

**Chapter 161: GRAPHIC ARTS - OFFSET LITHOGRAPHY AND LETTERPRESS PRINTING**

Summary: This regulation restricts the volatile organic compound (VOC) emissions from Offset Lithography and Letterpress operations.

**1. Applicability**

- A. This regulation applies statewide.
- B. This regulation applies to any Offset Lithography (Heatset, Sheet Fed or Coldset) and Letterpress printing operation.

---

NOTE: Graphic Arts – Flexography and Rotogravure printing operations are subject to Graphic Arts – Rotogravure and Flexography, 06-096 CMR 132 (effective February 10, 1993).

---

- C. An owner or operator of a facility that utilizes any type of Heatset, Coldset or Sheet Fed offset web lithography or letterpress printing press system, whose maximum actual emissions are greater than 3 tons of VOCs per rolling 12 month period, is subject to this rule.

---

NOTE: Facilities or any owner that emits greater than 10 pounds per hour, 100 pounds per day of VOCs may have additional air licensing requirements and should contact the Department to determine whether any licensing requirements apply.

---

- D. Any owner or operator of an offset lithographic or letterpress printing operation, who is subject to this rule, must demonstrate compliance by twelve months from the effective date of this rule. For a source that commences operation after May 31, 2010, the owner or operator must determine compliance status by 12 months after the date on which the source commences operation.
- E. Any facility that becomes or is currently subject to these provisions because its emissions, before controls, equal or exceed 3 tons per rolling twelve month period will remain subject to these provisions for three years after the emissions fall below and remain below the 3 tons per year applicability threshold.

**2. Definitions**

- A. **Actual Emissions.** “Actual Emissions” means calculating a VOC mass balance over a period of time, using invoices and usage records to determine amounts of ink, fountain solution and cleaning solutions purchased and used; multiplied by an applicable emission release factor.
- B. **Alcohol.** “Alcohol” means any of the following compounds, when used as a fountain solution additive for offset lithographic or letterpress printing: ethanol, n-propanol, and isopropanol.
- C. **Alcohol substitute.** “Alcohol substitute” means any non-alcohol additives that contain VOCs and are used in the fountain solution; including but not limited to ethylene glycol or glycol ether compounds. Some additives are used to reduce the surface tension of water: others are added to prevent piling (ink build-up).

- D. Automatic Blanket Wash System.** “Automatic Blanket Wash System” means equipment used to clean lithographic blankets which can include, but is not limited to those utilizing a cloth and expandable bladder, brush, spray, or impregnated cloth system.
- E. Cleaning Solution.** “Cleaning Solution” means any liquid solvent or solution used to clean the operating surfaces of a printing press and its parts. For purposes of this rule, cleaning solutions include but are not limited to blanket wash, roller wash, metering roller cleaner, plate cleaner, impression cylinder washes, rubber rejuvenators, and other cleaners used for cleaning a press, press parts, or to remove dried ink or coating from areas around the press.
- F. Control device.** "Control device" means equipment used to reduce, by destruction or removal, the amount of air pollutant(s) in an air stream prior to discharge to the ambient air.
- G. Dampening System.** "Dampening system" means equipment used to deliver the fountain solution to the lithographic plate.
- H. Fountain Solution.** “Fountain solution: means a mixture of water and other volatile and non-volatile chemicals and additives that maintains the quality of the printing plate including preventing debris build up (e.g., spray power, paper fiber, coating particles, dried ink particles and other materials), and increases viscosity and reduces the surface tension of the water so that it spreads easily across the printing plate service. The fountain solution wets the non-image area so that the ink is maintained within the image areas. Non-volatiles additives include mineral salts and hydrophilic gums. Alcohol and alcohol substitutes are the most common VOC additives used to reduce the surface tension of the fountain solution.
- I. Fountain Solution Reservoir.** “Fountain Solution Reservoir” means the collection tank that accepts fountain solution recirculated from printing unit(s). In some cases, the tanks are equipped with cooling coils for refrigeration of the fountain solution.
- J. Heatset.** “Heatset” means any operation where the printing inks are set by the evaporation of the ink oils in a heatset dryer.
- K. Heatset Dryer.** “Heatset dryer” means any device used in heatset web offset lithographic printing to heat the printed substrate and to promote the evaporation of ink oils.
- L. Inking System.** “Inking System” means a series of rollers used to meter ink onto the lithographic plate. The system can include agitators, pumps, totes, and others types of ink containers.
- M. Letterpress printing press.** “Letterpress Printing press” means a printing press that uses a relief method which uses type directly. Printing is done from cast metal type or plates on which the image or printing areas is raised above the nonprinting areas. Ink rollers touch on the surface of the raised areas. The surrounding (nonprinting) areas are lower and do not receive ink. The inked image is transferred directly to the paper.
- N. Lithography.** “Lithography” means a planographic printing process where the image and nonimage areas are chemically differentiated; the image area is oil receptive and the nonimage area is water receptive. This method differs from other printing methods, where the image is typically printed from a raised or recessed surface.

