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

Part 9:

Surface treatment and coating

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

Partie 9: Traitement de surface et revêtement



Reference number
ISO 10110-9:1996(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 10110-9 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.

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

Part 9: Surface treatment and coating

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 rules for indicating the treatments and coatings applied to optical surfaces for functional and/or protective purposes.

2 Definitions

For the purposes of this part of ISO 10110, the following definitions apply.

2.1 functional coating: Thin film deposited to affect surface reflectance, to separate spectral wavelength regions, and/or to produce certain polarization or other special properties.

NOTE 1 The common types of functional coating are reflective, antireflective, wavelength selective, and conductive coatings.

Detailed information on coatings is contained in ISO 9211-1 to ISO 9211-4.

2.2 protective surface treatment: Paint or plating protection applied to optical surfaces, particularly rear surface mirrors, to prevent damage from handling, environmental effects and other causes.

NOTE 2 Surfaces may also be painted or covered in certain areas to limit their optically effective apertures for stray light control.

3 General

ISO 10110-1 stipulates that all indications apply fundamentally to the finished product. Accordingly, the dimensions given in drawings which mention surface treatments or coatings, refer to the dimensions after application of the treatments or coatings (see figure 5). However, in certain cases, the dimensions of a part before the application of surface treatments may be important. In such cases it shall be explicitly indicated in the drawing that these dimensions refer to the untreated part.

4 Indication in drawings

Since coating performance requirements are usually complex, they are described in separate specification documents, which shall be referenced in the drawings.

If the specification is simple, then it can be given directly on the drawing. In this case, the following symbols shall be used:

τ (the Greek letter tau) for transmission of radiant flux;

ρ (the Greek letter rho) for reflection of radiant flux;

α (the Greek letter alpha) for absorption of radiant flux.

Wavelengths shall be given in nanometers.

If no reference wavelength is indicated, the wavelength of the green mercury e-line ($\lambda = 546,07 \text{ nm}$), in accordance with ISO 7944, shall apply.

4.1 Indication of functional coatings

Functional coatings shall be indicated by a circle containing the Greek letter lambda (λ); this circle shall be located outside the element and tangent to the surface to be coated, or tangent to an extension line (see figure 2), if necessary. Exceptions are elements in which the coating is protected by a protective layer; in these cases the coating symbol shall be placed inside the optical element (see figure 6).

If, in drawings of sub-assembly, a coating is indicated on a surface joining two elements, this alone does not specify which of the adjoining surfaces is to carry the coating. If necessary, this information may be given in a note on the drawing or on a single element drawing of the appropriate part.

The coating symbol shall have a leader line to a box, containing the specification reference or specification. Examples are given in figures 1 to 4, and in figure 6.

The purpose of the coating should preferably be included in the box. Unless otherwise noted, the specifications shall refer to the indicated surface alone. In the case of functional coatings on surfaces which are to be cemented, it shall be indicated whether the specification applies before or after cementing (see figure 2).

Unless indicated otherwise, the coating shall extend at least over the optically effective surface. If necessary, toleranced dimensions shall be given for the area to be coated. In cases in which different regions of the same surface are to be coated differently, the regions shall be indicated by dimensioning (see figure 4).

For a lens element, the data may be given in tabular form (see ISO 10110-10). If the specification of a coating is too long to be included in the appropriate table field, it shall be given in the drawing field in a box as described above.

4.2 Indication of protective treatments

Protective treatments shall be indicated by a thick "chain" line (line type J, ISO 128) adjacent to the surface. The length of this line indicates the region to be treated. If necessary, dimensions shall be given for this region.

The specification of the surface treatment shall be given in a box, which is connected to the thick "chain" line by a leader. Examples are given in figures 5 and 6.

5 Blemishes of functional coatings

ISO 10110-7:1996, subclause 4.1.1.1 specifies the indication of an acceptability level for coating blemishes, which are covered further in ISO 9211-4.

6 Examples

Examples of functional coating and protective surface treatment indications are given in figures 1 to 6.

