SLOVENSKI STANDARD
SIST EN 967:1998

01-april-1998

Varovala glave za igralce hokeja na ledu

Head protectors for ice hockey players

Kopfschutz für Eishockeyspieler

Protections de tete des joueurs de hockey sur glace

Ta slovenski standard je istoveten z: **EN 967:1996**

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97.220.20	Oprema za zimske športe	Winter sports equipment

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English version

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Protections de tête des joueurs de hockey sur glace

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Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

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CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat: rue de Stassart,36 B-1050 Brussels

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Foreword

This European Standard has been prepared by Technical Committee CEN/TC 158 "Head protection", the secretariat of which is held by BSI.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by April 1997, and conflicting national standards shall be withdrawn at the latest by April 1997.

This European Standard has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this standard.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Iceland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

Introduction

The intention of head protectors is to reduce the risk of injury to the skull and the part of the face surrounded by the protector. The protective function is such that the force from impacts against the protector is distributed and damped and the penetration of objects is counteracted.

Head protectors for ice hockey players comprise helmets and, in most cases, an associated face protector. Face protectors can consist of eye protectors, teeth protectors or full face protectors. Helmets are tested and assessed as a separate unit, but face protectors are always tested and assessed together with the helmet or helmets for which the face protector is intended. This standard sets out minimum requirements and test methods. The intended function of the head protectors is to reduce skull and facial injuries that may occur in play or training.

The head protectors are intended for use by:

- players;
- goalkeepers;
- certain functionaries.

The working group which has prepared this standard has been aware that the requirements on mass of the head protector, shock absorbing capacity of the helmet and rigidity of face protectors should be more severe to cover the risks in modern ice hockey, with the tight play and high puck speeds. But the group has also been aware of that most head protectors today give good protection to most players and goalkeepers, so they did not wish to remove good products from the market by unreasonably severe requirements. However, the aim should be to find better materials and better constructions to meet higher requirements in the future.

1 Scope

This European Standard specifies performance requirements and tests for head protectors for ice hockey players. The intent is to reduce the risk of injury to the head without compromising the form or appeal of the game.

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

- construction
- shock absorbing properties
- puck impact resistance
- penetration
- retention system properties
- field of vision
- marking and information.

Note : Annex A gives optional properties and test methods for the optical quality of eye protectors.

Head protectors do not afford any protection from neck or spinal injuries.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN 960	Headforms for use in the testing of protective helmets
EN 45 001	General criteria for the operation of testing laboratories
ISO 6487	Road vehicles - Measurement techniques in impact tests - Instrumentation

3 Definitions

For the purposes of this standard, the following definitions apply:

3.1 Planes

3.1.1 **basic plane of the human head**: A plane at the level of the upper border of the external ear opening and the lower edge of the eye sockets.

3.1.2 **basic plane of a headform**: The plane relative to the headform that corresponds to the basic plane of the human head.

3.1.3 **reference plane**: A 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.

3.1.4 **longitudinal vertical median plane**: The vertical plane of symmetry of a headform.

3.1.5 **central transverse vertical plane**: A plane at right angles to the longitudinal vertical plane and passing through the central vertical axis.

3.2 **Central vertical axis :** The line relative to the headform that lies in the plane of symmetry, and that is normal to the basic plane at a point equidistant from the front and back of the headform.

3.3 Impact sites

3.3.1 Helmets (defined in relation to the headform)

3.3.1.1 **Crown**: the site where the central vertical axis meets the top of the headform.

3.3.1.2 **Front**: the site where the longitudinal vertical median plane meets the front of the headform 50 mm above the reference plane.

3.3.1.3 **Front boss**: the site where a plane through the central vertical axis 45° to the longitudinal vertical median plane meets the fore part of the headform 25 mm above the reference plane.

3.3.1.4 **Side**: the site where the central transverse vertical plane meets a side of the headform 25 mm above the reference plane.

3.3.1.5 **Rear boss**: the site where a plane through the central vertical axis 45° to the longitudinal vertical median plane meets the rear part of the headform in the reference plane.

