

**U**nder this heading will appear the text of proposed rules and changes. The notice of proposed rulemaking is required to contain an explanation of any new rule or any change in an existing rule and the reasons therefor. This is set out in the Purpose section with each rule. Also required is a citation to the legal authority to make rules. This appears following the text of the rule, after the word "Authority."

**E**ntirely new rules are printed without any special symbolology under the heading of the proposed rule. If an existing rule is to be amended or rescinded, it will have a heading of proposed amendment or proposed rescission. Rules which are proposed to be amended will have new matter printed in boldface type and matter to be deleted placed in brackets.

**A**n important function of the *Missouri Register* is to solicit and encourage public participation in the rulemaking process. The law provides that for every proposed rule, amendment, or rescission there must be a notice that anyone may comment on the proposed action. This comment may take different forms.

**I**f an agency is required by statute to hold a public hearing before making any new rules, then a Notice of Public Hearing will appear following the text of the rule. Hearing dates must be at least thirty (30) days after publication of the notice in the *Missouri Register*. If no hearing is planned or required, the agency must give a Notice to Submit Comments. This allows anyone to file statements in support of or in opposition to the proposed action with the agency within a specified time, no less than thirty (30) days after publication of the notice in the *Missouri Register*.

**A**n agency may hold a public hearing on a rule even though not required by law to hold one. If an agency allows comments to be received following the hearing date, the close of comments date will be used as the beginning day in the ninety (90)-day-count necessary for the filing of the order of rulemaking.

**I**f an agency decides to hold a public hearing after planning not to, it must withdraw the earlier notice and file a new notice of proposed rulemaking and schedule a hearing for a date not less than thirty (30) days from the date of publication of the new notice.

Proposed Amendment Text Reminder:

**Boldface text indicates new matter.**

*[Bracketed text indicates matter being deleted.]*

**Title 10—DEPARTMENT OF NATURAL RESOURCES  
Division 10—Air Conservation Commission  
Chapter 5—Air Quality Standards and Air Pollution  
Control Rules Specific to the St. Louis Metropolitan  
Area**

**PROPOSED AMENDMENT**

**10 CSR 10-5.330 Control of Emissions From Industrial Surface Coating Operations.** The commission proposes to amend the rule purpose; amend section (1); delete current sections (3), (4), and (5); add new sections (3), (4), and (5); and delete sections (6) and (7). If the commission adopts this rule action, it will be the department's intention to submit this rule amendment to the U.S. Environmental Protection Agency to replace the current rule that is in the Missouri State Implementation Plan. The evidence supporting the need for this proposed rulemaking is available for viewing at the Missouri Department of Natural Resources' Air Pollution Control Program at the

address listed in the Notice of Public Hearing at the end of this rule. More information concerning this rulemaking can be found at the Missouri Department of Natural Resources' Environmental Regulatory Agenda website, [www.dnr.mo.gov/reg/index.html](http://www.dnr.mo.gov/reg/index.html).

*PURPOSE: This rule restricts the emissions of volatile organic compounds from industrial surface coating operations. This amendment will exempt facilities that are regulated under other rules that limit emissions of volatile organic compounds and will incorporate changes in Reasonably Available Control Technology (RACT) for surface coating operations to be consistent with the current federal RACT guidance documents. The evidence supporting the need for this proposed rulemaking, per section 536.016, RSMo, is the U.S. Environmental Protection Agency 2006–2008 Control Techniques Guidelines for surface coating operations, a petition from The Boeing Company to amend the rule, and Clean Air Act section 182(b)(2).*

*PURPOSE: This rule restricts the emissions of volatile organic compounds from industrial surface coating operations.*

(1) Applicability.

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

(B) This rule shall apply to any installation with actual emissions of greater than *[two and one-half (2 1/2)]* **three (3)** tons in any calendar year *[after December 1, 1989,]* of volatile organic compounds (VOCs) from surface coating operations, **including related cleaning activities**, covered under this rule. *[This includes any installation which does not have an allowable VOC emission limit established under 10 CSR 10-6.060 or legally enforceable state implementation plan revision, which has actual VOC emissions of greater than two and one-half (2 1/2) tons in any calendar year after December 1, 1989. Once a source is determined to exceed the applicability level of this rule, it shall remain subject to this rule even if its actual emissions drop below the applicability level.]* **The installation shall not consider the effects of controls when calculating the applicable level of three (3) tons of actual VOC emissions.**

(C) This rule is *[not applicable to the surface coating of the following metal parts and products:]* **only applicable to the surface coating of manufactured items intended for distribution in commerce to persons other than the person or legal entity performing the surface coating.**

*[1. Automobile refinishing;*

*2. Customizing top coating of automobiles and trucks, if production is less than thirty-five (35) vehicles per day; and*

*3. Exterior of marine vessels.]*

**(D) Exemptions. This rule is not applicable to the following:**

**1. Motor vehicle refinishing;**

**2. Customizing top coating of motor vehicles, if production is less than thirty-five (35) vehicles per day;**

**3. Surface coating of the exterior of marine vessels except for pleasure craft;**

**4. Surface coating that is part of janitorial, building, and installation maintenance operations;**

**5. Research and development, performance testing, and quality control of coatings and surface coated products;**

**6. Aerosol coatings;**

**7. Field application of architectural coatings to buildings, building components, and stationary structures;**

**8. Powder coatings;**

**9. Surface coating and cleaning of aerospace vehicles or components at an aerospace manufacture or rework installation that—**

**A. Is subject to the requirements and/or aerospace-specific exemptions of 10 CSR 10-5.295; or**

B. Is not subject to 10 CSR 10-5.295 because the installation's potential to emit volatile organic compounds from aerospace surface coating and cleaning is twenty-five (25) tons per year or less;

10. Surface coating and cleaning of wood furniture or wood furniture components at a wood furniture manufacturing installation that—

A. Is subject to the requirements and/or wood furniture-specific exemptions of 10 CSR 10-5.530; or

B. Is not subject to 10 CSR 10-5.530 because the installation's potential to emit volatile organic compounds from wood furniture coating and cleaning is less than twenty-five (25) tons per year;

11. Surface coating and cleaning operations that are subject to a Reasonably Available Control Technology determination under 10 CSR 10-5.520;

12. Application and storage of traffic coatings that are subject to the requirements of 10 CSR 10-5.450;

13. Printing operations that are subject to the requirements of 10 CSR 10-5.340 or 10 CSR 10-5.442;

14. Surface coating and cleaning of articles used for internal company operations, including, but not limited to, work stands; scaffolding; jigs; tooling; dollies; tow bars; aircraft ground support equipment; portable equipment used for maintenance, testing, fabrication, or repair; toolboxes; storage bins; shelving; and other manufacturing or warehouse support items;

15. Surface coating operations which do not have a VOC limit in section (3) of this rule;

16. Adhesives and sealants that contain less than 0.17 pounds of VOC per gallon of coating (less water and exempt compounds) as applied;

17. Cyanoacrylate adhesives;

18. Adhesives, sealants, adhesive primers, and sealant primers that are supplied by the manufacturer or supplier in containers with a net volume of sixteen (16) fluid ounces or less, or a net weight of one (1) pound or less, except plastic cement welding adhesives and contact adhesives;

19. Contact adhesives that are supplied by the manufacturer or supplier in containers with a net volume of one (1) gallon or less; and

20. Adhesives, sealants, adhesive primers, sealant primers, surface preparation, and cleanup solvents that are used in the following operations:

A. Tire repair operations, provided the adhesive is labeled for tire repair only;

B. Assembly, repair, and manufacture of aerospace or undersea-based weapon systems;

C. Solvent welding operations used in the manufacture of medical devices or in the manufacture of medical equipment; and

D. Plaque laminating operations in which adhesives are used to bond clear, polyester acetate laminate to wood with lamination equipment installed prior to July 1, 1992.

(E) Once an installation exceeds the applicability level of this rule, it shall remain subject to this rule until it can demonstrate, to the satisfaction of the director, that the actual total VOC emissions from surface coating operations, including related cleaning activities, is below three (3) tons per year for five (5) consecutive calendar years.

[(3) General Provisions. No person shall emit to the atmosphere any VOC from any surface coating operation in excess of the amount allowed in section (4). A surface coating operation includes an application area(s), flashoff area(s), oven(s) and any other functional area needed to complete a coating.

(4) Tables of Emission Limitations and Dates of Compliance.  
(A) Table A: VOC Emission Limits Based on Solids Applied.

Operations	Emission Limit lbs. VOC/gal. Solids Applied	Dates of Compliance
Surface Coating		
Auto/light duty truck		
Topcoat	15.1	12/1/89
Spray Prime or Primer Surfacer	15.1	12/1/89

(B) Table B: VOC Emission Limits Based on Weight of VOC per Gallon of Coating (minus water and non-VOC organic compounds).

Surface Coatings Operations	Emission Limit lbs. VOC/gal. Coating (less water & non-VOC organic compounds)	Dates of Compliance (See Note)
Large Appliance		
Topcoat	2.8	12/31/81
Final Repair	6.5	12/31/81
Magnet Wire	1.7	12/31/81
Metal Furniture	3.0	12/31/81
Auto/Light Duty Truck		
Chrysler Motor Co. (Car)		
Prime-Electrocoat	1.2	12/31/85
Spray Prime	4.2	12/31/79
Topcoat	3.4	12/31/83
Final Repair	2.8	12/31/85
Miscellaneous Metal Parts	3.9	12/31/79
Extreme Performance and Air Dried Coatings	3.0	12/31/84
All Other Coatings	2.5	12/31/85
Chrysler Motor Co. (Truck)	4.8	12/31/81
Prime-Electrocoat	1.2	12/31/84
Spray Prime	4.4	12/31/79
Topcoat	3.4	12/31/82
Final Repair	2.8	12/31/84
Miscellaneous Metal Parts	3.9	12/31/79
Extreme Performance and Air Dried Coatings	2.5	12/31/84
All Other Coatings	4.8	12/31/84
Ford Motor Company		
Prime-Electrocoat	1.2	12/31/82
Spray Prime	3.2	12/31/83
Topcoat	3.6	12/31/84
Final Repair	4.8	12/31/84
Miscellaneous Metal Parts		
Extreme Performance and Air Dried Coatings	3.5	12/31/82
All Other Coatings	3.0	12/31/82
General Motors Company		
Cathodic Electrocoat	1.2	12/31/82
Primer Surfacer	3.0	12/31/82
Topcoat	2.8	12/31/84

Topcoat	5.8	12/31/79
	5.0	12/31/81
	2.8	12/31/84
Final Repair	6.5	7/1/79
	4.8	12/31/84
Miscellaneous Metal Parts		
Extreme Performance and Air Dried Coatings	3.5	12/31/82
All Other Coatings	3.0	12/31/82
Paper	2.9	12/31/81
Vinyl	3.8	12/31/81
Fabric	2.9	12/31/81
Coil	2.6	12/31/81
Can		
2 Piece Exterior Sheet Basecoat	4.0	12/31/82
2 and 3 Piece Interior Body Spray	2.8	12/31/85
2 Piece End Exterior	4.2	12/31/82
3 Piece Side Seam	4.2	12/31/82
End Seal Compound	5.5	12/31/82
	4.2	12/31/82
	3.7	12/31/85
Railroad Cars, Farm Implements and Machinery, and Heavy Duty Trucks	3.5	12/31/82
Other Metal Parts		
Clear Coat	4.3	12/31/82
Extreme Performance and Air Dried Coatings	3.5	12/31/82
All Other Coatings	3.0	12/31/82
Plastic Parts	3.5	4/11/84
Mail Boxes and Shutters	3.5	4/11/85

Where:  
 A = daily gal. each coating used (minus water and exempt solvents) in a surface coating operation;  
 B = lbs. VOC/gal. coating (minus water and exempt solvents);  
 C = total daily gal. coatings used (minus water and exempt solvents) in a surface coating operation; and  
 N = number of coatings used in a surface coating operation;  
 2. Compliance with the emission limits in subsection (4)(B), Table B may be determined on a pounds of VOC per gallon of coating solids basis. The determination is made by first converting the emission limit in subsection (4)(B), Table B to pounds of VOC per gallon of coating solids as shown in the following three (3) steps:

$$1) \frac{\text{lbs. VOC per gallon of coating (emission limit from (4)(B))} - 7.36 \text{ lbs. per gallon (average density of solvents used to originally establish the emission limit)}}{\text{Volume fraction of VOC}} = \text{fraction of VOC}$$

$$2) 1 - \text{Volume fraction of VOC} = \text{Volume fraction of solids}$$

$$3) \frac{\text{lbs. VOC per gallon of coating (emission limit from (4)(B))} - \text{Volume fraction of solids}}{\text{Volume fraction of solids}} = \text{lbs. VOC gallons of coating solids}$$

This value from step 3) is the new emission limit. It is equivalent to the emission limit in subsection (4)(B) on a coating solids basis. The VOC per gallon of coating solids for each coating solids used is then determined using the method referenced in 10 CSR 10-6.030(14)(C) using the one (1)-hour bake. The composite daily weighted average of pounds of VOC per gallon of coating solids as tested for in the actual coatings used is compared to the new emission limit. Source operations on a coating line using coatings with a composite actual daily weighted average value less than or equal to the new emission limit, are in compliance with this rule; or

3. Compliance with the emission limits in subsection (4)(B), Table B may be determined on a pounds of VOC per gallon of coating solids applied basis. An owner or operator may request his/her emission limit be modified to be equivalent to the emission limit in subsection (4)(B), but in emission units of pounds of VOC emitted per gallon of coating solids applied. This new emission limit is derived by dividing the emission limit from paragraph (5)(B)2. by an appropriate value for transfer efficiency (TE) as determined by the director. Prior to this determination, the owner or operator shall demonstrate to the satisfaction of the director that an adequate, fully replicable TE test method exists for the source operation. Upon approval of the TE demonstration, the director will develop an emission limit equivalent to the applicable emission limit in subsection (4)(B).

(6) Record Keeping.

(A) The owner or operator of a coating line shall keep records detailing specific VOC sources as necessary for the director to determine daily compliance. These may include:

1. Daily records of the type and the quantity of coatings used daily;
2. The coating manufacturer's formulation data for each coating on forms provided or approved by the director;
3. Daily records of the type and quantity of solvents for coating, thinning, purging and equipment cleaning used;
4. All test results to determine capture and control efficiencies, TEs and coating makeup;

Note: The emission limit associated with the latest compliance date for each surface coating process supersedes interim emission limits associated with earlier compliance dates. No coating operation shall have emission limits from Tables A and B that apply at the same time.

(5) Determination of Compliance. Compliance with section (4) of this rule shall be determined by one (1) of the following methods specified in subsections (5)(A) and (B) as applicable and appropriate:

(A) For subsection (4)(A), Table A, the calculation of daily volume-weighted emission performance for automobile and light duty truck primer surfacer and topcoat operations shall be made according to procedures detailed in the United States Environmental Protection Agency (EPA) document entitled "Protocol for Determining the Daily Volatile Organic Compound Emission Rate of Automobile and Light Duty Truck Topcoat Operations" (U.S. EPA-450/3-88-018) dated December, 1988; and

(B) For subsection (4)(B), Table B—

1. Compliance with the emission limits may be determined using the method referenced in 10 CSR 10-6.030(14)(C) using the one (1)-hour bake. Emission performance shall be on the basis of a daily volume-weighted average of all coatings used in each surface coating operation as delivered to the coating applicator(s) on a coating line. The daily volume-weighted average (DAVG<sub>vw</sub>) shall be calculated by the following formula:

$$DAVG_{vw} = \frac{\sum_{i=1}^n (A_i \times B)}{C}$$

5. Daily records of the type and quantity of waste solvents reclaimed or discarded daily;

6. Daily records of the quantity of pieces or materials coated daily; and

7. Any additional information pertinent to determining compliance.

(B) Records such as daily production rates may be substituted for actual daily coating use measurements provided the owner submits a demonstration approved by the director that these records are adequate for the purposes of this rule.

(C) Records required under subsections (6)(A) and (B) shall be retained by the owner or operator for a minimum of two (2) years. These records shall be made available to the director upon request.

(7) Compliance Schedules.

(A) Owners or operators who were subject to this rule prior to December 1, 1989 shall be subject to the compliance dates set forth in section (4). Record keeping systems required of these owners or operators under section (6) shall be in place and functioning not later than April 1, 1990. All other subject owners or operators shall be in compliance and have all record keeping systems in place by December 1, 1990.

