



Standard Specification for Throat Protective Equipment for Hockey Goaltenders¹

This standard is issued under the fixed designation F3165; 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 throat protectors marketed, sold, and intended for ice hockey goalkeepers.

1.2 The intent of this specification is to reduce the risk of injury to the throat without compromising the form or appeal of the game. To do so, the 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 throat 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 throat 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 Coverage,

1.5.4 Marking and information.

1.6 Throat protection is intended for use by goalkeepers.

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

1.8 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.

1.9 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

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 *ASTM Standards:*²

D2240 Test Method for Rubber Property—Durometer Hardness

2.2 *CSA Standards:*³

CSA Z262.6 Specifications for facially featured headforms

3. Terminology

3.1 *Definitions:*

3.1.1 *chip, n*—readily visible particle missing from the protector with an area bigger than 9mm².

3.1.2 *combination, n*—combined unit of a throat protector placed or attached on a hockey goaltender mask with which it is designed to be used.

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

3.1.4 *impact sites for testing throat protectors, n*—

3.1.4.1 *direct impact, n*—point in the intersection between the horizontal plane and the median plane in the direction of the center of the throat protector mid-point between top edge and bottom edge of the throat protector.

3.1.4.2 *25° impact, n*—point 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. 1**), aimed in the direction of the throat protector mid-point between top edge and bottom edge of the throat protector.

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

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.

Current edition approved March 15, 2016. Published March 2016. DOI: 10.1520/F3165-16.

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 Canadian Standards Association (CSA), 178 Rexdale Blvd., Toronto, ON M9W 1R3, Canada, <http://www.csagroup.org>.

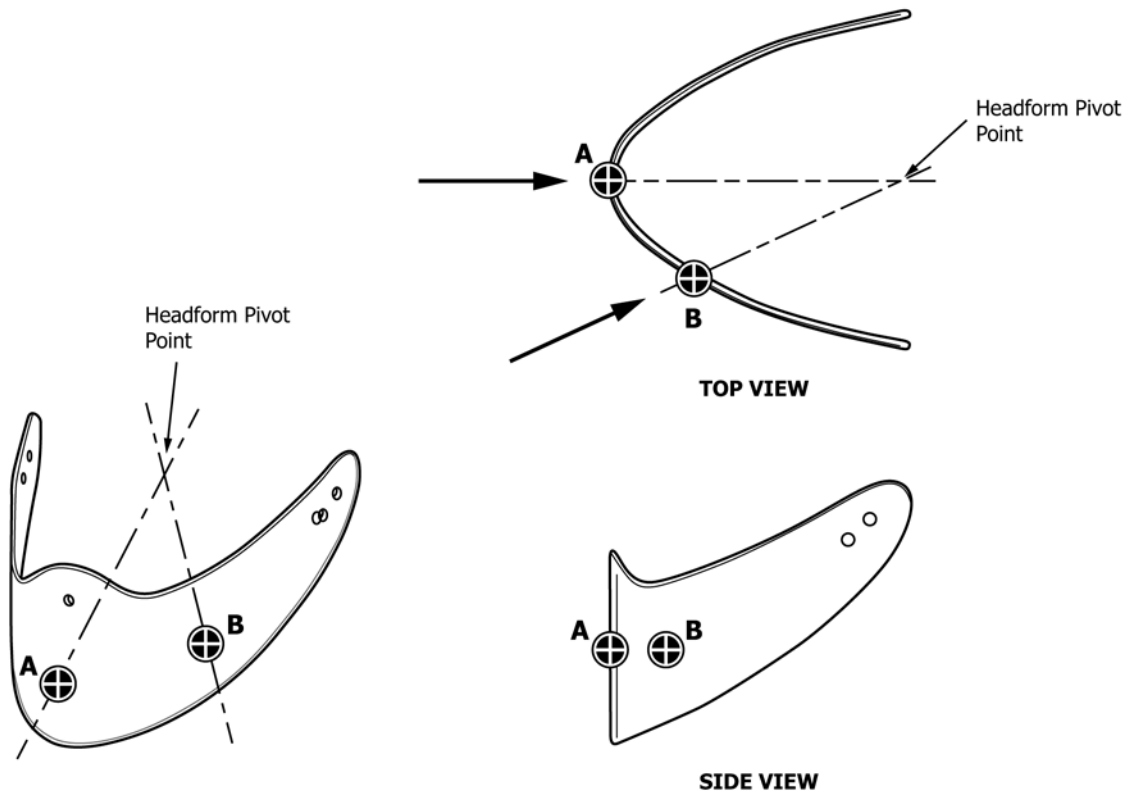


FIG. 1 Puck Impact Sites

3.1.6 planes, *n*—

3.1.6.1 *basic plane of a headform, n*—plane relative to the headform that corresponds to the basic plane of the human head.

