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

**Part 10:
Table representing data of optical
elements and cemented assemblies**

*Optique et photonique — Préparation des dessins pour éléments et
systèmes optiques —*

*Partie 10: Tableau représentant les données d'éléments optiques et
d'assemblages collés*



PDF disclaimer

This PDF file may contain embedded typefaces. In accordance with Adobe's licensing policy, this file may be printed or viewed but shall not be edited unless the typefaces which are embedded are licensed to and installed on the computer performing the editing. In downloading this file, parties accept therein the responsibility of not infringing Adobe's licensing policy. The ISO Central Secretariat accepts no liability in this area.

Adobe is a trademark of Adobe Systems Incorporated.

Details of the software products used to create this PDF file can be found in the General Info relative to the file; the PDF-creation parameters were optimized for printing. Every care has been taken to ensure that the file is suitable for use by ISO member bodies. In the unlikely event that a problem relating to it is found, please inform the Central Secretariat at the address given below.

STANDARDSISO.COM : Click to view the full PDF of ISO 10110-10:2004

© ISO 2004

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. 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.

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.

ISO 10110-10 was prepared by Technical Committee ISO/TC 172, *Optics and photonics*, Subcommittee SC 1, *Fundamental standards*.

This second edition cancels and replaces the first edition (ISO 10110-10:1996) which has been technically revised to expand the scope from only single optical elements to single optical elements and cemented assemblies.

ISO 10110 consists of the following parts, under the general title *Optics and photonics — 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*
- *Part 10: Table representing data of optical elements and cemented assemblies*
- *Part 11: Non-toleranced data*
- *Part 12: Aspheric surfaces*
- *Part 14: Wavefront deformation tolerance*
- *Part 17: Laser irradiation damage threshold*

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

Part 10:

Table representing data of optical elements and cemented assemblies

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 optical elements and cemented assemblies in tabular form.

2 Normative references

The following referenced documents are indispensable for the application 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 10110-2, *Optics and optical instruments — Preparation of drawings for optical elements and systems — Part 2: Material imperfections — Stress birefringence*

ISO 10110-3, *Optics and optical instruments — Preparation of drawings for optical elements and systems — Part 3: Material imperfections — Bubbles and inclusions*

ISO 10110-4, *Optics and optical instruments — Preparation of drawings for optical elements and systems — Part 4: Material imperfections — Inhomogeneity and striae*

ISO 10110-5, *Optics and optical instruments — Preparation of drawings for optical elements and systems — Part 5: Surface form tolerances*

ISO 10110-6, *Optics and optical instruments — Preparation of drawings for optical elements and systems — Part 6: Centring tolerances*

ISO 10110-7, *Optics and optical instruments — Preparation of drawings for optical elements and systems — Part 7: Surface imperfections tolerances*

ISO 10110-8, *Optics and optical instruments — Preparation of drawings for optical elements and systems — Part 8: Surface texture*

ISO 10110-9, *Optics and optical instruments — Preparation of drawings for optical elements and systems — Part 9: Surface treatment and coating*

ISO 10110-11, *Optics and optical instruments — Preparation of drawings for optical elements and systems — Part 11: Non-toleranced data*

3 Format

3.1 General

The drawing shall consist of the following three fields (see Figures 1 and 2):

- drawing field in accordance with 3.2;
- table field in accordance with 3.3;
- title field in accordance with 3.4.

3.2 Drawing field

In this field, a schematic drawing of the optical element or cemented assembly 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.

The datum axis for centring and the surface texture specification (see ISO 10110-6 and ISO 10110-8) shall be indicated on the drawing.

3.3 Table field

This field contains dimensions, tolerances, and permissible material imperfections of the optical element or cemented assembly. It is sub-divided into subfields.

The number and contents of the subfields depend on whether a single element or a cemented assembly is specified.

a) In the case of a single element:

- the left subfield refers to the left surface (surface 1) of the optical element;
- the central subfield refers to material specification;
- the right subfield refers to the right surface (surface 2) of the optical element.

