

COMMONWEALTH OF VIRGINIA
STATE AIR POLLUTION CONTROL BOARD
REGULATIONS FOR THE CONTROL AND ABATEMENT OF AIR POLLUTION

9 VAC 5 CHAPTER 40.
EXISTING STATIONARY SOURCES.

PART II
Emission Standards

Article 53
Emission Standards for
Lithographic Printing Processes (Rule 4-53)

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9VAC5-40-7800. Applicability and designation of affected facility.

A. Except as provided in subsections C, D, and E of this section, the affected facility to which the provisions of this article apply is each lithographic printing process that uses a substrate other than a textile.

B. The provisions of this article apply only to sources of volatile organic compounds in volatile organic compound emissions control areas designated in 9VAC5-20-206.

C. Exempted from the provisions of this article are offset lithographic printing operations in the Northern Virginia Volatile Organic Compound Emissions Control Area. Provisions applicable to offset lithographic printing operations in the Northern Virginia Volatile Organic Compound Emissions Control Area are provided in Article 56.1 (9VAC5-40-8420 et seq.) of this part.

D. Exempted from the provisions of this article are facilities in all volatile organic compound emissions control areas, other than the Northern Virginia Volatile Organic Compound Emissions Control Area, whose potential to emit is less than 100 tons per year of volatile organic compounds, provided the emission rates are determined in a manner acceptable to the board. All volatile organic compound emissions from printing inks, coatings, cleaning solutions, and fountain solutions shall be considered in applying the exemption levels specified in this subsection.

E. The provisions of this article do not apply to the following:

1. Printing processes used exclusively for determination of product quality and commercial acceptance provided:

- a. The operation is not an integral part of the production process;
- b. The emissions from all product quality printing processes do not exceed 400 pounds in any 30 day period; and
- c. The exemption is approved by the board.

2. Photoprocessing, typesetting, or imagesetting equipment using water-based chemistry to develop silver halide images.

3. Platemaking equipment using water-based chemistry to remove unhardened image-producing material from an exposed plate.

4. Equipment used to make blueprints.

5. Any sheet-fed offset lithographic press with a cylinder width of 26 inches or less.

9VAC5-40-7810. Definitions.

A. For the purpose of these regulations and subsequent amendments or any orders issued by the board, the words or terms shall have the meaning given them in subsection C of this section.

B. As used in this article, all terms not defined here shall have the meaning given them in 9 VAC 5 Chapter 10 (9 VAC 5-10-10 et seq.), unless otherwise required by context.

C. Terms defined.

"Alcohol" means any of the following compounds when used as a fountain solution additive: ethanol, n-propanol, and isopropanol.

"Alcohol substitute" means any nonalcohol additive that contains volatile organic compounds and is used in the fountain solution.

"Batch" means a supply of fountain solution that is prepared and used without alteration until completely used or removed from the printing process.

"Cleaning solution" means any blanket or roller wash used to remove ink and debris from the operating surface of a printing press.

"Composite partial vapor pressure" means the sum of the partial pressures of the compounds defined as volatile organic compounds. Composite partial vapor pressure is calculated as follows:

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

where:

- W_i = Weight of the "i"th VOC compound, in grams.
- W_w = Weight of water, in grams.
- W_e = Weight of exempt compound, in grams.
- MW_i = Molecular weight of the "i"th VOC compound, in grams/gram-mole.
- MW_w = Molecular weight of water, in grams/gram-mole.
- MW_e = Molecular weight of exempt compound, in grams/gram-mole.
- PP_c = VOC composite partial pressure at 20°C, in millimeters of mercury (mm Hg).
- VP_i = Vapor pressure of the "i"th VOC compound at 20°C, in mm Hg.

"Fountain solution" means any mixture of water, volatile and nonvolatile chemicals, and additives applied to a lithographic plate to repel ink from the non-image area on the plate.

"Heatset" means a lithographic printing process in which heat from a dryer is used to evaporate ink oils from the substrate.

"Lithographic printing" means a planographic printing process in which the image and nonimage areas are chemically differentiated with the image area being oil-receptive and the nonimage area being water-receptive.

"Non-heatset" means a lithographic printing process in which the printing inks are set and dried by absorption or oxidation rather than heat. For the purposes of this article, UV-cured and electron beam-cured inks are considered non-heatset.

"Press" means a printing production assembly composed of one or more

units to produce a printed substrate (sheet or web).

"Printing" means a photomechanical process in which a transfer of text, designs, and images occurs through contact of an image carrier with a substrate.