3.1.6.2 *basic plane of the human head, n*—plane that is located at the level of the external upper borders of the ear canal (external auditory meatus) and the inferior margins of the orbits of the eyes.

3.1.6.3 *frontal plane, n*—vertical plane that is perpendicular to the median and reference planes and passes through the top of the headform (see Fig. 2).

3.1.6.4 *horizontal plane, n*—any plane that passes across the head at right angles to both the frontal and median plane (see Fig. 2).

3.1.6.5 *median plane, n*—vertical plane that passes through the headform from front to back and divides the headform into right and left halves (see Fig. 2).

3.1.6.6 *reference plane, n*—construction plane parallel to the basic plane of the headform at a distance from it which is a function of the size of the headform.

3.1.7 *protector, n*—comprises a throat protector either specially adapted to the goaltender mask or forming a continuous unit designed to protect the whole or parts of the wearer's throat against injury.

3.1.8 *vertex, n*—point of intersection on the headform of the median plane with the frontal plane (see Fig. 2).

4. Requirements

4.1 Materials:

4.1.1 *Documentation*—The manufacturer shall provide written documentation indicating that the materials used in the construction of the throat protector fulfill the requirements of 4.1.2 – 4.1.6.

4.1.2 *Cleaners*—All materials used shall be known not to be adversely affected by ordinary household soap and cleaners as recommended by the manufacturer.

4.1.3 *Finishes*—Paints, glues, and finishes used in manufacturing shall be compatible with the materials used in the construction of the throat protector.

4.1.4 *Non-irritants*—Material coming in contact with the wearer shall not be of any type known to cause skin irritation or disease or undergo significant loss of strength, flexibility, or other physical changes as a result of contact with perspiration, oil, or grease.

4.1.5 *Adhesives*—Adhesive material used to attach padding or straps to the throat protector or visor shall be of a formulation that will not alter the chemical or physical properties of the materials to an extent so as to reduce their protective qualities.

4.1.6 *Polymeric Changes*—All materials used in the construction of the throat protector shall be resistant to irreversible polymeric changes when exposed to temperatures up to 70°C or ultraviolet radiation.

4.2 *Finish*—All parts shall be well finished and free of sharp edges and other irregularities that would present a potential hazard to the user or other players.

4.3 *Attachment System*—The attachment system of a throat protector to a goaltender's mask shall be so designed so that the