(B) Owners or operators subject to this rule, but operating under alternate compliance plans as allowed prior to December 1, 1989, shall submit documentation by March 1, 1990 that their controls represent compliance with this rule. If the director determines that the documentation represents compliance, the director shall propose to the Missouri Air Conservation Commission subsequent rules' amendments to make those control measures enforceable. If documentation is not submitted or if the director determines the documentation does not represent compliance, the owner or operator shall comply with section (4) of this rule. All owners or operators subject to this subsection shall demonstrate compliance by December 1, 1990.]

(3) General Provisions. General provisions for specific coatings may be found in the following subsections of section (3) of this rule:

Coating	Subsection
Large Appliance Coatings	(3)(A)
Metal Furniture Coatings	(3)(B)
Automobile and Light Duty Truck Assembly Coatings	(3)(C)
Paper, Film, and Foil Coatings	(3)(D)
Magnet Wire Coatings	(3)(E)
Coil Coatings	(3)(F)
Can Coatings	(3)(G)
Vinyl and Fabric Coatings	(3)(H)
Flat Wood Paneling Coatings	(3)(I)
Miscellaneous Metal and Plastic Parts Coatings	(3)(J)
Industrial Adhesive Application	(3)(K)

(A) Large Appliance Coatings.

1. The requirements in this subsection apply to the surface coating of doors, cases, lids, panels, and interior support parts of the following residential and commercial products:

- A. Washers;
- B. Dryers;
- C. Ranges;
- D. Refrigerators;
- E. Freezers;
- F. Water heaters;
- G. Dishwashers;
- H. Trash compactors;

- I. Air conditioners; and
- J. Other similar products.

2. Emission limits.

A. Prior to September 1, 2011, no owner or operator of a surface coating unit subject to this subsection may cause, allow, or permit the discharge into the ambient air of any VOCs in excess of the following, as delivered to the coating applicator(s):

Large Appliance Coatings	
Coating Category	Emission Limit pounds of VOC per gallon of coating (minus water and exempt compounds)
Topcoat	2.8
Final Repair	6.5

B. On or after September 1, 2011, no owner or operator of a surface coating unit subject to this subsection may cause, allow, or permit the discharge into the ambient air of any VOCs in excess of the following, as delivered to the coating applicator(s):

Large Appliance Coatings		
Coating Category	Emission Limit pounds of VOC per gallon of coating (minus water and exempt compounds)	
	Baked	Air Dried
General, One Component	2.3	2.3
General, Multi Component	2.3	2.8
Extreme High Gloss	3.0	2.8
Extreme Performance	3.0	3.5
Heat Resistant	3.0	3.5
Metallic	3.5	3.5
Pretreatment Coatings	3.5	3.5
Solar Absorbent	3.0	3.5
Repair and Touch Up	6.5	6.5

3. Method and determination of compliance. The emission limits in paragraph (3)(A)2. of this rule shall be achieved through one (1) of the following:

A. VOC content of coatings. Determine the daily volume-weighted average VOC content of all coatings used in a surface coating unit, expressed as pounds of VOC per gallon of coating (minus water and exempt compounds) per subparagraph (5)(C)3.A. of this rule. The surface coating unit is in compliance if this value is less than or equal to the emission limits in paragraph (3)(A)2. of this rule;

B. Combination of VOC content of coatings and add-on controls. Calculate the required control system efficiency per paragraph (5)(C)4. of this rule. The surface coating unit is in compliance if the actual overall control system efficiency is greater than or equal to the required control system efficiency; or

C. Control system. If a control system is used to achieve compliance, the overall control system efficiency must be ninety percent (90%) or greater.

4. Application equipment. On or after September 1, 2011, one (1) or a combination of the following equipment shall be used for coating application, unless achieving compliance by using an add-on control system per subparagraph (3)(A)3.C. of this rule:

- A. Electrostatic equipment;
- B. High-volume low-pressure (HVLP) spray equipment;
- C. Flow coating;
- D. Roller coating;
- E. Dip coating, including electrodeposition;
- F. Airless spray;

G. Air-assisted airless spray; and

H. Other coating application method capable of achieving a transfer efficiency equivalent or better than achieved by HVLP spraying.

5. Work practices. On or after September 1, 2011, work practices shall be used to minimize VOC emissions from solvent storage, mixing operations, and handling operations for coatings, thinners, cleaning materials, and waste materials. Work practices shall include, but not be limited to, the following:

A. Store all VOC-containing coatings, thinners, and cleaning materials in closed containers;

B. Ensure that mixing and storage containers used for VOC containing coatings, thinners, coating related waste, and cleaning materials are kept closed at all times except when depositing or removing these materials;

C. Minimize spills of VOC-containing coatings, thinners, and cleaning materials;

D. Clean up spills immediately;

E. Convey any coatings, thinners, and cleaning materials in closed containers or pipes from one (1) location to another; and

F. Minimize VOC emissions from the cleaning of application, storage, mixing, and conveying equipment by ensuring that equipment cleaning is performed without atomizing the cleaning solvent and all spent solvent is captured in closed containers.

6. The VOC limits in paragraph (3)(A)2. of this rule do not apply to the following types of coatings and coating operations:

A. Stencil coatings;

B. Safety-indicating coatings;

C. Solid film lubricants; or

D. Electric-insulating and thermal-conducting coatings.

**(B) Metal Furniture Coatings.**

1. The requirements in this subsection apply to surface coating of any furniture made of metal or any metal part that will be assembled with other metal, wood, fabric, plastic, or glass parts to form a furniture piece.

**2. Emission limits.**

A. Prior to September 1, 2011, no owner or operator of a surface coating unit subject to this subsection may cause, allow, or permit the discharge into the ambient air of any VOCs in excess of three (3.0) pounds of VOC per gallon of coating (minus water and exempt compounds) as delivered to the coating applicator(s).

B. On or after September 1, 2011, no owner or operator of a surface coating unit subject to this subsection may cause, allow, or permit the discharge into the ambient air of any VOCs in excess of the following, as delivered to the coating applicator(s):

<b>Metal Furniture Coatings</b>		
<b>Coating Category</b>	<b>Emission Limit</b> pounds of VOC per gallon of coating (minus water and exempt compounds)	
	<b>Baked</b>	<b>Air Dried</b>
<b>General, One Component</b>	<b>2.3</b>	<b>2.3</b>
<b>General, Multi Component</b>	<b>2.3</b>	<b>2.8</b>
<b>Extreme High Gloss</b>	<b>3.0</b>	<b>2.8</b>
<b>Extreme Performance</b>	<b>3.0</b>	<b>3.5</b>
<b>Heat Resistant</b>	<b>3.0</b>	<b>3.5</b>
<b>Metallic</b>	<b>3.5</b>	<b>3.5</b>
<b>Pretreatment Coatings</b>	<b>3.5</b>	<b>3.5</b>
<b>Solar Absorbent</b>	<b>3.0</b>	<b>3.5</b>

3. Method and determination of compliance. The emission limits in paragraph (3)(B)2. of this rule shall be achieved through

one (1) of the following:

A. VOC content of coatings. Determine the daily volume-weighted average VOC content of all coatings used in a surface coating unit, expressed as pounds of VOC per gallon of coating (minus water and exempt compounds) per subparagraph (5)(C)3.A. of this rule. The surface coating unit is in compliance if this value is less than or equal to the emission limits in paragraph (3)(B)2. of this rule;

B. Combination of VOC content of coatings and add-on controls. Calculate the required control system efficiency per paragraph (5)(C)4. of this rule. The surface coating unit is in compliance if the actual overall control system efficiency is greater than or equal to the required control system efficiency; or

C. Control system. If a control system is used to achieve compliance, the overall control system efficiency must be ninety percent (90%) or greater.

4. Application equipment. On or after September 1, 2011, one (1) or a combination of the following equipment shall be used for coating application, unless achieving compliance by using an add-on control system per subparagraph (3)(B)3.C. of this rule:

A. Electrostatic equipment;

B. HVLP spray equipment;

C. Flow coating;

D. Roller coating;

E. Dip coating, including electrodeposition;

F. Airless spray;

G. Air-assisted airless spray; and

H. Other coating application method capable of achieving a transfer efficiency equivalent or better than achieved by HVLP spraying.

5. Work practices. On or after September 1, 2011, work practices shall be used to minimize VOC emissions from solvent storage, mixing operations, and handling operations for coatings, thinners, cleaning materials, and waste materials. Work practices shall include, but not be limited to, the following:

A. Store all VOC-containing coatings, thinners, and cleaning materials in closed containers;

B. Ensure that mixing and storage containers used for VOC-containing coatings, thinners, coating related waste, and cleaning materials are kept closed at all times except when depositing or removing these materials;

C. Minimize spills of VOC-containing coatings, thinners, and cleaning materials;

D. Clean up spills immediately;

E. Convey any coatings, thinners, and cleaning materials in closed containers or pipes from one (1) location to another; and

F. Minimize VOC emissions from the cleaning of application, storage, mixing, and conveying equipment by ensuring that equipment cleaning is performed without atomizing the cleaning solvent and all spent solvent is captured in closed containers.

6. The VOC limits in paragraph (3)(B)2. of this rule do not apply to the following types of coatings and coating operations:

A. Stencil coatings;

B. Safety-indicating coatings;

C. Solid film lubricants; and

D. Electric-insulating and thermal-conducting coatings.

**(C) Automobile and Light Duty Truck Assembly Coatings.**

1. The requirements in this subsection apply to automobile and light duty truck surface coating operations performed in an automobile or light duty truck assembly installation.

**2. Emission limits.**

A. Prior to September 1, 2011, no owner or operator of an automobile or light duty truck assembly installation may cause, allow, or permit the discharge into the ambient air of any VOC in excess of the following:

Automobile and Light Duty Truck Assembly Coatings	
Coating Category	Emission Limit
Topcoat	15.1 pounds of VOC per gallon of coating solids deposited
Spray Primer or Primer Surfacer	15.1 pounds of VOC per gallon of coating solids deposited
Electrodeposition Primer	1.4 pounds of VOC per gallon of coating solids deposited
Final Repair	4.8 pounds of VOC per gallon of coating (minus water and exempt compounds)
Miscellaneous Metal Parts, Extreme Performance, and Air Dried Coatings	3.5 pounds of VOC per gallon of coating (minus water and exempt compounds)
All Other Coatings	3.0 pounds of VOC per gallon of coating (minus water and exempt compounds)

B. On or after September 1, 2011, no owner or operator of an automobile or light duty truck assembly installation may cause, allow, or permit the discharge into the ambient air of any VOC in excess of the following:

Automobile and Light Duty Truck Assembly Coatings			
Coating Category	Emission Limit		
	$R_T < 0.040$	$0.040 \leq R_T < 0.160$	$R_T \geq 0.160$
Electrodeposition primer (EDP)	No VOC Emission Limit	$0.7 \times 350^{0.160-R_T}$ pounds of VOC per gallon of coating solids deposited	0.7 pounds of VOC per gallon of coating solids deposited
Primer-surfacer	12.0 pounds of VOC per gallon of coating solids deposited		
Topcoat	12.0 pounds of VOC per gallon of coating solids deposited		
Combined Primer-Surfacer and Topcoat	12.0 pounds of VOC per gallon of coating solids deposited		
Final repair	4.8 pounds of VOC per gallon of coating (minus water and exempt compounds)		

Miscellaneous Materials	
Material	Emission Limit pounds of VOC per gallon of coating (minus water and exempt compounds)
Automobile and light duty truck glass bonding primer	7.5
Automobile and light duty truck adhesive	2.1
Automobile and light duty truck cavity wax	5.4
Automobile and light duty truck sealer	5.4
Automobile and light duty truck deadener	5.4
Automobile and light duty truck gasket/gasket-sealing material	1.7
Automobile and light duty truck underbody coating	5.4
Automobile and light duty truck trunk interior coating	5.4
Automobile and light duty truck bedliner	1.7
Automobile and light duty truck weatherstrip adhesive	6.3
Automobile and light duty truck lubricating wax/compound	5.8

3. Method and determination of compliance. The emission limits in paragraph (3)(C)2. of this rule shall be achieved through the following:

A. Spray primer; primer-surfacer; topcoat; and combined primer-surfacer and topcoat. The VOC emission rate, expressed as pounds of VOC per gallon of coating solids deposited, is determined by the procedures in the U.S. Environmental Protection Agency (EPA) document *Protocol for Determining the Daily Volatile Organic Compound Emission Rate of Automobile and Light-Duty Truck Primer-Surfacer and Topcoat Operations* (EPA-453/R-08-002), dated September 2008. The surface coating unit is in compliance if the emission rate is less than or equal to the emission limit in paragraph (3)(C)2. of this rule;

B. Electrodeposition primer (EDP). Determine the monthly volume-weighted average VOC emission rate of the EDP coating unit, expressed as pounds of VOC per gallon of coating solids deposited, per subparagraph (5)(C)3.D. of this rule. The EDP coating unit is in compliance if this value is less than or equal to the emission limit in paragraph (3)(C)2. of this rule;

C. Final repair coatings. Determine the daily volume-weighted average VOC content of all coatings used in a surface coating unit, expressed as pounds of VOC per gallon of coating (minus water and exempt compounds) per subparagraph (5)(C)3.A. of this rule. The surface coating unit is in compliance if this value is less than or equal to the emission limits in paragraph (3)(C)2. of this rule; and

D. All other coatings. Determine the monthly volume-weighted average VOC content of all coatings used in a surface coating unit, expressed as pounds of VOC per gallon of coating (minus water and exempt compounds) per subparagraph (5)(C)3.E. of this rule. The surface coating unit is in compliance if this value is less than or equal to the emission limit in paragraph (3)(C)2. of this rule.

4. Work practices and work practice plan.

A. Work practices. On or after September 1, 2011, work practices shall be used to minimize VOC emissions from storage, mixing operations, and handling operations for coatings, thinners, cleaning materials, and waste materials. Work practices shall include, but not be limited to, the following:

(I) Store all VOC-containing coatings, thinners, and cleaning materials in closed containers;

(II) Ensure that mixing and storage containers used for VOC-containing coatings, thinners, coating related waste, and cleaning materials are kept closed at all times except when depositing or removing these materials;

(III) Minimize spills of VOC-containing coatings, thinners, and cleaning materials;

(IV) Clean up spills immediately;

(V) Convey any coatings, thinners, and cleaning materials in closed containers or pipes from one (1) location to another; and

(VI) Minimize VOC emissions from the cleaning of application, storage, mixing, and conveying equipment by ensuring that equipment cleaning is performed without atomizing the cleaning solvent and all spent solvent is captured in closed containers.

B. Work practice plan. Installations subject to subparagraph (3)(C)4.A. of this rule shall develop and implement a work practice plan to minimize VOC emissions from cleaning and purging of equipment associated with all coating operations for which emission limits are specified in paragraph (3)(C)2. of this rule. The plan shall specify practices and procedures to ensure that VOC emissions from the following operations are minimized:

(I) Vehicle body wiping;

(II) Coating line purging;

(III) Flushing of coating systems;

(IV) Cleaning of spray booth grates;

(V) Cleaning of spray booth walls;

(VI) Cleaning of spray booth equipment;

(VII) Cleaning external spray booth areas; and  
 (VIII) Other housekeeping measures, such as keeping solvent-laden rags in closed containers.

(D) Paper, Film, and Foil Coatings.

1. The requirements in this subsection apply to paper, film, and foil coating operations, with the exception of the following:

A. Paper, film, and foil surface coating units with potential to emit below twenty-five (25) tons per year of VOC from coating, prior to controls;

B. Coating performed on or in-line with any offset lithographic, screen, letterpress, flexographic, rotogravure, or digital printing press that is part of a printing process; and

C. Size presses and on-machine coaters on papermaking machines that apply sizing or water-based clays.

2. Emission limits.

A. Prior to September 1, 2011, no owner or operator of a surface coating unit subject to this subsection may cause, allow, or permit the discharge into the ambient air of any VOCs in excess of two and nine-tenths (2.9) pounds of VOC per gallon of coating (minus water and exempt compounds) as delivered to the coating applicator(s).

