Indiana Air Pollution Control Compliance Kit For Lithographic Printing Operations

May 31, 2013

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Letter of Recommendation

INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
We Protect Hoosiers and Our Environment.

Michael R. Pence
Governor

Thomas W. Easterly
Commissioner

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May 8, 2013

Mr. Joseph E. Lyman
President
Great Lakes Graphics Association
W232 N2950 Roundy Circle E
Pewaukee, WI 53072

Re: Indiana Air Pollution Control Compliance Kit for Lithographic Printing Operations, January 23, 2013

Dear Mr. Lyman:

On October 5, 2006, in the Federal Register [71 FR 8475], the U.S. Environmental Protection Agency issued a series of new control techniques guidelines for the control of volatile organic compound (VOC) emissions in ozone nonattainment areas. These control techniques guidelines establish the presumptive Reasonable Available Control Technology (RACT) level or "floor" for volatile organic compound emissions from certain source categories.

One of these control techniques guidelines was issued for the offset lithographic and letterpress printing industry: Control Techniques Guideline for Offset Lithographic Printing and Letterpress Printing [EPA 453/R-06-002, September 2006]. According to Section 182(b) of the federal Clean Air Act Amendments of 1990, states must revise their state implementation plan (via regulation) to address these control techniques guidelines for any moderate ozone nonattainment areas.

Consequently, on December 2, 2009, Indiana published [DIN: 20091202-IR-326090221FRA] new VOC RACT rules for Lake and Porter counties, 326 IAC 8-16, Offset Lithographic Printing and Letterpress Printing.

In partnership with the Great Lakes Graphic Association (GLGA) [formally Printing Industry of Illinois/Indiana Association (PII)], Specialty Graphic Imaging Association, and Printing Industries of America (PIA), a webinar was presented on April 20, 2011 and the Indiana Air Pollution Control Compliance Kit for Lithographic Printing Operations (also known as "Compliance Toolkit") was made available to Indiana printers located in Lake and Porter counties who may be affected by 326 IAC 8-16.

The Compliance Toolkit provides recordkeeping and certification forms, guidance including examples on how to determine VOC emissions, a copy of 326 IAC 8-16 as well as answers to many questions. It will aid individual printing operations in determining if they are subject to the rule and how to demonstrate compliance. Lastly, the forms in the guide will help printers comply with the recordkeeping requirements of these rules.

Starting in 1999, IDEM partnered with GLGA (formally PII) as well as several Indiana printers to develop and publish the Compliance and Pollution Prevention Guidebook for Indiana Printers which is available at http://www.in.gov/idem/ctap/files/ctap_printers_guidebook.pdf.

Additionally, IDEM has been a participant in several National Environmental Health & Safety Conferences hosted in part by PIA.

If you have any questions, please contact me at (317) 233-1039 or mstoddar@idem.IN.gov.

Sincerely,

Mark C. Stoddard

Mark C. Stoddard
Environmental Engineer
Compliance & Technical Assistance Program

Introduction and Background

This toolkit is intended to assist printers in complying with the new air pollution control regulation. It contains information and forms that will allow printing operations to understand their compliance obligations, fulfill certification requirements, and put in place programs to demonstrate compliance with the various requirements of the rule. Please note that if you are using other print processes (flexography, gravure, screen printing, digital, letterpress), there are different requirements.

On December 2, 2009 amendments to Rule 16 Offset Lithographic Printing and Letterpress Printing of 326 Indiana Administrative Code Article 8 became effective, which establishes requirements that facilities must be in compliance with by April 1, 2011. Changes to the regulations apply to all lithographic printing operations in Lake and Porter Counties.

Facilities located in Lake and Porter County with actual VOC emissions of greater than 3 tons per year on a 12-month rolling basis are subject to the entire rule, while facilities located in Lake and Porter Counties with actual VOC emissions less than 3 tons per year on a 12-month rolling basis are subject to only the recordkeeping requirements of the rule. A copy of the final rule is included in Appendix 4.

The rule is significant because it targets small printing operations in Lake and Porter Counties. The reason for the focus on this geographic area is because of the persistent air pollution problems and continuing non-compliance with the federal ozone standard. Ozone is one of the six air pollutants regulated by the Federal EPA. Areas that exceed the acceptable level or concentration of ozone are classified as nonattainment and are required to develop and implement air pollution control regulations to reduce the ozone concentration, which is produced by VOC reacting with nitrogen oxides in the presence of sunlight.

For all lithographic printing operations in Lake and Porter Counties, the rule requires documentation of compliance status and the specific limitations that apply. Depending on VOC emissions, changes to fountain solutions and cleaning solvents as well as additional reporting, recordkeeping, and monitoring may be required. Facilities that are subject to the rule must submit a compliance certification to the Indiana Department of Environmental Management by May 1, 2011.

Questions and Answers

When did the new rules become effective?

The rule changes became effective on December 2, 2009. Facilities must be in compliance with the rule by April 1, 2011.

Who does this rule apply to?

The rule applies to all lithographic and letterpress printers in Lake and Porter Counties.

What does 326 IAC 8-16 require?

Lithographic printing facilities in Lake County and Porter County with 12-month rolling VOC emissions of greater than or equal to 3 tons must limit the VOC in their fountain solutions and cleaning solutions and keep records. Facilities with less than 3 tons must keep records. These facilities must notify the department as to which parts of the rule apply to their operations by May 1, 2011.

Heatset web operations at facilities in Lake and Porter Counties with potential ink oil emissions greater than 25 tons per year before control must meet the control device requirements. As an alternative, these operations can also accept conditions in their permit which limit their actual emissions to less than 25 tons per year.

What do I need to do if the VOC limits/control requirements of 326 IAC 8-16 do not apply to me?

Facilities outside Lake and Porter County do not need to meet the requirements of this rule. Facilities that are exempt from the VOC content limits and control device requirements of the rule must meet the recordkeeping requirements.

What records must a facility with emissions below 3 tons per 12-month rolling period keep to demonstrate exemption?

To show that emissions are below the 3 ton per year on a 12-month rolling basis, facilities may keep material use records or calculate their VOC emissions. Material use below the thresholds in the following chart ensures that VOC emissions will not exceed 3 tons per year on a 12-month rolling basis.

A facility having a combination of printing methods must calculate emissions.

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

Facilities choosing to demonstrate that their emissions are below 3 tons per 12-month rolling period by material use records must keep the following monthly records for sheet-fed and non-heatset presses:

- gallons of cleaning solvent used
- gallons of fountain solution additive used

For facilities using heatset presses choosing to demonstrate that their emissions are below 3 tons per 12-month rolling period by material use records, the following monthly records are required:

- pounds of ink used
- pounds of cleaning solvent used
- pounds of fountain solution additive used

Facilities choosing to demonstrate that their emissions are below 3 tons per 12-month rolling period by calculating emissions must keep monthly records of the following:

- Gallons of each cleaning solvent used
- VOC content of each cleaning solvent
- Gallons of each fountain solution additive used
- VOC content of fountain solution additive used
- Total pounds of each ink used
- VOC content of each ink used

All records used to demonstrate that a facility is below the emission threshold of 3 tons per 12-month rolling period must be provided to the IDEM within 30 days of receiving a written request, or the facility will be subject to all applicable requirements of the rule.

How do I calculate my VOC emissions?

Calculating emissions from a facility requires the facility to gather material use (i.e., purchase minus inventory and waste), and VOC content information, and utilize the appropriate material use emission and retention factors. The Indiana Department of Environmental Management has included in the rule the retention and emission factors that are to be used in determining emissions. When calculating VOC emissions, the following retention factors should be used:

- For heatset inks, a 20% retention factor, which means 80% of the VOC is released as an air emission.
- For non-heatset web and sheetfed inks, a 95% retention factor, which means 5% of the VOC is released as an air emission.
- For cleaning solutions with a vapor pressure below 10mmHg at 68 degrees Fahrenheit used in conjunction with shop towels, if contaminated shop towels are stored in closed containers, a 50% retentions factor, which means 50% of the VOC is released as an air emission.
- For all other materials, a 0% retention factor, which means 100% of the VOC is released as an air emission.

For more information on how to calculate VOC emissions, refer to the following appendices:

- Appendix 1 - Determining VOC Emissions From Heatset Web Offset Lithographic Printing Operations
- Appendix 2 - Determining VOC Emissions From Non-heatset Web Offset Lithographic Printing Operations
- Appendix 3 - Determining VOC Emissions From Sheetfed Offset Lithographic Printing Operations

What are the VOC content limits for inks?

Due to the low volatility of the solvents used in lithographic inks, there are no requirements to reformulate inks or use inks with a specific VOC content. This is important, as use of soy or other vegetable oil based inks is not being required. However, certain heatset presses are required to install and operate add-on control devices that will reduce ink oil emissions.

What are the VOC content limits for fountain solutions?

The VOC content limits for fountain solution apply to facilities located in Lake and Porter Counties with actual VOC emissions of three tons or more on a 12-month rolling basis. The limits are based on the type of lithographic printing, use of alcohol, and refrigeration of the fountain solution. These limits are as follows:

Heatset - The VOC content in the as-applied fountain solution must meet one of the following conditions:

- 1.6% VOC or less, by weight if the fountain solution contains alcohol, or
- 3% VOC or less, by weight if the fountain solution contains alcohol and if the temperature of the fountain solution is maintained below 60°F, or
- 5% VOC or less, by weight, if the as-applied fountain solution contains no alcohol.

Non-heatset web - The VOC content of the as-applied fountain solution must be 5% VOC or less, by weight, and the as-applied fountain solution must contain no alcohol.

Sheet-fed -The VOC content of the as-applied fountain solution must be:

- 5% VOC or less, by weight if the fountain solution contains alcohol, or
- 8.5% VOC or less, by weight if the fountain solution contains alcohol and the temperature of the fountain solution is maintained below 60°F, or
- 5% VOC or less, by weight, if the as-applied fountain solution contains no alcohol.

Two types of presses are excluded from the above limitations. They are:

1. Sheet-fed offset lithographic presses with a sheet size of 11 inches by 17 inches or smaller.
2. Any press with a fountain solution reservoir of less than one gallon.

If a press cannot operate with these fountain solution limits, the owner or operator can submit a petition to the commissioner requesting a site-specific reasonably available control technology plan.

What are the VOC content limits for cleaning solutions?

For facilities located in Lake and Porter Counties with 3 tons or more actual VOC emissions on a 12-month rolling basis, the required composition of cleaning solvents (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 from areas around the press) are as follows:

- 70% VOC content by weight, or
- VOC composite partial vapor pressure less than or equal to 10 mm Hg at 20°C

The regulation allows for the use of no more than 110 gallons on a 12-month rolling basis of cleaning solutions that do not meet the vapor pressure or VOC content limits listed above, provided appropriate records are maintained.

What are the testing requirements to demonstrate compliance with VOC content and temperature limits?

To determine alcohol content of as-applied fountain solutions containing alcohol, an accurate hydrometer with a visual, analog, or digital readout with an accuracy of 0.5% must be used.

