10 CSR 10-5.550 Control of Volatile Organic Compound Emissions From Reactor Processes and Distillation Operations Processes in the Synthetic Organic Chemical Manufacturing Industry

(1) Applicability.

(A) The provisions of this rule apply to any vent stream originating from a process unit with a reactor process or distillation operation located in St. Louis City and Jefferson, St. Charles, Franklin and St. Louis Counties existing on February 29, 2000.

(B) Exemptions from the provisions of this rule are as follows:

1. Any reactor process or distillation operation that is designed and operated in a batch mode is not subject to the provisions of this rule;

2. Any reactor process or distillation operation that is part of a polymer manufacturing operation is not subject to the provisions of this rule;

3. Any reactor process or distillation operation operating in a process unit with a total design capacity of less than one (1) gigagram (1,100 tons) per year for all chemicals produced within that unit is not subject to the provisions of this rule except for the reporting and recordkeeping requirements listed in subsection (4)(D) of this rule; and

4. Any vent stream for a reactor process or distillation operation with a flow rate less than 0.0085 standard cubic meter per minute or a total volatile organic compound (VOC) concentration less than five hundred (500) parts per million by volume is not subject to the provisions of this rule except for the performance testing requirement listed in subparagraph (3)(B)3.B., paragraph (3)(B)9. and the reporting and recordkeeping requirements listed in subsection (4)(C) of this rule.

(C) In the event that other rules in Title 10 Division 10 of the *Code of State Regulations* are also applicable to reactor processes and distillation operation processes in the chemical manufacturing industry, the more stringent rule applies.

(2) Definitions.

(A) Batch mode—A noncontinuous operation or process in which a discrete quantity or batch of feed is charged into a process unit and distilled or reacted at one time.

(B) Boiler—Any enclosed combustion device that extracts useful energy in the form of steam.
(C) By compound—By individual stream components, not carbon equivalents.

(D) Continuous recorder—A data recording device recording an instantaneous data value at least once every fifteen (15) minutes.

(E) Distillation operation—An operation separating one or more feed stream(s) into two(2) or more exit stream(s), each exit stream having component concentration different from those in the feed stream(s). The separation is achieved by the redistribution of the components between the liquid and vapor-phase as they approach equilibrium within the distillation unit.

(F) Distillation unit—A device or vessel in which distillation operations occur, including all associated internals (such as trays or packing) and accessories (such as reboiler, condenser, vacuum pump, stream jet, etc.), plus any associated recovery system.

(G) Flame zone—The portion of the combustion chamber in a boiler occupied by the flame envelope.

(H) Flow indicator—A device that indicates whether gas flow is present in a vent stream.

(I) Halogenated vent stream—Any vent stream determined to have a total concentration of halogen atoms (by volume) contained in organic compounds of two hundred (200) parts per million by volume or greater determined by Method 18 of 40 CFR part 60, Appendix A, as specified in 10 CSR 10-6.030(22), or other test or data validated by Method 301 of 40 CFR part 63, Appendix A, or by engineering assessment or process knowledge that no halogenated organic compounds are present. Method 301 of 40 CFR 63, Appendix A, promulgated as of July 1, 2018 is hereby incorporated by reference in this rule, as published by the Office of the Federal Register. Copies can be obtained from the U.S. Publishing Office Bookstore, 710 N. Capitol Street NW, Washington DC 20401. This rule does not incorporate any subsequent amendments or additions. For example, one hundred fifty (150) parts per million by volume of ethylene dichloride would contain three hundred (300) parts per million by volume of total halogen atoms.

(J) Incinerator—Any enclosed combustion device that is used for destroying organic compounds. Auxiliary fuel may be used to heat waste gas to combustion temperatures. Any energy recovery section present is not physically formed into one section; rather, the energy recovery system is a separate section following the combustion section and the two are joined by ducting or connections that carry fuel gas.

(K) Primary fuel—The fuel that provides the principal heat input to the device. To be considered primary, the fuel must be able to sustain operation without the addition of other fuels.

(L) Process heater—A device that transfers heat liberated by burning fuel to fluids contained in tubes, including all fluids except water that is heated to produce steam.

