Designation: C 787 – 03$^{\epsilon 1}$

Standard Specification for Uranium Hexafluoride for Enrichment[1]

This standard is issued under the fixed designation C 787; 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.

ϵ^1 NOTE—The table in Section 5.4 was corrected editorially in December 2004.

1. Scope

1.1 This specification covers uranium hexafluoride (UF_6) intended for feeding to an enrichment plant. Included are specifications for UF_6 derived from unirradiated natural uranium and UF_6 derived from irradiated uranium that has been reprocessed and converted to UF_6 for enrichment and subsequent reuse. The objectives of this specification are twofold: (*1*) To define the impurity and uranium isotope limits for Commercial Natural UF_6 feedstock so that the corresponding enriched uranium is essentially equivalent to enriched uranium made entirely from virgin natural UF_6; and (*2*) To define additional limits for Reprocessed UF_6(or any mixture of Reprocessed UF_6 and Commercial Natural UF_6). For such UF_6, special provisions may be needed to ensure that no extra hazard arises to the work force, process equipment, or the environment.

1.2 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 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 O 474.1).

1.3 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[2]

C 859 Terminology Relating to Nuclear Materials[2]

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

C 1052 Practice for Bulk Sampling of Liquid Uranium Hexafluoride[2]

C 1295 Test Method for Gamma Energy Emission from Fission Products in Uranium Hexafluoride[2]

2.2 *ANSI Standard:*

N14.1 Packaging of Uranium Hexafluoride for Transport[3]

2.3 *U.S. Government Documents:*

Inspection, Weighing, and Sampling of Uranium Hexafluoride Cylinders, Procedures for Handling and Analysis of Uranium Hexafluoride, Vol. 1, DOE Report ORO-671-1, latest revision[4]

Uranium Hexafluoride: A Manual of Good Handling Practices, United States Enrichment Corporation Report USEC-651, latest revision[5]

Nuclear Safety Guide, U.S. Nuclear Regulatory Commission Report TID-7016, Rev. 2, 1978, and ORNL-NUREG-CSD-6[4]

Clarke, H. K., Handbook of Nuclear Safety, DOE Report DP-532 [4]

Control and Accountability of Nuclear Materials, Basic Principles, U.S. DOE O 474.1 [4]

3. Terminology

3.1 *Definitions of Terms Specific to This Standard*—Terms shall be defined in accordance with Terminology C 859C 859, except for the following:

3.1.1 *Commercial Natural UF_6*—UF_6 from natural unirradiated uranium (containing 0.711 ± 0.004 g ^{235}U per 100 g U).

3.1.1.1 *Discussion*—It is recognized that some contamination with reprocessed uranium may occur during routine processing. This is acceptable provided that the UF_6 meets the requirements for Commercial Natural UF_6.

3.1.2 *Reprocessed UF_6*—any UF_6 made from uranium that has been exposed in a neutron irradiation facility and subsequently chemically separated from the fission products and transuranic isotopes so generated.

[1] This specification is under the jurisdiction of ASTM Committee C26 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] Available from American National Standards Institute, 11 W. 42nd St., 13th Floor, New York, NY 10036.

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

[5] Available from United States Enrichment Corporation, 6903 Rockledge Drive, Bethesda, MD 20817.