To determine VOC content of as applied fountain or cleaning solutions, the following methods may be used:

1. 40 CFR 60, Method 24
2. MSDS or supplier information based on 40 CFR 60, Method 24
3. If diluted prior to use, material balance calculations based on 40 CFR 60 Method 24 data for concentrates and the proportions in which they are mixed to make the as-applied material.

Temperature of refrigerated fountain solutions must be measured using a thermometer or other temperature detection device capable of reading to 0.5 degrees Fahrenheit.

What are the requirements for control devices for heatset web offset presses?

Heat-set web offset printing presses must meet control equipment requirements if they are located in Lake or Porter Counties and have an annual potential to emit 25 tons of VOC or more from petroleum ink oils before controls.

Subject facilities must have pollution control equipment with a destruction efficiency of 90% if the control equipment was installed prior to January 1, 2010 and 95% destruction efficiency if the control equipment was installed on or after January 1, 2010.

An alternative option to the use of destruction efficiencies is provided. A facility may demonstrate that the outlet concentration is less than 20 parts per million volume measured as hexane on a dry basis. Measuring the outlet concentration is an excellent alternative for those presses that use a combined dryer and afterburner or when the printer consistently prints light coverage work that would not generate a high inlet concentration.

Some presses are exempt from this control requirement. Facilities with enforceable permit conditions limiting actual emissions to less than 25 tons per year before controls are exempt from the control requirements. Also exempt are heat-set web presses used for printing books and heat-set web presses with a maximum web width of 22 inches.

What records must be kept for heatset web presses that are exempt from control requirement?

Facilities that are exempt from control requirements because potential VOC emissions are below 25 tons per year, or conditions of their permit limit emissions to less than 25 tons per year before controls must kept specific records. Exempt facilities must keep the following monthly records:

- Total pounds of each ink used
- VOC content of each ink used
- Hours of operation of each press

What are the testing requirements for control devices for heatset presses?

In order to demonstrate that control devices are complying with the required emission limits, testing is required with the following parameters:

1. Testing must be run at typical operating conditions and flow rates compatible with schedule production.
2. Negative dryer pressure must be established during the initial test using an airflow direction indicator (smoke stick, aluminum ribbons, differential gauge, etc). Continuous dryer monitoring is not required.
3. The initial emissions test must be performed within 90 days of April 1, 2011, or within 180 days upon initial startup of a new press
4. A test conducted before April 1, 2011 may be accepted if it was conducted with an IDEM approved protocol, a U.S. EPA approved test method was used, and testing was conducted during press operation that is consistent with current operation and capacity.

The following are approved test methods, which should be completed using the procedures outlined in 326 IAC 8-1-4 (d) through (f):

1. Method 18, Measurement of Gaseous Organic Compound Emissions by Gas Chromatography;
2. Method 25, Determination of Total Gaseous Non-methane Organic Emissions as Carbon; or
    a. If using Method 25 the probe should be heated to at least the gas steam temperature, typically close to 350 degrees Fahrenheit to prevent condensation.
3. Method 25A, Determination of Total Gaseous Organic Concentration Using a Flame Ionization Analyzer.
    a. If using Method 25A the sampling components and flame ionization detector block should be heated to at least the gas steam temperature, typically close to 350 degrees Fahrenheit to prevent condensation.

What are the monitoring and recordkeeping requirements?

Fountain Solution containing alcohol

The use of alcohol in fountain solution for non-heatset web presses is prohibited. If alcohol is used in a non-heatset web fountain solution, records including time and amount of alcohol used must be maintained. For fountain solutions used on heatset web and sheet-fed presses the following records and monitoring are required:

VOC Content

Manually prepared

- VOC content at time of preparation using a hydrometer calibrated with a standard solution according to manufacturer's specifications, temperature corrected at least once per eight hour shift or once per batch, whichever is longer

Automatically prepared

- Determine VOC content from mixing system settings, calibrated to manufacturer's specifications

Temperature

- Record temperature in degrees Fahrenheit once per day as measured in the recirculating tank

Fountain Solution containing alcohol substitutes

VOC Content

Batch record option

- Record the following for each batch:
  - Volume and VOC content of each concentrated alcohol substitutes added
  - Volume of alcohol added
  - Volume of water added
  - Calculated VOC content of final mixed batch
  - Date and time each batch was prepared

Recipe-log option (alternative to batch record option)

- A recipe for each fountain solution used must be maintained for 5 years from the date the recipe was last prepared, and include the following information:
  - VOC content of each concentrated alcohol substitute
  - Proportions in which the fountain solution is mixed, including the addition of alcohol or water, identified as volume when preparing a discrete batch, or setting when an automatic mixing unit is used
  - The calculated VOC content of the final mixed recipe
- The recipe-log must contain the date and time each batch was prepared and confirmation that is was prepared according to the documented recipe

Fountain solutions containing alcohol substitutes with less than 5% VOC as-supplied

- For fountain solutions containing less than 5% VOC before dilution, an MSDS with VOC content determined according to 40 CFR 60 Method 24 is required, but dilution records are not

Cleaning Solvent

The following monthly records must be kept for all cleaning solvents:

- Total amount (gallons) of each cleaning material used
- VOC content or VOC vapor pressure of all cleaning materials used
- Total amount (gallons) of each cleaning material that exceeds the allowable VOC content or VOC vapor pressure limits

Ink Usage

Facilities must maintain monthly records of the total gallons of all inks used.

Control Device Monitoring

Operating temperatures for oxidizers will be determined based on the time-weighted average of temperatures recorded during testing which demonstrates compliance with the emission standard. The source must maintain the oxidizer at the 3-hour average not less than 50 degrees Fahrenheit below the average temperature determined at the most recent test demonstrating compliance. Temperature must be monitored at all times when a connected press is operational.

Records from all stack tests and operating parameters must be maintained for 5 years, along with a log of any time that the control device or monitoring equipment was not in operation while a connected press was in operation. The following specific monitoring and recordkeeping is required:

Catalytic oxidizers

- Temperature monitoring and recording equipment must use an analog or digital recording device to monitor and record gas temperature upstream of the catalyst bed at least once every 15 minutes
- Catalyst bed material must be inspected annually for condition and potential depletion, and a representative sample of the catalyst must be taken and tested to determine ability to function at or above control requirements.

Thermal and Regenerative oxidizers

- Temperature monitoring and recording equipment must monitor and record oxidizer operating temperature at least once every 15 minutes

What are the compliance certification requirements?

Owners or operators of a lithographic press that is subject to this rule must submit a compliance certification to IDEM by May 1, 2011. The certification must contain:

- A description of the control requirements to which the operation is subject
- A description of any add-on control devices at the source
- A description of the monitoring devices at the source

- A description of the compliance records required
- The results of any compliance tests, including documentation
- A statement by the owner or operator as to whether the source has complied with the requirements to which it is subject

Sample forms, starting on page 27, may be submitted to IDEM to meet this requirement.

Are there requirements for handling cleaning materials and used shop towels?

Any used shop towels (cloth or paper) containing VOCs or solvents must be kept in closed containers when not in use. In addition, any containers used to store cleaning materials must be kept closed when not in use.

What if my facility exceeds the VOC content limits for fountain solution or control requirements for add-on control devices?

The IDEM must be notified within 45 days of the exceedance occurring.

How can I obtain additional information?

Additional information on this rule can be obtained by contacting Gary Jones, Assistant Vice President of EHS Affairs, Printing Industries of America by telephone at 412-259-1794 or by email at gjones@printing.org

The Indiana Administrative code can be found at (http://www.in.gov/legislative/iac/).

Indiana's Volatile Organic Compound Rules can be found at (http://www.in.gov/legislative/iac/T03260/A00080.PDF?).

Recordkeeping and Certification Forms

Fountain Solution Batch VOC Content Form-One Step

Fountain Solution Concentrate Name: _____

Formula Number: _____

Press(es) Fountain Solution Used on: _____

Date Use Began: _____ Date Use Ended: _____

Data Inputs

Fountain Solution Density (lbs/gal)*: _____

VOC Content (lbs/gal)**: _____

Ounces of Concentrate Added to Prepare Gallon of As-applied Fountain Solution: _____

* Density can either be found on the Material Safety Data Sheet or determined by multiplying the specific gravity from the MSDS by 8.34 pounds per gallon.

** VOC content can either be found on the Material Safety Data Sheet, conducting USEPA Method 24, or determined by summing the percent composition of each individual VOC and multiplying it by the density. Do not include exempt VOCs.

Calculation

1. To find the weight (lbs) of VOC in the concentrate, multiply the ounces of concentrate by the VOC content and divide by 128 oz/gal.

$$\frac{\text{Oz. Concentrate} \times \text{VOC Content (lbs/gal)}}{128 \text{ oz/gal}}$$

2. To find the weight percent of VOC, multiply the result of Step 1 by 128 oz/gal and divide by the sum of the oz of concentrate plus 128 ounces of water (128 oz per gallon), multiplied by 8.34 lbs/gal of water.

$$\frac{\text{Answer to Step 1} \times 128 \text{ oz/gal}}{(\text{Oz of concentrate} + 128 \text{ oz}) \times 8.34 \text{ lbs/gal}}$$

3. Multiply the answer to Step 3 by 100 to convert from a decimal to a percent.

   Answer to Step 3 x 100 = % VOC by weight

Answer

% VOC by Weight: _____

Fountain Solution VOC Addition Form

Indicate when any VOC is added to the As-Applied Fountain Solution

Date	Quantity in Press or Fountain Reservoir (gal)	Weight Percent VOC Prior to Addition	Amount Added In Ounces	VOC Content of Additive (lbs/gal)	New VOC Concentration of the As-Applied Fountain Solution (In Weight Percent)

Calculation

New As-Applied Fountain Solution VOC Concentration:

1. To calculate the weight of VOC in As-applied Fountain Solution before addition, multiply the gallons of fountain solution in the reservoir (second column) by the weight percent VOC in the fountain solution prior to the addition of extra VOC (third column) and 8.34 lbs/gal of water.

   Gallons Fountain Solution Reservoir x Weight Percent VOC x 8.34 lb/gal

2. To calculate the weight of VOC in the additive multiply the ounces of additive (fourth column) by the VOC Content of the additive (fifth column) in lbs/gal and divide this result by 128 oz/gal.

   $$\frac{\text{Oz. Additive Added x VOC Content (lbs/gal)}}{\text{128 oz/gal}}$$

3. To find the weight percent VOC, add the answers from Step 1 and 2 together and multiply by 128 oz/gal. Divide this by the gallons of fountain solution in the reservoir (second column) multiplied by 128 oz plus the ounces of additive added (third column) multiplied by 8.34 lbs/gal.

   $$\frac{\text{(Result of Steps 1+2) x 128 oz/gal}}{\text{[(Gal of Fountain Solution x 128 oz/gal) + oz of Additive Added] x 8.34 lbs/gal}}$$

4. Multiply the answer to Step 3 by 100 to convert from a decimal to percent.

Answer to Step 3 x100=% VOC by weight

Answer

% VOC by weight_____

Fountain Solution Batch VOC Content Form-Two Step

Fountain Solution Concentrate Name: _____

Formula Number: _____

Fountain Solution Additive Name: _____

Formula Number: _____

Press(es) Fountain Solution Used on: _____

Date Use Began: _____ Date Use Ended: _____

Data Inputs

Concentrate Density (lbs/gal)*: _____

Concentrate VOC Content (lbs/gal)**: _____

Ounces of Concentrate Added to Prepare Gallon of As-applied Fountain Solution: _____

Additive Density (lbs/gal)*: _____

Additive VOC Content (lbs/gal)**: _____

Ounces of Additive Added to Prepare Gallon of As-applied Fountain Solution: _____

* Density can either be found on the Material Safety Data Sheet or determined by multiplying the specific gravity from the MSDS by 8.34 pounds per gallon.