(M) Process unit—Equipment assembled and connected by pipes or ducts to produce, as intermediates or final products, one or more SOCMI chemicals (included in Appendix A of Control of Volatile Organic Compound Emissions from Reactor Processes and Distillation Operations Processes in the Synthetic Organic Chemical Manufacturing Industry, EPA-450/4-91-031. Appendix A of Control of Volatile Organic Compound Emissions from Reactor Processes and Distillation Operations Processes in the Synthetic Organic Chemical Manufacturing Industry, EPA-450/4-91-031 promulgated August 1993 is hereby incorporated by reference in this rule. Copies can be obtained from the National Service Center for Environmental Publications (NSCEP), P.O. Box 42419, Cincinnati, Ohio 45242-0419. A process unit can operate independently if supplied with sufficient feed or raw materials and sufficient product storage facilities.

(N) Product—Any compound or SOCMI chemical (see Appendix A of Control of Volatile Organic Compound Emissions from Reactor Processes and Distillation Operations Processes in the Synthetic Organic Chemical Manufacturing Industry, EPA-450/4-91-031, as incorporated by reference in subsection (2)(M) of this rule) that is produced as that chemical for sales as a product, by-product, co-product, or intermediate or for use in the production of other chemicals or compounds.

(O) Reactor processes—Unit operations in which one or more chemicals, or reactants other than air, are combined or decomposed in such a way that their molecular structures are altered and one or more new organic compounds are formed.

(P) Recovery device—An individual unit of equipment, such as an adsorber, carbon adsorber, or condenser, capable of and used for the purpose of recovering chemicals for use, reuse, or sale.

(Q) Recovery system—An individual recovery device or series of such devices applied to the same vent stream.

(R) Total organic compounds or "TOC"—Those compounds measured according to the procedures of Method 18 of 40 CFR part 60, Appendix A. For the purposes of measuring molar compositions as required in subparagraph (3)(B)3.D.; hourly emissions rate as required in subparagraph (3)(B)5.D. and paragraph (3)(B)2.; and TOC concentration as required in paragraph (4)(A)4. The definition of TOC excluded those compounds that the Administrator designates as having negligible photochemical reactivity. The Administrator has designated the following organic compounds negligibly reactive: methane; ethane; 1,1,1-trichloroethane; methylene chloride; trichlorofluoromethane; dichlorodifluoromethane; chlorodifluoromethane; trifluoromethane; trichlorotrifluoroethane; dichlorotetrafluoroethane; and chloropentafluoroethane.

(S) Total resource effectiveness index value or "TRE index value"—A measure of the supplemental total resource requirement per unit reduction of organic hazardous air pollutants associated with a process vent stream, based on vent stream flow rate, emission rate of volatile organic compound, net heating value, and corrosion properties (whether or not the vent stream contains halogenated compounds) as quantified by the given equations. The TRE index is a decision tool used to determine if the annual cost of controlling a given vent gas stream is acceptable when considering the emissions reduction achieved.

(T) Vent stream—Any gas stream discharge directly from a distillation operation or reactor process to the atmosphere or indirectly to the atmosphere after diversion through other process equipment. The vent stream excludes relief valve discharges and equipment leaks including, but not limited to pumps, compressors, and valves.

(U) Definitions of certain terms specified in this rule, other than those specified in this rule section, may be found in 10 CSR 10-6.020.

(3) General Provisions.

(A) Control Requirements.

1. For individual vent streams within a process unit with a TRE index value less than or equal to one (1.0), the owner or operator shall--

A. Reduce emissions of TOC (less methane and ethane) by ninety-eight (98) weight-percent, or to twenty (20) parts per million by volume, on a dry basis corrected to three percent (3%) oxygen, whichever is less stringent. If a boiler or process heater is used to comply with this paragraph, then the vent stream shall be introduced into the flame zone of the boiler or process heater; or

B. Combust emissions in a flare. Flares used to comply with this paragraph shall comply with the requirements of 40 CFR 60.18. 40 CFR 60.18 promulgated as of July 1, 2018 is hereby incorporated by reference in this rule, as published by the Office of the Federal Register. Copies can be obtained from the U.S. Publishing Office Bookstore, 710 N. Capitol Street NW, Washington DC 20401. The flare operation requirement does not apply if a process, not subject to this rule, vents an emergency relief discharge into a common flare header and causes the flare servicing the process subject to this rule to be out of compliance with one or more of the provisions of the flare operation rule.

