



Ohio Administrative Code

Rule 3745-266-106 Standards to control metals emissions.

Effective: June 12, 2023

(A) General. The owner or operator shall comply with the metals standards provided by paragraph (B), (C), (D), (E), or (F) of this rule for each metal listed in paragraph (B) of this rule that is present in the hazardous waste at detectable levels by using analytical procedures specified in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods" (SW-846).

(B) "Tier I" feed rate screening limits. Feed rate screening limits for metals are specified in appendix B to this rule as a function of terrain-adjusted effective stack height and terrain and land use in the vicinity of the facility. Criteria for facilities that are not eligible to comply with the screening limits are provided in paragraph (B)(7) of this rule. "Tier I" feed rate screening limits are:

(1) Noncarcinogenic metals. The feed rates of antimony, barium, lead, mercury, thallium, and silver in all feedstreams, including hazardous waste, fuels, and industrial furnace feedstocks shall not exceed the screening limits specified in appendix B to this rule.

(a) The feed rate screening limits for antimony, barium, mercury, thallium, and silver are based on either:

(i) An hourly rolling average as described in paragraph (E)(6)(a)(ii) of rule 3745-266-102 of the Administrative Code; or

(ii) An instantaneous limit not to be exceeded at any time.

(b) The feed rate screening limit for lead is based on one of the following:

(i) An hourly rolling average as described in paragraph (E)(6)(a)(ii) of rule 3745-266-102 of the Administrative Code;

(ii) An averaging period of two to twenty-four hours as described in paragraph (E)(6)(b) of rule



3745-266-102 of the Administrative Code with an instantaneous feed rate limit not to exceed ten times the feed rate that would be allowed on an hourly rolling average basis; or

(iii) An instantaneous limit not to be exceeded at any time.

(2) Carcinogenic metals.

(a) The feed rates of arsenic, cadmium, beryllium, and chromium in all feedstreams, including hazardous waste, fuels, and industrial furnace feedstocks shall not exceed values derived from the screening limits specified in appendix B to this rule. The feed rate of each of these metals is limited to a level such that the sum of the ratios of the actual feed rate to the feed rate screening limit specified in appendix B to this rule shall not exceed 1.0, as provided by the following equation:

$$\sum_{i=1}^n \frac{AFR_{(i)}}{FRSL_{(i)}} \leq 1.0$$

where:

n = number of carcinogenic metals

AFR = actual feed rate to the device for metal "i"

FRSL = feed rate screening limit provided by appendix B to this rule for metal "i"

(b) The feed rate screening limits for the carcinogenic metals are based on either:

(i) An hourly rolling average; or

(ii) An averaging period of two to twenty-four hours as described in paragraph (E)(6)(b) of rule 3745-266-102 of the Administrative Code with an instantaneous feed rate limit not to exceed ten times the feed rate that would be allowed on an hourly rolling average basis.



(3) Terrain-adjusted effective stack height (TESH).

(a) The terrain-adjusted effective stack height is determined according to the following equation:

$$\text{TESH} = H_a + H_1 - T_r$$

where:

H_a = actual physical stack height

H_1 = plume rise as determined from appendix A to this rule as a function of stack flow rate and stack gas exhaust temperature

T_r = terrain rise within five kilometers of the stack

(b) The stack height (H_a) may not exceed "good engineering practice stack height" as defined in 40 CFR 51.100(ii).

(c) If the TESH for a particular facility is not listed in the tables in appendix B to this rule, the nearest lower TESH listed in the tables in appendix B to this rule shall be used. If the TESH is four meters or less, a value of four meters shall be used.

(4) Terrain type. The screening limits are a function of whether the facility is located in noncomplex or complex terrain. A device located where any part of the surrounding terrain within five kilometers from the stack equals or exceeds the elevation of the physical stack height (H_a) is considered to be in complex terrain and the screening limits for complex terrain apply. Terrain measurements are to be made from U.S. geological survey 7.5-minute topographic maps of the area surrounding the facility.

(5) Land use. The screening limits are a function of whether the facility is located in an area where the land use is urban or rural. To determine whether land use in the vicinity of the facility is urban or rural, procedures provided in the appendix to rule 3745-266-103 of the Administrative Code shall be used.



(6) Multiple stacks. Owners and operators of facilities with more than one on-site stack from a boiler, industrial furnace, incinerator, or other thermal treatment unit subject to controls of metals emissions under a hazardous waste installation and operation permit or interim standards controls shall comply with the screening limits for all such units assuming all hazardous waste is fed into the device with the worst-case stack based on dispersion characteristics. The worst-case stack is determined from the following equation as applied to each stack:

$$K = HVT$$

where:

K = a parameter accounting for relative influence of stack height and plume rise

H = physical stack height (meters)

V = stack gas flow rate (cubic meters per second)

T = exhaust temperature (degrees Kelvin)

The stack with the lowest value of K is the worst-case stack.

