10 CSR 10-5.455 Control of Emission from Solvent Cleanup Operations

(1) Applicability.

(A) This rule shall apply throughout St. Louis City and the Counties of Jefferson, St. Charles, Franklin, and St. Louis.

(B) This rule shall apply to any person who performs or allows the performance of any cleaning operation involving the use of organic solvents or solvent solutions. Except as provided in subsections (1)(C) through (1)(G) of this rule, the provisions of this rule shall apply to any stationary source that emits at least three (3) tons per twelve (12)-month rolling period or more of volatile organic compounds (VOCs) from cleaning operations at the source, in the absence of air pollution control equipment, and stores and/or disposes of these solvent materials.

(C) The following solvent cleaning operations are not subject to the provisions of this rule:

1. Cold cleaner;

2. Open top vapor degreaser;

3. Conveyorized cold cleaner;

4. Conveyorized vapor degreaser;

5. Stripping of cured coatings, cured ink, or cured adhesives;

6. Cleaning operation in printing prepress or graphic arts pre-press area, including the cleaning of film processors, color scanners, plate processors, film cleaning, and plate cleaning;

7. Nonmanufacturing area cleaning. Nonmanufacturing areas include cafeterias, laboratories, pilot facilities, restrooms, janitorial cleaning, including graffiti removal, and office buildings; and

8. Cleaning operations for emission units within the following source categories listed for regulation under section 183(e) of the Clean Air Act:

A. Aerospace coatings;

B. Auto and light duty truck assembly coatings;

C. Fiberglass boat manufacturing materials;

D. Flat wood paneling coatings;

E. Flexible packaging printing materials;

F. Large appliance coatings;

G. Letterpress printing materials;

H. Lithographic printing materials;

I. Metal furniture coatings;

J. Miscellaneous industrial adhesives;

K. Miscellaneous metals parts coatings;

L. Paper, film, and foil coatings;

M. Plastic parts coatings;

N. Shipbuilding and repair coatings; and

O. Wood furniture coatings.

(D) The following solvent cleaning operations are exempt from the VOC-content limitations specified in subsection (3)(A) of this rule:

1. Cleaning of solar cells, laser hardware, scientific instruments, and high-precision optics;

2. Cleaning conducted as part of the following: performance laboratory tests on coatings, adhesives, or inks; research and development programs; and laboratory tests in quality assurance laboratories;

3. Cleaning of paper-based gaskets and clutch assemblies where rubber is bonded to metal by means of an adhesive;

4. Cleaning of cotton swabs to remove cottonseed oil before cleaning of high-precision optics;

5. Cleaning at medical device and pharmaceutical facilities using up to one and one half (1.5) gallons per day of solvents;

6. Cleaning of adhesive application equipment used for thin metal laminating;

7. Cleaning of electronic or electrical cables;

8. Touch-up cleaning performed on printed circuit boards where surface mounted devices have already been attached;

9. Cleaning of coating and adhesive application processes utilized to manufacture transdermal drug delivery product using less than three (3) gallons per day of ethyl acetate;

10. Cleaning of application equipment used to apply coating on satellites and radiation effect coatings;

11. Cleaning of application equipment used to apply solvent-borne fluoropolymer coatings;

12. Cleaning of ultraviolet or electron beam adhesive application;

13. Cleaning of sterilization indicating ink application equipment if the facility uses less than one and one-half (1.5) gallons per day of solvents for such cleaning;

14. Cleaning of metering rollers, dampening rollers, and printing plates;

15. Cleaning of numismatic dies; and

16. Cleaning of operations associated with digital printing.

(E) Cleaning with aerosol products shall be exempt from the requirements of subsection (3)(A) of this rule if the facility uses one and one-quarter (1.25) gallons (one hundred sixty (160) fluid ounces) or less of the aerosol products per day.

(F) Cleaning operations at a manufacturer of coatings, inks, or resins are exempt from subsections (3)(A) and (3)(B) of this rule.

