**Section 721.933 Standards: Closed-Vent Systems and Control Devices**

a) Applicability

1) The remanufacturer or other person that stores or treats the hazardous secondary materials in hazardous secondary material management units using closed-vent systems and control devices used to comply with provisions of this Part must comply with the provisions of this Section.

2) This subsection (a)(2) corresponds with 40 CFR 261.1033, which USEPA has marked "reserved". This statement maintains structural consistency with the federal regulations.

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 721.932(a)(1) for all affected process vents can be 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, not 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) The owner or operator must operate a flare 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 if 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 if the flare is non-assisted. 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 unassisted 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 (C).

B) A steam-assisted or non-assisted 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 non-assisted flare designed for and operated with an exit velocity, as determined by the methods specified in subsection (e)(3), less than the velocity, Vmax, 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, Vmax, 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 unassisted.

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, 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 Method 22.

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

$$H\_{T}=K\left[\sum\_{i=1}^{n}C\_{i}H\_{i}\right]$$

Where:

|  |  |  |
| --- | --- | --- |
| HT | = | Net heating value of the sample, MJ/scm; if 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 mol is 20°C |
| K | = | Constant, 1.74 × 10-7 (1/ppm) (g mol/scm) (MJ/kcal) if standard temperature for (g mol/scm) is 20°C |
| Ci | = | 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), incorporated by reference in 35 Ill. Adm. Code 720.111, and measured for hydrogen and carbon monoxide by ASTM D 1946-90, incorporated by reference in Section 720.111 |
| Hi | = | Net heat of combustion of sample component i, kcal/g mol at 25°C and 760 mm Hg. The heats of combustion may be determined using ASTM D 2382-83, incorporated by reference in Section 720.111, 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), each incorporated by reference in 35 Ill. Adm. Code 720.111, 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:

$$log\_{10}\left(V\_{max}\right)=\frac{\left(H\_{T}+28.8\right)}{31.7}$$

Where:

|  |  |  |
| --- | --- | --- |
| HT | = | The net heating value as determined in subsection (c)(2) |

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

$$V\_{max}=8.706+0.7084 \left(H\_{T}\right)$$

Where:

|  |  |  |
| --- | --- | --- |
| HT | = | The net heating value as determined in subsection (c)(2) |

f) The remanufacturer or other person that stores or treats the hazardous secondary material 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 vent 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 specified below:

A) For a thermal vapor incinerator, 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 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 a parameter(s) that indicates good combustion operating practices are being used.

F) For a condenser, either:

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 like a fixed-bed carbon adsorber, either:

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 this Section.

g) A remanufacturer or other person that stores or treats hazardous secondary material in a hazardous secondary material management unit using a carbon adsorption system like 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 721.935(b)(4)(C)(vi).

h) A remanufacturer or other person that stores or treats hazardous secondary material in a hazardous secondary material management unit using a carbon adsorption system like 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 721.935(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 721.935(b)(4)(C)(vii).

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

j) A remanufacturer or other person that stores or treats hazardous secondary material at 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 must 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 procedure in Section 721.934(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 remanufacturer or other person that stores or treats the hazardous secondary material 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 compliance with the following requirements:

A) An initial leak detection monitoring of the closed-vent system must be conducted by the remanufacturer or other person that stores or treats the hazardous secondary material on or before the date that the system becomes subject to this section. The remanufacturer or other person that stores or treats the hazardous secondary material must monitor the closed-vent system components and connections using the procedures specified in Section 721.934(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 remanufacturer or other person that stores or treats the hazardous secondary material 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 remanufacturer or other person that stores or treats the hazardous secondary material must monitor a component or connection using the procedures specified in Section 721.934(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 Agency, except as provided for in subsection (o), using the procedures specified in Section 721.934(b) to demonstrate that the components or connections operate with no detectable emissions. The Agency must make any request for monitoring in writing to the remanufacturer or other person that stores or treats the hazardous secondary material.

C) If a defect or leak is detected, the remanufacturer or other person that stores or treats the hazardous secondary material must repair the defect or leak in compliance with subsection (l)(3).

D) The remanufacturer or other person that stores or treats the hazardous secondary material must maintain a record of the inspection and monitoring in compliance with the requirements specified in Section 721.935.

2) Each closed-vent system that is used to comply with subsection (k)(2) must be inspected and monitored as follows:

A) The closed-vent system must be visually inspected by the remanufacturer or other person that stores or treats the hazardous secondary material to check for defects that could result in air pollutant emissions. Defects include visible cracks, holes, or gaps in ductwork or piping or loose connections.

B) The remanufacturer or other person that stores or treats the hazardous secondary material 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 remanufacturer or other person that stores or treats the hazardous secondary material must perform the inspections at least once every year.

C) If a defect or leak is detected, the remanufacturer or other person that stores or treats the hazardous secondary material must repair the defect or the leak in compliance with subsection (l)(3).

D) The remanufacturer or other person that stores or treats the hazardous secondary material must maintain a record of the inspection and monitoring in compliance with the requirements specified in Section 721.935.

3) The remanufacturer or other person that stores or treats the hazardous secondary material 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 within 5 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 remanufacturer or other person that stores or treats the hazardous secondary material determines that emissions resulting from immediate repair would be greater than the fugitive emissions likely to result from delay of repair. Repair of the equipment must be completed by the end of the next process unit shutdown.

D) The remanufacturer or other person that stores or treats the hazardous secondary material must maintain a record of the defect repair in compliance with the requirements specified in Section 721.935.

m) Closed-vent systems and control devices used to comply with provisions of this Subpart AA must be operated at all times when emissions may be vented to them.

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

1) 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 Subpart X; or

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

2) Incinerated in a hazardous waste incinerator for which the owner or operator either:

A) Has been issued a final permit under 35 Ill. Adm. Code 702, 703, and 705 that implements Subpart O; or

B) Has designed and operates the incinerator in compliance with the interim status requirements of Subpart O of 35 Ill. Adm. Code 725.

3) Burned in a boiler or industrial furnace for which the owner or operator either:

A) Has been issued a final permit under 35 Ill. Adm. Code 702, 703, and 705 that implements Subpart H of 35 Ill. Adm. Code 726; or

B) Has designed and operates the boiler or industrial furnace in compliance 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 721.935(c)(9), as unsafe to monitor are exempt from subsection (l)(1)(B)(ii) if both of the following conditions are met:

1) The remanufacturer or other person that stores or treats the hazardous secondary material in a hazardous secondary material management unit using a closed-vent system determines 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 remanufacturer or other person that stores or treats the hazardous secondary material in a hazardous secondary material management unit using a 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.

(Source: Amended at 48 Ill. Reg. 16813, effective November 7, 2024)