** VOC content can either be found on the Material Safety Data Sheet, conducting USEPA Method 24, or determined by summing the percent composition of each individual VOC and multiplying it by the density. Do not include exempt VOCs.

Calculation

1. To find the weight of VOC in the concentrate, multiply the ounces of concentrate by the VOC content and divide by 128 oz/gal.

$$\frac{\text{Oz. Concentrate} \times \text{VOC Content (lbs/gal)}}{128 \text{ oz/gal}}$$

2. To find the weight of VOC in the additive, multiply the ounces of concentrate by the VOC content and divide by 128 oz/gal.

$$\frac{\text{Oz. Additive x VOC Content (lbs/gal)}}{\text{128 oz/gal}}$$

3. To find the weight percent of VOC, add the answers from Steps 1 and 2 , multiply the result by 128 oz/gal and divide by the sum of the ounces of concentrate plus the ounces of additive plus 128 ounces of water (128 oz per gallon), multiplied by 8.34 lbs/gal of water.

$$\frac{\text{(Answer to Step 1+ Answer to Step 2) x 128 oz/gal}}{\text{(Oz of concentrate+ Oz of additive + 128 (oz water)) x 8.34 lbs/gal}}$$

4. Multiply the answer to Step 3 by 100 to convert from a decimal to a percent.

   Answer to Step 3 x 100= % VOC by weight

Answer

% VOC by Weight: _____

Fountain Solution VOC Addition Form

Indicate when any VOC is added to the As-Applied Fountain Solution

Date	Quantity in Press or Fountain Reservoir (gal)	Weight Percent VOC Prior to Addition	Amount Concentrate Added In Ounces	Amount of Additive Added in Ounces	VOC Content of Concentrate (lbs/gal)	VOC Content of Additive (lbs/gal)	New VOC Concentration of the As-Applied Fountain Solution (In Weight Percent)

Calculation

New As-Applied Fountain Solution VOC Concentration:

1. To calculate the weight of VOC in As-applied Fountain Solution before addition, multiply the gallons of fountain solution in the reservoir (second column) by the weight percent VOC in the fountain solution prior to the addition of extra VOC (third column) and 8.34 lbs/gal of water.

   Gallons Fountain Solution Reservoir x Weight Percent VOC x 8.34 lb/gal

2. To calculate the weight of VOC in the concentrate added (if adding concentrate), multiply the ounces of concentrate (fourth column) by the VOC Content of the concentrate (sixth column) in lbs/gal and divide this result by 128 oz/gal.

   $$\frac{\text{Oz. Concentrate Added x VOC Content (lbs/gal)}}{\text{128 oz/gal}}$$

3. To calculate the weight of VOC in the additive added (if adding additive) multiply the ounces of additive (fifth column) by the VOC Content of the additive (seventh column) in lbs/gal and divide this result by 128 oz/gal.

$$\frac{\text{Oz. Additive Added x VOC Content (lbs/gal)}}{\text{128 oz/gal}}$$

4. To find the weight percent VOC, add the answers from Steps one, and/or two, and three together and multiply by 128 oz/gal. Divide this by the gallons of fountain solution in the reservoir (second column) multiplied by 128 oz plus the ounces of concentrate added (fourth column) and/or ounces of additive added (fifth column) multiplied by 8.34 lbs/gal.

$$\frac{\text{(Result of Steps 1+2+3) x 128 oz/gal}}{\text{[(Gal of Fountain Solution x 128 oz/gal) + oz of concentrate + oz of additive] x 8.34 lbs/gal}}$$

5. Multiply the answer to Step 4 by 100 to convert from a decimal to percent.

   Answer to Step 3 x100=% VOC by weight

Answer

% VOC by weight_____

Fountain Solution Batch Record

Press ID or Description	Date Prepared	Time Prepared	Recipe Number	Batch prepared per recipe		Prepared by:
				Yes	No	

Cleaning Solution Batch VOC Content Form

Cleaning Solution Concentrate Name: _____

Formula Number: _____

Press(es) Cleaning Solution Used on: _____

Date Use Began: _____ Date Use Ended: _____

Data Inputs

Cleaning Solution Density (lbs/gal)*: _____

VOC Content (lbs/gal)**: _____

Ounces of Concentrate Added to Prepare Gallon of As-applied Cleaning Solution: _____

* Density can either be found on the Material Safety Data Sheet or determined by multiplying the specific gravity from the MSDS by 8.34 pounds per gallon.

** VOC content can either be found on the Material Safety Data Sheet, conducting USEPA Method 24, or determined by summing the percent composition of each individual VOC and multiplying it by the density. Do not include exempt VOCs.

Calculation

1. To find the weight (lbs) of VOC in the concentrate, multiply the ounces of concentrate by the VOC content and divide by 128 oz/gal.

$$\frac{\text{Oz. Concentrate} \times \text{VOC Content (lbs/gal)}}{128 \text{ oz/gal}}$$

2. To find the weight percent of VOC, multiply the result of Step 1 by 128 oz/gal and divide by the sum of the oz of concentrate plus 128 ounces of water (128 oz per gallon), multiplied by 8.34 lbs/gal of water.

$$\frac{\text{Answer to Step 1} \times 128 \text{ oz/gal}}{(\text{Oz of concentrate} + 128 \text{ oz}) \times 8.34 \text{ lbs/gal}}$$

3. Multiply the answer to Step 3 by 100 to convert from a decimal to a percent.

   Answer to Step 3 x 100 = % VOC by weight

Answer

% VOC by Weight: _____

Cleaning Solution VOC Addition Form

Indicate when any VOC is added to the As-Applied Cleaning Solution

Date	Quantity in Press or Cleaning Reservoir (gal)	Weight Percent VOC Prior to Addition	Amount Added In Ounces	VOC Content of Additive (lbs/gal)	New VOC Concentration of the As-Applied Cleaning Solution (In Weight Percent)

Calculation

New As-Applied Cleaning Solution VOC Concentration:

1. To calculate the weight of VOC in As-applied Cleaning Solution before addition, multiply the gallons of cleaning solution in the reservoir (second column) by the weight percent VOC in the cleaning solution prior to the addition of extra VOC (third column) and 8.34 lbs/gal of water.

   Gallons Cleaning Solution Reservoir x Weight Percent VOC x 8.34 lb/gal

2. To calculate the weight of VOC in the additive multiply the ounces of additive (fourth column) by the VOC Content of the additive (fifth column) in lbs/gal and divide this result by 128 oz/gal.

   $$\frac{\text{Oz. Additive Added x VOC Content (lbs/gal)}}{\text{128 oz/gal}}$$

3. To find the weight percent VOC, add the answers from Step 1 and 2 together and multiply by 128 oz/gal. Divide this by the gallons of cleaning solution in the reservoir (second column) multiplied by 128 oz plus the ounces of additive added (third column) multiplied by 8.34 lbs/gal.

   $$\frac{\text{(Result of Steps 1+2) x 128 oz/gal}}{\text{[(Gal of Cleaning Solution x 128 oz/gal) + oz of Additive Added] x 8.34 lbs/gal}}$$

4. Multiply the answer to Step 3 by 100 to convert from a decimal to percent.

Answer to Step 3 x100=% VOC by weight

Answer

% VOC by weight_____

Cleaning Solution Batch Record

Press ID or Description	Date Prepared	Time Prepared	Recipe Number	Batch prepared per recipe		Prepared by:
				Yes	No	

Cleaning Solution Usage Record

Year: _____

Cleaning Solution Name	VOC Content	Vapor Pressure	Gallons of Cleaning Solution Used											
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Amount Exceeding Limits (not to exceed 110 gallons per 12 month rolling period)														

12 Month Rolling Emissions – Material Usage Option

Select one of the following:
☐ - Sheet-fed (768 total gallons)
☐ - Non-heatset Web(768 total gallons)
☐ - Heatset Web (5400 total pounds)

Year: _____

	VOC (gal or lb.)											
	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Ink												
Fountain Solution												
Cleaning Solution												
Miscellaneous												
Total Month												
12 Month total (current month plus 11 previous months)												

Year: _____

	VOC (lbs.)											
	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Ink												
Fountain Solution												
Cleaning Solution												
Miscellaneous												
Total Month												
12 Month total (current month plus 11 previous months)												

Lithographic Printing Facility RACT Certification Form

Heatset Web Offset Press Certification

Owner / Operator Name: _____

Equipment (Press) Description: _____

IDEM Permit Number: _____

IDEM Emission Unit Number: _____

Requirement	Requirement Description **Select all that apply at the time of certification.**
326 IAC 8-16-4 (a) (add-on controls)	**1. Compliance option used (select one):** ☐ Press was installed prior to January 1, 2011 and the control system must meet 90% control efficiency [Section 4 (a) (1)] ☐ Press was installed on or after to January 1, 2011 and the control system must meet 95% control efficiency [Section 4 (a) (2)] ☐ Press must maintain a maximum VOC outlet concentration of 20 ppmv as hexane (C6H14) on a dry basis [Section 4 (a) (3)] ☐ Press is exempt - Used for book printing [Section 2 (2)] ☐ Press is exempt – Maximum web width of 22 inches or less [Section 2 (2)] ☐ Press is exempt – Potential VOC emissions from petroleum ink oil before control are below 25 tpy [Section 2 (1)] ☐ Press is exempt – Actual VOC emissions from petroleum ink oil are limited through enforceable permit conditions to less than 25 tons per year [Section 2 (1)] **2. Description of add-on control system in use** _____ _____ _____ **3. Description of add-on control temperature monitoring and recording device:** _____ _____ _____ **4. Records and monitoring required in Section 7 (a)(1) and (2)**

Lithographic Printing Facility RACT Certification Form

	a. Always select the following. ☐ For catalytic and thermal oxidizers The source must maintain the oxidizer at the 3-hour average not less than 50 degrees Fahrenheit below the temperature determined at the most recent test demonstrating compliance. Temperature must be monitored when a connected press is operational. Records from all stack tests and operating parameters must be maintained for 5 years, along with a log of any time that the control device or monitoring equipment was not in operation while a connected press was in operation. b. Select the following if using a catalytic oxidizer. ☐ For catalytic oxidizers Temperature monitoring and recording equipment must use an analog or digital recording device to monitor gas temperature upstream of the catalyst bed at least once every 15 minutes Catalyst bed material must be inspected annually for condition and potential depletion, and a representative sample of the catalyst must be taken and tested to determine ability to function at or above control requirements. c. Select the following if using a thermal oxidizer. ☐ For thermal oxidizers Temperature monitoring and recording equipment must monitor and record oxidizer operating temperature at least once every 15 minutes **5. Compliance testing results per Section 6 (a)** List and attach the results of any compliance tests, including documentation of test data: _____ _____
326 IAC 8-16-4 (b) (Fountain Solution)	**1. Compliance option used:** ☐ Maintain fountain solution VOC content below 5% by weight and use no alcohol [Section 4 (b) (1)] ☐ Maintain fountain solution VOC content below 1.6% by weight, the fountain solution contains alcohol and is not refrigerated [Section 4 (b) (2)]