(G) Subsection (3)(E) applies to manufacturers of coatings, inks, and resins only.

(H) Once a source has exceeded the applicability level of this rule, it shall remain subject to this rule even if its actual emissions drop below the applicability level of this rule until it can demonstrate, to the satisfaction of the director, that the total actual VOC emissions from solvent cleaning operations, before consideration of controls, is less than three (3) tons per twelve (12)-month rolling period for sixty (60) consecutive months.

(2) Definitions. Definitions of certain terms specified in this rule may be found in 10 CSR 10-6.020.

(3) General Provisions.

(A) VOC-Content Limitations. No owner or operator of a source subject to this rule shall perform any cleaning operation subject to this rule unless the owner or operator meets the requirements in paragraph (3)(A)1., (3)(A)2., or (3)(A)3. of this rule—

1. The VOC content of the as-used cleaning solutions (minus water and exempt compounds) shall not exceed the following emissions limitations:

A. Product cleaning during manufacturing process or surface preparation for coating, adhesive, or ink application.

Solvent Cleaning Operation	**VOC Emission Limit**	
	Kilograms per liter	**Pounds per gallon**
Electrical apparatus components and electronic components	0.10	0.83
Medical devices and pharmaceuticals	0.80	6.70

B. Repair and maintenance cleaning

Solvent Cleaning Operation	**VOC Emission Limit**	
	Kilograms per liter	**Pounds per gallon**
Electrical apparatus components and electronic components	0.10	0.83
Medical devices and pharmaceuticals: tools, equipment, and machinery	0.80	6.70
Medical devices and pharmaceuticals: general work surfaces	0.60	5.00

C. Cleaning of ink application equipment.

Solvent Cleaning Operation	**VOC Emission Limit**	
	Kilograms per liter	**Pounds per gallon**
Rotogravure printing that does not print flexible packaging	0.10	0.83
Screen printing	0.50	4.20
Ultraviolet ink and electro beam ink application equipment, except screen printing	0.65	5.40
Flexographic printing that does not print flexible packaging	0.10	0.83

D. All other solvent cleaning operations

Solvent Cleaning Operation	VOC Emission Limit	
	Kilograms per liter	Pounds per gallon
All other solvent cleaning operations not subject to specific limitations in paragraphs (3)(A)1., (3)(A)2., or (3)(A)3. of this rule	0.05	0.42

2. The composite vapor pressure of each as-used cleaning solution used does not exceed eight millimeters of mercury (8.0 mmHg) measured at twenty degrees Celcius (20 °C) (sixty-eight degrees Fahrenheit (68 °F)); or

3. An oxidizer or carbon adsorber is installed and operated that reduces VOC emissions from the subject cleaning operation by at least eighty-five percent (85%) overall. The owner or operator may use an emission control system other than an afterburner or carbon adsorber if such device reduces VOC emission from the subject cleaning operation by at least eighty-five percent (85%) by mass, the owner or operator submits a plan to the director detailing appropriate monitoring devices, test methods, record-keeping requirements, and operation parameters for such a control device, and such a plan is approved by the director and the U.S. Environmental Protection Agency (EPA) within federally-enforceable permit conditions.

(B) Cleaning Devices and Methods. The owner or operator of a facility that is subject to this rule shall employ one (1) or more of the following cleaning devices and methods:

1. Wipe cleaning;

2. Closed containers or hand-held spray bottles from which solvents are applied;

3. Cleaning equipment which has a solvent container that can be, and is, closed during cleaning operations, except when depositing and removing objects to be cleaned, and is closed during non-operation with the exception of maintenance and repair to the cleaning equipment itself; and

4. Remote reservoir cleaner, if the operator of the cleaner complies with all of the following:

A. Prevents solvent vapors from escaping from the solvent container by using such devices as a cover or a valve when the remote reservoir is not being used, cleaned, or repaired;

B. Directs solvent flow in a manner that will prevent liquid solvent from splashing outside of the remote reservoir cleaner;

