

Protective clothing — Hand, arm, leg, genital and neck protectors for use in ice hockey — Protectors for players other than goalkeepers — Requirements and test methods

ICS 13.340.10; 97.220.20

National foreword

This Draft for Development is the official English language version of CEN/TS 15256:2005.

This publication is not to be regarded as a British Standard.

It is being issued in the Draft for Development series of publications and is of a provisional nature because the subject is still under technical development. It should be applied on this provisional basis, so that information and experience of its practical application may be obtained.

Comments arising from the use of this Draft for Development are requested so that UK experience can be reported to the European organization responsible for its conversion to a European standard. A review of this publication will be initiated 2 years after its publication by the European organization so that a decision can be taken on its status at the end of its 3-year life. Notification of the start of the review period will be made in an announcement in the appropriate issue of *Update Standards*.

According to the replies received by the end of the review period, the responsible BSI Committee will decide whether to support the conversion into a European Standard, to extend the life of the Technical Specification or to withdraw it. Comments should be sent in writing to the Secretary of BSI Subcommittee PH/3/9, Protective clothing for riders of motorcycles and sports players, at British Standards House, 389 Chiswick High Road, London W4 4AL, giving the document reference and clause number and proposing, where possible, an appropriate revision of the text.

A list of organizations represented on this subcommittee can be obtained on request to its secretary.

Cross-references

The British Standards which implement international or European publications referred to in this document may be found in the *BSI Catalogue* under the section entitled “International Standards Correspondence Index”, or by using the “Search” facility of the *BSI Electronic Catalogue* or of British Standards Online.

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Summary of pages

This document comprises a front cover, an inside front cover, the CEN/TS title page, pages 2 to 42, an inside back cover and a back cover.

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Amendments issued since publication

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English version

**Protective clothing - Hand, arm, leg, genital and neck protectors
for use in ice hockey - Protectors for players other than
goalkeepers - Requirements and test methods**

Vêtements de protection - Protège-mains et bras, guêtres,
coquilles et protège-cou utilisés pour le hockey sur glace -
Protections pour joueurs autres que les gardiens de but -
Exigences et méthodes d'essai

Schutzkleidung - Hand-, Arm-, Bein-, Genital-, und
Halsschützer für Eishockey - Protektoren für Spieler außer
Torwarte - Anforderungen und Prüfverfahren

This Technical Specification (CEN/TS) was approved by CEN on 26 October 2003 for provisional application.

The period of validity of this CEN/TS is limited initially to three years. After two years the members of CEN will be requested to submit their comments, particularly on the question whether the CEN/TS can be converted into a European Standard.

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Foreword

This document (CEN /TS 15256:2005) has been prepared by Technical Committee CEN/TC 162 "Protective clothing including hand and arm protection and lifejackets", the secretariat of which is held by DIN, in collaboration with ISO/TC 83 "Sports and recreational equipment".

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to announce this Technical Specification: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

Introduction

Personal protective equipment is used by ice hockey players to reduce the severity of injuries. The risks in ice hockey are falls to the ice, collision with the rink, goal cages or other players, impacts and cuts by skates, sticks, pucks or other players' personal protective equipment.

Ice hockey is a sport with intrinsic hazards. Participation in ice hockey implies the acceptance of some risk of injury. Use of equipment conforming to this Technical Specification will not necessarily prevent all injuries.

1 Scope

This Technical Specification applies to personal protective equipment (excluding face and head protectors) for ice hockey players other than goal keepers. This Technical Specification specifies requirements for neck, shoulder, elbow, wrist and hand, genital, hip, coccygeal, thigh, knee and shin protectors. It specifies the cut resistance of all the protectors except those for the shoulders and elbows, and impact performance for all the protectors except the neck protector. Additionally for all protectors it specifies requirements for innocuousness, ergonomics, cleaning, restraint, zone of protection, and provisions for marking and information for users.

NOTE Requirements and test methods for face and head protectors are specified in EN 967.

