
**Plastics — Determination of thermal
conductivity and thermal diffusivity —**

**Part 4:
Laser flash method**

*Plastiques — Détermination de la conductivité thermique et de la
diffusivité thermique —*

Partie 4: Méthode flash laser



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ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. 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.

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.

ISO 22007-4 was prepared by Technical Committee ISO/TC 61, *Plastics*, Subcommittee SC 5, *Physical-chemical properties*.

ISO 22007 consists of the following parts, under the general title *Plastics — Determination of thermal conductivity and thermal diffusivity*:

- *Part 1: General principles*
- *Part 2: Transient plane heat source (hot disc) method*
- *Part 3: Temperature wave analysis method*
- *Part 4: Laser flash method*

Plastics — Determination of thermal conductivity and thermal diffusivity —

Part 4: Laser flash method

1 Scope

1.1 This part of ISO 22007 specifies a method for the determination of the thermal diffusivity of a thin solid disc of plastics in the thickness direction by the laser flash method. This method is based upon the measurement of the temperature rise at the rear face of the thin-disc specimen produced by a short energy pulse on the front face.

1.2 The method can be used for homogeneous solid plastics as well as composites having an isotropic or orthotropic structure. In general, it covers materials having a thermal diffusivity, α , in the range $1 \times 10^{-7} \text{ m}^2 \cdot \text{s}^{-1} < \alpha < 1 \times 10^{-4} \text{ m}^2 \cdot \text{s}^{-1}$. Measurements can be carried out in gaseous and vacuum environments over a temperature range from -100°C to $+400^\circ\text{C}$.

NOTE For inhomogeneous specimens, the measured values may be specimen thickness dependent.

2 Normative references

The following referenced documents are indispensable for the application 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*

ISO 22007-1, *Plastics — Determination of thermal conductivity and thermal diffusivity — Part 1: General principles*

ISO/IEC Guide 98-3, *Uncertainty of measurement — Part 3: Guide to the expression of uncertainty in measurement (GUM:1995)*

3 Terms and definitions

For the purpose of this document, the terms and definitions given in ISO 22007-1 and the following apply.

3.1 pulse width

t_p

time duration for which the laser pulse intensity is larger than half of its maximum value

NOTE It is expressed in seconds (s).