B. On or after September 1, 2011, no owner or operator of a surface coating unit subject to this subsection may cause, allow, or permit the discharge into the ambient air of any VOCs in excess of the following, as delivered to the coating applicator(s):

Paper, Film, and Foil Coatings	
Coating Category	Emission Limit pounds of VOC per pound of coating solids
Pressure sensitive tape and label	0.2
Paper, film, and foil surface coating (not including pressure sensitive tape and label)	0.4

3. Method and determination of compliance. The emission limits in paragraph (3)(D)2. of this rule shall be achieved through one (1) of the following:

A. VOC content of coatings.

(I) Prior to September 1, 2011. Determine the daily volume-weighted average VOC content of all coatings used in a surface coating unit, expressed as pounds of VOC per gallon of coating (minus water and exempt compounds) per subparagraph (5)(C)3.A. of this rule. The surface coating unit is in compliance if this value is less than or equal to the emission limit in paragraph (3)(D)2. of this rule.

(II) On or after September 1, 2011. Determine the daily mass-weighted average VOC content of all coatings used in a surface coating unit, expressed as pounds of VOC per pound of coating solids per subparagraph (5)(C)3.C. of this rule. The surface coating unit is in compliance if this value is less than or equal to the emission limits in paragraph (3)(D)2. of this rule; or

B. Control system. If a control system is used to achieve compliance, the overall control system efficiency must be ninety percent (90%) or greater.

4. Work practices. On or after September 1, 2011, work practices shall be used to minimize VOC emissions from solvent storage, mixing operations, and handling operations for coatings, thinners, cleaning materials, and waste materials. Work practices shall include, but not be limited to, the following:

A. Store all VOC-containing coatings, thinners, and cleaning materials in closed containers;

B. Ensure that mixing and storage containers used for VOC-containing coatings, thinners, coating related waste, and cleaning materials are kept closed at all times except when depositing or removing these materials;

C. Minimize spills of VOC-containing coatings, thinners, and cleaning materials;

D. Clean up spills immediately;

E. Convey any coatings, thinners, and cleaning materials in closed containers or pipes from one (1) location to another; and

F. Minimize VOC emissions from the cleaning of application, storage, mixing, and conveying equipment by ensuring that equipment cleaning is performed without atomizing the cleaning solvent and all spent solvent is captured in closed containers.

(E) Magnet Wire Coatings.

1. The requirements in this subsection apply to the coating of electrically insulating varnish or enamel to aluminum or copper wire for use in electrical machinery.

2. Emission limits. No owner or operator of a surface coating unit subject to this subsection may cause, allow, or permit the discharge into the ambient air of any VOCs in excess of one and seven-tenths (1.7) pounds of VOC per gallon of coating (minus water and exempt compounds) as delivered to the coating applicator(s).

3. Method and determination of compliance. The emission limits in paragraph (3)(E)2. of this rule shall be achieved through one (1) of the following:

A. VOC content of coatings. Determine the daily volume-weighted average VOC content of all coatings used in a surface coating unit, expressed as pounds of VOC per gallon of coating (minus water and exempt compounds), per subparagraph (5)(C)3.A. of this rule. The surface coating unit is in compliance if this value is less than or equal to the emission limit in paragraph (3)(E)2. of this rule;

B. Combination of VOC content of coatings and add-on controls. Calculate the required control system efficiency per paragraph (5)(C)4. of this rule. The surface coating unit is in compliance if the actual overall control system efficiency is greater than or equal to the required control system efficiency; or

C. Control system. If a control system is used to achieve compliance, the overall control system efficiency must be ninety percent (90%) or greater.

(F) Coil Coatings.

1. The requirements in this subsection apply to the surface coating of any flat metal sheet or strip that comes in rolls or coils.

2. Emission limits. No owner or operator of a surface coating unit subject to this subsection may cause, allow, or permit the discharge into the ambient air of any VOCs in excess of two and six-tenths (2.6) pounds of VOC per gallon of coating (minus water and exempt compounds) as delivered to the coating applicator(s).

3. Method and determination of compliance. The emission limits in paragraph (3)(F)2. of this rule shall be achieved through one (1) of the following:

A. VOC content of coatings. Determine the daily volume-weighted average VOC content of all coatings used in a surface coating unit, expressed as pounds of VOC per gallon of coating (minus water and exempt compounds), per subparagraph (5)(C)3.A. of this rule. The surface coating unit is in compliance if this value is less than or equal to the emission limit in paragraph (3)(F)2. of this rule;

B. Combination of VOC content of coatings and add-on controls. Calculate the required control system efficiency per paragraph (5)(C)4. of this rule. The surface coating unit is in compliance if the actual overall control system efficiency is greater than or equal to the required control system efficiency; or

C. Control system. If a control system is used to achieve compliance, the overall control system efficiency must be ninety percent (90%) or greater.

(G) Can Coatings.

1. The requirements in this subsection apply to the surface coating of cans.

2. Emission limits. No owner or operator of a surface coating unit subject to this subsection may cause, allow, or permit the

discharge into the ambient air of any volatile organic compounds, as delivered to the coating applicator(s), in excess of the following:

Can Coatings	
Coating Category	Emission Limit pounds of VOC per gallon of coating (minus water and exempt compounds)
2-Piece Exterior Sheet Basecoat	2.8
2- and 3-Piece Interior Body Spray	4.2
2-Piece End Exterior	4.2
3-Piece Side Seam	5.5
End Seal Compound	3.7

3. Method and determination of compliance. The emission limits in paragraph (3)(G)2. of this rule shall be achieved through one (1) of the following:

A. VOC content of coatings. Determine the daily volume-weighted average VOC content of all coatings used in a surface coating unit, expressed as pounds of VOC per gallon of coating (minus water and exempt compounds), per subparagraph (5)(C)3.A. of this rule. The surface coating unit is in compliance if this value is less than or equal to the emission limit in paragraph (3)(G)2. of this rule;

B. Combination of VOC content of coatings and add-on controls. Calculate the required control system efficiency per paragraph (5)(C)4. of this rule. The surface coating unit is in compliance if the actual overall control system efficiency is greater than or equal to the required control system efficiency; or

C. Control system. If a control system is used to achieve compliance, the overall control system efficiency must be ninety percent (90%) or greater.

(H) Vinyl and Fabric Coatings.

1. The requirements in this subsection apply to vinyl coating and fabric coating.

2. Emission limits. No owner or operator of a surface coating unit subject to this subsection may cause, allow, or permit the discharge into the ambient air of any volatile organic compounds, as delivered to the coating applicator(s), in excess of the following:

Vinyl and Fabric Coatings	
Coating Category	Emission Limit pounds of VOC per gallon of coating (minus water and exempt compounds)
Vinyl	3.8
Fabric	2.9

3. Method and determination of compliance. The emission limits in paragraph (3)(H)2. of this rule shall be achieved through one (1) of the following:

A. VOC content of coatings. Determine the daily volume-weighted average VOC content of all coatings used in a surface coating unit, expressed as pounds of VOC per gallon of coating (minus water and exempt compounds), per subparagraph (5)(C)3.A. of this rule. The surface coating unit is in compliance if this value is less than or equal to the emission limit in paragraph (3)(H)2. of this rule;

B. Combination of VOC content of coatings and add-on controls. Calculate the required control system efficiency per paragraph (5)(C)4. of this rule. The surface coating unit is in compliance if the actual overall control system efficiency is greater than or equal to the required control system efficiency; or

C. Control system. If a control system is used to achieve compliance, the overall control system efficiency must be ninety percent (90%) or greater.

(I) Flat Wood Paneling Coatings.

1. The requirements in this subsection apply to the coating of the following:

- A. Printed interior panels made of hardwood plywood and thin particle board;
- B. Natural finish hardwood plywood panels;
- C. Hardboard paneling with Class II finishes;
- D. Exterior siding; and
- E. Tileboard.

2. Emission limits. On or after September 1, 2011, no owner or operator of a surface coating unit subject to this subsection may cause, allow, or permit the discharge into the ambient air of any VOCs in excess two and one-tenths (2.1) pounds of VOC per gallon of coating (minus water and exempt compounds) as delivered to the coating applicator(s).

3. Method and determination of compliance. The emission limits in paragraph (3)(I)2. of this rule shall be achieved through one (1) of the following:

A. VOC content of coatings. Determine the daily volume-weighted average VOC content of all coatings used in a surface coating unit, expressed as pounds of VOC per gallon of coating (minus water and exempt compounds), per subparagraph (5)(C)3.A. of this rule. The surface coating unit is in compliance if this value is less than or equal to the emission limit in paragraph (3)(I)2. of this rule;

B. Combination of VOC content of coatings and add-on controls. Calculate the required control system efficiency per paragraph (5)(C)4. of this rule. The surface coating unit is in compliance if the actual overall control system efficiency is greater than or equal to the required control system efficiency; or

C. Control system. If a control system is used to achieve compliance, the overall control system efficiency must be ninety percent (90%) or greater.

4. Work practices. On or after September 1, 2011, work practices shall be used to minimize VOC emissions from solvent storage, mixing operations, and handling operations for coatings, thinners, cleaning materials, and waste materials. Work practices shall include, but not be limited to, the following:

- A. Store all VOC-containing coatings, thinners, and cleaning materials in closed containers;
- B. Ensure that mixing and storage containers used for VOC-containing coatings, thinners, coating related waste, and cleaning materials are kept closed at all times except when depositing or removing these materials;
- C. Minimize spills of VOC-containing coatings, thinners, and cleaning materials;
- D. Clean up spills immediately;
- E. Convey any coatings, thinners, and cleaning materials in closed containers or pipes from one (1) location to another; and
- F. Minimize VOC emissions from the cleaning of application, storage, mixing, and conveying equipment by ensuring that equipment cleaning is performed without atomizing the cleaning solvent and all spent solvent is captured in closed containers.

(J) Miscellaneous Metal and Plastic Parts Coatings.

1. The requirements in this subsection apply to the surface coating of all other miscellaneous metal and plastic parts including, but not limited to, the following:

- A. Large and small farm implements and machinery;
- B. Railroad cars;
- C. Small household appliances;
- D. Office equipment;
- E. Commercial and industrial machinery and equipment;
- F. Any other industrial category that coats metal parts or products under the Standard Industrial Classification Code of major groups #33, #34, #35, #36, #37, #38, and #39;
- G. Fabricated metal products;
- H. Molded plastic parts;



- I. Automotive or transportation equipment;
- J. Interior or exterior automotive parts;
- K. Construction equipment;
- L. Motor vehicle accessories;
- M. Bicycles and sporting goods;
- N. Toys;
- O. Recreational vehicles;
- P. Pleasure craft (recreational boats);
- Q. Extruded aluminum structural components;
- R. Heavier vehicles;
- S. Lawn and garden equipment;
- T. Business machines;
- U. Laboratory and medical equipment;
- V. Electronic equipment;
- W. Steel drums;
- X. Metal pipes; and
- Y. Prefabricated architectural components when the coating is applied in a surface coating unit as defined in subsection (2)(S).

2. Emission limits.

A. Prior to September 1, 2011, no owner or operator of a surface coating unit subject to this subsection may cause, allow, or permit the discharge into the ambient air of any VOCs in excess of the following, as delivered to the coating applicator(s):

Coating Category	Emission Limit pounds of VOC per gallon of coating (minus water and exempt compounds)
<b>Metal Parts</b>	
Clear Coat	4.3
Extreme Performance Coatings	3.5
Air Dried Coatings	3.5
All Other Coatings	3.0
<b>Plastic Parts</b>	3.5
<b>Railroad Cars</b>	3.5
<b>Farm Implements and Machinery</b>	3.5
<b>Heavy Duty Trucks</b>	3.5
<b>Mail Boxes and Shutters</b>	3.5

B. On or after September 1, 2011, no owner or operator of a surface coating unit subject to this subsection may cause, allow, or permit the discharge into the ambient air of any VOCs in excess of the following, as delivered to the coating applicator(s):

Metal Parts and Products Coatings		
Coating Category	Emission Limit pounds of VOC per gallon of coating (minus water and exempt compounds)	
	Air Dried	Baked
General, One Component	2.8	2.3
General, Multi Component	2.8	2.3
Camouflage	3.5	3.5
Clear Coat	4.3	4.3
Electric-Insulating Varnish	3.5	3.5
Etching Filler	3.5	3.5
Extreme High Gloss	3.5	3.0
Extreme Performance	3.5	3.0
Heat Resistant	3.5	3.0
High Performance Architectural	6.2	6.2
High Temperature	3.5	3.5
Metallic	3.5	3.5
Military Specification	2.8	2.3
Mold Seal	3.5	3.5
Pan Backing	3.5	3.5
Prefabricated Architectural	3.5	2.3
Pretreatment Coatings	3.5	3.5
Repair and Touch Up	3.5	3.0
Silicone Release	3.5	3.5
Solar Absorbent	3.5	3.0
Vacuum Metalizing	3.5	3.5
Drum, New, Exterior	2.8	2.8
Drum, New, Interior	3.5	3.5
Drum, Reconditioned, Exterior	3.5	3.5
Drum, Reconditioned, Interior	4.2	4.2

<b>Plastic Parts and Products Coatings</b>	
<b>Coating Category</b>	<b>Emission Limit pounds of VOC per gallon of coating (minus water and exempt compounds)</b>
<b>Automotive/Transportation</b>	
<b>High Bake, Interior and Exterior Parts</b>	
Flexible Primer	4.5
Non-Flexible Primer	3.5
Basecoat	4.3
Clear Coat	4.0
Non-Basecoat/Clear Coat	4.3
<b>Low Bake/Air Dried, Exterior Parts</b>	
Primer	4.8
Basecoat	5.0
Clear Coat	4.5
Non-Basecoat/Clear Coat	5.0
<b>Low Bake/Air Dried, Interior Parts</b>	
Touch Up and Repair	5.2
<b>Business Machine</b>	
Primer	2.9
Topcoat	2.9
Texture Coat	2.9
Fog Coat	2.2
Touch Up and Repair	2.9
<b>Plastic, All Other</b>	
General, One Component	2.3
General, Multi Component	3.5
Electric Dissipating and Shock-Free	6.7
Extreme Performance	3.5
Metallic	3.5
<b>Military Specification</b>	
One (1) Pack	2.8
Two (2) Pack	3.5
Mold Seal	6.3
Multi Colored	5.7
Optical	6.7
Polyurethane Shoe Sole	6.7
Vacuum-Metalizing	6.7

<b>Pleasure Craft Coatings</b>	
<b>Coating Category</b>	<b>Emission Limit pounds of VOC per gallon of coating (minus water and exempt compounds)</b>
Extreme High Gloss Topcoat	5.0
High Gloss Topcoat	3.5
Pretreatment Wash Primer	6.5
Finish Primer/Surfacer	3.5
High Build Primer/Surfacer	2.8
Aluminum Substrate Antifoulant	4.7
Other Substrate Antifoulant	2.8
Antifoulant Sealer/Tie	3.5
All Other	3.5

<b>Motor Vehicle Materials</b>	
<b>Coating Category</b>	<b>Emission Limit pounds of VOC per gallon of coating (minus water and exempt compounds)</b>
Motor Vehicle Cavity Wax	5.4
Motor Vehicle Sealer	5.4
Motor Vehicle Deadener	5.4
Motor Vehicle Gasket/Gasket-Sealing Material	1.7
Motor Vehicle Underbody	5.4
Motor Vehicle Trunk Interior	5.4
Motor Vehicle Bedliner	1.7
Motor Vehicle Lubricating Wax/Compound	5.8

3. Method and determination of compliance. The emission limits in paragraph (3)(J)2. of this rule shall be achieved through one (1) of the following:

A. VOC content of coatings. Determine the daily volume-weighted average VOC content of all coatings used in a surface coating unit, expressed as pounds of VOC per gallon of coating (minus water and exempt compounds), per subparagraph (5)(C)3.A. of this rule. The surface coating unit is in compliance if this value is less than or equal to the emission limit in paragraph (3)(J)2. of this rule;

B. Combination of VOC content of coatings and add-on controls. Calculate the required control system efficiency per paragraph (5)(C)4. of this rule. The surface coating unit is in compliance if the actual overall control system efficiency is greater than or equal to the required control system efficiency; or

C. Control system. If a control system is used to achieve compliance, the overall control system efficiency must be ninety percent (90%) or greater.

