Designation: C 922 – 00

Standard Specification for Sintered Gadolinium Oxide-Uranium Dioxide Pellets[1]

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INTRODUCTION

This specification is intended to provide the nuclear industry with a general specification for gadolinium oxide-uranium dioxide pellets. It recognizes the diversity of manufacturing methods by which gadolinium oxide-uranium 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. Therefore, it is anticipated that the purchaser may supplement this specification with additional requirements for specific applications.

1. Scope

1.1 This specification is for finished sintered gadolinium oxide-uranium dioxide pellets for use in light-water reactors. It applies to gadolinium oxide-uranium dioxide pellets containing uranium of any ^{235}U concentration and any concentration of gadolinium oxide.

1.2 This specification recognizes the presence of reprocessed uranium in the fuel cycle and consequently defines isotopic limits for gadolinium oxide-uranium dioxide pellets made from 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 unreprocessed 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 (*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 pertaining to possessing, shipping, processing, or using source or special nuclear material. Examples of U.S. Governmental documents are Code of Federal Regulations (Latest Edition), Title 10, Part 50, Title 10, Part 71, and Title 49, Part 173.

1.4 The following precautionary 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.*

2. Referenced Documents

2.1 *ASTM Standards:*

C 696 Test Methods for Chemical, Mass Spectrometric, and Spectrochemical Analysis of Nuclear-Grade Uranium Dioxide Powders and Pellets[2]

C 753 Specification for Nuclear-Grade, Sinterable Uranium Dioxide Powder[2]

C 859 Terminology Relating to Nuclear Materials[2]

C 888 Specification for Nuclear-Grade Gadolinium Oxide (Gd_2O_3) Powder[2]

C 968 Test Methods for Analysis of Sintered Gadolinium Oxide-Uranium Dioxide Pellets[2]

C 996 Specification for Uranium Hexafluoride Enriched to Less than 5 % ^{235}U[2]

C 1233 Practice for Determining the Equivalent Boron Content of Nuclear Materials[2]

E 105 Practice for Probability Sampling of Materials[3]

2.2 *ANSI Standard:*

NQA-1 Quality Assurance Program Requirements for Nuclear Facilities[4]

2.3 *U.S. Government Documents:*

Code of Federal Regulations (Latest Edition), Title 10, Part 50, Energy (10 CFR 50) Domestic Licensing of Production and Utilization Facilities[5]

Code of Federal Regulations, Title 10, Part 71, Packaging and Transportation of Radioactive Material[5]

Code of Federal Regulations, Title 49, Part 173, General Requirements for Shipments and Packaging[5]

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

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

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