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AMERICAN SOCIETY FOR TESTING AND MATERIALS
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Standard Specification for Blended Uranium Oxides with a ^{235}U Content of Less Than 5 % for Direct Hydrogen Reduction to Nuclear Grade Uranium Dioxide¹

This standard is issued under the fixed designation C 1348; 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 such uranium oxide powders. It recognizes the diversity of conversion processes and the many special requirements for chemical and physical characterization that may be imposed by the end use of the powder. It is anticipated, therefore, that this specification may be supplemented with additional requirements by agreement between the buyer and the seller.

1. Scope

1.1 This specification covers blended uranium trioxide (UO_3), U_3O_8 , or mixtures of the two, powders that are intended for conversion into a sinterable uranium dioxide (UO_2) powder by means of a direct reduction process. The UO_2 powder product of the reduction process must meet the requirements of Specification C 753 and be suitable for subsequent UO_2 pellet fabrication by pressing and sintering methods. This specification applies to uranium oxides with a ^{235}U enrichment less than 5 %.

1.2 This specification includes chemical, physical, and test method requirements for uranium oxide powders as they relate to the suitability of the powder for storage, transportation, and direct reduction to UO_2 powder. This specification is applicable to uranium oxide powders for such use from any source.

1.3 The scope of this specification does not comprehensively cover all provisions for preventing criticality accidents, for health and safety, or for shipping. Observance of this specification does not relieve the user of the obligation to conform to all international, national, state, and local regulations for processing, shipping, or any other way of using uranium oxide powders (see 2.2 and 2.3).

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

1.5 The following safety hazards caveat pertains only to the test methods portion of the annexes in 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 Metal Powders and Related Compounds Using the Scott Volumeter²
 - C 696 Test Methods for Chemical, Mass Spectrometric, and Spectrochemical Analysis of Nuclear-Grade Uranium Dioxide Powders and Pellets³
 - C 753 Specification for Nuclear-Grade, Sinterable Uranium Dioxide Powder³
 - C 799 Test Methods for Chemical, Mass Spectrometric, Spectrochemical, Nuclear, and Radiochemical Analysis of Nuclear-Grade Uranyl Nitrate Solutions³
 - 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
 - C 1287 Test Method for Determination of Impurities in Uranium Dioxide by Inductively Coupled Plasma Mass Spectrometry³
 - E 11 Specification for Wire-Cloth Sieves for Testing Purposes⁴
 - E 105 Practice for Probability Sampling of Materials⁴
- #### 2.2 ANSI Standard:
- NQA-1 Quality Assurance Program, Requirements for Nuclear Facilities⁵

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 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.