

breakthrough for adsorbers of 55 gallons or less, and within 24 hours of the detection of a breakthrough for adsorbers greater than 55 gallons.

(4) In lieu of replacing the first adsorber immediately, you may elect to monitor the outlet of the second canister beginning on the day the breakthrough between the first and second canister is identified and each day thereafter. This daily monitoring must continue until the first canister is replaced. If the constituent being monitored is detected at the outlet of the second canister during this period of daily monitoring, both canisters must be replaced within 8 hours of the time of detection of volatile organic compounds or HAP at 90 percent of the allowed level (90 percent of breakthrough definition).

(f) *Condenser monitoring.* If you are using a condenser to meet an emission limit in Table 1 or 2 to this subpart and you are required to use CPMS as specified in § 63.11925(c), you must install and operate a condenser exit gas temperature monitoring device.

(g) *Other control devices.* If you use a control device other than those listed in this subpart to comply with an emission limit in Table 1 or 2 to this subpart and you are required to use CPMS as specified in § 63.11925(c), you must comply with the requirements as specified in paragraphs (g)(1) and (2) of this section.

(1) Submit a description of the planned monitoring, recordkeeping, and reporting procedures. The Administrator will approve, deny or modify the proposed monitoring, reporting and recordkeeping requirements as part of the review of the plan or through the review of the permit application or by other appropriate means.

(2) You must establish operating limits for monitored parameters that are approved by the Administrator. To establish the operating limit, the information required in § 63.11935(d) must be submitted in the notification of compliance status report specified in § 63.11985(a).

(h) *Alternatives to monitoring requirements.* (1) You may request approval to use alternatives to the continuous operating parameter monitoring listed in

this section, as specified in §§ 63.11985(c)(4) and 63.8.

(2) You may request approval to monitor a different parameter than those established in § 63.11935(d) or to set unique monitoring parameters, as specified in §§ 63.11985(c)(5) and 63.8. Until permission to use an alternative monitoring parameter has been granted by the Administrator, you remain subject to the requirements of this subpart.

**§ 63.11945 What performance testing requirements must I meet for process vents?**

(a) *General.* For each control device used to meet the emission limits for process vents in Table 1 or 2 to this subpart, you must conduct the initial and periodic performance tests required in § 63.11925(d) and (e) and as specified in § 63.11896 using the applicable test methods and procedures specified in Table 8 to this subpart and paragraphs (b) through (d) of this section.

(b) *Process operating conditions.* You must conduct performance tests under the conditions specified in paragraphs (b)(1) through (3) of this section, as applicable. Upon request, the owner or operator shall make available to the Administrator such records as may be necessary to determine the conditions of performance tests. In all cases, a site-specific plan must be submitted to the Administrator for approval prior to testing in accordance with § 63.7(c). The test plan must include the emission profiles described in § 63.11925(g).

(1) *Continuous process vents.* For continuous process vents, you must conduct all performance tests at maximum representative operating conditions for the process. For continuous compliance, you must conduct subsequent performance tests within the range of operating limit(s) that were established for the control device during the initial or subsequent performance tests specified in § 63.11925(d) and (e). If an operating limit is a range, then you must conduct subsequent performance tests within the range of maximum or minimum operating limits for the control device, which result in highest emissions (*i.e.*, lowest emission reduction).

(2) *Batch process operations.* Testing must be conducted at absolute worst-

case conditions or hypothetical worst-case conditions as specified in paragraph (c) of this section.

(3) *Combination of both continuous and batch unit operations.* You must conduct performance tests when the batch process vents are operating at absolute worst-case conditions or hypothetical worst-case conditions, as specified in paragraphs (c)(1) and (2) of this section, and at maximum representative operating conditions for the process. For continuous compliance, you must operate the control device as close as possible to your operating limit(s) for the control device established during the initial or subsequent performance tests specified in §63.11925 (d) and (e). If an operating limit is a range, then you must operate the control device as close as possible to the maximum or minimum operating limit for the control device, whichever results in higher emissions (*i.e.*, lower emission reduction), unless the Administrator specifies or approves alternate operating conditions.