4. Application equipment. On or after September 1, 2011, one (1) or a combination of the following equipment shall be used for coating application, unless achieving compliance by using an add-on control device per subparagraph (3)(J)3.C. of this rule:

- A. Electrostatic equipment;
- B. HVLP spray equipment;
- C. Flow coating;
- D. Roller coating;
- E. Dip coating, including electrodeposition;
- F. Airless spray;
- G. Air-assisted airless spray; and

H. Other coating application method capable of achieving a transfer efficiency equivalent or better than achieved by HVLP spraying.

5. Work practices. On or after September 1, 2011, work practices shall be used to minimize VOC emissions from solvent storage, mixing operations, and handling operations for coatings, thinners, cleaning materials, and waste materials. Work practices shall include, but not be limited to, the following:

A. Store all VOC-containing coatings, thinners, and cleaning materials in closed containers;

B. Ensure that mixing and storage containers used for VOC-containing coatings, thinners, coating related waste, and cleaning materials are kept closed at all times except when depositing or removing these materials;

C. Minimize spills of VOC-containing coatings, thinners, and cleaning materials;

D. Clean up spills immediately;

E. Convey any coatings, thinners, and cleaning materials in closed containers or pipes from one (1) location to another; and

F. Minimize VOC emissions from the cleaning of application, storage, mixing, and conveying equipment by ensuring that equipment cleaning is performed without atomizing the cleaning solvent and all spent solvent is captured in closed containers.

6. For metal parts coatings, the VOC limits in paragraph (3)(J)2. of this rule do not apply to the following types of coatings and coating operations:

- A. Stencil coatings;
- B. Safety-indicating coatings;
- C. Solid film lubricants;
- D. Electric-insulating and thermal-conducting coatings;
- E. Magnetic data storage disk coatings; and
- F. Plastic extruded onto metal parts to form a coating.

7. For metal parts coatings, the application equipment requirements in paragraph (3)(J)4. of this rule do not apply to the following types of coatings and coating operations:

- A. Touch-up coatings;
- B. Repair coatings; and
- C. Textured coatings.

8. For plastic parts coatings, the VOC limits in paragraph (3)(J)2. of this rule do not apply to the following types of coatings and coating operations:

A. Touch-up and repair coatings;

B. Stencil coatings applied on clear or transparent substrates;

C. Clear or translucent coatings;

D. Coatings applied at a paint manufacturing installation while conducting performance tests on the coatings;

E. Any individual coating category used in volumes less than fifty (50) gallons in any one (1) year, if substitute compliant coatings are not available, provided that the total usage of all such coatings does not exceed two hundred (200) gallons per year, per installation;

F. Reflective coating applied to highway cones;

G. Mask coatings that are less than one-half (0.5) millimeter thick (dried) and the area coated is less than twenty-five (25) square inches;

H. Electromagnetic interference and radio frequency interference (EMI/RFI) shielding coatings; and

I. Heparin-benzalkonium chloride (HBAC)-containing coatings applied to medical devices, provided that the total usage of all such coatings does not exceed one hundred (100) gallons per year, per installation.

9. For plastic parts coatings, the application equipment requirements in paragraph (3)(J)4. of this rule do not apply to airbrush operations using five (5) gallons or less per year of coating.

10. For automobile, transportation, or business machine plastic parts coatings, the VOC limits in paragraph (3)(J)2. of this rule do not apply to the following types of coatings and coating operations:

- A. Texture coatings;
- B. Vacuum metalizing coatings;
- C. Gloss reducers;
- D. Texture adhesion primers;
- E. Electrostatic preparation coatings;
- F. Resist coatings; and
- G. Stencil coatings.

11. For pleasure craft surface coating operations, the application equipment requirements in paragraph (3)(J)4. of this rule do not apply to extreme high gloss coatings.

12. The limits for military specification coatings in subparagraph (3)(J)2.B. of this rule do not apply to coatings that meet the following criteria:

A. The coating is applied to military equipment used for national defense;

B. The coating performance is critical to the successful operation of the military equipment;

C. The coating is mandated in a specification or contract

and a substitution of coatings that meet the VOC limits in subparagraph (3)(J)2.B. of this rule is prohibited; and

D. The director grants approval for the use of the coating at the installation.

(K) Industrial Adhesive Application.

1. The requirements in this subsection apply to adhesive application processes.

2. Emission limits.

A. On or after September 1, 2011, no owner or operator of an adhesive application process subject to this subsection may cause, allow, or permit the discharge into the ambient air of any VOCs in excess of the following, as delivered to the coating applicator(s):

Category	Emission Limit pounds of VOC per gallon of coating (minus water and exempt compounds)
<b>Adhesives Applied to the Specific Substrates</b>	
Reinforced Plastic Composites	1.7
Flexible Vinyl	2.1
Metal	0.3
Porous Material (Except Wood)	1.0
Rubber	2.1
Wood	0.3
Other Substrates	2.1
<b>Specialty Adhesive Application Processes</b>	
Ceramic Tile Installation	1.1
Contact Adhesive	2.1
Cove Base Installation	1.3
Floor Covering Installation, Indoor	1.3
Floor Covering Installation, Outdoor	2.1
Floor Covering Installation, Perimeter Bonded Sheet Vinyl	5.5
Metal to Urethane/Rubber Molding or Casting	7.1
Motor Vehicle Adhesive	2.1
Motor Vehicle Weatherstrip Adhesive	6.3
Multipurpose Construction	1.7
Plastic Solvent Welding, ABS	3.3
Plastic Solvent Welding, Except ABS	4.2
Sheet Rubber Lining Installation	7.1
Single-Ply Roof Membrane Installation/Repair, Except EPDM Glue	2.1
Structural Glazing	0.8
Thin Metal Laminating	6.5
Tire Repair	0.8
Waterproof Resorcinol	1.4
<b>Adhesive Primer Application Processes</b>	
Motor Vehicle Glass Bonding Primer	7.5
Plastic Solvent Welding Adhesive Primer	5.4
Single-Ply Roof Membrane Adhesive Primer	2.1
Other Adhesive Primer	2.1

B. The VOC limits in subparagraph (3)(K)2.A. of this rule for adhesives or adhesive primers applied to particular substrates shall apply as follows:

(I) If an adhesive is subject to a specific VOC limit in subparagraph (3)(K)2.A., the specific limit is applicable rather than an adhesive-to-substrate limit; and

(II) When an adhesive is used to bond dissimilar substrates, the applicable substrate category with the highest VOC content shall be the limit.

3. Method and determination of compliance. The emission limits in paragraph (3)(K)2. of this rule shall be achieved through one (1) of the following:

A. VOC content of coatings. Determine the daily volume-weighted average VOC content of all coatings used in an adhesive application process, expressed as pounds of VOC per gallon of coating (minus water and exempt compounds) per subparagraph (5)(C)3.A. of this rule. The adhesive application process is in compliance if this value is less than or equal to the emission limits in paragraph (3)(K)2. of this rule;

B. Combination of VOC content of coatings and add-on controls. Calculate the required control system efficiency per paragraph (5)(C)4. of this rule. The adhesive application process is in compliance if the actual overall control system efficiency is greater than or equal to the required control system efficiency; or

C. Control system. If a control system is used to achieve compliance, the overall control system efficiency must be eighty-five percent (85%) or greater.

4. Application equipment. On or after September 1, 2011, one (1) or a combination of the following equipment shall be used for adhesive application, unless achieving compliance by using an add-on control device per subparagraph (3)(K)3.C. of this rule:

A. Electrostatic spray;

B. HVLP spray;

C. Flow coat;

D. Roller coat or hand application, including non-spray application methods similar to hand- or mechanically-powered caulking gun, brush, or direct-hand application;

E. Dip coat, including electrodeposition;

F. Airless spray;

G. Air-assisted airless spray; and

H. Other adhesive application method capable of achieving a transfer efficiency equivalent or better than achieved by HVLP spraying.

5. Work practices. On or after September 1, 2011, work practices shall be used to minimize VOC emissions from solvent storage, mixing operations, and handling operations for coatings, thinners, cleaning materials, and waste materials. Work practices shall include, but not be limited to, the following:

A. Store all VOC-containing coatings, thinners, and cleaning materials in closed containers;

B. Ensure that mixing and storage containers used for VOC-containing coatings, thinners, coating related waste, and cleaning materials are kept closed at all times except when depositing or removing these materials;

C. Minimize spills of VOC-containing coatings, thinners, and cleaning materials;

D. Clean up spills immediately;

E. Convey any coatings, thinners, and cleaning materials in closed containers or pipes from one (1) location to another; and

F. Minimize VOC emissions from the cleaning of application, storage, mixing, and conveying equipment by ensuring that equipment cleaning is performed without atomizing the cleaning solvent and all spent solvent is captured in closed containers.

(4) Reporting and Record Keeping.

(A) The owner or operator of a surface coating unit covered under this rule shall keep records as necessary to determine com-

pliance. Records kept should be appropriate for the facility, their products, and operations. These may include, as applicable, one (1) or more of the following:

1. Current list of coatings used and the VOC content as applied;

2. Daily volume usage of each coating;

3. Records of the weighted average VOC content for each coating type included in averaging for coating operations that achieve compliance through coating VOC content or a combination of coating VOC content and control system;

4. Annual VOC emissions from surface coating equipment cleaning; and

5. All test results to determine capture efficiency, control efficiency, and coating properties.

(B) Records such as daily production rates may be substituted for actual daily coating use measurements provided the owner submits a demonstration, approved by the director, that these records are adequate for the purposes of this rule.

(C) Any owner or operator using an emission control device to achieve compliance shall maintain daily records 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. An owner or operator of a surface coating unit employing a thermal or catalytic oxidizer to achieve compliance shall comply with the following requirements:

A. Continuous temperature monitoring and 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 surface coating unit and the control device:

(I) A log or record of the operating time for the control device, monitoring equipment, and the associated surface coating unit;

(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 surface coating unit was in compliance; and

(III) For catalytic oxidizers, all three (3)-hour periods of operation during which the average temperature of the exhaust gases immediately before the catalyst bed was more than fifty degrees Fahrenheit (50°F) below the average temperature of the exhaust gases during the most recent emission test that demonstrated that the surface coating unit 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 surface coating operation was in compliance; and

6. An owner or operator of a surface coating unit employing a carbon adsorption system to achieve compliance shall comply with the following requirements:

A. The following types of monitoring and recording equipment 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 is 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 is 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 surface coating unit and the carbon adsorption system:

(I) A log or record of the operating time for the carbon adsorption system, monitoring equipment, and the associated surface coating unit;

(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 surface coating unit 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 surface coating unit 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 surface coating unit was in compliance.

(D) Records required under subsections (4)(A) through (4)(C) of this rule shall be retained by the owner or operator for a minimum of five (5) years. These records shall be made available to the director upon request.

#### (5) Test Methods.

(A) Test Methods for Control Systems. Owners or operators demonstrating compliance with the provisions of this rule via a control system shall determine the overall control system efficiency as the product of the capture efficiency and control device efficiency, using the following test methods:

1. The VOC concentration of gaseous air streams shall be determined with a test consisting of three (3) separate runs, each lasting a minimum of sixty (60) minutes using one (1) of the following methods as specified by 40 CFR 60, Appendix A—Reference Methods:

A. Method 18—Measurement of Gaseous Organic Compound Emissions by Gas Chromatography;

B. Method 25—Determination of Total Gaseous Non-methane Organic Emissions as Carbon; or

C. Method 25A—Determination of Total Gaseous Organic Concentration Using Flame Ionization Analyzer;

2. Sample and velocity traverses shall be determined by using one (1) of the following methods as specified by 40 CFR 60, Appendix A—Reference Methods:

A. Method 1—Sample and Velocity Traverses for Stationary Sources; or

B. Method 1A—Sample and Velocity Traverses for Stationary Sources with Small Stacks or Ducts;

3. Velocity and volumetric flow rates shall be determined by using one (1) of the following methods as specified by 40 CFR 60,

#### Appendix A—Reference Methods:

A. Method 2—Determination of Stack Gas Velocity and Volumetric Flow Rate (Type S Pitot Tube);

B. Method 2A—Direct Measurement of Gas Volume Through Pipes and Small Ducts;

C. Method 2C—Determination of Stack Gas Velocity and Volumetric Flow Rate in Small Stacks or Ducts (Standard Pitot Tube);

D. Method 2D—Measurement of Gas Volumetric Flow Rates in Small Pipes and Ducts;

E. Method 2F—Determination of Stack Gas Velocity and Volumetric Flow Rate With Three-Dimensional Probes;

F. Method 2G—Determination of Stack Gas Velocity and Volumetric Flow Rate With Two-Dimensional Probes; or

G. Method 2H—Determination of Stack Gas Velocity Taking Into Account Velocity Decay Near the Stack Wall;

4. To analyze the exhaust gases, use the method in 10 CSR 10-6.030(3);

5. To measure the moisture in the stack gas, use the method in 10 CSR 10-6.030(4); and

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

(B) Test Methods for Determining Coating Properties. The coating properties in paragraphs (5)(B)1. through (5)(B)6. of this rule shall be determined from the coating manufacturer's supplied data or the method referenced in 10 CSR 10-6.030(14)(C). If there is a discrepancy between the manufacturer's supplied data and the method referenced in 10 CSR 10-6.030(14)(C), compliance shall be based on the method referenced in 10 CSR 10-6.030(14)(C).

1. Density of coating,  $D_C$ .

A. Electrodeposition primer. For electrodeposition primer, the coating density shall be as received.

B. All other coatings. For all other coatings, the coating density shall be as applied.

2. Volume fraction of solids in the coating,  $V_S$ .

A. Electrodeposition primer. For electrodeposition primer, the volume fraction of solids in the coating shall be as received.

B. All other coatings. For all other coatings, the volume fraction of solids in the coating shall be as applied.

3. Weight fraction of exempt compounds in the coating,  $W_E$ .

4. Weight fraction of regulated VOC in the coating,  $W_O$ . This value does not include the weight fraction of water or exempt compounds.

A. Electrodeposition primer. For electrodeposition primer, the weight fraction of VOC in the coating shall be as received.

B. All other coatings. For all other coatings, the weight fraction of VOC in the coating shall be as applied.

5. Weight fraction of solids in the coating,  $W_S$ .

6. Weight fraction of water in the coating,  $W_W$ .

#### (C) Other Test Methods and Calculations.

1. Calculating the VOC content of the coating.

A. The VOC content of the coating as applied, expressed as pounds of VOC per gallon of coating (minus water and exempt compounds), shall be determined using Equation (1) as follows:

$$B = \frac{D_C \times W_O}{1 - \left( \frac{D_C \times W_W}{8.33} \right) - \left( \sum_{j=1}^m \frac{D_C \times W_{Ej}}{D_{Ej}} \right)} \quad (1)$$

Where:

B = VOC content of the coating as applied, expressed as pounds of VOC per gallon of coating (minus water and exempt compounds);

$D_C$  = density of coating as applied, expressed as pounds per gallon;  
 $W_O$  = weight fraction of regulated VOC in the coating, as applied. This value does not include the weight fraction of water or exempt compounds;  
 $W_W$  = weight fraction of water in the coating, as applied;  
 $W_E$  = weight fraction of exempt compounds in the coating, as applied;  
 $D_E$  = density of each exempt compound, expressed as pounds per gallon;  
 $m$  = number of exempt compounds in the coating; and  
 8.33 = density of water, expressed as pounds per gallon.

B. The VOC content of the coating as applied, expressed as pounds of VOC per gallon of coating solids, shall be determined using Equation (2) as follows:

$$B_S = \frac{D_C \times W_O}{V_S} \quad (2)$$

Where:

$B_S$  = VOC content of the coating as applied, expressed as pounds of VOC per gallon of coating solids;  
 $D_C$  = density of coating as applied, expressed as pounds per gallon;  
 $W_O$  = weight fraction of regulated VOC in the coating, as applied. This value does not include the weight fraction of water or exempt compounds; and  
 $V_S$  = volume fraction of solids in the coating, as applied.

C. The VOC content of the coating as applied, expressed as pounds of VOC per pound of coating solids, shall be determined using Equation (3) as follows:

$$B_{MWS} = \frac{D_C \times W_O}{D_C \times W_S} \quad (3)$$

Where:

$B_{MWS}$  = VOC content of the coating as applied, expressed as pounds of VOC per pound of coating solids;  
 $D_C$  = density of coating as applied, expressed as pounds per gallon;  
 $W_O$  = weight fraction of regulated VOC in the coating, as applied. This value does not include the weight fraction of water or exempt compounds; and  
 $W_S$  = weight fraction of solids in the coating, as applied.

