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**Optics and optical instruments —
Preparation of drawings for optical
elements and systems —**

Part 10:

Table representing data of a lens element

*Optique et instruments d'optique — Indications sur les dessins pour
éléments et systèmes optiques —*

Partie 10: Tableau représentant les données d'une lentille

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Reference number
ISO 10110-10:1996(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 10110-10 was prepared by Technical Committee ISO/TC 172, *Optics and optical instruments*, Subcommittee SC 1, *Fundamental standards*.

ISO 10110 consists of the following parts, under the general title *Optics and optical instruments — Preparation of drawings for optical elements and systems*:

- Part 1: *General*
- Part 2: *Material imperfections — Stress birefringence*
- Part 3: *Material imperfections — Bubbles and inclusions*
- Part 4: *Material imperfections — Inhomogeneity and striae*
- Part 5: *Surface form tolerances*
- Part 6: *Centring tolerances*
- Part 7: *Surface imperfection tolerances*
- Part 8: *Surface texture*
- Part 9: *Surface treatment and coating*

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- Part 10: Table representing data of a lens element
- Part 11: Non-toleranced data
- Part 12: Aspheric surfaces
- Part 13: Laser irradiation damage threshold

Annex A of this part of ISO 10110 is for information only.

Optics and optical instruments — Preparation of drawings for optical elements and systems —

Part 10:

Table representing data of a lens element

1 Scope

ISO 10110 specifies the presentation of design and functional requirements for optical elements and systems in technical drawings used for manufacturing and inspection.

This part of ISO 10110 specifies a format for indicating the dimensions, permissible deviations, and material imperfections of a lens element in tabular form.

2 Format

The drawing shall be sub-divided into three fields (see figure 1).

2.1 Drawing field

In this field, a schematic drawing of the lens element shall be given, together with all information not given in the table field. It is not necessary that the drawing be true-to-scale; if a drawing scale factor is indicated, the drawing shall be a true-to-scale technical drawing.

Note that the datum axis for centring and the surface texture specification (see ISO 10110-6 and ISO 10110-8) are to be indicated on the drawing.

2.2 Table field

This field contains dimensions, tolerances, and permissible material imperfections of the lens element. It is sub-divided into three subfields.

The left subfield refers to the left surface of the lens element.

The central subfield refers to material specifications.

The right subfield refers to the right surface of the lens element.

Table 1 describes in detail the properties which may be indicated.

2.3 Title field

This field is provided for general indications such as name, type and/or reference number of the lens element, part number and scale (if any) of the drawing, and for a reference to ISO 10110.

3 Non-toleranced data

All properties which are specified neither in the drawing field nor in the table field are covered by ISO 10110-11.

4 Examples

Figures 2 and 3 give examples of the tabular indication of data for lens elements.

Table 1 — Properties to be listed

Items	Description
Material	Type, name, identification number of the material
n v	If appropriate, refractive index and Abbe number (and tolerances) in accordance with ISO 7944
R	Radius of curvature with tolerance, if desired. The direction of curvature shall be indicated as follows: convex surface: CX concave surface: CC
\varnothing_e	Optically effective diameter
Protective chamfer	Minimum and maximum permissible widths of the protective chamfer
Ⓐ	Surface treatment and coating in accordance with ISO 10110-9
0/	Stress birefringence tolerance in accordance with ISO 10110-2
1/	Indication of permissible bubbles and other inclusions in accordance with ISO 10110-3
2/	Inhomogeneity and striae classes in accordance with ISO 10110-4
3/	Surface form tolerance in accordance with ISO 10110-5
4/	Centring tolerance in accordance with ISO 10110-6
5/	Surface imperfection tolerance in accordance with ISO 10110-7
6/	Laser irradiation damage threshold indication in accordance with ISO 10110-13 (if appropriate)
	If appropriate, the words "To be cemented" shall be added

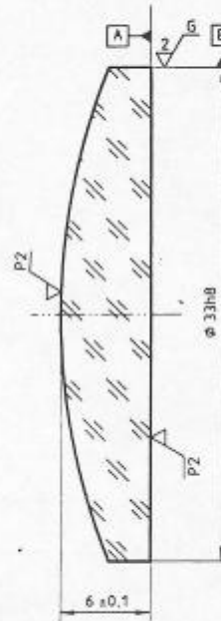
Drawing field
Indications in accordance with 3.1

Table field
Indications in accordance with 3.2

Left surface	Material specification	Right surface
<i>R</i>		<i>R</i>
\varnothing_e		\varnothing_e
Protective chamfer	n	Protective chamfer
(λ)	v	(λ)
3/	0/	3/
4/	1/	4/
5/	2/	5/
6/*		6/*
To be cemented*		To be cemented*
Indications in accordance with ISO 10110	<i>Title field</i> Indications in accordance with 3.3	

