INTERNATIONAL STANDARD

ISO 8980-1

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Ophthalmic optics — Finished single-vision corrective lenses —

Part 1: General requirements

Optique ophtalmique — Verres correcteurs unifocaux finis —

Partie 1: Spécifications générales

Reference number
ISO 8980-1:1992(E)

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.

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 8980-1 was prepared by Technical Committee ISO/TC 172, *Optics and optical instruments*, Sub-Committee SC 8, *Ophthalmic optics*.

ISO 8980 consists of the following parts, under the general title *Ophthalmic optics — Finished single-vision corrective lenses*:

— *Part 1: General requirements*

— *Part 2: Special requirements*

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Ophthalmic optics — Finished single-vision corrective lenses —

Part 1:
General requirements

1 Scope

This part of ISO 8980 specifies the optical, mechanical and geometric requirements to be met by volume-produced, factory-finished, uncut single-vision ophthalmic lenses.

It applies to lenses that may or may not have a daylight filter function, but it does not apply to lenses that are manufactured specifically for individual prescriptions.

Special requirements for single-vision corrective lenses, such as transmittance (including photochromic, polarizing and gradient tinted lenses, etc.), abrasion resistance and stability in daylight, will be the subject of a future part of this International Standard (ISO 8980-2).

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 8980. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO 8980 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 7944:1984, *Optics and optical instruments — Reference wavelengths*.

ISO 8598:—[1], *Optics and optical instruments — Focimeters*.

3 Definitions

For the purposes of this part of ISO 8980, the following definitions apply.

3.1 uncut lens: An ophthalmic lens which has optically finished surfaces but which has not been cut or edged to the final size and shape to be fitted in a spectacle frame.

3.2 spherical power lens: A lens bringing a paraxial pencil of parallel light to a single focus.

NOTE 1 This definition could also apply to aspherical lenses designed for single-vision purposes.

3.3 astigmatic power lens: A lens bringing a paraxial pencil of parallel rays to two separate line foci mutually at right angles and hence, unlike a spherical lens, having two principal powers. One of these powers may be zero, with the corresponding focal line at infinity.

Lenses referred to as toric lenses, sphero-cylindrical lenses, cylinder lenses and bi-toric lenses are all astigmatic lenses.

3.4 refractive power: The reciprocal of the paraxial focal length of an ophthalmic lens, measured in air.

NOTE 2 Its unit is the dioptre (D) and is expressed in reciprocal metres (m^{-1}). In some countries, the symbol (δ) is used for official purposes.

3.5 astigmatic power: Difference between the minimum and maximum refractive power values.

1) To be published.

3.6 principal meridians: Perpendicular sections of a lens containing the optical axis and having maximum and minimum refractive powers.

NOTE 3 In general, the two principal meridians are perpendicular to each other (regular astigmatism).

3.7 power of a spherical power lens: The mean value of the refractive powers for the two principal meridians. (See note 2.)

3.8 power of an astigmatic power lens: Power comprising three values: the refractive powers of each principal meridian and the cylindrical power (the difference between the two principal meridians). (See note 2.)

3.9 prismatic power: The deviation of a light ray through a specified point on a lens.

NOTE 4 Its unit is the prism dioptre (Δ) and is expressed in centimetres per metre (cm/m).

3.10 vertex power: There are two vertex powers of a lens

a) **back vertex power** [expressed in dioptres (D)]: The reciprocal of the back vertex focal length measured in metres.

b) **front vertex power** [expressed in dioptres (D)]: The reciprocal of the front vertex focal length measured in metres.

NOTE 5 According to convention, the back vertex power is specified as the "power" of a corrective lens; the front vertex power is, however, required for certain purposes, e.g. in the measurement of some multifocal lenses.

3.11 optical centre: A point on either surface of the lens through which an incident light ray normal to the surface passes through the lens without undergoing any deviation.

