SLOVENSKI STANDARD
SIST EN ISO 13468-1:1999

01-maj-1999

Polimerni materiali – Določevanje celotne prepustnosti svetlobe prozornih materialov – 1. del: Instrument z enim žarkom(ISO 13468-1:1996)

Plastics - Determination of total luminous transmittance of transparent materials - Part 1: Single-beam instrument (ISO 13468-1:1996)

Kunststoffe - Bestimmung des totalen Lichttransmissionsgrades von transparenten Materialien - Teil 1: Einstrahlinstrument (ISO 13468-1:1996)

Plastiques - Détermination du facteur de transmission du flux lumineux total des matériaux transparents - Partie 1: Instrument a faisceau unique (ISO 13468-1:1996)

Ta slovenski standard je istoveten z: **EN ISO 13468-1:1996**

ICS:

83.080.01	Polimerni materiali na splošno	Plastics in general

SIST EN ISO 13468-1:1999 **en**

EUROPEAN STANDARD

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Plastics - Determination of total luminous transmittance of transparent materials - Part 1: Single-beam instrument (ISO 13468-1:1996)

Plastiques - Détermination du facteur de transmission du flux lumineux total des matériaux transparents - Partie 1: Instrument à faisceau unique (ISO 13468-1:1996)

Kunststoffe - Bestimmung des totalen Lichttransmissionsgrades von transparenten Materialien Teil 1: Einstrahlinstrument (ISO 13468-1:1996)

This European Standard was approved by CEN on 1996-06-09. CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

The European Standards exist in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

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CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat: rue de Stassart,36 B-1050 Brussels

Foreword

The text of the International Standard ISO 13468-1:1996 has been prepared by Technical Committee ISO/TC 61 "Plastics" in collaboration with Technical Committee CEN/TC 249 "Plastics", the secretariat of which is held by IBN.

ISO 13468 consists of the following parts, under the general title

Plastics - Determination of the total luminous transmittance of the transparent materials

Part 1: Single-beam instrument
Part 2: Double-beam instrument

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by February 1997, and conflicting national standards shall be withdrawn at the latest by February 1997.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

Endorsement notice

The text of the International Standard ISO 13468-1:1996 was approved by CEN as a European Standard without any modification.

INTERNATIONAL STANDARD

ISO 13468-1

First edition
1996-08-15

Plastics — Determination of the total luminous transmittance of transparent materials —

Part 1: Single-beam instrument

Plastiques — Détermination du facteur de transmission du flux lumineux total des matériaux transparents —

Partie 1: Instrument à faisceau unique

Reference number
ISO 13468-1:1996(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 13468-1 was prepared by Technical Committee ISO/TC 61, *Plastics*, Subcommittee SC 11, *Products*.

ISO 13468 consists of the following parts, under the general title *Plastics — Determination of the total luminous transmittance of transparent materials*:

— *Part 1: Single-beam instrument*

— *Part 2: Double-beam instrument*

Annex A of this part of ISO 13468 is for information only.

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Plastics — Determination of the total luminous transmittance of transparent materials —

Part 1:
Single-beam instrument

1 Scope

This part of ISO 13468 covers the determination of the total luminous transmittance, in the visible region of the spectrum, of planar transparent and substantially colourless plastics, using a single-beam photometer with a specified CIE standard light source and photodetector. This part of ISO 13468 cannot be used for plastics which contain fluorescent materials.

This part of ISO 13468 is applicable to transparent moulding materials, films and sheets not exceeding 10 mm in thickness.

NOTES

1 Total luminous transmittance can also be determined by a double-beam spectrophotometer as in part 2 of the standard. Part 1, however, provides a simple but precise, practical and quick determination. This method is suitable for use not only for analytical purposes but also for quality control.

