INTERNATIONAL STANDARD

ISO 14889

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Ophthalmic optics — Spectacle lenses — Fundamental requirements for uncut finished lenses

Optique ophtalmique — Verres de lunettes — Exigences fondamentales relatives aux verres finis non détourés

Reference number
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Content

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Foreword

ISO (the International Organization for Standardization) is a world-wide 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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75% of the member bodies casting a vote.

International Standard ISO 14889 was prepared by Technical Committee ISO/TC 172, *Optics and optical instruments,* Subcommittee SC 7, *Ophthalmic optics and instruments.*

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Ophthalmic optics — Spectacle lenses — Fundamental requirements for uncut finished lenses

1 Scope

This International Standard specifies essential requirements for uncut finished spectacle lenses. This International Standard is not applicable to protective lenses.

This International Standard takes precedence over the corresponding requirements of other standards, if differences exist.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of the publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on the International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 8980-1:1996, *Ophthalmic optics - Uncut finished spectacle lenses - Part 1 : Specifications for single-vision and multifocal lenses*

ISO 8980-2:1996, *Ophthalmic optics - Uncut finished spectacle lenses - Part 2 : Specifications for progressive power lenses*

ISO 8980-3:—[1], *Ophthalmic optics - Uncut finished spectacle lenses - Part 3 : Transmittance specifications and test methods*

ISO 13666:—[1], *Ophthalmic optics - Spectacle lenses - Vocabulary*

3 Definitions

For the purposes of this International Standard, the definitions given in ISO 13666 and the following definition apply :

3.1 manufacturer (of an uncut finished spectacle lens)

Natural or legal person who places the uncut finished lens on the market.

1 To be published.

4 General requirements for spectacle lenses

4.1 Performance

In addition to the requirements specified in this International Standard, uncut finished lenses shall comply with the relevant parts of ISO 8980.

4.2 Design

Spectacle lenses shall be designed so that the overall risk associated with their use according to the conditions intended by the manufacturer, relative to the risk when the spectacle lenses are not used, is reduced to a level consistent with the materials used and compatible with the generally acknowledged state-of-the-art.

4.3 Materials

4.3.1 Physiological compatibility

Lenses shall not be made from materials known to be physiologically incompatible or known to create a significant number of allergic reactions when the lenses are used as intended by the manufacturer.

4.3.2 Flammability

When the lens is tested as described in 5.1, there shall be no continued combustion after withdrawal of the test rod.

4.4 Mechanical strength

Uncut spectacle lenses shall withstand the quasi-static loading type-test described in 5.2.

The requirement for minimum robustness shall be satisfied if the spectacle lens withstands the application of a 22 mm steel ball with a force of (100 ± 2) N, when tested as described in 5.2.

This test shall be carried out immediately after conditioning at a temperature of (23 ± 5) °C.

As a consequence of the test for mechanical strength, the following defects shall not have occurred :

a) lens fracture

A spectacle lens shall be considered to have fractured if it has cracked through its entire thickness into two or more pieces ; or if more than 5 mg of the lens material has become detached from the surface away from the one in contact with the ball ; or if the ball has passed through the test specimen.

b) lens deformation

A spectacle lens shall be considered to have been deformed if a mark has appeared on the white paper on the side opposite to that on which the force has been applied.

NOTE : If the spectacle lens is intended for use for industrial or other purposes where mechanical hazards exist, a higher level of mechanical strength or robustness may be required. If eye protection is required, the specific requirements are given in the appropriate International Standard.

4.5 Transmittance

4.5.1 General requirements

The transmittance shall conform to the requirements specified in ISO 8980-3.

When using illuminant D 65, the luminous transmittance τ_V of spectacle lenses shall not be ≤ 3 % at the design reference point.

4.5.2 Additional requirements for lenses intended for use when driving

NOTE : This clause does not apply to spectacle lenses whose transmittance is ≤ 8 %. This is because such lenses are not intended for driving or road use.

4.5.2.1 Spectral transmittance

The spectral transmittance $\tau(\lambda)$ of the lens at any wavelength in the range 500 nm to 650 nm shall be not less than 0,2 τ_V.

4.5.2.2 Daylight use

When using illuminant D 65, the luminous transmittance τ_V of spectacle lenses for driving during daylight shall be ≥ 8 % at the design reference point.

4.5.2.3 Use at night

When using illuminant D 65, the luminous transmittance τ_V of spectacle lenses for driving at night shall be ≥ 75 % at the design reference point.

4.5.2.4 Relative visual attenuation quotient for signal light recognition

Spectacle lenses conforming to 4.5.2.2 and 4.5.2.3 shall have a relative visual attenuation quotient Q of not less than :

a) 0,8 for red ;

b) 0,8 for yellow ;

c) 0,6 for green ;

d) 0,4 for blue.

5 Test methods

All tests described in this International Standard are type tests.

5.1 Flammability

5.1.1 Apparatus

The test device consists of a steel rod (300 ± 3) mm long and 6 mm nominal diameter, with a flat end face perpendicular to its longitudinal axis, a heat source, and a thermocouple with a temperature-indicating device.