(7) Criteria for facilities not eligible for screening limits. If any criteria in paragraphs (B)(7)(a) to (B)(7)(e) of this rule are met, the "Tier I" and "Tier II" screening limits do not apply. Owners and operators of such facilities shall comply with either the "Tier III" standards provided by paragraph (D) of this rule or with the "Adjusted Tier I" feed rate screening limits provided by paragraph (E) of this rule. The criteria are the following:

(a) The device is located in a narrow valley less than one kilometer wide;

(b) The device has a stack taller than twenty meters and is located such that the terrain rises to the physical height within one kilometer of the facility;



(c) The device has a stack taller than twenty meters and is located within five kilometers of a shoreline of a large body of water such as an ocean or large lake;

(d) The physical stack height of any stack is less than 2.5 times the height of any building within five building heights or five projected building widths of the stack and the distance from the stack to the closest boundary is within five building heights or five projected building widths of the associated building; or

(e) The director determines that standards based on site-specific dispersion modeling are required.

(8) Implementation. The feed rate of metals in each feedstream shall be monitored to ensure that the feed rate screening limits are not exceeded.

(C) "Tier II" emission rate screening limits. Emission rate screening limits are specified in appendix B to this rule as a function of terrain-adjusted effective stack height and terrain and land use in the vicinity of the facility. Criteria for facilities that are not eligible to comply with the screening limits are provided in paragraph (B)(7) of this rule. "Tier II" emission rate screening limits are:

(1) Noncarcinogenic metals. The emission rates of antimony, barium, lead, mercury, thallium, and silver shall not exceed the screening limits specified in appendix B to this rule.

(2) Carcinogenic metals. The emission rates of arsenic, cadmium, beryllium, and chromium shall not exceed values derived from the screening limits specified in appendix B to this rule. The emission rate of each of these metals is limited to a level such that the sum of the ratios of the actual emission rate to the emission rate screening limit specified in appendix B to this rule shall not exceed 1.0, as provided by the following equation:

$$\sum_{i=1}^n \frac{AER_{(i)}}{ERSL_{(i)}} \leq 1.0$$



where:

n = number of carcinogenic metals

AER = actual emission rate for metal "i"

ERSL = emission rate screening limit provided by appendix B to this rule for metal "i"

(3) Implementation. The emission rate limits shall be implemented by limiting feed rates of the individual metals to levels during the trial burn (for new facilities or a permit by rule facility applying for a permit) or the compliance test (for permit by rule facilities). The feed rate averaging periods are the same as provided by paragraphs (B)(1)(a), (B)(1)(b), and (B)(2)(b) of this rule. The feed rate of metals in each feedstream shall be monitored to ensure that the feed rate limits for the feedstreams specified in rule 3745-266-102 or 3745-266-103 of the Administrative Code are not exceeded.

(4) Descriptions and limitations. The descriptions and limitations provided by paragraph (B) of this rule for the following terms also apply to the "Tier II" emission rate screening limits provided by paragraph (C) of this rule: "terrain-adjusted effective stack height," "good engineering practice stack height," "terrain type," "land use," and "criteria for facilities not eligible to use the screening limits."

(5) Multiple stacks.

(a) Owners and operators of facilities with more than one on-site stack from a boiler, industrial furnace, incinerator, or other thermal treatment unit subject to controls on metals emissions under a hazardous waste installation and operation permit or interim standards controls shall comply with the emissions screening limits for any such stacks assuming all hazardous waste is fed into the device with the worst-case stack based on dispersion characteristics.

(b) The worst-case stack is determined by procedures in paragraph (B)(6) of this rule.

(c) For each metal, the total emissions of the metal from those stacks shall not exceed the screening limit for the worst-case stack.



(D) "Tier III" and "Adjusted Tier I" site-specific risk assessment. Paragraph (D) of this rule applies to facilities complying with either the "Tier III" or "Adjusted Tier I" controls, except where specified otherwise, including the following:

(1) General. Conformance with the "Tier III" metals controls shall be demonstrated by emissions testing to determine the emission rate for each metal. In addition, conformance with either the "Tier III" or "Adjusted Tier I" metals controls shall be demonstrated by air dispersion modeling to predict the maximum annual average off-site ground level concentration for each metal, and a demonstration that acceptable ambient levels are not exceeded.

(2) Acceptable ambient levels. Appendices A and B to rule 3745-266-109 of the Administrative Code list the acceptable ambient levels for purposes of this rule. Reference air concentrations (RACs) are listed for the noncarcinogenic metals and 10^{-5} risk-specific doses (RSDs) are listed for the carcinogenic metals. The RSD for a metal is the acceptable ambient level for that metal provided that only one of the four carcinogenic metals is emitted. If more than one carcinogenic metal is emitted, the acceptable ambient level for the carcinogenic metals is a fraction of the RSD as described in paragraph (D)(3) of this rule.