See Figures 3 and 4.

b) In the case of a cemented assembly:

- the number of subfields equals the number of surface;
- cemented or contacted surfaces are counted as one surface.

See Figures 5, 6 and 7.

Table 1 lists detailed descriptions of the properties which may be indicated.

3.4 Title field

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

4 Non-toleranced data

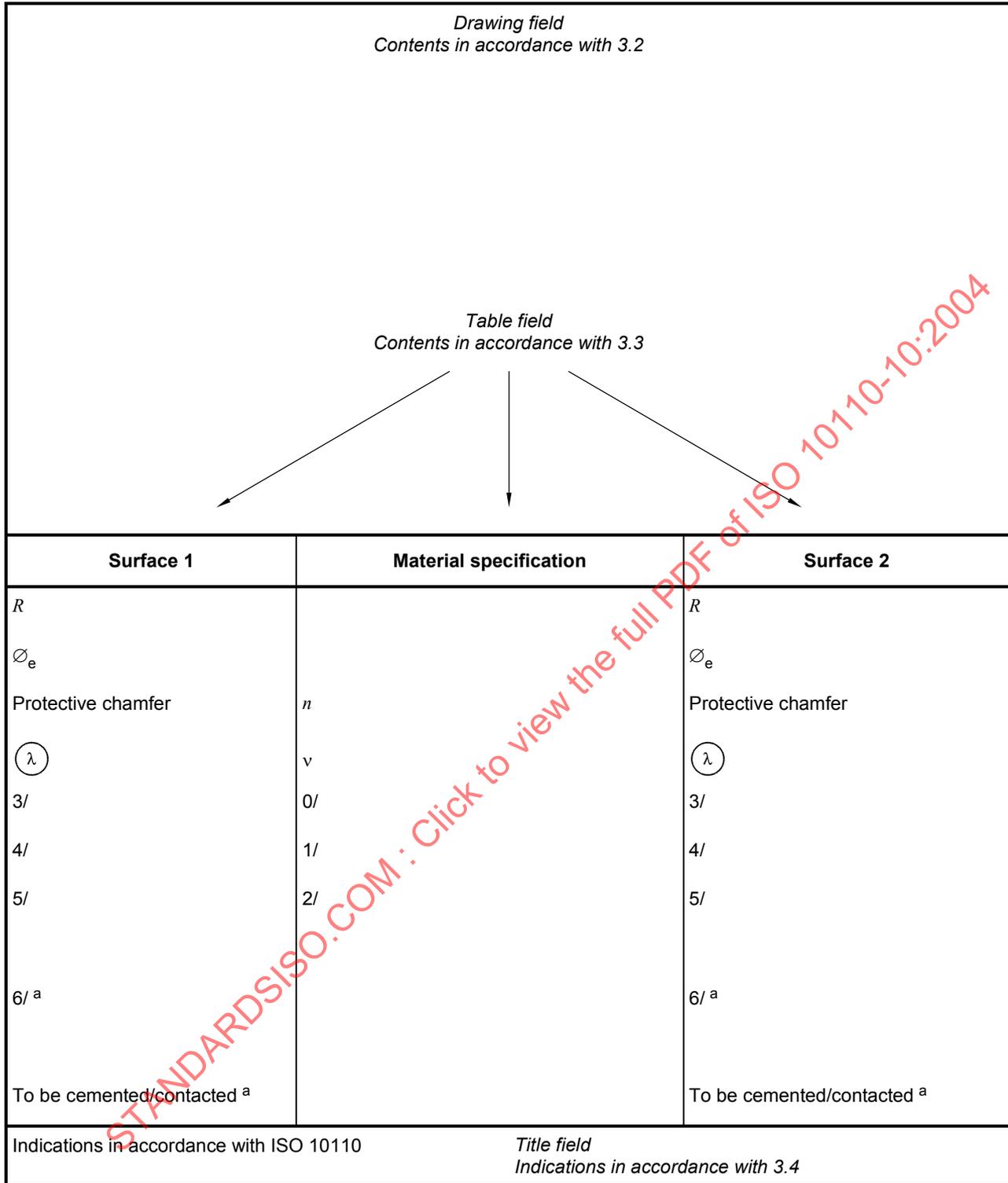
All properties specified neither in the drawing field nor in the table field are covered by ISO 10110-11.

