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Protective equipment for martial arts —

Part 1: General requirements and test methods

Équipement de protection pour les arts martiaux —
Partie 1: Exigences et méthodes d'essai générales

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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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For an explanation on 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 the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 83, *Sports and other recreational facilities and equipmen*t, Subcommittee SC 6, *Martial arts*.

A list of all parts in the ISO 21924 series can be found on the ISO website.

Introduction

Protective equipment for martial arts (hereinafter referred to as protectors) protect the wearer against contusion, abrasion, laceration, fractures and physical injuries.

Protectors covered by this document will not necessarily prevent any serious injury caused by the execution of martial arts.

Protective equipment for martial arts —

Part 1:
General requirements and test methods

1 Scope

This document specifies the general requirements and test methods for innocuousness, ergonomics, restraint, zone of protection, impact performance, as well as provisions for marking and the information supplied by the manufacturer for protective equipment used in martial arts.

The protectors covered by this document are mainly designed for use in unarmed martial arts such as taekwondo, karate, kick-boxing and similar disciplines.

Additional requirements and test methods for components of protectors for specific kinds of martial arts are specified in further parts of this document.

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 105-A02, *Textiles — Tests for colour fastness — Part A02: Grey scale for assessing change in colour*

ISO 105-A03, *Textiles — Tests for colour fastness — Part A03: Grey scale for assessing staining*

ISO 105-E04, *Textiles — Tests for colour fastness — Part E04: Colour fastness to perspiration*

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 http://www.iso.org/obp

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

3.1
protective equipment for martial arts
equipment worn on the body which mainly provides protection against the effect of external forces and energies in martial arts

3.2
zone of protection
zone of protectors primarily intended to ensure the protection of the wearer of martial arts equipment

4 Requirements

4.1 General

Protectors shall be so designed and manufactured that in the foreseeable conditions of use for which they are intended, the user can perform the sporting activity normally while enjoying protection at the specified limit.

It shall be possible to clean the protectors in accordance with the manufacturer's instructions without the loss of the ability to fulfil the requirements of this document.

4.2 Innocuousness

Protectors shall be designed and manufactured to provide protection when used in accordance with the information supplied by the manufacturer, without any harm to the user or others when so used. Materials, incorporated substances, seams and edges and particularly those parts of the protectors in close contact with the user shall not impair the user's health and hygiene.

The colour of protectors or parts of them shall be resistant to perspiration.

For textile materials, when tested in accordance with 5.3.1, this requirement is considered as fulfilled if, using an alkaline and acid solution according to ISO 105-E04,

— a fastness grade 3 to 4 according to ISO 105-A02 by the change in colour, and

— a fastness grade 3 to 4 according to ISO 105-A03 by staining

will be reached.

For other materials, these requirements are considered as fulfilled if no staining of the used strips of filter paper is observed when they are tested in accordance with 5.3.2.

4.3 Restraint

The design of the protectors shall enable secure fixation to the body of the user, so that they will remain in place during the normal use for which they are intended. If secure fixation is not provided by restraint systems which are integrated elements or permanently attached to the protector, instructions shall be provided by the manufacturer describing a method of secure fixation.

If rigid, sharp edges and abrasive elements are part of the restraint system, they shall be completely covered by a soft padding.

The displacement of the protector from its original position shall be after each individual test less than 15 % of the linear dimension of the zone of protection (see 4.5 and Clause 7) measured in the line with the force supplied as specified in 5.4.

When tested according to 5.4, no parts of the restraint system shall break, split, be released or fail in any other way.

4.4 Sizing

Protectors shall be supplied in a number of different sizes to meet the requirements according to different body dimensions of wearers. The size shall be marked on the protector.

The specific sizing is defined in the relevant parts of this document.

4.5 Zone of protection

The dimensions of the zone of protection shall be as defined in the relevant parts of this document.

The manufacturer shall mark the zone of protection on the protector or in the information supplied by the manufacturer.

The zone of protection shall be measured as specified in 5.5.

4.6 Impact performance

When tested according to 5.6, no part of the protector shall break, split or be deformed irreversibly.

Specific requirements are defined in relevant parts of this document.

5 Testing

NOTE This clause specifies test conditions that apply to all types of protectors. Test methods for particular types of protectors are as defined in the relevant parts of this document.

5.1 Sampling

Where the protectors are normally supplied as single items, then two single protectors of each size shall be provided for testing.

Where the protectors are normally supplied in pairs, then two pairs of protectors of each size shall be provided for testing.

Where only one size of a protector is manufactured then four pairs, if normally supplied in pairs, or four singles, if normally supplied in singles, of that protector shall be provided for testing.

