INTERNATIONAL STANDARD

ISO 13468-2

Second edition
2021-06

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 13468-2:2021(E)

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Published in Switzerland

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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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 61, *Plastics*, Subcommittee SC 5, *Physical-chemical properties,* in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 249, *Plastics,* in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This second edition cancels and replaces the first edition (ISO 13468-2:1999), of which it constitutes a minor revision.

The changes compared to the previous edition are as follows:

— the normative references have been updated.

A list of all parts in the ISO 13468 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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

Part 2: Double-beam instrument

1 Scope

This document covers the determination of the total luminous transmittance, in the visible region of the spectrum, of planar transparent plastics and substantially colourless plastics, using a double-beam scanning spectrophotometer. This document cannot be used for plastics which contain fluorescent materials.

This document 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 ISO 13468-1.

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

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

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 291, *Plastics — Standard atmospheres for conditioning and testing*

CIE Publication No 15, *Colorimetry*

CIE Publication No [1] 17, *International lighting vocabulary*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in CIE Publication No. 17 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

1) Also published as IEC 60050-845, *International Electrotechnical Vocabulary (IEV) International electrotechnical vocabulary — Chapter 845: Lighting*.

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

Note 1 to entry: 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
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
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 ±1,0 %. To fulfil this requirement, the response of the photodetector shall be sufficiently linear in the visible region of the spectrum and the spectral bandwidth at half power of the monochromator shall be sufficiently small. The measurement conditions shall be such that the specimen temperature does not increase while measurements are made.