3.12 reference point: That point on a lens at which the manufacturer indicates that the design specifications for the lens shall apply.

4 Classification

A distinction is drawn between three main series of corrective lenses, for each of which an individual set of requirements is specified.

4.1 Single-vision lenses

Lenses designed to provide correction for a single viewing distance.

4.2 Multifocal lenses

Lenses designed to provide correction for two or more defined viewing ranges.

4.3 Progressive power lenses

Lenses designed to provide correction for more than one viewing range in which the power changes continuously rather than discretely.

5 General requirements

5.1 Tolerances on optical power

5.1.1 General

The measurement of optical power shall be carried out at the reference point of the lens, using a focimeter specified in ISO 8598 or an equivalent method, and using one of the reference wavelengths specified in ISO 7944.

NOTES

6 For a non-prismatic lens, the reference point corresponds to its optical centre.

7 The tolerances specified in 5.1.2 and 5.1.3 apply for a room temperature of 23 °C ± 5 °C.

5.1.2 Tolerances on the power of single-vision lenses (back vertex power)

5.1.2.1 Tolerances on the power of spherical power lenses

The tolerances on the power of spherical power lenses shall be as given in table 1.

5.1.2.2 Tolerances on the power of astigmatic power lenses

Astigmatic power lenses shall comply both with the tolerances on each meridian, A, and with the tolerances on the cylinder, B. The tolerances on the power of astigmatic power lenses shall be as given in table 2.

Table 1

Values in dioptres

Back vertex power (nominal value)		Tolerance on spherical power	Tolerance on astigmatic power
0 to − 3,00 (incl.)	0 to + 3,00 (incl.)	± 0,09	0,06
below − 3,00 to − 6,00	over + 3,00 to + 6,00	± 0,12	
below − 6,00 to − 9,00	over + 6,00 to + 9,00		1 % (0,09 max.)
below − 9,00 to − 12,00	over + 9,00 to + 12,00	± 0,18	
below − 12,00 to − 20,00	over + 12,00 to + 20,00	± 0,25	

Table 2

Values in dioptres

Meridian of highest absolute power (nominal value)		Tolerance on each meridian *A*	Tolerance on the astigmatic power *B*		
			0,25 to 0,75	1 to 4,00	4,25 to 6,00
− 0,25 to − 3,00	+ 0,25 to + 3,00	± 0,09	± 0,09	± 0,12	± 0,18
below − 3,00 to − 6,00	over + 3,00 to + 6,00	± 0,12	± 0,12		
below − 6,00 to − 9,00	over + 6,00 to + 9,00			± 0,18	
below − 9,00 to − 12,00	over + 9,00 to + 12,00	± 0,18			± 0,25
below − 12,00 to − 20,00	over + 12,00 to + 20,00	± 0,25	± 0,18	± 0,25	

5.1.3 Tolerances on the prismatic power at the reference point and on centring

The prismatic effect of afocal and focal corrective lenses shall be measured within a circle having a 2 mm radius around the reference point of the uncut lens. Within this circle there shall be a point at which the tolerance on prismatic effect and on centring shall be ± 0,25 prism dioptres; this tolerance on prismatic effect shall apply up to 6,00 prism dioptres.

5.2 Material and surface quality

The method for assessing material and surface quality is specified in clause 6.

In a 30 mm diameter central zone around the reference point, the lens shall not exhibit any defects which impair vision, such as bubbles, inclusions, scratches, pits, marks or other defects deriving from manufacture. Outside this central zone, small isolated material and/or surface defects are acceptable.

5.3 Geometric sizes and tolerances

5.3.1 Sizes and appearance of periphery

The following three sizes shall be identified:

a) nominal size, d_n, which is the size declared by the manufacturer;

b) effective size, d_e, which is the real outer size of the lens (stock, as cast, or after blocking out);

c) useful size, d_u, which is the optically usable size, avoiding the presence of bevel, edge defects, etc.