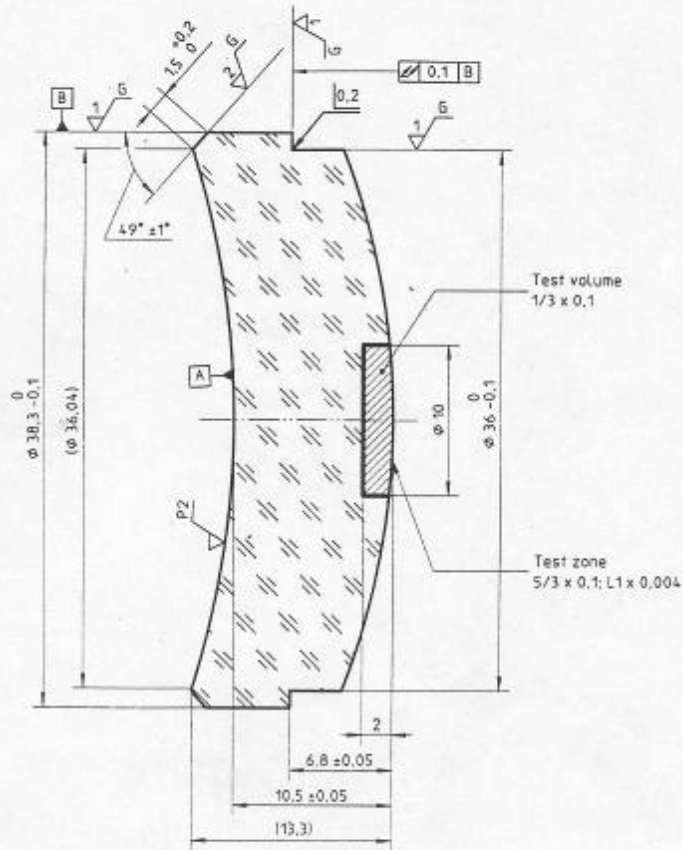
* (if required)

Figure 1 — Tabular indication of data for a lens element



Left surface	Material specification	Right surface
$R 37,449 CX$ $\varnothing_e 30,5$ Protective chamfer 0,4 – 0,6 (A) AR 209.1060 3/ 5(1) 4/ 1,4' 5/ 5 × 0,1; C 5 × 0,16; L 3 × 0,004; E 0,4 6/ 6 KWcm ⁻² ; 1 060 nm; 10	Hoya LaC9 or Schott LaK9 $n (1\ 060\ nm) 1,675\ 9 \pm 0,001$ $v -$ 0/ 20 1/ 5 × 0,1 2/ 1; 2	R_{∞} $\varnothing_e 29$ Protective chamfer 0,4 – 0,6 (A) AR 209.1060 3/ 5(1) 4/ — 5/ 5 × 0,1; C 5 × 0,16; L 3 × 0,004; E 0,4 6/ 6 KWcm ⁻² ; 1 060 nm; 10
Indications in accordance with ISO 10110		Lens 114.379

Figure 2 — Example of tabular indication of data for a lens element



Left surface	Material specification	Right surface
R 60,43 CC	BK7	R 50,17 CX
\varnothing_e 35	n_o 1,518 72 ± 0,001	\varnothing_e 34
Protective chamfer 0,2 – 0,4	v_o 63,96 ± 0,8 %	Protective chamfer 0,2 – 0,4
(A) AR 207b	0/ 10	(A) —
3/ 2(0,5)	1/ 5 × 0,16	3/ 3(1)
4/ —	2/ 1; 2	4/ 2'
5/ 5 × 0,16; L 2 × 0,04; E 0,5		5/ 5 × 0,16; L 2 × 0,04; E 0,5
		To be cemented
Indications in accordance with ISO 10110		Lens 124.736

Figure 3 — Example of tabular indication of data for a lens element

Annex A
(informative)

Bibliography

- [1] ISO 10110-6:1996, *Optics and optical instruments — Preparation of drawings for optical elements and systems — Part 6: Centring tolerances.*
- [2] ISO 10110-8:—¹⁾, *Optics and optical instruments — Preparation of drawings for optical elements and systems — Part 8: Surface texture.*
- [3] ISO 10110-11:1996, *Optics and optical instruments — Preparation of drawings for optical elements and systems — Part 11: Non-toleranced data.*

1) To be published.

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• ISO

ICS 37.020; 37.100.10

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