"Printing process" means any operation or system wherein printing ink or a combination of printing ink and surface coating is applied, dried or cured and which is subject to the same emission standard. May include any equipment which applies, conveys, dries or cures inks or surface coatings, including, but not limited to, flow coaters, flashoff areas, air dryers, drying areas and ovens. It is not necessary for a printing process to have an oven, flashoff area or drying area to be included in this definition.

"Sheet-fed" means a lithographic printing process in which individual sheets of substrate are fed into the press sequentially.

"Unit" means the smallest complete printing component, composed of an inking and dampening system, of a printing press.

"Web" means a continuous roll of printing substrate.

9VAC5-40-7820. Standard for volatile organic compounds.

A. No owner or other person shall use or permit the use of any lithographic printing process employing a fountain solution containing volatile organic compounds unless the fountain solution as applied to each lithographic press meets the following requirements:

1. For each heatset web press:

a. When the fountain solution contains alcohol:

(1) The fountain solution shall contain no more than a daily average of 1.6% volatile organic compounds by weight; or

(2) The temperature of the fountain solution shall be maintained at or below 60°F and the fountain solution shall contain no more than a daily average of 3.0% volatile organic compounds by weight; or

b. When the fountain solution contains no alcohol, the fountain solution shall contain no more than a daily average of 5.0% volatile organic compounds by weight.

2. For each non-heatset web press and each newspaper press, the fountain solution shall contain no alcohol and shall contain no more than a daily average of 5.0% volatile organic compounds by weight.

3. For each sheet-fed press:

a. The fountain solution shall contain no more than a daily average of 5.0% volatile organic compounds by weight; or

b. The temperature of the fountain solution shall be maintained at or below 60°F and the fountain solution shall contain no more than a daily average of 8.5% volatile organic compounds by weight.

B. No owner or other person shall use or permit the use of any heatset web offset lithographic printing process unless:

1. A system is installed which achieves an emission reduction from the press dryer exhaust vent of 90% by weight of volatile organic compounds (minus methane and ethane); or

2. The maximum dryer exhaust outlet concentration is maintained at 50 parts per million volume (ppmv) as carbon (minus methane and ethane).

C. No owner or other person shall use or permit the use of any lithographic printing process employing a cleaning solution containing volatile organic compounds unless:

1. The daily average of the cleaning solution as applied contains no more than 30% volatile organic compounds by weight; or

2. The daily average of the volatile organic compound portion of the cleaning solution as applied has a composite partial vapor pressure of 10 millimeters of mercury or less at 68°F (20°C).

D. All printing inks, fountain solutions, cleaning solutions, and other products containing 25% or more volatile organic compounds by weight shall be disposed of by one of the following methods:

1. Reclamation, either in-house or by outside services; or

2. Incineration.

E. All cleaning solution and applicators shall be stored in covered containers or machines with remote reservoirs when not in use.

9VAC5-40-7830. Reserved.

9VAC5-40-7840. Standard for visible emissions.

The provisions of Article 1 (9 VAC 5-40-60 et seq.) of this chapter (Emission Standards for Visible Emissions and Fugitive Dust/Emissions, Rule 4-1) shall not apply.

9VAC5-40-7850. Standard for fugitive dust/emissions.

The provisions of Article 1 (9 VAC 5-40-60 et seq.) of this chapter (Emission Standards for Visible Emissions and Fugitive Dust/Emissions, Rule 4-1) shall not apply.

9VAC5-40-7860. Standard for odor.

The provisions of Article 2 (9 VAC 5-40-130 et seq.) of this chapter (Emission Standards for Odor, Rule 4-2) apply.

9VAC5-40-7870. Standard for toxic pollutants.

The provisions of Article 3 (9 VAC 5-40-160 et seq.) of this chapter (Emission Standards for Toxic Pollutants, Rule 4-3) apply.

9VAC5-40-7880. Compliance.

A. The provisions of 9 VAC 5-40-20 (Compliance) apply.

B. All affected facilities in the Northern Virginia and Richmond VOC Emissions Control Areas shall be in compliance with the provisions of this rule by April 1, 1998.

C. All affected facilities in VOC emission control areas, other than the Northern Virginia and Richmond VOC Emissions Control Areas, shall be in compliance with the provisions of this rule by October 4, 2007.

9VAC5-40-7890. Test methods and procedures.

