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BSI Standards Publication

Plastics — Determination of thermal conductivity and thermal diffusivity

Part 5: Results of interlaboratory testing of poly(methyl methacrylate) samples (ISO/TR 22007-5:2011)

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National foreword

This Published Document is the UK implementation of CEN ISO/TR 22007-5:2014. It is identical to ISO/TR 22007-5:2011.

The UK participation in its preparation was entrusted to Technical Committee PRI/21, Testing of plastics.

A list of organizations represented on this committee can be obtained on request to its secretary.

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Plastiques - Détermination de la conductivité thermique et de la diffusivité thermique - Partie 5 : Résultats d'essais interlaboratoires du poly(méthacrylate de méthyle) (ISO/TR 22007-5:2011)

Kunststoffe - Bestimmung der Wärmeleitfähigkeit und der Temperaturleitfähigkeit - Teil 5: Ergebnisse des Ringversuchs an Polymethylmethacrylatproben (ISO/TR 22007-5:2011)

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Foreword

The text of ISO/TR 22007-5:2011 has been prepared by Technical Committee ISO/TC 61 “Plastics” of the International Organization for Standardization (ISO) and has been taken over as CEN ISO/TR 22007-5:2014 by Technical Committee CEN/TC 249 “Plastics” the secretariat of which is held by NBN.

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Endorsement notice

The text of ISO/TR 22007-5:2011 has been approved by CEN as CEN ISO/TR 22007-5:2014 without any modification.

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Foreword

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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.

In exceptional circumstances, when a technical committee has collected data of a different kind from that which is normally published as an international Standard ("state of the art", for example), it may decide by a simple majority vote of its participating members to publish a Technical Report. A Technical Report is entirely informative in nature and does not have to be reviewed until the data it provides are considered to be no longer valid or useful.

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ISO/TR 22007-5 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*

— *Part 5: Results of inter-laboratory testing of poly(methyl methacrylate) samples* [Technical Report]

Introduction

The purpose of this document is to record the results of the interlaboratory comparison of measurements of the thermal conductivity and thermal diffusivity of poly(methyl methacrylate) PMMA specimens, as a source of information in support of the development of the series of standards on thermal conductivity and diffusivity of plastics, ISO 22007 [1 - 4].

TECHNICAL REPORT **ISO/TR 22007-5:2011(E)**

Plastics — Determination of thermal conductivity and thermal diffusivity —

Part 5:
Results of interlaboratory testing of poly(methyl methacrylate) samples

IMPORTANT — The electronic file of this document contains colours which are considered to be useful for the correct understanding of the document. Users should therefore consider printing this document using a colour printer.

1 Scope

This Technical Report presents the results of interlaboratory testing for the determination of thermal conductivity and thermal diffusivity of two poly(methyl methacrylate) (PMMA) materials by means of the transient and the modulated methods presented in ISO 22007 parts 2 to 4 [1 - 4] and additional transient and steady state methods.

The instructions for the intercomparison are presented in Annex A with key items reproduced in the main part of this Technical Report.

The detailed results of individual laboratories are presented in Annexes B to F.

2 Symbols and definitions

Symbol	Meaning	Unit
α	Thermal diffusivity	m^2/s
d	Thickness of specimen	m
λ	Thermal conductivity	W/(m·K)

For definitions of the terms used, the reader is referred to ISO 472 [5] and ISO 22007-1 [1].

3 Specimen preparation and characterization

3.1 Specimens

Two types of PMMA material were used in the intercomparison:

- Sumipex 000 (cast grade), Lot. 6621114, supplied by Sumitomo Chemical Co. Ltd, Japan [6]. Referred to as "Sumipex cast PMMA" herein. Sheet thickness ≈ 2 mm.
- AAJHF (extruded grade), supplied via NPL, UK. Referred to as "extrusion grade PMMA" herein. Sheet thickness ≈ 3 mm.