~~Designation:F513–00 (Reapproved 2007)~~

~~An American National Standard~~

~~Standard Safety Specification for~~ Designation: F513 – 12 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.

~~INTRODUCTION~~

~~Ice hockey is a contact sport with intrinsic hazards. Protective equipment can not eliminate all injuries, but will substantially reduce their severity and frequency. Participation in this sport by a player implies acceptance of some injury risk. The goal of protective equipment is to minimize the risk of injury.~~

~~After careful consideration of the mechanisms and forces involved in hockey injuries, this specification for eye and facial protective equipment has been prepared. A significant reduction of oculo-facial injuries by the use of facial protective equipment is an expected result.~~

~~Performance requirements are presented that are intended to minimize injury with minimal impairment of the form and appeal of the sport. The committee considers this specification as preliminary, subject to revision as indicated by subsequent injury statistics. With these goals in mind, the impact and penetration requirements were determined. It is realized that ocular and facial injuries will still be possible; however, it was felt that more stringent requirements may interfere with player performance.~~

~~In addition to the use of facial protective equipment conforming to this specification, the following recommendations are made: (*1*) A minimal stick blade width of 70 mm (2.8 in.) (per accepted rule book limits); (*2*) Modification to rear blade of the ice skate to prevent penetration through wire mesh masks; (*3*) Stricter rules against high sticking; and (*4*) Stricter rules and enforcement against fighting. All of the requirements of this specification are subject to modification if future statistics demonstrate significant injuries under game conditions; (*5*) If full face wire protectors are used for goaltenders, a throat protector must be affixed.~~

1. Scope

~~1.1This consumer safety specification covers eye and face protective equipment for hockey players.~~

~~1.2This specification is intended to reduce the demonstrated hazards associated with the sport of ice hockey involving the face including eyes.~~

~~1.3The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.~~

~~1.4The following precautionary caveat pertains only to the test method portion, Section 7 of this specification: *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.*~~

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

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

2. Referenced Documents

2.1 ~~*Federal Standards:*~~

~~National Institute of Standards and Technology Special Publication 374~~

~~Federal Test Methods Standards, No. 46,Method3022~~ ASTM Standards:[2]

D1003 Test Method for Haze and Luminous Transmittance of Transparent Plastics

D2240 Test Method for Rubber PropertyDurometer Hardness

2.2 ~~*American National Standards:*~~

~~ANSI Z80.1,1979, Requirements for First-Quality Prescription Opthalmic Lenses~~

~~ANSI Z80.3,1977, Requirements for Nonprescription Sunglasses and Fashion Eyewear~~

~~ANSI Z87.1,1979, Practice for Occupational and Educational Eye and Face Protectors~~ CSA Standard:

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

3. Terminology

3.1 *Definitions:*

~~3.1.1*astigmatism*~~

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

3.1.2 *chip*, *n*—~~a condition in a lens that creates two axially separated line foci of each object point. The lines being mutually perpendicular. In other words, the lens has two different refractive powers in meridians that are 90° apart.~~

~~3.1.2*binocular*, *adj*—relating to the field of view which is shared by both eyes simultaneously.~~ —readily visible particle missing from the protector with an area bigger than 9 mm^2.

3.1.3 ~~*central viewing zone*~~collimated light source (source of illumination), *n*—~~that part of the lens which has its center in line with the wearer's line of sight when looking straight. The zone is a truncated circle 60 mm (2.4 in.) in diameter centered on the above points. The upper portion is truncated 20 mm (0.8 in.) above the center line. The center of the central viewing zone shall be the point of intersection of the line of sight with the lens as mounted on the Alderson headform.~~ —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 ~~*eye*~~combination, *n*—~~relating to the eye of a test headform or the eye of a person wearing a protector or that part of an eye protective device through which a wearer's eye would normally look.~~ —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 ~~*eye of the headform*~~computer interface, *n*—~~all structures contained within the orbital rim of the Alderson fiftieth percentile headform.~~ —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.