- O. Non-heatset.** “Non-heatset” means a printing process where the printing inks are set by absorption and/or oxidation of the ink oil, not by evaporation of the ink oils in a dryer. For the purposes of this rule, use of an infrared heater or printing conducted using ultraviolet-cured or electron beam-cured inks is considered non-heatset.
- P. Offset.** “Offset” means a printing process that transfers the ink film from the lithographic plate to an intermediary surface (blanket), which, in turn, transfers the ink film to the substrate.
- Q. Press.** “Press” means printing production assembly composed of one or more units used to produce a printed substrate including any associated coating, spray power application, heatset web dryer, ultraviolet or electron beam curing units, or infrared heating units.
- R. Sheet fed.** “Sheet fed” means any operation where paper is fed to the press in individual sheets.
- S. Substrate.** “Substrate” means the surface to which a coating is applied.
- T. VOC Composite Partial Vapor Pressure** – “VOC Composite Partial Vapor Pressure” means 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”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”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  
 $PP_c$  = VOC composite partial vapor pressure at 20°C (68°F), in mm Hg  
 $VP_i$  = Vapor pressure of the “i”th VOC compound at 20°C (68°F), in mm Hg

- U. Web.** “Web” means a continuous roll of paper used as a printing substrate.

### 3. Emission Control Limits

#### A. Work Practice Standards, Fountain and Cleaning Solution VOC Limits

Any owner or operator of a facility that utilizes any type of heatset, coldset or sheet fed offset web lithography printing press, or letterpress printing press system is subject to the following requirements for:

- (1) **Work Practice Standards** Each owner or operator shall use the following work practices:
- (a) New and used VOC-containing ink, fountain solution and cleaning solvent,

including solvents mixed on the premises, shall be stored in a nonabsorbent, non-leaking container. Such a container shall be kept closed at all times except when the container is being filled, emptied or is otherwise actively in use;

- (b) Spills and leaks of VOC-containing ink, fountain solution and cleaning solvent shall be minimized. Any leaked or spilled VOC-containing ink, fountain solution or cleaning solvent shall be absorbed and removed immediately;
  - (c) Absorbent applicators, such as cloth and paper, which are moistened with VOC containing ink, fountain solution or cleaning solvent, shall be stored in a closed, non-absorbent, non-leaking container for disposal or recycling;
  - (d) VOC-containing ink, fountain solution and cleaning solvents shall be conveyed from one location to another in closed containers or pipes; and
  - (e) Cleaning shall be performed to minimize associated VOC emissions.
- (2) **Fountain Solution VOC Requirements** for heatset, sheet fed and coldset offset lithographic and letterpress presses. Any owner or operator of a subject printing press shall meet the following emission requirements:
- (a) **Heatset Web Offset or Letter Press VOC Requirements** for on-press fountain solution, shall achieve one of the following limits for fountain solution used on each heatset press;
    - (i) If the fountain solution contains only alcohol substitutes, maintain the as-applied VOC content of the fountain solution at or below 5.0 percent, by weight, and use no alcohol in the fountain solution
    - (ii) If the fountain solution contains alcohol; maintain the as-applied VOC content of the fountain solution at or below 1.6 per cent, by weight; or
    - (iii) If the fountain solution contains alcohol and is refrigerated; maintain an as-applied VOC content of the fountain solution at or below 3.0 per cent, by weight and refrigerate to sixty degrees Fahrenheit or less.
  - (b) **Sheet-Fed Web Offset or Letter Press VOC Requirements** for on-press fountain solution shall achieve one of the following limits for fountain solution used on each sheet fed press:
    - (i) If the fountain solution contains only alcohol substitutes, maintain the as-applied VOC content of the solution at or below 5.0 per cent, by weight.
    - (ii) If the fountain solution contains alcohol; maintain the as-applied VOC content of the fountain solution at or below 5.0 per cent, by weight, or
    - (iii) If the fountain solution contains alcohol and is refrigerated; maintain the as-applied VOC content of the solution at or below 8.5 per cent, by weight and refrigerate to sixty degrees Fahrenheit or less.