5 Examples

Figures 3 to 7 give examples of the tabular indication of data for optical elements and cemented assemblies.

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 (see note below). 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
λ	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 10110-17 (if appropriate)
	If appropriate, the words "To be cemented" or "To be contacted" shall be added.
NOTE	Other ISO symbols are defined for the radius of curvature. In particular, ISO 129 uses "SR" as such a symbol.



^a If required; delete non-applicable state.

Figure 1 — Tabular indication of data for a single element

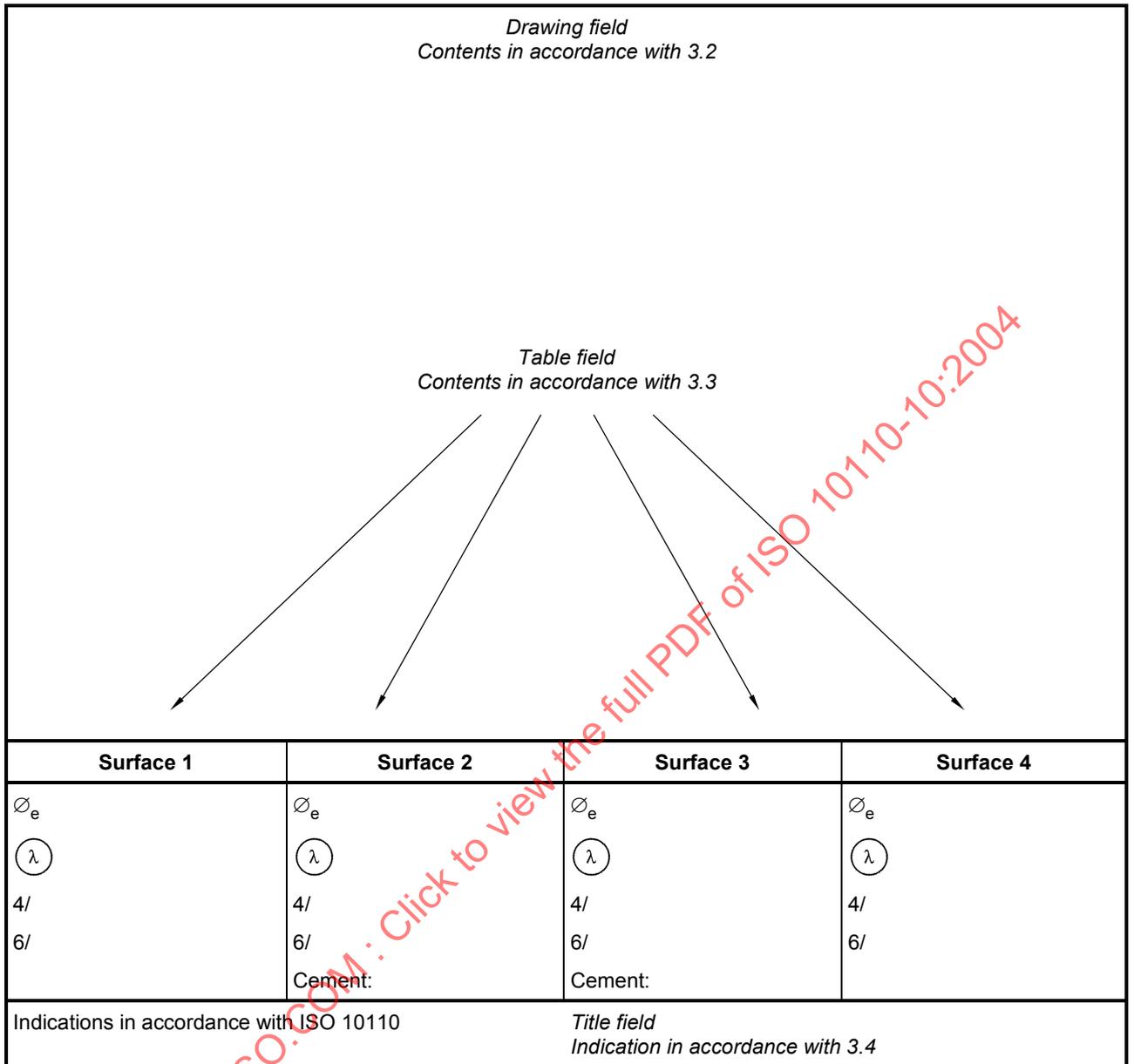
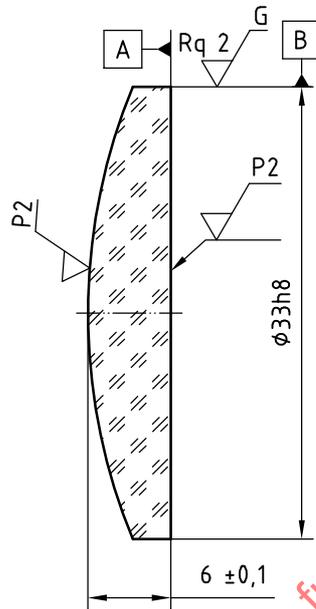