~~[2] Available from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.~~

[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 American National Standards Institute, 11 W. 42nd St., 13th Floor, New York, NY 10036.~~

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

3.1.6 ~~*haze*~~dioptre, *n*~~—the fraction of the total transmitted light from a normally incident beam which is not transmitted in a focused condition but scattered by inclusions or surface defects. Excessive haze will reduce contrast and visibility.~~ —measure of the power of a lens or a prism equal to the reciprocal of its focal length expressed in metres.

3.1.7 ~~*impact resistant*~~field of vision, ~~*adj*—the ability of a device to afford protection from impact as required by this standard.~~ 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 ~~*interpupillary distance, P.D.*~~glabella, *n*~~—the distance between the center of the pupils of the eyes.~~ —most prominent midline point between the eyebrows identical to the bony glabella of the frontal bone.

3.1.9 ~~*lens*~~goniometer, *n*~~—when so equipped, the transparent part or parts of a protective device through which the wearer normally sees.~~ —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 ~~*luminous transmittance*~~haze, *n*~~—luminous transmittance is a function of a spectral transmittance of the lens weighted by the corresponding ordinates of the photopic luminous efficiency distribution of the CIE (1931) standard colormetric observer and by the spectral intensity of standard illuminant *A*. (See ANSI Z80.3, 1977, paragraph 2.9.1).~~ —percentage of transmitted light that, in passing through the specimen, deviates from the incident beam by forward scattering.

3.1.11 ~~*power imbalance*~~helmet positioning index, HPI, *n*~~—a condition that exists when the refractive power created by the right lens of a protective device is different from that of the left lens.~~

~~3.1.12*prism,*~~ *—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*~~—the angular deviation of a ray of light as it passes through a lens resulting from the angle at which the ray strikes each surface of the lens and the index of refraction of the material from which it is made.~~ —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).

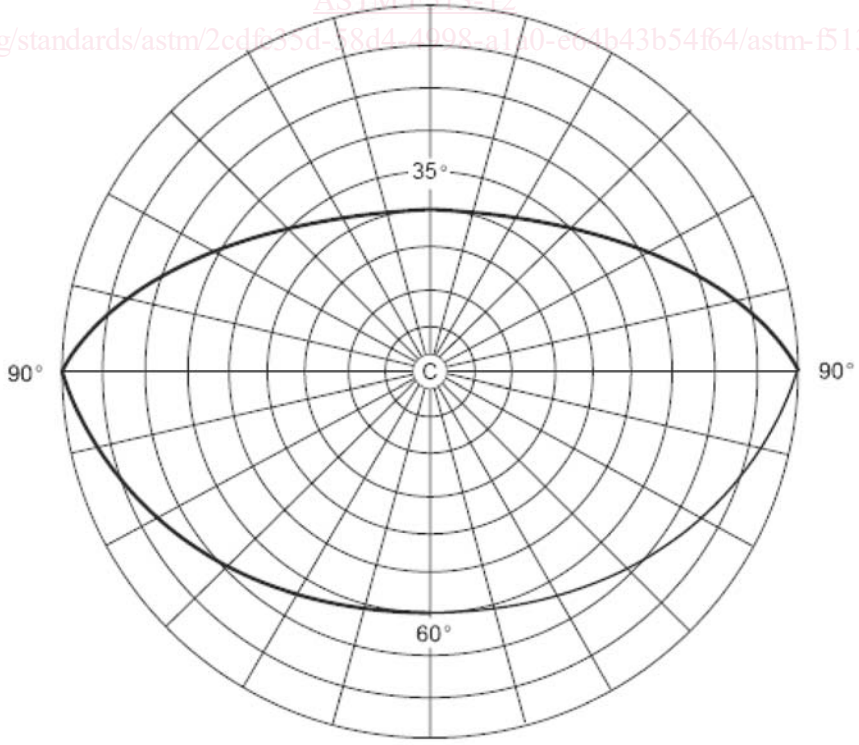

FIG. 1 Peripheral Field of Vision