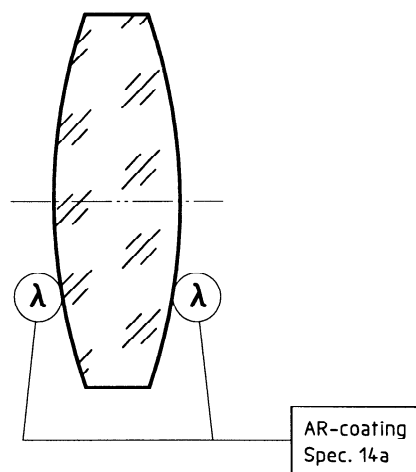


Figure 1 — Example of functional coating indication referencing separate specification

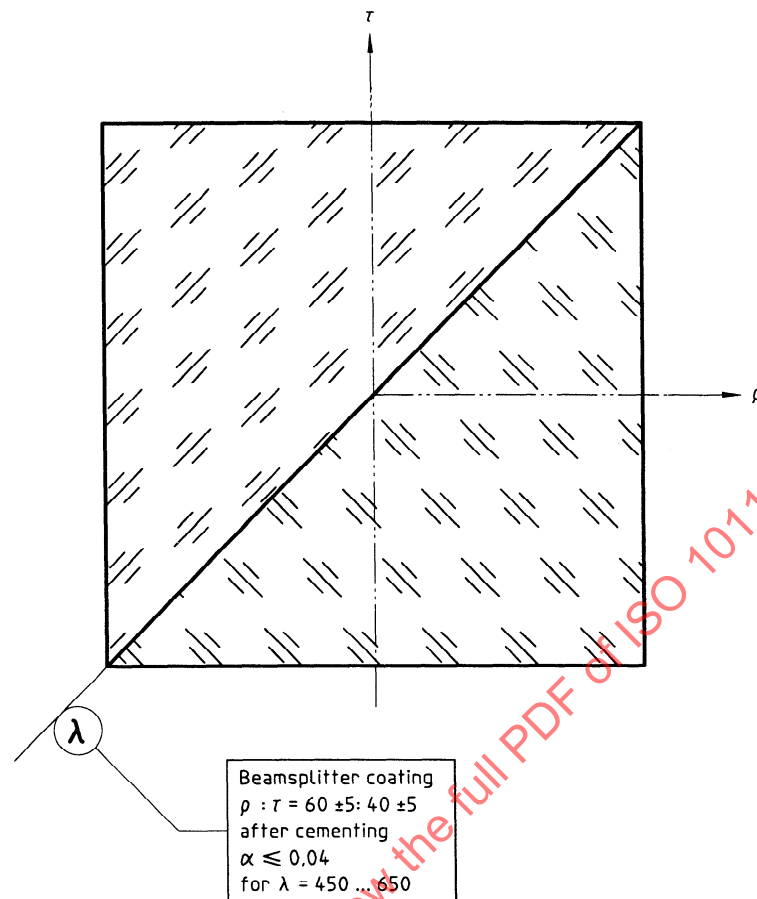


Figure 2 — Example of functional coating indication with optical characteristic specification

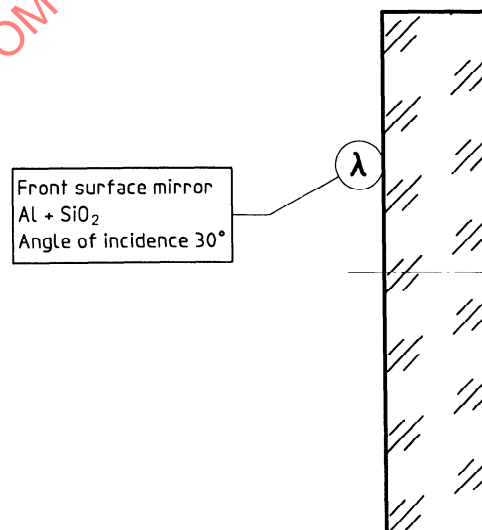


Figure 3 — Example of functional coating indication with specification of material