- (iv) Exemption: sheet-fed presses with sheet size of 11 x 17 inches or smaller or with total fountain solution reservoir of less than one gallon.
  - (c) **Coldset Web Offset or Letterpress Requirements** for on press fountain solution shall maintain the as-applied VOC content of the fountain solution used on each non-heatset press at or below 5.0 per cent, by weight, and use no alcohol in the fountain solution.
  - (d) Where it can be demonstrated to the satisfaction of the Department that a subject lithographic or letterpress printing press cannot be operated with fountain solutions meeting the limits in this Section for reasons of technological and/or economic infeasibility, the permitting authority may establish site-specific limits based upon evidence of technological or economic feasibility, subject to approval by the administrator.
- (3) **Cleaning Solvent Limits:** The owner or operator of an offset lithographic printing press or letterpress printing press shall use cleaning solvents that:
- (a) Have composite partial vapor pressure less than 10 mm Hg at 20°C, or; have a VOC content less than 70 per cent by weight; and

(4) **Exemptions**

- (a) Fountain Solution Limits for Sheet-Fed Web Offset or Letter Press presses: sheet-fed presses with sheet size of 11 x 17 inches or smaller or with total fountain solution reservoir of less than one gallon.
- (b) Fountain Solution Limits for Coldset Web Offset or Letterpress presses: sheet-fed presses with sheet size of 11 x 17 inches or smaller or with total fountain solution reservoir of less than one gallon.
- (c) Cleaning Solution Limits: For non - press or press parts cleaning processes, a facility is allowed to use a maximum 110 gallons of higher VOC content cleaning solvents within any consecutive twelve month period.

**B. VOC Emission Control Requirements for Heatset Dryers**

An owner or operator of a Lithographic or Letterpress heatset dryer system whose actual emissions are greater than 25 tons per year of VOC emissions from the dryer, before controls, shall be equipped with a control system and shall operate the control system to meet the following requirements.

- (1) Exemption: Heatset presses used for book printing and heatset presses with maximum web width of 22 inches or less are excluded from the add-on control requirements.
- (2) For a control system first installed before the effective date of this rule the control system shall reduce VOC emissions from each dryer by at least ninety per cent or maintain a maximum VOC outlet concentration of twenty ppmv, as hexane (C<sub>6</sub>H<sub>14</sub>) on a dry basis, whichever is less stringent; or

- (3) For a control system first installed on or after the effective date of the rule, the control system shall reduce VOC emissions from each dryer by at least ninety-five per cent or maintain a maximum VOC outlet concentration of twenty ppmv, as hexane (C<sub>6</sub>H<sub>14</sub>) on a dry basis, whichever is less stringent; or
  - (4) An owner or operator of a heatset lithographic or heatset letter press printing press and dryer(s) equipped with a control system shall maintain the dryer air pressure lower than the pressroom air pressure at all times the press is operating; and ensure that :
    - (a) The capture system and control device are operated at all times that the printing press is in operation, and
    - (b) The control device is equipped with the applicable monitoring equipment specified in Section 4 Compliance Test methods, and the monitoring equipment is installed, calibrated, operated, and maintained according to the manufacturer's specifications at all times the control device is in use.
- C.** Any owner or operator shall demonstrate compliance with this section through the applicable coating analysis and test methods specified in Section 4 Compliance Test Methods of this rule and in accordance with the capture efficiency test methods in Chapter 126.

#### **4. Compliance Test methods.**

The following test methods should be used, except where the use of an adaptation or alternative to any of the analytical methods specified in this section shall be approved by the Department and US EPA on a case-by-case basis. The owner or operator shall submit sufficient documentation for the Department and US EPA to find that the analytical methods specified below would yield inaccurate results and that the proposed adaptation is appropriate.

- A.** For any heatset web offset or heatset web letterpress printing press that is subject to the requirements of Section 3B Control System Requirements of this rule, compliance shall be determined by performing emission tests in accordance with the following:
- (1) For the purpose of demonstrating compliance with the emission control requirements Section B of this rule, the affected source shall be run at typical operating conditions and flow rates compatible with scheduled production during any emission testing.
  - (2) The negative dryer pressure shall be established during the initial test using an airflow direction indicator, such as a smoke stick or aluminum ribbons, or differential pressure gauge.
  - (3) The following US EPA test methods (in 40 CFR Part 60, Appendix A) shall be used to demonstrate compliance with the applicable emission control requirement in Section 3B of this rule.
    - (a) US EPA Method 1 or 1A, as appropriate, shall be used to select the sampling sites.
    - (b) US EPA Method 2, 2A, 2C, or 2D, as appropriate, shall be used to determine the velocity and volumetric flow rate of the exhaust stream.

