**Section 724.933 Standards: Closed-Vent Systems and Control Devices**

a) Compliance Required

1) Owners or operators of closed-vent systems and control devices used to comply with provisions of this Part must comply with the provisions of this Section.

2) Implementation Schedule

A) The owner or operator of an existing facility that cannot install a closed-vent system and control device to comply with the provisions of this Subpart AA on the effective date that the facility becomes subject to the provisions of this Subpart AA must prepare an implementation schedule that includes dates by which the closed-vent system and control device will be installed and in operation. The controls must be installed as soon as possible, but the implementation schedule may allow up to 30 months after the effective date that the facility becomes subject to this Subpart AA for installation and startup.

B) Any unit beginning operation that is subject to the provisions of this Subpart AA when operation begins must comply with the rules immediately (i.e., must have control devices installed and operating on startup of the affected unit); the 30-month implementation schedule does not apply.

C) The owner or operator of any facility in existence on the effective date of a statutory or regulatory amendment that renders the facility subject to this Subpart AA must comply with all requirements of this Subpart AA as soon as practicable, but no later than 30 months after the effective date of the amendment. When control equipment required by this Subpart AA cannot be installed and begin operation by the effective date of the amendment, the facility owner or operator must prepare an implementation schedule that includes the following information: specific calendar dates for award of contracts or issuance of purchase orders for the control equipment, initiation of on-site installation of the control equipment, completion of the control equipment installation, and performance of any testing to demonstrate that the installed equipment meets the applicable standards of this Subpart AA. The owner or operator must enter the implementation schedule in the operating record or in a permanent, readily available file located at the facility.

D) An owner or operator of a facility or unit that becomes newly subject to the requirements of this Subpart AA due to an action other than those described in subsection (a)(2)(C) must comply with all applicable requirements immediately (i.e., the facility or unit must have control devices installed and operating on the date the facility or unit becomes subject to this Subpart AA; the 30-month implementation schedule does not apply).

b) A control device involving vapor recovery (e.g., a condenser or adsorber) must be designed and operated to recover the organic vapors vented to it with an efficiency of 95 weight percent or greater unless the total organic emission limits of Section 724.932(a)(1) for all affected process vents is attained at an efficiency less than 95 weight percent.

c) An enclosed combustion device (e.g., a vapor incinerator, boiler, or process heater) must be designed and operated to reduce the organic emissions vented to it by 95 weight percent or greater; to achieve a total organic compound concentration of 20 ppmv, expressed as the sum of the actual compounds and not in carbon equivalents, on a dry basis, corrected to three percent oxygen; or to provide a minimum residence time of 0.50 seconds at a minimum temperature of 760° C. If a boiler or process heater is used as the control device, then the vent stream must be introduced into the flame zone of the boiler or process heater.

d) Flares

1) A flare must be designed for and operated with no visible emissions, as determined by the methods specified in subsection (e)(1), except for periods not to exceed a total of five minutes during any two consecutive hours.

2) A flare must be operated with a flame present at all times, as determined by the methods specified in subsection (f)(2)(C).

3) A flare must be used only if the net heating value of the gas being combusted is 11.2 MJ/scm (300 Btu/scf) or greater and the flare is steam-assisted or air-assisted or if the net heating value of the gas being combusted is 7.45 MJ/scm (200 Btu/scf) or greater and the flare is nonassisted. The net heating value of the gas being combusted must be determined by the methods specified in subsection (e)(2).

4) Exit Velocity

A) A steam-assisted or nonassisted flare must be designed for and operated with an exit velocity, as determined by the methods specified in subsection (e)(3), less than 18.3 m/s (60 ft/s), except as provided in subsections (d)(4)(B) and (d)(4)(C).

B) A steam-assisted or nonassisted flare designed for and operated with an exit velocity, as determined by the methods specified in subsection (e)(3), equal to or greater than 18.3 m/s (60 ft/s) but less than 122 m/s (400 ft/s) is allowed if the net heating value of the gas being combusted is greater than 37.3 MJ/scm (1,000 Btu/scf).

C) A steam-assisted or nonassisted flare designed for and operated with an exit velocity, as determined by the methods specified in subsection (e)(3), less than the velocity, V, as determined by the method specified in subsection (e)(4), and less than 122 m/s (400 ft/s) is allowed.

5) An air-assisted flare must be designed and operated with an exit velocity less than the velocity, V, as determined by the method specified in subsection (e)(5).

6) A flare used to comply with this Section must be steam-assisted, air-assisted, or nonassisted.

e) Compliance Determination and Equations

1) Reference Method 22 (Visual Determination of Fugitive Emissions from Material Sources and Smoke Emissions from Flares) in appendix A to 40 CFR 60 (Test Methods), incorporated by reference in 35 Ill. Adm. Code 720.111(b), must be used to determine the compliance of a flare with the visible emission provisions of this Subpart AA. The observation period is two hours and must be used according to Reference Method 22.