2. For each individual vent stream(s) within a process unit with a TRE index value greater than one (1.0), the owner or operator shall maintain vent stream parameters that result in a calculated total resource effectiveness greater than one (1.0) without the use of a volatile organic compound control device. The TRE index shall be calculated at the outlet of the final recovery device.

(B) Total Resource Effectiveness Determination, Performance Testing, and Exemption Testing.

1. For the purpose of demonstrating compliance with the TRE index value in paragraph (3)(A)2. of this rule, engineering assessment may be used to determine process vent stream flow rate, net heating value, and TOC emission rate for the representative operating condition expected to yield the lowest TRE index value.

A. If the TRE value calculated using such engineering assessment and the TRE equation in subparagraph (3)(B)6.A. of this rule is greater than four (4.0), then it is not recommended that the owner or operator perform the measures specified in paragraph (3)(B)5. of this rule,

B. If the TRE value calculated using such engineering assessment and the TRE equation in subparagraph (3)(B)6.A. of this rule is less than or equal to four (4.0), then it is recommended that the owner or operator perform the measurements specified in paragraph (3)(B)5. of this rule.

C. Engineering assessment includes, but is not limited to, the following:

(I) Previous test results proved the test are representative of current operating practices at the process unit;

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

(III) Maximum flow rate specified or implied within a permit limit applicable to the process vent;

(IV) Design analysis based on accepted chemical engineering principles, measurable process parameters, or physical or chemical laws or properties. Examples for analytical methods include, but are not limited to—

(a) Use of material balances based on process stoichiometry to estimate maximum VOC concentration;
(b) Estimation of maximum flow rate based on physical equipment design such as pump or blower capacities;

(c) Estimation of TOC concentrations based on saturation conditions; and

(d) Estimation of maximum expected net heating value based on the stream concentration of each organic compound, or, alternatively, as if all TOC in the stream were the compound with the highest heating value; and

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

2. For the purpose of demonstrating compliance with the control requirements of this rule, the process unit shall be run at representative operating conditions and flow rates during any performance test.

3. The following methods in 40 CFR part 60, Appendix A, as specified in 10 CSR 10-6.030(22) shall be used demonstrate compliance with the emission limit or percent reduction efficiency requirement listed in subparagraph (3)(A)1.A. of this rule:

A. Method 1 or 1A, as appropriate, for selection of the sampling sites. The control device inlet sampling site for determination of vent stream molar composition or TOC (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;

B. Method 2, 2A, 2C, or 2D, as appropriate, for determination of gas stream volumetric flow rate;

C. The emission rate correction factor, integrated sampling, and analysis procedure of Method 3 to determine the oxygen concentration (% O_{2d}) for the purpose of determining compliance with the twenty (20) parts per million by volume limit. The sampling site shall be the same as that of the TOC samples, and samples shall be taken during the same time that the TOC samples are taken. The TOC concentration corrected to three percent (3%) oxygen (C_c) shall be computed using the following equation:

$$C_c = C_{TOC} \times \left(\frac{17.9}{20.9 - \% O_{2d}} \right)$$

where:

C_c = Concentration of TOC (minus methane and ethane) corrected to three percent (3%) O_2, dry basis, parts per million by volume.

C_{TOC} = Concentration of TOC (minus methane and ethane), dry basis, parts per million by volume; and

$\% O_{2d}$ = Concentration of oxygen, dry basis, percent by volume;

D. Method 18 to determine the concentration of TOC (less methane and ethane) at the outlet of the control device when determining compliance with the twenty (20) parts per million by volume limit, or at both the control device inlet and outlet when the reduction efficiency of the control device is to be determined.

(I) The minimum sampling time for each run shall be one (1) hour in which either an integrated sample or four (4) grab samples shall be taken. If grab sampling is used then the samples shall be taken at fifteen (15) minute intervals.

(II) The emission reduction (R) of TOC (less methane and ethane) shall be determined using the following equation:

$$R = \frac{E_i - E_o}{E_i} \times 100$$

where:

R = Emission reduction, percent by weight.