A. The provisions of 9 VAC 5-40-30 (Emission testing) apply.

B. For the purpose of demonstrating compliance with the emission control requirements of this rule, the affected facility shall be run under typical operating conditions and flow rates compatible with scheduled production during any emission testing.

C. Emissions tests shall include an initial test within 90 days of start-up when the control device is installed and operating that demonstrates compliance with the emission standard in 9 VAC 5-40-7820.

D. The following Reference methods (cited in 40 CFR part 60, Appendix A) shall be used to demonstrate compliance with the emission limit or percent reduction efficiency requirement in 9 VAC 5-40-7820. Alternate methods may be used with the approval of the board.

1. Reference Method 1 or 1A, as appropriate, shall be used to select the sampling sites. The control device sampling sites for determining efficiency in reducing

volatile organic compounds (excluding methane and ethane) from the dryer exhaust shall be placed before the control device inlet (after the dryer) and at the outlet of the control device.

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

3. Reference Method 18, 25, or 25A shall be used to determine the volatile organic compound concentration of the exhaust stream entering and exiting the control device. Good judgment is required in determining the best applicable volatile organic compound test method for each situation. The method selected shall be based on consideration of the diversity of organic species present and their total concentration and on consideration of the potential presence of interfering gases. Because of the different response factors for the many organic compounds formed during the combustion process, only Reference Method 25, which measures volatile organic compounds as a carbon, shall be used; except in cases where the expected outlet volatile organic compound concentration of the control device is less than 100 ppmv as carbon, in which case Reference Method 25A shall be used.

a. If average, non-methane volatile organic compound concentrations in the outlet of a thermal or catalytic oxidizer measured by Reference Method 25A are found to be greater than 100 ppmv as carbon, the board may request a repeat test to be conducted using Reference Method 18 or 25.

b. A test shall consist of three separate runs, each lasting a minimum of 60 minutes, unless the board determines that process variables dictates shorter sampling times.

c. Reference Method 25 specifies a minimum probe and temperature of 265°F. To prevent condensation, the probe should be heated to at least the gas stream temperature, typically close to 350°F.

E. The volatile organic compound content of each batch of fountain solution shall be determined by one of the following procedures:

1. Analysis by Reference Method 24 of a sample of the batch of fountain solution; or

2. Calculation which combines Reference Method 24 analytical volatile organic compound content data for the concentrated materials used to prepare the press-ready batch based on records of the proportions in which they are mixed to make the batch. The analysis of the concentrated materials may be performed by the supplier of the materials. Mix proportions may be used to determine the volatile organic compound content of the fountain solution as a substitute for Method 24 if the supplier has provided Method 24 information for the volatile organic compound content of the concentrates.

F. A thermometer or other temperature detection device capable of reading to 0.5°F shall be used to ensure that any refrigerated fountain solution recirculating reservoirs are maintained at or below 60°F at all times.

G. The volatile organic compound or volatile organic compound partial vapor pressure of each cleaning solution shall be determined by one of the following procedures:

1. Analysis by Reference Method 24 for volatile organic compound content or by an appropriate method for composite partial vapor pressure of a sample of the cleaning solution; or

2. Calculation for volatile organic compound content which combines Reference Method 24 analytical volatile organic compound content data for the concentrated materials used to prepare the press-ready batch based on records of the proportions in which they are mixed to make the batch. The analysis of the concentrated materials may be performed by the supplier of the material. Mix proportions may be used to determine the volatile organic compound content of the cleaning solution as a substitute for Method 24 if the supplier has provided Method 24 information for the volatile organic compound content of the concentrates.

9VAC5-40-7900. Monitoring.

A. The provisions of 9 VAC 5-40-40 (Monitoring) apply.

B. Add-on dryer exhaust control device.

1. The owner of a subject heatset web offset lithographic printing press shall install, calibrate, maintain, and operate a temperature monitoring device according to the manufacturer's instructions at the outlet of the control device. The monitoring temperature shall be set during the testing required to demonstrate compliance with the emission standard in 9 VAC 5-40-7820 B. Monitoring shall be performed only when the unit is operational.

2. The temperature monitoring device shall be equipped with a continuous recorder. Both the temperature monitoring device and the continuous recorder shall have an accuracy of 0.5°F.

3. The dryer pressure shall be maintained lower than the pressroom air pressure so that air flows into the dryer at all times when the press is operating. A 100% emissions capture efficiency for the dryer shall be established using an air flow direction indicator, such as a smoke stick or aluminum ribbons.