2 Normative references

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

EN 420, *Protective gloves - General requirements and test methods*

EN ISO 6330, *Textiles - Domestic washing and drying procedures for textile testing (ISO 6330:2000)*

3 Terms and definitions

For the purposes of this Technical Specification, the following terms and definitions apply.

3.1

anatomical form

solid or hollow object defined by its shape, used to support the personal protective equipment for examination and measurement of the coverage provided by its components

3.2

anvil

round or square section rigid metal block with a specified shape at its upper end used to transmit the force of impact from the inside of the test specimen to the force transducer

3.3

types of personal protective equipment for ice hockey players

3.3.1

neck protector

cut resistant device worn to reduce the risk of external injury to the throat by cuts from skates

3.3.1.1

neck part

part of a neck protector that surrounds the cylindrical portion of the anatomical neck form

3.3.1.2

bib

part of a neck protector that lies over the thoracic region of the anatomical neck form

3.3.2

shoulder protector

device primarily designed to reduce the risk of impact injury to the shoulder joint (the acromioclavicular joint and the glenohumeral joint) and the distal end of the collar bone

3.3.3

elbow protector

device primarily designed to reduce the risk of impact injury to the tip of the elbow and overlying structures

3.3.4

pants

garment primarily designed to reduce the risk of impact injury to the body from the waist to the knees

NOTE Pants incorporate hip, thigh and coccygeal protectors overlying these structures.

3.3.5

genital protector

device primarily designed to reduce the risk of impact injury to the genitalia

NOTE Commonly known as a "jock" or "box".

3.3.6

leg protector

device primarily designed to reduce the risk of impact injury to the knee and the shin

NOTE Leg protectors may be constructed of distinct knee protectors and shin protectors that are permanently joined to form a leg protector.

3.3.7

glove

garment designed to reduce the risk of impact and cut injuries to the lower part of the arm, wrist and hand.

3.4

zone of protection

area of the protective equipment that is intended to provide protection, and is subject to specific testing

4 Performance Level

The performance level of a protector is a number used to designate the value obtained when the protector is subjected to a particular test. The higher the number, the greater the degree of protection provided. The performance levels for which requirements are specified in this Technical Specification are suitable for the following players and levels of the sport.

A Level 1 protector is a product designed to be used by players up to 135 cm in height, for recreational ice hockey only.

A Level 2 protector is a product designed for all sizes of players for recreational ice hockey only.

A Level 3 protector is a product designed for all sizes of players for all levels of ice hockey.

5 Requirements

5.1 Innocuousness

Protective clothing and equipment for ice hockey players shall meet a general requirement that the product is safe to use and fit for its purpose. It shall be designed and manufactured to provide protection when used

according to the manufacturer's instructions, without endangering the user or other players. There shall not be hard or sharp edges, seams, buckles or other items on the surfaces of the products that could harm the user or other players during normal use. Examination shall be made according to 6.3.4.

Construction materials and incorporated substances, shall not harm those coming into contact with them. The manufacturer shall list in the Information supplied with the product, the substances used in the main components of the product, and shall label any product containing substances or preparations generally known to be hazardous. Information about determining the chemical innocuousness of protective clothing and equipment is given in Annex A.

All materials used in the manufacture of personal protective equipment for ice hockey players shall be known to be unaffected by ordinary house-hold soap and cleaners recommended by the manufacturer. They shall not be known to undergo significant loss of strength, flexibility or other detrimental changes as a result of contact with sweat or toiletries.

5.2 Ergonomics

All protectors shall either have ventilation holes or shall be lined with a material which has been shown to remove sweat from the skin.

When examined in accordance with 6.3.5 all protectors shall be comfortable and shall permit normal playing movements.

5.3 Sizing

Protective equipment shall be marked with its size. For equipment other than genital protectors, the manufacturer shall mark on the equipment, in centimetres, the range of sizes of users that the item of equipment is intended to fit. The body dimension to be used to indicate the size of each type of protective equipment shall be as given in Table 1.