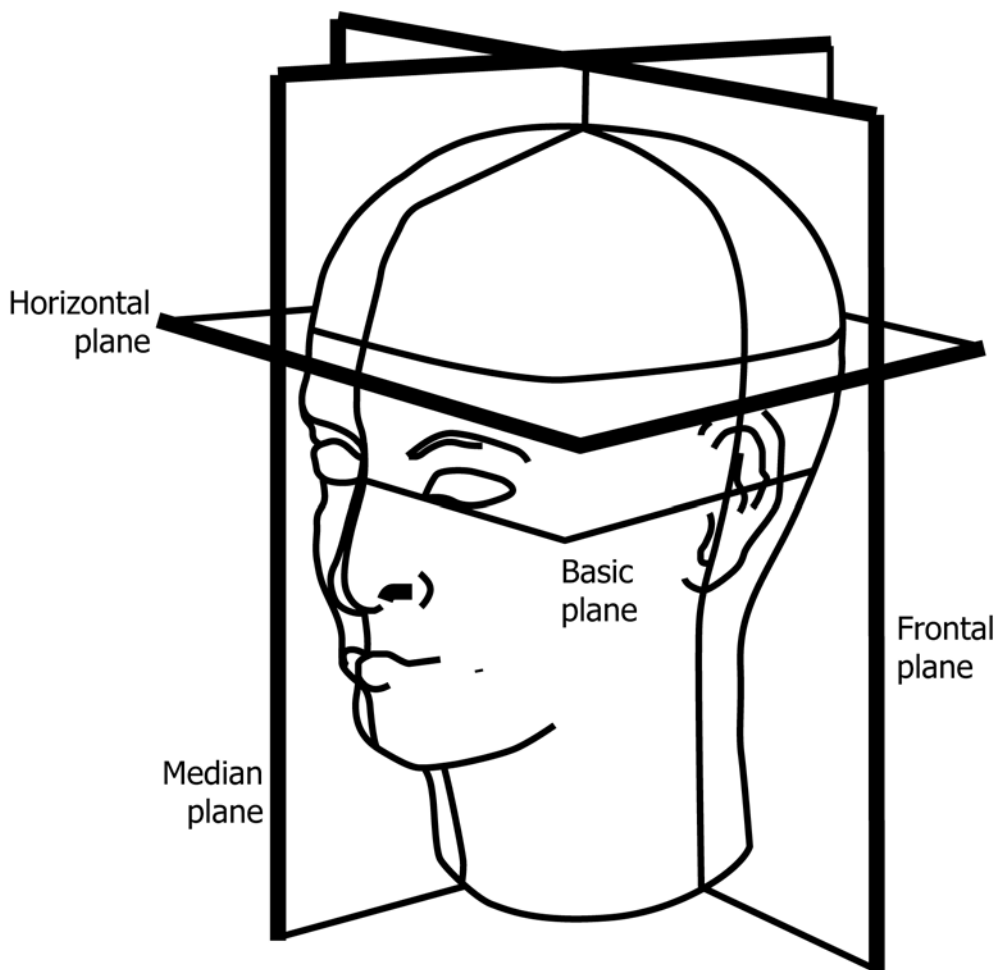


FIG. 2 Orientation Planes

throat protector can be easily attached to the mask without requiring any machining operation by the user.

4.4 Coverage and Openings:

4.4.1 The extent of the coverage shall be so as to minimize exposure to potential injuries at impact but also as to not interfere with other part of protective equipment, such as headgear and body padding.

4.4.2 If apertures are part of the design, no aperture shall have any dimension exceeding 38 mm. The aperture shall be completely surrounded by the protector. The distance from any edge of an aperture to any edge of the protector shall not be less than 20 mm.

4.5 Puck Impact Resistance—There shall be no breakage of the structural components of the throat protector or failure of the point of attachments to the goaltender mask. Cracking of surface coatings is permissible but chips (see 3.1.1) are not permitted.

4.6 Design:

4.6.1 Overlap—Throat protectors shall overlap the lower edge of the goaltender mask by at least 6 mm as viewed perpendicular to the median plane as shown in Fig. 3.

5. Test Methods

5.1 Sampling:

5.1.1 Types—Only new, throat protectors as offered for sale shall be tested. The protector shall be inspected visually and by hand before conditioning.

5.1.2 Documentation—Verify that the manufacturer shall provide written documentation indicating that the materials used in the construction of the throat protector fulfill the general requirements in 4.1.2 – 4.1.6.

5.1.3 Throat Protectors—Throat protectors shall be assembled and mounted on the appropriate goaltender mask in accordance with the instructions of the manufacturer (see Fig. 3).

5.2 Conditioning:

5.2.1 Low-Temperature Conditioning—The sample shall be exposed to a temperature of $(-25 \pm 2)^\circ\text{C}$ for not less than 4 h, but not more than 24 h. Testing shall be between 90 and 180 s of removal from the refrigeration chamber. Protectors may be returned to the conditioning environment to meet this requirement. Before the resumption of testing, the protector shall remain in the conditioning environment for a minimum of 15 min for each 5-min period they are out of the conditioning environment.

