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Eye and face protection — Test methods —

Part 1:
Geometrical optical properties

Protection des yeux et du visage — Méthodes d'essai —

Partie 1: Propriétés optiques géométriques

ICS: 13.340.20

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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).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on 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.

The Committee responsible for this document is ISO/TC 94, *Personal safety — Personal protective equipment*, Subcommittee SC 6, *Eye and face protection*.

This document cancels and replaces the ISO 4854:1981, which has been technically revised.

A list of all parts in the ISO 18526- series can be found on the ISO website.

Introduction

This family of documents was developed in response to the worldwide stakeholders' demand for minimum requirements and test methods for eye and face protectors traded internationally. ISO 4007 gives the terms and definitions for all the various product types. The test methods are in the ISO 18526- series, while the requirements for occupational eye and face protectors are in the ISO 16321- series. Eye protection for specific sports is mostly dealt with by the ISO 18527- series. A guidance document for the selection, use and maintenance of eye and face protectors is in preparation.

Eye and face protection — Test methods —

Part 1:
Geometrical optical properties

1 Scope

This document specifies the reference test methods for determining the spherical, cylindrical, and prismatic refractive properties of unmounted and mounted plano lenses (non-corrective lenses) for eye and face protectors.

This document does not apply to any eye and face protection requirement standards for which other test methods are specified.

Other test methods may be used if shown to be equivalent.

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 4007, *Personal protective equipment – Eye and Face Protection - Vocabulary*

ISO 18526-2,[1)] *Eye and face protection – Test methods — Part 2: Physical optical properties*

ISO 18526-4,[2)] *Eye and face protection – Test methods — Part 4: Headforms*

ISO 11664-1, *Colorimetry — Part 1: CIE standard colorimetric observers*

ISO/IEC Guide 98-3, *Uncertainty of measurement — Part 3: Guide to the expression of uncertainty in measurement (GUM:1995)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 4007 apply.

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

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

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

For the purpose of this document, “test sample” is taken to be the object under test, e.g. “lens”, “filter” or “complete protector” as specified in the requirement standards.

1) Under preparation (Stage at the time of publication ISO/DIS 18526-2)

2) Under preparation (Stage at the time of publication ISO/DIS 18526-4)

4 Preparatory information

Before testing, refer to the requirement standard appropriate to the product for the information needed to apply the tests in this document, for example:

— the number of test samples;

— preparation of test samples;

— the selection of test samples (if included in this part);

— any prior conditioning or testing;

— test method (if more than one are included in this part);

— any deviations from the method(s);

— characteristics to be assessed subjectively (if appropriate);

— pass/ fail criteria.

5 General test requirements

Unless otherwise specified, the values stated in this document are expressed as nominal values. Except for temperature limits, values that are not stated as maxima or minima shall be subject to a tolerance of ± 5%.

Unless otherwise specified, the ambient temperature for testing should be between 16 °C and 32 °C and any temperature limits specified shall be subject to an accuracy of ±1 °C. Relative humidity should be maintained at (50 ± 20) %.

Unless otherwise specified, the test samples shall be tested at the reference points (for testing) as defined in ISO 4007.

The tests shall be done by trained observers.

6 Geometric optical test methods

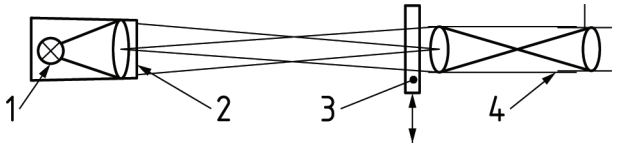
6.1 Test method for refractive power and prismatic deviation for plano lenses

6.1.1 Principle

This test is intended to measure the refractive power and prismatic deviation for nominally plano lenses and is called the telescope method.

6.1.2 Apparatus

A schematic drawing of a possible telescope set-up is given in Figure 1. Alternatively, an externally illuminated telescope target may be used.



Key

1 light source
2 telescope target
3 test sample
4 telescope

Figure 1 — Schematics of telescope set-up

6.1.2.1 Telescope

A telescope with a nominal aperture of 20 mm and a magnification between 10x and 30x, fitted with an adjustable eyepiece incorporating a reticule. The focusing adjustment shall have a scale of refractive power capable of calibrating the telescope by using the methods as described in clause 6.1.2.4 or by utilising any other applicable method delivering the required maximum uncertainty of measurement 0,01 D.

6.1.2.2 Illuminated target

A target, consisting of a black plate incorporating the cut-out pattern shown in Figure 2, behind which is located a light source of adjustable luminance. A condenser lens may be necessary, to achieve sufficient luminance by focusing the light source on the telescope objective.

The large annulus of the target has an outer diameter of (23,0 ± 0,1) mm with an annular aperture of (0,6 ± 0,1) mm. The small annulus has an inner diameter of (11,0 ± 0,1) mm with an annular aperture of (0,6 ± 0,1) mm. The central aperture has a diameter of (0,6 ± 0,1) mm. The bars are (20,0 ± 0,1) mm long and (2 ± 0,1) mm wide with a (2 ± 0,1) mm separation. The distance from the outer circle to the inner bars shall be (2,0 ± 0,5) mm.

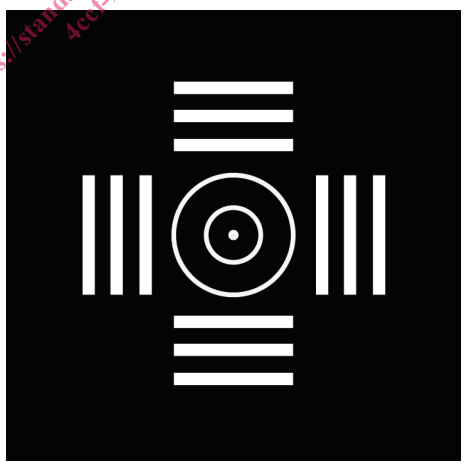


Figure 2 — Telescope target (dimensions are given in 6.1.2.2)

6.1.2.3 Filter

An optional filter with its maximum transmittance in the green part of the spectrum will reduce chromatic aberration. It is recommended that a filter with a spectral transmittance that is similar to the CIE 1931 standard colorimetric observer according to ISO 11664-1 is used.