NOTE 8 Isolated peripheral flaws, chips and bubbles can be acceptable.

5.3.2 Minimum tolerances on sizes

5.3.2.1 Minimum tolerance of effective size

The minimum tolerance on the effective size, d_e, in relation to the nominal size, d_n, shall be − 1 mm.

5.3.2.2 Minimum tolerance on the useful size

The minimum tolerance on the useful size, d_u, in relation to the nominal size, d_n, shall be

− 1 mm ($d_n \leqslant 65$ mm)

− 2 mm ($d_n > 65$ mm)

NOTE 9 The values specified in 5.3.2.1 and 5.3.2.2 correspond exclusively to negative tolerances on the sizes considered.

Positive tolerances may be the subject of agreement between the customer and the supplier.

5.3.3 Thickness

The effective thickness shall be measured at the reference point of the convex surface and normal to this surface. It shall not differ by more than 0,3 mm from the nominal value.

NOTE 10 The nominal thickness of the lens may be specified by the manufacturer or be the subject of agreement between the customer and the supplier.

6 Test method for material and surface quality

Place the lens in a suitable system, such as that shown in figure 1.

Carry out the examination of the lens at the "light/dark" boundary and without any magnification optics. The room lighting shall be about 200 lx.

NOTE 11 This observation is subjective and requires some experience.

7 Identification of the lens

7.1 The package of the lens shall be marked with the following information:

a) the refractive power and if any, the prismatic power;

b) nominal lens sizes (see 5.3.1);

c) colour;

d) material, or manufacturer's or supplier's trade name or equivalent;

The following information shall be available from the manufacturer on request:

e) centre or edge thickness;

f) nominal base curve;

g) optical properties (refractive index, constringence, transmittance).

7.2 Only single-vision corrective lenses which meet the general requirements specified in clause 5 shall be identified by the number of this part of ISO 8980.

Dimensions in millimetres

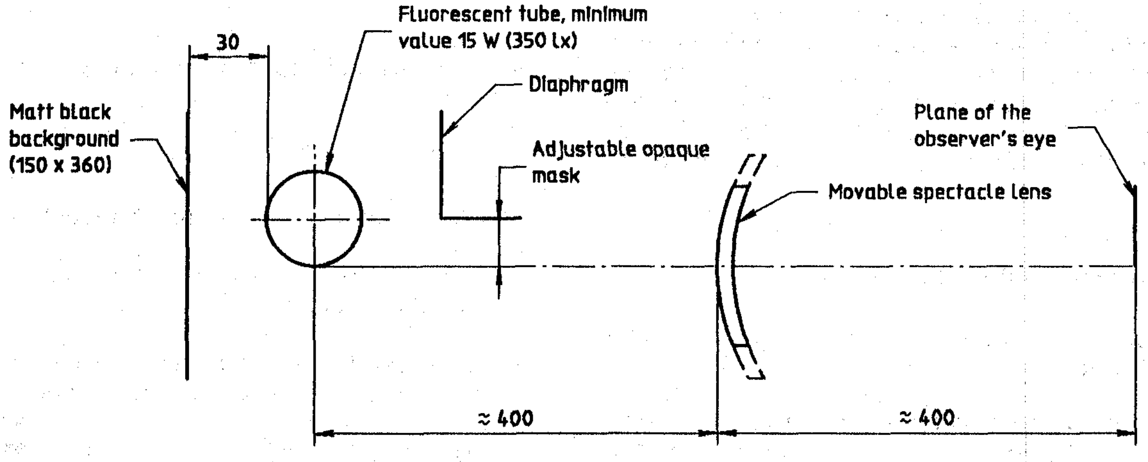

Figure 1 — Recommended system for visually inspecting a lens for defects

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Descriptors: optical equipment, ophthalmic optics, oculars, corrective lenses, classification, definitions, specifications, tests, labelling.

Price based on 4 pages