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Protective equipment for martial arts —

Part 4: Additional requirements and test methods for head protectors

Équipement de protection pour les arts martiaux —

Partie 4: Exigences et méthodes d'essai complémentaires relatives aux protecteurs de la tête

Reference number
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Contents

Page

Foreword

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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

Head protectors are an individual item of protective equipment to protect the front, the sides and the rear of the head in martial arts.

They are designed to provide a degree of safety in case of accidental contact during martial arts. Martial arts can be dangerous and severe blows to the head may cause serious injury even if the protector is fitted and used properly.

Protective equipment for martial arts —

Part 4:
Additional requirements and test methods for head protectors

1 Scope

This document specifies additional requirements and test methods for head protectors without face protection used in unarmed martial arts, such as taekwondo, karate, kick-boxing and similar disciplines.

It also applies to head protectors used in boxing.

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 21924-1:2017, *Protective equipment for martial arts — Part 1: General requirements and test methods*

EN 960, *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 21924-1 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/

4 Requirements

4.1 General

The general requirements for head protectors shall be the same as those given in ISO 21924-1.

Head protectors shall be easy to put on and take off.

4.2 Openings

Head protectors shall be so designed that the ears have a connection to the environment to enable the wearer to hear as well as to prevent air pressure damage caused by blows on the ear.

The head protector may be pierced by openings that allow ventilation.

4.3 Mass

The maximum mass permitted shall vary with the head circumference. The relevant mass is specified in Table 1.

Table 1 — Head circumference and mass of the head protector

Head circumference mm	<540	540 to 560	>560 to 580	>580
Mass g	max. 360	max. 380	max. 400	max. 420

4.4 Sizing

The manufacturer shall indicate in centimetres the range of head circumference of the user for which the head protector is designed.

4.5 Field of vision

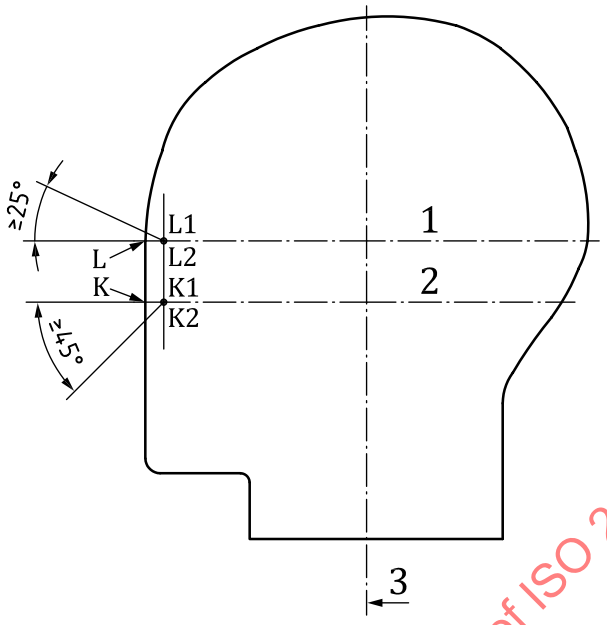
When tested in accordance with 5.4, there shall be no occultation in the field of vision bounded by angles as follows (see Figure 1):

— horizontally: min 105° from the longitudinal vertical median plane to the left and right hand sides;

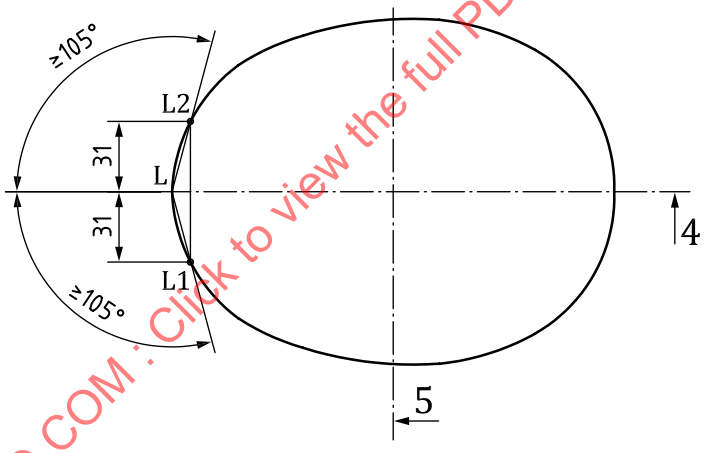
— upwards: min 25° from the reference plane;

— downwards: min 45° from the basic plane.

