



Designation: C1703 – 18 (Reapproved 2023)

Standard Practice for Sampling of Gaseous Uranium Hexafluoride for Enrichment¹

This standard is issued under the fixed designation C1703; 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.

1. Scope

1.1 This practice covers methods for withdrawing representative sample(s) of uranium hexafluoride (UF_6) during a transfer occurring in the gas phase. Such transfer in the gas phase can take place during the filling of a cylinder during a continuous production process, for example the distillation column in a conversion facility. Such sample(s) may be used for determining compliance with the applicable commercial specification, for example Specification C787.

1.2 Since UF_6 sampling is taken during the filling process, this practice does not address any special additional arrangements that may be agreed upon between the buyer and the seller when the sampled bulk material is being added to residues already present in a container (“heels recycle”). Such arrangements will be based on QA procedures such as traceability of cylinder origin (to prevent for example contamination with irradiated material).

1.3 If the receiving cylinder is purged after filling and sampling, special verifications must be performed by the user to verify the representativity of the sample(s). It is then expected that the results found on volatile impurities with gas phase sampling may be conservative.

1.4 This practice is only applicable when the transfer occurs in the gas phase. When the transfer is performed in the liquid phase, Practice C1052 should apply. This practice does not apply to gas sampling after the cylinder has been filled since the sample taken will not be representative of the cylinder.

1.5 *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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.6 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recom-*

mendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.

2. Referenced Documents

2.1 *ASTM Standards:*²

C761 Test Methods for Chemical, Mass Spectrometric, Spectrochemical, Nuclear, and Radiochemical Analysis of Uranium Hexafluoride

C787 Specification for Uranium Hexafluoride for Enrichment

C859 Terminology Relating to Nuclear Materials

C1052 Practice for Bulk Sampling of Liquid Uranium Hexafluoride

C1838 Practice for Cleaning for 1S and 2S Bottles

2.2 *Other Document:*

ISO 7195 Packaging of Uranium Hexafluoride (UF_6) for Transport³

3. Terminology

3.1 *Definitions of Terms Specific to This Standard:*

3.1.1 *container*—a vessel either holding or receiving by transfer, the UF_6 to be sampled; it may consist of, for example, a fixed vessel in a UF_6 handling plant or a cylinder to be used for the transport of UF_6 .

3.1.2 *sample vessel*—the small vessel into which the sample of UF_6 is withdrawn for analysis in the laboratory for characterization. It can be a 1S or 2S bottle or a PCTFE (polychlorotrifluoroethylene)/PTFE (polytetrafluoroethylene) pot or tube or any other type of cylinder compatible with UF_6 .

3.2 For definitions of terms used in this test method but not defined herein, refer to Terminology C859.

4. Summary of Practices

4.1 A common method of withdrawing gas UF_6 for sampling utilizes a continuous withdrawal using for example a capillary to produce one sample. Depending on the pressure

¹ This practice 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 For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

³ Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, http://www.ansi.org.