



Designation: C1075 – 17 (Reapproved 2022)

Standard Practices for Sampling Uranium-Ore Concentrate¹

This standard is issued under the fixed designation C1075; 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

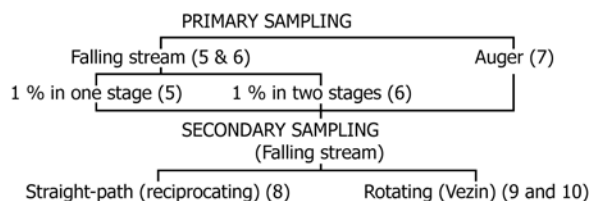
1.1 These practices are intended to provide the nuclear industry with procedures for obtaining representative bulk samples from uranium-ore concentrates (UOC) (see Specification C967).

1.2 These practices also provide for obtaining a series of representative secondary samples from the original bulk sample for the determination of moisture and other test purposes, and for the preparation of pulverized analytical samples (see Test Methods C1022 and C1843).

1.3 These practices consist of a number of alternative procedures for sampling and sample preparation which have been shown to be satisfactory through long experience in the nuclear industry. These procedures are described in the following order.

Stage	Procedure	Section
Primary Sampling	One-stage falling stream	5
	Two-stage falling stream	6
	Auger	7
Secondary Sampling	Straight-path (reciprocating)	8
	Rotating (Vezin)	9, 10

1.3.1 The primary and secondary sampling stages can be organized in the following way:



1.3.2 It is possible to combine the various elements of these stages in different ways to give satisfactory results depending on the agreed requirements of the contracting parties. For a given stage, however, each procedure must be regarded as a whole. It is highly inadvisable to mix elements belonging to different procedures.

¹ These practices are under the jurisdiction of ASTM Committee C26 on Nuclear Fuel Cycle and are the direct responsibility of Subcommittee C26.02 on Fuel and Fertile Material Specifications.

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1.4 These procedures do not include requirements for health, safety, and accountability. The observance of these practices does not relieve the user of the obligation to be aware of and to conform to all applicable international, federal, state, and local regulations pertaining to processing, shipping, or using uranium-ore concentrates. (Guidance is provided in CFR 10, Chapter 1.)

1.5 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

1.6 *This standard does not purport to address all of the safety problems, 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.*

1.7 *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 Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 ASTM Standards:²

C859 Terminology Relating to Nuclear Materials
C967 Specification for Uranium Ore Concentrate
C1022 Test Methods for Chemical and Atomic Absorption Analysis of Uranium-Ore Concentrate
C1843 Test Method for Determining Moisture Content in Uranium-Ore Concentrate

2.2 Other Document:

CFR 10 Nuclear Materials Licensing Code of Federal Regulations, Chapter 1³

3. Terminology

3.1 Except as otherwise defined herein, definitions of terms are as given in Terminology C859.

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 U.S. Government Printing Office Superintendent of Documents, 732 N. Capitol St., NW, Mail Stop: SDE, Washington, DC 20401, http://www.access.gpo.gov.

4. General Requirements

4.1 Material Requirements:

4.1.1 The uranium-ore concentrates shall be free-flowing and of a particle size not to exceed 6 mm (0.25 in.) or such other limit agreed upon between contracting parties.

4.1.2 The average moisture content shall not exceed 5.0 % weight of the uranium-ore concentrates.

4.1.3 The material shall be shipped to the sampling plant in 200 L (55-gal) standard steel drums that are fitted with steel lids and equipped with suitable gasket, sealing rings, and sealing bungs (if applicable) to ensure weatherproofing. The drums shall be constructed so that the top of the drum is fully open when the lid is removed.

4.1.4 The number of drums in a sampling lot shall not exceed 90 and the gross weight shall not exceed 45 metric tons (100 000 lb).

