



Designation: C 833 – 95a

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 (uranium-plutonium) dioxide pellets. It applies to uranium-plutonium dioxide pellets containing plutonium additions up to 10 % weight. The isotopic composition of the diluent uranium shall be of any ²³⁵U composition. The isotopic composition of the plutonium component shall be as normally prepared by in-reactor neutron irradiation of uranium having less than 5 % ²³⁵U.

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 international, federal, state, and local regulations on possessing, shipping, processing, or using source or special nuclear materials. Guidance is provided in CFR Title 10, TID-7016, and DP-532 (see 2.3).

1.3 All terms used herein are as defined in Terminology C 859.

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

NQA-1 Quality Assurance Program Requirements for Nuclear Facilities

2.3 U.S. Government Documents:⁵

CFR Title 10, Chapter 1 Nuclear Safety Guide (Title 49 Transportation, Chapter 1 Materials Transportation Bureau) Nuclear Safety Guide, U.S. AEC Report TID-7016 Handbook of Nuclear Safety, AEC Report DP-532

CFR 10, Chapter 1, Regulatory Guide 1.126 An Acceptable Model and Related Statistical Methods for the Analysis of Fuel Densification

3. Terminology

3.1 Definitions:

¹ This specification is under the jurisdiction of ASTM Committee C-26 on Nuclear Fuel Cycle and is the direct responsibility of Subcommittee C26.02 on Fuel and Fertile Material Specifications.

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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, 11 West 42nd St., 13th Floor, New York, NY 10036.

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