Dimensions in millimetres



a) Section of headform in longitudinal vertical plane



b) Section of headform in reference plane

Key

1 reference plane
2 basic plane
3 central vertical axis
4 longitudinal vertical median plane
5 central transverse vertical plane

Figure 1 — Field of vision

4.6 Restraint

A restraint system shall be provided by the manufacturer which enables the user to attach the head protector firmly without any assistance.

When attached firmly, the system shall meet the requirements defined in ISO 21924-1:2017, 4.3 excluding the third paragraph of ISO 21924-1:2017, 4.3, when tested according to 5.5.

After each individual test, the displacement of the head protector from its original position shall be less than 5 % of the head circumference.

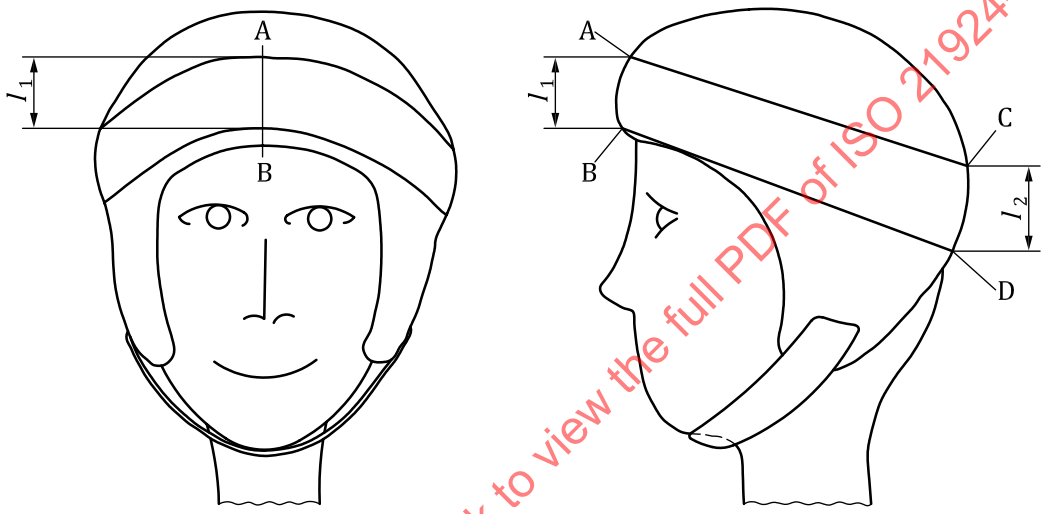
Restraint systems shall be fitted with adjusters.

4.7 Zone of protection

The zone of protection shall cover the head protector including the largest diameter. It shall come into contact with the lower edge of the head protector in the forehead region.

The location and dimensions of the zone of protection shall be as given in Figure 2 and Table 2.

The information supplied by the manufacturer shall determine how the head protector is correctly positioned on the head and where the zone of protection is located with reference to the outer dimensions of the head protector.



Key

l_1 width of the zone of protection along the symmetrical plane of the head protector in the forehead region

l_2 width of the zone of protection along the symmetrical plane at the back of the head

A to D points of marking

Figure 2 — Location of the zone of protection of head protectors

Table 2 — Dimensions of the zone of protection of head protectors

Head circumference mm	l_1 mm **min.**	l_2 mm **min.**
<530	30	40
530 to 560	35	45
>560 to 580	40	50
>580	45	55

4.8 Impact performance

Head protectors conform to this document if the maximum peak force is below 2 kN when tested in accordance with 5.7.

5 Test methods

5.1 General

If no special test methods are specified, the requirements of this document are to be tested by measurement, visual inspection, tactile examination, etc.

For the tests new, unused protectors shall be used.

5.2 Sampling

Sampling shall be carried out in accordance with ISO 21924-1:2017, 5.1.

5.3 Conditioning

Conditioning is carried out in accordance with ISO 21924-1:2017, 5.2.