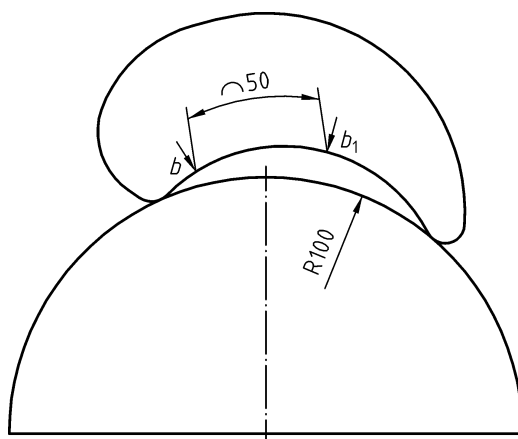
Table 1 — Body dimensions to be used in size marking of protective equipment

Protective Equipment	Body dimensions	
	Essential dimension	Optional additional dimension
Neck protectors	Neck circumference	Body height
Shoulder protectors	Chest girth (circumference)	
Elbow protectors	Body height	
Leg protectors	Body height	
Hip, thigh and coccygeal protectors in pants	Waist girth (circumference)	Body height
Genital protectors	See Table 2	Waist girth (circumference)
Gloves	According to EN 420	Body height

Genital protectors shall be measured in accordance with 6.3.6.2 and shall be marked with a designated size in accordance with Table 2.

Table 2 — Size designations to be used for genital protector marking

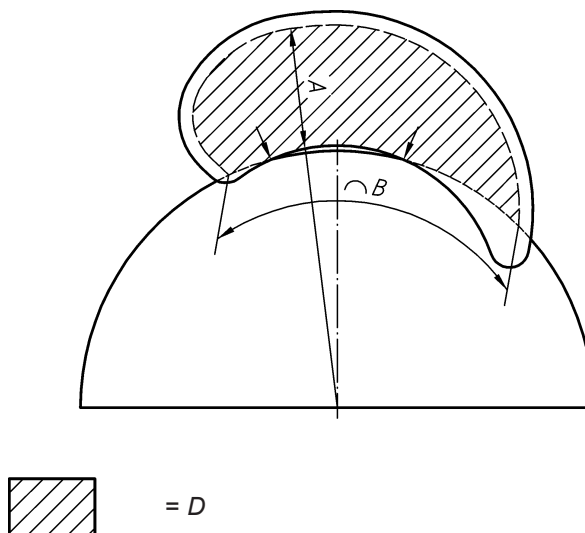
Size designation	<i>A</i> Internal depth ^a min. mm	<i>B</i> Internal length ^a min. mm	<i>C</i> Internal width at widest part min. mm	<i>D</i> Volume ^a min. cm ³
Female size 1	20	100	55	70
Female size 2	25	110	65	110
Female size 3	30	120	75	150
Male size 1	40	120	85	170
Male size 2	45	130	95	225
Male size 3	50	140	105	300
^a Dimensions are shown in Figure 1.				



a) Side view of a genital protector placed on the 100 mm radius half cylinder specified in 6.3.6.2.

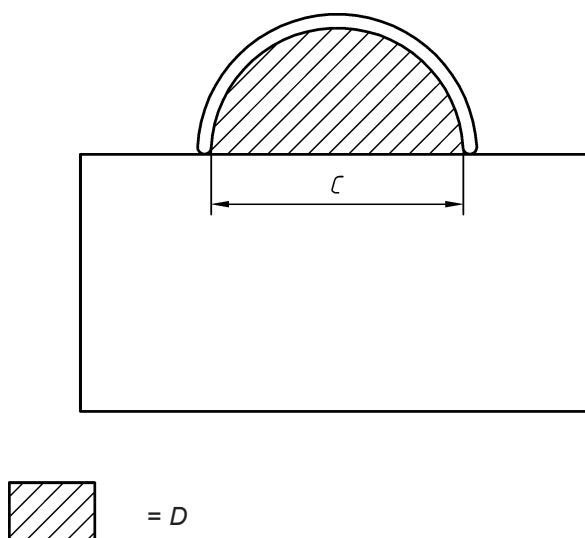
Bearing area indicator marks are shown 50 mm apart (*b* to *b1*).