4.1.5 A minimum number of drums in a sampling lot may be established depending upon the sampling procedure used.

4.2 Sampling Equipment Requirements:

4.2.1 Care shall be taken in the design and operation of the sampling and all associated equipment to minimize the exchanges of air between the atmosphere and the sampling system. For obvious safety reasons dust-carrying internal air must be prevented from escaping the system. This is achieved by means of dust collectors. The latter, however, shall be designed and operated in such a way that a minimum amount of external air shall be allowed into the system. The purpose of this is (1) to limit the exchanges of moisture between the atmosphere and the UOC and (2) to prevent a size-selective

dusting. In any case, the amount of dust escaping the sampling operations must be kept to a minimum.

4.2.2 The scales for the gross and tare weights of the drums shall be capable of reading to the nearest 0.2 kg (0.5 lb) and shall be fitted with a print-out or data processing system, or both. They shall have a capacity of 600 kg (1300 lb). The weigh scale shall be calibrated and adjusted if required, at the beginning, middle, and end of each lot weighed. Test weights shall be certified by a statutory authority and shall be traceable to national or state standards.

4.2.3 All sampling containers shall be clean and dry before usage.

5. Primary Sampling, Falling Stream—1 % In One Stage

5.1 *Scope*—The falling-stream procedure provides for removing a large number of increments of the material as it falls freely at a uniform, controlled rate. All of the material in a lot passes through the system and is subject to incremental sampling.

5.2 Sampling Equipment Requirements:

5.2.1 A schematic diagram of a typical falling-stream sampling facility is shown in Fig. 1. Subsequent procedures are described by reference to this equipment.

5.2.2 The flow of material through the falling-stream system shall be controlled by a rotary valve discharging to the hopper or pan of the first stage vibrating feeder. The rate of flow should not exceed $4.5 \times 10^{-2} \cdot \text{m}^3$ (1.6 ft³)/min and also should be controlled so that the cutter obtains from the falling stream at least $1 \text{ cut}/2.8 \times 10^{-2} \cdot \text{m}^3$ (1.0 ft³) of material.

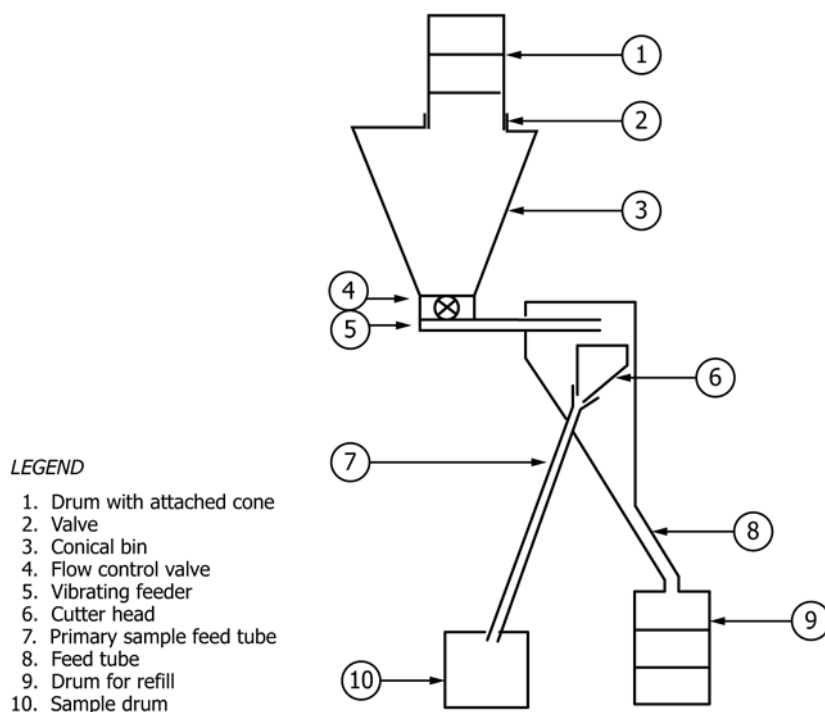


FIG. 1 Schematic Diagram of Falling-Stream Primary Sampler In One Stage