(c) *Batch worst-case conditions.* The absolute worst-case conditions for batch process operations must be characterized by the criteria presented in paragraph (c)(1) of this section. The hypothetical worst-case conditions for batch process operations must be characterized by the criteria presented in paragraph (c)(2) of this section.

(1) *Absolute worst-case conditions.* For batch process operations, absolute worst-case conditions are defined by the criteria presented in paragraph (c)(1)(i) of this section if the maximum load is the most challenging condition for the control device. Otherwise, absolute worst-case conditions are defined by the conditions in paragraph (c)(1)(ii) of this section. You must consider all relevant factors, including load and compound-specific characteristics in defining absolute worst-case conditions.

(i) A 1-hour period of time in which the inlet to the control device contains the highest HAP mass loading rate, in pounds per hour, capable of being vented to the control device. An emission profile as described in §63.11925(g) must be used to identify the 1-hour period of maximum HAP loading.

(ii) The period of time when the HAP loading or stream composition (including non-HAP) is most challenging for the control device. These conditions include, but are not limited to the following:

(A) Periods when the stream contains the highest combined organic load, in pounds per hour, described by the emission profiles in §63.11925(g).

(B) Periods when the streams contain HAP constituents that approach limits of solubility for scrubbing media.

(C) Periods when the streams contain HAP constituents that approach limits of adsorptivity for adsorption systems.

(2) *Hypothetical worst-case conditions.* For batch process operations, hypothetical worst-case conditions are simulated test conditions that, at a minimum, contain the highest hourly HAP load of emissions that would be predicted to be vented to the control device based on the emissions profiles described in paragraphs (c)(3)(ii) or (iii) of this section.

(3) *Emission profile.* For batch process operations, you must develop an emission profile for the vent to the control device that describes the characteristics of the vent stream at the inlet to the control device under worst-case conditions. The emission profile must be developed based on any one of the procedures described in paragraphs (c)(3)(i) through (iii) of this section.

(i) *Emission profile by process.* The emission profile must consider all batch emission episodes that could contribute to the vent stack for a period of time that is sufficient to include all processes venting to the stack and must consider production scheduling. The profile must describe the HAP load to the device that equals the highest sum of emissions from the episodes that can vent to the control device in any given hour. Emissions per episode must be calculated using the procedures specified in §63.11950. Emissions per episode must be divided by the duration of the episode only if the duration of the episode is longer than 1 hour.

(ii) *Emission profile by equipment.* The emission profile must consist of emissions that meet or exceed the highest emissions, in pounds per hour that

would be expected under actual processing conditions. The profile must describe equipment configurations used to generate the emission events, volatility of materials processed in the equipment, and the rationale used to identify and characterize the emission events. The emissions may be based on using a compound more volatile than compounds actually used in the process(es), and the emissions may be generated from all equipment in the process(es) or only selected equipment.

(iii) *Emission profile by capture and control device limitation.* The emission profile must consider the capture and control system limitations and the highest emissions, in pounds per hour that can be routed to the control device, based on maximum flow rate and concentrations possible because of limitations on conveyance and control

equipment (e.g., fans and lower explosive level alarms).

(d) *Concentration correction calculation.* If a combustion device is the control device and supplemental combustion air is used to combust the emissions, the concentration of total hydrocarbons, total organic HAP, vinyl chloride, and hydrogen chloride must be corrected as specified in paragraph (d)(1) or (2) of this section. If a control device other than a combustion device is used to comply with an outlet concentration emission limit for batch process vents, you must correct the actual concentration for supplemental gases as specified in paragraph (d)(3) of this section.