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☐ Maintain fountain solution VOC content below 3.0% by weight, the fountain solution contains alcohol and is refrigerated to below 60 degrees Fahrenheit [Section 4 (b) (3)]

☐ Press is exempt – fountain solution reservoir capacity less than 1 gallon [Section 2 (3)]

1. Select recordkeeping option as required in Section 7

☐ For manually prepared fountain solution containing alcohol

VOC content at time of preparation is determined and recorded using a hydrometer calibrated with a standard solution according to manufacturers specifications, temperature corrected at least once per eight hour shift or once per batch, whichever is longer

Description of hydrometer used:

_____

☐ For automatically prepared fountain solution containing alcohol

VOC content is determined and recorded from mixing system settings, calibrated to manufacturer's specifications

☐ For fountain solutions refrigerated to meet the requirements of [Section 4 (b) (3)]

Record temperature in degrees Fahrenheit once per day as measured in the recirculating tank

Description of temperature detection device used:

_____

☐ For fountain solutions containing alcohol substitutes prepared according to the batch record option:

Record the following for each batch:

- Volume and VOC content of each concentrated alcohol substitutes added
- Volume of alcohol added
- Volume of water added
- Calculated VOC content of final mixed batch
- Date and time each batch was prepared

☐ For fountain solutions containing alcohol substitutes prepared according to the Recipe-log option:

A recipe for each fountain solution used must be maintained for 5 years from the date the recipe was last prepared, and include the following information:

- VOC content of each concentrated alcohol substitute
- Proportions in which the fountain solution is mixed, including the

Lithographic Printing Facility RACT Certification Form

	addition of alcohol or water, identified as volume when preparing a discrete batch, or setting when an automatic mixing unit is used • The calculated VOC content of the final mixed recipe • The recipe-log must contain the date and time each batch was prepared and confirmation that is was prepared according to a certain recipe ☐ For fountain solutions containing alcohol substitutes with less than 5% VOC as-supplied For fountain solutions containing less than 5% VOC before dilution, an MSDS with VOC content determined according to 40 CFR 60 Method 24 is required, but dilution records are not
326 IAC 8-16-4 (f) (Cleaning Solution)	**1. Select compliance option(s) used:** ☐ As-applied VOC content of cleaning solvents is being maintained at or below 70% by weight [Section 4 (f) (1) (A)] ☐ As-applied VOC composite partial vapor pressure of cleaning solvents is being maintained at or below 10 mm Hg at 20 degrees Celsius (68 degrees Fahrenheit) [Section 4 (f) (1) (B)] **2. Records required in Section 7** ☐ The following monthly records must be kept: • Total amount (gallons) of each cleaning material used • VOC content or VOC vapor pressure of all cleaning materials used • Total amount (gallons) of each cleaning material that exceeds the allowable VOC content or VOC vapor pressure limits
326 IAC 8-16-4 (f)(2) (Closed containers)	**1. Work practices required:** ☐ All cleaning materials and solvent-laden shop towels are kept in closed containers

Certification

This is to certify that the lithographic printing press described above complies with the applicable requirements of 326 IAC 8-16.

Signature: _____

Name: _____

Title: _____

Date Signed: _____

Lithographic Printing Facility RACT Certification Form

Sheetfed Offset Press Certification

Owner / Operator Name: _____

Equipment Description: _____

IDEM Permit Number: _____

IDEM Emission Unit Number: _____

Requirement	Requirement Description **Select all that apply at the time of certification**
326 IAC 8-16-4 (fountain solutions)	**2. Compliance option used:** ☐ Maintain fountain solution VOC content below 5% by weight and use no alcohol [Section 4 (c) (1)] ☐ Maintain fountain solution VOC content below 5% by weight, the fountain solution contains alcohol and is not refrigerated [Section 4 (c) (2)] ☐ Maintain fountain solution VOC content below 8.5% by weight, the fountain solution contains alcohol and is refrigerated to below 60 degrees Fahrenheit [Section 4 (c) (3)] ☐ Press is exempt – fountain solution reservoir capacity less than 1 gallon [Section 2 (3)] ☐ Press is exempt – maximum sheet size 11x17 inches or less [Section 2 (4)] **3. Select recordkeeping option as required in Section 7** ☐ For manually prepared fountain solution containing alcohol VOC content at time of preparation is determined and recorded using a hydrometer calibrated with a standard solution according to manufacturers specifications, temperature corrected at least once per eight hour shift or once per batch, whichever is longer Description of hydrometer used: _____ ☐ For automatically prepared fountain solution containing alcohol VOC content is determined and recorded from mixing system settings,

Lithographic Printing Facility RACT Certification Form

	calibrated to manufacturer's specifications ☐ For fountain solutions refrigerated to meet the requirements of [Section 4 (b) (3)] Record temperature in degrees Fahrenheit once per day as measured in the recirculating tank Description of temperature detection device used: _____ ☐ For fountain solutions containing alcohol substitutes prepared according to the batch record option: Record the following for each batch: • Volume and VOC content of each concentrated alcohol substitutes added • Volume of alcohol added • Volume of water added • Calculated VOC content of final mixed batch • Date and time each batch was prepared ☐ For fountain solutions containing alcohol substitutes prepared according to the Recipe-log option: A recipe for each fountain solution used must be maintained for 5 years from the date the recipe was last prepared, and include the following information: • VOC content of each concentrated alcohol substitute • Proportions in which the fountain solution is mixed, including the addition of alcohol or water, identified as volume when preparing a discrete batch, or setting when an automatic mixing unit is used • The calculated VOC content of the final mixed recipe • The recipe-log must contain the date and time each batch was prepared and confirmation that is was prepared according to a certain recipe ☐ For fountain solutions containing alcohol substitutes with less than 5% VOC as-supplied For fountain solutions containing less than 5% VOC before dilution, an MSDS with VOC content determined according to 40 CFR 60 Method 24 is required, but dilution records are not
326 IAC 8-16-4 (f) (Cleaning solvents)	**1. Select compliance option(s) used:** ☐ As-applied VOC content of cleaning solvents is being maintained at or below 70% by weight [Section 4 (f) (1) (A)]

Lithographic Printing Facility RACT Certification Form

	☐ As-applied VOC composite partial vapor pressure of cleaning solvents is being maintained at or below 10 mm Hg at 20 degrees Celsius (68 degrees Fahrenheit) [Section 4 (f) (1) (B)] **2. Records required in Section 7** ☐ The following monthly records must be kept: • Total amount (gallons) of each cleaning material used • VOC content or VOC vapor pressure of all cleaning materials used • Total amount (gallons) of each cleaning material that exceeds the allowable VOC content or VOC vapor pressure limits
326 IAC 8-16-4 (f)(2) (Closed containers)	**2. Work practices required:** ☐ All cleaning materials and solvent-laden shop towels are kept in closed containers

Certification

This is to certify that the lithographic printing press described above complies with the applicable requirements of IAC 326 8-16.

Signature:

_____

Name: _____

Title: _____

Date Signed: _____

Non-heatset Web Offset Press Certification

Owner / Operator Name: _____

Equipment Description: _____

IDEM Permit Number: _____

IDEM Emission Unit Number: _____

Requirement	Requirement Description **Select all that apply at the time of certification**
326 IAC 8-16-4 (fountain solutions)	**1. Compliance option used:** ☐ Maintain fountain solution VOC content below 5% by weight and use no alcohol [Section 4 (d)] ☐ Press is exempt – fountain solution reservoir capacity less than 1 gallon [Section 2 (3)] ☐ Not applicable – this press does not use a fountain solution. **2. Select recordkeeping option as required in Section 7** ☐ For fountain solutions containing alcohol substitutes prepared according to the batch record option: Record the following for each batch: • Volume and VOC content of each concentrated alcohol substitutes added • Volume of alcohol added • Volume of water added • Calculated VOC content of final mixed batch • Date and time each batch was prepared ☐ For fountain solutions containing alcohol substitutes prepared according to the Recipe-log option: A recipe for each fountain solution used must be maintained for 5 years from the date the recipe was last prepared, and include the following information: • VOC content of each concentrated alcohol substitute • Proportions in which the fountain solution is mixed, including the addition of alcohol or water, identified as volume when preparing a discrete batch, or setting when an automatic mixing unit is used • The calculated VOC content of the final mixed recipe

	• The recipe-log must contain the date and time each batch was prepared and confirmation that is was prepared according to a certain recipe ☐ For fountain solutions containing alcohol substitutes with less than 5% VOC as-supplied For fountain solutions containing less than 5% VOC before dilution, an MSDS with VOC content determined according to 40 CFR 60 Method 24 is required, but dilution records are not
326 IAC 8-16-4 (f) (Cleaning solvents)	**1. Select compliance option(s) used:** ☐ As-applied VOC content of cleaning solvents is being maintained at or below 70% by weight [Section 4 (f) (1) (A)] ☐ As-applied VOC composite partial vapor pressure of cleaning solvents is being maintained at or below 10 mm Hg at 20 degrees Celsius (68 degrees Fahrenheit) [Section 4 (f) (1) (B)] **2. Records required in Section 7** ☐ The following monthly records must be kept: • Total amount (gallons) of each cleaning material used • VOC content or VOC vapor pressure of all cleaning materials used • Total amount (gallons) of each cleaning material that exceeds the allowable VOC content or VOC vapor pressure limits
326 IAC 8-16-4 (f)(2) (Closed containers)	**1. Work practices required:** ☐ All cleaning materials and solvent-laden shop towels are kept in closed containers

Certification

This is to certify that the lithographic printing press described above complies with the applicable requirements of IAC 326 8-16.

Signature: _____

Name: _____

Title: _____

Date Signed: _____

Instructions for Completing the Certification Form(s)

Applicability

A certification must be completed for each printing press located at facility in Lake or Porter County whose annual emission of volatile organic compound (VOC) is 3 tons or more per year based on a 12 month rolling average. The certification forms are equipment specific. Choose the appropriate form for the type or press being certified (Heatset, Sheetfed or Non-heatset).

General Instructions for completing the form

This form is intended to be completed electronically. To enter information into the gray-shaded boxes, click on the box once and begin typing the required information. To place an "x" in a check box, double click the box. A box will open. Change the default from "Not checked" to "Checked" and then click "OK".

All requested information must be included on the form (e.g. no blanks).

All forms may be also printed and completed by hand.

Specific Instructions

1. Enter the name of the owner / operator of the facility. The owner / operator may be any public or private organization, individual, partnership or other entity who owns, leases, controls, operates or supervises a facility, an emission source or air pollution control equipment.