C. Does not clean porous or absorbent materials, such as cloth, leather, wood, or rope;

D. Uses only solvent containers free of all liquid leaks. Auxiliary equipment, such as pumps, pipelines, or flanges, shall not have any liquid leaks, visible tears, or cracks. Any liquid leak, visible tear, or crack detected shall be repaired within one (1) calendar day, or the leaking section of the remote reservoir cold cleaner shall be drained of all solvent and shut down until it is repaired or replaced;

E. Non-atomized solvent flow method where the cleaning solvent is collected in a container or a collection system which is closed except for solvent collection openings and, if necessary, openings to avoid excessive pressure build-up inside the container; and

F. Solvent flushing method where the cleaning solvent is discharged into a container which is closed except for solvent collection openings, and, if necessary, other openings to avoid excessive pressure build-up inside the container. The discharged solvent from the equipment must be collected into containers without atomizing into the open air. The solvent may be flushed through the system by air or hydraulic pressure or by pumping.

(C) Operating Requirements. The owner or operator of a source subject to the requirements of this section shall comply with the following for each subject cleaning operation:

1. Cover all open containers and properly cover and store applicators used to apply cleaning solvents;

2. Dispose of all used cleaning solutions, cleaning towels, and applicators used to apply cleaning solvents in closed containers that are nonleaking and nonabsorbent;

3. Minimize air circulation around the cleaning operation; and

4. Utilize equipment practices that minimize emissions.

(D) Control Device Inspection. For catalytic oxidizers, the catalyst bed material shall be inspected annually for general catalyst condition and any signs of potential catalyst depletion. The owner or operator shall also collect a representative sample of the catalyst from the oxidizer, per manufacturer's recommendations, and have it tested to evaluate the catalyst's capability to continue to function at or above the required control efficiency. An evaluation of the catalyst bed material shall be conducted whenever the results of the inspection indicate signs of potential catalyst depletion or poor catalyst condition based on manufacturer's recommendations but not less than once per year.

(E) Requirements for coatings, inks, and resin manufacturers. Coating, ink, and resin manufacturers must comply with the following requirements:

1. Clean portable or stationary mixing vats, high dispersion mills, grinding mills, tote tanks, and roller mills by one (1) or more of the following methods:

A. Use a solvent or solvent solution that either contains less than 1.67 pounds per gallon (0.20 kilograms per liter) of VOC or has a composite vapor pressure no more than eight millimeters of mercury (8.0 mmHg) at twenty degrees Celsius (20 °C);

B. Collect and vent the emissions from equipment cleaning to a VOC emission control system that has an overall capture and control efficiency of at least eighty percent (80%) by weight for the VOC emissions. Where such reduction is achieved by incineration, at least ninety percent (90%) of the organic carbon shall be oxidized to carbon dioxide; or

C. Use organic solvents other than those allowed in subparagraph (3)(E)1.A. of this rule provided no more than sixty (60) gallons (two hundred twenty-eight (228) liters) of fresh solvent shall be used per month. Organic solvent that is reused or recycled (either onsite or offsite), for further use in equipment cleaning or the manufacture of coating, is not included in this limit;

2. Work practices while cleaning shall include:

A. Equipment being cleaned must be maintained leak free;

B. VOC-containing cleaning materials must be drained from the cleaned equipment upon completion of cleaning;

C. VOC-containing cleaning materials, including waste solvents, shall not be stored or disposed of in such a manner that will cause or allow evaporation into the atmosphere; and

D. Store all VOC-containing materials in closed containers; and

3. When using solvent for wipe cleaning, the owner or operator of a facility shall:

A. Not use open containers for the storage or disposal of cloth or paper impregnated with organic compounds that is used for cleanup or coating, ink, or resin removal; and

B. Not store spent or fresh organic compounds to be used for cleanup or coating, ink, or resin removal in open containers.

