INTERNATIONAL STANDARD

ISO 8980-1

Second edition
1996-02-01

Ophthalmic optics — Uncut finished spectacle lenses —

Part 1:
Specifications for single-vision and multifocal lenses

Optique ophtalmique — Verres de lunettes finis non détourés —
Partie 1: Spécifications pour les verres unifocaux et multifocaux

Reference number
ISO 8980-1:1996(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*, Subcommittee SC 8, *Ophthalmic optics*.

This second edition cancels and replaces the first edition (ISO 8980-1:1992), which has been technically revised.

ISO 8980 consists of the following parts, under the general title *Ophthalmic optics — Uncut finished spectacle lenses*:

— *Part 1: Specifications for single-vision and multifocal lenses*

— *Part 2: Specifications for progressive power lenses*

— *Part 3: Transmittance specifications and test methods*

Annex A of this part of ISO 8980 is for information only.

International Organization for Standardization
Case Postale 56 • CH-1211 Genève 20 • Switzerland
Printed in Switzerland

Ophthalmic optics — Uncut finished spectacle lenses —

Part 1:
Specifications for single-vision and multifocal lenses

1 Scope

This part of ISO 8980 specifies requirements for the optical and geometrical properties for uncut finished single-vision and multifocal spectacle lenses.

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.*

ISO 13666:—[1], *Ophthalmic optics — Spectacles lenses — Vocabulary.*

3 Definitions

For the purposes of this part of ISO 8980, the definitions given in ISO 13666 apply.

1) To be published.

4 Classification

Finished lenses are classified as follows:

a) single-vision finished lenses;

b) multifocal finished lenses;

c) progressive power finished lenses.

5 Requirements

The tolerances shall apply at a temperature of 23 °C ± 5 °C.

5.1 Optical requirements

5.1.1 General

The optical tolerances shall apply at the reference points of the lens at one of the reference wavelengths specified in ISO 7944.

The as-worn position can result in the apparent power to the eye being different from that determined as a result of the focimeter measurement.

If the manufacturer has applied corrections to compensate for the as-worn position, then the tolerances shall apply to the corrected value and this corrected value shall be stated by the manufacturer on the package or in an accompanying document (see 7.1).

5.1.2 Tolerances on the power of single-vision lenses and multifocal lenses for the distance portion (back vertex power)

The optical power shall be determined using a focimeter complying with ISO 8598 or an equivalent method.

5.1.2.1 Tolerances on the power of lenses

Spherical, aspherical and cylindrical power lenses shall comply with the tolerances on the power of each meridian, A, and with the tolerances on the cylindrical power, B (see table 1).

5.1.2.2 Tolerances on the direction of cylinder axis

The tolerances on the direction of cylinder axis as specified in table 2 shall be measured using the method described in 6.1.

These tolerances apply to multifocal lenses and to single-vision lenses with a predetermined orientation, e.g. prism base setting.

Table 1 — Tolerances on the power of lenses

Values in dioptres (D)

Power of meridian with highest absolute power	**Tolerance on the power of each meridian, A**	**Tolerance on the cylindrical power, B**			
		⩾ 0,00 and ⩽ 0,75	> 0,75 and ⩽ 4,00	> 4,00 and ⩽ 6,00	> 6,00
⩾ 0,00 and ⩽ 3,00	± 0,12	± 0,09	± 0,12	± 0,18	± 0,25
> 3,00 and ⩽ 6,00	± 0,12	± 0,12	± 0,12	± 0,18	± 0,25
> 6,00 and ⩽ 9,00	± 0,12	± 0,12	± 0,18	± 0,18	± 0,25
> 9,00 and ⩽ 12,00	± 0,18	± 0,12	± 0,18	± 0,25	± 0,25
> 12,00 and ⩽ 20,00	± 0,25	± 0,18	± 0,25	± 0,25	± 0,25
> 20,00	± 0,37	± 0,25	± 0,25	± 0,37	± 0,37

Table 2 — Tolerances on the direction of cylinder axis

Cylindrical power, in dioptres	⩽ 0,50	> 0,5 and ⩽ 0,75	> 0,75 and ⩽ 1,50	> 1,50
Tolerance on the axis, in degrees	± 7	± 5	± 3	± 2

5.1.3 Tolerances on the addition power for multifocal lenses

The tolerances on the addition power as specified in table 3 shall be measured using the method described in 6.2.

5.1.4 Tolerances on optical centration and prismatic power

Within the areas centred around the design reference point there shall be a point at which the difference between the prescribed and/or the thickness reduction prism and the measured prismatic power does not exceed the values given in table 4.

5.1.5 Tolerances on the base setting of prism

The tolerances on the base setting of any prism shall be determined by verifying that the horizontal and vertical components comply with table 4.