2) The net heating value of the gas being combusted in a flare must be calculated using the following equation:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| HT | = | K | x | n  Σ  i=1 | Ci | x | Hi |

Where:

|  |  |  |
| --- | --- | --- |
| HT | = | the net heating value of the sample in MJ/scm; where the net enthalpy per mole of offgas is based on combustion at 25 °C and 760 mm Hg, but the standard temperature for determining the volume corresponding to one mole is 20 °C |
| K | = | 1.74 x -10-7 (1/ppm)(g mol/scm)(MJ/kcal) where the standard temperature for (g mol/scm) is 20 °C |
| Ci | = | the concentration of sample component i in ppm on a wet basis, as measured for organics by Reference Method 18 (Measurement of Gaseous Organic Compound Emissions by Gas Chromatography) in appendix A to 40 CFR 60 (Test Methods), and for carbon monoxide, by ASTM D 1946-90 (Standard Practice for Analysis of Reformed Gas by Gas Chromatography), each incorporated by reference in 35 Ill. Adm. Code 720.111 |
| Hi | = | the net heat of combustion of sample component i, kcal/gmol at 25 °C and 760 mm Hg. The heats of combustion must be determined using ASTM D 2382-88 (Standard Test Method for Heat of Combustion of Hydrocarbon Fuels by Bomb Calorimeter (High Precision Method)), incorporated by reference in 35 Ill. Adm. Code 720.111(a), if published values are not available or cannot be calculated |

3) The actual exit velocity of a flare must be determined by dividing the volumetric flow rate (in units of standard temperature and pressure), as determined by Reference Methods 2 (Determination of Stack Gas Velocity and Volumetric Flow Rate (Type S Pitot Tube)), 2A (Direct Measurement of Gas Volume through Pipes and Small Ducts), 2C (Determination of Gas Velocity and Volumetric Flow Rate in Small Stacks or Ducts (Standard Pitot Tube)), or 2D (Measurement of Gas Volume Flow Rates in Small Pipes and Ducts) in appendix A to 40 CFR 60 (Test Methods), incorporated by reference in 35 Ill. Adm. Code 720.111(b), as appropriate, by the unobstructed (free) cross-sectional area of the flare tip.

4) The maximum allowed velocity in m/s, Vmax, for a flare complying with subsection (d)(4)(C) must be determined by the following equation:

|  |  |  |
| --- | --- | --- |
| log10(Vmax) | = | HT + 28.8 |
| 31.7 |

Where:

|  |  |  |
| --- | --- | --- |
| HT | = | the net heating value as determined in subsection (e)(2) |

5) The maximum allowed velocity in m/s, Vmax, for an air-assisted flare must be determined by the following equation:

|  |  |  |
| --- | --- | --- |
| Vmax | = | 8.706 + 0.7084 HT |

Where:

|  |  |  |
| --- | --- | --- |
| HT | = | the net heating value as determined in subsection (e)(2) |

f) The owner or operator must monitor and inspect each control device required to comply with this Section to ensure proper operation and maintenance of the control device by implementing the following requirements:

1) Install, calibrate, maintain, and operate according to the manufacturer's specifications a flow indicator that provides a record of stream flow from each affected process vent to the control device at least once every hour. The flow indicator sensor must be installed in the vent stream at the nearest feasible point to the control device inlet but before the point at which the vent streams are combined.

2) Install, calibrate, maintain, and operate according to the manufacturer's specifications a device to continuously monitor control device operation, as follows:

A) For a thermal vapor incinerator, a temperature monitoring device equipped with a continuous recorder. The device must have accuracy of ±1 percent of the temperature being monitored in °C or ±0.5°C, whichever is greater. The temperature sensor must be installed at a location in the combustion chamber downstream of the combustion zone.

B) For a catalytic vapor incinerator, a temperature monitoring device equipped with a continuous recorder. The device must be capable of monitoring temperature at two locations and have an accuracy of ±1 percent of the temperature being monitored in °C or ±0.5° C, whichever is greater. One temperature sensor must be installed in the vent stream at the nearest feasible point to the catalyst bed inlet and a second temperature sensor must be installed in the vent stream at the nearest feasible point to the catalyst bed outlet.

C) For a flare, a heat sensing monitoring device equipped with a continuous recorder that indicates the continuous ignition of the pilot flame.