2. Enter the IDEM operating permit or permit to install identification number; otherwise, enter "N/A".

3. Enter the IDEM emission unit number as listed in the operating permit or permit to install; otherwise, enter "N/A".

4. Enter a description of the equipment (press).

5. For each of the requirements in "Requirements" column in the table, indicate, in the "Requirement Description" column, each of the following:

    a. Compliance option used.

    b. Records being kept to demonstrate continuous compliance.

    c. Other requested information.

Note 1: Selecting a compliance option does not imply that the facility does not have the ability to change the compliance option at a future date.

Note 2: It is important to make sure that any modified permit or new permit issued as a result of this rule contains all of your compliance options.

Certification

Enter all information requested in the gray-shaded boxes. **Only an authorized person is permitted to sign the notification.** Authorized persons are the owner or operator of the lithographic printing operation.

Submission

When the form is complete, print a copy and, on each page, write the page number and page count in the spaces provided. Make a copy of the completed and signed form for your records and submit the original to:

Indiana Department of Environmental Management
Compliance and Enforcement Branch
Office of Air Quality
Indiana. Dept. of Environmental Management
100 North Senate Avenue
IGCN Room 1003
Indianapolis, IN 46204-2251

Appendix 1

Determining VOC Emissions From
Heatset Web Offset Lithographic Printing Operations

Background

The two most important aspects involved in air pollution control regulations for the printer is knowing how much air pollution is being released from their operation and what specific air pollution permit and possible control regulations need to be met. The first step in determining what permit or possible control requirements apply is to determine both the actual and potential emissions of air pollutants.

The two principal pollutants of concern are volatile organic compounds (VOC) and hazardous air pollutants (HAPs). VOCs are those chemicals that will evaporate and lead to the formation of ozone in the lower atmosphere. There is a small list of chemicals that are considered exempt from the definition of VOC and the ones possibly found in offset printing include acetone, methyl acetate, and methylene chloride. For more information see PNEAC fact sheet "What are VOCs and do printing related material contain them?" (http://www.pneac.org/sheets/all/vocs.cfm). There is a list of 188 Hazardous Air Pollutants (http://www.epa.gov/ttn/atw/188polls.html) that are subject to regulation. Calculations of HAP emissions will not be discussed in this fact sheet, please contact PNEAC or Printing Industries of America for more information on HAP emissions.

The principal reason why a printer needs to know their VOC emissions is because of construction and/or operating permits and emission inventory reporting requirements. Many states and local air pollution control agencies have instituted a system of permitting that requires a source of air pollution to obtain either a permit to construct or a permit to operate and in some cases a single construction and operation permit. Permits can be viewed as a contract between the printer and the permitting authority allowing the printer to pollute at a given rate. If permits are required, they are required to be in hand prior to accepting delivery of a new press, modifying an existing press such as adding a coating unit, or actually running the press.

The need to obtain an air pollution control permit depends on the threshold that has been set by the state and/or local air pollution control agency responsible for your area. The thresholds can be based on several different parameters. Some state and local agencies use an actual emission rate or amount while others use a potential emission rate or amount threshold. Some agencies use actual material consumption rates to determine if permits are required. Permits can be required for a single piece of equipment or for an entire facility. In addition, if the emissions exceed certain thresholds, then the use of an afterburner, either a stand-alone unit or one that is integrated into the dryer could be required.

The permitting and control thresholds can vary quite dramatically and it is important to know what the permit threshold is for your particular location. Even if a printer is not required to obtain an air pollution control permit, good environmental management practice dictates that emission calculations should be performed at lease annually, when a new piece of equipment that emits air pollution such as a press is purchased, or when an existing piece of equipment emitting air pollution is modified such as adding a coating unit on a press. In order to verify that a permit is not required, some state and local air permitting authorities require printers to calculate the emissions. For more information

see PNEAC fact sheet “Understanding Air Pollution Permits” (http://www.pneac.org/sheets/all/airpollutionpermits.cfm).

VOC Emissions from Heatset Web Offset Lithography

The majority of VOCs emitted from the heatset web process are emitted from the dryer due to the evaporation of the ink oil during the drying process. The remainder is emitted through general pressroom ventilation air. Since not all of the emissions are released from a definitive point, the direct measurement of all emissions (or emissions over time for an emission rate) is difficult, if not impractical. Therefore, emissions have to be calculated from material use and material content information. This approach is quite acceptable to permitting authorities. In fact, this same approach is used for printing and coating operations (e.g., flexographic printing or rotogravure printing) where most or all of the VOCs are emitted through process stacks or vents.

The materials utilized in heatset web offset lithographic printing process that contain VOCs are the fountain solution with isopropyl alcohol or isopropyl alcohol substitutes/extenders, cleaning solvents used to clean ink and other press components, ink oils, and other materials that are applied inline such as coatings and adhesives.

Other sources of emissions in a heatset web offset lithographic printing operation include parts washers, binding and finishing equipment, and some prepress equipment. While these sources are generally not significant, their emissions need to be included in a total facility emission inventory. In some instances, such as an ink jetting operation using solvent-based inks, some of the other sources of VOC emissions may have to be permitted as the emissions could exceed the specified threshold.

Determining VOC Emissions From Heatset Presses

VOC emissions from materials used in heatset web printing operations are a function of consumption multiplied by the VOC content and then multiplied any applicable release factor or carry over/capture efficiency. There are several important release and carry over factors that should be used in determining emissions from input materials. These factors allow the printer to show that not all of the VOC contained in a product is actually emitted. These factors have been reviewed and approved by USEPA and are based on the physical characteristics, how the materials are used and managed in the process, and have been supported with testing.

In determining VOC emissions from heatset web inks printed on paper, a retention factor of 20% has been accepted by USEPA. The 20% retention factor equates into an 80% release factor and was established a result of ink oil retention studies conducted by the printing industry. In addition, the capture/carry over efficiency for the ink oil or VOC emissions is 100% as the ink oils are only released in the dryer. The 80% retention factor and 100% capture efficiency are included in several key USEPA documents including the 1993 draft Control Techniques Guideline for Offset Lithography and the final 2006 Control Techniques Guideline for Offset Lithographic and Letterpress Printing (EPA 453/R-06-002). These references have been widely accepted by many state/local air permitting authorities as authoritative. In addition, the ink release and capture efficiency factor can also to be used for any conventional varnishes that would be applied as an overprint coating as they are essentially printing inks without pigments.

The carry over/capture efficiency for fountain solutions containing alcohol substitutes has been established at 70%. This means that 30% of the VOC in fountain solution is released into the pressroom air and not controlled. The carry over/capture efficiency for automatic blanket washes that

have a vapor pressure less than 10 mm Hg at 20^{o}C (68^{o}F) is 40%, which means 60% of the solvent is emitted uncontrolled.

Another important retention factor for determining VOC emissions is the one for low vapor pressure cleaning solutions used in manual cleaning and in conjunction with shop towels. USEPA has established a 50% shop towel retention factor for cleaning solutions with VOC composite vapor pressures less than 10 mm Hg at 20^{o}C (68^{o}F). The shop towels need to be kept in a closed container when not being used. This retention factor was included in the Alternative Control Techniques Guideline for Offset Lithography, released in June 1994 (EPA 453/R-94-054) and the 2006 Control Techniques Guideline for Offset Lithographic and Letterpress Printing (EPA 453/R-06-002). The ACT was released to supplement the draft CTG and provides significant revisions to some of the elements contained in the CTG.

No retention or release factors have been established for VOCs used in water-based or UV-cured coatings, adhesives, or other materials used in heatset web lithographic printing operations. Therefore, all of the VOCs in these materials would all be considered released into the atmosphere. The only “credit” or reduction in for VOC not released would be for the VOC contained in discarded wastes. In some instances, state and local permitting agencies will require proof that of the volume discarded as well as the VOC content that is in the waste.

VOC Emission Calculation Worksheet For Heatset Web Offset Lithographic Printing

The following worksheet presents both the formulas and assumptions that can be used to determine both actual and potential VOC emissions from heatset web offset lithographic printing operations. The assumptions on retention and release factors are taken directly from principally three EPA documents entitled 2006 Control Techniques Guideline for Offset Lithographic and Letterpress Printing (EPA 453/R-06-002) the November 1993 draft Control Techniques Guideline for Offset Lithography, and the Alternative Control Techniques Guideline issued in June 1994 (EPA 453/R-94-054).

Material	**Usage[1]**	**Units**	**VOC Content[2]**	**Units**	**Release Factor[3]**	**Control Factor[4]**	**VOC Emissions[5]**
Ink		pounds/yr		% by weight			
Fountain Solution (FS) Concentrate		gallons/yr		lbs VOC/gal			
FS Additive		gallons/yr		lbs VOC/gal			
Cleaning Solution		gallons/yr		lbs VOC/gal			
		gallons/yr		lbs VOC/gal			
		gallons/yr		lbs VOC/gal			
Coatings and Conventional Varnishes		pounds/yr		% by weight			
		gallons/yr		lbs VOC/gal			
Misc.		gallons/yr		lbs VOC/gal			
Total VOC Emissions							

1. Usage is defined as purchase amount minus change in standing inventory, minus the amount that is discarded.

2. List either percent VOC content (by weight) or pounds of VOC per gallon for the product.

    a. The VOC content information may be provided by the supplier via the MSDS, USEPA Method 24 analysis, or summing % content of all VOCs and multiplying it by the density to calculate VOC. If density is unknown, multiply specific gravity from MSDS by 8.33 lbs/gal.

    b. Do not include exempt VOCs such as methylene chloride, 1,1,1-trichloroethane, acetone, methyl acetate, or T-butyl acetate. (see www.epa.gov/ttn/naaqs/ozone/ozonetech/def_VOC.htm for the definition of a VOC)

c. For Ink VOC content, the applicant can determine the VOC emissions for each ink used or use the highest VOC containing ink in each category.

3. Use the following VOC release factor:

Material	**Release Factor**
Ink	0.8
Fountain Solution Concentrate	1.0
Fountain Solution Additive	1.0
Automatic Blanket Wash	1.0
Cleaning Solution (Manual)	0.5*
Coating	
UV	1.0
Water-Based	1.0
Conventional Varnish	0.8

* The VOC composite vapor pressure of the cleaning solution must be less than 10 mm Hg at 20°C (68°F).
Alternatively, the VOC content of the cleaning solution cannot exceed 30% by weight.

4. The control factor is the combination of the carry over factor and the destruction/removal efficiency of any control device used to oxidize or remove VOCs from the dryer exhaust. Common control devices are afterburners that are either stand alone or integrated into the dryer. The control factor is represents the amount of VOC in a decimal format that is **not** destroyed, which is the amount of VOC that is not captured or destroyed by a control device.

   Use the following VOC carry over factor:

Material	**Carry Over Factor**
Ink	1.0
Fountain Solution Concentrate	0.7
Fountain Solution Additive	0.7
Automatic Blanket Wash	0.4
Cleaning Solution (Manual)	N/A
Coating	
UV	N/A
Water-Based	N/A
Conventional Varnish	1.0

   For example, the control factor for fountain solution with alcohol substitutes used on a press with an afterburner with a destruction efficiency or 95% is [1-(0.7 x 0.95)] or 0.335. This represents the fraction of the material that is **not** captured and oxidized or destroyed. If there is no afterburner, then the use of the control factor should not be used.

