

# American National Standard

for Optics and Electro-Optical Instruments –  
Preparation of drawings for optical elements and systems–  
Part 10: Table representing data of optical elements  
and cemented assemblies

Secretariat  
Optics and Electro-Optics Standards Council

Approved 2014  
American National Standards Institute, Inc.



## ANSI/OEOSC OP1.0110-10:2014 (ISO 10110-10:2004 MOD)

### American National Standard

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## Foreword to the American National Standard edition

This national standard establishes uniform practices for drawing notations for optical elements and assemblies. It is based entirely on the international standard, ISO 10110-10:2004.

In its implementation as a national standard, however, some accommodations must be made for standard practice in the United States, and several provisions of ISO 10110-10:2004 are superseded by more applicable national standards already in circulation. This requires the following modifications in interpretation.

- 1) It is often inconvenient to place the surface texture, notations in the drawing, especially when two or more surface texture notations per surface are required e.g. for roughness and mid-spatial frequency ripple control. Therefore the surface texture notation (described in ISO 10110-8 and ANSI/OEOSC OP1.0110-8) may be placed in the table field or the drawing field, as applicable.
- 2) In the special case where the specifications for the interior surfaces of a doublet or triplet are identical, a compound form of the drawing table can be created consisting of a series of alternating surface and material fields. In this case the surface wedge of the interior surface is the wedge tolerance on the cement layer.
- 3) When tabulating the radius of curvature in an assembly, the inner surfaces are frequently formed from a convex surface and a concave surface being bonded together. In these cases the direction of curvature is indicated consistent with the right-most element forming the interface.
- 4) Alternative notations are allowed for glass properties. If desired, the material birefringence, bubbles and inclusions, inhomogeneity and/or striae can be specified using ANSI/OEOSC OP3.001. When this is desired, the symbols and notations defined in that standard are used in place of 0/, 1/, and/or 2/ in the materials subfield. In this case, an additional note shall be added to the drawing or table clarifying which glass standard notation is in effect. Since alternative notations are offered in the areas of glass properties the normative references for ISO 10110-2, ISO 10110-3, and ISO 10110-4 should be considered informative.
- 5) Alternative notations are allowed for surface imperfections. If desired, the surface quality properties can be specified using ANSI/OEOSC OP1.002. When this is desired the symbols and notations defined in that standard are used after the indication 5/ in the surface subfield and a note shall be added to the drawing clarifying which surface imperfection standard notation is in effect; e.g. 5/80-50 per ANSI/OEOSC OP1.002. Since alternative notations are offered in the area of surface imperfections, the normative reference for ISO 10110-7 should be considered informative.
- 6) The default wavelength in the United States is the red HeNe line, 632.8 nm. The normative reference for ISO 7944 should be considered informative. A note should be included on the drawing indicating the wavelength, for example "Reference wavelength  $\lambda = 632.8 \text{ nm}$ ."

**ANSI/OEOSC OP1.0110-5:2015 (ISO 10110-5:2007 MOD)**

As with other parts of ISO 10110, there are several references to other parts of ISO 10110 for which for which there is an analogous American National Standard. The following table shows the OP equivalent standards for the parts of ISO 10110. Where possible, it is recommended that the OP standards be used. As of this writing, not all of the OP standards are available, and suitable equivalent ISO standards should be employed.

<b>ISO Standard</b>	<b>OP Equivalent</b>	<b>Subject</b>
ISO 10110-1	OP 1.0110-1	Drawing notation, general
ISO 10110-2 thru 4	OP 3.001	Glass tolerances
ISO 10110-5 and ISO10110-14	OP 1.0110-5 OP 1.0110-14	Surface wavefront, transmitted wavefront
ISO 10110-6	OP 1.0110-6	Centering
ISO 10110-7	OP 1.002	Surface imperfections
ISO 10110-8	OP 1.0110-8	Surface texture
ISO 10110-9	OP 1.0110-9	Coatings
ISO 10110-10	OP 1.0110-10	Tabular notation
ISO 10110-11	OP 1.0110-11	Defaults
ISO 10110-12	OP 1.0110-12	Aspheric notation
ISO 10110-17	Under review	Laser Damage

In the interests of facilitating the use of this standard, the original text of ISO 10110-10 has not been modified. Instead, the changes which differentiate the American National Standard version from the ISO version have been identified with a note following each section requiring modification. These notes are marked "ANS Note" so that they are not confused with the notes in the original document.

This standard was processed and approved for submittal to ANSI by the OEOSC Committee on Optics and Electro-Optical Instruments. OP Committee approval of the standard does not necessarily imply that all committee members voted for its approval. At the time it approved this standard, the OP Committee had the following members:

David Aikens, Chairperson  
Gene Kohlenberg, Secretary  
David Aikens, Task Force Leader  
David Aikens, Editor

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**ANSI/OEOSC OP1.0110-10:2014 (ISO 10110-10:2004 MOD)**

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† A member of the Task Force that prepared this standard

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NATIONAL  
STANDARD

**ANSI/OEOSC  
OP1.0110-10  
(ISO 10110-10 MOD)**

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**Optics and Electro-Optical Instruments —  
Preparation of drawings for optical  
elements and systems —**

Part 10:

**Table representing data of optical  
elements and cemented assemblies**



Reference number  
ISO 10110-10:2004(E)

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## Foreword to the ISO edition

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*

This is a preview of "ANSI/OEOSC OP1.0110-...". [Click here to purchase the full version from the ANSI store.](#)

# Optics and Electro-Optical Instruments — 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*