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Protective clothing for use in snowboarding — Wrist protectors — Requirements and test methods

Habillement de protection destiné à la pratique du surf des neiges — Protecteurs de poignets — Exigences et méthodes d'essai

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 94, *Personal safety — Protective clothing and equipment*, Subcommittee SC 13, *Protective clothing*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 162, *Protective clothing including hand and arm protection and lifejackets*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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Introduction

Snowboarding are all the pastimes and competitions in which a snowboard is used. The users range from small children to adults of all ages.

The wrist is the most frequently injured body region among snowboarders. The majority of wrist injuries are consequences of falls. The most common injury mechanism is described as a compressive load applied to a hyperextended wrist. Beginners and children have a high incidence of wrist injuries due to snowboarding. One third of injuries among beginner snowboarders are to the wrist.

Studies have shown that the risk of sustaining a wrist injury can be reduced by wearing wrist protection. Wrist protectors in snowboarding are intended to protect the wearer against fractures as well as contusions and sprains.

Wrist protectors will not prevent all wrist, forearm, hand, elbow and shoulder injuries in snowboard accidents.

A wide variety of wrist protectors is commercially available. Consumers can choose between different principal design concepts. One is the “integrated protection concept” in which the protective elements are integrated within a glove. Another one is the “separated protection concept” where the protective elements are individual components (similar to a brace or orthosis) that can be worn with or without a glove. If worn with a glove it can be foreseen to place them underneath or on top of the glove[3][4][5][6].

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Protective clothing for use in snowboarding — Wrist protectors — Requirements and test methods

1 Scope

This document specifies the requirements and test methods for ergonomics, innocuousness, comfort/sizing, restraint, ability to limit wrist extension and attenuate impact force on the palm as well as provisions for marking and instructions supplied by the manufacturer for wrist protectors for all users of snowboard equipment.

It does not apply to protectors used in roller sports, alpine skiing, or other sports. This document does not address protection for the forearm due to axial forces caused by an impact on the fingers or fist. Moreover, this document does not address protection against palmar flexion (terminal flexion) caused by an impact on the dorsal side of the hand.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

ISO 21420:2020, *Protective gloves — General requirements and test methods*

ISO 13999-1:1999, *Protective clothing — Gloves and arm guards protecting against cuts and stabs by hand knives — Part 1: Chain mail gloves and arm guards*

3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1
wrist
radio-carpal joint

3.2
dorsal
pertaining to upper side or back of the hand and wrist

3.3
palmar
pertaining to the palm side of the hand and wrist

3.4
wrist protector
wrist guard
device worn on the wrist and extending onto the forearm and the hand, that is intended to reduce the risk of wrist injuries by mechanical impact

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3.5
concepts of wrist protectors

3.5.1
integrated protection concept
glove and protection elements forming one unit and used as one product

3.5.2
standalone protection concept
protection elements forming a wrist protector which can be worn with a glove, where the suitable type of glove will be specified by the manufacturer

Note 1 to entry: The manufacturer specifies how the protector is to be worn, including, whether the protector is to be worn underneath or on top of the glove.

3.7
stiffness element
design element that limits wrist extension

3.8
splint
type of stiffness element that uses semi-rigid support on either the dorsal and/or palmar area of the protector

3.9
fastener
strap or connector attaching wrist protector to the wrist

3.10
extension
movement of the hand in the dorsal direction

Note 1 to entry: Dorsal pertains to the back of the hand, palmar to the palm.

3.11
flexion
movement of the hand in the palmar direction

4 Requirements

4.1 General

Performance requirements shall be based on 3 ranges (A, B, C) as defined in Table 1.

The size of the wrist protector shall be defined according to the hand size in ISO 21420.

Table 1 — Correlation range to size

	Range		
	A	**B**	**C**
Size	≤6	7 to 8	≥9

Requirements are fulfilled, if ergonomic-, innocuousness - and restraint- tests are fulfilled at room temperature (20 °C) and impact- and limitation of wrist extension-tests are fulfilled at room temperature and in cold condition (–10 °C)

However, additional impact- and limitation of wrist extension-tests at lower temperature might be performed and specified in the information supplied by the manufacturer (see Clause 7).

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