भारतीय मानक

Indian Standard

IS 5920 (Part 7) : 2024
IS0 10110-11 : 2016

प्रकाशिकी और फोटोनिक्स — प्रकाशीय तत्वों और प्रणालियों के लिए आरेखण तैयार करना

भाग 7 गैर-सहनीय डेटा

Optics and Photonics — Preparation of Drawings for Optical Elements and Systems

Part 7 Non-Toleranced Data

ICS 01.100.20; 37.020

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Optics and Photonics Sectional Committee, PGD 39

NATIONAL FOREWORD

This Indian Standard (Part 7) which is identical to ISO 10110-11 : 2017 ‘Optics and photonics — Preparation of drawings for optical elements and systems — Part 11: Non-toleranced data’ issued by the International Organization for Standardization (ISO) was adopted by the Bureau of Indian Standards on the recommendation of the Optics and Photonics Sectional Committee and approval of the Production and General Engineering Division Council.

This standard specifies the presentation of design and functional requirements for optical elements and systems in technical drawings used for manufacturing and inspection. This document also specifies the permissible deviations and material imperfections when these are not explicitly indicated.

IS 5920 (Part 1) supersedes the originally published Indian Standard IS 5920 : 1970 ‘Recommendation for the preparation of drawing for optical elements and system’.

This standard has been published in thirteen parts. The other parts in this series are:

Part 1 General

Part 2 Surface form tolerances

Part 3 Centring tolerances

Part 4 Surface imperfections

Part 5 Surface texture

Part 6 Surface treatment and coating

Part 8 Aspheric surfaces

Part 9 Wavefront deformation tolerance

Part 10 Diffractive surfaces

Part 11 Laser irradiation damage threshold

Part 12 Stress birefringence, bubbles and inclusions, homogeneity, and striae

Part 13 General description of surfaces and components

The text of ISO standard has been approved as suitable for publication as an Indian Standard without deviations. Certain conventions are, however, not identical to those used in Indian Standards. Attention is particularly drawn to the following

a) Wherever the words ‘International Standard’ appear referring to this standard, they should be read as ‘Indian Standard’; and

b) Comma (,) has been used as a decimal marker while in Indian Standards, the current-practice is to use a point (.) as the decimal marker.

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Introduction

Non-toleranced data covers cases where information required to fabricate optical components is not included on drawings. It is effectively the default values for the standard, dependent on size of the optic for many of the values. Because these values are the default, they are intentionally chosen to be values deemed as loose fabrication requirements for industry. These values do not represent absolute limits, however, and can be made looser for given drawings and application.

The current revision is an update to the 1996 edition of this part of ISO 10110. This version includes a few additional parameters and has magnitudes of some values updated. The values are intended to represent reasonable loose quantities for current standard practice optical fabrication with traditional methodology. Although it is quite difficult to come up with universal values representing such standard practice, it is important to have quantities defined as defaults for cases where such information is not included on drawings, whether unintentional or by design choice.

Indian Standard

OPTICS AND PHOTONICS — PREPARATION OF DRAWINGS FOR OPTICAL ELEMENTS AND SYSTEMS
PART 7 NON-TOLERANCED DATA

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 the permissible deviations and material imperfections when these are not explicitly indicated.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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 photonics — Preparation of drawings for optical elements and systems — Part 5: Surface form tolerances*

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

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

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

3 Permissible deviations and material imperfections

Complete functional properties of an optical element, dimensions and tolerances as well as surface and material properties should be indicated in optical drawings.

The permissible deviations and material imperfections are given in Table 1 when such quantities are not specified in drawings.

NOTE ln cases in which the values given in Table 1 are appropriate, the drawing can be simplified by omission of their indications.

These tolerances do not represent absolute limits. Even looser tolerances may be used; however, they shall then be indicated in the drawing.

If a drawing of an optical part contains no indication of qualities mentioned in the various parts of ISO 10110, the values of Table 1 shall be applied. The surface texture specifications for an optical element in accordance with ISO 10110-8 shall always be given in the drawing; no implicit indication for surface texture is therefore given in this part of ISO 10110.

Table 1 — Permissible deviations and material imperfections in case explicit indications are not given

