Designation: F 327 – 78 (Reapproved 1996)

Standard Practice for Sampling Gas Blow Down Systems and Components for Particulate Contamination by Automatic Particle Monitor Method[1]

This standard is issued under the fixed designation F 327; 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 describes how to connect, prepare, and sample pressurized gas systems (having up to 0.75-in. (19.1-mm) diameter lines) for particulate contamination by using an automatic monitor.

1.2 The values stated in inch-pound units are to be regarded as the standard. The values given in parentheses are for information only.

1.3 *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 statements, see Section 5.

2. Terminology

2.1 *Definitions:*

2.1.1 *downstream terminal point*—the point in a gas system from which gas is fed into a further system or component, usually the designated "sample port."

2.1.2 *filtered gas system*—a gas system that is equipped with required filtration devices to furnish gas that is suitably clean for the intended application.

2.1.3 *purge*—to flush a gas supply system or component with a regulated flow of gas.

2.1.4 *sample port*—the designated point in a gas system or component from which a representative gas sample may be taken.

3. Summary of Practice

3.1 The pressurized gas system or component and the apparatus are prepared in accordance with the requirements of the users sample analysis procedure. The sensing unit of the automatic particle monitor is connected to the designated sample port which is under purge condition. The system flow-rate is adjusted to the sample flow rate requirement. All the gas passing through the sensing unit is monitored for particulate contamination until the required sample volume has been analyzed.

4. Apparatus

4.1 *Automatic Monitor*, with sensor that sizes and counts all entering fluid in accordance with the users requirements for pressure, flow, temperature, and accuracy.

4.2 *Filtered Gas System*—See Fig. 1.

4.3 *Stop Watch or Timer*, with a + 1, − 0-s resolution.

4.4 *Miscellaneous Fittings*, as needed for sampling point adaption, cleaned and packaged within system contamination requirements.

4.5 *Connecting Lines*, cleaned and packaged within system contamination requirements.

4.6 *Flowmeter*, calibrated for the sample port fluid, flow, and temperature requirements.

5. Hazards

5.1 Personnel must stand clear of exiting gas.

5.2 Ear protection must be used when gas flow approaches sonic velocity.

5.3 All lines and associated system components must be connected and operated within the requirements of recognized safety codes.

6. Procedure

6.1 Establish a minimum continuous purge pressure of 1 psig (6.89 kPa) gage or 0.1 ft^3/min (2.83 dm^3/min), flow from the filtered gas pressure supply.

6.2 Connect one end of a suitable connecting line to the purge outlet of 6.1, and then connect the other end to the inlet of the component or system to be sampled.

NOTE 1—If the system to be sampled is already connected to the filtered gas pressure supply, then establish the purge as noted in 6.1.

6.3 Connect a suitable connecting line from the sample port to the inlet of the automatic monitor sensing device. (When no sample port is designated, use the down-stream terminal point from which purge gas is flowing.)

6.4 Increase the purge to one of the following:

6.4.1 0.3-ft^3/min (8.49-dm^3/min) flow,

6.4.2 5-psig (34.5-kPa) gage pressure, or

6.4.3 5 % of system operating pressure when this pressure is

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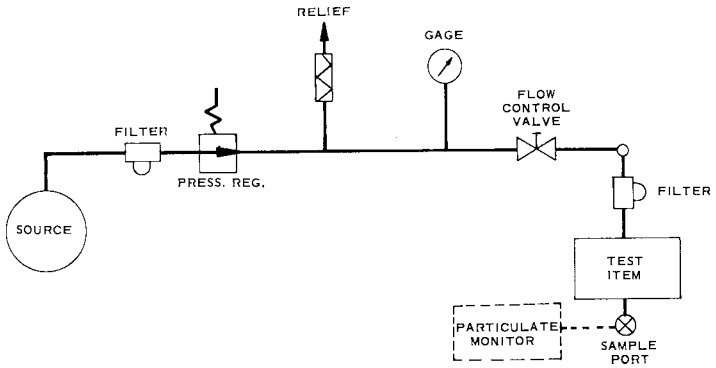

FIG. 1 Filtered Gas System

less than 5-psig (34.5-kPa) gage.

6.5 *Surge Pressure Cleaning*:

6.5.1 Quickly increase the continuous purge pressure for a 5-s duration, three times at 1-min intervals in accordance with one of the following:

6.5.1.1 To 100-psig (689.5-kPa) gage pressure,

6.5.1.2 To 4.0-ft^3/min (113.2-dm^3/min) flow,

6.5.1.3 70 % of system operating pressure when this operating pressure is below 100 psig (689.5 kPa) gage.

6.5.1.4 In accord with a given system operation requirement, but not to exceed the rated pressure of the sensing unit.

6.5.2 Reduce the purge pressure to the level in 6.4 after each surge pressure application of 6.5.1 (that is during 1-min interval).

6.6 Connect a flowmeter to the outlet of the automatic monitor sensor and adjust the flow versus time to achieve a required sample volume within the capability of the sensor. Remove the flowmeter after adjusting the flow.

6.7 Set automatic monitor display to zero.

6.8 Simultaneously begin automatic particulate counting, sizing and timing of volumetric flow.

6.9 Record particulate contamination counts on the monitor display for the required sample volume.

6.10 Adjust the continuous purge to the level in 6.4.

6.11 Evaluate results and if requirements of contamination levels are acceptable, disconnect the monitor and secure the system in accordance with the user's requirements.

6.12 If results are rejected, repeat 6.5-6.12.

7. Precision

7.1 Each testing agency has the responsibility of judging the acceptability of its own results. The precision of the results is a function of the procedures (Note 2), facilities utilized, as well as compliance to the recommended industry state-of-the-art practices in cleanliness. Reproducible analysis determinations by different users can be achieved only with identical facilities and trained conscientious personnel.

NOTE 2—Every effort should be made to eliminate outside contamination during operations.