E_i = Mass rate of TOC (minus methane and ethane) entering the control device, kilogram TOC per hour.

E_o = Mass rate of TOC (minus methane and ethane) discharged to the atmosphere, kilogram TOC per hour.

(III) The mass rates of TOC (E_i, E_o) shall be computed using the following equations:

$$E_i = K_2 \left(\sum_{j=1}^{n} C_{ij}M_{ij}\right) Q_i;$$

and

$$E_o = K_2 \left(\sum_{j=1}^{n} C_{oj}M_{oj}\right) Q_o$$

where:

C_{ij}, C_{oj} = Concentration of sample component "j" of the gas stream at the inlet and outlet of the control device, respectively, dry basis, parts per million by volume.

M_{ij}, M_{oj} = Molecular weight of sample component "j" of the gas stream at the inlet and outlet of the control device, respectively, grams per gram-mole.

Q_i, Q_o = Flow rate of gas stream at the inlet and outlet of the control device, respectively, dry standard cubic meters per minute.

K_2 = 2.494×10^{-6} (liters per minute) (gram-mole per standard cubic meter)(kilogram per gram)(minute per hour), where standard temperature for (gram-mole per standard cubic meter) is twenty degrees Celsius (20°C); and

n = Number of components in the sample.

(IV) The TOC concentration (C_{TOC}) is the sum of the individual components and shall be computed for each run using the following equation:

$$C_{TOC} = \sum_{j=1}^{n} C_j$$

where:

C_{TOC} = Concentration of TOC (minus methane and ethane), dry basis, parts per million by volume;

C_j = Concentration of sample component "j", dry basis, parts per million by volume; and

n = Number of components in the sample; and

E. When a boiler or process heater with a design heat input capacity of forty-four (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.

4. When a flare is used to comply with the control requirements of this rule, the flare shall comply with the requirements of 40 CFR part 60.18.

5. The following test methods shall be used to determine compliance with the TRE index value:

A. Method 1 or 1A, as appropriate, for selection of the sampling site.

(I) The sampling site for the vent stream molar composition determination and flow rate prescribed in subparagraph (3)(B)5.B. and subparagraph (3)(B)5.C. of this rule shall be, except for the situations outlined in part (3)(B)5.A.(II) of this rule, after the final recovery device, if a recovery system is present, prior to the inlet of any control device, and prior to any post-reactor or post-distillation unit introduction of halogenated compounds into the process vent stream. No traverse site selection method is needed for vents smaller than ten (10) centimeters in diameter.

(II) If any gas stream other than the reactor or distillation vent stream is normally conducted through the final recovery device —

(a) The sampling site for vent stream flow rate and molar composition shall be prior to the final recovery device and prior to the point at which any nonreactor or nondistillation stream or stream from a nonaffected reactor or distillation unit is introduced. Method 18 shall be used to measure organic compound concentrations at this site;

(b) The efficiency of the final recovery device shall be determined by measuring the organic compound concentrations using Method 18 at the inlet to the final recovery device after the introduction of all vent streams and at the outlet of the final recovery device; and

(c) The efficiency of the final recovery device determined according to subpart (3)(B)5.A.(II)(b) of this rule shall be applied to the organic compound concentrations measured according to subpart (3)(B)5.A.(II)(a) of this rule to determine the concentrations of organic compounds from the final recovery device attributable to the reactor or distillation vent stream. The resulting organic compound concentrations are then used to perform the calculations outlined in subparagraph (3)(B)5.D. of this rule;

B. The molar composition of the vent stream shall be determined as follows:

(I) Method 18 to measure the concentration of organic compounds including those containing halogens; and

(II) ASTM D1946-90(2015)e1, as specified in 10 CSR 10-6.040(16), to measure the concentration of carbon monoxide and hydrogen;

C. The volumetric flow rate shall be determined using Method 2, 2A, 2C, or 2D, as appropriate;

D. The emission rate of TOC (minus methane and ethane), (E_{TOC}), in the vent stream shall be calculated using the following equation:

$$E_{TOC} = K_2 \sum_{j=1}^{n} C_j M_j Q_s$$

where:

E_{TOC} = Emission rate of TOC (minus methane and ethane) in the sample, kilograms per hour.

