



# SLOVENSKI STANDARD SIST EN ISO 21821:2023

01-februar-2023

Nadomešča:  
SIST EN 725-11:2007

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**Fina keramika (sodobna keramika, sodobna tehnična keramika) - Določanje zgoščevalnih lastnosti keramičnega prahu pri naravnem sintranju (ISO 21821:2019)**

Fine ceramics (advanced ceramics, advanced technical ceramics) - Determination of densification properties of ceramic powders on natural sintering (ISO 21821:2019)

Hochleistungskeramik - Bestimmung des Verdichtungsverhaltens keramischer Pulver beim natürlichen Sinterbrand (ISO 21821:2019)

Céramiques techniques (céramiques avancées, céramiques techniques avancées) - Détermination des propriétés de densification des poudres céramiques lors d'un frittage naturel (ISO 21821:2019)

**Ta slovenski standard je istoveten z: EN ISO 21821:2022**

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**EN ISO 21821**

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English Version

## Fine ceramics (advanced ceramics, advanced technical ceramics) - Determination of densification properties of ceramic powders on natural sintering (ISO 21821:2019)

Céramiques techniques (céramiques avancées, céramiques techniques avancées) - Détermination des propriétés de densification des poudres céramiques lors d'un frittage naturel (ISO 21821:2019)

Hochleistungskeramik - Bestimmung des Verdichtungsverhaltens keramischer Pulver beim natürlichen Sinterbrand (ISO 21821:2019)

This European Standard was approved by CEN on 21 November 2022.

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**CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels**

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## European foreword

The text of ISO 21821:2019 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 21821:2022 by Technical Committee CEN/TC 184 "Advanced technical ceramics" the secretariat of which is held by DIN.

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of an identical text or by endorsement, at the latest by May 2023, and conflicting national standards shall be withdrawn at the latest by May 2023.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

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The text of ISO 21821:2019 has been approved by CEN as EN ISO 21821:2022 without any modification.



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21821

First edition  
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**Fine ceramics (advanced ceramics,  
advanced technical ceramics) —  
Determination of densification  
properties of ceramic powders on  
natural sintering**

*Céramiques techniques (céramiques avancées, céramiques techniques  
avancées) — Détermination des propriétés de densification des  
poudres céramiques lors d'un frittage naturel*

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## ISO 21821:2019(E)

## 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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

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

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at [www.iso.org/members.html](http://www.iso.org/members.html).

# Fine ceramics (advanced ceramics, advanced technical ceramics) — Determination of densification properties of ceramic powders on natural sintering

## 1 Scope

This document specifies the test method to determine the extent to which ceramic powder compacts made of granulated or ungranulated ceramic powders are densified, when they are sintered at a high temperature without the application of any external pressure or external densification force. The test method is applicable to pure oxides, mixtures of oxides and solid solutions, and is also applicable to non-oxides (e.g. carbides, nitrides) that can be sintered under vacuum or constant gas pressure (1 bar or less) to prevent oxidation or decomposition. The test method is not applicable to ceramics that can only be sintered using pressure-assisted sintering techniques such as hot pressing (HP), hot isostatic pressing (HIP), gas pressure sintering (GPS) or spark plasma sintering (SPS). Inorganic sintering additives can be used where their presence is reported.

## 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 3611, *Geometrical product specifications (GPS) — Dimensional measuring equipment: Micrometers for external measurements — Design and metrological characteristics*

ISO/IEC 17025, *General requirements for the competence of testing and calibration laboratories*

ISO 17172, *Fine ceramics (advanced ceramics, advanced technical ceramics) — Determination of compaction properties of ceramic powders*

## 3 Terms and definitions

No terms and definitions are listed in this document.

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

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

## 4 Principle

When ceramic powder compacts are heat-treated at high temperatures, they shrink and are densified due to sintering. The mass, dimensions (diameter and height), volume and apparent density of a ceramic powder compact are measured before and after sintering through thermal treatment. The variations in mass, dimensions, volume and apparent density depend on maximum temperature, dwell time, heating rate and apparent density after compaction, and can be expressed as a function of these parameters. For example, the variation in relative density can be plotted as a function of sintering temperature for each compacting pressure.