angle in the vertical plane measured upwards from the horizontal.

3.1.7.4 *temporally, adv*—refers to an angle in the horizontal plane measured from the primary position of gaze to the right for the right eye and from the primary position of gaze to the left for the left eye.

3.1.8 *glabella, n*—most prominent midline point between the eyebrows identical to the bony glabella of the frontal bone.

3.1.9 *goniometer, n*—positioning device that moves the headform such that the angular rotation and movement in both the horizontal and vertical directions enables a spherical scan to be made of the fields of vision as seen through a face protector or visor.

3.1.10 *haze, n*—percentage of transmitted light that, in passing through the specimen, deviates from the incident beam by forward scattering.

3.1.11 *helmet positioning index, HPI, n*—vertical distance measured at the median plane, from the front edge of the helmet to the basic plane, when the helmet is placed on the reference headform.

3.1.12 *impact sites for testing face protectors:—*

3.1.12.1 *eye impact, n*—point in the horizontal plane 25° to the median plane and in the direction of the eye (see Fig. 2).

3.1.12.2 *mouth impact, n*—point in the intersection between the horizontal plane and the median plane in the direction of the center of the mouth.

3.1.12.3 *side impact, n*—point halfway between the mouth level and the eye level in the horizontal plane, 25° to the median plane, and in the direction of the axis formed by the intersection of the median plane and the frontal plane (see Fig. 2).

3.1.13 *interpupillary distance, PD, n*—distance in millimetres between the centers of the pupils of both eyes on the facially featured headform.

3.1.14 *laser, n*—luminous device used for alignment of the sensors.