K_2 = Constant, 2.494×10^{-6} (liters per parts per million)(gram-moles per standard cubic meter)(kilogram per gram)(minute per hour), where standard temperature for (gram-mole per standard cubic meter)(g-mole/scm) is twenty degrees Celsius (20°C).

C_j = Concentration of compound "j", on a dry basis, in parts per million as measured by Method 18, as indicated in subparagraph (3)(B)3.C. of this rule;

M_j = Molecular weight of sample "j", grams per gram-mole;

Q_s = Vent stream flow rate (standard cubic meters per minute) at a temperature of twenty degrees Celsius (20°C); and

n = Number of components in the sample;

E. The total process vent stream concentration (by volume) of compounds containing halogens (parts per million by volume, by compound) shall be summed from the individual concentrations of compounds containing halogens which were measured by Method 18; and

F. The net heating value of the vent stream shall be calculated using the equation:

$$H_T = K_1 \sum_{j=1}^{n} C_j H_j \ (1 - B_{ws})$$

where:

H_T = Net heating value of the sample (megajoule per standard cubic meter), where the net enthalpy per mole of vent stream is based on combustion at twenty five degrees Celsius (25°C) and seven hundred sixty (760) millimeters of mercury, but the standard temperature for determining the volume corresponding to one mole is twenty degrees Celsius (20°C), as in the definition of Q_s (vent stream flow rate);

K_1 = Constant, 1.740×10^{-7} (parts per million)$^{-1}$ (gram-mole per standard cubic meter), (megajoule per kilocalorie), where standard temperature for (gram-mole per standard cubic meter) is twenty degrees Celsius (20°C);

B_{ws} = Water vapor content of the vent stream, proportion by volume: except that if the vent stream passes through a final stream jet and is not condensed, it shall be assumed that $B_{ws} = 0.023$ in order to correct to 2.3 percent moisture;

C_j = Concentration on a dry basis of compound "j" in parts per million, as measured for all organic compounds by Method 18 and measured for hydrogen and carbon monoxide by the American Society for Testing and Materials D1946-90(2015)e1, as specified in 10 CSR 10-6.040(16);

H_j = Net heat of combustion of compound "j", kilocalorie per gram-mole, based on combustion at twenty five degrees Celsius (25°C) and seven hundred sixty (760) millimeters of mercury. The heat of combustion of vent stream components shall be determined using ASTM D4809-13, as specified in 10 CSR 10-6.040(25), if published values are not available or cannot be calculated; and

n = Number of components in the sample.

6. The Total Resource Effectiveness (TRE) index.

A. The TRE index value of the vent shall be calculated using the following equation:

$$TRE = \frac{1}{E_{TOC}} [a + b\,(Q_s) + c\,(H_t) + d(E_{TOC})]$$

where:

TRE = TRE index value;

E_{TOC} = Hourly emission rate of TOC (minus methane and ethane), (kilograms per hour) as calculated in subparagraph (3)(B)5.D. of this rule;

Q_s = Vent stream flow rate standard cubic meters per minute at a standard temperature of twenty degrees Celsius (20°C);

H_T = Vent stream net heating value (megajoules per standard cubic meter), as calculated in subparagraph (3)(B)5.F. of this rule; and

a,b,c,d = Coefficients presented in Table 1.

Table 1. Coefficients For Total Resource effectiveness For Nonhalogenated And Halogenated Vent Streams

		Value of Coefficients			
Type of stream	Control device basis	a	b	c	d
Nonhalogenated	Flare	2.129	0.183	-0.005	0.359
	Thermal incinerator 0 Percent heat recovery	3.075	0.021	-0.037	0.018
	Thermal incinerator 70 Percent heat recovery	3.803	0.032	-0.042	0.007
Halogendated	Thermal incinerator and scrubber	5.470	0.181	-0.040	0.004

B. The owner or operator of a vent stream shall use the applicable coefficients in Table 1 to calculate the TRE index value based on a flare, a thermal incinerator with zero percent (0%) heat recovery, and a thermal incinerator with seventy percent (70%) heat recovery, and select the lowest TRE index value.