Figure 2 — Tabular indication of data for a cemented assembly



Surface 1		Material specification	Surface 2		
R	37,449 CX	Hoya LaC9 or Schott N-LaK9	R	∞	
∅ _e	30,5		∅ _e	29	
Protective chamfer 0,4 to 0,6		n (1 060 nm) 1,675 9 ± 0,001	Protective chamfer 0,4 to 0,6		
(λ)	AR 209.1060	v	—	(λ)	AR 209.1060
3/	5 (1)	0/	20	3/	5(1)
4/	1,4'	1/	5 × 0,1	4/	—
5/	5 × 0,1; C 5 × 0,16; L 3 × 0,004; E 0,4	2/	1; 2	5/	5 × 0,1; C 5 × 0,16; L 3 × 0,004; E 0,4
6/	—			6/	—
Indications in accordance with ISO 10110			Lens 114.379		

Figure 3 — Example of tabular indication of data for an optical element

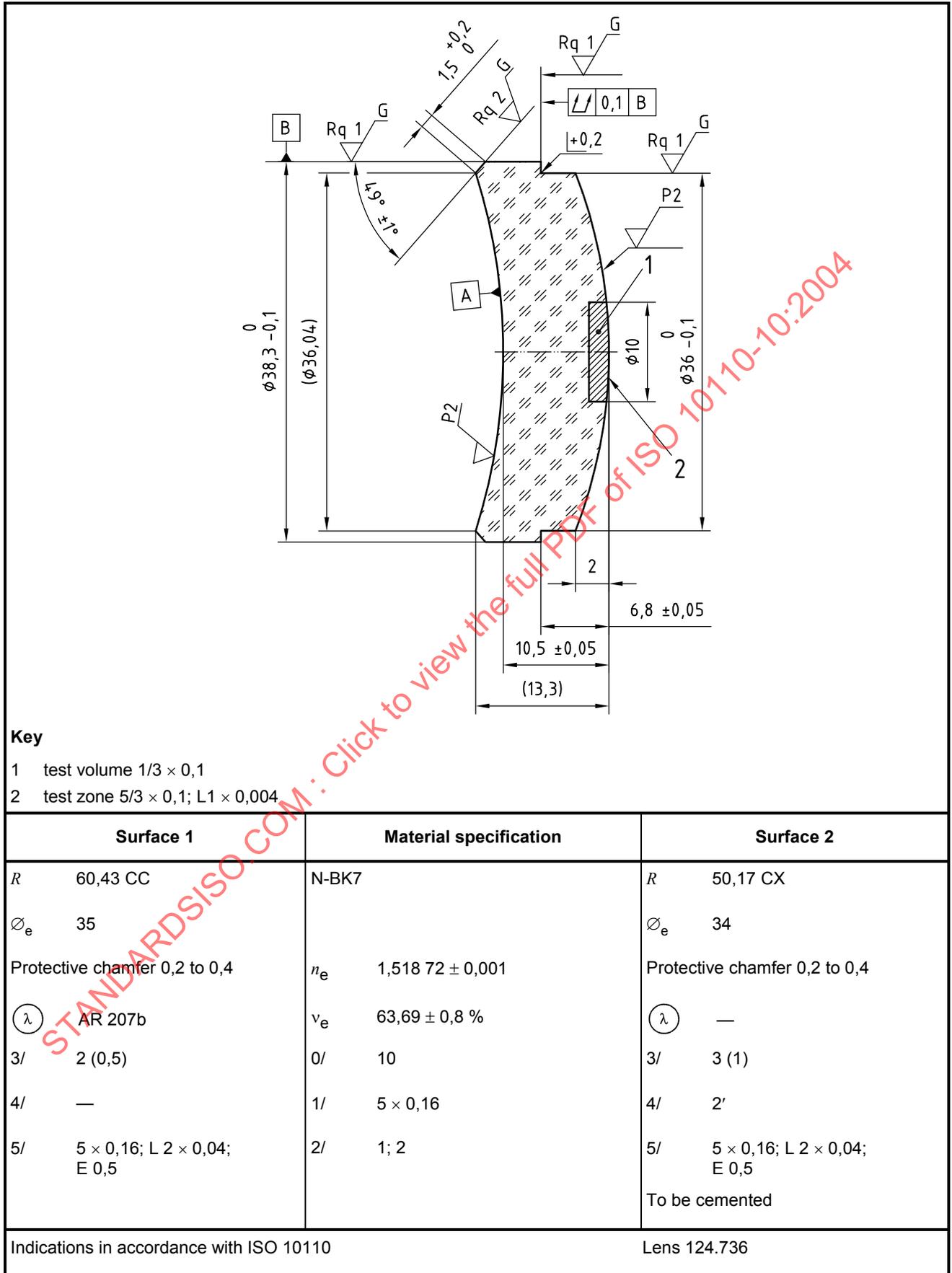
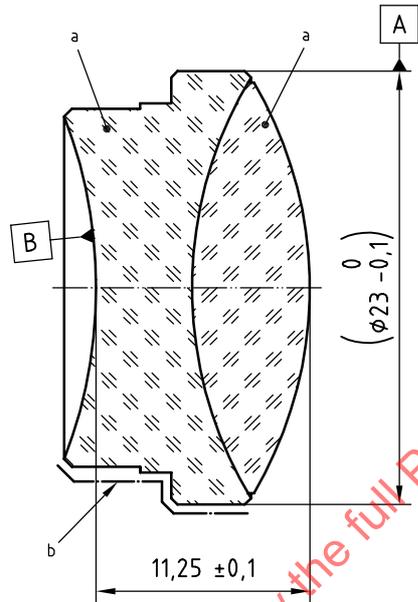


Figure 4 — Example of tabular indication of data for an optical element (lens)



Surface 1		Surface 2		Surface 3	
Ø _e	16,5	Ø _e	19,8	Ø _e	20,8
(λ)	(AR 209.1060)	(λ)	—	(λ)	(AR 209.1060)
4/	—	4/	Δ 1'	4/	0,6'
6/	—	6/	—	6/	—
			Cement: NOA61		
Indications in accordance with ISO 10110			Optical cemented assembly 987.654		

^a Part number.

^b Paint, specification 12345.

Figure 5 — Example of tabular indication of data for a cemented assembly (doublet)