5. The actual VOC emissions are determined by multiplying the Usage, VOC Content, and Release Factor, and Control Factor together. The total VOC emissions are the result of adding all of the individual VOC emission determinations together.

   To convert the total pounds per year into tons per year, divide the total pounds by 2,000 because there are 2,000 pounds in one ton.

Example of VOC Emission Calculation For Heatset Web Press With 95% Efficient Afterburner

Material	Annual Usage	VOC Content
Heatset Ink, Process	400,000 pounds	40% by weight
Fountain Solution Concentrate	1,200 gallons	1.0 pound/gallon
Fountain Solution Additive	800 gallons	6.7 pounds/gallon
Cleaning Solution - Blanket Wash	2,200 gallons	6.24 pounds/gallon
Cleaning Solution - Roller Wash	400 gallons	5.9 pounds/gallon
Automatic Blanket Wash	2,000 gallons	7.0 pounds/gallon
Coating - Conventional	6,000 pounds	45% by weight
Misc – Plate Cleaner	8 gallons	2.5 pounds/gallon

Material	**Usage**	**Units**	**VOC Content**	**Units**	**Release Factor**	**Control Factor[1]**	**VOC Emissions**
Ink	400,000	pounds/Yr	0.40	% by weight	0.8	0.05[2]	6,400
Fountain Solution (FS) Concentrate	1,200	gallons/Yr	1.0	lbs VOC/gal	1.0	0.335[3]	402
FS Additive	800	gallons/Yr	6.7	lbs VOC/gal	1.0	0.335[3]	1,796
Blanket Wash (Manual)	1,200	gallons/Yr	6.24	lbs VOC/gal	0.5	1[4]	3,744
Roller Wash	300	gallons/Yr	5.9	lbs VOC/gal	0.5	1[4]	885
Blanket Wash (Auto)	2,000	gallons/Yr	7.0	lbs VOC/gal	1.0	0.62[5]	8,680
Coating – Conventional	6,000	pounds/Yr	0.45	% by weight	0.8	0.05[2]	108
Misc.	8	gallons/Yr	2.5	lbs VOC/gal	1.0	1[4]	20
Total VOC Emissions							22,032 lbs/yr 11.02 tons/yr

1. Control Factor – [1-(release factor X destruction efficiency of add-on control device)]
2. Ink control factor - [1-(1 x 0.95)] = 0.05 (conventional coating is ink without pigment)
3. Fountain Solution control factor for alcohol substitutes – [1-(0.7 x 0.95)] = 0.335
4. Blanket wash, roller wash, and misc control factor – [1 – (0 x 0.95)] = 1 (not used when dryer is running)
5. Automatic blanket wash control factor for low vapor pressures (less than 10 mm Hg) – [1-(0.6 x 0.95)] = 0.62

References

1. Control Techniques Guideline for Offset Lithographic and Letterpress Printing (EPA 453/R-06-002) September 2006 is available at http://www.epa.gov/glo/SIPToolkit/ctg_act/200609_voc_epa453_r-06-002_litho_letterpress_printing.pdf

2. Draft Control of Volatile Organic Compound Emissions from Offset Lithographic Printing, September 1993 is available at www.epa.gov/ttn/atw/print/printpg.html under Closely Related Rules, Policies or Program Guidance

3. Alternative Control Techniques Document: Offset Lithographic Printing (EPA-453/R-94-054), June 1994, is available at www.epa.gov/ttn/atw/print/printpg.html under Closely Related Rules, Policies or Program Guidance

4. Printers' Simplified Total Environmental Partnership (PrintSTEP), August 2006 Workbooks are available through www.epa.gov/compliance/assistance/sectors/printstep.html under PrintSTEP Products.

5. Potential to Emit (PTE) Guidance for Specific Source Categories, April 1998, Memo and Attached Technical Support Document are available at www.epa.gov/ttn/oarpg/t5pgm.html - scroll down to item dated 4-14-98.

6. EIIP Volume III, Chapter 7 on Graphic Arts, November 2006 is available at www.epa.gov/ttn/chief/eiip/techreport/volume03/iii07.pdf

Appendix 2

Determining VOC Emissions From
Non-heatset Web Offset Lithographic Printing Operations

Background

The two most important aspects involved in air pollution control regulations for the printer is knowing how much air pollution is being released from their operation and what specific air pollution permit and possible control regulations need to be met. The first step in determining what permit or possible control requirements apply is to determine both the actual and potential emissions of air pollutants.

The two principal pollutants of concern are volatile organic compounds (VOC) and hazardous air pollutants (HAPs). VOCs are those chemicals that will evaporate and lead to the formation of ozone in the lower atmosphere. There is a small list of chemicals that are considered exempt from the definition of VOC and the ones possibly found in offset printing include acetone, methyl acetate, and methylene chloride. For more information see PNEAC fact sheet "What are VOCs and do printing related material contain them?" (http://www.pneac.org/sheets/all/vocs.cfm). There is a list of 188 Hazardous Air Pollutants (http://www.epa.gov/ttn/atw/188polls.html) that are subject to regulation. Calculations of HAP emissions will not be discussed in this fact sheet, please contact PNEAC or Printing Industries of America for more information on HAP emissions.

The principal reason why a printer needs to know their VOC emissions is because of construction and/or operating permits and emission inventory reporting requirements. Many states and local air pollution control agencies have instituted a system of permitting that requires a source of air pollution to obtain either a permit to construct or operate. Permits can be viewed as a contract between the printer and the permitting authority allowing the printer to pollute at a given rate. If permits are required, they are required to be in hand prior to accepting delivery of a new press, modifying an existing press such as adding a coating unit, or actually running the press.

The need to obtain an air pollution control permit depends on the threshold that has been set by the state and/or local air pollution control agency responsible for your area. The thresholds can be based on several different parameters. Some state and local agencies use an actual emission rate or amount while others use a potential emission rate or amount threshold. Some agencies use actual material consumption rates to determine if permits are required. Permits can be required for a single piece of equipment or for an entire facility. The permitting thresholds can vary quite dramatically and it is important to know what the permit threshold is for your particular location. Even if a printer is not required to obtain an air pollution control permit, good environmental management practice dictates that emission calculations should be performed at lease annually, when a new piece of equipment that emits air pollution such as a press is purchased, or when an existing piece of equipment emitting air pollution is modified such as adding a coating unit on a press. In order to verify that a permit is not required, some state and local air permitting authorities require printers to calculate the emissions.

VOC Emissions From Non-heatset Web Offset Lithography

The majority of VOCs emitted from the non-heatset web process are emitted through general pressroom ventilation air rather than through process stacks or vents. As a result of the lack of a definitive point of emissions from the non-heatset web press, the direct measurement of emissions (or

emission rates) is difficult, if not impractical. Therefore, emissions have to be calculated from material use and material content information. This approach is quite acceptable to permitting authorities. In fact, this same approach is used for printing and coating operations (e.g., flexographic printing or rotogravure printing) where most or all of the VOCs are emitted through process stacks or vents. The materials utilized in non-heatset web offset lithographic printing process that contain VOCs are the fountain solution with isopropyl alcohol or isopropyl alcohol substitutes/extenders, cleaning solvents used to clean ink and other press components, ink oils, coatings, and adhesives.

Other sources of emissions in a non-heatset web offset lithographic printing operation include parts washers, binding and finishing equipment, and some prepress equipment. While these sources are generally not significant, their emissions need to be included in a total facility emission inventory. In some instances, such as an ink jetting operation using solvent-based inks, some of the other sources of VOC emissions may have to be permitted as the emissions could exceed the specified threshold.

VOC emissions from materials used in non-heatset web printing operations are a function of consumption multiplied by the VOC content and any applicable release factor. There are two extremely important release factors that should be used in determining emissions from input materials. These retention factors allow for a reduction in VOC emissions because it has been established with USEPA that due to their physical characteristics and how certain materials are used and handled, they are not released into the air.

For determining VOC emissions from non-heatset web inks printed on paper, a retention factor of 95% has been accepted by USEPA. The 95% retention factor equates into a 5% release factor and was established a result of ink oil retention studies conducted by the printing industry. The 95% retention factor was included in a document entitled Control Techniques Guideline for Offset Lithography, which was released in draft form in November 1993 and in final form in 2006 as the Control Techniques Guideline for Offset Lithographic and Letterpress Printing (EPA 453/R-06-002). This reference has been widely accepted by many state/local air permitting authorities as authoritative. This retention factor is also to be used for any varnishes that would be applied as an overprint coating as they are essentially printing inks without pigments.

The other important retention factor for determining VOC emissions is the one for low vapor pressure cleaning solutions used in conjunction with shop towels. USEPA has established a 50% shop towel retention factor for cleaning solutions with VOC composite vapor pressures less than 10 mm Hg at 20^{o}C (68^{o}F). The shop towels need to be kept in a closed container when not being used. This retention factor was included in the Alternative Control Techniques Guideline for Offset Lithography, released in June 1994 (EPA 453/R-94-054) and the 2006 Control Techniques Guideline for Offset Lithographic and Letterpress Printing (EPA 453/R-06-002). The ACT was released to supplement the draft CTG and provides significant revisions to some of the elements contained in the CTG.

No retention or release factors have been established for VOCs used in fountain solutions, coatings, adhesives, or other materials used in non-heatset web lithographic printing operations. Therefore, all of the VOCs in these materials would all be released into the atmosphere. The emissions from automatic blanket washers would all be considered released into the atmosphere. The only “credit” for VOC not released would be for that contained in discarded wastes.

VOC Emission Calculation Worksheet For Non-heatset Web Offset Lithographic Printing

The following worksheet presents both the formulas and assumptions that can be used to determine both actual and potential VOC emissions from non-heatset web offset lithographic printing operations. The assumptions on retention and release factors are taken directly from three EPA documents entitled Control Techniques Guideline for Offset Lithography issued as a draft in November 1993, the final 2006 Control Techniques Guideline for Offset Lithographic and Letterpress Printing (EPA 453/R-06-002), and the Alternative Control Techniques Guideline issued in June 1994 (EPA 453/R-94-054).

Material	**Usage[1]**	**Units**	**VOC Content[2]**	**Units**	**Release Factor[3]**	**VOC Emissions[4]**
Ink		Pounds/Yr		% by Weight		
Fountain Solution (FS) Concentrate		Gallons/Yr		Lbs VOC/Gal		
FS Additive		Gallons/Yr		Lbs VOC/Gal		
Cleaning Solution		Gallons/Yr		Lbs VOC/Gal		
		Gallons/Yr		Lbs VOC/Gal		
		Gallons/Yr		Lbs VOC/Gal		
Coatings and Conventional Varnishes		Pounds/Yr		% by Weight		
		Gallons/Yr		Lbs VOC/Gal		
Misc.		Gallons/Yr		Lbs VOC/Gal		
Total VOC Emissions						

1. Usage is defined as purchase amount minus change in standing inventory, minus the amount that is discarded.

2. List either percent VOC content (by weight) or pounds of VOC per gallon for the product.

    a. The VOC content information may be provided by the supplier via the SDS, USEPA Method 24 analysis, or summing % content of all VOCs and multiplying it by the density to calculate VOC. If density is unknown, multiply specific gravity from MSDS by 8.33 lbs/gal.

    b. Do not include exempt VOCs - Methylene Chloride, 1,1,1-Trichloroethane, Acetone, or Methyl Acetate.

c. For Ink VOC content, the applicant can determine the VOC emissions for each ink used or use the highest VOC containing ink in each category.