(3) Carcinogenic metals. For the carcinogenic metals, arsenic, cadmium, beryllium, and chromium, the sum of the ratios of the predicted maximum annual average off-site ground level concentrations (except that on-site concentrations shall be considered if a person resides on-site) to the RSD for all carcinogenic metals emitted shall not exceed 1.0, as determined by the following equation:

$$\sum_{i=1}^n \frac{\text{Predicted Ambient Concentration}_{(i)}}{\text{Risk - Specific Dose}_{(i)}} \leq 1.0$$

where n = number of carcinogenic metals

(4) Noncarcinogenic metals. For the noncarcinogenic metals, the predicted maximum annual average off-site ground level concentration for each metal shall not exceed the reference air concentration.



(5) Multiple stacks. Owners and operators of facilities with more than one on-site stack from a boiler, industrial furnace, incinerator, or other thermal treatment unit subject to controls on metals emissions under a hazardous waste installation and operation permit or interim standards controls shall conduct emissions testing (except that facilities complying with "Adjusted Tier I" controls need not conduct emissions testing) and dispersion modeling to demonstrate that the aggregate emissions from all such on-site stacks do not result in an exceedance of the acceptable ambient levels.

(6) Implementation. Under "Tier III", the metals controls shall be implemented by limiting feed rates of the individual metals to levels during the trial burn (for new facilities or a permit by rule facility applying for a permit) or the compliance test (for permit by rule facilities). The feed rate averaging periods are the same as provided by paragraphs (B)(1)(a), (B)(1)(b), and (B)(2)(b) of this rule. The feed rate of metals in each feedstream shall be monitored to ensure that the feed rate limits for the feedstreams specified in rule 3745-266-102 or 3745-266-103 of the Administrative Code are not exceeded.

(E) "Adjusted Tier I" feed rate screening limits. The owner or operator may adjust the feed rate screening limits provided by appendix B to this rule to account for site-specific dispersion modeling. Under this approach, the adjusted feed rate screening limit for a metal is determined by back-calculating from the acceptable ambient level provided by appendices A and B to rule 3745-266-109 of the Administrative Code using dispersion modeling to determine the maximum allowable emission rate. This emission rate becomes the "Adjusted Tier I" feed rate screening limit. The feed rate screening limits for carcinogenic metals are implemented as prescribed in paragraph (B)(2) of this rule.

(F) Alternative implementation approaches.

(1) The director may approve on a case-by-case basis approaches to implement the "Tier II" or "Tier III" metals emission limits provided by paragraph (C) or (D) of this rule alternative to monitoring the feed rate of metals in each feedstream.

(2) The emission limits provided by paragraph (D) of this rule shall be determined as follows:

(a) For each noncarcinogenic metal, by back-calculating from the RAC provided in appendix A to



rule 3745-266-109 of the Administrative Code to determine the allowable emission rate for each metal using the dilution factor for the maximum annual average ground level concentration predicted by dispersion modeling in conformance with paragraph (H) of this rule; and

(b) For each carcinogenic metal by:

(i) Back-calculating from the RSD provided in appendix B to rule 3745-266-109 of the Administrative Code to determine the allowable emission rate for each metal if that metal were the only carcinogenic metal emitted using the dilution factor for the maximum annual average ground level concentration predicted by dispersion modeling in conformance with paragraph (H) of this rule; and

(ii) If more than one carcinogenic metal is emitted, selecting an emission limit for each carcinogenic metal not to exceed the emission rate determined by paragraph (F)(2)(b)(i) of this rule such that the sum for all carcinogenic metals of the ratios of the selected emission limit to the emission rate determined by that paragraph does not exceed 1.0.

(G) Emission testing.

(1) General. Emission testing for metals shall be conducted using method 0060, "Determinations of Metals in Stack Emissions," U.S. EPA publication SW-846.

(2) Hexavalent chromium. Emissions of chromium are assumed to be hexavalent chromium unless the owner or operator conducts emissions testing to determine hexavalent chromium emissions using procedures prescribed in method 0061, "Determination of Hexavalent Chromium Emissions from Stationary Sources," U.S. EPA publication SW-846.

(H) Dispersion modeling. Dispersion modeling required by this rule shall be conducted according to methods recommended in 40 CFR Part 51, appendix W ("Guideline on Air Quality Models- Revised," and supplements), the "Hazardous Waste Combustion Air Quality Screening Procedure," provided in the appendix to rule 3745-266-103 of the Administrative Code, or in "Screening Procedures for Estimating the Air Quality Impact of Stationary Sources, Revised" to predict the maximum annual average off-site ground level concentration. However, on-site concentrations shall



be considered when a person resides on-site.

(I) Enforcement. For the purposes of permit enforcement, compliance with the operating requirements specified in the permit (under rule 3745-266-102 of the Administrative Code) is regarded as compliance with this rule. However, evidence that compliance with those permit conditions is insufficient to ensure compliance with this rule may be information justifying modification of a permit under rule 3745-50-51 of the Administrative Code.

[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."]