Designation: F 310 – 70 (Reapproved 1996)

An American National Standard

Standard Practice for Sampling Cryogenic Aerospace Fluids[1]

This standard is issued under the fixed designation F 310; 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.

This standard has been approved for use by agencies of the Department of Defense.

1. Scope

1.1 This practice describes procedures for taking a sample of cryogenic aerospace fluid 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 hazard statement, see Section 5.

2. Referenced Documents

2.1 *ASTM Standards:*

F 311 Practice for Processing Aerospace Liquid Samples for Particulate Contamination Analysis Using Membrane Filters[2]

2.2 *Military Standards:*[3]

MIL-C-81302

MIL-P-25508D

MIL-S-27626A (U-SAF)

3. Summary of Practice

3.1 A clean container is used to collect a sample of cryogenic aerospace fluid either from a sampling valve, or poured from a larger Dewar flask used for storage. The sampling container is chilled down by the exiting cold gas and liquid until it will contain only liquid to be used for analysis.

4. Apparatus

4.1 *Dewar Flask*, 1-L capacity.

4.2 *Dewar Cover*, with provisions for venting.

NOTE 1—It is mandatory that this Dewar flask be maintained in a clean condition (particulate and hydrocarbon control).

4.3 *Protective Clothing*, such as an apron, face shield, and gloves.

4.4 *Stainless Steel Catch Bucket* (hydrocarbon clean if used for liquid oxygen sampling).

4.5 *Liquid Cryogenic Sampler, TTU-131/E*, as described in MIL-S-27626A (U-SAF) and MIL-P-25508D.

4.6 *Miscellaneous Fittings*, for sample point adaption (cleaned to be hydrocarbon and particulate-controlled in accordance with system requirements).

4.7 *Polyethylene Wash Bottle*, 1-L capacity, filled with trichlorotrifluoroethane per MIL-C-81302, filtered in the manner described in ASTM Practice F 311.

4.8 *Flexible Hose*, pressure-rated at 500 psig (3447 kPa gage) suitable for minimum temperature to be encountered and made of materials compatible with the fluid being sampled.

4.9 *Polychlorotrifluoroethylene Bag*.

5. Hazards

5.1 When sampling cryogenic fluids, care should always be exercised to avoid contact with fluid or cold gas to prevent painful frostbite. During the chill-down process, caution should also be exercised as gas exiting from the sampling point is under high pressure.

6. Procedure Using Dewar Flask

6.1 Clean the outlet of the sampling port with fluid from a polyethylene wash bottle.

6.2 Open the sampling valve and allow the chill-down to occur until liquid is flowing into the catch bucket.

6.3 Remove the cover from the Dewar flask.

6.4 Hold the flask in a stream of liquid and fill to approximately one-half full. Dump the liquid in the catch bucket.

6.5 Repeat the procedure described in 6.4 until the flask has been sufficiently chilled down.

6.6 Fill the Dewar flask approximately three-fourths full and replace the cover.

6.7 Close the sampling valve.

6.8 Place a polychlorotrifluoroethylene bag on top of the Dewar flask. (**Caution:** Do not seal the bag. Allow it to vent.)

6.9 Identify the sample and analyze it as required.

7. Procedure Using the TTU 131/E Sampler

7.1 Clean outlet of the sampling port with fluid from a polyethylene bottle.

7.2 Attach the sample inlet port to the sampling point using fittings as necessary, and flexible hose if necessary.

7.3 Remove the dust cover on the outlet, and open the sampling valve on the system.

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[1] This practice is under the jurisdiction of ASTM Committee E-21 on Space Simulation and Applications of Space Technology and is the direct responsibility of Subcommittee E21.05 on Contamination.

Current edition effective Aug. 14, 1970. Originally issued 1966. Replaces D 2543 – 66 T. Redesignated F 310 in 1970.

[2] *Annual Book of ASTM Standards*, Vol 14.02.

[3] Available from Standardization Documents Order Desk, Bldg. 4 Section D, 700 Robbins Ave., Philadelphia, PA 19111-5094, Attn: NPODS.

7.4 Allow chill-down to occur until a steady stream of liquid is exiting from the outlet of the samples.

7.5 Open the chamber valve on the sample for approximately 10 s and then close; this allows the precooled reservoir chamber to fill.

7.6 Remove the sampler from the system, and place the dust cover on the inlet and outlet ports.

7.7 Invert the sample to spill liquid into the outer chamber, the gasification will occur.

7.8 Relieve pressure in the cylinder, if it exceeds 500 psi (3447 kPa) as indicated on the gage of the sampler.

7.9 Identify the sample, and analyze as required.