2. Equivalent emission limits. Emission limits expressed as pounds of VOC per gallon of coating (minus water and exempt compounds) shall be converted to an equivalent emission limit expressed as pounds of VOC per gallon of coating solids using Equation (4) as follows:

$$L_S = \frac{L}{\left(1 - \frac{L}{7.36}\right)} \quad (4)$$

Where:

$L_S$  = emission limit expressed as pounds of VOC per gallon of coating solids;  
 $L$  = emission limit expressed as pounds of VOC per gallon of coating (minus water and exempt compounds); and  
 7.36 = average density of solvents, in pounds per gallon, used to originally establish the emission limits.

3. Weighted averaging.

A. The daily volume-weighted average VOC content of all coatings used in a surface coating unit, expressed as pounds of

VOC per gallon of coating (minus water and exempt compounds), shall be calculated using Equation (5) as follows:

$$DAVG_{VW} = \frac{\sum_{i=1}^n (A_i \times B_i)}{C} \quad (5)$$

Where:

$DAVG_{VW}$  = daily volume-weighted average VOC content, expressed as pounds of VOC per gallon of coating (minus water and exempt compounds);  
 $A$  = daily gallons of each coating used (minus water and exempt compounds) in a surface coating unit;  
 $B$  = VOC content of the coating as applied, expressed as pounds of VOC per gallon of coating (minus water and exempt compounds). This is determined by subparagraph (5)(C)1.A. of this rule;  
 $C$  = total daily gallons of coatings used (minus water and exempt compounds) in a surface coating unit; and  
 $n$  = number of coatings used in a surface coating unit.

B. The daily volume-weighted average VOC content of all coatings used in a surface coating unit, expressed as pounds of VOC per gallon of coating solids, shall be calculated using Equation (6) as follows:

$$DAVG_{VWS} = \frac{\sum_{i=1}^n (A_{S_i} \times B_{S_i})}{C_S} \quad (6)$$

Where:

$DAVG_{VWS}$  = daily volume-weighted average VOC content, expressed as pounds of VOC per gallon of coating solids;  
 $A_S$  = daily gallons of coating solids for each coating used in a surface coating unit;  
 $B_S$  = VOC content of the coating as applied, expressed as pounds of VOC per gallon of coating solids. This is determined by subparagraph (5)(C)1.B. of this rule;  
 $C_S$  = total daily gallons of coatings solids used in a surface coating unit; and  
 $n$  = number of coatings used in a surface coating unit.

C. The daily mass-weighted average VOC content of all coatings used in a surface coating unit, expressed as pounds of VOC per pound of coating solids, shall be calculated using Equation (7) as follows:

$$DAVG_{MWS} = \frac{\sum_{i=1}^n (A_{MWS_i} \times B_{MWS_i})}{C_{MWS}} \quad (7)$$

Where:

$DAVG_{MWS}$  = daily mass-weighted average VOC content, expressed as pounds of VOC per pound of coating solids;  
 $A_{MWS}$  = daily pounds of coating solids for each coating used in a surface coating unit;  
 $B_{MWS}$  = VOC content of the coating as applied, expressed as pounds of VOC per pound of coating solids. This is determined by subparagraph (5)(C)1.C. of this rule;  
 $C_{MWS}$  = total daily pounds of coatings solids used in a surface coating unit; and  
 $n$  = number of coatings used in a surface coating unit.

D. The monthly volume-weighted average VOC emission rate of an electrodeposition primer, expressed as pounds of VOC per gallon of coating solids deposited, shall be determined using Equation (8) as follows:

$$MAVG_{VWS} = \left[ \frac{\sum_{i=1}^n L_{C_i} D_{C_i} W_{O_i} + \sum_{j=1}^m L_{D_j} D_{D_j}}{\sum_{i=1}^n L_{C_i} V_{S_i}} \right] \times [1-E/100] \quad (8)$$

Where:

$MAVG_{VWS}$  = monthly volume-weighted average VOC emission rate of the electrodeposition primer, expressed as pounds of VOC per gallon of coating solids deposited;

$L_C$  = monthly volume of each coating consumed, as received, expressed as gallons;

$D_C$  = density of each coating as received, expressed as pounds per gallon;

$W_O$  = weight fraction of VOC in each coating, as received;

$L_D$  = monthly volume of each type of VOC dilution solvent added to the coating, expressed as gallons;

$D_D$  = density of each type of VOC dilution solvent added to the coating, expressed as pounds per gallon;

$V_S$  = volume fraction of solids in each coating as received, expressed as gallons of solids per gallon of coating;

$E$  = overall control system efficiency;

$n$  = number of coatings used; and

$m$  = number of VOC dilution solvents used.

E. The monthly volume-weighted average VOC content of all coatings used in a surface coating unit, expressed as pounds of VOC per gallon of coating (minus water and exempt compounds), shall be calculated using Equation (9) as follows:

$$MAVG_{VW} = \frac{\sum_{i=1}^n (A_i \times B_i)}{C} \quad (9)$$

Where:

$MAVG_{VW}$  = monthly volume-weighted average VOC content as applied, expressed as pounds of VOC per gallon of coating (minus water and exempt compounds);

$A$  = monthly gallons of each coating used (minus water and exempt compounds) in a surface coating unit;

$B$  = VOC content of the coating as applied, expressed as pounds of VOC per gallon of coating (minus water and exempt compounds), as delivered to the coating applicator. This is determined by subparagraph (5)(C)1.A. of this rule;

$C$  = total monthly gallons of coatings used (minus water and exempt compounds) in a surface coating unit; and

$n$  = number of coatings used in a surface coating unit.

4. The required control system efficiency shall be determined using Equation (10) as follows:

$$R = \left[ \frac{(DAVG_{VWS} - L_S)}{DAVG_{VWS}} \right] \times 100 \quad (10)$$

Where:

$R$  = required control system efficiency;

$DAVG_{VWS}$  = daily volume-weighted average VOC content of all coatings used in a surface coating unit, expressed as pounds of VOC per gallon of coating solids, per subparagraph (5)(C)3.B. of this rule; and

$L_S$  = emission limits expressed as pounds of VOC per gallon of coating solids, per paragraph (5)(C)2. of this rule.

*PUBLIC COST:* This proposed amendment will not cost state agencies or political subdivisions more than five hundred dollars (\$500) in the aggregate.

*PRIVATE COST:* This proposed amendment will cost private entities \$2,280,500 in the aggregate. This consists of a one (1)-time initial capital cost of one hundred fifty thousand dollars (\$150,000) and two hundred thirteen thousand fifty dollars (\$213,050) in annualized costs.

*NOTICE OF PUBLIC HEARING AND NOTICE TO SUBMIT COMMENTS:* A public hearing on this proposed amendment will begin at 9:00 a.m., February 3, 2011. The public hearing will be held at the Doubletree Hotel and Conference Center, Ballrooms C, D, and E, 16625 Swingley Ridge Road, Chesterfield, Missouri. Opportunity to be heard at the hearing shall be afforded any interested person. Interested persons, whether or not heard, may submit a written or email statement of their views until 5:00 p.m., February 10, 2011. Written comments shall be sent to Chief, Air Quality Planning Section, Missouri Department of Natural Resources' Air Pollution Control Program, PO Box 176, Jefferson City, MO 65102-0176. Email comments shall be sent to [apcprulespn@dnr.mo.gov](mailto:apcprulespn@dnr.mo.gov).

*AUTHORITY:* section 643.050, RSMo Supp. [1999] 2010. Original rule filed Dec. 15, 1978, effective July 12, 1979. For intervening history, please consult the Code of State Regulations. Amended: Filed Nov. 30, 2010.

**FISCAL NOTE  
PRIVATE COST**

- I. Department Title:** 10 – Department of Natural Resources  
**Division Title:** 10 – Air Conservation Commission  
**Chapter Title:** 5 – Air Quality Standards and Air Pollution Control Rules Specific to the St. Louis Metropolitan Area

<b>Rule Number and Title:</b>	10 CSR 10-5.330 Control of Emissions From Industrial Surface Coating Operations
<b>Type of Rulemaking:</b>	Amendment to Existing Rule

**II. SUMMARY OF FISCAL IMPACT**

Estimate of the number of entities by class which would likely be affected by the adoption of the rule:	Classification by types of the business entities which would likely be affected:	Estimate in the aggregate as to the cost of compliance with the rule by the affected entities:
Approximately seventy (70) surface coating facilities in the St. Louis ozone non-attainment area.	North American Industry Classification System codes: 316, 321, 326, 331, 332, 333, 334, 336, 337, 339, 482, 811, 321211, 321212, 321219, 321999, 332116, 332612, 332951, 333312, 333319, 335121, 335122, 335221, 335222, 335224, 335228, 336111, 336112, 336211, 337124, 337127, 337214, 337215, 339111, 339114, 81142 Standard Industry Classification codes: 2514, 2522, 2531, 2542, 2599, 3631, 3632, 3633, 3639, 3429, 3469, 3495, 3585, 3589, 3645, 3646, 3821, 3843 Source Classification Codes: 40200701, 40200706, 40200707, 40200710, 40200711, 40200712	\$2,280,500

**III. WORKSHEET**

A survey was sent to seventy (70) facilities in the St. Louis ozone non-attainment area that perform surface coating operations that are likely to be affected by the rulemaking. The survey informed them of the Control Techniques Guidelines (CTGs) recently published by the U. S. Environmental Protection Agency (EPA) and requested information on the volatile organic compound (VOC) content, quantity, category, and cost of the coatings they use; the type of application equipment they use to apply the coatings; the total VOC emissions from surface coating operations; and the coating category and cost of the coatings they would use under the proposed limits set forth in the



CTGs. These facilities were identified by using Standard Industrial Classification codes, North American Industry Classification System codes, and Source Classification Codes that EPA listed in the CTGs and relevant Federal Register Notices.

Responses were received from 48 facilities. The information from the responding facilities was compiled to determine the total cost associated with compliance to the proposed limits. The results of the survey show:

Coating Category	Incremental Cost (Annualized)	Incremental Cost (Assuming 10 Year Rule Life)	One-Time Capital Cost	Total Cost of Compliance
Miscellaneous Metal and Plastic Parts	\$205,410	\$2,054,100	\$150,000	\$2,204,100
Automobile and Light-Duty Truck Assembly	\$0	\$0	\$0	\$0
Large Appliance	\$0	\$0	\$0	\$0
Metal Furniture	\$0	\$0	\$0	\$0
Flat Wood Paneling	\$0	\$0	\$0	\$0
Paper, Film, and Foil	\$3,662	\$36,620	\$0	\$36,620
Adhesive	\$3,978	\$39,780	\$0	\$39,780
Total	\$213,050	\$2,130,500	\$150,000	\$2,280,500

#### IV. ASSUMPTIONS

1. For the convenience of calculating this fiscal note over a reasonable time frame, the life of the rule is assumed to be ten (10) years although the duration of the rule is indefinite. If the life of the rule extends beyond ten years, the annual costs for additional years will be consistent with the assumptions used to calculate annual costs as identified in this fiscal note.
2. Compliance with the proposed emission limits would be achieved by using coatings with a weighted average VOC content that is equal to or below the proposed limits. No control system would be used to achieve compliance. This assumption is consistent with the EPA CTG cost consideration.
3. The incremental cost of compliance results from the reformulation or substitution of coatings that meet the proposed limits. In many instances, the cost of the reformulated coating per gallon is higher than the cost per gallon of the present coating.
4. Where responding facilities provided a cost estimate for the coating they would use to comply with the proposed limits, that cost was used to estimate their cost of compliance.
5. Where responding facilities did not provide a cost estimate for the coating they would use to comply with the proposed limits, the cost of compliance was

estimated by using the cost effectiveness in the CTGs. These cost effectiveness values, expressed at dollars per ton of VOC emission reduction, are:

- a. Miscellaneous Metal and Plastic Parts Coatings - \$1,758.
  - b. Automobile and Light-Duty Truck Assembly Coatings - \$0. The EPA states that affected facilities are already using the control measures in the CTG and, therefore, should incur no additional costs.
  - c. Large Appliance Coatings - \$500.
  - d. Metal Furniture Coatings - \$200.
  - e. Flat Wood Paneling Coatings - \$1,600.
  - f. Paper, Film, and Foil Coatings - \$1,200.
  - g. Miscellaneous Industrial Adhesives - \$265.
6. Where facilities did not reply to the survey, information for their VOC emissions was obtained from 2008 Missouri Emissions Inventory System (MOEIS) records. Using this information, the VOC reduction percentage and cost per ton from the appropriate CTGs were used to determine their estimated cost of compliance and reduction in VOC emissions. Facilities that showed no VOC emissions from surface coating operations in their 2008 MOEIS record were assumed to have no cost impact and no VOC reductions. Facilities that had no 2008 MOEIS record were not included in the calculations.
7. The annual quantity of each coating used would remain the same for the present coatings and the coatings used to comply with the proposed limits. In other words, they would have the same substrate coverage.
8. The coating usage was based on calendar year 2008 data from industry surveys or MOEIS records.
9. When the proposed emission limit was less than the present VOC content of the coating, the VOC emission reduction, excluding adhesives, was calculated using the following equation:

$$AR_{VOC} = \frac{(C - L) \cdot U}{2000}$$

Where:

$AR_{VOC}$  = is the annual VOC reductions, expressed as tons

C = Present VOC content of the coating, expressed as pounds of VOC per gallon of coating

L = The VOC content of the coating under the proposed limits, expressed as pounds of VOC per gallon of coating. This VOC content was assumed to be equal to the proposed limits.

U = Annual quantity of coating used, expressed as gallons per year. This was assumed to be equal for the present coating and the proposed coating.

10. For adhesives, the VOC reduction was assumed to be 64% with a cost effectiveness of \$265 per ton, as stated in the CTG.
11. The financial figures for the information received from the surveyed facilities are in 2008 dollars. The cost effectiveness figures presented in the individual CTGs are assumed to be current for the year they were published, ranging from 2006 to 2008.
12. No additional recordkeeping costs will be incurred. Affected facilities are already maintaining records of the quantity and weighted average VOC content of their coatings.

**Title 10—DEPARTMENT OF NATURAL RESOURCES**  
**Division 10—Air Conservation Commission**  
**Chapter 5—Air Quality Standards and Air Pollution**  
**Control Rules Specific to the St. Louis Metropolitan**  
**Area**

**PROPOSED AMENDMENT**

**10 CSR 10-5.340 Control of Emissions From Rotogravure and Flexographic Printing [Facilities] Operations.** The commission proposes to amend the rule title and rule purpose; amend sections (1), (2), (3), (4), and (5); and delete section (6). If the commission adopts this rule action, it will be the department's intention to submit this rule amendment to the U.S. Environmental Protection Agency to replace the current rule that is in the Missouri State Implementation Plan. The evidence supporting the need for this proposed rulemaking is available for viewing at the Missouri Department of Natural Resources' Air Pollution Control Program at the address listed in the Notice of Public Hearing at the end of this rule. More information concerning this rulemaking can be found at the Missouri Department of Natural Resources' Environmental Regulatory Agenda website, [www.dnr.mo.gov/reg/index.html](http://www.dnr.mo.gov/reg/index.html).

*PURPOSE: This rule restricts volatile organic compound emissions from rotogravure and flexographic printing operations including flexible package printing operations. This amendment will update the rule to include specific emission limits of volatile organic compounds for flexible package printing operations in the St. Louis ozone nonattainment area. This will make the limits consistent with the current federal Reasonably Available Control Technology guidance documents. The evidence supporting the need for this proposed rulemaking, per section 536.016, RSMo, is the U.S. Environmental Protection Agency 2006 Control Techniques Guidelines for flexible package printing and Clean Air Act section 182(b)(2).*

*PURPOSE: This rule restricts volatile organic compound emissions from rotogravure and flexographic printing [facilities] operations including flexible package printing operations.*

**(1) [Application] Applicability.**

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

(B) This rule applies to installations with at least one (1) of the following:

1. *[u]*Uncontrolled potential emissions equal to or greater than two hundred fifty kilograms (250 kg) per day or one hundred (100) tons per year of volatile organic compounds (VOC) from the combination of rotogravure and flexographic printing presses. The uncontrolled potential emissions are the potential emissions (as defined) plus the amount by weight of VOCs whose emission into the atmosphere is prevented by the use of air pollution control devices[.];

2. Individual flexible package printing press(es) with the potential to emit VOCs in an amount equal to or greater than twenty-five (25) tons per year; and

3. Flexible package printing operations that have actual VOC emissions, including related cleaning activities, before consideration of controls, of at least three (3) tons per twelve (12)-month rolling period. Once an installation exceeds this applicability level, it shall remain subject to this rule even if its actual emissions drop below this applicability level until it can demonstrate, to the satisfaction of the director, that the total actual VOC emissions from flexible package printing operations including related cleaning activities, is less than three (3) tons per twelve (12)-month rolling for five (5) consecutive twelve (12)-month periods.

