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An American National Standard

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

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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

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

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

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

1.4 The 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.*

2. Referenced Documents

2.1 *Federal Standards:*[2]

National Institute of Standards and Technology Special Publication 374

Federal Test Methods Standards, No. 46, Method 3022

2.2 *American National Standards:*[3]

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

3. Terminology

3.1 *Definitions:*

3.1.1 *astigmatism*, *n*—a condition in a lens that creates two axially separated line foci of each object point. The lines being

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

[3] Available from American National Standards Institute, 11 W. 42nd St., 13th Floor, New York, NY 10036.

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.

3.1.3 *central viewing zone*, *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.

3.1.4 *eye*, *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.

3.1.5 *eye of the headform*, *n*—all structures contained within the orbital rim of the Alderson fiftieth percentile headform.

3.1.6 *haze*, *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.

3.1.7 *impact resistant*, *adj*—the ability of a device to afford protection from impact as required by this standard.

3.1.8 *interpupillary distance, P.D.*, *n*—the distance between the center of the pupils of the eyes.

3.1.9 *lens*, *n*—when so equipped, the transparent part or parts of a protective device through which the wearer normally sees.

3.1.10 *luminous transmittance*, *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).

3.1.11 *power imbalance*, *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*, *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.

3.1.13 *prism imbalance*:

3.1.13.1 *vertical imbalance, n*—the difference in prismatic deviation between parallel light beams incident on the two eyes of a protective device in the vertical meridian.

3.1.13.2 *horizontal imbalance, n*—the difference in prismatic deviation of incident parallel light beams on the two eyes of a protective device in a horizontal meridian. (See Section 7.)

3.1.13.3 *base-in, adj*—relating to the type of prism imbalance that tends to cause parallel rays of light passing through a protector, spaced apart by the interpupillary distance to converge.

3.1.13.4 *base-out, adj*—relating to the type of prism imbalance which tends to cause parallel rays of light passing through a protector, spaced apart by the interpupillary distance to diverge.

3.1.14 *protective device (or protector)*, *n*—a device that provides protection to the wearer's eyes against specific hazards encountered in sports.

3.1.15 *refractive power*, *n*—the focusing effect of a lens expressed in diopters.

3.1.16 *resolution (optical)*, *n*—the characteristic of a lens that allows separate distinct points in close proximity to be discerned when looking through the lens.

3.1.17 *spherical power*, *n*—the most positive meridional astigmatic power of a lens.

3.1.18 *tint*, *n*—a characteristic of a transparent material that allows a specific color to appear dominant and reduces the material's luminous transmittance properties.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *cleanable*, *adj*—the ability of a protective device to be made readily free of dirt or grime without being damaged during an appropriate cleaning process in accordance with the manufacturer's instructions.

3.2.2 *coverage*, *n*—a characteristic of a protective device that obstructs straight line paths that are coincident with the wearer's eyes.

3.2.3 *peripheral field*, *n*—the outer limits of vision which, as shown in charts of the visual fields, extends to 40° and above, to 60° below, and to 90° temporally.

4. Types of Protectors

4.1 *Type 1*—A full face protector intended for use by any persons other than goaltenders.

4.2 *Type 2*—A full face protector intended for use by persons 10 years of age or younger, other than goaltenders.

5. Performance Requirements

5.1 All testing shall be done with the protectors mounted on a helmet of a make or model as specified by the protector manufacturer and placed on a headform identical in dimensions to the Aero Medical Laboratory (AML) headform, as to be worn by the consumer (see Table 1).

5.2 All portions of the protectors, shall be capable of meeting impact and optical requirements at any temperature between 20 and − 26°C (68 and − 13°F).

5.3 *Optical Requirements, (all protectors)*:

5.3.1 *Peripheral Field of View*—When tested in accordance with 7.1.1 at 20 ± 2°C (68 ± 3.6°F) protectors shall have fields of view equal or exceeding the following:

(*a*) Temporal—90°,
(*b*) Inferior field—60°, and
(*c*) Superior field—40°

See Fig. 1, Fig. 2, and Fig. 3 for illustrations of these angles.

5.4 *Optical Requirements (clear shields)*:

TABLE 1 Facially Featured Headforms

Material: Durometer:	Urethane 60–65 (shore A)	
Size	Hat Size (circ. mm)	Prothane Reference Number
Youth	6½ (521)	AA-7FF-413-M
Juvenile	6⅞ (550)	JJ-7FF-413-M
Adult	7 (559)	AD-7FF-413-M