(4) Reporting and Record Keeping. All owners and operators subject to this rule shall maintain records as required by this section sufficient to determine continuous compliance with this rule. These records shall be kept for at least five (5) years to be automatically extended if enforcement action is pending. These records shall be made available immediately upon request for review by the Department of Natural Resources' personnel and other air pollution control agencies upon presentation of proper credentials.

(A) The owner or operator of a facility that includes an industrial solvent cleaning operation shall keep records detailing specific VOC uses as necessary for the director to determine monthly compliance. All facility records must include the following:

1. A list of all solvents currently used and/or stored at the site. The list shall include the following information:

A. Cleaning solvent type by name/code/manufacturer;

B. The actual VOC content of the cleaning solvents, based upon EPA Method 24, of each cleaning material, in pounds per gallon of material, as applied or the VOC composite partial vapor pressures of the solvents or solvent solutions used in the industrial cleaning operations. This calculation need only be performed once for each batch of cleaning solution used; and

C. The actual mixing ratio for the cleaning solvent as applied; and

2. Records of usage including the following information:

A. Monthly records of total applied volume in gallons for each cleaning solvent used;

B. Monthly records of solvent cleaning activity associated with each solvent used;

C. Monthly records of total volume of aerosol products in ounces used; and

D. The total monthly VOC emissions (summation of gallons × VOC content (in pounds per gallon)).

(B) If a facility includes automatic equipment, records shall also include, as applicable, the following:

1. For a source with automatic equipment that prepares each batch of cleaning solution(s) on site, records for each batch shall include:

A. The name and identification of each cleaning solution;

B. The VOC content of each cleaning solvent in the cleaning solution;

C. Each change to the setting of the automatic equipment, with date, time, description of changes in the cleaning solution constituents (e.g., cleaning solvents), and description of changes to the proportion of cleaning solvent and water (or other non-VOC);

D. The proportion of each cleaning solvent and water (or other non-VOC) used to prepare the as-used cleaning solution;

E. The VOC content of the as-used cleaning solution, with the supporting calculations; and

F. A calibration log for the automatic equipment, detailing periodic checks;

2. For a source with automatic equipment that does not prepare cleaning solution(s) on site, records for each batch of cleaning solution shall include:

A. The name and identification of each cleaning solution;

B. Date, time of preparation, and each subsequent modification of the batch;

C. The VOC content of each cleaning solvent in the cleaning solution;

D. The total amount of each cleaning solvent and water (or other non-VOC) used to prepare the as-used cleaning solution; and

E. The VOC content of the as-used cleaning solution, with supporting calculations; and

3. For cleaning solutions that are not prepared at the site, but are used as-purchased, the manufacturer’s specifications for VOC content may be used if such manufacturer’s specifications are based on the results of tests of the VOC content in accordance with EPA Method 24.

(C) Any owner or operator using an emission control device pursuant to this rule shall maintain records, on a daily basis, of key system operating parameters for emission control equipment, including, but not limited to:

1. Identification of the type of emissions control system used;

2. Hours of operation;

3. Routine and non-routine maintenance, including dates and duration of any outages;

4. Records of test reports conducted;

5. If an owner or operator of a solvent cleaning operation employs a thermal oxidizer or catalytic oxidizer to achieve and maintain maintain compliance, the owner or operator shall comply with the following requirements:

A. Continuous temperature monitoring and continuous temperature recording equipment shall be installed and operated to accurately measure the operating temperature(s) for the control device; and

B. The following information shall be collected and recorded each day of operation of the solvent cleaning operation and the control device, and the information shall be maintained at the facility for a period of five (5) years:

(I) A log or record of the operating time for the control device, monitoring equipment, and the associated solvent cleaning operation;

(II) For thermal oxidizers, all three (3)-hour periods of operation during which the average combustion temperature was more than fifty degrees Fahrenheit (50 °F) below the average combustion temperature during the most recent emission test that demonstrated that the solvent cleaning operation was in compliance; and