If six or less sizes are manufactured, samples of each size shall be provided for testing. If more than six sizes are manufactured, the sizes to be provided for testing shall be agreed with the test house to be representative of the whole size range.

The samples shall be supplied to the test house with the information supplied by the manufacturer according to Clause 7.

5.2 Conditioning

Before a test is carried out, the samples shall be cleaned three times in accordance with the cleaning instructions as detailed in the information supplied by the manufacturer (see Clause 7).

All tests shall be carried out at an ambient temperature of (20 ± 2) °C and at a relative humidity of (65 ± 5) %.

Before testing, the samples shall be stored at this temperature and humidity for at least 4 h.

5.3 Colour fastness to perspiration

5.3.1 Textile materials

Carry out the test in accordance with ISO 105-E04.

If different textile materials or colours are used for protectors, test each material and each colour separately.

5.3.2 Non-textile materials

5.3.2.1 General

If the protective equipment is made of different non-textile materials or colours, test each material and each colour separately.

5.3.2.2 Apparatus

The apparatus shall consists of the following.

5.3.2.2.1 Filter paper, for qualitative analyses, medium porous.

5.3.2.2.2 Adhesive tape, colourless self-adhesive plastic tape, approximately 12 mm in width.

5.3.2.2.3 Test solution, consisting of:

a) 4,5 g sodium chloride, NaCl;

b) 0,3 g of potassium chloride, KCl;

c) 0,3 g of sodium sulfate, Na_2SO_4;

d) 0,4 g of ammonium chloride, NH_4Cl;

e) 3,0 g lactic acid, $CH_3{\cdot}CH(OH){\cdot}COOH$, approximately 90 % absolute;

f) 0,2 g urea $H_2N{\cdot}CO{\cdot}NH_2$;

g) 1 000 cm^3 of distilled water or water of equivalent purity.

5.3.2.2.4 Dessicator.

5.3.2.2.5 Oven, with a temperature of (40 ± 2) °C.

5.3.2.3 Procedure

Cut a strip of approximately 15 mm in width and a maximum of 80 mm in length from the filter paper.

Saturate this strip with the test solution.

Attach the saturated strip of filter paper with the adhesive tape to the specimen such that the specimen contacts the saturated filter paper as closely as possible. The adhesive tape shall cover the strip of filter paper over its whole length and project at least 10 mm beyond both ends of the strip.

Store the prepared specimen in a dessicator for 2 h at (40 ± 2) °C above water. Previously, the dessicator shall be brought to the test temperature in an oven and left in the oven for the period of test.

Subsequently, detach the filter paper from the specimen and examine it for staining.

5.4 Restraint

When testing the restraint, the protector(s) shall be attached to an appropriate test subject. The subject shall be of the appropriate body dimensions as defined in the information supplied by the manufacturer for the relevant size of the protector(s).

The attachment shall be made in accordance with the instructions described in the information supplied by the manufacturer.

A force in accordance with the relevant parts of this document shall be applied to the protector(s) for a period of (30 ± 5) s.

The maximum amount of displacement of the protector shall be measured while the force is applied.

At least one test shall be carried out in each test direction. After each individual test, the sample shall be returned to its original position.

5.5 Zone of protection

An individual test gauge shall be used for each size of each type of protector. The test gauges shall be designed such that they can be fitted to the surface of the protector.

By placing the test gauge on the zone of protection identified by the manufacturer, it shall be determined whether the requirements for shape and size specified in the relevant parts of this document are met.

The test gauge shall be in accordance with the minimum dimensions of the zone of protection specified in the relevant parts of this document.

5.6 Impact performance

If no other method is defined in the relevant parts of this document, testing is carried out by a drop test with a striker to be made of steel.

The striker shall be a mass of (2,5 ± 0,025) kg and of cylindrical form of diameter (80 ± 2) mm. The impact surface of the striker shall be domed having a radius of curvature of (100 ± 2) mm.

The attachment of the protector to the respective testing device and the kinetic energy are specified in the relevant parts of this document.

The test shall be carried out three times on the same position in accordance with the relevant parts of this document.

6 Marking

Protectors shall be durably and clearly marked with the following:

a) the name or trademark of the manufacturer or his authorized representative within the European Union;

b) the designation of the protector, commercial name or code that uniquely identifies the protector;

c) the size of the protector;

d) the number of the relevant part of this document;

e) a clear indication whether the protector is for left or right fitting, if appropriate;

f) the year of manufacture (date or code);

g) the following pictogram instruction for the user to see the information supplied by the manufacturer.