**Section 218.433 Performance and Testing Requirements**

a) For the purpose of demonstrating compliance with the TRE index value in Section 218.432(c) of this Subpart, an engineering assessment shall be made to determine process vent stream flow rate, net heating value, and VOM emission rate for the representative operating conditions expected to yield the lowest TRE index value. The source shall also calculate the TRE index values pursuant to the equations contained within Appendix G (b)(1) of this Part.

1) If the TRE index value calculated using such engineering assessment and the TRE equation in Appendix G (b)(1) of this Part is greater than 4.0, then the owner or operator is exempt from performing the measurements specified in Appendix G (a) of this Part.

2) If the TRE index value calculated using such engineering assessment and the TRE equation in Appendix G (b)(1) of this Part is less than or equal to 4.0, then the owner or operator shall perform the measurements specified in Appendix G (a) of this Part. An owner or operator of a source may, in the alternative, elect to comply with the control requirements specified in Section 218.432 of this Subpart rather than performing the measurements in Appendix G (a) of this Part.

3) An engineering assessment shall include, but is not limited to, the following:

A) Previous test results, provided the tests are representative of current operating practices at the chemical manufacturing process unit;

B) Bench-scale or pilot-scale test data of the process under representative operating conditions;

C) Maximum flow rate, as stated within a permit limit, applicable to the process vent;

D) Design analysis based on accepted chemical engineering principles, measurable process parameters, or physical or chemical laws or properties. Examples of analytical 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;

iii) Estimation of VOM concentrations based on saturation conditions; and

iv) Estimation of maximum expected net heating value based on the stream concentration of each organic compound, or, alternatively, as if all VOM in the stream were the compound with the highest heating value.

E) All data, assumptions, and procedures used in the engineering assessment shall be documented.

b) For the purpose of demonstrating compliance with the control requirements in Section 218.432 of this Subpart, the chemical manufacturing process unit shall be run at representative operating conditions and flow rates during any performance test.

c) The following methods in 40 CFR 60, incorporated by reference at Section 218.112 of this Part, shall be used to demonstrate compliance with the reduction efficiency requirement listed in Section 218.432(a)(1) of this Subpart.

1) Method 1 or 1A, incorporated by reference at Section 218.112 of this Part, as appropriate, for selection of the sampling sites. The control device inlet sampling site for determination of vent stream molar composition or VOM content, less methane and ethane, reduction efficiency shall be located after the last recovery device but prior to the inlet of the control device, prior to any dilution of the process vent stream, and prior to release to the atmosphere.

2) Method 2, 2A, 2C or 2D, incorporated by reference at Section 218.112 of this Part, as appropriate, for determination of gas stream volumetric flow rate.

3) The emission rate correction factor, integrated sampling, and analysis procedure of Method 3, incorporated by reference at Section 218.112 of this Part, shall be used to determine the oxygen concentration (%O2d) for the purpose of determining compliance with the 20 ppmv limitation. The sampling site for determining compliance with the 20 ppmv limitation shall be the same site used for the VOM samples, and samples shall be taken at the same time that the VOM samples are taken. The VOM concentration corrected to 3 percent oxygen (Cc) shall be computed using the following formula:



where:

|  |  |  |
| --- | --- | --- |
| Cc | = | Concentration of VOM (minus methane and ethane) corrected to 3 percent O2, dry basis, ppmv. |
| CVOM | = | Concentration of VOM(minus methane and ethane), dry basis, ppmv. |
| %O2d | = | Concentration of oxygen, dry basis, percent by volume. |

4) Method 18, incorporated by reference at Section 218.112 of this Part, to determine the concentration of VOM, less methane and ethane, at the outlet of the control device when determining compliance with the 20 ppmv limitation in Section 218.432(a)(1) of this Subpart, or at both the control device inlet and outlet when the reduction efficiency of the control device is to be determined.

A) The minimum sampling time for each run shall be 1 hour in which either an integrated sample or four grab samples shall be taken. If grab sampling is used then the samples shall be taken at 15-minute intervals.

B) The emission reduction (R) of VOM, less methane and ethane, shall be determined using the following formula:



where:

|  |  |  |
| --- | --- | --- |
| R | = | Emission reduction, percent by weight. |
| Ei | = | Mass rate of VOM (minus methane and ethane) entering the control device, kg VOM/hr. |
| Eo | = | Mass rate of VOM, less methane and ethane discharged to the atmosphere, kg VOM/hr. |

C) The mass rates of VOM (E[i], E[o]) shall be computed using the following formula:





where:

|  |  |  |
| --- | --- | --- |
| Cij, Coj | = | Concentration of sample component "j" of the gas stream at the inlet and outlet of the control device, respectively, dry basis, ppmv. |
| Mij, Moj | = | Molecular weight of sample component "j" of the gas stream at the inlet and outlet of the control device, respectively, grams/gram-mole. |
| Qi, Qo | = | Flow rate of gas stream at the inlet and outlet of the control device, respectively, dry space scm/min. |
| K2 |  | 2.494 x 10-6 (liters/minute) (gram-mole per scm) (kg/g) (min/hr), where standard temperature for (gram-mole/scm) is 20° C. |

D) The representative VOM concentration (C[VOM]) is the sum of each of the individual components of VOM (C[j]) and shall be computed for each run using the following:



where:

|  |  |  |
| --- | --- | --- |
| CVOM | = | Concentration of VOM (minus methane and ethane), dry basis, ppmv. |
| Cj | = | Concentration of sample component "j", dry basis, ppmv. |
| n | = | Number of components in the sample. |

5) When a boiler or process heater with a design heat input capacity of 44 megawatts or greater, or a boiler or process heater into which the process vent stream is introduced with the primary fuel, is used to comply with the control requirements, an initial performance test is not required.

d) When a flare is used to comply with the control requirements of this rule, the flare shall comply with the requirements of 40 CFR 60.18, incorporated by reference at Section 218.112 of this Part.

(Source: Added at 19 Ill. Reg. 6848, effective May 9, 1995)