2 Substantially colourless plastics include those which are faintly tinted.

3 Specimens more than 10 mm thick may be measured provided the instrument can accommodate them, but the results may not be comparable with those obtained using specimens less than 10 mm thick.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 13468. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO 13468 are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 291:1977, *Plastics — Standard atmospheres for conditioning and testing.*

ISO 5725-1:1994, *Accuracy (trueness and precision) of measurement methods and results — Part 1: General principles and definitions.*

ISO 5725-2:1994, *Accuracy (trueness and precision) of measurement methods and results — Part 2: Basic method for the determination of repeatability and reproducibility of a standard measurement method.*

ISO 5725-3:1994, *Accuracy (trueness and precision) of measurement methods and results — Part 3: Intermediate measures of the precision of a standard measurement method.*

ISO 7724-2:1984, *Paints and varnishes — Colorimetry — Part 2: Colour measurement.*

ISO/CIE 10526:1991, *CIE standard colorimetric illuminants.*

ISO/CIE 10527:1991, *CIE standard colorimetric observers.*

CIE Publication No. 17.4:1987, *CIE International lighting vocabulary* [also published as IEC 50(845):1987, *International electrotechnical vocabulary — Chapter 845: Lighting*].

3 Definitions

For the purposes of this part of ISO 13468, the definitions given in CIE Publication No. 17.4 for *transparent medium*, *transmittance*, *regular transmittance* and *luminous flux* apply, together with the following:

3.1 transparent plastics: Plastics in which the transmission of light is essentially regular and which have a high transmittance in the visible region of the spectrum.

NOTE 4 Provided their geometrical shape is suitable, objects will be seen distinctly through plastic which is transparent in the visible region.

3.2 total luminous transmittance: The ratio of the transmitted luminous flux to the incident luminous flux when a parallel beam of light passes through a specimen.

4 Apparatus

4.1 The apparatus shall consist of a stabilized light source, an associated optical system, an integrating sphere fitted with ports, and a photometer. Ingress of external light into the integrating sphere shall be prevented. A schematic arrangement of the apparatus is shown in figure 1.

4.2 The light source and/or photodetector shall be fitted with filters so that the output of the combined system corresponds to the CIE standard colorimetric observer as specified in ISO/CIE 10527 and CIE standard illuminant D_{65} as specified in ISO/CIE 10526. The output of the photodectector shall be proportional, to within 1 %, to the incident flux over the flux range used. The spectrophotometric characteristics of the light source and the photodetector shall be kept constant during measurements on specimens. The measurement conditions shall be such that the specimen temperature does not increase while measurements are made.

4.3 The light source shall be combined with an optical system to produce a parallel beam of light; the angle which any ray of this beam makes with the axis of the beam shall not exceed 0,087 rad (5°). The beam shall not be vignetted at either port of the sphere.

The diameter of the beam shall be 0,5 to 0,8 times the diameter of the entrance port of the integrating sphere.

4.4 Using this instrument, the repeatability standard deviation shall be 0,2 % or less. The within-laboratory reproducibility over long time intervals shall not exceed the repeatability by a factor of more than 3.