D) For a boiler or process heater having a design heat input capacity less than 44 MW, a temperature monitoring device equipped with a continuous recorder. The device must have an accuracy of ±1 percent of the temperature being monitored in °C or ±0.5° C, whichever is greater. The temperature sensor must be installed at a location in the furnace downstream of the combustion zone.

E) For a boiler or process heater having a design heat input capacity greater than or equal to 44 MW, a monitoring device equipped with a continuous recorder to measure parameters that indicate good combustion operating practices are being used.

F) For a condenser, either of the following:

i) A monitoring device equipped with a continuous recorder to measure the concentration level of the organic compounds in the exhaust vent stream from the condenser; or

ii) A temperature monitoring device equipped with a continuous recorder. The device must be capable of monitoring temperature with an accuracy of ±1 percent of the temperature being monitored in °C or ±0.5° C, whichever is greater. The temperature sensor must be installed at a location in the exhaust vent stream from the condenser exit (i.e., product side).

G) For a carbon adsorption system that regenerates the carbon bed directly in the control device such as a fixed-bed carbon adsorber, either of the following:

i) A monitoring device equipped with a continuous recorder to measure the concentration level of the organic compounds in the exhaust vent stream from the carbon bed, or

ii) A monitoring device equipped with a continuous recorder to measure a parameter that indicates the carbon bed is regenerated on a regular, predetermined time cycle.

3) Inspect the readings from each monitoring device required by subsections (f)(1) and (f)(2) at least once each operating day to check control device operation and, if necessary, immediately implement the corrective measures necessary to ensure the control device operates in compliance with the requirements of this Section.

g) An owner or operator using a carbon adsorption system such as a fixed-bed carbon adsorber that regenerates the carbon bed directly onsite in the control device must replace the existing carbon in the control device with fresh carbon at a regular, predetermined time interval that is no longer than the carbon service life established as a requirement of Section 724.935(b)(4)(C)(vi).

h) An owner or operator using a carbon adsorption system such as a carbon canister that does not regenerate the carbon bed directly onsite in the control device must replace the existing carbon in the control device with fresh carbon on a regular basis by using one of the following procedures:

1) Monitor the concentration level of the organic compounds in the exhaust vent stream from the carbon adsorption system on a regular schedule, and replace the existing carbon with fresh carbon immediately when carbon breakthrough is indicated. The monitoring frequency must be daily or at an interval no greater than 20 percent of the time required to consume the total carbon working capacity established as a requirement of Section 724.935(b)(4)(C)(vii), whichever is longer.

2) Replace the existing carbon with fresh carbon at a regular, predetermined time interval that is less than the design carbon replacement interval established as a requirement of Section 724.935(b)(4)(C)(vii).

i) An alternative operational or process parameter may be monitored if the operator demonstrates that the parameter will ensure that the control device is operated in conformance with these standards and the control device's design specifications.

j) An owner or operator of an affected facility seeking to comply with the provisions of this Part by using a control device other than a thermal vapor incinerator, catalytic vapor incinerator, flare, boiler, process heater, condenser, or carbon adsorption system is required to develop documentation including sufficient information to describe the control device operation and identify the process parameter or parameters that indicate proper operation and maintenance of the control device.

k) A closed-vent system must meet either of the following design requirements:

1) A closed-vent system must be designed to operate with no detectable emissions, as indicated by an instrument reading of less than 500 ppmv above background, as determined by the methods specified at Section 724.934(b), and by visual inspections; or

2) A closed-vent system must be designed to operate at a pressure below atmospheric pressure. The system must be equipped with at least one pressure gauge or other pressure measurement device that can be read from a readily accessible location to verify that negative pressure is being maintained in the closed-vent system when the control device is operating.

l) The owner or operator must monitor and inspect each closed-vent system required to comply with this Section to ensure proper operation and maintenance of the closed-vent system by implementing the following requirements:

1) Each closed-vent system that is used to comply with subsection (k)(1) must be inspected and monitored in accordance with the following requirements:

A) An initial leak detection monitoring of the closed-vent system must be conducted by the owner or operator on or before the date that the system becomes subject to this Section. The owner or operator must monitor the closed-vent system components and connections using the procedures specified in Section 724.934(b) to demonstrate that the closed-vent system operates with no detectable emissions, as indicated by an instrument reading of less than 500 ppmv above background.

B) After initial leak detection monitoring required in subsection (l)(1)(A), the owner or operator must inspect and monitor the closed-vent system as follows:

i) Closed-vent system joints, seams, or other connections that are permanently or semi-permanently sealed (e.g., a welded joint between two sections of hard piping or a bolted and gasketed ducting flange) must be visually inspected at least once per year to check for defects that could result in air pollutant emissions. The owner or operator must monitor a component or connection using the procedures specified in Section 724.934(b) to demonstrate that it operates with no detectable emissions following any time the component is repaired or replaced (e.g., a section of damaged hard piping is replaced with new hard piping) or the connection is unsealed (e.g., a flange is unbolted).

ii) Closed-vent system components or connections other than those specified in subsection (l)(1)(B)(i) must be monitored annually and at other times as requested by the Regional Administrator, except as provided for in subsection (o), using the procedures specified in Section 724.934(b) to demonstrate that the components or connections operate with no detectable emissions.