Figure 1 — Dimensions of genital protectors



b) Schematic side view of a genital protector trimmed to fit onto the 100 mm radius half cylinder specified in 6.3.6.2. Dimensions A and B are shown.

D = The volume to be measured



c) Schematic cross section of a genital protector on the 100 mm radius half cylinder specified in 6.3.6.2.

D = The volume to be measured.

Figure 1 Dimensions of genital protectors (continued)

5.4 Dimensions and locations of zones of protection, cut test areas and impact test areas

5.4.1 Neck protectors

When neck protectors are examined in accordance with 6.3.6.1 the protective material shall cover the zone of protection shown in Figure 2 which has the dimensions given in Table 3.

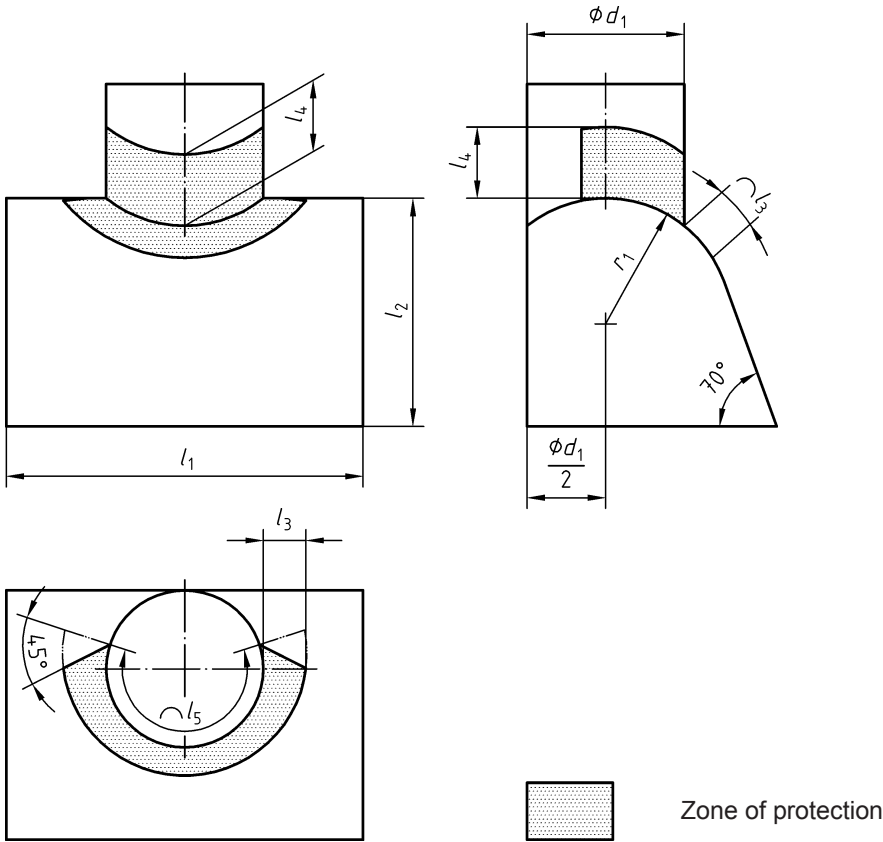


Figure 2 — Anatomical neck form and zone of protection

Table 3 — Neck protector test form dimensions and requirements for the dimensions of the zone of protection

Neck circumference cm	Body height cm	Form dimensions mm				Minimum zone of protection dimensions mm		
		d_1	r_1	l_1	l_2	l_3	l_4	l_5
< 36	< 160	110	88	250	160	30	50	60% of largest user's neck circumference
> 36	> 160	125	100	250	160	40	65	60% of largest user's neck circumference

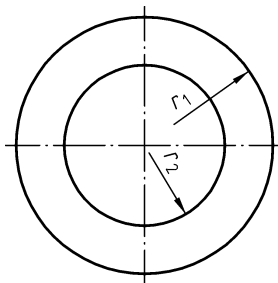
The cut test area shall be the same as the zone of protection specified in Figure 2 and Table 3 but shall exclude a perimeter area 10 mm wide.

