Designation: C 1346 – 96

AMERICAN SOCIETY FOR TESTING AND MATERIALS
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Standard Practice for Dissolution of UF_6 from P-10 Tubes[1]

This standard is issued under the fixed designation C 1346; 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 the dissolution of UF_6 from a P-10 tube to provide solutions for analysis.

1.2 *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.* For specific safeguard and safety precaution statements, see Section 8.

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 787 Specification for Uranium Hexafluoride for Enrichment[2]

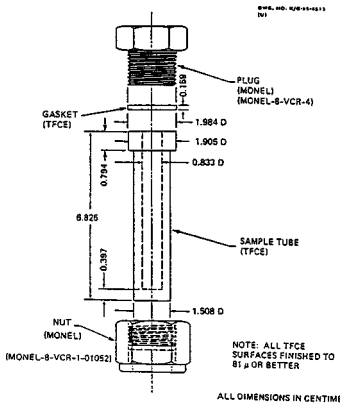
3. Summary of Practice

3.1 UF_6 samples intended for analysis are packaged in P-10 tubes to prevent sublimation and reaction with moisture in the air. The P-10 tube assembly (Fig. 1) consists of a fluorothene tube containing the UF_6, a fluorothene gasket to cover the tube's opening, and a Monel nut and plug to seal the gasket to the tube.

3.2 The UF_6 tube is weighed, cooled in liquid nitrogen, and quickly opened and immersed in ice-cold water for dissolution. The pieces of the tube's assembly are removed from the resulting solution, rinsed, dried, reassembled, and weighed. The solution is dried for gravimetric conversion to U_3O_8, or diluted to an appropriate concentration for dispensing into aliquants for subsequent analysis.

4. Significance and Use

4.1 Uranium hexafluoride is a basic material used to prepare nuclear reactor fuel. To be suitable for this purpose the material must meet criteria for uranium content, isotopic composition, metallic impurities, hydrocarbon, and partially substituted halohydrocarbon content in Specification C 787. This practice results in the complete dissolution of the sample for uranium and impurities analysis, and determination of isotopic distribution by thermal ionization mass spectrometry as described in Test Methods C 761. Highly volatile impurities should be determined directly on UF_6.



NOTE 1—This figure is from page 10 of the reference in Footnote 4.

FIG. 1 P-10 Sample Tube

5. Apparatus

5.1 *Steam bath*, in a hood.

5.2 *Dewar flask*, wide-mouth.

5.3 *Vise*, small lab-bench model.

5.4 *Aluminum foil*.

5.5 *Wrenches*, 2.4 cm (15⁄16 in.).

5.6 *Plastic clamping forceps*, 12 to 13 cm long, with a straight tip.

5.7 *Plastic clamping forceps*, 12 to 13 cm long, with a claw-like bent tip, to securely hold the cylindrical fluorothene tube.

NOTE 1—These forceps are not commercially available. Bend the ends of a straight-tip forceps by heating over a moderate flame, shaping, and maintaining the shape until cool.

5.8 *Lint-free tissues*.

5.9 *TFE-fluorocarbon-coated spatula*, 0.5- to 1-cm wide at its flat end.

5.10 *Platinum rod*, optional.

5.11 *Watch glasses*, plastic, two per sample (one to fit platinum dishes and one to hold tube components).

5.12 *Platinum dishes*, 250-mL.

5.13 *Funnels*, plastic.

[1] This practice is under the jurisdiction of ASTM Committee C-26 on Nuclear Fuel Cycle and is the direct responsibility of Subcommittee C26.05 on Methods of Test.

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[2] *Annual Book of ASTM Standards*, Vol 12.01.