



**PDF disclaimer**

This PDF file may contain embedded typefaces. In accordance with Adobe's licensing policy, this file may be printed or viewed but shall not be edited unless the typefaces which are embedded are licensed to and installed on the computer performing the editing. In downloading this file, parties accept therein the responsibility of not infringing Adobe's licensing policy. The ISO Central Secretariat accepts no liability in this area.

Adobe is a trademark of Adobe Systems Incorporated.

Details of the software products used to create this PDF file can be found in the General Info relative to the file; the PDF-creation parameters were optimized for printing. Every care has been taken to ensure that the file is suitable for use by ISO member bodies. In the unlikely event that a problem relating to it is found, please inform the Central Secretariat at the address given below.

© ISO 2005

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office  
Case postale 56 • CH-1211 Geneva 20  
Tel. + 41 22 749 0111  
Fax + 41 22 749 0947  
E-mail [copyright@iso.org](mailto:copyright@iso.org)  
Web [www.iso.org](http://www.iso.org)

Published in Switzerland

## Contents

Page

|   |           |
|---|-----------|
| Foreword .....  | iv        |
| <b>1</b> <b>Scope</b> .....   | <b>1</b>  |
| <b>2</b> <b>Normative references</b> .....  | <b>1</b>  |
| <b>3</b> <b>Terms and definitions</b> .....   | <b>1</b>  |
| <b>4</b> <b>Apparatus</b> .....   | <b>3</b>  |
| 4.1 <b>Specimen holder</b> .....  | <b>4</b>  |
| 4.2 <b>Pulse laser</b> .....  | <b>4</b>  |
| 4.3 <b>Thermometer for measuring steady-state temperature of the specimen</b> .....   | <b>5</b>  |
| 4.4 <b>Detector for measuring transient temperature rise of rear face of the specimen</b> .....   | <b>5</b>  |
| 4.5 <b>Environment for measurements</b> .....   | <b>5</b>  |
| 4.6 <b>Temperature control unit</b> .....   | <b>5</b>  |
| 4.7 <b>Data acquisition unit</b> .....  | <b>5</b>  |
| <b>5</b> <b>Specimen</b> .....  | <b>5</b>  |
| 5.1 <b>Shape and dimension of specimens</b> .....   | <b>5</b>  |
| 5.2 <b>Coating on the specimen</b> .....  | <b>6</b>  |
| 5.3 <b>Reference specimen</b> .....   | <b>6</b>  |
| <b>6</b> <b>Measurement procedure</b> .....   | <b>6</b>  |
| 6.1 <b>Measurement of specimen thickness</b> .....  | <b>6</b>  |
| 6.2 <b>Surface treatment</b> .....  | <b>6</b>  |
| 6.3 <b>Determination of flash time of the laser pulse and the chronological profile of the laser pulse</b> .....  | <b>6</b>  |
| 6.4 <b>Temperature and atmosphere control</b> .....   | <b>6</b>  |
| 6.5 <b>Stability of specimen temperature</b> .....  | <b>6</b>  |
| 6.6 <b>Energy of pulse heating</b> .....  | <b>7</b>  |
| 6.7 <b>Measurement temperature</b> .....  | <b>7</b>  |
| 6.8 <b>Record</b> .....   | <b>7</b>  |
| <b>7</b> <b>Data analysis</b> .....   | <b>7</b>  |
| 7.1 <b>Calculation based on the half-rise-time method</b> .....   | <b>7</b>  |
| 7.2 <b>Criteria for applicability of the half-rise-time method</b> .....  | <b>7</b>  |
| <b>8</b> <b>Measurement report</b> .....  | <b>10</b> |
| <b>Annex A</b> (informative) <b>Principle of laser flash thermal diffusivity measurements</b> .....   | <b>12</b> |
| <b>Annex B</b> (informative) <b>Correction for non-ideal initial and boundary conditions</b> .....  | <b>13</b> |
| <b>Annex C</b> (informative) <b>Data analysis algorithms to calculate thermal diffusivity from observed temperature history curve under non-ideal initial and boundary conditions</b> ..... | <b>19</b> |
| <b>Annex D</b> (informative) <b>Other error factors</b> .....   | <b>22</b> |
| <b>Annex E</b> (informative) <b>Reference data and reference materials of thermal diffusivity</b> .....   | <b>28</b> |
| <b>Bibliography</b> .....   | <b>29</b> |