Property	Range of maximum (diagonal) dimension of the part mm			
	2 up to 10	over 10 up to 30	over 30 up to 100	over 100 up to 300
Part diameter or edge length (mm)	+0/ −0,15	+0/ −0,15	+0/ −0,75	+0,2/ −1,5
Clear aperture to part edge (mm)	0,5	1	1	2
Thickness (mm)	±0,1	±0,2	±0,4	±0,8
Angle deviation of prisms and plate	±0° 30′	±0° 30′	±0° 30′	±0° 30′
Width of protective chamfer (mm)	0,1 to 0,3	0,3 to 0,5	0,3 to 0,8	0,8 to 1,6
Principal refractive index	$\pm 2{,}0 \times 10^{-3}$	$\pm 2{,}0 \times 10^{-3}$	$\pm 2{,}0 \times 10^{-3}$	$\pm 2{,}0 \times 10^{-3}$
Abbe number	±0,8 %	±0,8 %	±0,8 %	±0,8 %
Stress birefringence in accordance with ISO 10110-2 (nm/cm)	0/20	0/20	0/30	0/40
Bubbles and inclusions in accordance with ISO 10110-3	1/3 × 0,16	1/5 × 0,25	1/5 × 0,4	1/5 × 0,63
lnhomogeneity and striae in accordance with ISO 10110-4	2/1;1	2/1;1	2/0;1	2/0;1
Surface form tolerances in accordance with ISO 10110-5	3/5(1)	3/5(2)	3/5(2) (all Ø 30 mm)	3/8(2) (all Ø 60 mm)
Centring tolerances in accordance with ISO 10110-6	4/20′	4/10′	4/10′	4/10′
Surface imperfections in accordance with ISO 10110-7	5/3 × 0,16	5/5 × 0,25	5/5 × 0,4	5/5 × 0,63

NOTE 1 This part of ISO 10110 does not provide implicit specifications for laser irradiation damage threshold (see ISO 10110-17), or additional surface imperfections for coated optics for edge chips (see ISO 10110-7).

NOTE 2 Default numbers apply to the finished part.

NOTE 3 Principal refractive index and Abbe number variation may be assessed at convenient wavelength values because differences between these parameters at different wavelengths is assumed to be inconsequential for non-toleranced data (see ISO 12123).

Bibliography

[1] ISO 7944, *Optics and optical instruments — Reference wavelengths*

[2] ISO 10110-17, *Optics and photonics — Preparation of drawings for optical elements and systems — Part 17: Laser irradiation damage threshold*

[3] ISO 12123, *Optics and photonics — Specification of raw optical glass*

(Continued from second cover)

In this adopted standard, reference appears to certain International Standards for which Indian Standards also exist. The corresponding Indian Standards, which are to be substituted in their respective places, are listed below along with their degree of equivalence for the editions indicated:

International Standard	*Corresponding Indian Standard*	*Degree of Equivalence*
ISO 10110-2 Optics and optical instruments — Preparation of drawings for optical elements and systems — Part 2: Material imperfections — Stress birefringence	IS 5920 (Part 12) : 2024/ ISO 10110-18 : 2018 Optics and photonics — Preparation of drawings for optical elements and systems: Part 12 Stress birefringence, bubbles and inclusions, homogeneity, and striae (ISO 10110-2 has been amalgamated into ISO 10110-18)	Identical
ISO 10110-3 Optics and optical instruments — Preparation of drawings for optical elements and systems — Part 3: Material imperfections — Bubbles and inclusions	IS 5920 (Part 12) : 2024/ ISO 10110-18 : 2018 Optics and photonics — Preparation of drawings for optical elements and systems: Part 12 Stress birefringence, bubbles and inclusions, homogeneity, and striae (ISO 10110-3 has been amalgamated into ISO 10110-18)	Identical
ISO 10110-4 Optics and optical instruments — Preparation of drawings for optical elements and systems — Part 4: Material imperfections — Inhomogeneity and striae	IS 5920 (Part 12) : 2024/ ISO 10110-18 : 2018 Optics and photonics — Preparation of drawings for optical elements and systems: Part 12 Stress birefringence, bubbles and inclusions, homogeneity, and striae (ISO 10110-4 has been amalgamated into ISO 10110-18)	Identical
ISO 10110-5 Optics and photonics — Preparation of drawings for optical elements and systems — Part 5: Surface form tolerance	IS 5920 (Part 2) : 2024/ ISO 10110-5 : 2015 Optics and photonics — Preparation of drawings for optical elements and systems: Part 2 Surface form tolerance	Identical
ISO 10110-6 Optics and photonics — Preparation of drawings for optical elements and systems — Part 6: Centring tolerance	IS 5920 (Part 3) : 2024/ ISO 10110-6 : 2015 Optics and photonics — Preparation of drawings for optical elements and systems: Part 3 Centring tolerances	Identical
ISO 10110-7 Optics and photonics — Preparation of drawings for optical elements and systems — Part 7: Surface imperfection	IS 5920 (Part 4) : 2024/ ISO 10110-7 : 2017 Optics and photonics — Preparation of drawings for optical elements and systems: Part 4 Surface imperfection	Identical
ISO 10110-8 Optics and photonics — Preparation of drawings for optical elements and systems — Part 8: Surface texture	IS 5920 (Part 5) : 2024/ ISO 10110-8 : 2019 Optics and photonics — Preparation of drawings for optical elements and systems: Part 5 Surface texture	Identical

Bureau of Indian Standards

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Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the website-www.bis.gov.in or www.standardsbis.in.

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Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

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