C. Fountain solution volatile organic compound concentration.

1. The purpose of monitoring the volatile organic compound concentration

in the fountain is to provide data that can be correlated to the amount of material used when the fountain solution contains alcohol and complies with the limits listed in 9 VAC 5-40-7820. The following methods may be used to determine the concentration of alcohol in the fountain solution in lieu of calculating the alcohol concentration using the protocol of 9 VAC 5-40-7890 E. The monitoring requirements of 9 VAC 5-40-7900 C 1 a through c shall be required only if noncompliance with 9 VAC 5-40-7820 A is established.

a. The owner of any offset lithographic printing press shall monitor the alcohol concentration of the fountain solution with a refractometer that is corrected for temperature at least once for each 8-hour shift or once per batch, whichever is longer. The refractometer shall have a visual, analog, or digital readout with an accuracy of 0.5%. A standard solution shall be used to calibrate the refractometer for the type of alcohol used in the fountain. Alternatively, the refractometer shall be standardized against measurements performed to determine compliance according to the procedures described in 9 VAC 5-40-7890 D.

b. Alternatively, the owner of any offset lithographic printing press shall monitor fountain solution alcohol concentration with a hydrometer equipped with a temperature correction at least once for each 8-hour shift or once per batch, whichever is longer. The hydrometer shall have a visual, analog, or digital readout with an accuracy of 0.5%. A standard solution shall be used to calibrate the hydrometer for the type of alcohol used in the fountain. Alternatively, the hydrometer shall be standardized against measurements performed to determine compliance according to the procedures described in 9 VAC 5-40-7890 D.

c. The volatile organic compound content of the fountain solution may be monitored with a conductivity meter if it is determined that a refractometer or hydrometer cannot be used for monitoring the type of volatile organic compounds in the fountain solution. The conductivity meter reading for the fountain solution shall be referenced to the conductivity of the incoming water.

2. If, through recordkeeping for a period of six months or more, the printing process is shown to consistently meet the requirements in 9 VAC 5-40-7890 D, the monitoring requirement may be waived or extended to a longer period of time.

D. Fountain solution temperature.

1. The owner of any offset lithographic printing press using refrigeration equipment on the fountain shall install, maintain, and continuously operate a temperature monitor of the fountain solution reservoir.

2. The temperature on the temperature monitor shall be read and recorded at least once per operating day to verify that the refrigeration system is operating properly.

9VAC5-40-7910. Notification, records and reporting.

A. The provisions of 9 VAC 5-40-50 (Notification, records and reporting) apply.

B. The owner of any offset lithographic printing press shall record the following key parameters on a monthly basis:

1. The type of control device operating on the heatset offset lithographic printing press and the operating parameters specified in 9 VAC 5-40-7900 B;

2. The equipment standard selected to comply with the requirements listed in 9 VAC 5-40-7920 B;

3. The volatile organic compound content of the fountain and cleaning solutions, to comply with 9 VAC 5-40-7920;

4. The temperature of the fountain solution, to comply with the requirements listed in 9 VAC 5-40-7920 A, if applicable;

5. For manual cleaning, the amount of cleaning solution concentrate and water per batch of cleaning solution mixed;

6. For automatic cleaning, the flow rates of cleaning solution concentrate and water, as specified in 9 VAC 5-40-7920 C; and

7. Corrective actions taken when exceedances of any parameters monitored according to the requirements of 9 VAC 5-40-7890 through 9 VAC 5-40-7900 occur.

9VAC5-40-7920. Registration.

The provisions of 9 VAC 5-20-160 (Registration) apply.

9VAC5-40-7930. Facility and control equipment maintenance of malfunction.

The provisions of 9 VAC 5-20-180 (Facility and control equipment maintenance or malfunction) apply.

9VAC5-40-7940. Permits.

A permit may be required prior to beginning any of the activities specified below and the provisions of 9 VAC 5 Chapter 50 (9 VAC 5-50-10 et seq.) and 9 VAC 5 Chapter 80 (9 VAC 5-80-10 et seq.) may apply. Owners contemplating such action should contact the appropriate regional office for guidance.

1. Construction of a facility.

2. Reconstruction (replacement of more than half) of a facility.

3. Modification (any physical change to equipment) of a facility.
4. Relocation of a facility.
5. Reactivation (restart-up) of a facility.
6. Operation of a facility.

HISTORICAL NOTES:

Derived from: Rule 4-45 of Part IV of VR 120-01 (§ 120-04-4501 through § 120-04-4515)

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