emissions from process vents, storage tanks, and wastewater systems combined. The affected source is in compliance if the emission reduction is greater than or equal to 98 percent.

(2) Any owner or operator who elects to comply with § 63.523(b) by limiting HAP emissions from process vents, storage tanks, and wastewater systems to 5,000 pounds per year or less shall demonstrate compliance according to the requirements of paragraphs (d)(2) (i) and (ii) of this section.

(i) Emissions from process vents, storage tanks, and wastewater systems shall be determined according to paragraphs (a) (1) through (3) of this section. Emissions shall be converted to annual emissions. Annual emission calculations shall reflect production levels representative of normal operating conditions.

(ii) The owner or operator shall calculate total emissions from all process vent, storage tank, and wastewater system emission points. The

where:

E=mass of HAP vapor displaced from the vessel being heated up;

(P_i)_{Tn}=partial pressure of each HAP in the vessel headspace at initial (n=1) and final (n=2) temperature;

Pa₁=initial gas pressure in the vessel; Pa₂=final gas pressure; and

MW_{HAP}=the average molecular weight of HAP present in the vessel.

The moles of gas displaced is represented by:

$$\Delta \eta = \frac{V}{R} \left[\left(\frac{Pa_1}{T_1} \right) - \left(\frac{Pa_2}{T_2} \right) \right]$$

where:

> η=number of lb-moles of gas displaced;

V=volume of free space in the vessel; R=ideal gas law constant;

Pa₁=initial gas pressure in the vessel; Pa₂=final gas pressure;

 T_1 =initial temperature of vessel; and T_2 =final temperature of vessel.

The initial pressure of the noncondensable gas in the vessel shall be calculated according to the following equation:

$$Pa_1 = P_{atm} - \sum (P_{ic})_{T1}$$

where:

affected source is in compliance with the standard if total emissions are less than or equal to 5,000 lb/yr.

(e) The owner or operator of any existing, new, or reconstructed WSR source that chooses to comply with the emission limit for process vents, storage tanks, and wastewater systems shall demonstrate initial compliance by determining emissions for all process vent, storage tank, and wastewater systems emission points using the methods described in this section.

(1) Emissions of HAP reactor process vents shall be calculated for each batch emission episode according to the methodologies described in paragraph (e)(1) of this section.

(i) Emissions from vapor displacement due to transfer of material into or out of the reactor shall be calculated according to the following equation:

$$E = \frac{(y_i)(V)(P_T)(MW)}{(R)(T)}$$

$$E = \frac{\frac{\sum (P_i)_{T1}}{Pa_1} + \frac{\sum (P_i)_{T2}}{Pa_2}}{2} \times \Delta \eta \times MW_{HAP}$$

Pa₁=initial partial pressure of gas in the vessel headspace;

P_{atm}=atmospheric pressure; and

 $(P_{ic})_{T1}$ =initial partial pressure of each condensable volatile organic compound (including HAP) in the vessel headspace, at the initial temperature (T₁).

The average molecular weight of HAP in the displaced gas shall be calculated as follows:

$$MW_{HAP} = \frac{\sum_{i=1}^{n} (\text{mass of HAP})_{i}}{\sum_{i=1}^{n} \frac{(\text{mass of HAP})_{i}}{(\text{HAP molecular weight})_{i}}}$$

where n is the number of different HAP compounds in the emission stream.

(2) Emissions of HAP from process vents may be measured directly. The EPA Test Methods listed in paragraph (e)(2) (i) through (iii) of this section, from 40 CFR part 60, appendix A, shall be used to demonstrate compliance with the requirements of § 63.524 by direct measurement. Testing shall be performed for every batch emission episode of the unit operation. Gas stream volumetric flow rates shall be measured at 15-minute intervals, or at least once during each batch emission episode. Organic HAP or TOC where:

- E=mass emission rate;
- yi=saturated mole fraction of HAP in the vapor phase;
- V=volume of gas displaced from the vessel;
- R=ideal gas law constant;
- T=temperature of the vessel vapor space; absolute;
- P_T =pressure of the vessel vapor space; and

MW=molecular weight of the HAP.

(ii) Emissions from reactor purging shall be calculated using the methodology described in paragraph
(e)(1)(i) of this section, except that for purge flow rates greater than 100 standard cubic feet per minute (scfm), the mole fraction of HAP will be assumed to be 25 percent of the saturated value.

(iii) Emissions caused by heating of the reactor vessel shall be calculated according to the following methodology:

concentration shall be determined from samples collected in an integrated sample over the duration of each episode, or from grab samples collected simultaneously with the flow rate measurements (every 15 minutes). If an integrated sample is collected for laboratory analysis, the sampling rate shall be adjusted proportionally to reflect variations in flow rate. Test conditions shall represent the normal operating conditions under which the data used to calculate the production rate are taken.

(i) Method 1 or 1A of 40 CFR part 60, appendix A, as appropriate, shall be used for selection of the sampling sites if the flow measuring device is a pitot tube. A traverse shall be conducted before and after each sampling period. No traverse is necessary when using Method 2A or 2D.

(ii) Method 2,2A, 2C or 2D of 40 CFR part 60, appendix A, as appropriate, shall be used for the determination of gas stream volumetric flow rate. If Method 2 or 2C is used, the velocity measurements shall be made at a single point than can be used, in conjunction with the traverse, to establish an average velocity across the stack.

(iii) Method 25A and/or Methods 18 and 25A of 40 CFR part 60, appendix A, as appropriate, shall be used to