3.3.1.6 **Rear**: the site where the longitudinal vertical median plane meets the back of the headform in the reference plane.

3.3.2 Face protectors

3.3.2.1 **Side impact site**: The site half-way between the mouth level and the eye level in the horizontal plane, 45° to the longitudinal vertical median plane and in the direction of the most protruding part of the cheek at that level.

3.3.2.2 **Eye impact site**: The site in the horizontal plane 25° to the longitudinal vertical median plane and in the direction of the eye.

3.3.2.3 **Mouth impact site**: The site in the intersection between the horizontal plane and the longitudinal vertical median plane in the direction of the mouth.

3.4 G_{SI} Gadd Severity Index

A weighted impulse criterion measure that estimates the injury hazard to the human head based on an impact and determined from the acceleration-time wave form. It is mathematically defined by the equation:

$$G_{SI} = \int_{t_o}^{t_o+\tau} a^{2,5} dt$$

where :
2,5 is the weighting exponent
a is the acceleration of a body, m/s^2
t is time in seconds
τ is the time of impact, i.e. pulse duration in seconds

3.5 Helmet type

Categories of helmets which do not differ in such essential respects as the materials or dimensions or construction of the helmet, of the retention system or of the protective padding.

4 Types of head protectors

The head protector for ice hockey players comprises a helmet and a face protector either specially adapted to the helmet or forming a continuous unity, designed to protect the whole or parts of the wearer's head against injury.

Types of head protectors are :

- helmet
- helmet in combination with:
  - eye protector (visor)
  - mouth protector
  - full face protector for players
  - full face protector for goalkeepers
- goalkeeper's protection mask.

5 Requirements

5.1 General requirements

5.1.1 Materials

When conditioned in accordance with any of the methods described in 6.3 the head protector shall still fulfil the requirements of this standard.

All materials used in the construction of the head protector shall not be adversely affected by ordinary household soap and cleaners recommended by the manufacturer. The shock absorbing material used shall be known to absorb impacts without crushing.

Paints, glues and finishes used in manufacturing shall be compatible with the materials used in the construction of the head protector.

Material coming in contact with the wearer's head 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 from the wearer's head.

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

5.1.2 Finish

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

5.1.3 Attachment system

The attachment system of a face protector to a helmet shall be so designed so that the face protector can be easily attached to the helmet without requiring any machining operation by the user.

5.1.4 Field of vision

There shall be no occultation in the field of vision bounded by angles as follows, see figure 1:

- upwards 40°
- downwards: 60°
- horizontally: 90°.

Suitable test methods are given in 6.6 and in Annex A.

Note: Annex A also gives optional properties and test methods for the optical quality of eye protectors.

5.1.5 Penetration

When tested in accordance with 6.7, no contact with the bare headform by the test blade shall be made within the protected areas, except for the ear apertures.