C. The owner or operator of a unit with a halogenated vent stream, determined as any stream with a total concentration of halogen atoms contained in organic compounds of two hundred (200) parts per million by volume or greater, shall use the applicable coefficients in Table 1 to calculate the total resource effectiveness index value based on a thermal incinerator and scrubber.

7. Each owner or operator of an affected facility seeking to comply with paragraph (3)(A)2. of this rule shall recalculate the flow rate and TOC concentration for that affected facility whenever process changes are made. Examples of process changes include changes in production capacity, feedstock type, or catalyst type, or whenever there is replacement, removal, or addition of recovery equipment. The flow rate and VOC concentration shall be recalculated based on test data, or on best engineering estimates of the effects of the change to the recovery system.

8. Where the recalculated values yield a TRE index $\leq$ 1.0, the owner or operator shall notify the state Air Pollution Control Program within one (1) week of the recalculation and conduct a performance test according to the methods and procedures required by subsection (3)(B) of this rule.

9. For the purpose of demonstrating that a process vent stream has a VOC concentration below five hundred (500) parts per million by volume, the following procedures shall be followed:

A. The sampling site shall be selected as specified in subparagraph (3)(B)3.A. of this rule;

B. Method 18 or Method 25A of 40 CFR part 60, Appendix A, as specified in 10 CSR 10-6.030(22), shall be used to measure concentration; alternatively, any other method or data that has been validated according to the protocol in Method 301 of 40 CFR part 63, Appendix A may be used;

(I) Where Method 18 is used, the following procedures shall be used to calculate parts per million by volume concentration:

(a) The minimum sampling time for each run shall be one (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 approximately equal intervals in time, such as fifteen (15) minute intervals during the run; and

(b) The concentration of TOC (minus methane and ethane) shall be calculated using Method 18 according to subparagraph (3)(B)3.D. of this rule.

(II) Where Method 25A is used, the following procedures shall be used to calculate parts per million by volume TOC concentration:

(a) Method 25A shall be used only if a single VOC is greater than fifty (50) percent of total VOC, by volume, in the process vent stream.

(b) The process vent stream composition may be determined by either process knowledge, test data collected using an appropriate EPA method or a method of data collection validated according to the protocol in Method 301 of 40 CFR part 63, Appendix A. Examples of information that could constitute process knowledge include calculations based on material balances, process stoichiometry, or previous test results provided the results are still relevant to the current process vent stream conditions;

(c) The VOC used as the calibration gas for Method 25A shall be the single VOC present at greater than fifty percent (50%) of the total VOC by volume;

(d) The span value for Method 25A shall be fifty (50) parts per million by volume;

(e) Use of Method 25A is acceptable if the response from the high-level calibration gas is at least twenty (20) times the standard deviation of the response from the zero calibration gas when the instrument is zeroed on the most sensitive scale; and

(f) The concentration of TOC shall be corrected to three percent (3%) oxygen using the procedures and equation in subparagraph (3)(B)3.C. of this rule; and

C. The owner or operator shall demonstrate that the concentration of TOC including methane and ethane measured by Method 25A is below two hundred fifty (250) parts per million by volume with VOC concentration below five hundred (500) parts per million by volume to qualify for the low concentration exclusion.

(C) Monitoring Requirements.

1. The owner or operator of an affected facility that uses an incinerator to seek to comply with the TOC emission limit specified under subparagraph (3)(A)1.A. of this rule shall install, calibrate, maintain, and operate according to manufacturer's specifications: a temperature monitoring device equipped with a continuous recorder and having a minimum accuracy of plus or minus one percent (± 1 %) of the temperature being measured expressed in degrees Celsius or plus or minus (±) 0.5°C, whichever is more accurate.

A. Where an incinerator other than a catalytic incinerator is used, a temperature monitoring device shall be installed in the firebox.

B. Where a catalytic incinerator is used, temperature monitoring devices shall be installed in the gas stream immediately before and after the catalyst bed.

2. The owner or operator of an affected facility that uses a flare to seek to comply with subparagraph (3)(A)1.B. of this rule shall install, calibrate, maintain, and operate according to manufacturer's specifications, a heat-sensing device, such as a ultraviolet beam sensor or thermocouple, at the pilot light to indicate continuous presence of a flame.

