



Designation: C757 – 06

Standard Specification for Nuclear-Grade Plutonium Dioxide Powder, Sinterable¹

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INTRODUCTION

This specification is intended to provide the nuclear industry with a general standard for sinterable plutonium dioxide powder. It recognizes the diversity of manufacturing methods by which plutonium dioxide powders are produced, and the many special requirements for chemical and physical characterization that may be imposed by the end use of the powder in a specific reactor system. It is, therefore, anticipated that the buyer may supplement this specification with more stringent or additional requirements for specific applications.

1. Scope

1.1 This specification covers nuclear grade plutonium dioxide, sinterable powder obtained by the oxalate precipitation route, calcined above 500°C, or any other equivalent process acceptable to the buyer. Included is plutonium dioxide of various isotopic compositions as normally prepared by in-reactor neutron irradiation of natural or slightly enriched uranium or by in-reactor neutron irradiation of recycled plutonium mixed with uranium.

1.2 There is no discussion of or provision for preventing criticality incidents, nor are health and safety requirements, the avoidance of hazards, or shipping precautions and controls discussed. Observance of this specification does not relieve the user of the obligation to be aware of and conform to all national and local regulations on processing, shipping, or using source or special nuclear materials. For examples in the U.S. Government, relevant documents are Code of Federal Regulations, Title 10 Nuclear Safety Guide, U.S. Atomic Energy Commission Report TID-7016², and “Handbook of Nuclear Safety”, H. K. Clark, U.S. Atomic Energy Commission Report, DP-532².

1.3 The PuO₂ shall be produced by a qualified process and in accordance with a quality assurance program approved by the user.

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

1.5 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 ASTM Standards:³

C697 Test Methods for Chemical, Mass Spectrometric, and Spectrochemical Analysis of Nuclear-Grade Plutonium Dioxide Powders and Pellets

C1233 Practice for Determining Equivalent Boron Contents of Nuclear Materials

C1295 Test Method for Gamma Energy Emission from Fission Products in Uranium Hexafluoride and Uranyl Nitrate Solution

2.2 ANSI Standard:

ANSI/ASME NQA-1 Quality Assurance Requirements for Nuclear Facility Applications⁴

2.3 U.S. Government Documents:

Code of Federal Regulations, Title 10, Nuclear Safety Guide, U.S. Atomic Energy Commission Report TID-7016²

“Handbook of Nuclear Safety,” Clark, H. K., U.S. Atomic Energy Commission Report, DP-532²

2.4 ISO Standard:

¹ This specification is under the jurisdiction of ASTM Committee C26 on Nuclear Fuel Cycle and is the direct responsibility of Subcommittee C26.02 on Fuel and Fertile Material Specifications.

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² Available from Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

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* volume information, refer to the standard’s Document Summary page on the ASTM website.

⁴ Available from American National Standards Institute, 11 W. 42nd St., 13th Floor, New York, NY 10036.