



Standard Specification for Sintered (Uranium-Plutonium) Dioxide Pellets¹

This standard is issued under the fixed designation C 833; 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.

INTRODUCTION

This specification is intended to provide the nuclear industry with a general standard for uranium-plutonium dioxide pellets for thermal reactor use. It recognizes the diversity of manufacturing methods by which uranium-plutonium dioxide pellets are produced and the many special requirements for chemical and physical characterization that may be imposed by the operating conditions to which the pellets will be subjected in specific reactor systems. It does not recognize the possible problems associated with the reprocessing of such pellets. It is, therefore, anticipated that the purchaser may supplement this specification with additional requirements for specific applications.

1. Scope

1.1 This specification covers finished sintered and ground (uranium-plutonium) dioxide pellets for use in thermal reactors. It applies to uranium-plutonium dioxide pellets containing plutonium additions up to 15 % weight. This specification may not completely cover the requirements for pellets fabricated from weapons-derived plutonium.

1.2 This specification does not include (1) provisions for preventing criticality accidents or (2) requirements for health and safety. Observance of this specification does not relieve the user of the obligation to be aware of and conform to all applicable international, federal, state, and local regulations pertaining to possessing, processing, shipping, or using source or special nuclear material. Examples of U.S. government documents are Code of Federal Regulations Title 10, Part 50—Domestic Licensing of Production and Utilization Facilities; Title 10, Part 71—Packaging and Transportation of Radioactive Material; and Title 49, Part 173—General Requirements for Shipments and Packaging.

1.3 The following safety hazards caveat pertains only to the technical requirements portion, Section 4, of this specification: *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.*

1.4 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

2. Referenced Documents

2.1 ASTM Standards:

- C 698 Test Methods for Chemical, Mass Spectrometric, and Spectrochemical Analysis of Nuclear-Grade Mixed Oxides ((U, Pu)O₂)²
- C 753 Specification for Nuclear-Grade, Sinterable Uranium Dioxide Powder²
- C 757 Specification for Nuclear-Grade Plutonium Dioxide Powder, Sinterable²
- C 859 Terminology Relating to Nuclear Materials²
- C 1165 Test Method for Determining Plutonium by Controlled-Potential Coulometry in H₂SO₄ At a Platinum Working Electrode²
- C 1204 Test Method for Uranium in the Presence of Plutonium by Iron(II) Reduction in Phosphoric Acid Followed by Chromium(VI) Titration²
- C 1206 Test Method for Plutonium by Iron (II)/Chromium (VI) Amperometric Titration²
- C 1233 Practice for Determining Equivalent Boron Contents of Nuclear Material²
- E 105 Practice for Probability Sampling of Materials³

2.2 ANSI Standard:⁴

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

2.3 U.S. Government Documents:⁵

USNRC Regulatory Guide 1.126 An Acceptable Model and Related Statistical Methods for the Analysis of Fuel Densification

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.

Current edition approved June 10, 2001. Published October 2001. Originally published as C 833 – 76. Last previous edition C 833 – 95a.

² Annual Book of ASTM Standards, Vol 12.01.

³ Annual Book of ASTM Standards, Vol 14.02.

⁴ Available from American National Standards Institute, 25 West 43rd St., 4th Floor, New York, NY 10036.

⁵ Available from Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.