5.1.2 Procedure

Heat one end of the steel rod over a length of at least 50 mm to a temperature of (650 ± 20) °C. Measure the temperature of the rod by means of the thermocouple attached at a distance of (20 ± 1) mm from the heated end of the rod.

With the rod positioned with its axis vertical, allow the heated face of the rod to rest under its own weight on the surface of the test sample for a period of not less than 5 s, and then remove the rod.

Repeat this test on a sample lens made from each material to be used. Carry out visual inspection to establish whether combustion continues after removal of the rod from the test sample.

5.2 Mechanical strength

5.2.1 Apparatus (see figure 1)

5.2.1.1 Loading device

A steel ball of 22 mm nominal diameter is fastened to the lower end of a tube, the nominal length of which is 70 mm. The loading mass shall be such that the force acting on the test specimen is (100 ± 2) N.

5.2.1.2 Specimen support

The specimen support consists of a steel supporting plate and a load ring. The upper face of the steel supporting plate and the lower face of the load ring shall each be fitted, by appropriate means, with a circular silicone rubber ring of (40 ± 5) IRDH having an inside diameter of (35 ± 0,1) mm and a nominal cross-section of 3 mm × 3 mm.

If the specimen lens is of insufficient dimensions to enable its entire periphery to be adequately supported, a suitable adaptor sleeve shall be used.

The load ring shall have a mass of (250 ± 5) g.

NOTE 1 : This mass is necessary to ensure that the silicone seating presses securely against the upper surface of the specimen.

For curved lenses with a cylindrical component, the supporting plate and load ring shall be curved to conform to the surfaces of the lens.

A sheet of carbon paper on top of a sheet of white paper is placed on the plane base of a cylindrical cavity in the supporting plate. The plane base of the cavity shall be located 1,5 mm below the surface to which the silicone ring is attached (assumed to be plane in this case), and parallel to it. In those cases where a supporting plate is designed to support a lens surface that is not rotationally symmetric and therefore has a three-dimensional upper face to carry the silicone ring, the distance of 1,5 mm is measured from the lowest point of the edge of the cavity to the plane base of it.

NOTE 2 : An alternative method may be used (for example a mechanical sensor to measure deformation) if shown to be equivalent.

5.2.2 Procedure

5.2.2.1 Preparation

Carry out the test at the temperature specified in 4.4.

5.2.2.2 Positioning of the specimen

Centre the specimen on the support with the back surface downwards and place the load ring centrally on the specimen with its silicone rubber ring face down.

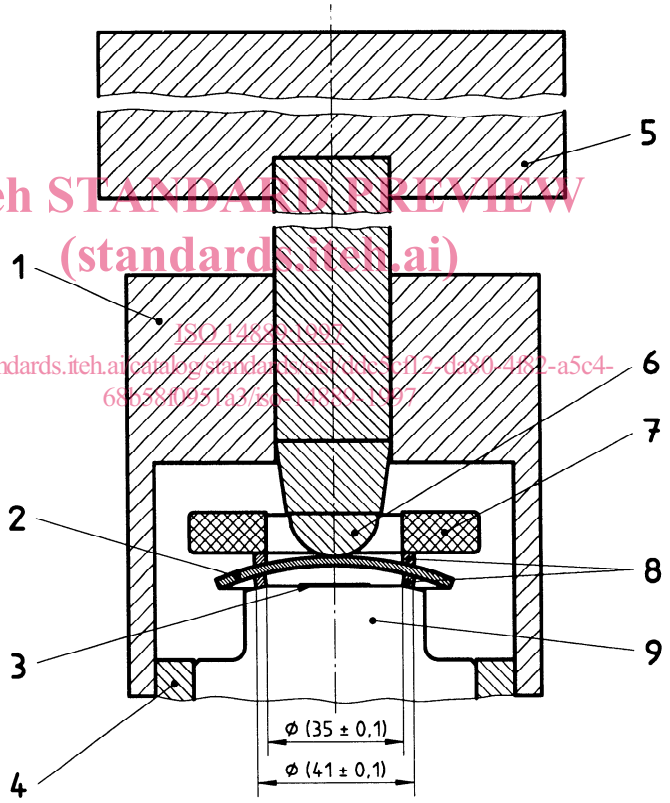
5.2.2.3 Application of the load

Lower the loading mass onto the lens at a speed not exceeding 400 mm/min. Maintain the force of (100 ± 2) N for (10 ± 2) s. Then remove the loading mass.

6 Information

The information to be supplied by the manufacturer shall comply with the relevant part(s) of ISO 8980.

Dimensions in millimetres



1 Guiding block
2 Spectacle lens
3 Carbon paper on white paper
4 Centring ring
5 Loading mass (100 ± 2) N
6 Steel ball
7 Load ring (250 ± 5) g
8 Silicone seating rings (35 × 3 × 3)
9 Support system

Figure 1 — Apparatus for minimum robustness test