3. The owner or operator of an affected facility that uses a boiler or process heater with a design heat input capacity less than forty-four (44) megawatts to seek to comply with subparagraph (3)(A)1.A. of this rule shall install, calibrate, maintain, and operate according to the manufacturer's specifications, a temperature monitoring device in the firebox. The monitoring device should be equipped with a continuous recorder and have a minimum accuracy of plus or minus one percent (± 1 %) of the temperature being measured expressed in degrees Celsius or plus or minus (±) 0.5°C, whichever is more accurate. Any boiler or process heater in which all vent streams are introduced with primary fuel is exempt from this requirement.

4. The owner or operator of an affected facility that seeks to demonstrate compliance with the total resource effectiveness index limit specified under paragraph (3)(A)2. of this rule shall install, calibrate, maintain, and operate according to manufacturer's specifications the following equipment:

A. Where an absorber is the final recovery device in the recovery system —

(I) A scrubbing liquid temperature monitor equipped with a continuous recorder; and

(II) Specific gravity monitor equipped with a continuous recorders;

B. Where a condenser is the final recovery device in the recovery system, a condenser exit (product side) temperature monitoring device equipped with a continuous recorder and having a minimum accuracy of plus or minus one percent (± 1 %) of the temperature being monitored expressed in degrees Celsius or plus or minus (±) 0.5°C, whichever is more accurate;

C. Where a carbon adsorber is the final recovery device unit in the recovery system, in integrating regeneration stream flow monitoring device having a minimum accuracy of ± 10 percent, capable of recording the total regeneration stream mass flow for each regeneration cycle; and a carbon bed temperature monitoring device having a minimum accuracy of ± 1 percent of the temperature being monitored expressed in degrees Celsius or ± 0.5°C, whichever is more accurate, and capable of recording the carbon bed temperature after each regeneration and within fifteen (15) minutes of completing any cooling cycle; or

D. Where an absorber scrubs halogenated streams after an incinerator, boiler, or process heater, the following monitoring equipment is required for the scrubber —

(I) A pH monitoring device equipped with a continuous recorder; and

(II) Flow meters equipped with a continuous recorders to be located at the scrubber influent for liquid flow and the scrubber inlet for gas stream flow.

5. The owner or operator of a process vent using a vent system that contains bypass lines that could divert a vent stream away from the combustion device used shall either —

A. Install, calibrate, maintain, and operate a flow indicator that provides a record of vent stream flow at least once every fifteen (15) minutes. The flow indicator shall be installed at the entrance to any bypass line that could divert the vent stream away from the combustion device to the atmosphere; or

B. Secure the bypass line valve in the closed position with a car-seal or a lock-and-key type configuration. A visual inspection of the seal or closure mechanism shall be performed at least once every month to ensure that the valve is maintained in the closed position and the vent stream is not diverted through the bypass line.

(4) Reporting and Record Keeping.

(A) Each reactor process or distillation operation subject to this rule shall keep records of the following parameters measured during a performance test or TRE determination required under subsection (3)(B) of this rule and required to be monitored under subsection (3)(C) of this rule.

1. Where an owner or operator subject to the provisions of this rule seeks to demonstrate compliance with subparagraph (3)(A)1.A. of this rule through the use of either a thermal or catalytic incinerator —

A. The average firebox temperature of the incinerator (or the average temperature upstream and downstream of the catalyst bed for a catalytic incinerator), measured at least every fifteen (15) minutes and averaged over the same time period of the performance testing; and

B. The percent reduction of TOC determined as specified in paragraph (3)(B)3. of this rule achieved by the incinerator, or the concentration of TOC (parts per million by volume, by compound) determined as specified in paragraph (3)(B)3. of this rule at the outlet of the control device on a dry basis corrected to three percent (3%) oxygen.

2. Where an owner or operator subject to the provisions of this rule seeks to demonstrate compliance with subparagraph (3)(A)1.A. of this rule through the use of a boiler or process heater and the boiler or process heater is not exempt from these requirements due to all vent streams being introduced with primary fuel—

A. A description of the location at which the vent stream is introduced into the boiler or process heater; and

B. The average combustion temperature of the boiler or process heater with a design heat input capacity of less than forty-four (44) megawatts measured at least every fifteen (15) minutes and averaged over the same time period of the performance test.

