

---

---

**Uranium dioxide powder —  
Determination of apparent density  
and tap density**

*Poudre de dioxyde d'uranium — Détermination de la masse  
volumique apparente et de la masse volumique après tassement*

iTeh Standards  
(<https://standards.iteh.ai>)  
Document Preview

[ISO 9161:2019](https://standards.iteh.ai/catalog/standards/iso/083df890-3816-4e1e-ab70-47beaf007760/iso-9161-2019)

<https://standards.iteh.ai/catalog/standards/iso/083df890-3816-4e1e-ab70-47beaf007760/iso-9161-2019>



iTeh Standards  
(<https://standards.iteh.ai>)  
Document Preview

ISO 9161:2019

<https://standards.iteh.ai/catalog/standards/iso/083df890-3816-4e1e-ab70-47beaf007760/iso-9161-2019>



**COPYRIGHT PROTECTED DOCUMENT**

© ISO 2019

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office  
CP 401 • Ch. de Blandonnet 8  
CH-1214 Vernier, Geneva  
Phone: +41 22 749 01 11  
Fax: +41 22 749 09 47  
Email: [copyright@iso.org](mailto:copyright@iso.org)  
Website: [www.iso.org](http://www.iso.org)

Published in Switzerland

# Contents

Page

<b>Foreword</b> .....	<b>iv</b>
<b>Introduction</b> .....	<b>v</b>
<b>1 Scope</b> .....	<b>1</b>
<b>2 Normative references</b> .....	<b>1</b>
<b>3 Terms and definitions</b> .....	<b>1</b>
<b>4 Principle</b> .....	<b>1</b>
4.1 Apparent density.....	1
4.2 Tap density.....	1
<b>5 Apparatus</b> .....	<b>2</b>
<b>6 Sampling and samples</b> .....	<b>3</b>
<b>7 Procedure</b> .....	<b>3</b>
7.1 Safety precautions.....	3
7.2 Calibration.....	4
7.3 Determination of the apparent density.....	4
7.4 Determination of tapped density.....	4
7.5 Number of determinations.....	4
7.6 Quality control.....	5
<b>8 Expression of results</b> .....	<b>5</b>
8.1 Method of calculation.....	5
8.2 Precision.....	5
<b>9 Test report</b> .....	<b>5</b>
<b>Bibliography</b> .....	<b>7</b>

[ISO 9161:2019](https://standards.iteh.ai/catalog/standards/iso/083df890-3816-4e1e-ab70-47beaf007760/iso-9161-2019)

<https://standards.iteh.ai/catalog/standards/iso/083df890-3816-4e1e-ab70-47beaf007760/iso-9161-2019>

## 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)).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

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 85, *Nuclear energy, nuclear technologies, and radiological protection*, Subcommittee SC 5, *Nuclear installations, processes and technologies*.

This second edition cancels and replaces the first edition (ISO 9161:2004), which has been technically revised.

The main changes compared to the previous edition are as follows:

- an introduction has been added;
- definitions in [Clause 3](#) have been updated;
- safety precautions have been updated.

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).

## Introduction

Uranium dioxide (UO<sub>2</sub>) powder is the source material for the manufacture of nuclear fuel as pellets, and is produced for use in nuclear reactors by a variety of processes. Specifications for UO<sub>2</sub> powder used in the production of sintered pellets as a nuclear fuel are given in standards such as ASTM C753<sup>[5]</sup> or specifications supplied by the user. These specifications can include requirements for apparent (or bulk) density, tap density, or both.

This document specifies a method for determination of the apparent density and tap density of free-flowing UO<sub>2</sub> powder, and can be used for a variety of powder types. The method can also be applied to other fuel powders, and to powder mixtures, to demonstrate compliance with appropriate specifications for those powders.

It has been assumed in the preparation of this document that the execution of its provisions and the interpretation of the results obtained are entrusted to appropriately qualified and experienced people.

iTeh Standards  
(<https://standards.iteh.ai>)  
Document Preview

[ISO 9161:2019](https://standards.iteh.ai/catalog/standards/iso/083df890-3816-4e1e-ab70-47beaf007760/iso-9161-2019)

<https://standards.iteh.ai/catalog/standards/iso/083df890-3816-4e1e-ab70-47beaf007760/iso-9161-2019>

