



Ohio Administrative Code

Rule 3745-51-733 Closed-vent systems and control devices - process vents.

Effective: [March 7, 2025](#)

(A)

(1) The remanufacturer or other person who stores or treats the hazardous secondary materials in hazardous secondary material management units using closed-vent systems and control devices used to comply with Chapter 3745-51 of the Administrative Code shall comply with this rule.

(2) [Reserved.]

(B) A control device involving vapor recovery (e.g., a condenser or adsorber) shall be designed and operated to recover the organic vapors vented to the control device with an efficiency of ninety-five weight per cent or greater unless the total organic emission limits of paragraph (A)(1) of rule 3745-51-732 of the Administrative Code for all affected process vents can be attained at an efficiency less than ninety-five weight per cent.

(C) An enclosed combustion device (e.g., a vapor incinerator, boiler, or process heater) shall be designed and operated to reduce the organic emissions vented to the enclosed combustion device by ninety-five weight per cent or greater; to achieve a total organic compound concentration of twenty parts per million by volume (ppmv), expressed as the sum of the actual compounds, not carbon equivalents, on a dry basis corrected to three per cent oxygen; or to provide a minimum residence time of 0.5 seconds at a minimum temperature of seven hundred sixty degrees Celsius. If a boiler or process heater is used as the control device, then the vent stream shall be introduced into the flame zone of the boiler or process heater.

(D)

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



(2) A flare shall be operated with a flame present at all times, as determined by the methods specified in paragraph (F)(2)(c) of this rule.

(3) A flare shall be used only if the net heating value of the gas being combusted is 11.2 MegaJoules per standard cubic meter of gas (MJ/scm) [three hundred British thermal units per standard cubic foot (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 (two hundred Btu/scf) or greater if the flare is non-assisted. The net heating value of the gas being combusted shall be determined by the methods specified in paragraph (E)(2) of this rule.

(4)

(a) A steam-assisted or non-assisted flare shall be designed for and operated with an exit velocity, as determined by the methods specified in paragraph (E)(3) of this rule, less than 18.3 meters per second (m/s) [sixty feet per second (ft/s)], except as provided in paragraph (D)(4)(b) and paragraph (D)(4)(c) of this rule.

(b) A steam-assisted or non-assisted flare designed for and operated with an exit velocity, as determined by the methods specified in paragraph (E)(3) of this rule, equal to or greater than 18.3 m/s (sixty ft/s) but less than one hundred twenty-two m/s (four hundred ft/s) is allowed if the net heating value of the gas being combusted is greater than 37.3 MJ/scm (one thousand 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 paragraph (E)(3) of this rule, less than the velocity, V_{\max} , as determined by the method specified in paragraph (E)(4) of this rule and less than one hundred twenty-two m/s (four hundred ft/s) is allowed.

(5) An air-assisted flare shall be designed and operated with an exit velocity less than the velocity, V_{\max} , as determined by the method specified in paragraph (E)(5) of this rule.

(6) A flare used to comply with this rule shall be steam-assisted, air-assisted, or non-assisted.



(E)

(1) Reference method 22 in 40 CFR Part 60 shall be used to determine the compliance of a flare with the visible emission provisions of rules 3745-51-730 to 3745-51-735 of the Administrative Code.

The observation period is two hours and shall be used according to method 22.

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

$$H_T = K \left[\sum_{i=1}^n C_i H_i \right]$$

Where:

H_T = Net heating value of the sample, MJ/scm; where the net enthalpy per mole of offgas is based on combustion at twenty-five degrees Celsius and seven hundred sixty millimeters of mercury (mm Hg), but the standard temperature for determining the volume corresponding to one mole (mol) is twenty degrees Celsius;

K = Constant, 1.74×10^{-7} (1/ppm) (g mol/scm) (MJ/kcal) where standard temperature for (g mol/scm) is twenty degrees Celsius; ppm means parts per million, g mol/scm means gram mole per standard cubic meter of gas, MJ/kcal means MegaJoules per kilocalorie;

C_i = Concentration of sample component i in ppm on a wet basis, as measured for organics by reference method 18 in 40 CFR Part 60 and measured for hydrogen and carbon monoxide by ASTM D1946-82; and

H_i = Net heat of combustion of sample component i , kcal/nine mol at twenty-five degrees Celsius and seven hundred sixty mm Hg. The heats of combustion may be determined using ASTM D2382-83 if published values are not available or cannot be calculated.