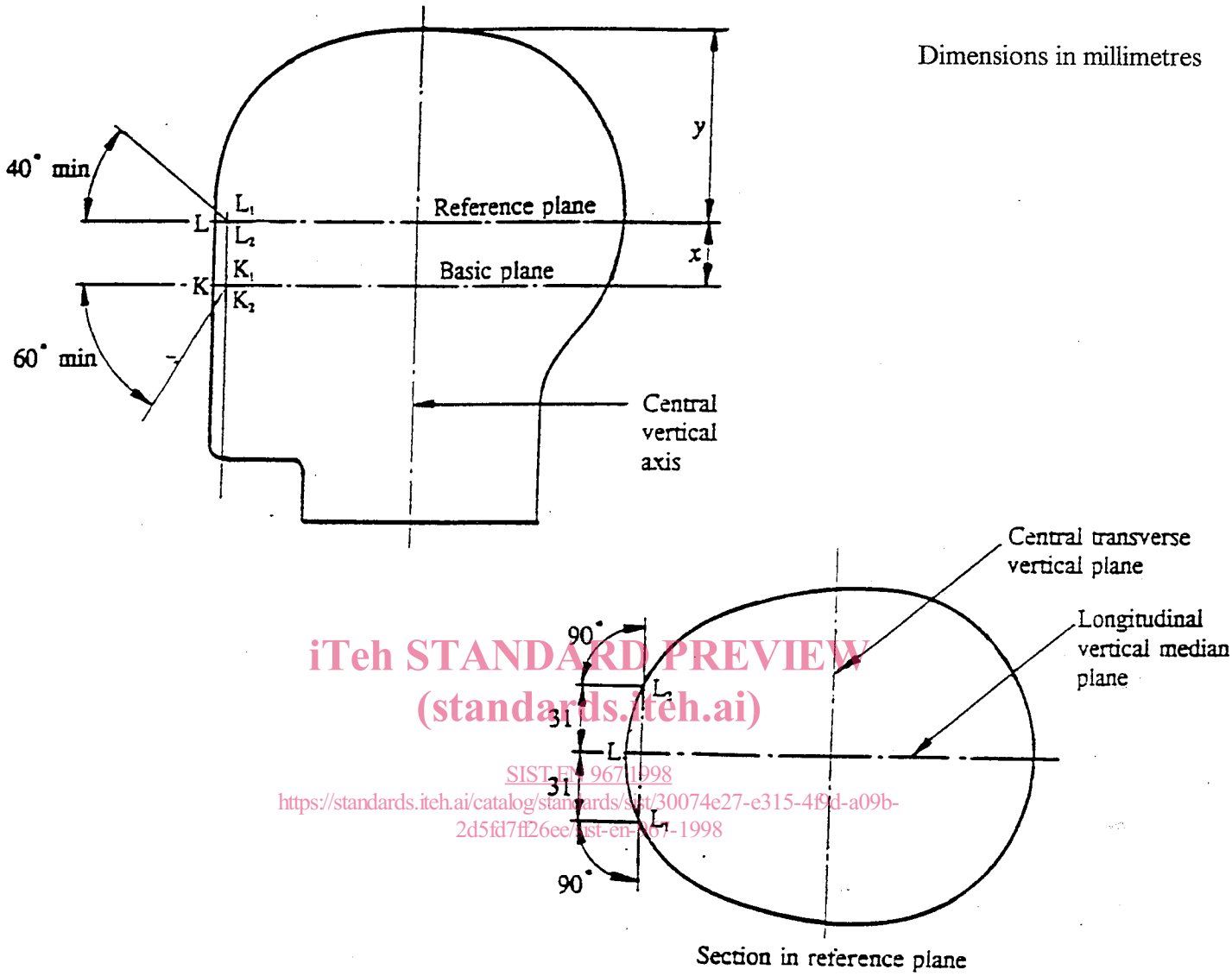
5.1.6 Mass

When tested in accordance with 6.2. the mass shall not exceed the values given in table 1.

Table 1: Maximum mass of head protectors

Type of head protector	Max. mass g
Helmet Helmet with eye protector (visor), mouth protector or full face protector for players	800
Helmet with full face protector for goalkeepers Goalkeeper's protection mask	1000

Dimensions in millimetres



Headform (see EN 960) Code letter	Size Inside circumference of helmet	*x*	*y*
A	500	24	89,5
E	540	26	96
J	570	27,5	102,5
M	600	29	107

Figure 1: Field of vision

5.2 Helmets - Special requirements

5.2.1 Design

No sharp surfaces or protruding parts shall present a potential hazard to the user or other players. The back edge of the helmet should be designed to minimize the possibility of lacerations and/or contusions to the back of the neck. The assembly to be used by the user shall require no machining operation.

Any optional devices fitted to the helmet shall be so designed that they are unlikely to cause any injury to the wearer or other players during contact or otherwise.

The components of the 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.

5.2.2 Protected area

The protected area shall be at least the area above the line BCDEF in figure 2 a) when the helmet is positioned in accordance with 6.4.4.2.