(1) Determine the concentration of total hydrocarbons, total organic HAP, vinyl chloride, or hydrogen chloride corrected to 3-percent oxygen (C<sub>c</sub>) using Equation 1 of this section.

$$C_c = C_m \left( \frac{17.9}{20.9 - \%O_{2d}} \right) \quad (\text{Eq. 1})$$

Where:

C<sub>c</sub> = Concentration of total hydrocarbons, total organic HAP, vinyl chloride, or hydrogen chloride corrected to 3-percent oxygen, dry basis, parts per million by volume.

C<sub>m</sub> = Concentration of total hydrocarbons, total organic HAP, vinyl chloride, or hydrogen chloride, dry basis, parts per million by volume.

%O<sub>2d</sub> = Concentration of oxygen, dry basis, percentage by volume.

(2) To determine the oxygen concentration, you must use the emission

rate correction factor (or excess air), integrated sampling and analysis procedures of Method 3, 3A, or 3B at 40 CFR part 60, appendix A-2, or ANSI/ASME PTC 19.10-1981 (incorporated by reference, see §63.14).

(3) Correct the measured concentration for supplemental gases using Equation 2 of this section. Process knowledge and representative operating data may be used to determine the fraction of the total flow due to supplemental gas.

$$C_a = C_m \left( \frac{Q_s + Q_a}{Q_a} \right) \quad (\text{Eq. 2})$$

Where:

C<sub>a</sub> = Corrected outlet concentration of HAP, dry basis, parts per million by volume (ppmv).

C<sub>m</sub> = Actual concentration of HAP measured at control device outlet, dry basis, ppmv.

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Q<sub>a</sub> = Total volumetric flow rate of all gas streams vented to the control device, except supplemental gases.

Q<sub>s</sub> = total volumetric flow rate of supplemental gases.

**§ 63.11950 What emissions calculations must I use for an emission profile?**

When developing your emission profiles for batch process vents as required in § 63.11925(g), except as specified in paragraph (i) of this section, you must

calculate emissions from episodes caused by vapor displacement, purging a partially filled vessel, heating, depressurization, vacuum operations, gas evolution, air drying, or empty vessel purging, using the applicable procedures in paragraphs (a) through (h) of this section.

(a) *Vapor displacement.* You must calculate emissions from vapor displacement due to transfer of material using Equation 1 of this section.

$$E = \left( \frac{V}{RT} \right) \sum_{i=1}^n P_i (MW_i) \quad (\text{Eq. 1})$$

Where:

E = Mass of HAP emitted.

V = Volume of gas displaced from the vessel.

R = Ideal gas law constant.

T = Temperature of the vessel vapor space; absolute.

P<sub>i</sub> = Partial pressure of the individual HAP.

MW<sub>i</sub> = Molecular weight of the individual HAP.

n = Number of HAP compounds in the emission stream.

i = Identifier for a HAP compound.

(b) *Gas sweep of a partially filled vessel.* You must calculate emissions from purging a partially filled vessel using Equation 2 of this section. The pressure of the vessel vapor space may be set equal to 760 millimeters of mercury

(mmHg). You must multiply the HAP partial pressure in Equation 2 of this section by a HAP-specific saturation factor determined in accordance with Equations 3 through 5 of this section. Solve Equation 3 of this section iteratively beginning with saturation factors (in the right-hand side of the equation) of 1.0 for each condensable compound. Stop iterating when the calculated saturation factors for all compounds are the same to two significant figures for subsequent iterations. Note that for multi-component emission streams, saturation factors must be calculated for all condensable compounds, not just the HAP.

$$E = \sum_{i=1}^n P_i MW_i \left( \frac{Vt}{RT} \right) \left( \frac{P_T}{P_T - \sum_{j=1}^m (P_j)} \right) \quad (\text{Eq. 2})$$

Where:

E = Mass of HAP emitted.

V = Purge flow rate of the noncondensable gas at the temperature and pressure of the vessel vapor space.

R = Ideal gas law constant.

T = Temperature of the vessel vapor space; absolute.

P<sub>i</sub> = Partial pressure of the individual HAP at saturated conditions.

P<sub>j</sub> = Partial pressure of individual condensable compounds (including HAP) at saturated conditions.