SLOVENSKI STANDARD
SIST EN ISO 19628:2021

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Nadomešča:
SIST EN 1159-3:2004
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Fina keramika (sodobna keramika, sodobna tehnična keramika) - Termofizikalne lastnosti keramičnih kompozitov - Ugotavljanje specifične toplotne kapacitete (ISO 19628:2017)

Fine ceramics (advanced ceramics, advanced technical ceramics) - Thermophysical properties of ceramic composites - Determination of specific heat capacity (ISO 19628:2017)

Hochleistungskeramik - Thermophysikalische Eigenschaften von keramischen Verbundwerkstoffen - Bestimmung der spezifischen Wärmekapazität (ISO 19628:2017)

Céramiques techniques - Propriétés thermophysiques des composites céramiques - Détermination de la capacité thermique specifique (ISO 19628:2017)

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81.060.30	Sodobna keramika	Advanced ceramics

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Fine ceramics (advanced ceramics, advanced technical ceramics) - Thermophysical properties of ceramic composites - Determination of specific heat capacity (ISO 19628:2017)

Céramiques techniques - Propriétés thermophysiques des composites céramiques - Détermination de la capacité thermique specifique (ISO 19628:2017)

Hochleistungskeramik - Thermophysikalische Eigenschaften von keramischen Verbundwerkstoffen - Bestimmung der spezifischen Wärmekapazität (ISO 19628:2017)

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European foreword

The text of ISO 19628:2017 has been prepared by Technical Committee ISO/TC 206 "Fine ceramics" of the International Organization for Standardization (ISO) and has been taken over as EN ISO 19628:2021 by Technical Committee CEN/TC 184 "Advanced technical ceramics" the secretariat of which is held by DIN.

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The text of ISO 19628:2017 has been approved by CEN as EN ISO 19628:2021 without any modification.

INTERNATIONAL STANDARD

ISO 19628

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Fine ceramics (advanced ceramics, advanced technical ceramics) — Thermophysical properties of ceramic composites — Determination of specific heat capacity

Céramiques techniques — Propriétés thermophysiques des composites céramiques — Détermination de la capacité thermique specifique

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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.

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This document was prepared by Technical Committee ISO/TC 206, *Fine ceramics*.

Fine ceramics (advanced ceramics, advanced technical ceramics) — Thermophysical properties of ceramic composites — Determination of specific heat capacity

1 Scope

This document describes two methods for the determination of the specific heat capacity of ceramic matrix composites with continuous reinforcements (1D, 2D, 3D).

Unidirectional (1D), bi-directional (2D) and tridirectional (XD, with $2 < x \leq 3$).

The two methods are:

— method A: drop calorimetry;

— method B: differential scanning calorimetry.

They are applicable from ambient temperature up to a maximum temperature, depending on the method: method A can be used up to 2 250 K, while method B is limited to 1 900 K.

NOTE Method A is limited to the determination of an average value of the specific heat capacity over a given temperature range and can give a larger spread of results.

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 19634, *Fine ceramics (advanced ceramics, advanced technical ceramics) — Ceramic composites — Notations and symbols*

IEC 60584-1, *Thermocouples — Part 1: Reference tables*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 19634 and the following apply.

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

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

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

3.1
specific heat capacity
C_p
amount of heat required to raise the temperature of a mass unit of material by 1 K at constant temperature and pressure

$$C_p = \frac{1}{m}\frac{dQ}{dT}$$

where Q is the heat required for a test-piece of mass m.

3.2
mean specific heat capacity
$\overline{C}_p$
amount of heat required to raise the temperature of a mass unit of a material from temperature T_1 to temperature T_2 at a constant pressure, divided by the temperature increase ($T_2 - T_1$) expressed in K

3.3
representative volume element
RVE
minimum volume which is representative of the material considered

4 Method A – drop calorimetry

4.1 Principle

A test piece is dropped from a conditioning chamber at a constant temperature T_1 to another chamber at a constant temperature T_2.

The mean specific heat capacity is determined from the measured amount of heat required to maintain the temperature constant in the second chamber. Transfer of the test piece shall be done under conditions as close as possible to adiabatic conditions.

4.2 Apparatus

4.2.1 Drop calorimeter, there are several types of drop calorimeters. They include one (or more) conditioning chambers and measuring chambers, which can be operated under controlled atmosphere and which are all equipped with a temperature control system that allows a temperature stability of less than 1 K.

The conditioning chamber shall have a homogeneous temperature zone size greater than the test specimen size. The measuring chamber shall have a homogeneous temperature zone of a sufficient length to accept several specimens and a sufficient thermal inertia to limit the temperature disturbance, due to the drop.

Heat transfer by radiation during the drop shall be avoided as far as possible.

4.2.2 Balance, with an accuracy of 0,1 mg for test pieces over 10 mg and an accuracy of 0,01 mg for test pieces below 10 mg.

4.2.3 Temperature detectors, thermocouples in accordance with IEC 60584-1 shall be used for the measurement of temperature up to 1 920 K.

For higher temperatures, infrared detectors or any other suitable device may be used.

4.2.4 Data acquisition system, the sampling period during the test shall be less than 0,5 s.

4.3 Standard reference materials

Standard reference materials which can be used for calibration purposes are listed in Annex B.

4.4 Test specimens

The test specimens shall be representative of the material.