



Designation: C 996 – 96

## Standard Specification for Uranium Hexafluoride Enriched to Less Than 5 %<sup>235</sup>U<sup>1</sup>

This standard is issued under the fixed designation C 996; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

### 1. Scope

1.1 This specification covers nuclear grade uranium hexafluoride ( $UF_6$ ) that either has been processed through an enrichment plant, or has been produced by the blending of Highly Enriched Uranium with other uranium to obtain uranium of any <sup>235</sup>U concentration below 5 % and that is intended for fuel fabrication. The scope of this specification includes specifications for  $UF_6$  enriched from Commercial Natural  $UF_6$ , and  $UF_6$  enriched from Reprocessed  $UF_6$ ; enriched  $UF_6$  derived from Highly Enriched Uranium is included in the specification for  $UF_6$  enriched from Commercial Natural  $UF_6$  (see **Note 1**). Commercial Natural  $UF_6$ , Reprocessed  $UF_6$ , Highly Enriched  $UF_6$ , and Derived Enriched  $UF_6$  are defined in Section 3. The objectives of this specification are twofold: (1) To define the impurity and uranium isotope limits for Enriched Commercial Grade  $UF_6$  so that, with respect to fuel design and manufacture, it is essentially equivalent to enriched uranium made from natural  $UF_6$ ; and (2) To define limits for Enriched Reprocessed  $UF_6$  to be expected if Reprocessed  $UF_6$  is to be enriched without dilution with Commercial Natural  $UF_6$ . For such  $UF_6$ , special provisions, not defined herein, may be needed to ensure fuel performance and to protect the work force, process equipment, and the environment.

**NOTE 1**—Due to limited experience with enriched  $UF_6$  derived from Highly Enriched Uranium, such material must be carefully monitored to ensure compliance with this specification; when such Derived Enriched  $UF_6$  is directly provided to the buyer, it shall be identified as such by the seller.

1.2 This specification is intended to provide the nuclear industry with a standard for enriched  $UF_6$  that is to be used in the production of sinterable  $UO_2$  powder for fuel fabrication. In addition to this specification, the parties concerned may agree to other appropriate conditions.

1.3 The scope of this specification does not comprehensively cover all provisions for preventing criticality accidents or requirements for health and safety or for shipping. Observance of this specification does not relieve the user of the obligation to conform to all applicable international, federal,

state, and local regulations for processing, shipping, or in any other way using  $UF_6$  (see, for example, TID-7016, DP-532, ORNL-NUREG-CSD-6, and DOE 5633.3B).

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 761** Test Methods for Chemical, Mass Spectrometric, Spectrochemical, Nuclear, and Radiochemical Analysis of Uranium Hexafluoride<sup>2</sup>

**C 787** Specification for Uranium Hexafluoride for Enrichment<sup>2</sup>

**C 859** Terminology Relating to Nuclear Materials<sup>2</sup>

**C 1052** Practice for Bulk Sampling of Liquid Uranium Hexafluoride<sup>2</sup>

**C 1295** Test Method for Gamma Energy Emission from Fission Products in Uranium Hexafluoride<sup>2</sup>

#### 2.2 ANSI Standards:<sup>3</sup>

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

**ANSI N14.1** Packaging of Uranium Hexafluoride for Transport

#### 2.3 U.S. Government Documents:

**Inspection, Weighing, and Sampling of Uranium Hexafluoride Cylinders, Procedure for Handling and Analysis of Uranium Hexafluoride, Vol. 1, DOE Report ORO-671-1, latest revision<sup>4</sup>**

**Uranium Hexafluoride: A Manual of Good Handling Practices, United States Enrichment Corporation Report USEC-651, latest revision<sup>5</sup>**

**Nuclear Safety Guide, U.S. NRC Report TID-7016, Rev. 2, 1978, and ORNL-NUREG-CSD-6<sup>4</sup>**

**Clarke, H. K., Handbook of Nuclear Safety, DOE Report DP-532<sup>4</sup>**

**Code of Federal Regulations, Title 10, Part 50, (Appendix B)<sup>4</sup>**

<sup>2</sup> *Annual Book of ASTM Standards*, Vol 12.01.

<sup>3</sup> Available from the American National Standards Institute, 11 W. 42nd St., 13th Floor, New York, NY 10036.

<sup>4</sup> Available from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

<sup>5</sup> Available from United States Enrichment Corporation, 6903 Rockledge Drive, Bethesda, MD 20817.

<sup>1</sup> 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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