



Designation: ~~C1065-93~~ Designation: **C 1065 – 08**

Standard Specification for Nuclear-Grade Zirconium Oxide Powder¹

This standard is issued under the fixed designation C 1065; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This specification defines the physical and chemical requirements for zirconium oxide powder intended for fabrication into shapes, either entirely or partially of zirconia, for use in a nuclear reactor core.

1.2 The material described herein shall be particulate in nature.

~~1.3 The values stated in SI units are to be regarded as the standard.~~

1.3 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

2. Referenced Documents

2.1 *ASTM Standards:*²

C 117 [Test Method for Materials Finer than 75- \$\mu\$ m \(No. 200\) Sieve in Mineral Aggregates by Washing](#)

C 371 [Test Method for Wire-Cloth Sieve Analysis of Nonplastic Ceramic Powders](#)

C 859 ~~Terminology Relating to Nuclear Materials~~ [Terminology Relating to Nuclear Materials](#)

C 1233 [Practice for Determining Equivalent Boron Contents of Nuclear Materials](#)

E 11 ~~Specification for Wire-Cloth Sieves for Testing Purposes~~ [Specification for Wire Cloth and Sieves for Testing Purposes](#)

E 105 [Practice for Probability Sampling of Materials](#)

2.2 *ANSI Standard:*

~~ANSI/ASME NQA-1 Quality Assurance Program Requirements for Nuclear Facilities~~³

[ANSI/ASME NQA-1 Quality Assurance Requirements for Nuclear Facility Applications](#)

2.3 *U.S. Government Standard:*⁴

Code of Federal Regulations, Title 10, Part 50, Energy (10 CFR 50) Domestic Licensing of Production and Utilization Facilities

3. Terminology

3.1 Terms shall be defined in accordance with Terminology C 859 except for the following:

3.2 *buyer*—the organization issuing the purchase order.

3.3 *phase transformation*—the rearrangement of the atomic ordering of a crystalline lattice as a material is cycled through a critical transformation or inversion temperature. The change from one crystalline phase to another may be accompanied by a volume change that could lead to cracks or defects in products fabricated from such materials.

3.4 *powder lot*—a specified quantity of zirconium oxide powder (with stabilizing additive, if applicable) blended together such that samples taken in accordance with the procedures of Section 8 can be considered as representative of the entire specified quantity.

3.5 *seller*—the zirconium oxide processor.

3.6 *stabilizing additive*—a material which, when added in sufficient quantity to the subject material exhibiting the phase transformation, produces a stabilized crystalline phase that does not undergo a transformation at any temperature within the expected fabrication or usage regime of the manufactured product; the potentially deleterious volume change is therefore avoided.

¹ This specification is under the jurisdiction of ASTM Committee C-26 on Nuclear Fuel Cycle and is the direct responsibility of Subcommittee C26.03 on Neutron Absorber Materials Specifications.

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² This specification is under the jurisdiction of ASTM Committee C26 on Nuclear Fuel Cycle and is the direct responsibility of Subcommittee C26.03 on Neutron Absorber Materials Specifications.

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³ For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards*, Vol 14.01, volume information, refer to the standard's Document Summary page on the ASTM website.

⁴ Annual Book of ASTM Standards, Vol 14.02.

⁵ Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, <http://www.ansi.org>.

⁶ Available from the American National Standards Institute, 11 W. 42nd St., 13th Floor, New York, NY 10036.

⁷ Available from U.S. Government Printing Office Superintendent of Documents, 732 N. Capitol St., NW, Mail Stop: SDE, Washington, DC 20401, <http://www.access.gpo.gov>.