

3, and 4 for measuring flow rate of exhaust gas at the inlet to the control device.

#### 7.0 Reagents and Standards

**7.1 Tracer Gas.** Use SF<sub>6</sub> as the tracer gas. The manufacturer of the SF<sub>6</sub> tracer gas should provide a recommended shelf life for the tracer gas cylinder over which the concentration does not change more than  $\pm 2$  percent from the certified value. A gas mixture of SF<sub>6</sub> diluted with nitrogen should be used; based on experience and calculations, pure SF<sub>6</sub> gas is not necessary to conduct tracer gas testing. Select a concentration and flow rate that is appropriate for the analytical instrument's detection limit, the minimum measurement level (MML), and the exhaust gas flow rate from the enclosure (see section 8.1.1). You may use a tracer gas other than SF<sub>6</sub> with the prior approval of the Administrator. If you use an approved tracer gas other than SF<sub>6</sub>, all references to SF<sub>6</sub> in this protocol instead refer to the approved tracer gas.

**7.2 Calibration Gases.** The SF<sub>6</sub> calibration gases required will be dependent on the selected MML and the appropriate span selected for the test. Commercial cylinder gases certified by the manufacturer to be accurate to within 1 percent of the certified label value are preferable, although cylinder gases certified by the manufacturer to 2 percent accuracy are allowed. Additionally, the manufacturer of the SF<sub>6</sub> calibration gases should provide a recommended shelf life for each calibration gas cylinder over which the concentration does not change more than  $\pm 2$  percent from the certified value. Another option allowed by this method is for the tester to obtain high concentration certified cylinder gases and then use a dilution system meeting the requirements of EPA Method 205, 40 CFR part 51, Appendix M, to make multi-level calibration gas standards. Low-level, mid-level, and high-level calibration gases will be required. The MML must be above the low-level standard, the high-level standard must be no more than four times the low-level standard, and the mid-level standard must be approximately halfway between the high- and low-level standards. See section 12.1 for an example calculation of this procedure.

**Note:** If using an FTIR as the analytical instrument, the tester has the option of following the CTS procedures of Method 320; the calibration standards (and procedures) specified in Method 320 may be used in lieu of the calibration standards and procedures in this protocol.

**7.2.1 Zero Gas.** High purity nitrogen.

**7.2.2 Low-Level Calibration Gas.** An SF<sub>6</sub> calibration gas in nitrogen with a concentration equivalent to 20 to 30 percent of the applicable span value.

**7.2.3 Mid-Level Calibration Gas.** An SF<sub>6</sub> calibration gas in nitrogen with a concentration equivalent to 45 to 55 percent of the applicable span value.

**7.2.4 High-Level Calibration Gas.** An SF<sub>6</sub> calibration gas in nitrogen with a concentration equivalent to 80 to 90 percent of the applicable span value.

#### 8.0 Sample Collection, Preservation, Storage, and Transport

##### 8.1 Test Design

##### 8.1.1 Determination of Minimum Tracer Gas Flow Rate.

**8.1.1.1** Determine (via design calculations or measurements) the approximate flow rate of the exhaust gas through the enclosure (acfm).

**8.1.1.2** Calculate the minimum tracer gas injection rate necessary to assure a detectable SF<sub>6</sub> concentration at the exhaust gas measurement point (see section 12.1 for calculation).

**8.1.1.3** Select a flow meter for the injection system with an operating range appropriate for the injection rate selected.

##### 8.1.2 Determination of the Approximate Time to Reach Equilibrium.

**8.1.2.1** Determine the volume of the enclosure.

**8.1.2.2** Calculate the air changes per minute of the enclosure by dividing the approximate exhaust flow rate (8.1.1.1 above) by the enclosed volume (8.1.2.1 above).