5.3 Positioning:

5.3.1 Determination of Head-Positioning Index (HPI)—The HPI and corresponding headform size shall be specified by the

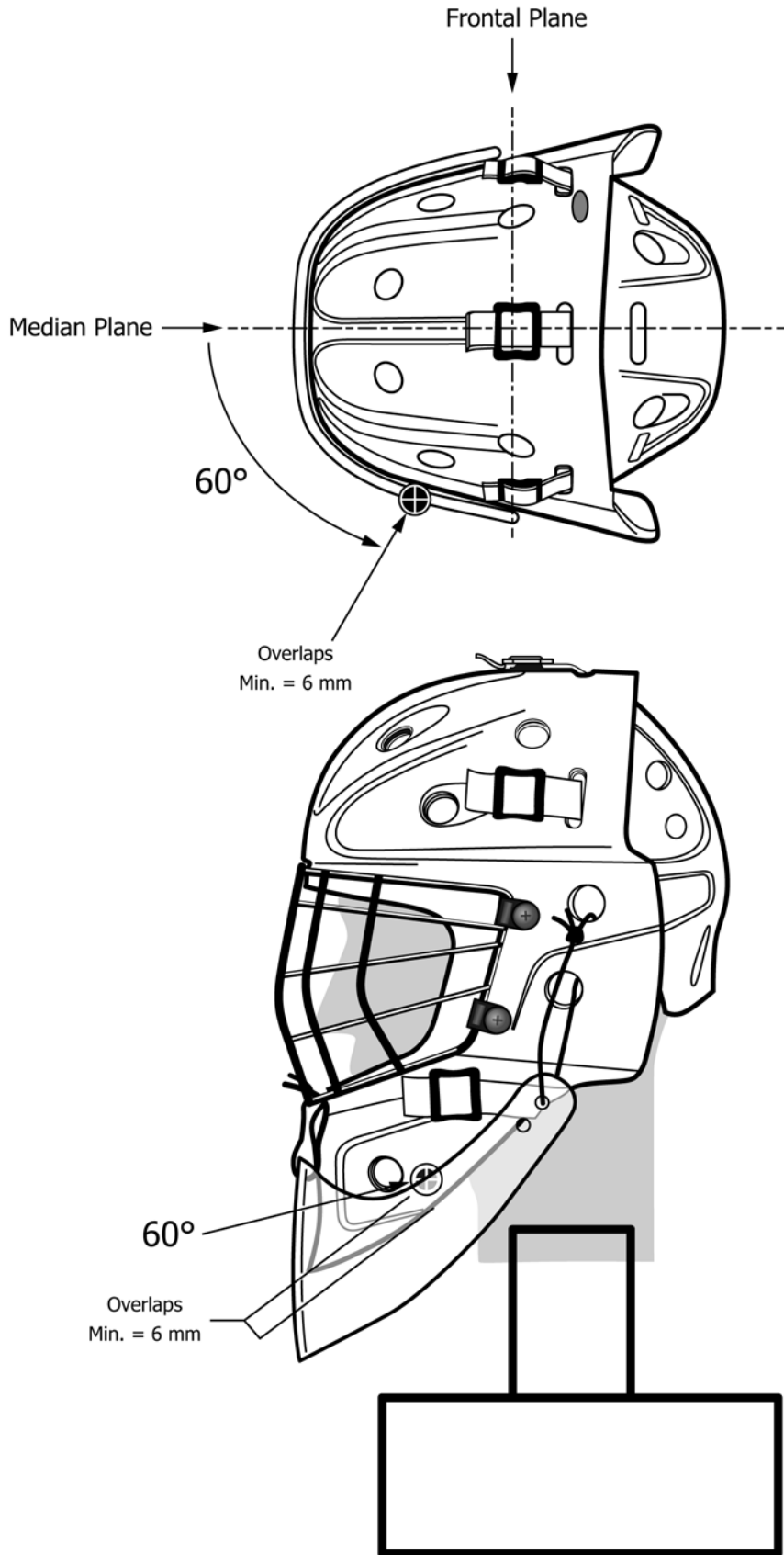


FIG. 3 Throat Protector Installation and Overlap

goaltender mask manufacturer. If the HPI and corresponding headform size is not available from the manufacturer, the throat/mask protector combination shall not be tested.

5.3.2 *Positioning of Goaltender Mask with Throat Protector*—Adjust and position the goaltender mask on the largest headform for the size range using the HPI. Adjust the throat protector on the mask with the overlap as specified in 4.6.1.

5.4 *Determination of Puck Impact Resistance:*

5.4.1 *Equipment:*

5.4.1.1 *Puck Accelerator*—A device (puck accelerator, see Fig. 4), which can give a hockey puck a specific velocity, direction, and with minimal rotation, shall be used. The velocity shall be variable between 10 and 36 m.s-1 with an accuracy of ± 1.0 m.s-1.

5.4.1.2 *Maximum Distance*—The puck shall be directed toward the impact site with as little rotation as possible. The distance between the impact site on the sample and the end of the guiding device shall not exceed 600 mm.

5.4.1.3 *Facially Featured Headform*—Facially featured headforms shall be in accordance with CSA Z262.6. The largest facially featured headform that the protector being tested fits on shall be used.

5.4.1.4 *Puck*—The hockey puck shall be in accordance with Annex A1.

5.4.1.5 *Velocity Measurement*—The velocity shall be measured no more than 600 mm from the site of impact. The equipment for measuring and recording the velocity of the puck shall be capable of measuring the velocity with a tolerance of ± 1 %.