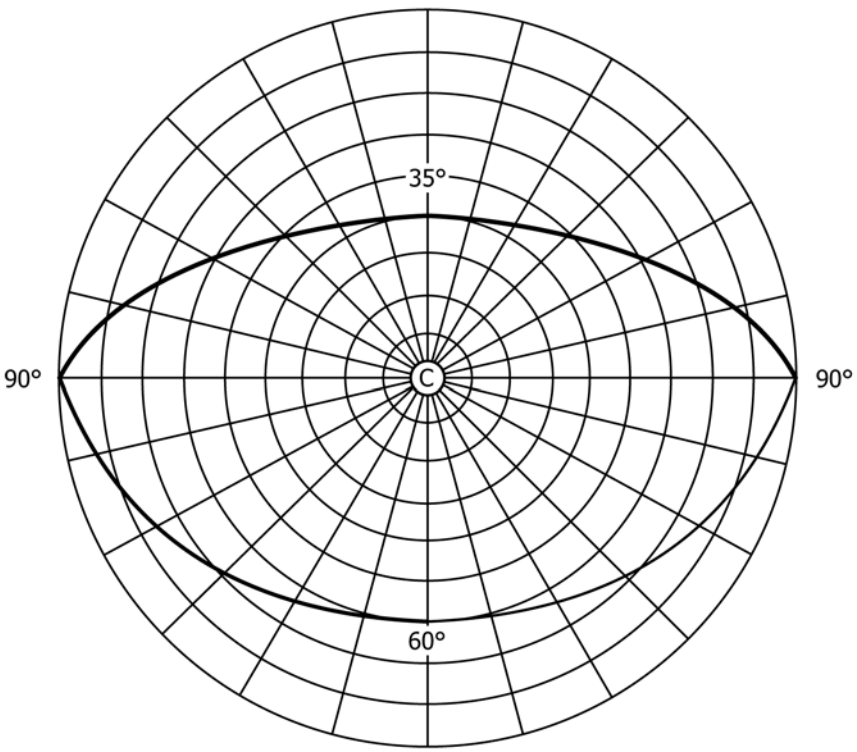

FIG. 1 Peripheral Field of Vision

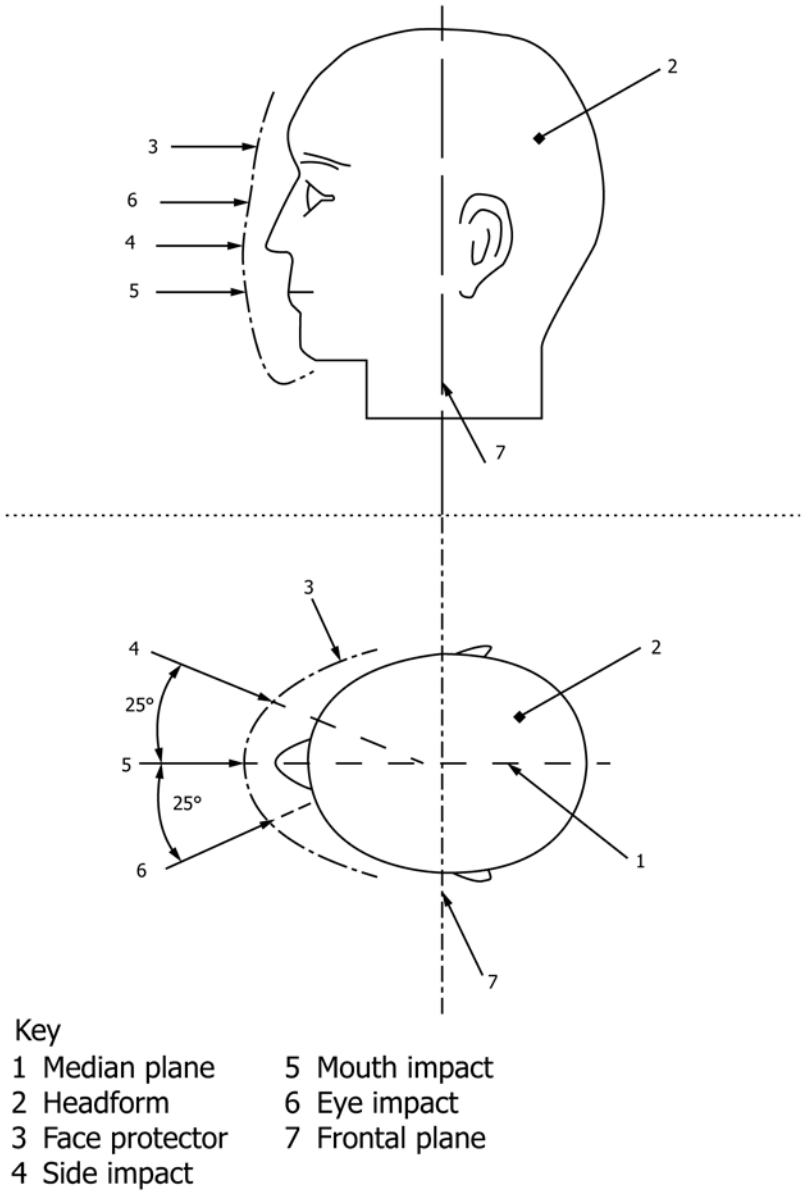

FIG. 2 Puck Impact Sites for Testing Face Protectors

3.1.15 *luminous transmittance, n*—ratio of the light transmitted by a medium to the incident light.

3.1.16 *menton, n*—lowest point on the mandibular symphysis.

3.1.17 *no-contact zone, n*—designated zone of the headform in which contact is not permitted during the puck impact resistance test (see 4.8 and Fig. 3).

3.1.18 *optical clarity, n*—sharpness of an image.

3.1.19 *optical quality field-of-vision area, n*—that area on a transparent face protector or visor determined by the outline of a cone whose axis projects along the primary position of the gaze and extends 35° (radius of fixation), the apex of the cone is centered on each pupil, and the area generated by each cone is joined above and below and is extended to a point 90° laterally to each side in the horizontal plane (see Fig. A1.1).

3.1.20 *orbit, n*—the bony cavity containing the eyeball.

3.1.21 *orbitale, n*—lowermost point on the inferior margin of the orbit (infraorbital margin).

3.1.22 *peripheral field of vision, n*—oval-shaped field extending 90° temporally, 60° inferiorly, 45° nasally, and 35° superiorly (see Fig. 1).

3.1.23 *permanent, n*—information that remains legible and cannot be removed in its entirety under conditions of normal use.

3.1.24 *photosensors, n*—sensors 5 mm in diameter centered in the pupils of the headform covered by a 5-mm translucent lens of 8-mm radius of curvature, convex forward.

3.1.24.1 *Discussion—(1)* The photosensors are cosine corrected, for example, provided with diffusing covers that are a means of correcting the light-sensitive surface for wide angles of incidence. *(2)* Light contact with the sensors produces an electrical signal that is fed into a computer interface.