



Designation: C 757 – 90 (Reapproved 2002)

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 purchaser 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 purchaser. 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 Federal, state, and local regulations on processing, shipping, or using source or special nuclear materials. Examples of U.S. Government documents are N7.2 Radiation Protection in Nuclear Reactor Fuel Fabrication Plants², Code of Federal Regulations, Title 10 Nuclear Safety Guide, U.S. Atomic Energy Commission Report TID-7016³, and “Handbook of Nuclear Safety”, H. K. Clark, U.S. Atomic Energy Commission Report, DP-532³.

1.3 The PuO₂ shall be produced by the processor employing 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:

C 697 Test Method for Chemical, Mass Spectrometric, and Spectrochemical Analysis of Nuclear-Grade Plutonium Dioxide Powders and Pellets⁴

2.2 ANSI Standards:

N7.2 Radiation Protection in Nuclear Reactor Fuel Fabrication Plants²

ANSI-ASME NQA-1 Quality Assurance Program Requirements for Nuclear Facilities²

2.3 U.S. Government Documents:

Code of Federal Regulations, Title 10, Nuclear Safety Guide, U.S. Atomic Energy Commission Report TID-7016³

“Handbook of Nuclear Safety,” Clark, H. K., U.S. Atomic Energy Commission Report, DP-532³

2.4 ISO Standard:

ISO 8300 Determination of Pu content in plutonium dioxide (PuO₂) of Nuclear Grade Quality, Gravimetric Method²

3. Isotopic Content

3.1 Concentrations and homogeneity ranges of the plutonium isotopes shall be as specified by the purchaser.

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

³ Available from Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

⁴ Annual Book of ASTM Standards, Vol 12.01.