(2) Definitions.

*[(A)]* Definitions of certain terms specified in this rule may be found in 10 CSR 10-6.020.

*[(B)]* The definition of a term specific to this rule is as follows: *ink formulation as applied, includes the base ink and any additives such as thinning solvents to make up the ink material that is applied to a substrate.*

**(3) [Emission Limits] General Provisions.**

(A) *[No owner or operator shall use or permit the use of any of the following printing presses unless they are equipped with a control device. The control device shall remove, destroy or prevent the emission of VOCs into the ambient air by at least the percentage indicated by weight of the uncontrolled VOC emissions on a daily weighted basis.]*

**VOC Emission Control for Flexographic and Rotogravure Printing Presses.** Each source that satisfies the applicability requirement of paragraph (1)(B)1. of this rule shall meet one (1) of the following:

1. No owner or operator shall use or permit the use of any of the following printing presses unless they are equipped with a control device. The control device shall remove, destroy, or prevent the emission of VOCs into the ambient air by at least the percentage indicated by weight of the uncontrolled VOC emissions on a daily weighted basis.

Printing Press	Percentage
Flexographic	60
Publication Rotogravure	75
Other Rotogravure	65

or

*[(B)]2.* Low solvent technology may be used to achieve VOC emission reductions instead of the methods *[required]* in *[subsection] paragraph (3)(A)1. of this rule.* If low solvent technology is used, the following limits must be met for each press:

*[1.]A.* For waterborne inks, the volatile portion of the ink as applied to the substrate must contain no more than twenty-five percent (25%) by volume of VOC; and

*[2.]B.* For water-based or high solids inks, the ink as applied to the substrate must be at least sixty percent (60%) by volume non-VOC material.

**(B) VOC Emission Control for Flexible Package Printing Presses.** Each source that satisfies the applicability requirement of paragraph (1)(B)2. of this rule shall meet one (1) of the following:

1. No owner or operator shall use or permit the use of any of the following flexible packaging printing presses unless they are equipped with a control device. The control device shall remove, destroy, or prevent the emission of VOCs into the ambient air by at least the percentage indicated by weight of the uncontrolled VOC emissions on a daily weighted basis.

Flexible Package Printing Press First Installed	VOC Control Device First Installed	VOC Control Percentage
Prior to March 14, 1995	Prior to September 1, 2011	65
Prior to March 14, 1995	On or after September 1, 2011	70
On or after March 14, 1995	Prior to September 1, 2011	75
On or after March 14, 1995	On or after September 1, 2011	80

or

2. Low solvent technology may be used to achieve VOC emission reductions instead of the methods in paragraph (3)(B)1. of this rule. If low solvent technology is used, all inks, coatings, and adhesives combined must meet one (1) of the following limits for each press:

A. Contain no more than 0.8 pounds of VOC per pound solids applied; or

**B. Contain no more than 0.16 pounds of VOC per pound materials applied.**

(C) *[No owner or operator shall use or permit the use of any flexographic or rotogravure printing press that uses cleanup] Press Cleaning.* For the purpose of this rule, a cleaning operation is any activity involving the cleaning of a press or press parts or removal of dried ink from areas around a press including the off-line cleaning of inks, coatings, and adhesives from press parts that have been removed from the press for cleaning. It does not include the use of parts washers or cold cleaners for purposes other than removing inks, coatings, or adhesives or the use of janitorial supplies (e.g., detergents or floor cleaners) to clean areas around a press. For sources meeting any of the applicability requirements of subsection (1)(B) of this rule, no owner or operator of any applicable printing press shall perform a cleaning operation that uses cleaning solvents containing VOCs unless—

1. The *[cleanup] cleaning* solvents are kept in tightly-covered tanks or containers during transport and storage;

2. The *used* cleaning cloths *[used] contaminated* with the *[cleanup] cleaning* solvents are placed in tightly-closed containers *[when not in use and]* while awaiting off-site transportation. The cleaning cloths *[should] shall* be properly cleaned and disposed of. *The cloths, when properly cleaned or disposed of, are processed in a way that as much of the solvent as practicable is recovered for some further use or destroyed. Cleaning and disposal methods shall be approved by the director;* and

3. An owner or operator may use an alternate method for reducing *[cleanup] cleaning* solvent VOC emissions, including the use of low VOC *[cleanup] cleaning* solvents, if the owner or operator shows the emission reduction is equal to or greater than paragraphs (3)(C)1. and 2. of this rule. This alternate method must be approved by the director.

(4) **Reporting and Record Keeping.** All owners and operators subject to this rule shall maintain records as required by this section to determine continuous compliance with this rule. These records shall be kept for at least five (5) years or longer if enforcement action is pending. These records shall be 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) For owners or operators using an add-on control device(s) to meet the requirements of *[subsection] paragraph (3)(A)1. or (3)(B)1. of this rule*, the following parameters shall be monitored and recorded to determine compliance with *[subsection (3)(A)] the applicable provisions of this rule*:

1. *[Exhaust gas] Operating* temperature of all *[incinerators or temperature rise across a catalytic incinerator bed] VOC destruction devices monitored* on a continuous basis while a connected printing press is operating and logged at least once every fifteen (15) minutes. The operating temperature is the gas temperature upstream of the catalyst bed for catalytic oxidizers and the oxidizer operating temperature for thermal and regenerative oxidizers;

2. VOC breakthrough on a carbon adsorption unit on a continuous basis;

3. Results of all emissions testing and inspections of control equipment as required in section (5) of this rule when performed;

4. Maintenance, repairs, and malfunction of any air pollution control equipment when performed; *[and]*

5. The cumulative amount of VOC recovered during a calendar month for all VOC recovery equipment; and

*[5.]6.* Any other monitoring parameter required by the director to determine compliance with *[subsection] paragraph (3)(A)1. or (3)(B)1. of this rule*.

(B) For owners or operators meeting the requirements of *[subsection (3)(B)] paragraphs (3)(A)2. and (3)(B)2. of this rule*, for

each ink formulation used, the following shall be recorded for each press to determine continuous compliance with *[subsection (3)(B)] the applicable provisions of this rule*:

1. Volume-weighted ink VOC content in percent by volume for each ink formulation as applied on a monthly basis;

2. Results of ink testing as required in section (5) of this rule when performed, **manufacturer's formula specification sheet, or Material Safety Data Sheets (MSDS) for each ink purchased;** and

3. Any other information required by the director to determine compliance with *[subsection] paragraph (3)(A)2. or (3)(B)2. of this rule*.

(C) For owners and operators using low solvent technology without the use of control equipment to meet the requirements of *[subsection (3)(B)] paragraphs (3)(A)2. and (3)(B)2. of this rule*, and for whom subsection (4)(B) of this rule does not apply, the following shall be recorded in addition to the records required by *subsection (4)(B) of this rule* to determine daily compliance with *[subsection (3)(B)] the applicable provisions of this rule*:

*[1. Volume-weighted ink VOC content in percent by volume for each ink formulation as applied on a monthly basis;]*

*[2.]1.* Ink usage in gallons for each ink formulation as applied on a daily basis for each press;

*[3.]2.* Volume-weighted density of VOCs in ink in pounds per gallon for each ink formulation as applied on a daily basis;

*[4.]3.* Volume-weighted average of the VOC content of each ink formulation as applied in percent by volume for each press on a daily basis;

*[5.]4.* Ink water content in percent by volume for each ink formulation as applied on a daily basis for each press; **and**

*[6.]5.* Ink exempt solvent content in percent by volume for each ink formulation as applied on a daily basis for each press $[:]$ .

*[7. Results of ink testing as required in section (5) of this rule when performed; and*

*8. Any other information required by the director to determine compliance with subsection (3)(B).*

(D) *Records of all information required in subsections (4)(A)–(C) shall be kept for at least two (2) years. These records shall be available immediately upon request for review by Department of Natural Resources personnel and other air pollution control agencies with proper authority.]*

(5) **[Determination of Compliance] Test Methods.**

(A) Testing and compliance demonstrations for the emission limits of *[subsection] paragraph (3)(A)1. or (3)(B)1. of this rule* shall follow the procedures contained in 10 CSR 10-6.030(14)(A) and 10 CSR 10-6.030(20). The averaging time for these tests shall be three (3) one (1)-hour tests. These procedures will determine control device capture efficiency and destruction efficiency. Control device testing will be required as the director determines necessary to verify the capture and destruction efficiencies. At a minimum, *[control device testing must be completed and submitted once to the appropriate air pollution control agency within one hundred eighty (180) days after this provision of the rule is effective (Aug. 5, 1992), unless the director determines that a valid test is already on file. Inlet and outlet gas temperature rise across a catalytic incinerator shall be used to determine daily compliance.]* an initial emission test shall be performed after any required control equipment is installed. The emission limits of *paragraph (3)(A)1. or (3)(B)1. of this rule* shall not have been met until compliance has been verified at least once 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. The oxidizer operating temperature or the temperature of the gas upstream of the catalyst bed monitored and recorded in accordance with *paragraph (4)(A)1. of this rule* shall be used as the operating parameter for determining continuous compliance. These temperatures

shall be monitored with an accuracy of the greater of plus or minus three-fourths percent ( $\pm 0.75\%$ ) of the temperature being measured expressed in degrees Celsius or two and one-half degrees Celsius ( $2.5^{\circ}\text{C}$ ). **The operating parameter temperatures 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 ( $50^{\circ}\text{F}$ ) below the average temperature observed during the most recent stack test to demonstrate continuous compliance.**

(B) Testing and compliance demonstrations for the emission limits of *[subsection (3)(B)] paragraph (3)(A)2. or (3)(B)2. of this rule* shall follow the procedures contained in 10 CSR 10-6.030 subsections (14)(C) and (D), respectively. *[This] These* procedures will determine the VOC content of inks. Ink testing will be required as the director determines necessary to verify the manufacturers' formula specifications. *[At a minimum, ink testing will be required once after February 6, 1992.]* Ink manufacturer's formula specifications or MSDS shall be used to determine *[daily]* compliance.

(C) **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.

*[(6) Compliance Dates.*

(A) *The owner or operator of a rotogravure or flexographic printing installation subject to this rule must submit a final control plan to the director by December 31, 1980, for his/her approval. This plan must include the following:*

- 1. A detailed plan of process modifications; and*
- 2. A time schedule for compliance containing increments of progress and a final compliance date.*

(B) *Compliance with this rule shall be accomplished by any installation as expeditiously as practicable, but in no case shall final compliance extend beyond December 31, 1982.]*

*AUTHORITY: section 643.050, RSMo [1994] 2000. Original rule filed March 13, 1980, effective Sept. 12, 1980. Amended: Filed Nov. 10, 1981, effective May 13, 1982. Amended: Filed Oct. 4, 1988, effective March 11, 1989. Amended: Filed July 15, 1991, effective Feb. 6, 1992. Amended: Filed Nov. 30, 2010.*

*PUBLIC COST: This proposed amendment will not cost state agencies or political subdivisions more than five hundred dollars (\$500) in the aggregate.*

*PRIVATE COST: This proposed amendment will cost private entities eight hundred fifty-two thousand dollars (\$852,000) in the aggregate. This consists of a one (1)-time initial capital cost of two hundred thirty-two thousand dollars (\$232,000) and sixty-two thousand dollars (\$62,000) in annualized costs.*

*NOTICE OF PUBLIC HEARING AND NOTICE TO SUBMIT COMMENTS: A public hearing on this proposed amendment will begin at 9:00 a.m., February 3, 2011. The public hearing will be held at the Doubletree Hotel and Conference Center, Ballrooms C, D, and E, 16625 Swingley Ridge Road, Chesterfield, Missouri. Opportunity to be heard at the hearing shall be afforded any interested person. Interested persons, whether or not heard, may submit a written or email statement of their views until 5:00 p.m., February 10, 2011. Written comments shall be sent to Chief, Air Quality Planning*

*Section, Missouri Department of Natural Resources' Air Pollution Control Program, PO Box 176, Jefferson City, MO 65102-0176. Email comments shall be sent to [apcprulespn@dnr.mo.gov](mailto:apcprulespn@dnr.mo.gov).*

**FISCAL NOTE  
PRIVATE COST**

- I. Department Title:** 10 – Department of Natural Resources  
**Division Title:** 10 – Air Conservation Commission  
**Chapter Title:** 5 – Air Quality Standards and Air Pollution Control Rules Specific to the St. Louis Metropolitan Area

<b>Rule Number and Title:</b>	10 CSR 10-5.340 Control of Emissions From Rotogravure and Flexographic Printing Facilities
<b>Type of Rulemaking:</b>	Amendment to Existing Rule

**II. SUMMARY OF FISCAL IMPACT**

Estimate of the number of entities by class which would likely be affected by the adoption of the rule:	Classification by types of the business entities which might be affected:	Estimate in the aggregate as to the cost of compliance with the rule by the affected entities:
2	Flexible Package Printing North American Industry Classification System codes (NAICS): 322221, 326112, 322223, 3265111, 322224, 32225, 332999 Standard Industry Classification code (SIC): 2754 Source Classification Codes (SCC): 40500301, 40500302, 40500311, 40500312, 40500314, 40500501, 40500511, 40500512, 40500513, 40500514	\$852,000

**III. WORKSHEET**

**Flexible Package Printing (FPP)**

Proposed Rule Provisions	Estimated # of applicable presses or facilities (N)	Total Capital Investment (TCI)	Total Annual Cost (TAC) (per press / facility)	Total Cost of Compliance over life of rule (TCC)
Press/Dryer VOC Emission Controls (Catalytic Oxidizer)	1	\$232,000	\$62,000	\$852,000
Cleaning	2	\$0	\$0	\$0
		\$232,000	\$62,000	\$852,000

$$(TCC) = N * [(TCI) + 10 * (TAC)]$$

**IV. ASSUMPTIONS**

1. For the convenience of calculating this fiscal note over a reasonable time frame, the life of the rule is assumed to be 10 years although the duration of the rule is indefinite. If the life of the rule extends beyond ten years, the annual costs for additional years will be consistent with the assumptions used to calculate annual costs as identified in this fiscal note.
2. Since this rule amendment is substantially similar to the emission limits and techniques presented in the U.S. Environmental Protection Agency's (EPA) *Control Techniques Guidelines (CTG) for Flexible Package Printing* (EPA-453/R-06-003, September 2006), this private entity fiscal cost analysis is based on the CTG cost estimates outlined in Appendix B of that document.
3. All figures are in 2005 dollars matching EPA's cost analysis.
4. Costs are based on 2 flexible package printing (FPP) facilities being applicable at the 3 tons per year (tpy) threshold that will have to comply with the cleaning provisions and 1 FPP press at the 25 tpy potential to emit level that will have to install a dryer VOC control device.
5. Costs are based on the VOC control device being an add-on fixed bed catalytic oxidizer with either a dryer exhaust rate of 2900 cubic feet per minute (cfm), or a dryer air flow rate of 5800 cfm employing recirculation at 50%. This typical or average installation matches Case 1.A in Appendix B of the EPA's CTG and has the specifications as outlined in the table below:

**FPP Dryer Typical Fixed Bed Catalytic Oxidizer**

<b>Parameter</b>	<b>Specification</b>
Solvent usage, tpy	25
Capture efficiency, %	70%
Control device efficiency, %	95%
Operating hours, hr/yr	2000hr/yr
Exhaust rate/oxidizer capacity	2900 cfm
TCI, \$	\$232,000
Solvent loading, lb/hr	17.5 lb/hr
Assumed VOC compound	toluene
VOC concentration, parts per million by volume (ppmv)	420 ppmv
TAC, \$	\$62,000
Solvent loading, tpy	17.5 ton/yr
VOC emission reduction, 95% efficiency	16.6
Cost effectiveness, \$/ton	3,700

6. Total capital investment costs for the add-on control device is based on purchased equipment costs which include the control device and auxiliary equipment costs, instrumentation costs, sales tax, and freight costs. Costs for instrumentation (10 percent), sales tax (3 percent), and freight (5 percent) were estimated to be 18

percent of control device and auxiliary equipment costs.

