
**Fine ceramics (advanced ceramics,
advanced technical ceramics) —
Determination of compressive
strength of ceramic granules**

*Céramiques fines (céramiques avancées, céramiques techniques
avancées) — Détermination de la force de compression des
granules de céramique*

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Foreword

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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).

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: [Foreword - Supplementary information](#).

The committee responsible for this document is ISO/TC 206, *Fine ceramics*.

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Fine ceramics (advanced ceramics, advanced technical ceramics) — Determination of compressive strength of ceramic granules

1 Scope

This International Standard specifies the testing method to determine the compressive strength of ceramic granules, when subjected to uniaxial compressive loading in a confining die, under specified conditions.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 7500-1, *Metallic materials — Calibration and verification of static uniaxial testing machines — Part 1: Tension/compression testing machines — Calibration and verification of the force-measuring system*

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

3 Principle

In general, a ceramic powder compact is made of ceramic granules. When ceramic granules are compacted uniaxially in a confining die by pressing, first they are rearranged during compaction. However, when a pressure higher than the critical pressure is applied to ceramic granules, the deformation and the fracture of granulated powder also occur. The final density of powder compact depends on the compressive strength (critical pressure) of ceramic granules. When ceramic granules are pressed in a die by using a universal testing machine (UTM), a load-displacement (or load-strain) curve can be obtained. Load-displacement curve can be converted into pressure-density curve by using the dimensions and density of a powder compact ejected from the die. The compressive strength can be determined from the slope change in the pressure-density curve.

4 Symbols and designation

Symbol	Designation	Unit
ρ_p	Green density of powder compact	g/cm ³
m	Mass of powder compact	g
V	Volume of powder compact	cm ³
A	Area of powder compact	cm ²
h	Height of powder compact	cm
l	Displacement of powder compact	cm
l_f	Final displacement of powder compact	cm

5 Apparatus

5.1 Cylindrical die, which shall be made from a hard material, preferably hardened steel or tungsten carbide. The die for producing cylindrical compacts shall contain two punches and shall be of a floating type