(III) For catalytic oxidizers, all three (3)-hour periods of operation during which the average temperature of the dryer exhaust gases immediately before the catalyst bed was more than fifty degrees Fahrenheit (50 °F) below the average temperature of the dryer exhaust gases during the most recent emission test that demonstrated that the solvent cleaning operation was in compliance, and all three (3)-hour periods during which the average temperature difference across the catalyst bed was less than eighty percent (80%) of the average temperature difference during the most recent emission test that demonstrated that the solvent cleaning operation was in compliance; and

6. If an owner or operator of a solvent cleaning operation employs a carbon adsorption system to achieve and maintain compliance, the owner or operator shall comply with the following requirements:

A. Monitoring and recording equipment that records all of the following shall be installed and operated for the carbon adsorption system:

(I) A continuous emission monitoring and recording system that is capable of accurately measuring and recording the concentration of organic compounds in the exhaust gases from the carbon adsorption system;

(II) Monitoring and recording equipment that are capable of accurately measuring and recording the total mass steam flow rate for each regeneration cycle of each carbon bed; and

(III) Monitoring and recording equipment that are capable of accurately measuring and recording the temperature of each carbon bed after regeneration (and after completion of any cooling cycle(s)); and

B. The following information shall be collected and recorded each day of operation of the solvent cleaning operation and the carbon adsorption system:

(I) A log or record of the operating time for the carbon adsorption system, monitoring equipment, and the associated solvent cleaning operation;

(II) For a carbon adsorption system that employs a continuous emission monitoring and recording system to measure and record the concentration of organic compounds in the exhaust gases, all three (3)- hour periods of operation during which the average concentration level or reading in the exhaust gases is more than twenty percent (20%) greater than the exhaust gas organic compound concentration level or reading measured by the most recent performance test that demonstrated that the solvent cleaning operation was in compliance;

(III) For a carbon adsorption system that employs monitoring and recording equipment to measure and record the total mass steam flow rate for each regeneration cycle of each carbon bed, all carbon bed regeneration cycles during which the total mass steam flow rate was more than ten percent (10%) below the total mass steam flow rate during the most recent performance test that demonstrated that the solvent cleaning operation was in compliance; and

(IV) For a carbon adsorption system that employs monitoring and recording equipment to measure and record the temperature of each carbon bed after regeneration (and after completion of any cooling cycle(s)) was more than ten percent (10%) greater than the carbon bed temperature during the most recent performance test that demonstrated that the solvent cleaning operation was in compliance.

(5) Test Methods. Certain test methods mentioned in this rule may be found in 10 CSR 10-6.030. Other EPA test methods specific to this rule may be found in 40 CFR 60, Appendix A.

(A) Control Efficiency Testing. To demonstrate compliance with the emission limits of subsection (3)(C) of this rule, an initial emission test shall be performed after any required control equipment is installed. The emission limits shall not have been met until compliance has been verified through this testing. Testing shall also be required after significant modifications to any control equipment required by this rule. Significant modifications include any repairs or changes that might substantially alter or affect the overall control efficiency. This subsection outlines the methods to be used for any such testing.

1. The emission unit shall be run at typical operating conditions and flow rates compatible with scheduled production during any emission testing.

2. EPA Method 1 or 1A, as appropriate, shall be used to select the sampling sites.

3. EPA Method 2, 2A, 2C, or 2D, as appropriate, shall be used to determine the velocity and volumetric flow rate of the exhaust stream.

4. EPA Method 3 or 3A, as appropriate, shall be used to determine the concentration of oxygen (O2) and carbon dioxide (CO2).

5. EPA Method 4 shall be used to determine moisture content.

6. EPA Method 18, 25, or 25A shall be used to determine the VOC concentration of the exhaust stream entering and exiting the control device, unless the alternate limit in paragraph (3)(C)2. of this rule is being used for compliance, in which case only the VOC concentration of the exit exhaust shall be determined. In cases where the anticipated outlet VOC concentration of the control device is less than fifty parts per million by volume (50 ppmv) as carbon, EPA Method 25A shall be used.