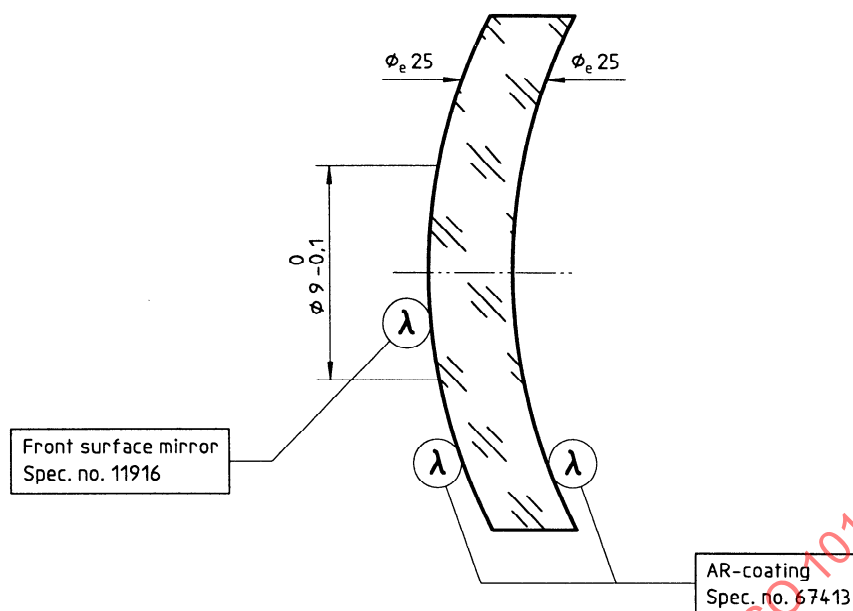


Figure 4 — Example of functional coating indication showing two different coatings on the same surface

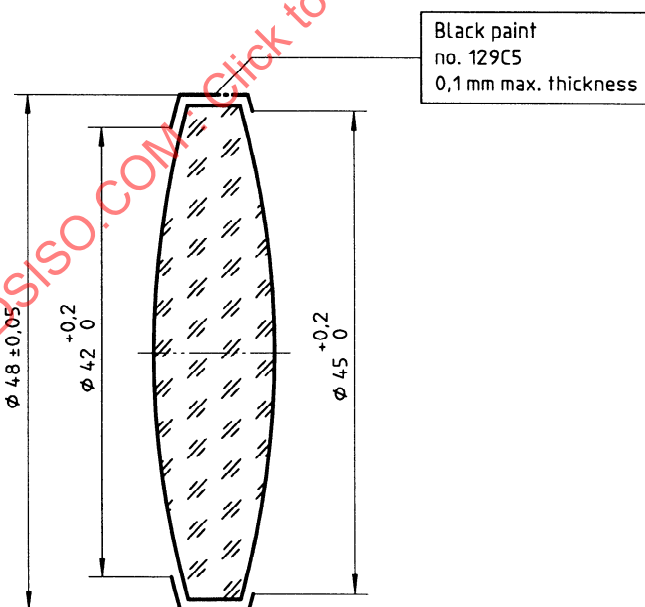


Figure 5 — Example of protective surface treatment indication (The outer diameter of 48 ± 0.05 refers to the part after painting)

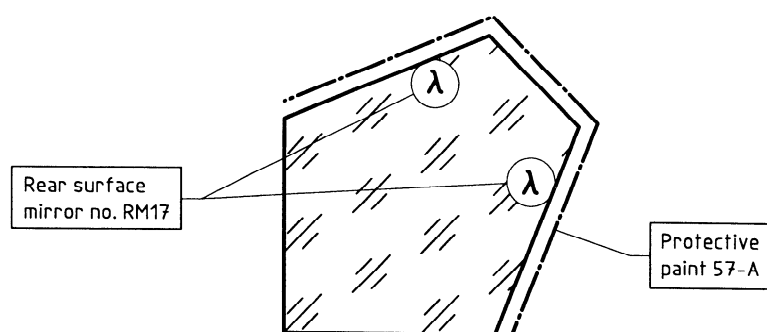


Figure 6 — Example of indication of a protective surface treatment combined with a functional coating

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