INTERNATIONAL STANDARD

ISO 13468-2

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

Part 2:
Double-beam instrument

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

Partie 2: Instrument à double faisceau

Reference number
ISO 13468-2:1999(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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

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 13468-2 was prepared by Technical Committee ISO/TC 61, *Plastics*, Subcommittee SC 5, *Physical-chemical properties*.

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*

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

Part 2:
Double-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 double-beam scanning spectrophotometer. 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.

NOTE 1 Total luminous transmittance can also be determined by a single-beam instrument as in part 1 of this International Standard.

NOTE 2 Substantially colourless plastics include those which are faintly tinted.

NOTE 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 normative documents contain provisions which, through reference in this text, constitute provisions of this part of ISO 13468. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of ISO 13468 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 291:1997, *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/CIE 10526:1999, *CIE standard illuminants for colorimetry.*

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

CIE Publication No. 15.2:1986, *Colorimetry.*

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

3 Terms and definitions

For the purposes of this part of ISO 13468, the terms and definitions given in CIE Publication No. 17.4 for "transparent medium", "transmittance", "regular transmittance", "radiant flux" 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 Provided their geometrical shape is suitable, objects will be seen distinctly through plastic which is transparent in the visible region.

3.2
total spectral transmittance
the ratio of the transmitted radiant flux (regular and diffuse) to the incident radiant flux when a parallel beam of monochromatic radiation of a given wavelength passes through a specimen

3.3
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 the following elements:

— a stabilized light source;

— a monochromator;

— an optical system that forms two parallel beams of monochromatic radiation of equal wavelength λ and approximately equal radiant flux from the output of the monochromator (called the sample and the reference beam);

— and an integrating sphere fitted with ports and a photodetector.

The sample beam enters the sphere through the entrance port. The reference beam enters the sphere through the reference port. The photodetector is mounted on the photodetector port in a manner that allows it to view with equal efficiency all parts of the sphere. Ingress of external light into the integrating sphere shall be prevented. A schematic arrangement of the integrating sphere is shown in Figure 1.

4.2 The value of the total luminous transmittance determined by the instrument shall be accurate to $\pm$ 1,0 %. To fulfill this requirement, the response of the photodetector must be sufficiently linear in the visible region of the spectrum and the spectral bandwidth at half power of the monochromator must be sufficiently small. The measurement conditions shall be such that the specimen temperature does not increase while measurements are made.