7. Several components of the annual costs include direct annual costs such as labor wages and maintenance costs, utilities, and raw materials. Common costs for indirect annual costs include overhead and administrative charges. Direct costs are listed below:

**Assumptions for TAC Calculations**

Parameter	Factor
<b>Direct Annual Costs</b>	
Operator Wage Rate (except steam stripper)	\$12.95/hr
Maintenance Labor Wage Rate	\$14.95/hr
Supervisor Labor Cost	15 percent of Operator labor cost
Maintenance materials cost	100 percent of Maintenance Labor cost
Utilities	\$3.30 per 1,000 scf
Natural Gas Cost	\$0.059 per kW-hr
Electricity Cost	
<b>Indirect Annual Costs</b>	
Overhead	60 percent of all labor and maintenance material costs
Admin, Property Taxes, and Insurance	4 percent of TCI

8. The cleaning provisions outline responsible work practices: keeping cleaning materials and used shop towels in closed containers, and conveying cleaning materials from one location to another in closed containers or pipes. Since these work practices could result in offsetting cleaning solvent costs, it is assumed that there is no cost to comply with the cleaning provisions.
9. No additional recordkeeping costs will be incurred. Affected facilities are either already maintaining appropriate records or additional recordkeeping costs are negligible.



**Title 10—DEPARTMENT OF NATURAL RESOURCES**  
**Division 10—Air Conservation Commission**  
**Chapter 5—Air Quality Standards and Air Pollution**  
**Control Rules Specific to the St. Louis Metropolitan**  
**Area**

**PROPOSED AMENDMENT**

**10 CSR 10-5.442 Control of Emissions From Lithographic and Letterpress Printing Operations.** The commission proposes to amend the rule title and rule purpose; amend sections (1), (2), (3), and (4); delete section (5); and renumber and amend section (6). If the commission adopts this rule action, it will be the department's intention to submit this rule amendment to the U.S. Environmental Protection Agency to replace the current rule that is in the Missouri State Implementation Plan. The evidence supporting the need for this proposed rulemaking is available for viewing at the Missouri Department of Natural Resources' Air Pollution Control Program at the address listed in the Notice of Public Hearing at the end of this rule. More information concerning this rulemaking can be found at the Missouri Department of Natural Resources' Environmental Regulatory Agenda website, [www.dnr.mo.gov/regs/index.html](http://www.dnr.mo.gov/regs/index.html).

*PURPOSE: This rule restricts volatile organic compound emissions from lithographic and letterpress printing operations. This amendment will update the rule to include specific emission limits of volatile organic compounds for both offset lithographic and letterpress printing operations in the St. Louis ozone nonattainment area. This will make the limits consistent with the current federal Reasonably Available Control Technology guidance documents. The evidence supporting the need for this proposed rulemaking, per section 536.016, RSMo, is the U.S. Environmental Protection Agency 2006 Control Techniques Guidelines for offset lithographic printing and letterpress printing and Clean Air Act section 182(b)(2).*

*PURPOSE: This rule restricts volatile organic compound emissions from lithographic and letterpress printing operations.*

*[(1) Definitions. Definitions of some terms specified in this rule may be found in 10 CSR 10-6.020. Other definitions specific to this rule are as follows:*

*(A) Alcohol—Refers to isopropanol, isopropyl alcohol; normal propyl alcohol or ethanol;*

*(B) Alcohol Substitutes—Nonalcohol additives that contain volatile organic compounds (VOCs) and are used in the fountain solution;*

*(C) Cleanup solution—A liquid used to remove printing ink and debris from the surfaces of the printing press and its parts;*

*(D) Fountain solution—The solution which is applied to the image plate to maintain the hydrophilic properties of the non-image areas. It is primarily water containing an etchant, gum arabic and a dampening aid;*

*(E) Heatset—A class of web-offset lithography which requires a heated dryer to evaporate the ink oils and solvents from the printing inks;*

*(F) Lithographic printing—A printing process where a planographic plate is used with the image area oleophilic and the nonimage area hydrophilic;*

*(G) Press—A printing production assembly that can be made up of one (1) or many units to produce a finished product;*

*(H) Printing—Any operation that imparts color, design, alphabet, or numerals on a substrate;*

*(I) Printing ink—Any fluid or viscous composition used in printing, impressing, or transferring an image onto a substrate;*

*(J) Offset—The process that transfers an image from a plate to a rubber blanket cylinder before transfer to the substrate surface to be printed;*

*(K) Sheet-fed—Printing presses that are fed from a stack of individual paper sheets instead of a web. Sheet-fed presses generally use coldset inks; and*

*(L) Web—The substrate printed in a continuous roll-fed printing process.]*

*[(2) Applicability.*

*(A) This rule shall apply to installations that operate offset lithographic printing presses including heatset web offset presses, non-heatset web offset presses (newspaper and non-newspaper), and non-heatset sheet-fed offset presses in the City of St. Louis and Jefferson, St. Charles, Franklin and St. Louis Counties.*

*(B) This rule shall apply only to installations described in subsection (2)(A) which have ever had the potential to emit VOCs equal to or greater than one hundred (100) tons per year. Once the installation exceeds the applicability level of this rule, it shall remain subject to this rule even if its potential emissions drop below the applicability level.*

*(C) This rule shall not apply to printing on fabric, metal or plastic.]*

**(1) Applicability.**

**(A) This rule shall apply to installations that operate offset lithographic or letterpress printing presses including heatset web, non-heatset web (newspaper and non-newspaper), and non-heatset sheet-fed presses in the City of St. Louis and Jefferson, St. Charles, Franklin, and St. Louis Counties.**

**(B) This rule shall apply only to installations described in subsection (1)(A) of this rule, with total actual emissions from lithographic and letterpress printing operations, including related cleaning activities, before consideration of controls, of more than three (3) tons per twelve (12)-month rolling period of volatile organic compounds (VOCs).**

**(C) This rule shall not apply to printing on fabric, metal, or plastic.**

**(D) Once the installation exceeds 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 lithographic and letterpress printing operations, including related cleaning activities, before consideration of controls, is less than three (3) tons per twelve (12)-month rolling for five (5) consecutive twelve (12)-month periods.**

**(E) VOC emissions calculations guidance may be found in subsection (5)(D) of this rule. As an alternative, the material use guidance in subsection (5)(E) of this rule may be used to determine applicability.**

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

**(3) [Emission Limits.] General Provisions.**

**(A) Fountain Solutions. This subsection applies only to offset lithographic presses with a total fountain solution reservoir capacity of one (1) gallon or more.**

**[(A)]1. No owner or operator shall use or permit the use of any applicable offset lithographic printing press unless—**

**[1.]A. For each heatset web press/es/—**

**[A.](I) The fountain solution, as applied, contains one and six-tenths percent (1.6%) or less by [volume] weight of alcohol; or**

**[B.](II) The fountain solution, as applied, contains three percent (3.0%) or less by [volume] weight of alcohol and is refrigerated to a temperature of sixty degrees Fahrenheit (60 °F)/,] or less; or**

[C.](III) The fountain solution, as applied, contains five percent (5.0%) or less by [volume] weight of alcohol substitutes; and

[D.](IV) The fountain solution mixing tanks are covered for alcohol-based solutions;

[2.]/B. For each sheet-fed press[es] with a maximum sheet size greater than eleven inches by seventeen inches (11" × 17") —

[A.](I) The fountain solution, as applied, contains five percent (5.0%) or less by [volume] weight of alcohol; or

[B.](II) The fountain solution, as applied, contains eight and five-tenths percent (8.5%) or less by [volume] weight of alcohol and is refrigerated to a temperature of sixty degrees Fahrenheit (60 °F)[,] or less; or

[C.](III) The fountain solution, as applied, contains five percent (5.0%) or less by [volume] weight of alcohol substitutes or a combination of alcohol and alcohol substitutes; and

[D.](IV) The fountain solution mixing tanks containing alcohol-based solutions are covered;

[3.]/C. For each non-heatset web press[es—], the fountain solution, as applied, contains no alcohol and five percent (5.0%) or less by weight of alcohol substitutes;

[A. The fountain solution contains five percent (5.0%) or less by volume alcohol substitutes; or

B. The fountain solution contains five percent (5%) or less by volume of a combination of alcohol and alcohol substitutes; and

C. The fountain solution mixing tanks containing alcohol based solutions are covered;]

[4.]/2. Direct measurement of the alcohol content of the fountain solution [sample(s) should], as applied, shall be performed and recorded with a [modification of the EPA Method 415.1. Alternately, a sample of the fountain solution may be taken from the fountain tray or reservoir of fountain solution during use and measured with a hydrometer or refractometer. The unit shall be considered in compliance with paragraphs (3)(A)1., 2., or 3. if the refractometer or hydrometer measurement is less than or equal to the measurement obtained with a modification of EPA Method 415.1, plus ten percent (10%)] hydrometer, equipped with temperature correction or with readings adjusted for temperature, at least once per day or once per batch, whichever is longer. A standard solution shall be used to calibrate the hydrometer once per month for the type of alcohol used in the fountain;

[5.]/3. For fountain solutions, as applied, containing alcohol substitutes or nonalcohol additives and, as an alternative to paragraph (3)(A)2. of this rule, [The] the VOC content [of a fountain solution containing alcohol substitutes or nonalcohol additives] shall be established with proper record keeping [including] which may include, as necessary to determine compliance, the amount of concentrated substitute added per quantity of fountain water, date of preparation, [and] calculated VOC content of the final solution, or by measurement using U.S. Environmental Protection Agency (EPA) Method 24 analysis as outlined in paragraph (5)(C)1. of this rule. For automatic mixing systems, verification and record keeping of the mixer settings shall be performed at least once each month; and

[6.]/4. [Determination of] The fountain solution temperature for each required refrigerated fountain reservoir containing alcohol-based solutions shall be [determined] measured at least once per day or once per batch, whichever is longer, by a thermometer or other temperature detection device capable of reading to one-half degree Fahrenheit (0.5 °F).

(B) Press Cleaning. No owner or operator shall use or permit the use of any applicable offset lithographic or letterpress printing press [that uses cleanup solutions containing VOCs] unless—

1. [The cleanup solution has] All cleaning solutions, excluding a quantity not to exceed one hundred ten (110) gallons per facility in any twelve (12) consecutive months, shall have a

VOC content of [thirty percent (30%)] seventy percent (70%) or less, by weight, or a composite partial vapor pressure less than or equal to ten (10) millimeters of mercury (Hg) at twenty degrees Celsius (20 °C);

2. The [cleanup] cleaning solutions are kept in tightly-covered [tanks or containers during transport and storage; and] containers at all times except when being dispensed as needed for cleaning operations;

3. The used cleaning cloths [used] contaminated with [the cleanup] cleaning solutions are placed in tightly-closed containers [when not in use and] while awaiting off-site transportation. The cleaning cloths should be properly cleaned and disposed[. The cloths, when properly cleaned or disposed, shall be processed in such a way that as much of the solvent, as practicable, is recovered for further use or is destroyed. A cleaning and disposal plan shall be submitted to the director by the compliance deadline specified in section (5) of this rule. A copy of the plan must be kept on-site for inspection purposes.]; and

4. The VOC content or composite partial vapor pressure of the cleaning solution, as applied, shall be established with proper record keeping which may include, as necessary to determine compliance, the amount of concentrated cleaning solution added per quantity of water, date of preparation, calculated VOC content, composite partial vapor pressure of the final solution, by measurement using EPA Method 24 analysis as outlined in paragraph (5)(C)2. of this rule, or the formula in paragraph (5)(C)3. of this rule. For automatic blanket wash systems, verification and record keeping of the mixer settings shall be performed at least once each month.

(C) Heatset Web Press Emission Control Systems. This subsection applies only to heatset web lithographic and letterpress printing presses with the potential to emit (PTE) VOCs from ink oil greater than twenty-five tons per year (25 TPY) unless any such press is used for book printing or has a maximum web width of twenty-two inches (22") or less.

[(C)]1. No owner or operator shall use or permit the use of any [heatset web-offset lithographic printing] press without a dryer [that has ever had an actual emission rate of ten (10) tons per year or more of VOCs unless] which has one hundred percent (100%) of [the dryer] its exhaust [is] ducted to a control device that is maintained and operated to achieve[s ninety], at all times while the press is operating, at least the indicated percentage [(90%) or greater,] by weight control efficiency [and the highest achievable capture efficiency reasonable].

VOC Control Device First Installed	VOC Control Percentage
Prior to September 1, 2011	90
On or after September 1, 2011	95

The dryer pressure shall be maintained below the pressure of the press room [to reduce the potential for fugitive VOC emissions from the dryer. Testing procedures for capture efficiencies shall be done as stated in 10 CSR 10-6.030(20), or by another method approved by the director.] at all times while the press is operating. Continuous dryer air flow monitoring is not required.

2. As an alternative to achieving the applicable control efficiency in paragraph (3)(C)1. of this rule, any press shall operate its control device to maintain a maximum VOC outlet concentration of twenty parts per million by volume (20 ppmv) as hexane (C<sub>6</sub>H<sub>14</sub>) on a dry basis.

(D) Use of emission control equipment under subsection (3)(C) of this rule shall require that continuous temperature monitors be installed, calibrated, maintained, and operated [and maintained] at all times while a connected printing press is operating.

Temperatures shall be measured with an accuracy of plus or minus seventy-five hundredths of one percent ( $\pm 0.75\%$ ) measured in degrees Celsius, or two and one-half degrees Celsius (2.5 °C). The operating temperatures to be used as the parameters for demonstrating continuous compliance shall be determined per subsection (5)(A) of this rule. The monitors continuously shall measure—

1. *[The exhaust gas temperature of all VOC destruction devices and the gas temperature immediately upstream and downstream of any catalytic bed with an accuracy of plus or minus seventy-five hundredths of one percent ( $\pm 0.75\%$ ) measured in degrees Celsius, or two and one-half degrees Celsius (2.5°C)]* For catalytic oxidizers, the gas temperature upstream of the catalyst bed;

2. *[The cumulative amount of VOC recovered during a calendar month for all VOC recovery equipment attached to a dryer]* For thermal and regenerative oxidizers, the oxidizer operating temperature; and

3. Any other parameters considered necessary by the director to verify compliance and proper operation of emission control equipment.

(4) *[Recordkeeping]* Reporting and Record Keeping.

(A) All persons 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 *[two (2)]* five (5) years *[to be automatically extended]* or longer if enforcement action is pending. These records shall be available immediately upon request for review by the Department of Natural Resources personnel and other air pollution control agencies upon presentation of proper credentials.

(B) All persons subject to subsection (3)(C) of this rule shall maintain records for each control device sufficient to demonstrate that the control efficiency is being maintained. **These records shall include, but are not limited to:**

1. **The temperature readings, logged at least once every fifteen (15) minutes, from the monitors required by paragraph (3)(D)1. of this rule; and**

2. **The operating parameters of any required control device determined from any initial or subsequent control efficiency compliance testing as outlined in subsection (5)(A) of this rule.**

(C) For each *[regulated]* applicable printing press, records shall be maintained to show—

1. *Percent by volume of alcohol or alcohol substitute(s), if either is used, in fountain solution as monitored on a once-per-day basis;*

2. *Daily and monthly quantity of alcohol or alcohol substitute(s), if either is used, by volume added to the fountain solution;*

1. For each fountain solution whose VOC content is modified, the calculation or direct measurement data that indicates the resultant VOC content by weight. The calculation or measurement need only be performed once for each batch of fountain solution used except that it need not be performed at all for the dilution of a fountain solution containing alcohol substitutes purchased with less than five percent (5%) VOC content before dilution or for alcohol containing fountain solutions requiring refrigeration purchased with less than three percent (3%) or eight-and-five-tenths percent (8.5%) VOC content, for heatset web and sheet-fed presses, respectively;

3.2. For each fountain solution, a manufacturer's formulation data sheet or *[A]* Material Safety Data Sheet (MSDS) listing the physical properties of alcohol or alcohol substitute(s) such as density and percent VOC as purchased from the supplier;

4.3. Results of any testing conducted on an emission unit at a regulated facility;

5.4. Maintenance records and inspection results of any air pollution control equipment; and

6.5. The temperature of refrigerated alcohol-based fountain solution as recorded *[on a once-per-shift basis]* at least once per day or once per batch, whichever is longer.