5.4.1.6 *Neck Foam Support*—the foam used to cover the metal neck portion shall be a VN600 16 mm foam.

5.4.2 *Samples:*

5.4.2.1 *Quantity*—The number of samples for testing and assessment of throat protectors of a given make and model is provided in Table 1. The sample numbers corresponding to those given in Table 1 shall be of the same size and model. It is required to use the same number of goaltender masks of the model for which the throat protector is intended. The samples shall be numbered 1 and 2.

5.4.2.2 *Throat Protector/Goaltender Mask Combination*—If the throat protector is intended to fit several models of goaltender masks, one such combination shall be tested completely. The other combinations need only undergo the test(s) specified in 4.4 and 4.6.

5.4.3 *Procedures:*

5.4.3.1 *General*—The testing shall be carried out in accordance with Table 1.

NOTE 1—The impact sites are shown in Fig. 1 and defined in 3.1.4.

NOTE 2—Fig. 4 shows the schematic of the apparatus.

5.4.3.2 *Assembly*—Assemble the throat protector and mount on the appropriate goaltender mask in accordance with the instructions of the manufacturer (see Fig. 3).

5.4.3.3 *Headform Positioning*—Place the facially featured headform in front of the puck accelerator so that the centerline of the path of the puck coincides with the center of the point to be impacted.

5.4.3.4 *Toughness Data*—The puck is shot with the velocity stated in Table 1. After each impact, inspect the throat protector for damage (deformation, cracking, breakage, separation from the goaltender mask). There shall be one impact per site per protector.

6. Report

6.1 The test report shall include at least the following information:

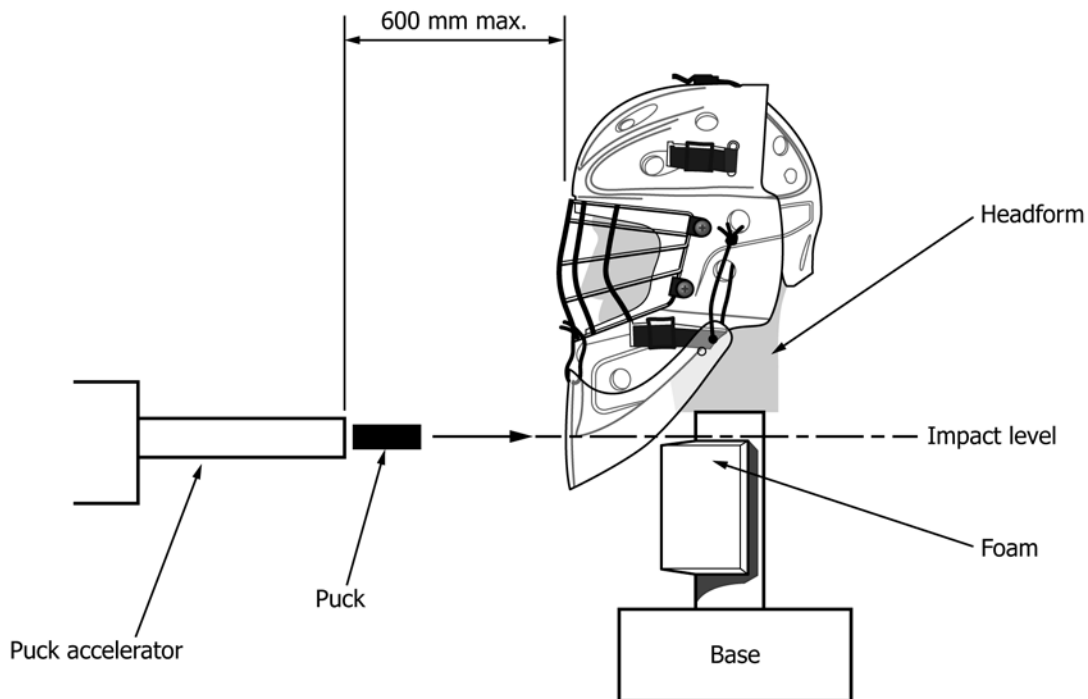


FIG. 4 Schematic of Apparatus for Testing Puck Impact Resistance of Throat Protector

TABLE 1 Protocol for Testing Throat Protectors

Type	Test	Sample No.	Impact Site	Conditioning temperature	Puck velocity, m/s (km/h)
One type only	Toughness	1	Direct impact (Site A)	Low	33 (119)
		2	25° impact (Site B)		

- 6.1.1 Number of this specification,
- 6.1.2 Name or trademark of the manufacturer or the body taking responsibility for manufacture,
- 6.1.3 Identification details of the throat protector tested including range of size,
- 6.1.4 Description of the throat protector,
- 6.1.5 Results of tests in accordance with Section 5,
- 6.1.6 Documentation requirements in Sections 4 and 5,
- 6.1.7 Date of testing, and
- 6.1.8 Name of testing laboratory.

