INTERNATIONAL STANDARD

ISO 10256-2

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Protective equipment for use in ice hockey —

Part 2: Head protection for skaters

Équipements de protection destinés à être utilisés en hockey sur glace —

Partie 2: Protections de tête pour les skateurs

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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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The committee responsible for this document is ISO/TC 83, *Sports and other recreational facilities and equipment*, Subcommittee SC 5, *Ice hockey equipment and facilities*.

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This first edition of ISO 10256-2, together with ISO 10256-1, ISO 10256-3, ISO 10256-4, ISO 10256-5, and ISO 10256-6 cancels and replaces the ISO 10256:2003, which has been technically revised.

ISO 10256 consists of the following parts, under the general title *Protective equipment for use in ice hockey*:

— *Part 1: General requirements*

— *Part 2: Head protection for skaters*

— *Part 3: Face protectors for skaters*

— *Part 4: Head and face protection for goalkeepers*

— *Part 5: Neck laceration protection for ice hockey players*

The following parts are under preparation:

— *Part 6: Lower leg protectors for ice hockey players*

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Introduction

Ice hockey is a sport in which there is a risk of injury. Ice hockey helmets afford no protection from neck or spinal injury. Severe head, brain, or spinal injuries, including paralysis or death, can occur in spite of using an ice hockey helmet according to this part of ISO 10256.

The intention of head protection used in ice hockey is to reduce the frequency and severity of localized injuries to the head. The protective function is such that the force from impacts against the protector is distributed and dampened and the penetration of objects is counteracted.

Part of the head protection for use in ice hockey consists of a helmet. To achieve the performance of which it is capable and to ensure stability on the head, a helmet is intended to be as closely fitting as possible consistent with comfort. In use, it is essential that the helmet is securely fastened, with any chin strap or neck strap adjusted according to manufacturer's instructions.

Subcommittee 5 is aware that specifications for the performance of the helmet are required to reduce the risk of injury in ice hockey. There was consensus that most of today's head protectors meet the performance requirements of this part of ISO 10256. The goal of the subcommittee is to promote the use of better materials and/or constructions as they become available to meet the future requirements of the sport of ice hockey. Subcommittee 5 recognizes that in order to provide for comfort, fit and use, helmets is intended to have a mass consistent with providing the appropriate performance characteristics.

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Protective equipment for use in ice hockey —

Part 2:
Head protection for skaters

1 Scope

This part of ISO 10256 specifies performance requirements and test methods for head protectors for use in ice hockey and is intended to be read in conjunction with ISO 10256-1.

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

a) construction and protected area;

b) shock absorption;

c) penetration;

d) retention system properties;

e) field of vision;

f) marking and information.

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This part of ISO 10256 applies to head protectors worn by

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— players other than goalkeepers, and

— certain functionaries (e.g. referees).

NOTE 1 The requirements of a Clause take precedent over a figure.

NOTE 2 The intent of this part of ISO 10256 is to reduce the risk of injury to the head without compromising the form or appeal of the game.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 6487, *Road vehicles — Measurement techniques in impact tests — Instrumentation*

ISO 10256-1:2016, *Protective equipment for use in ice hockey — Part 1: General requirements*

EN 960:2006, *Headforms for use in the testing of protective helmets*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 10256-1 and the following apply.

3.1
drop height
vertical distance between the lowest point (impact point) of the elevated helmet and the impact surface on a drop test apparatus

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3.2
fastening system
devices used to connect the components of the helmet

3.3
field of vision
extent of vision through the protector in the "as worn" position when placed on the appropriate headform and measured with reference to the entrance pupil of the stationary eye

3.4
goniometer
positioning device that moves the headform such that the angular rotation and movement in reference to the corneal eye point in both the horizontal and vertical directions can be recorded

3.5
helmet
device worn on the head that is intended to reduce the risk of head injury to ice hockey participants

Note 1 to entry: Helmets can include:

a) a shock-attenuating system;

b) a retention system;

c) manufacturers' attachments.

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3.6
helmet model
category of helmets that have the same essential characteristics

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Note 1 to entry: Essential characteristics include:

a) materials;

b) dimensions;

c) construction;

d) retention system;

e) protective padding.

3.7
helmet positioning index
HPI
vertical distance measured at the median plane, from the front edge of the helmet to the reference plane, when the helmet is placed on the reference headform

3.8
impact sites
Note 1 to entry: Impact sites are defined in relation to the headform using projected measurements.

3.8.1
prescribed impact site
crown, front, front boss, side, rear, rear boss

Note 1 to entry: See Figure 1.

3.8.1.1
crown
point where the central vertical axis meets the top of the headform

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3.8.1.2
front
point on the median plane which is 50 mm above the anterior intersection with the reference plane

3.8.1.3
front boss
point 25 mm above the reference plane and 45° in a clockwise or counter-clockwise direction about the central vertical axis

3.8.1.4
side
point 25 mm above the reference plane on the mid-frontal plane

3.8.1.5
rear
point at the posterior intersection of the median and reference plane

3.8.1.6
rear boss
point on the reference plane and 135° in a clockwise or counter-clockwise direction about the central vertical axis

3.8.2
non-prescribed impact sites
locations on or above the test line and at least one-fifth of the circumference of the headform from any prior impact site use

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3.9
liner
material inside the outer covering of the helmet, with the principal objective to absorb kinetic energy generated by an impact to the head

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Note 1 to entry: This material, or part of it, helps to ensure a snug comfortable fit of the helmet on the head.