3. Use the following for the appropriate VOC release factor:

Ink	0.05
Fountain Solution Concentrate	1.0
Fountain Solution Additive	1.0
Cleaning Solution	0.5*
Coating	
UV	1.0
Water-Based	1.0
Conventional	0.05

* The VOC composite vapor pressure of the cleaning solution must be less than 10 mm Hg at 20^{o}C (68^{o}F).

Alternatively, the VOC content of the cleaning solution cannot exceed 30% by weight.

4. The actual VOC emissions are determined by multiplying the Usage, VOC Content, and Release Factors together. The total VOC emissions are the result of adding all of the individual VOC emission determinations together. To convert the total pounds per year into tons per year, divide the total pounds by 2,000 because there are 2,000 pounds in one ton.

Example of VOC Emission Calculation Using Above Approach and Worksheet

Material	Annual Usage	VOC Content
Non-heatset Web Ink, Process	25,200 pounds	35% by weight
Fountain Solution Concentrate	420 gallons	0.717 pounds/gallon
Fountain Solution Additive	120 gallons	6.7 pounds/gallon
Cleaning Solution - Blanket Wash	1,200 gallons	6.24 pounds/gallon
Cleaning Solution - Roller Wash	300 gallons	5.9 pounds/gallon
Coating - UV	180 gallons	8.5 pounds/gallon
Coating - Conventional	6,000 pounds	35% by weight

Material[1]	**Usage[2]**	**Units**	**VOC Content[3]**	**Units**	**Release Factor[4]**	**VOC Emissions[5]**
Ink	25,200	Pounds/Yr	0.35	% by Weight	0.05	441
Fountain Solution (FS) Concentrate	420	Gallons/Yr	0.717	Lbs VOC/Gal	1.0	301.14
FS Additive	120	Gallons/Yr	6.7	Lbs VOC/Gal	1.0	804
Cleaning Solution	1,200	Gallons/Yr	6.24	Lbs VOC/Gal	0.5	3,744
	300	Gallons/Yr	5.9	Lbs VOC/Gal	0.5	885
		Gallons/Yr		Lbs VOC/Gal		
Coatings – UV	180	Pounds/Yr	8.5	% by Weight	1.0	15.3
Coating – Conventional	6,000	Gallons/Yr	0.35	Lbs VOC/Gal	0.05	105
		Gallons/Yr		Lbs VOC/Gal		
Misc.		Gallons/Yr		Lbs VOC/Gal		
Total VOC Emissions						6,295.3 lbs/yr 3.15 tons/yr

References

1. Control Techniques Guideline for Offset Lithographic and Letterpress Printing (EPA 453/R-06-002) September 2006 is available at http://www.epa.gov/glo/SIPToolkit/ctg_act/200609_voc_epa453_r-06-002_litho_letterpress_printing.pdf

2. Draft Control of Volatile Organic Compound Emissions from Offset Lithographic Printing, September 1993 is available at www.epa.gov/ttn/atw/print/printpg.html under Closely Related Rules, Policies or Program Guidance

3. Alternative Control Techniques Document: Offset Lithographic Printing (EPA-453/R-94-054), June 1994, is available at www.epa.gov/ttn/atw/print/printpg.html under Closely Related Rules, Policies or Program Guidance

4. Printers' Simplified Total Environmental Partnership (PrintSTEP), August 2006 Workbooks are available through www.epa.gov/compliance/assistance/sectors/printstep.html under PrintSTEP Products.

5. Potential to Emit (PTE) Guidance for Specific Source Categories, April 1998, Memo and Attached Technical Support Document are available at www.epa.gov/ttn/oarpg/t5pgm.html - scroll down to item dated 4-14-98.

6. EIIP Volume III, Chapter 7 on Graphic Arts, November 2006 is available at www.epa.gov/ttn/chief/eiip/techreport/volume03/iii07.pdf

Appendix 3

Determining VOC Emissions From
Sheetfed Offset Lithographic Printing Operations

Background

The two most important aspects involved in air pollution control regulations for the printer is knowing how much air pollution is being released from their operation and what specific air pollution permit and possible control regulations need to be met. The first step in determining what permit or possible control requirements apply is to determine both the actual and potential emissions of air pollutants.

The two principal pollutants of concern are volatile organic compounds (VOC) and hazardous air pollutants (HAPs). VOCs are those chemicals that will evaporate and lead to the formation of ozone in the lower atmosphere. There is a small list of chemicals that are considered exempt from the definition of VOC and the ones possibly found in offset printing include acetone, methyl acetate, and methylene chloride. For more information see PNEAC fact sheet "What are VOCs and do printing related material contain them?" (http://www.pneac.org/sheets/all/vocs.cfm). There is a list of 188 Hazardous Air Pollutants (http://www.epa.gov/ttn/atw/188polls.html) that are subject to regulation. Calculations of HAP emissions will not be discussed in this fact sheet, please contact PNEAC or Printing Industries of America for more information on HAP emissions.

The principal reason why a printer needs to know their VOC emissions is because of construction and/or operating permits and emission inventory reporting requirements. Many states and local air pollution control agencies have instituted a system of permitting that requires a source of air pollution to obtain either a permit to construct or operate. Permits can be viewed as a contract between the printer and the permitting authority allowing the printer to pollute at a given rate. If permits are required, they are required to be in hand prior to accepting delivery of a new press, modifying an existing press such as adding a coating unit, or actually running the press.

The need to obtain an air pollution control permit depends on the threshold that has been set by the state and/or local air pollution control agency responsible for your area. The thresholds can be based on several different parameters. Some state and local agencies use an actual emission rate or amount while others use a potential emission rate or amount threshold. Some agencies use actual material consumption rates to determine if permits are required. Permits can be required for a single piece of equipment or for an entire facility. The permitting thresholds can vary quite dramatically and it is important to know what the permit threshold is for your particular location. Even if a printer is not required to obtain an air pollution control permit, good environmental management practice dictates that emission calculations should be performed at lease annually, when a new piece of equipment that emits air pollution such as a press is purchased, or when an existing piece of equipment emitting air pollution is modified such as adding a coating unit on a press. In order to verify that a permit is not required, some state and local air permitting authorities require printers to calculate the emissions. For more information see PNEAC fact sheet "Understanding Air Pollution Permits" (http://www.pneac.org/sheets/all/airpollutionpermits.cfm).

VOC Emissions From Sheetfed Offset Lithography

The majority of VOCs emitted from the sheetfed process are emitted through general pressroom ventilation air rather than through process stacks or vents. As a result of the lack of a definitive point

of emissions from the sheetfed press, the direct measurement of emissions (or emission rates) is difficult, if not impractical. Therefore, emissions have to be calculated from material use and material content information. This approach is quite acceptable to permitting authorities. In fact, this same approach is used for printing and coating operations (e.g., flexographic printing or rotogravure printing) where most or all of the VOCs are emitted through process stacks or vents. The materials utilized in sheetfed offset lithographic printing process that contain VOCs are the fountain solution with isopropyl alcohol or isopropyl alcohol substitutes/extenders, cleaning solvents used to clean ink and other press components, ink oils, coatings, and adhesives.

Other sources of emissions in a sheetfed offset lithographic printing operation include parts washers, binding and finishing equipment, and some prepress equipment. While these sources are generally not significant, their emissions need to be included in a total facility emission inventory. In some instances, such as an ink jetting operation using solvent-based inks, some of the other sources of VOC emissions may have to be permitted as the emissions could exceed the specified threshold.

VOC emissions from materials used in sheetfed printing operations are a function of consumption multiplied by the VOC content and any applicable release factor. There are two extremely important release factors that should be used in determining emissions from input materials. These retention factors allow for a reduction in VOC emissions because it has been established with USEPA that due to their physical characteristics and how certain materials are used and handled, they are not released into the air.

For determining VOC emissions from sheetfed inks printed on paper, a retention factor of 95% has been accepted by USEPA. The 95% retention factor equates into a 5% release factor and was established a result of ink oil retention studies conducted by the printing industry. The 95% retention factor was included in a document entitled Control Techniques Guideline for Offset Lithography, which was released in draft form in November 1993 and final form in 2006 as the Control Techniques Guideline for Offset Lithographic and Letterpress Printing (EPA 453/R-06-002). This reference has been widely accepted by many state/local air permitting authorities as authoritative. This retention factor is also to be used for any varnishes that would be applied as an overprint coating as they are essentially printing inks without pigments.

The other important retention factor for determining VOC emissions is the one for low vapor pressure cleaning solutions used in conjunction with shop towels. USEPA has established a 50% shop towel retention factor for cleaning solutions with VOC composite vapor pressures less than 10 mm Hg at 20^{o}C (68^{o}F). The shop towels need to be kept in a closed container when not being used. This retention factor was included in the Alternative Control Techniques Guideline for Offset Lithography, released in June 1994 (EPA 453/R-94-054) and the 2006 Control Techniques Guideline for Offset Lithographic and Letterpress Printing (EPA 453/R-06-002). The ACT was released to supplement the draft CTG and provides significant revisions to some of the elements contained in the CTG.

No retention or release factors have been established for VOCs used in fountain solutions, coatings, adhesives, or other materials used in sheetfed lithographic printing operations. Therefore, all of the VOCs in these materials would all be released into the atmosphere. The emissions from automatic blanket washers would all be considered released into the atmosphere. The only “credit” for VOC not released would be for that contained in discarded wastes.

VOC Emission Calculation Worksheet For Sheetfed Offset Lithographic Printing

The following worksheet presents both the formulas and assumptions that can be used to determine both actual and potential VOC emissions from sheetfed offset lithographic printing operations. The

assumptions on retention and release factors are taken directly from three EPA documents entitled Control Techniques Guideline for Offset Lithography issued as a draft in November 1993, the final 2006 Control Techniques Guideline for Offset Lithographic and Letterpress Printing (EPA 453/R-06-002), and the Alternative Control Techniques Guideline issued in June 1994 (EPA 453/R-94-054).