C) In the event that a defect or leak is detected, the owner or operator must repair the defect or leak in accordance with the requirements of subsection (l)(3).

D) The owner or operator must maintain a record of the inspection and monitoring in accordance with the requirements specified in Section 724.935.

2) Each closed-vent system that is used to comply with subsection (k)(2) must be inspected and monitored in accordance with the following requirements:

A) The closed-vent system must be visually inspected by the owner or operator to check for defects that could result in air pollutant emissions. Defects include, but are not limited to, visible cracks, holes, or gaps in ductwork or piping or loose connections.

B) The owner or operator must perform an initial inspection of the closed-vent system on or before the date that the system becomes subject to this Section. Thereafter, the owner or operator must perform the inspections at least once every year.

C) In the event that a defect or leak is detected, the owner or operator must repair the defect in accordance with the requirements of subsection (l)(3).

D) The owner or operator must maintain a record of the inspection and monitoring in accordance with the requirements specified in Section 724.935.

3) The owner or operator must repair all detected defects as follows:

A) Detectable emissions, as indicated by visual inspection or by an instrument reading greater than 500 ppmv above background, must be controlled as soon as practicable, but not later than 15 calendar days after the emission is detected, except as provided for in subsection (l)(3)(C).

B) A first attempt at repair must be made no later than five calendar days after the emission is detected.

C) Delay of repair of a closed-vent system for which leaks have been detected is allowed if the repair is technically infeasible without a process unit shutdown, or if the owner or operator determines that emissions resulting from immediate repair would be greater than the fugitive emissions likely to result from delay of repair. Repair of such equipment must be completed by the end of the next process unit shutdown.

D) The owner or operator must maintain a record of the defect repair in accordance with the requirements specified in Section 724.935.

m) A closed-vent system or control device used to comply with provisions of this Subpart AA must be operated at all times when emissions may be vented to it.

n) The owner or operator using a carbon adsorption system to control air pollutant emissions must document that all carbon removed that is a hazardous waste and that is removed from the control device is managed in one of the following manners, regardless of the volatile organic concentration of the carbon:

1) It is regenerated or reactivated in a thermal treatment unit that meets one of the following:

A) The owner or operator of the unit has been issued a final permit under 35 Ill. Adm. Code 702, 703, and 705 that implements the requirements of Subpart X; or

B) The unit is equipped with and operating air emission controls in accordance with the applicable requirements of Subparts AA and CC or Subparts AA and CC of 35 Ill. Adm. Code 725; or

C) The unit is equipped with and operating air emission controls in accordance with a national emission standard for hazardous air pollutants under 40 CFR 61 (National Emission Standards for Hazardous Air Pollutants) or 63 (National Emission Standards for Hazardous Air Pollutants for Source Categories), each incorporated by reference in 35 Ill. Adm. Code 720.111(b).

2) It is incinerated in a hazardous waste incinerator for which the owner or operator has done either of the following:

A) The owner or operator has been issued a final permit under 35 Ill. Adm. Code 702, 703, and 705 that implements the requirements of Subpart O; or

B) The owner or operator has certified compliance in accordance with the interim status requirements of Subpart O of 35 Ill. Adm. Code 725.

3) It is burned in a boiler or industrial furnace for which the owner or operator has done either of the following:

A) The owner or operator has been issued a final permit under 35 Ill. Adm. Code 702, 703, and 705 that implements the requirements of Subpart H of 35 Ill. Adm. Code 726; or

B) The owner or operator has designed and operates the boiler or industrial furnace in accordance with the interim status requirements of Subpart H of 35 Ill. Adm. Code 726.

o) Any components of a closed-vent system that are designated, as described in Section 724.935(c)(9), as unsafe to monitor are exempt from the requirements of subsection (l)(1)(B)(ii) if both of the following conditions are fulfilled:

1) The owner or operator of the closed-vent system has determined that the components of the closed-vent system are unsafe to monitor because monitoring personnel would be exposed to an immediate danger as a consequence of complying with subsection (l)(1)(B)(ii); and

2) The owner or operator of the closed-vent system adheres to a written plan that requires monitoring the closed-vent system components using the procedure specified in subsection (l)(1)(B)(ii) as frequently as practicable during safe-to-monitor times.

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