3.10
natural frequency
frequency at which a system will tend to oscillate when displaced from its static equilibrium position

3.11
outer covering
shell
material that gives the helmet its form

3.12
retention system
system which secures the helmet firmly to the head by passing under the mandible in whole or in part when adjusted according to manufacturer's instructions

3.13
support assembly
drop assembly in the monorail system minus the weight of the headform, ball arm, ball clamp, ball clamp bolts, and accelerometer

3.14
spherical impactor
device made of low resonance material that couples mechanically with the ball arm connector of the drop assembly in place of the impact test headform and is used for system verification of the drop assembly

EXAMPLE Magnesium, aluminium alloy, or stainless steel.

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3.15
test area
area on and above the test line, where an impact site shall be located

3.16
test line
line that defines the boundaries of the test area

Note 1 to entry: See Figure 2.

4 Requirements

4.1 Innocuousness

The manufacturer shall provide written documentation indicating that the materials used in the construction of the helmet fulfil the requirements for innocuousness given in ISO 10256-1.

4.2 Ergonomics

Manufacturers shall provide documentation indicating that the helmet fulfils the requirements for ergonomics given in ISO 10256-1.

4.3 Attachments

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4.3.1 Optional devices

Manufacturers shall provide documentation to confirm that any optional device fitted to the helmet has been designed to minimize the risk of injury to the wearer or other players during contact or otherwise.

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4.3.2 Fastener components

Fasteners for securing attachments to the helmet shall be so designed that the degree of protection afforded to the wearer by the helmet is not thereby reduced.

4.3.3 Eye and full-face protectors

Helmets shall be designed to allow eye or full-face protectors to be attached with simple tools (e.g. screwdriver).

4.4 Protected area

4.4.1 Minimum protected area

The protected area shall be at least the area above the line BCDEF in Figure 3 when the helmet is positioned according to 5.4. This area shall correspond with the headform size with which the helmet is to be tested.

4.4.2 Ear aperture

No ear aperture (opening) shall have a linear dimension exceeding 38 mm. The distance to any other edge of the helmet shall be not less than 20 mm. The ear aperture shall be completely surrounded by the outer covering of the helmet (shell).

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4.4.3 Ventilation openings

Openings for the purpose of ventilation are permitted on the helmet provided that they fulfil the penetration requirements in 4.5.

4.5 Penetration

Except for the ear apertures and when tested according to 5.6, there shall be no contact with the bare headform by the test blade within the designated protected area.

NOTE See Figure 5.

4.6 Shock absorbing capacity

When tested according to 5.7, no single impact shall exceed a peak acceleration of 275 *g* under all test conditions. The outer covering (shell) shall remain intact, with no cracks visible through the thickness of the shell.

4.7 Retention system

4.7.1 Straps

The retention system, which is required on all helmets, consists of a straps which passes under the mandible and is buckled on both sides of the helmet. The retention strap shall be not less than 13 mm wide.

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NOTE See Figure 4.

4.7.2 Extensibility and strength

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When tested according to 5.8, the displacement of the roller holder shall not exceed 25 mm during the load range between 5 N and 110 N and the release force shall be not less than 110 N and not more than 300 N.

NOTE See Figure 4.

4.8 Field of vision

When tested under ambient conditions, the helmet shall not interfere with vision in the upward and horizontal directions respective to each corneal eye point as defined by the following angles:

a) upward: 35°;

b) horizontally: 90°.

5 Test methods

5.1 Sampling

Only new and complete helmets as offered for sale shall be tested. The minimum number of samples needed for a complete test is found in Table1.

5.2 Conditioning temperatures

Helmet samples shall be conditioned under ambient, low and elevated temperature conditions according to ISO 10256-1.

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5.3 Field of vision

The upward field of vision is the solid angle bounded by the reference plane of the headform and a second plane tilted 35° upwards from the reference plane. This second plane intersects the reference plane at two points on the front surface of the headform that are 31 mm to the right and left of the median plane.

The left horizontal field of vision is the solid angle bounded by a plane parallel and 31 mm to the left of the median plane of the headform and a second plane perpendicular to the median plane (i.e. rotated 90° horizontally) and parallel to the lateral plane. The two planes intersect with the reference plane at the front surface of the headform at a point located 31 mm to the left of the median plane.

The right horizontal field of vision is the solid angle bounded by a plane parallel and 31 mm to the right of the median plane of the headform and a second plane perpendicular to the median plane (i.e. rotated 90° horizontally) and parallel to the lateral plane. The two planes intersect with the reference plane at the front surface of the headform at a point located 31 mm to the right of the median plane.

The accuracy of the device used to measure field of vision shall be (±1°). The reference test method of determining field of vision for this part of ISO 10256 is shown in Annex C.

5.4 Helmet positioning index (HPI)

The HPI and corresponding helmet size shall be provided by the helmet manufacturer. The testing laboratory shall select the headform that is appropriate to the size range. Where the HPI and corresponding helmet size range are not available from the manufacturer, the helmet shall not be tested.

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5.5 Protected area

Position the helmet on the largest full headform for the helmet's size range using the helmet positioning index (HPI). Apply a load of 50 N to the crown of the helmet in order to seat the helmet to the headform. When viewed perpendicular to the median plane, the helmet shall cover the protected area as required in 4.4 and Figure 3.

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5.6 Determination of penetration characteristics

5.6.1 Test apparatus

The apparatus shall consist of:

a) a headform according to EN 960;

b) a steel test blade according to Figure 5.

5.6.2 Procedure

5.6.2.1 Helmet positioning

The helmet shall be positioned on the largest headform for its size range, using the HPI.

5.6.2.2 Penetration test

Attempt to pass the end of the test-blade, without force, through all openings of the helmet (except the ear apertures) within the protected area (see Figure 3).

Any contact with the bare headform surface shall be recorded.

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