7. Product Marking

- 7.1 Each throat protector shall be permanently and legibly marked with the following information:
 - 7.1.1 Number of this specification;
 - 7.1.2 Product type (for example, B1, B2, and so forth), if no type, nothing is required;

- 7.1.3 Name or trademark of the manufacturer or the body taking responsibility for the manufacture;
- 7.1.4 Designation of the model;
- 7.1.5 Date code, as a minimum, week and year of manufacture;
- 7.1.6 Size or size range of the throat protector; and

8. Information for Users

- 8.1 The following information shall accompany each throat protector:
 - 8.1.1 Instructions for the purchaser, including information for proper fit, comfort, and use;
 - 8.1.2 Cleaning and caring instructions including a warning that cleaning agents, paints, decals, or anti-fog material shall not be applied unless authorized by the manufacturer;
 - 8.1.3 The throat protector shall be replaced if it has been exposed to violent impact or another stress that may have reduced its protective function;
 - 8.1.4 Consumers should use care to select a goaltender mask and throat protector combination that fits properly and is comfortable for use during play;
 - 8.1.5 Instructions concerning the assembly of the throat protector on the goaltender mask;
 - 8.1.6 The goaltender masks with which the throat protector is intended to be used.

9. Keywords

- 9.1 goaltender; ice hockey; puck impact; throat protector; toughness

ANNEX

(Mandatory Information)

A1. PUCK SPECIFICATIONS

A1.1 Scope

A1.1.1 This technical specification provides requirements for pucks intended for use in the testing of protectors with the scope of this specification.

A1.1.2 This specification establishes requirements for the material and physical requirements of the puck.

A1.2 General Requirements

A1.2.1 *Material*—The puck shall be as offered for sale as a “hockey puck” and shall consist of a hard rubber compound based on natural rubber, synthetic polyisoprene, styrene butadiene copolymer, or a mixture of any of these materials.

A1.2.2 *Diameter*—The diameter of the puck shall be 76.2 ± 0.6 mm.

A1.2.3 *Thickness*—The puck shall be of uniform thickness of 25.4 ± 0.6 mm.

A1.2.4 *Knurl*—The curved circumferential surface of the puck shall be finished with a knurl.

A1.2.5 *Mass*—The mass of the puck shall be not less than 155 g and not more than 170 g.

A1.3 Physical Properties

A1.3.1 *Hardness at Room Temperature*—The shore Type C durometer hardness at room temperature shall be not less than 55 points and not greater than 65 points (see 4.1).

A1.3.2 *Hardness at 0°C*—The Shore Type C durometer hardness at 0°C shall be not greater than +7 points of the hardness determined at room temperature (see 4.4).

A1.4 Test Methods

A1.4.1 *Hardness at Room Temperature*—The hardness of the puck shall be determined in accordance with Test Method [D2240](#).

A1.4.2 *Hardness at 0°C*—The puck shall be conditioned for a period of 1 h in a mixture of ice and water. The hardness at 0°C shall be determined immediately after removal from the ice and water, in accordance with Test Method [D2240](#).

ASTM International takes no position respecting the validity of any patent rights asserted in connection with any item mentioned in this standard. Users of this standard are expressly advised that determination of the validity of any such patent rights, and the risk of infringement of such rights, are entirely their own responsibility.

This standard is subject to revision at any time by the responsible technical committee and must be reviewed every five years and if not revised, either reapproved or withdrawn. Your comments are invited either for revision of this standard or for additional standards and should be addressed to ASTM International Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee, which you may attend. If you feel that your comments have not received a fair hearing you should make your views known to the ASTM Committee on Standards, at the address shown below.

This standard is copyrighted by ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959, United States. Individual reprints (single or multiple copies) of this standard may be obtained by contacting ASTM at the above address or at 610-832-9585 (phone), 610-832-9555 (fax), or service@astm.org (e-mail); or through the ASTM website (www.astm.org). Permission rights to photocopy the standard may also be secured from the Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923, Tel: (978) 646-2600; <http://www.copyright.com/>