**8.1.2.3** Calculate the time at which the tracer concentration in the enclosure will achieve approximate equilibrium. Divide 3 by the air changes per minute (8.1.2.2 above) to establish this time. This is the approximate length of time for the system to come to equilibrium. Concentration equilibrium occurs when the tracer concentration in the enclosure stops changing as a function of time for a constant tracer release rate. Because the press is continuously cycling, equilibrium may be exhibited by a repeating, but stable, cyclic pattern rather than a single constant concentration value. Assure sufficient tracer gas is available to allow the system to come to equilibrium, and to sample for a minimum of 20 minutes and repeat the procedure for a minimum of 3 test runs. Additional test runs may be required based on the results of the DQO and LCL analyses described in 40 CFR part 63, subpart KK, Appendix A.

**8.1.3 Location of Injection Points.** This method requires a minimum of three tracer gas injection points. The injection points should be located within leak prone, VOC/HAP-producing areas around the press, or horizontally within 12 inches of the defined equipment. One potential configuration of the injection points is depicted in Figure 1. The effect of wind, exfiltration through the building envelope, and air flowing through open building doors should be considered when locating tracer gas injection points within the PPE. The injection points should also be located at a vertical elevation equal to the VOC/HAP generating zones. The injection points should not be located beneath obstructions that would prevent a natural dispersion of the gas. Document the selected injection points in a drawing(s).

**8.1.4 Location of Flow Measurement and Tracer Sampling.** Accurate CD inlet gas flow rate measurements are critical to the success of this procedure. Select a measurement location meeting the criteria of EPA Method 1 (40 CFR part 60, Appendix A), Sampling and Velocity Traverses for Stationary Sources. Also, when selecting the measurement location, consider whether stratification of the tracer gas is likely at the location (e.g., do not select a location immediately after a point of air in-leakage to the duct).

**8.2 Tracer Gas Release.** Release the tracer gas at a calculated flow rate (see section 12.1 for calculation) through a minimum of three injection manifolds located as described above in 8.1.3. The tracer gas delivery lines must be routed into the enclosure and attached to the manifolds without violating the integrity of the enclosure.

##### 8.3 Pretest Measurements.

**8.3.1 Location of Sampling Point(s).** If stratification is not suspected at the measurement location, select a single sample point located at the centroid of the CD inlet duct or at a point no closer to the CD inlet duct walls than 1 meter. If stratification is suspected, establish a "measurement line" that passes through the centroidal area and in the direction of any expected stratification. Locate three traverse points at 16.7, 50.0 and 83.3 percent of the measurement line and sample from each of these three points during each run, or follow the procedure in section 8.3.2 to verify whether stratification does or does not exist.

**8.3.2 Stratification Verification.** The presence or absence of stratification can be verified by using the following procedure. While the facility is operating normally, initiate tracer gas release into the PPE. For rectangular ducts, locate at least nine sample points in the cross section such that the sample points are the centroids of similarly-shaped, equal area divisions of the cross section. Measure the tracer gas concentration at each point. Calculate the mean value for all sample points. For circular ducts, conduct a 12-point traverse (i.e., six points on each of the two perpendicular diameters) locating the sample points as described in 40 CFR part 60, Appendix A, Method 1. Perform the measurements and calculations as described above. Determine if the mean pollutant concentration is more than 10 percent different from any single point. If so, the cross section is considered to be stratified, and the tester may not use a single sample point location, but must use the three traverse points at 16.7, 50.0, and 83.3 percent of the entire measurement line. Other traverse points may be selected, provided that they can be shown to the satisfaction of the Administrator to provide a representative sample over the stack or duct cross section.

**8.4 CD Inlet Gas Flow Rate Measurements.** The procedures of EPA Methods 1–4 (40 CFR part 60, Appendix A) are used to determine the CD inlet gas flow rate. Molecular weight (Method (3) and moisture (Method (4) determinations are only required once for each test series. However, if the test series is not completed within 24 hours, then the molecular weight and moisture measurements should be repeated daily. As a minimum, velocity measurements are conducted according to the procedures of Methods 1 and 2 before and after each test run, as close to the start and end of the run as practicable. A velocity measurement between two runs satisfies both the criterion of "after" the run just completed and "before" the run to be initiated. Accurate exhaust gas flow rate measurements are critical to the success of this procedure. If significant temporal variations of flow rate are anticipated during the test run under normal process operating conditions, take