(3) The actual exit velocity of a flare shall be determined by dividing the volumetric flow rate (in units of standard temperature and pressure), as determined by reference method 2, method 2A, method 2C, or method 2D in 40 CFR Part 60 as appropriate, by the unobstructed (free) cross-sectional area of the flare tip.

(4) The maximum allowed velocity in m/s, V_{\max} , for a flare complying with paragraph (D)(4)(c) of this rule shall be determined by the following equation:

$$\text{Log}_{10}(V_{\max}) = \frac{(H_T + 28.8)}{31.7}$$

Where:

28.8 = Constant

31.7 = Constant,

H_T = The net heating value as determined in paragraph (E)(2) of this rule.

(5) The maximum allowed velocity in m/s, V_{\max} , for an air-assisted flare shall be determined by the following equation:

$$V_{\max} = 8.706 + 0.7084(H_T)$$

Where:

8.706 = Constant,

0.7084 = Constant,

H_T = The net heating value as determined in paragraph (E)(2) of this rule.



(F) The remanufacturer or other person who stores or treats the hazardous secondary material shall monitor and inspect each control device required to comply with this rule 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 shall 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 where:

(a) For a thermal vapor incinerator, a temperature monitoring device equipped with a continuous recorder. The device shall have an accuracy of plus or minus one per cent of the temperature being monitored in degrees Celsius or plus or minus 0.5 degrees Celsius, whichever is greater. The temperature sensor shall 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 shall be capable of monitoring temperature at two locations and have an accuracy of plus or minus one per cent of the temperature being monitored in degrees Celsius or plus or minus 0.5 degrees Celsius, whichever is greater. One temperature sensor shall be installed in the vent stream at the nearest feasible point to the catalyst bed inlet and a second temperature sensor shall 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 forty-four megawatts (MW), a temperature monitoring device equipped with a continuous recorder. The device shall have an accuracy of plus or minus one per cent of the temperature being monitored in degrees Celsius or plus or minus 0.5 degrees Celsius, whichever is greater. The temperature sensor shall 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 forty-four MW, a monitoring device equipped with a continuous recorder to measure a parameters 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 shall be capable of monitoring temperature with an accuracy of plus or minus one per cent of the temperature being monitored in degrees Celsius or plus or minus 0.5 degrees Celsius, whichever is greater. The temperature sensor shall 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:

(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 paragraphs (F)(1) and (F)(2) of this rule 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 rule.

(G) A remanufacturer or other person who stores or treats hazardous secondary material in a hazardous secondary material management unit using a carbon adsorption system such as a fixed-bed



carbon adsorber that regenerates the carbon bed directly on-site in the control device shall 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 paragraph (B)(4)(c)(vi) of rule 3745-51-735 of the Administrative Code.

(H) A remanufacturer or other person who stores or treats hazardous secondary material in a hazardous secondary material management unit using a carbon adsorption system such as a carbon canister that does not regenerate the carbon bed directly on-site in the control device shall 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 shall be daily or at an interval no greater than twenty per cent of the time required to consume the total carbon working capacity established as a requirement of paragraph (B)(4)(c)(vii) of rule 3745-51-735 of the Administrative Code, 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 paragraph (B)(4)(c)(vii) of rule 3745-51-735 of the Administrative Code.

(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 who stores or treats hazardous secondary material at an affected facility seeking to comply with Chapter 3745-51 of the Administrative Code 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 shall meet either of the following design requirements:

(1) A closed-vent system shall be designed to operate with no detectable emissions, as indicated by an instrument reading of less than five hundred ppmv above background as determined by the procedure in paragraph (B) of rule 3745-51-734 of the Administrative Code, and by visual inspections; or

(2) A closed-vent system shall be designed to operate at a pressure below atmospheric pressure. The system shall 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 who stores or treats the hazardous secondary material shall monitor and inspect each closed-vent system required to comply with this rule 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 paragraph (K)(1) of this rule shall be inspected and monitored in accordance with the following requirements:

(a) An initial leak detection monitoring of the closed-vent system shall be conducted by the remanufacturer or other person who stores or treats the hazardous secondary material on or before the date that the system becomes subject to this rule. The remanufacturer or other person who stores or treats the hazardous secondary material shall monitor the closed-vent system components and connections using the procedures specified in paragraph (B) of rule 3745-51-734 of the Administrative Code to demonstrate that the closed-vent system operates with no detectable emissions, as indicated by an instrument reading of less than five hundred ppmv above background.