For a single-vision lens with astigmatic and prismatic powers the tolerances on the difference between the cylindrical axis and the prism axis shall comply with table 2.

Table 3 — Tolerances on the addition power for multifocal lenses

Values in dioptres (D)

Value of the addition power	⩽ 4,00	> 4,00
Tolerance	± 0,12	± 0,18

Table 4 — Tolerances on optical centration and prismatic power

Prismatic power (Δ)	**Tolerances on single-vision lenses**		**Tolerances on multifocal lenses**		
	Prism (Δ)	Circle radius (mm)	Prism (Δ)	Horizontal (mm)	Vertical (mm)
⩾ 0,00 and ⩽ 2,00	± 0,25	1	± 0,25	1	0,5
> 2,00 and ⩽ 10,00	± 0,37		± 0,37		
> 10,00	± 0,50		± 0,50		

NOTES

1 The prismatic power specified in table 4 includes the combination of prescribed prism and any prism thinning.

2 The total prismatic tolerance at the prism reference point is the sum of the prismatic component resulting from the decentration tolerance (Prentice's rule) and the above tolerance on the prismatic power.

5.2 Geometrical tolerances

5.2.1 Tolerances on the size of finished lenses

Lens sizes are classified as follows:

a) nominal size (d_n): dimension(s), in millimetres indicated by the manufacturer;

b) effective size (d_e): actual dimension(s) in millimetres of the lens;

c) usable size (d_u): dimension(s), in millimetres of the area that is optically usable.

For lenses specified by diameter, the tolerances on size shall be as follows:

a) effective size, d_e:

$$d_e \geqslant d_n - 1 \text{ mm}$$

$$d_e \leqslant d_n + 2 \text{ mm}$$

b) usable size, d_u:

$$d_u \geqslant d_n - 2 \text{ mm}$$

The tolerance on usable size does not apply to lenses with a carrier curve, such as lenticulars.

As the size and thickness of lenses worked to prescription will inevitably be subject to the needs of the size and shape of the spectacle frame that is to be glazed, the tolerances on size and thickness are not applicable to these lenses. Such tolerances may be agreed between the prescriber and the supplier.

5.2.2 Tolerances on thickness

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

The nominal thickness of the lens may be specified by the manufacturer or be agreed between the user and the supplier. For lenses worked to prescription, see 5.2.1.

5.2.3 Tolerances on segment dimensions for multifocal lenses

When using one of the methods described in 6.3, each of the segment dimensions (width, depth and intermediate depth) shall not deviate from its nominal value by more than ±0,5 mm.

If sold as a matched pair, each of the segment dimensions (width, depth and intermediate depth) shall not deviate from its nominal value by more than ± 0,7 mm.

6 Test methods

6.1 Measurement method for cylinder axis for multifocal lenses

Measure the tolerances, if applicable, in relation to the horizontal in one of the following ways:

a) for round segment multifocal lenses, by the segment position prescribed on the lens order;

b) for non-circular segment, by the orientation of the segment.

6.2 Addition power measurement method

Place the lens so that the surface containing the addition segment is against the focimeter lens support and centralize the lens at the near reference point.

Using a focusing focimeter, measure the near vertex power after focusing the more nearly vertical lines of the target.

Establish the distance vertex power measurement point D (see figure 1), which is at the same distance above and to the side of the distance reference point B as the near vertex power measurement point N is from B. Then place the lens against the focimeter lens support and centralize the lens at D. Measure the distance vertex power after focusing the lines of the target which are closest to the vertical.

Calculate the addition power as the difference between the near vertex power and the distance vertex power.

Alternative measurement methods are acceptable if shown to perform equivalently to the above reference method.

In the case of an aspheric lens, the distance reference point and the method of measurement should be specified by the manufacturer.

In the case of negative lenses with negative distance powers of 6,00 D or more, back vertex power measurement methods are permitted. If the lens is designed according to the back vertex power measuring method, this should be stated by the manufacturer.

