



Standard Specification for Nuclear-Grade, Sinterable Uranium Dioxide Powder¹

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INTRODUCTION

This specification is intended to provide the nuclear industry with a general specification for sinterable uranium dioxide powder. It recognizes the diversity of manufacturing methods by which uranium dioxide powders are produced and the many special requirements for chemical and physical characterization which 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 additional requirements for specific applications.

1. Scope

1.1 This specification covers nuclear-grade, sinterable uranium dioxide powder. It applies to uranium dioxide powder containing uranium of any ^{235}U concentration for use in nuclear reactors.

1.2 This specification recognizes the presence of reprocessed uranium in the fuel cycle and consequently defines isotopic limits for commercial grade UO_2 . Such commercial grade UO_2 is defined so that, regarding fuel design and manufacture, the product is essentially equivalent to that made from unprocessed uranium. UO_2 falling outside these limits cannot necessarily be regarded as equivalent and may thus need special provisions at the fuel fabrication plant or in the fuel design.

1.3 This specification does not include provisions for preventing criticality accidents or 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, national, or federal, state, and local regulations pertaining to possessing, shipping, processing, or using source or special nuclear material.

1.4 Special tests and procedures are given in Annex A1.

1.5 This specification refers expressly to UO_2 powder before the addition of any die lubricant, binder, or pore former. If powder is sold with such additions, sampling procedures or allowable impurity contents, or both, may need to be modified by agreement between the buyer and the seller.

1.6 The following safety hazards caveat pertains to the test methods portion in the annexes 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.

2. Referenced Documents

2.1 ASTM Standards:

B 329 Test Method for Apparent Density of Powders of Refractory Metals and Compounds by the Scott Volume-ter²

C 696 Test Methods for Chemical, Mass Spectrometric, and Spectrochemical Analysis of Nuclear-Grade Uranium Dioxide Powders and Pellets³

C 859 Terminology Relating to Nuclear Materials³

C 996 Specification for Uranium Hexafluoride Enriched to Less than 5 % ^{235}U ³

C 1233 Practice for Determining Equivalent Boron Contents of Nuclear Materials³

E 11 Specification for Wire-Cloth Sieves for Testing Purposes⁴

E 105 Practice for Probability Sampling of Materials⁴

2.2 ANSI Standard:⁵

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

2.3 Federal Regulation:⁶

Code of Federal Regulations, Title 10, Chapter 1, Nuclear Regulatory Commission, Applicable Parts

3. Terminology

3.1 *Definitions*—Definitions of terms are as given in Terminology C 859.

² Annual Book of ASTM Standards, Vol 02.05.

³ Annual Book of ASTM Standards, Vol 12.01.

⁴ Annual Book of ASTM Standards, Vol 14.02.

⁵ Available from American National Standards Institute, 11 W. 42nd St., 13th Floor, New York, NY 10036.

⁶ Available from Standardization Documents, Order Desk, Building 4 Section D, 700 Robbins Ave., Philadelphia, PA 19111-5094, Attn: NPODS.

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