4.5 The design of the instrument shall be such that it reads zero when the incident flux is zero.

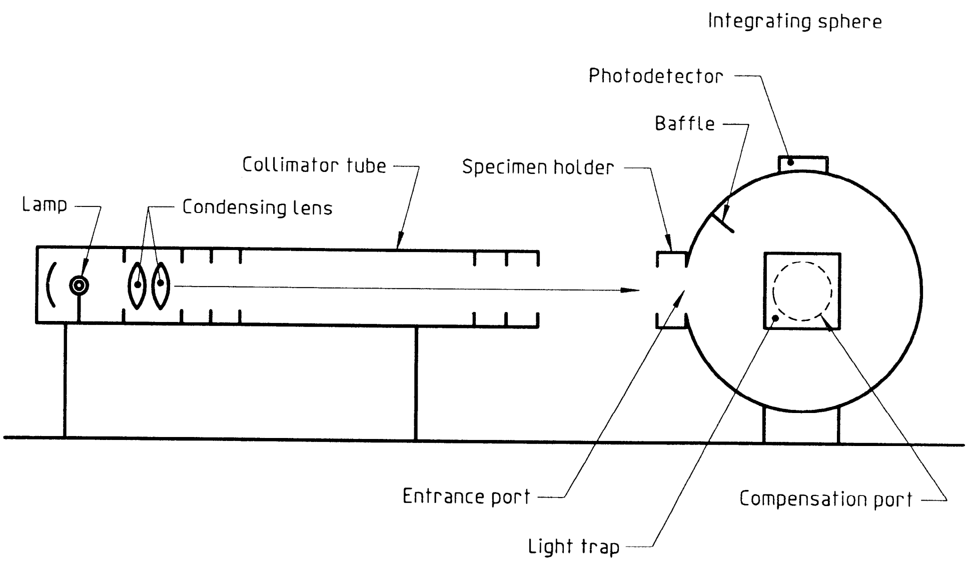

Figure 1 — Schematic arrangement of the apparatus

4.6 The integrating sphere used to collect the transmitted flux may be of any diameter as long as the total port area does not exceed 3,0 % of the internal area of the sphere.

NOTES

5 It is recommended that the diameter of the integrating sphere is not less than 150 mm so that specimens of a reasonable size can be used.

6 When the diameter of the integrating sphere is 150 mm and the diameters of the entrance, compensation and photodetector ports are 30 mm, the ratio of the total port area to the internal area of the sphere is 3,0 %.

4.7 The entrance and compensation ports of the integrating sphere shall be circular and of the same size. The entrance port, compensation port and photodetector port shall not lie on a great circle of the sphere.

4.8 The photodetector shall be fitted with baffles to prevent light falling on it directly from the specimen.

4.9 The surfaces of the interior of the integrating sphere and the baffles shall be of substantially equal luminous reflectance which, determined in accordance with ISO 7724-2, shall be 90 % or more and shall not vary by more than ± 3 %. When direct measurement of the reflectance of the internal surface of an integrating sphere is difficult, the measurement may be carried out instead on a surface prepared from the same material in the same way as the internal surface.

4.10 The light trap shall absorb 95 % or more of the light incident on it.

4.11 The specimen holder shall be such as to hold the specimen rigidly in a plane normal ± 2° to the light beam and as closely as possible to the integrating sphere to ensure that all the light which passes through the specimen, including scattered light, is collected.

The holder shall be designed so that it keeps flexible specimens, such as film, flat.

NOTE 7 It is recommended that thin, flexible film is clamped round the edge in a double-ring-type holder or double-sided adhesive tape is used to stick it to the edge of the holder. The latter method is used for thicker specimens, which cannot be mounted in the double-ring-type holder.

5 Test specimens

5.1 Specimens shall be cut from film, sheet or injection-moulded or compression-moulded mouldings.

5.2 Specimens shall be free of defects, dust, grease, adhesive from protecting materials, scratches and blemishes, and shall be free from visibly distinct internal voids and particles.

5.3 Specimens shall be large enough to cover the entrance port and the compensation port of the integrating sphere.

NOTE 8 For a 150 mm diameter sphere, a disc of 50 mm or 60 mm in diameter or a square with a side of the same length is recommended.

5.4 Three specimens shall be taken from each sample of a given material unless otherwise specified.

6 Conditioning

6.1 Prior to the test, condition the specimens in accordance with ISO 291, at 23 °C ± 2 °C and (50 ± 5) % relative humidity, for a length of time dependent on the specimen thickness and material such that the specimens reach thermal equilibrium.

NOTE 9 16 h is usually sufficient for specimens less than 0,025 mm thick. For thicker material, more than 40 h is recommended.

6.2 Set up the test apparatus in an atmosphere maintained at 23 °C ± 2 °C and (50 ± 5) % relative humidity.

7 Procedure

7.1 Allow the apparatus sufficient time to reach thermal equilibrium before making any measurements.