5.4.2 Shoulder protectors

Protective padding, or protective shells, or protective padding and shells, shall cover an area at least as large as the zone of protection specified for the size of protector.

The minimum zone of protection of shoulder protectors shall be a circle of radius r_1 , where r_1 is equal to 8 % of the chest girth of the largest size of user that the protector is intended to fit, as shown in Figure 3. The centre of the circle shall lie over the point of the shoulder which shall be identified as described in 6.3.6.1.

The impact test area shall be a circle of radius r_2 , in the centre of the zone of protection where r_2 is equal to 5 % of the chest girth of the largest size of user that the protector is intended to fit, as shown in Figure 3.



Key:

- r_1 Radius of circular zone of protection
- r_2 Radius of circular impact test area

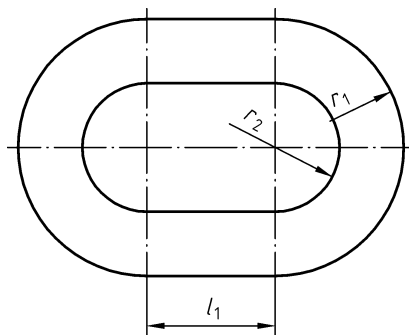
Figure 3 — Shapes of the zones of protection and the impact test areas of shoulder protectors

5.4.3 Elbow protectors

Protective padding, or protective shells, or protective padding and shells, shall cover an area at least as large as the zone of protection specified for the size of protector.

The minimum zone of protection of elbow protectors shall be a regular rectangular shape with semicircular ends with radii r_1 and a distance between their centres of l_1 as shown in Figure 4. The values of the radii r_1 and the distance between centres l_1 shall all be equal to 3,6 % of the body height of the largest size of user that the protector is intended to fit. The proximal centre of the shape shall lie over the point of the elbow which shall be identified as described in 6.3.6.1, and line l_1 shall lie parallel to the long axis of the ulna bone.

The impact test area shall be an area defined by semicircles with radii r_2 , and a distance between their centres of l_1 , in the centre of the zone of protection, as shown in Figure 4. Its radii shall be equal to 1,8 % of the body height of the largest size of user that the protector is intended to fit.



Key

- r_1 Radius of the ends of the area forming the zone of protection
 r_2 Radius of the ends of the area forming the impact test area
 l_1 Distance between the centres of the semicircular ends of the zone of protection and the impact test area

Figure 4 — Shapes of the zones of protection and the impact test areas of elbow protectors

5.4.4 Leg protectors

Protective padding, or protective shells, or protective padding and shells, shall cover an area at least as large as the zones of protection specified for the size of protector.

The minimum dimensions of the zones of protection of leg protectors shall be calculated according to Table 4 based on the body height of the largest user the protector is intended to fit as shown in figure 5. The centre of the knee zone 2 shall lie over the point of the knee which shall be identified as described in 6.3.6.1, and the centre line of the shin zone 2 shall lie down the centre of the shin.

NOTE The zone 1 areas lie around the zone 2 areas.

The impact test areas of zone 2 on the knee and the shin shall be the whole of each zone of protection. The impact test area in zone 1 shall be the area defined by dimensions l_2 , l_5 and r_2 .

Table 4 — Dimensions of the zones of protection of leg protectors as a percentage of body height

Dimension	l_1	l_2	l_3	l_4	l_5	l_6	r_1	r_2	r_3
Percentage of body height	20 %	19 %	18 %	3,5 %	7 %	8,2 %	6 %	5 %	3,5 %

Table 5 provides, for information, the calculated values of the dimensions of the zones of protection and impact test areas of leg protectors to fit users of given body heights.