(D) For each lithographic and letterpress printing installation subject to this rule, records shall be maintained to show—

1. *Properties of heatset inks as applied (determined by the manufacturer's formulation data), density of inks in pounds per gallon, and total VOC content in weight percent;*

2. *Quantity in pounds of heatset inks as applied to substrate on a monthly basis;*

3. *Quantity in gallons of cleanup solution used on a monthly basis; and]*

4.1. A Material Safety Data Sheet or manufacturer's formulations data listing the percentage by weight of VOC in the *[cleanup]* cleaning solution, the composite partial vapor pressure of VOC in the cleaning solution, or the necessary data to make a determination thereof as outlined in subsection (5)(C) of this rule;

2. For each cleaning solution whose VOC content is modified, the calculation that indicates the resultant VOC content by weight or composite partial vapor pressure. The calculation need only be performed once for each batch of cleaning solution used except that it need not be performed at all for the dilution of a cleaning solution which does not exceed the VOC limits of paragraph (3)(B)1. of this rule; and

3. The quantity of all cleaning solution used which does not meet the VOC limits set forth in paragraph (3)(B)1. of this rule on a twelve (12)-consecutive-month basis.

*[(5) Compliance.*

*(A) All persons subject to the provisions of this rule shall provide to the director for approval a demonstration of final compliance with subsections (3)(A)–(C)—*

1. *Upon startup of presses which are not in existence and operating on the effective date of this rule; and*

2. *Within eighteen (18) months after the effective date of this rule for any presses in existence and operating on the effective date of this rule.*

*(B) All persons subject to the provisions of this rule and not in compliance with all provisions of this rule within twelve (12) months from the effective date of this rule must submit a compliance plan to the director for approval. This plan shall be received within six (6) months after the effective date of this rule. This plan shall include the following:*

1. *A detailed plan of process modifications; and*

2. *A time schedule for compliance containing increments of progress, including—*

A. *Date of submittal of the source's final control plan to the appropriate air pollution control agency;*

B. *Date by which contracts for emission control systems or process modifications will be awarded; or date by which orders will be issued for the purchase of component parts to accomplish emission control or process modification;*

C. *Date of initiation of on-site construction or installation of emission control equipment or process change;*

D. *Date by which on-site construction or installation of emission control equipment or process modification is to be completed; and*

E. *Date by which final compliance is to be achieved.]*

*[(6) Testing Procedures. Testing and compliance demonstrations for subsection (3)(C) of this rule shall follow the procedures contained in Environmental Protection Agency Reference Methods 25 or 25A found in 40 CFR part 60 Appendix A. Further clarification shall be provided by Environmental Protection Agency memo dated October 25,*

1993, from John B. Rasnic to all Environmental Protection Agency regional offices.]

(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. Capture efficiency testing for heatset dryers is not required if it is demonstrated that pressure in the dryer is negative relative to the surrounding press room and the airflow is into the dryer. This test may be performed with a differential pressure gauge or an airflow direction indicator (e.g., smoke stick or aluminum ribbons).

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

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

5. EPA Method 3 or 3A, as appropriate, shall be used to determine the concentration of oxygen (O<sub>2</sub>) and carbon dioxide (CO<sub>2</sub>).

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

7. 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 (50) ppmv as carbon, EPA Method 25A shall be used.

8. 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.

9. 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.

10. 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).

11. 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).

12. 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.

13. 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.

(B) 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.

(C) VOC Content Testing.

1. Fountain solutions. Compliance with the VOC content limits for fountain solutions established in subsection (3)(A) of this rule shall be determined by one (1) of the following:

A. If fountain solution is diluted prior to use, a calculation that combines EPA Method 24 analytical data for the concentrated materials used to prepare the fountain solution and the proportions in which they are mixed to make the as-applied material. The analysis of the concentrated materials may be performed by the supplier of those materials. Owners or operators may use formulation information provided with the concentrated materials used to prepare the fountain solution, such as the container label, the product data sheet, or the MSDS sheet to document the VOC content of the concentrated material;

B. If fountain solution is not diluted prior to use, MSDS or manufacturer's formulation data sheet may be used; or

C. EPA Method 24 of a sample of fountain solution, as applied.

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

A. 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. See formula in paragraph (5)(C)3. of this rule. The analysis may be performed by the supplier of those materials; or

B. 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 MSDS sheet to document the VOC content of the concentrated material;

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

3. Calculations. The VOC composite partial vapor pressure is the sum of the partial pressure of the compounds defined as VOCs. VOC composite partial vapor pressure is calculated as follows:

$$PP_c = \sum_{i=1}^n \frac{(W_i)(VP_i)/MW_i}{\frac{W_w}{MW_w} + \frac{W_c}{MW_c} + \sum_{i=1}^n \frac{W_i}{MW_i}}$$

Where:

- $W_i$  = Weight of the  $i^{\text{th}}$  VOC compound, in grams  
 $W_w$  = Weight of water, in grams  
 $W_c$  = Weight of exempt compound, in grams  
 $MW_i$  = Molecular weight of the  $i^{\text{th}}$  VOC compound, in g/g-mole  
 $MW_w$  = Molecular weight of water, in g/g-mole  
 $MW_c$  = Molecular weight of exempt compound, in g/g-mole  
 $n$  = Number of VOC compounds  
 $PP_c$  = VOC composite partial vapor pressure at 20 °C (68 °F), in mmHg  
 $VP_i$  = Vapor pressure of the  $i^{\text{th}}$  VOC compound at 20 °C (68 °F), in mmHg

(D) VOC Emission Calculations, Retention Factors, and Capture Efficiencies. For purposes of determining VOC emissions from lithographic and letterpress printing operations, the following retention factors and capture efficiencies and formula shall be used:

1. A portion of the VOC contained in inks and cleaning solution is retained in the printed web or in the shop towels used for cleaning. The following retention factors shall be used:

A. For heatset inks printed on absorptive substrates, a twenty percent (20%) VOC retention factor shall be used meaning eighty percent (80%) of the VOC in the ink is emitted during the printing process and is available for capture and control by an add-on pollution control device;

B. For sheet-fed and non-heatset web inks printed on absorptive substrates, a ninety-five percent (95%) VOC retention factor shall be used, meaning five percent (5%) of the VOC in the ink is emitted during the printing process; and

C. For cleaning solution VOC emissions from shop towels using cleaning solutions with a VOC composite vapor pressure of no more than ten (10) mmHg at twenty degrees Celsius (20 °C) (sixty-eight degrees Fahrenheit (68 °F)), a fifty percent (50%) VOC retention factor shall be used if the contaminated shop towels are kept in closed containers;

2. A portion of the VOC contained in inks, fountain solutions, and automatic blanket washes on heatset presses is captured in the press dryer for control by add-on pollution control devices. The following capture factors shall be used:

A. For inks, a one hundred percent (100%) VOC capture efficiency shall be used. All the VOC in the ink that is not retained is assumed to be volatilized in the press dryer if it is demonstrated that the pressure in the dryer is negative relative to the surrounding press room and the airflow is into the dryer;

B. For fountain solutions containing alcohol substitutes, a seventy percent (70%) VOC capture factor shall be used; and

C. For automatic blanket wash solutions with a VOC composite partial vapor pressure of no more than ten (10) mmHg at twenty degrees Celsius (20 °C) (sixty-eight degrees Fahrenheit (68 °F)), a forty percent (40%) VOC capture factor shall be used; and

3. For calculating VOC emissions, the following equations shall be used:

A. For total VOC emissions from an offset lithographic printing facility, including all related cleaning activities—

$$VOC_{TOT} = \sum_{i=1}^m W_{INK_i} * VOC_{INK_i} * \left(1 - \frac{RF_{INK_i}}{100}\right) + \sum_{i=1}^n VOL_{FS_i} * VOC_{FS_i} + \sum_{i=1}^p VOL_{CS_i} * VOC_{CS_i} * \left(1 - \frac{RF_{CS_i}}{100}\right)$$

Where:

- $VOC_{TOT}$  = Total VOC emissions, expressed as pounds  
 $W_{INK}$  = Weight of ink used, expressed as pounds  
 $VOC_{INK}$  = Weight fraction of VOC in the ink  
 $RF_{INK}$  = Retention factor of the ink, expressed as a percent  
 $m$  = Number of inks  
 $VOL_{FS}$  = Volume of fountain solution used, expressed as gallons  
 $VOC_{FS}$  = VOC content of fountain solution, expressed as pounds per gallon  
 $n$  = Number of fountain solutions  
 $VOL_{CS}$  = Volume of cleaning solution used, expressed as gallons  
 $VOC_{CS}$  = VOC content of cleaning solution, expressed as pounds per gallon  
 $RF_{CS}$  = Retention factor of the cleaning solution, expressed as a percent  
 $p$  = Number of cleaning solutions

and

B. For VOC ink oil emissions from a heatset web lithographic or letterpress printing press—

$$VOC_{TOT} = \sum_{i=1}^n W_{INK_i} * VOC_{INK_i} * \left(1 - \frac{RF_{INK_i}}{100}\right)$$

Where:

- $VOC_{TOT}$  = Total VOC emissions, expressed as pounds  
 $W_{INK}$  = Weight of ink used, expressed as pounds  
 $VOC_{INK}$  = Weight fraction of VOC in the ink  
 $RF_{INK}$  = Retention factor of the ink, expressed as a percent  
 $n$  = Number of inks

(E) Material Use Guidance: Applicability Determination. Based on EPA's *Potential to Emit (PTE) Guidance for Specific Source Categories* (April 14, 1998) and the equations of paragraph (5)(D)3. of this rule, the methods in this subsection may be used for determining if a facility or press meets the corresponding applicability thresholds.

1. For determining if a facility meets the applicability limits of subsection (1)(B) of this rule, the material use thresholds are as follows:

Type of Printing Operation	12-Month Rolling Material Use Threshold
Sheet-fed	768 gallons of cleaning solvent and fountain solution additives
Non-heatset Web	768 gallons of cleaning solvent and fountain solution additives
Heatset Web	5,400 pounds of ink, cleaning solvent, and fountain solution additives

2. For determining if a web heatset press is subject to subsection (3)(C) of this rule, the material use thresholds are as follows:

Type of Printing Press	Annual Material Use Threshold
Heatset Web	55,800 pounds of ink

*AUTHORITY:* section 643.050, RSMo [1994] 2000. Original rule filed Oct. 7, 1994, effective May 28, 1995. Amended: Filed Nov. 30, 2010.

*PUBLIC COST:* This proposed amendment will not cost state agencies or political subdivisions more than five hundred dollars (\$500) in the aggregate.

*PRIVATE COST:* This proposed amendment will cost private entities \$6,976,330 in the aggregate.

*NOTICE OF PUBLIC HEARING AND NOTICE TO SUBMIT COMMENTS:* A public hearing on this proposed amendment will begin at 9:00 a.m., February 3, 2011. The public hearing will be held at the Doubletree Hotel and Conference Center, Ballrooms C, D, and E, 16625 Swingley Ridge Road, Chesterfield, Missouri. Opportunity to be heard at the hearing shall be afforded any interested person. Interested persons, whether or not heard, may submit a written or email statement of their views until 5:00 p.m., February 10, 2011. Written comments shall be sent to Chief, Air Quality Planning Section, Missouri Department of Natural Resources' Air Pollution Control Program, PO Box 176, Jefferson City, MO 65102-0176. Email comments shall be sent to [apcprulespn@dnr.mo.gov](mailto:apcprulespn@dnr.mo.gov).

**FISCAL NOTE  
PRIVATE COST**

- I. Department Title:** 10 – Department of Natural Resources  
**Division Title:** 10 – Air Conservation Commission  
**Chapter Title:** 5 – Air Quality Standards and Air Pollution Control Rules Specific to the St. Louis Metropolitan Area

<b>Rule Number and Title:</b>	10 CSR 10-5.442 Control of Emissions from Lithographic Printing Operations
<b>Type of Rulemaking:</b>	Amendment to Existing Rule

**II. SUMMARY OF FISCAL IMPACT**

Estimate of the number of entities by class which would likely be affected by the adoption of the rule:	Classification by types of the business entities which would likely be affected:	Estimate in the aggregate as to the cost of compliance with the rule by the affected entities:
35	Offset Lithography North American Industry Classification System code (NAICS): 323110 Standard Industry Classification code (SIC): 2752 Source Classification Codes (SCC): 40500401, 40500411, 40500412, 40500415, 40500416, 40500418	\$6,840,350
2	Letterpress Printing NAICS: 323119 SIC: 2751 SCC: 40500201, 40500202, 40500203, 40500211, 40500212, 40500215	\$135,980
		<b>\$6,976,330</b>

**II. WORKSHEET**

**Offset Lithographic**

Proposed Rule Provisions	Estimated # of applicable facilities	Average Annual Cost (per facility)	Total Annual Cost of compliance	Total Cost of compliance over life of rule
VOC Emission Controls (Device, Capital recovery, operation & maintenance)	2	\$223,035	\$446,070	\$4,460,700
Fountain Solutions (See Assumption 9)	35	\$0	\$0	\$0
Cleaning	35	\$6799	\$237,965	\$2,379,650
<b>Total</b>		\$229,834	\$684,035	<b>\$6,840,350</b>

**Letterpress Printing**

Proposed Rule Provision incurring compliance costs	Estimated # of applicable facilities	Average Annual Cost (per facility)	Total Annual Cost of compliance	Total Cost of compliance over life of rule
VOC Emission Controls (Device, Capital recovery, operation & maintenance)	0	\$223,035	\$0	\$0
Cleaning	2	\$6,799	\$13,598	\$135,980
<b>Total</b>		<b>\$6,799</b>	<b>\$13,598</b>	<b>\$135,980</b>

**IV. ASSUMPTIONS**

1. For the convenience of calculating this fiscal note over a reasonable time frame, the life of the rule is assumed to be 10 years although the duration of the rule is indefinite. If the life of the rule extends beyond ten years, the annual costs for additional years will be consistent with the assumptions used to calculate annual costs as identified in this fiscal note.
2. Since this rule amendment is substantially similar to the emission limits and techniques presented in the U.S. Environmental Protection Agency's (EPA) *Control Techniques Guidelines (CTG) for Offset Lithographic Printing and Letterpress Printing* (EPA-453/R-06-002, September 2006), this private entity fiscal cost analysis is based on the CTG cost estimates outlined in Appendix D of that document.
3. All costs are annualized. The capital recovery of the initial equipment and installation costs is part of the annual cost and is based on a 10-percent interest rate and a 10-year life for the equipment.
4. All figures are in 2005 dollars matching EPA's cost analysis.
5. EPA used a model plant analysis that estimated that 148 facilities nationally will have to add heatset dryer Volatile Organic Compound (VOC) emission controls costing \$33 million annually. These 148 plants were distributed among four categories. The cost to install controls, based on the average of all the categories, is \$223,035 per plant per year.
6. For the lithographic cleaning provisions, EPA estimated that there are 2698 applicable facilities nationwide, divided into 16 categories, in nonattainment areas that were not previously meeting the cleaning provisions. Nationally, the annual cost of compliance with the cleaning provisions was estimated to be \$18 million. From this, the average annual cost per facility is \$6799.
7. 2 heatset lithographic facilities will have presses requiring the installation of VOC control devices.
8. 35 lithographic facilities will now have to comply with the low VOC solvent cleaning and fountain solution provisions.
9. For the fountain solution provisions requiring a reduction in alcohol use or conversion to alcohol substitutes, the net cost is \$0 because any savings are offset by the installation and maintenance of conversion equipment to include new rubber rollers and any necessary water pretreatment conditioners.



10. 2 letterpress operations will have to comply with the cleaning provisions but no letterpress operations will have to install heatset dryer controls.
11. Costs per facility are the same for letterpress printing as for offset lithography, except that there are no fountain solutions in letterpress printing.
12. No additional recordkeeping costs will be incurred. Affected facilities are either already maintaining appropriate records or additional recordkeeping costs are negligible.