5.4 Determination of field of vision

Place the head protector on a headform of appropriate size.

The headform shall comply with EN 960.

Ascertain that the vertical median plane of the head protector coincides with the vertical median plane of the headform.

Adjust the head protector on the headform according to the manufacturer's instructions.

In that position, determine, using angle templates or other means of assessing angles of vision, whether the head protector complies with the requirements for field of vision in 4.5.

5.5 Restraint

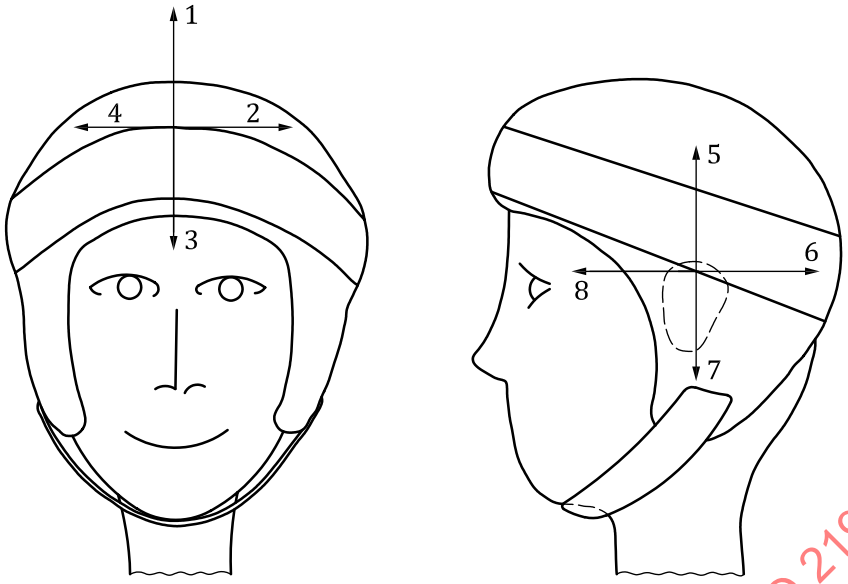
The head protector shall be attached to the head of a test person of appropriate head circumference according to the manufacturer's size declaration.

The test positions and test directions are shown in Figure 3. The test directions shall be as shown by arrows 1 to 8. They shall be tangential to the head protector.

One test position shall be within the front side on the vertical symmetrical plane and on the upper edge of the zone of protection.

The other test position shall be as close as possible near the ear within the zone of protection.

The test force to be applied shall be 20 N in each position.



Key

1 to 8 order of the test directions

Figure 3 — Test positions and test directions at head protectors

5.6 Zone of protection

The head protector shall be placed on the head of a test person with an appropriate head circumference or on a headform of suitable size. In accordance with the manufacturer's instructions, points A, B, C and D (see Figure 2) shall be marked on the head protector.

For this marking, the head protector is prepared in such a way that the zone of protection is stretched out with a flat surface. It can be cut in order to achieve this. The zone of protection shall not, however, be cut into several parts.

First, the lines AC and BD shall be marked as limiting lines for the zone of protection on the outer surface of the flat head protector. Attention shall be paid that these lines only touch the edge of the head protector in the forehead region and do not cut it. If necessary, the points A, B, C and D can be transferred, in compliance with the dimensions according to Table 2 and the declaration of the manufacturer, to the symmetrical plane of the head protector.

5.7 Impact performance

5.7.1 Apparatus

The principle of impact testing is shown in Figure 4.

5.7.1.1 Flat horizontal steel plate, with a width of at least 300 mm, a length of at least 350 mm and a thickness of at least 20 mm shall be used as a support of the sample. In the centre of the flat plate, there shall be a cylindrical hole with a diameter of (106 ± 2) mm.

5.7.1.2 Cylindrical anvil, with a diameter of (100 ± 2) mm, a thickness of at least 20 mm with a flat upper surface shall be mounted on a load cell.

The surface of the anvil facing the striker shall be in level with the surface of the flat plate with a tolerance of ±1 mm.

5.7.1.3 Compression ring, made of steel with a mass of (10 ± 0,1) kg, (140 ± 4) mm internal and (260 ± 4) mm external diameter shall be used to fix the sample to the support.

