



Standard Practice for Subsampling of Uranium Hexafluoride¹

This standard is issued under the fixed designation C1689; 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 is applicable to subsampling uranium hexafluoride (UF_6), using heat liquefaction techniques, from bulk containers, obtained in conformance with **C1052**, into smaller sample containers, which are required for laboratory analyses.

1.2 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

1.3 It is assumed that the liquid UF_6 being sampled comprises a single quality and quantity of material. This practice does not address any special additional arrangement that might be required for taking proportional or composite samples.

1.4 The number of samples to be taken, their nominal sample weight, and their disposition shall be agreed upon between the parties.

1.5 The scope of this practice does not include provisions for preventing criticality incidents.

1.6 *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:*²

C787 Specification for Uranium Hexafluoride for Enrichment

C859 Terminology Relating to Nuclear Materials

C996 Specification for Uranium Hexafluoride Enriched to Less Than 5 % ²³⁵U

C761 Test Methods for Chemical, Mass Spectrometric,

Spectrochemical, Nuclear, and Radiochemical Analysis of Uranium Hexafluoride

C1052 Practice for Bulk Sampling of Liquid Uranium Hexafluoride

2.2 *Other Documents:*

ANSI N14.1 Uranium Hexafluoride: Packaging for Transport³

ISO/DIS 7195 Packaging of Uranium Hexafluoride (UF_6) for Transport⁴

USEC-651 The UF_6 Manual: Good Handling Practices for Uranium Hexafluoride, latest revision⁵

3. Terminology

3.1 Terms shall be defined in accordance with Terminology **C859** except for the following:

3.1.1 *sample bottle*—the vessel (typically a 1S or 2S bottle) into which the sample of UF_6 is withdrawn from the container for transfer to the laboratory, analysis or dispatch to the customer.

3.1.2 *subsample tube*—the small vessel (for example, a P10 tube⁶) into which a subsample of UF_6 is withdrawn from the sample bottle for analysis of UF_6 quality or dispatch to the customer.

3.1.3 *subsample rig*—the equipment to perform the transfer of liquid UF_6 from the sample bottle into the subsample tube, typically a vacuum manifold equipped with heating and a liquid nitrogen trap.

4. Summary of Practice

4.1 Two methods of withdrawing a subsample of UF_6 are described which differ based on safety requirements namely:

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

⁴ Available from International Organization for Standardization (ISO), 1, ch. de la Voie-Creuse, Case postale 56, CH-1211, Geneva 20, Switzerland, <http://www.iso.ch>.

⁵ Available from United States Enrichment Corp., 6903 Rockledge Dr., Bethesda, MD 20817, <http://www.usec.com>.

⁶ Polychlorotrifluoroethylene P10 tubes are widely accepted by the industry for subsample collection and subsequent UF_6 quality analyses or dispatch to the customer. Other types of subsample tubes, for example P-20, P-80 or P100, can be used for internal subsample collection and processing. Dispatch of these subsample tubes may be agreed upon by buyer and seller and subject to (local) transport regulations.

¹ This practice is under the jurisdiction of ASTM Committee **C26** on Nuclear Fuel Cycle and is the direct responsibility of Subcommittee **C26.05** on Methods of Test.

Current edition approved Jan. 1, 2014. Published February 2014. Originally approved in 2008. Last previous edition approved in 2008 as C1689 – 08a. DOI: 10.1520/C1689-08aR14.

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.