- (c) US EPA Method 3 or 3A, as appropriate, shall be used to determine the concentration of O<sub>2</sub> and CO<sub>2</sub>.
  - (d) US EPA Method 4 shall be used to determine moisture content.
  - (e) US 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 of twenty ppmv as specified in Section 3B of this rule is being met, 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 ppmv as carbon, Method 25A shall be used.
    - (i) If the average concentrations in the outlet of a thermal or catalytic oxidizer measured by Method 25A are found to be greater than fifty ppmv as carbon, Method 18 or 25 may be used to determine non-VOC components (methane and ethane) to correct the outlet VOC readings, unless the director determines that the uncorrected Method 25A results are acceptable.
    - (ii) A compliance test shall consist of up to three separate runs, each lasting a minimum of sixty minutes, unless the director determines that process variables dictate shorter sampling times.
    - (iii) US EPA Method 25 specifies a minimum probe temperature of two hundred sixty-five degrees Fahrenheit. To prevent condensation, the probe should be heated to at least the gas stream temperature, typically close to three hundred fifty degrees Fahrenheit.
    - (iv) US EPA Method 25A specifies a minimum temperature of two hundred twenty degrees Fahrenheit for the sampling components leading to the analyzer. To prevent condensation when testing heatset web offset presses, the sampling components and flame ionization detector block should be heated to at least the gas stream temperature, typically close to three hundred fifty degrees Fahrenheit.
- B.** For any offset lithographic printing press that is subject to the requirements of Section 3A(2) Fountain Solution limits of this rule, compliance with the VOC content of the as-applied fountain solution shall be determined by one of the methods in paragraphs 4B(1) and (2) (below) of this rule except when paragraph 4B(4) is applicable:
- (1) US EPA Method 24 shall be used to determine the VOC content of the as-applied fountain solution;
  - (2) If diluted prior to use, a calculation shall be performed for VOC content that combines US EPA Method 24 analytical data for the concentrated materials used to prepare the as-applied fountain solution and the proportions in which they are mixed to make the as-applied fountain solution. The analysis of the concentrated material(s) may be performed by the supplier(s) of those material(s). The analytical data may be derived from a material safety data sheet (MSDS) or equivalent information from the supplier as long as it is based on US EPA Method 24 results; or

- (3) If not diluted prior to use, the owner or operator shall use formulation information provided by the supplier, such as a MSDS sheet or equivalent information from the supplier. In the event of a dispute between information provided by the supplier and data obtained by US EPA Method 24, the data obtained by US EPA Method 24 shall be employed.
  - (4) For any offset lithographic printing press that is subject to the Fountain Solution requirements of Sections 3A (2) (a) (ii) and (iii) of this rule, when adding alcohol to a fountain solution batch previously tested in accordance with one of the compliance test methods contained herein, in lieu of the methods in paragraphs 4B (1) to (3) above, the owner or operator shall determine the VOC (alcohol) content of the altered fountain solution using a hydrometer.
- C.** For any offset lithographic printing press that is subject to the refrigerated fountain solution temperature requirements of 3B (2) (a) (iii) and 3B (2) (b) (iii) of this rule, a thermometer or other temperature detection device capable of reading to 0.5 degrees Fahrenheit shall be used to ensure that any refrigerated fountain solution reservoirs are maintained at or below sixty degrees Fahrenheit at all times.
- D.** For any offset lithographic printing press that is complying via the Cleaning Solution requirements for VOC content of 70% by weight limits of this rule, the VOC content of cleaning solutions shall be determined by one of the following methods:
- (1) US EPA Method 24 shall be used to determine the VOC content of the cleaning solution;
  - (2) If diluted prior to use, a calculation shall be performed for VOC content that combines US 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 as-applied cleaning solution. The analysis of the concentrated material(s) may be performed by the supplier(s) of those material(s). The analytical data may be derived from a material safety data sheet (MSDS) or equivalent information from the supplier as long as it is based on US EPA Method 24 results; or (c) If not diluted prior to use, the owner or operator shall use formulation information provided by the supplier, such as MSDS sheet or equivalent information from the supplier. In the event of a dispute between information provided by the supplier and data obtained by US EPA Method 24, the data obtained by US EPA Method 24 shall be employed.
- E.** For any offset lithographic printing press that is complying via the Cleaning Solution requirements for VOC composite vapor pressure limits of this rule, the VOC composite partial vapor pressure of cleaning solutions shall be determined by one of the following methods:
- (1) If diluted prior to use, calculate the VOC composite vapor pressure of the as-applied solvent by using the formula for "VOC composite vapor pressure" as follows:
    - (a) Determine the identity and quantity of each compound in a blended organic solvent by using ASTM D2306, or by using ASTM E260 for organics and ASTM D3792 for water content, if applicable, or the manufacturer's product formulation data.