7. If EPA Method 25A is used—

A. The outlet readings from a thermal or catalytic oxidizer may be corrected by using EPA Method 18 or 25 to determine non-VOC components (methane and ethane) and subtracting these from the Method 25A result; and

B. The director may require a retest by EPA Method 18 or 25 if the average corrected outlet reading is greater than fifty (50) ppmv VOC as carbon.

8. A compliance test shall consist of up to three (3) separate runs, each lasting a minimum of sixty (60) minutes unless the director determines that the circumstances dictate shorter sampling times.

9. EPA Method 25 specifies a minimum probe temperature of two hundred sixty-five degrees Fahrenheit (265 °F). To prevent condensation, the probe should be heated to at least the gas stream temperature, typically close to three hundred fifty degrees Fahrenheit (350 °F).

10. EPA Method 25A specifies a minimum temperature of two hundred twenty degrees Fahrenheit (220 °F) for the sampling components leading to the analyzer. To prevent condensation when testing heatset printing presses, the sampling components and flame ionization detector lock should be heated to at least the gas stream temperature, typically close to three hundred fifty degrees Fahrenheit (350 °F).

11. The oxidizer operating temperature or the temperature of the gas upstream of the catalyst bed may be used as the operating parameter for determining continuous compliance with the emission standard of subsection (3)(C) of this rule. This temperature shall be computed as the time-weighted average of the temperature values recorded during the test. The owner or operator must maintain the oxidizer at a three (3)-hour average temperature no less than fifty degrees Fahrenheit (50 °F) below the average temperature observed during the most recent stack test to demonstrate continuous compliance.

12. Use of an adaptation to any of the methods specified in this subsection may be approved by the director on a case-by-case basis. The owner or operator shall submit sufficient documentation for the director to find that the methods specified in this subsection will yield inaccurate results and that the proposed adaptation is appropriate.

13. To determine capture efficiency, use the procedure in 10 CSR 10-6.030(20).

(B) VOC Content Testing for Cleaning Solutions. The VOC content or VOC composite partial vapor pressure of cleaning solutions shall be determined by one (1) of the following:

1. Analysis by EPA Method 24 for VOC content or by an appropriate method for VOC composite partial vapor pressure of a sample of the cleaning solution. The analysis may be performed by the supplier of those materials;

2. Calculation for VOC content that combines EPA Method 24 analytical data for the concentrated materials used to prepare the cleaning solution and the proportions in which they are mixed to make the cleaning solution as applied. Owners or operators may use formulation information provided with the concentrated materials used to prepare the cleaning solution, such as the container label, the product data sheet, or the Material Safety Data Sheet (MSDS) to document the VOC content of the concentrated material; or

3. If cleaning is not diluted prior to use, MSDS or manufacturer’s formulation data sheet may be used.

EPA Rulemakings

CFR: 40 C.F.R. 52.1320(c)
FRM: 79 FR 580 (1/6/14) effective 2/5/14
PRM: 78 FR 45112 (7/26/13)
State Submission: 5/4/2012
State Final: RSMo Supp. 2010 10 C.S.R. 10-5 (7/31/11) effective 8/30/11
APDB File: MO-319
Description: This revision lowers the allowable emissions threshold for VOCs released per day from the use, storage and disposal of industrial cleaning solvents, and adds requirements for facilities that exceed the applicability threshold in the St. Louis ozone nonattainment area. This revision represents RACT control levels for CTGs issued by EPA after 2006.

CFR: 40 C.F.R. 52.1320(c)
FRM: 65 FR 8060 (2/17/00)
PRM: 61 FR 10968 (3/18/96)
State Submission: 11/12/99
State Final: 10 C.S.R. 10-5 (2/28/97)
APDB File: MO-76
Description: This rule provides controls on solvent emissions from solvent cleanup operations in the St Louis nonattainment area.

Difference Between the State and EPA-Approved Regulation

None.