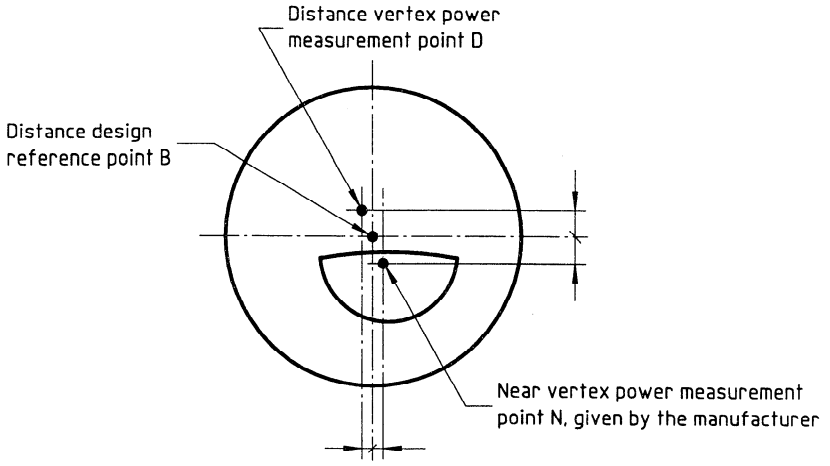


Figure 1 — Measurement of the addition power

6.3 Segment size measurement method

Measure the segment size in the tangential plane to the centre of the segment using a shadowgraph, an optical comparator fitted with the appropriate graticule or a precision millimetric measuring instrument.

6.4 Material and surface quality

See annex A.

7 Identification

7.1 Identification of the lens to be stated on the package of the lens or in an accompanying document

The following information at least shall be stated:

a) for all lenses

1) dioptric power, in dioptres,

2) nominal lens size, in millimetres,

3) colour (if not white),

4) identification of any coating,

5) material tradename or refractive index and manufacturer's or supplier's tradename or equivalent,

6) corrected values for optical centration and prismatic power if corrections have been made for the as-worn position (see 5.1.1);

b) for multifocal lenses

1) addition power and corrected values for the as-worn position (if applicable), in dioptres (see 5.1.1),

2) segment dimensions, in millimetres,

3) an indication stating right lens or left lens (if applicable),

4) segment prism, in prism dioptres (if applicable),

5) style designation or tradename.

7.2 Information to be made available

The following information shall be available on request:

a) the centre or edge thickness, in millimetres;

b) the base curve, in dioptres;

c) the optical properties (including constringence and spectral transmittance);

d) the prism thinning (if applicable).

8 Reference to this part of ISO 8980

If the manufacturer or supplier claims compliance with this part of ISO 8980, reference shall be made to ISO 8980-1 either on the package or in available literature.

Annex A
(informative)

Material and surface quality

A.1 Assessment

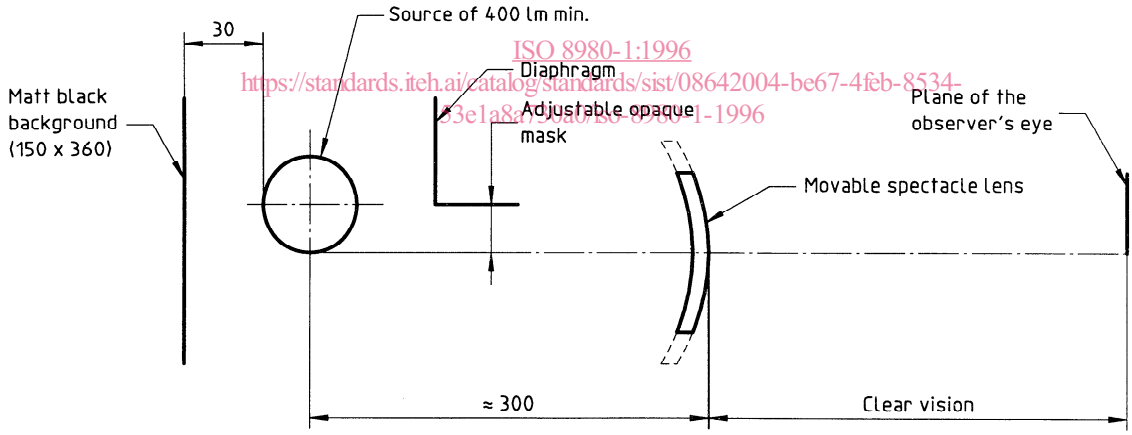
In a zone of 30 mm diameter, centred around the reference point and also over the whole area of the segment if the segment is not more than 30 mm in diameter, the lens should not exhibit any defect either internally or on the surfaces which may impair vision. For segments over 30 mm in diameter, the inspection area should also include a 30 mm diameter zone centred around the near design reference point. Outside this zone, small isolated material and/or surface defects are acceptable.

A.2 Test method

Carry out the lens inspection at a light/dark boundary and without the aid of magnifying optics. The recommended system is shown in figure A.1. Inspect the lens within a room with ambient lighting of about 200 lx. Use a source of at least 400 lm as an inspection lamp, for example a fluorescent tube of 15 W or an open shade 40 W incandescent clear lamp.

NOTE 1 This observation method is subjective and requires some experience.

Dimensions in millimetres



NOTE — The diaphragm is adjusted to shield the eye from the light source and to allow the lens to be illuminated by the light.

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

This page intentionally left blank