3. Where an owner or operator subject to the provisions of this rule seeks to demonstrate compliance with subparagraph (3)(A)1.B. of this rule through the use of a smokeless flare; flare design (i.e., steam-assisted, air-assisted, or nonassisted), all visible emission readings, heat content determinations, flow rate measurements, and exit velocity determinations made during the performance test, continuous records of the flare pilot flame monitoring, and records of all periods of operations during which the pilot flame is absent.

4. Where an owner or operator subject to the provisions of this rule seeks to demonstrate compliance with paragraph (3)(A)2. of this rule —

A. All measurements and calculations performed to determine the flow rate, and volatile organic compound concentration, heating value, and TRE index value of the vent stream; and

B. Records shall be kept of the following final recovery device parameters:

(I) Where an absorber is the final recovery device in the recovery system, the exit specific gravity (or alternative parameter which is a measure of the degree of absorbing liquid saturation, if approved, by the permitting authority), and average exit temperature of the absorbing liquid measured at least fifteen (15) minutes and averaged over the same time period of the performance testing (both measured while the vent stream is normally routed and constituted);

(II) Where a condenser is the final recovery device in the recovery system, the average exit (product side) temperature measured at least every fifteen (15) minutes and averaged over the same time period of the performance testing while the vent stream is routed and constituted normally; or

(III) Where a carbon adsorber is the final recovery device in the recovery system, the total stream mass or volumetric flow measured at least every fifteen (15) minutes and averaged over the same time period of the performance test (full carbon bed cycle), temperature of the carbon bed after regeneration (and within fifteen (15) minutes of completion of any cooling cycle(s)), and duration of the carbon bed steaming cycle (all measured while the vent stream is routed and constituted normally).

5. As an alternative to subparagraphs (4)(A)4.A. or (4)(A)4.B. of this rule, the concentration level or reading indicated by the organics monitoring device at the outlet of the absorber, condenser, or carbon adsorber, measured at least every fifteen (15) minutes and averaged over the same time period as the performance testing while the vent stream is normally routed and constituted.

(B) Each reactor process or distillation operation seeking to comply with paragraph (3)(A)2. of this rule shall also keep records of the following information:

1. Any changes in production capacity, feedstock type, or catalyst type, or of any replacement, removal, and addition of recovery equipment or reactors and distillation units; and

2. Any recalculation of the flow rate, TOC concentration, or TRE value performed according to paragraph (3)(B)7. of this rule.

(C) Each reactor process or distillation operation seeking to comply with the flow rate or concentration exemption level in paragraph (1)(B)4. of this rule shall keep records to indicate that the stream flow rate is less than 0.0085 standard cubic meters per minute or the concentration is less than five hundred (500) parts per million by volume.

(D) Each reactor process or distillation operation seeking to comply with the production capacity exemption level of one (1) gigagrams per year shall keep records of the design production capacity and changes in equipment or process operation that may affect design production capacity to the affected process unity.

(E) All records must be kept on site for a period of five (5) years and made available to the department upon request.

(5) Test Methods. See section (3) of this rule for applicable test methods.

EPA Rulemakings

CFR: 40 CFR 52.1320(c)
FRM: 87 FR 32088 (5/27/22)
PRM: 87 FR 17058 (3/25/22)
State Submission: 2/11/20
State Final: 10 CSR 10-5 (12/31/19) effective date 1/30/20
APDB File: MO-431
Description: These revisions amend the rule applicability section for sources subject to this rule, remove unnecessary words, update incorporations by reference, amend definitions specific to this rule, update test and reference methods, and make other minor edits.

CFR: 40 C.F.R. 52.1320(c)
FRM: 65 CFR 31489 (5/18/00)
PRM: 65 CFR 8094 (2/17/00)
State Submission: 10/10/99
State Final: 10 C.S.R. 10-5 (2/29/00)
APDB File: MO-130
Description: This rule establishes emission standards for the synthetic organic chemical manufacturing industry in the St. Louis nonattainment area.

Difference Between the State and EPA-Approved Regulation

None.