- (b) Determine the vapor pressure of each pure VOC component by using ASTM D2879 or publications such as Perry's Chemical Engineer's Handbook, CRC Handbook of Chemistry and Physics, or Lange's Handbook of Chemistry.
- (c) Calculate the VOC composite partial pressure of the solvent by using the formula for "VOC composite partial pressure" in Section 2 (T). For the purpose of this calculation, the blended solvent shall be assumed to be an ideal solution where Raoult's Law applies. The partial vapor pressures of each compound at twenty degrees Celsius (sixty-eight degrees Fahrenheit) shall be used in the formula. The VOC composite partial pressure shall be calculated as follows:
  - (2) If not diluted prior to use, the owner or operator shall use formulation information provided by the supplier, such as a material safety data sheet (MSDS) or equivalent information from the supplier as long as it is based on results determined in accordance with the procedure specified above in Section 4E(1) of this rule.

## 5. Monitoring and Recordkeeping Requirements

- A. Recordkeeping and reporting.** The records required in this section shall be available for inspection during normal business hours and copies shall be provided to the Department or US EPA upon request. All records must be maintained on site for a period of 6 years.
  - (1) The owner or operator of any heatset offset lithographic or letterpress printing press that is subject to the control system requirements specified in Section 3B of this rule, shall install and operate continuous temperature monitoring and recording equipment that measures and records temperature data at least once every fifteen minutes, and shall collect and record the following information and maintain the information at the facility for a period of 6 years:
    - (a) For each day of operation of the press, a log or record of the operating time for the control device, monitoring equipment, and the associated press.
    - (b) For thermal oxidizers, for each day of operation of the press, all three-hour periods of operation during which the average combustion temperature was more than fifty degrees Fahrenheit below the average combustion temperature during the most recent emission test that demonstrated that the press was in compliance.
    - (c) For catalytic oxidizers, for each day of operation of the press, all three-hour periods of operation during which the average temperature of the dryer exhaust gases immediately before the catalyst bed was more than fifty degrees Fahrenheit below the average temperature of the dryer exhaust gases during the most recent emission test that demonstrated that the press was in compliance.
    - (d) 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.

- (2) The owner or operator of a heatset web or sheet-fed offset lithographic printing press subject to the requirements for Fountain Solution containing alcohol limits pursuant to this rule shall measure:
  - (a) The VOC (alcohol) content, in accordance with Section 3B(4) of this rule, of any altered fountain solution, at the time of alteration, in per cent by weight, of the fountain solution employed in the press and shall maintain records of the results of the measurements at the facility for a period of five years. The alcohol content of the fountain solution shall be measured using a hydrometer. The hydrometer shall have a visual, analog, or digital readout with an accuracy of 0.5 per cent; and a standard solution shall be used to calibrate the hydrometer for the type of alcohol used in the fountain solution.
  - (b) On a daily basis, the temperature, in degrees Fahrenheit, of the fountain solution, if the owner or operator refrigerates the fountain solution containing alcohol in accordance with paragraph 3B(2)(a)(iii) and 3B(b)(iii) of this rule, and shall maintain records of the results of the measurements at the facility for a period of six years
- (3) The owner or operator of a subject lithographic printing press shall maintain records of the following information for each batch of fountain solution prepared for use in the press:
  - (a) The volume and VOC content of each concentrated alcohol substitute, added to make the batch of fountain solution, based upon the manufacturer's laboratory analysis using US EPA Method 24.
  - (b) The volume of alcohol added to make the batch of fountain solution.
  - (c) The volume of water added to make the batch of fountain solution.
  - (d) The calculated VOC content of the final, mixed batch.
  - (e) The date and time the batch was prepared.
- (4) The owner or operator of a subject non-heatset web offset lithographic printing press shall document all periods of time when alcohol was used in the press's fountain solution and the volume of alcohol used in each instance.
- (5) The owner or operator shall maintain monthly records of the VOC content or VOC composite partial vapor pressure of all cleaning materials employed in all the lithographic and letterpress printing operations.
- (6) The owner or operator of a subject lithographic printing press or letterpress printing press shall maintain monthly records of the following information:
  - (a) The total amount, in gallons, of all the cleanup materials employed; and

- (b) The total amount, in gallons, of the entire cleanup materials employed that exceeds the allowable VOC content or VOC composite vapor pressure.