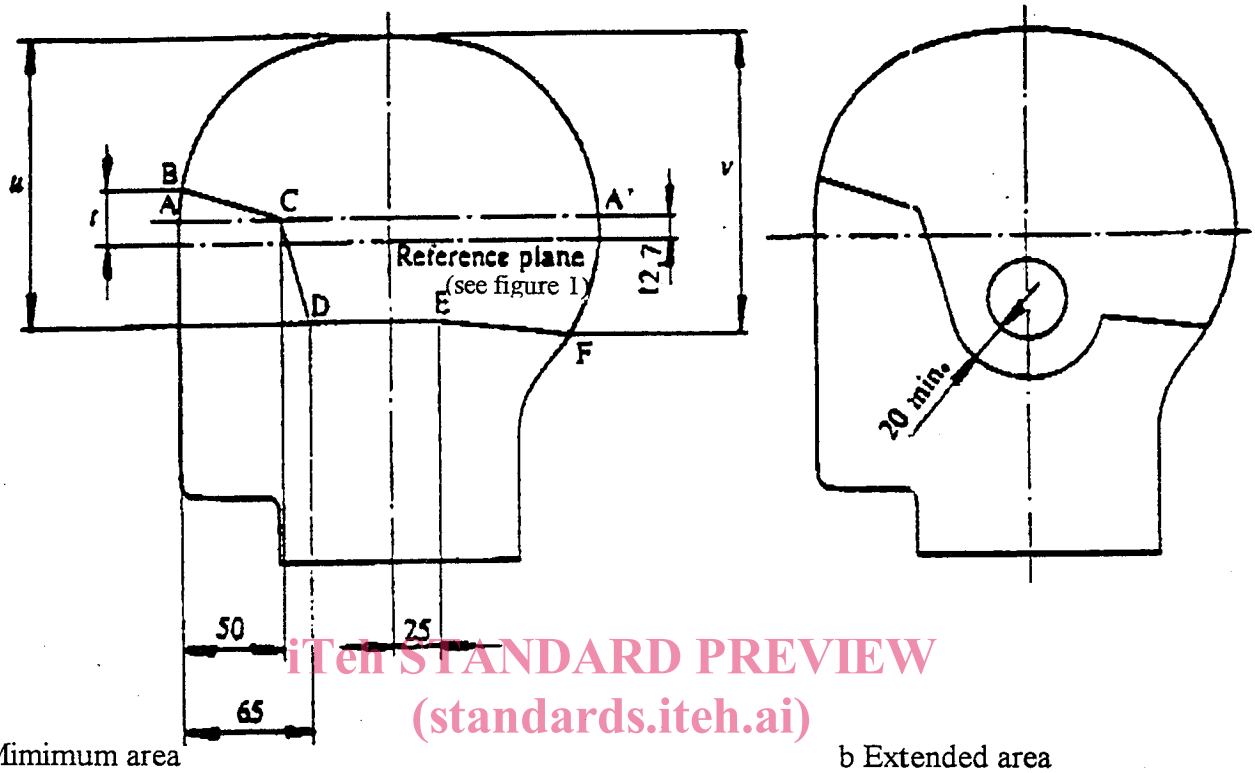
No ear aperture shall have a linear dimension exceeding 38 mm and the distance to any other edge of the helmet shall be not less than 20 mm. See figure 2 b).

Ventilation openings shall fulfil the penetration requirements in 5.1.5 and the distance from any ventilation opening to the edge of the helmet shall be not less than 20 mm.

5.2.3 Shock absorbing capacity

When tested in accordance with 6.4 no single impact shall exceed a G_{SI} of 1500 and the peak acceleration shall not exceed 300 g. The helmet shall remain intact with no visible cracks through the thickness of the outer covering (shell) nor shall the liner show any permanent damage.

Dimensions in millimetres



a Mimimum area b Extended area

Headform (EN 960) Code letter	Size Inside circumference of helmet	*t*	*u*	*v*
A	500	24	123	132
E	540	25	132	140
J	570	27	139	145
M	600	28	146	151

Figure 2: Definition of protected area