Plastics - Determination of thermal conductivity and thermal diffusivity - Part 2: Transient plane heat source (hot disc) method (ISO 22007-2:2008)

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See Eesti standard EVS-EN ISO 22007-2:2012 sisaldab Euroopa standardi EN ISO 22007-2:2012 ingliskeelset teksti.	This Estonian standard EVS-EN ISO 22007-2:2012 consists of the English text of the European standard EN ISO 22007-2:2012.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas.	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 25.01.2012.	Date of Availability of the European standard is 25.01.2012.
Standard on kättesaadav Eesti Standardikeskusest.	The standard is available from the Estonian Centre for Standardisation.

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile standardiosakond@evs.ee.

ICS 83.080.01

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN ISO 22007-2

January 2012

ICS 83.080.01

English Version

Plastics - Determination of thermal conductivity and thermal diffusivity - Part 2: Transient plane heat source (hot disc) method (ISO 22007-2:2008)

Plastiques - Détermination de la conductivité thermique et de la diffusivité thermique - Partie 2: Méthode de la source plane transitoire (disque chaud) (ISO 22007-2:2008)

Kunststoffe - Bestimmung der Wärmeleitfähigkeit und der Temperaturleitfähigkeit - Teil 2: Transientes Flächenquellenverfahren (Hot-Disk-Verfahren) (ISO 22007-2:2008)

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Ref. No. EN ISO 22007-2:2012: E

Foreword

The text of ISO 22007-2:2008 has been prepared by Technical Committee ISO/TC 61 “Plastics” of the International Organization for Standardization (ISO) and has been taken over as EN ISO 22007-2:2012 by Technical Committee CEN/TC 249 “Plastics” the secretariat of which is held by NBN.

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of an identical text or by endorsement, at the latest by July 2012, and conflicting national standards shall be withdrawn at the latest by July 2012.

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Endorsement notice

The text of ISO 22007-2:2008 has been approved by CEN as a EN ISO 22007-2:2012 without any modification.

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Introduction

A significant increase in the development and application of new and improved materials for broad ranges of physical, chemical, biological and medical applications has necessitated better performance data from methods of measurement of thermal-transport properties. The introduction of alternative methods that are relatively simple, fast and of good precision would be of great benefit to the scientific and engineering communities [1].

A number of measurement techniques described as contact transient methods have been developed and several have been commercialized. These are being widely used and are suitable for testing many types of material. In some cases, they can be used to measure several properties separately or simultaneously [2],[3].

A further advantage of some of these methods is that it has become possible to measure the true bulk properties of a material. This feature stems from the possibility of eliminating the influence of the thermal contact resistance (see 8.1.1) that is present at the interface between the probe and the specimen surfaces [1],[3],[4],[5],[6].

Plastics — Determination of thermal conductivity and thermal diffusivity —

Part 2: Transient plane heat source (hot disc) method

1 Scope

1.1 This part of ISO 22007 specifies a method for the determination of the thermal conductivity and thermal diffusivity, and hence the specific heat capacity per unit volume, of plastics. The experimental arrangement can be designed to match different specimen sizes. Measurements can be made in gaseous and vacuum environments at a range of temperatures and pressures.

1.2 This method is suitable for testing homogeneous and isotropic materials, as well as anisotropic materials with a uniaxial structure. In general, the method is suitable for materials having values of thermal conductivity, λ, in the approximate range 0,01 $W \cdot m^{-1} \cdot K^{-1} < \lambda < 500\ W \cdot m^{-1} \cdot K^{-1}$ and values of thermal diffusivity, α, in the range $5 \times 10^{-8}\ m^2 \cdot s^{-1} \leqslant \alpha \leqslant 10^{-4}\ m^2 \cdot s^{-1}$, and for temperatures, T, in the approximate range $50\ K < T < 1\ 000\ K$.

NOTE The specific heat capacity per unit volume, C, can be obtained by dividing the thermal conductivity, λ, by the thermal diffusivity, α, i.e. $C = \lambda / \alpha$, and is in the approximate range $0{,}2\ MJ \cdot m^{-3} \cdot K^{-1} < C < 5\ MJ \cdot m^{-3} \cdot K^{-1}$. It is also referred to as the volumetric heat capacity.

1.3 The thermal-transport properties of liquids can also be determined, provided care is taken to minimize thermal convection.

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 472, *Plastics — Vocabulary*

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