**B. Reporting Requirements for Monitoring and Record Keeping.**

The owner or operator of a lithographic or letterpress printing facility that is subject to this rule shall notify the Department of exceedances within forty-five days after the instance occurs, and it shall include a copy of the record showing the instance(s):

- (1) Each hydrometer measurement that shows an exceedance of the applicable alcohol content limits specified in this rule.
- (2) Each temperature reading that shows an exceedance of the temperature limits specified in this rule.
- (3) Each calculated VOC content that exceeds the VOC content limits specified in this rule.
- (4) Each instance when an exceedance of the alcohol usage restriction as specified for fountain solutions in this rule occurs.
- (5) Each instance when alcohol is used in the fountain solution for a non-heatset web offset lithographic printing press.
- (6) Each instance when an exceedance of the VOC content or VOC composite partial vapor pressure specified in this rule for cleanup materials occurs.
- (7) All three-hour blocks of time during which the average combustion temperature within the thermal oxidizer was below the temperature limits specified in this rule.
- (8) All three-hour blocks of time when the emissions unit was in operation during which the average temperature of the exhaust gases immediately before the catalyst bed was below the temperature limits specified Section 5A(1)(c) of this rule.

**6. Retention Factors and Capture Efficiencies.**

- A.** For purposes of determining VOC emissions from offset lithographic printing operations, the following retention factors and capture efficiencies 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) A twenty per cent VOC retention factor shall be used for heatset inks printed on absorptive substrates, meaning eighty per cent 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) A ninety-five per cent VOC retention factor shall be used for sheet-fed and non-heatset web inks printed on absorptive substrates, meaning five per cent of the VOC in the ink is emitted during the printing process.

- (c) A fifty per cent VOC retention factor shall be used for cleaning solution VOC in shop towels for cleaning solutions with a VOC composite vapor pressure of no more than ten mm Hg at twenty degrees Celsius (sixty-eight degrees Fahrenheit) if the contaminated shop towels are kept in closed containers, meaning fifty per cent of the VOC used on the shop towels is emitted during the cleaning process.
- (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 efficiencies are to be used:
  - (a) A one hundred per cent VOC carry over efficiency shall be used for inks. All the VOC in the ink that is not retained is assumed to be volatilized in the press dryer. 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.
  - (b) A seventy per cent VOC carry over efficiency shall be used for fountain solutions containing alcohol substitutes.
  - (c) A forty per cent VOC carry over efficiency shall to be used for automatic blanket wash solutions with a VOC composite vapor pressure of no more than ten mm Hg at twenty degrees Celsius (sixty-eight degrees Fahrenheit).

**7. Emission limitations from the handling, storage, and disposal of materials containing VOC**

- A. Vapor-tight containers shall be used for the storage of spent or fresh VOC and for the storage or disposal of cloth or paper impregnated with VOC that are used for surface preparation, clean up or coating removal.
- B. The use of VOC is prohibited for the cleanup of spray equipment unless equipment is used to collect the cleaning compounds and to minimize their evaporation to the atmosphere.

AUTHORITY: 38 M.R.S.A., Section 585-A

EFFECTIVE DATE:

---

**BASIS STATEMENT**

Many inks, fountain and cleaning solutions used in graphic arts contain volatile organic compounds (VOC), which are precursors to ground-level ozone formation. This regulation restricts the VOC emissions from offset lithography and letterpress printing operations. Under Section 184 of the Clean Air Act Amendments of 1990, the State must submit plans to control VOC emissions from all sources covered by a Control Technique Guideline (CTG) issued by US EPA.

This regulation is based on a CTG issued by US EPA on September , 2006 (FR ) and provides emission control standards for reducing VOC emissions stemming from the use of fountain solutions, cleaning materials and inks. It requires all sources within this category to determine their emission levels and implement reasonable options for keeping such emissions at a minimum, in a cost effective way that includes: control technology approaches, VOC composite vapor pressure limits and standards for work practices. The rule provides a variety of approaches for managing VOC emissions and complying with the limits stipulated in the rule with flexibility for sources to implement the limits in the manner that is most suitable for their facility.