**Section 219.502 Determination of Uncontrolled Total Annual Mass Emissions and Actual Weighted Average Flow Rate Values for Batch Operations**

a) Uncontrolled total annual mass emissions shall be determined by the following methods:

1) Direct process vent emissions measurements taken prior to any release to the atmosphere, following any recovery device and prior to any control device, provided such measurements conform with the requirements of measuring the mass flow rate of VOM incoming to the control device as set forth in Section 219.503(f)(2), (f)(3)(A) and (f)(3)(B) of this Subpart; or

2) Engineering estimates of the uncontrolled VOM emissions from a process vent or process vents, in the aggregate, within a batch process train, using either the potential or permitted number of batch cycles per year or total production as represented in the source's operating permit as follows:

A) Engineering estimates of the uncontrolled VOM emissions shall be based upon accepted chemical engineering principles, measurable process parameters, or physical or chemical laws and their properties. Examples of methods include, but are not limited to, the following:

i) Use of material balances based on process stoichiometry to estimate maximum VOM concentrations;

ii) Estimation of maximum flow rate based on physical equipment design such as pump or blower capacities; and

iii) Estimation of VOM concentrations based on saturation conditions.

B) All data, assumptions and procedures used in any engineering estimate shall be documented.

b) Average flow rate shall be determined by any of the following methods:

1) Direct process vent flow rate measurements taken prior to any release to the atmosphere, following any recovery device and prior to any control device, provided such measurements conform with the requirements of measuring incoming volumetric flow rate set forth in Section 219.503(e)(2) of this Subpart;

2) Average flow rate for a single unit operation having multiple emission events or batch process trains shall be the weighted average flow rate, calculated as follows:



where:

|  |  |  |
| --- | --- | --- |
| WAF | = | Actual weighted average flow rate for a single unit operation or batch process train; |
| AFRi | = | Average flow rate per emission event; |
| ADEi | = | Annual duration of emission event; and |
| n | = | Number of emission events. |

For purposes of this formula, the term "emission event" shall be defined as a discrete period of venting that is associated with a single unit operation. For example, a displacement of vapor resulting from the charging of a single unit operation with VOM will result in a discrete emission event that will last through the duration of the charge and will have an average flow rate equal to the rate of the charge. The expulsion of expanded vapor space when the single unit operation is heated is also an emission event. Both of these examples of emission events and others may occur in the same single unit operation during the course of the batch cycle. If the flow rate measurement for any emission event is zero, according to Section 218.503(f)(2) of this Subpart, then such event is not an emission event for purposes of this Section.

3) Engineering estimates calculated in accordance with the requirements in subsection (a)(2) of this Section.

c) For purposes of determining the average flow rate for steam vacuuming systems, the steam flow shall be included in the average flow rate calculation.

(Source: Added at 19 Ill. Reg. 7385, effective May 22, 1995)