(b) After initial leak detection monitoring required in this paragraph, the remanufacturer or other person who stores or treats the hazardous secondary material shall 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) shall be visually inspected at least once per year to check for defects that could result in air pollutant emissions. The remanufacturer or other person who stores or treats the hazardous secondary material shall monitor a component or connection using the procedures specified in paragraph (B) of rule 3745-51-734 of the Administrative Code to demonstrate that the component or connection 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 paragraph (L)(1)(b)(i) of this rule shall be monitored annually and at other times as requested by the director, except as provided for in paragraph (O) of this rule, using the procedures specified in paragraph (B) of rule 3745-51-734 of the Administrative Code to demonstrate that the components or connections operate with no detectable emissions.

(c) In the event that a defect or leak is detected, the remanufacturer or other person who stores or treats the hazardous secondary material shall repair the defect or leak in accordance with the requirements of paragraph (L)(3) of this rule.

(d) The remanufacturer or other person who stores or treats the hazardous secondary material shall maintain a record of the inspection and monitoring in accordance with the requirements specified in rule 3745-51-735 of the Administrative Code.

(2) Each closed-vent system that is used to comply with paragraph (K)(2) of this rule shall be inspected and monitored in accordance with the following requirements:

(a) The closed-vent system shall be visually inspected by the remanufacturer or other person who stores or treats the hazardous secondary material 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 remanufacturer or other person who stores or treats the hazardous secondary material shall perform an initial inspection of the closed-vent system on or before the date that the system becomes subject to this rule. Thereafter, the remanufacturer or other person who stores or treats the hazardous



secondary material shall perform the inspections at least once every year.

(c) In the event that a defect or leak is detected, the remanufacturer or other person who stores or treats the hazardous secondary material shall repair the defect in accordance with the requirements of paragraph (L)(3) of this rule.

(d) The remanufacturer or other person who stores or treats the hazardous secondary material shall maintain a record of the inspection and monitoring in accordance with the requirements specified in rule 3745-51-735 of the Administrative Code.

(3) The remanufacturer or other person who stores or treats the hazardous secondary material shall repair all detected defects as follows:

(a) Detectable emissions, as indicated by visual inspection, or by an instrument reading greater than five hundred ppmv above background, shall be controlled as soon as practicable, but not later than fifteen calendar days after the emission is detected, except as provided for in paragraph (L)(3)(c) of this rule.

(b) A first attempt at repair shall 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 remanufacturer or other person who 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 such equipment shall be completed by the end of the next process unit shutdown.

(d) The remanufacturer or other person who stores or treats the hazardous secondary material shall maintain a record of the defect repair in accordance with the requirements specified in rule 3745-51-735 of the Administrative Code.

(M) Closed-vent systems and control devices used to comply with rules 3745-51-730 to 3745-51-735 of the Administrative Code shall 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 shall 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 hazardous waste management permit under Chapter 3745-50 of the Administrative Code which implements the requirements of rules 3745-57-90 to 3745-57-93 of the Administrative Code; or

(b) The unit is equipped with and operating air emission controls in accordance with the applicable requirements of rules 3745-51-730 to 3745-51-735 and 3745-51-780 to 3745-51-789 or 3745-256-30 to 3745-256-35 and 3745-256-80 to 3745-256-90 of the Administrative Code; 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 Part 61 or 40 CFR Part 63.

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

(a) Has been issued a final hazardous waste management permit under Chapter 3745-50 of the Administrative Code which implements the requirements of rules 3745-57-40 to 3745-57-51 of the Administrative Code; or

(b) Has designed and operates the incinerator in accordance with the interim standards requirements of rules 3745-68-40 to 3745-68-52 of the Administrative Code.

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

(a) Has been issued a final hazardous waste management permit under Chapter 3745-50 of the Administrative Code which implements the requirements of rules 3745-266-100 to 3745-266-112 of the Administrative Code; or



(b) Has designed and operates the boiler or industrial furnace in accordance with the interim standards requirements of rules 3745-266-100 to 3745-266-112 of the Administrative Code.

(O) Any components of a closed-vent system that are designated, as described in paragraph (C)(9) of rule 3745-51-735 of the Administrative Code, as unsafe to monitor are exempt from the requirements of paragraph (L)(1)(b)(ii) of this rule if:

(1) The remanufacturer or other person who 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 paragraph (L)(1)(b)(ii) of this rule; and

(2) The remanufacturer or other person who 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 paragraph (L)(1)(b)(ii) of this rule as frequently as practicable during safe-to-monitor times.

[Comment: For dates of non-regulatory government publications, publications of recognized organizations and associations, federal rules, and federal statutory provisions referenced in this rule, see rule 3745-50-11 of the Administrative Code titled "Incorporated by reference."]