Material	**Usage[1]**	**Units**	**VOC Content[2]**	**Units**	**Release Factor[3]**	**VOC Emissions[4]**
Ink		Pounds/Yr		% by Weight		
Fountain Solution (FS) Concentrate		Gallons/Yr		Lbs VOC/Gal		
FS Additive		Gallons/Yr		Lbs VOC/Gal		
Cleaning Solution		Gallons/Yr		Lbs VOC/Gal		
		Gallons/Yr		Lbs VOC/Gal		
		Gallons/Yr		Lbs VOC/Gal		
Coatings and Conventional Varnishes		Pounds/Yr		% by Weight		
		Gallons/Yr		Lbs VOC/Gal		
Misc.		Gallons/Yr		Lbs VOC/Gal		
Total VOC Emissions						

1. Usage is defined as purchase amount minus change in standing inventory, minus the amount that is discarded.

2. List either percent VOC content (by weight) or pounds of VOC per gallon for the product.

   a. The VOC content information may be provided by the supplier via the MSDS, USEPA Method 24 analysis, or summing % content of all VOCs and multiplying it by the density to calculate VOC. If density is unknown, multiply specific gravity from MSDS by 8.33 lbs/gal.

   b. Do not include exempt VOCs - Methylene Chloride, 1,1,1-Trichloroethane, Acetone, or Methyl Acetate.

   c. For Ink VOC content, the applicant can determine the VOC emissions for each ink used or use the highest VOC containing ink in each category.

3. Use the following for the appropriate VOC release factor:

Ink	0.05
Fountain Solution Concentrate	1.0

Fountain Solution Additive	1.0
Cleaning Solution	0.5*
Coating	
UV	1.0
Water-Based	1.0
Conventional	0.05

* The VOC composite vapor pressure of the cleaning solution must be less than 10 mm Hg at 20^{o}C (68^{o}F).

Alternatively, the VOC content of the cleaning solution cannot exceed 30% by weight.

4. The actual VOC emissions are determined by multiplying the Usage, VOC Content, and Release Factors together. The total VOC emissions are the result of adding all of the individual VOC emission determinations together. To convert the total pounds per year into tons per year, divide the total pounds by 2,000 because there are 2,000 pounds in one ton.

Example of VOC Emission Calculation Using Above Approach and Worksheet

Material	Annual Usage	VOC Content

Sheetfed Ink, Process	25,200 pounds	35% by weight
Fountain Solution Concentrate	420 gallons	0.717 pounds/gallon
Fountain Solution Additive	120 gallons	6.7 pounds/gallon
Cleaning Solution - Blanket Wash	1,200 gallons	6.24 pounds/gallon
Cleaning Solution - Roller Wash	300 gallons	5.9 pounds/gallon
Coating - UV	180 gallons	8.5 pounds/gallon
Coating - Conventional	6,000 pounds	35% by weight

Material[1]	**Usage**[2]	**Units**	**VOC Content**[3]	**Units**	**Release Factor**[4]	**VOC Emissions**[5]
Ink	25,200	Pounds/Yr	0.35	% by Weight	0.05	441
Fountain Solution (FS) Concentrate	420	Gallons/Yr	0.717	Lbs VOC/Gal	1.0	301.14
FS Additive	120	Gallons/Yr	6.7	Lbs VOC/Gal	1.0	804
Cleaning Solution	1,200	Gallons/Yr	6.24	Lbs VOC/Gal	0.5	3,744
	300	Gallons/Yr	5.9	Lbs VOC/Gal	0.5	885
		Gallons/Yr		Lbs VOC/Gal		
Coatings – UV	180	Pounds/Yr	8.5	% by Weight	1.0	15.3
Coating – Conventional	6,000	Gallons/Yr	0.35	Lbs VOC/Gal	0.05	105
		Gallons/Yr		Lbs VOC/Gal		
Misc.		Gallons/Yr		Lbs VOC/Gal		
Total VOC Emissions						6,295.3 lbs/yr 3.15 tons/yr

References

1. Control Techniques Guideline for Offset Lithographic and Letterpress Printing (EPA 453/R-06-002) September 2006 is available at http://www.epa.gov/glo/SIPToolkit/ctg_act/200609_voc_epa453_r-06-002_litho_letterpress_printing.pdf

2. Draft Control of Volatile Organic Compound Emissions from Offset Lithographic Printing, September 1993 is available at www.epa.gov/ttn/atw/print/printpg.html under Closely Related Rules, Policies or Program Guidance

3. Alternative Control Techniques Document: Offset Lithographic Printing (EPA-453/R-94-054), June 1994, is available at www.epa.gov/ttn/atw/print/printpg.html under Closely Related Rules, Policies or Program Guidance

4. Printers' Simplified Total Environmental Partnership (PrintSTEP), August 2006 Workbooks are available through www.epa.gov/compliance/assistance/sectors/printstep.html under PrintSTEP Products.

5. Potential to Emit (PTE) Guidance for Specific Source Categories, April 1998, Memo and Attached Technical Support Document are available at www.epa.gov/ttn/oarpg/t5pgm.html - scroll down to item dated 4-14-98.

6. EIIP Volume III, Chapter 7 on Graphic Arts, November 2006 is available at www.epa.gov/ttn/chief/eiip/techreport/volume03/iii07.pdf

Appendix 4 Rule 16. Offset Lithographic Printing and Letterpress Printing

Rule 16. Offset Lithographic Printing and Letterpress Printing

326 IAC 8-16-1 Applicability

Authority: IC 13-14-8; IC 13-17-3-4; IC 13-17-3-11
Affected: IC 13-15; IC 13-17

Sec. 1. (a) This rule applies to sources in Lake County or Porter County that meet either of the following criteria:

(1) Have actual volatile organic compound (VOC) emissions, before consideration of controls, of equal to or greater than three (3) tons per rolling twelve (12) month period from all offset lithographic printing operations, including fountain solution and cleaning activities. Offset lithographic printing presses include heatset web, non-heatset web, and sheet-fed.

(2) Have actual VOC emissions, before consideration of controls, equal to or greater than three (3) tons per rolling twelve (12) month period from all letterpress printing operations, including cleaning activities.

(b) Offset lithographic printing operations and letterpress printing operations exempt from the requirements of this rule based on the threshold applicability in subsection (a) shall maintain records as required under section 11 of this rule.

(Air Pollution Control Division; 326 IAC 8-16-1; filed Nov 3, 2009, 3:31 p.m.: 20091202-IR-326090221FRA)

326 IAC 8-16-2 Exemptions

Authority: IC 13-14-8; IC 13-17-3-4; IC 13-17-3-11
Affected: IC 13-15; IC 13-17

Sec. 2. The following exemptions apply in this rule:

(1) Any heatset web offset lithographic printing press or heatset web letterpress printing press with potential VOC emissions from the dryer (ink oil) less than twenty-five (25) tons per year before consideration of controls or any heatset web offset lithographic printing press or heatset web letterpress printing press with actual VOC emissions from the dryer (ink oil) limited through enforceable permit conditions to less than twenty-five (25) tons per year before consideration of controls is exempt from the add-on control requirements in section 4(a) of this rule.

(2) Any heatset web offset lithographic printing press used for book printing or with maximum web width of twenty-two (22) inches or less is exempt from the add-on control requirements in section 4(a) of this rule.

(3) Any offset lithographic printing press with a total fountain solution reservoir capacity of less than one (1) gallon is exempt from the fountain solution requirements in section 4(b), 4(c), and 4(d) of this rule.

(4) Any sheet-fed off-set lithographic printing press with a maximum sheet size of eleven (11) inches by seventeen (17) inches or smaller is exempt from the fountain solution control requirements in section 4(c) of this rule.
(Air Pollution Control Division; 326 IAC 8-16-2; filed Nov 3, 2009, 3:31 p.m.: 20091202-IR-326090221FRA)

326 IAC 8-16-3 Definitions
Authority: IC 13-14-8; IC 13-17-3-4; IC 13-17-3-11
Affected: IC 13-15; IC 13-17

Sec. 3. The following definitions apply throughout this rule:

(1) "Alcohol" means any of the following compounds, when used as a fountain solution additive for offset lithographic printing:

(A) Ethanol.

(B) n-Propanol.

(C) Isopropanol.

(2) "Alcohol substitute" means a non-alcohol additive that contains VOC and is used in the fountain solution. Some additives are used to reduce the surface tension of water, and others are added to prevent piling (ink buildup).

(3) "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.

(4) "Batch" means a supply of fountain solution that is prepared and used without alteration until completely used or removed from the printing process. For purposes of this rule, the term may apply to solutions prepared in either discrete batches or solutions that are continuously blended with automatic mixing units.

(5) "Cleaning material" means a liquid solvent or solution used to clean the operating surfaces of a printing press and its parts. For purposes of this rule, the term includes, but is not limited to:

(A) blanket wash;

(B) roller wash;

(C) plate cleaner;

(D) metering roller cleaner;

(E) impression cylinder washes;

(F) rubber rejuvenators; and

(G) other cleaners; used for cleaning a press, press parts, or to remove dried ink or coating from the areas around the press.

For purposes of this rule, the term does not include cleaners used on electronic components of a press, prepress cleaning operations (for example, platemaking), postpress cleaning operations (for example, binding), cleaning supplies (for example, detergents) used to clean the floor (other than dried ink) in the area around a press, or cleaning performed in parts washers or cold cleaners.

(6) "Composite partial vapor pressure" means the sum of the partial pressures of the VOC compounds in a solvent.

(7) "Fountain solution" means a mixture of water and other volatile and nonvolatile chemicals and additives used in the lithographic printing operations that maintains the quality of the printing plate including preventing debris buildup (for example, 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 surface.

The fountain solution wets the nonimage area so that the ink is maintained within the image areas. Nonvolatile 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.

(8) "Fountain solution reservoir" means the collection tank that accepts fountain solution recirculated from the printing unit.

In some cases, the tanks are equipped with cooling coils for refrigeration of the fountain solution.

(9) "Heatset" means a class of lithography that requires a heated dryer to solidify the printing inks.

(10) "Letterpress printing" means a printing process in which the:

(A) image area is raised relative to the nonimage area; and

(B) paste ink is transferred to the substrate directly from the image surface.

(11) "Lithographic printing" means a 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 a raised or recessed surface.

(12) "Non-heatset" means a class of printing that does not require a heated dryer to solidify the printing inks. Ultravioletcured and electron beam-cured inks are considered non-heatset.

(13) "Offset printing" means a printing process that transfers the ink film from the plate to an intermediary surface (blanket) that, in turn, transfers the ink film to the substrate.

(14) "Sheet-fed printing" means a printing process where individual sheets of substrate are fed into the press sequentially.

(15) "Web" means a lithographic printing process where a continuous roll of substrate is fed into a press.

(Air Pollution Control Division; 326 IAC 8-16-3; filed Nov 3, 2009, 3:31 p.m.: 20091202-IR-326090221FRA)

326 IAC 8-16-4 Control requirements

Authority: IC 13-14-8; IC 13-17-3-4; IC 13-17-3-11
Affected: IC 13-15; IC 13-17

Sec. 4. (a) The owner or operator of a heatset web offset lithographic printing press or a heatset web letterpress, unless exempt as specified in section 2(1) or 2(2) of this rule, shall operate a control system that meets one (1) of the following requirements:

(1) Reduces VOC emissions from each dryer by at least ninety percent (90%) for a control system first installed before January 1, 2010.

(2) Reduces VOC emissions from each dryer by at least ninety-five percent (95%) for a control system first installed on or after January 1, 2010.

(3) Maintains a maximum VOC outlet concentration of twenty (20) parts per million by volume (ppmv), as hexane (C_6H_{14}) on a dry basis.

(b) The owner or operator of a heatset web offset lithographic printing press shall meet one (1) of the following requirements for the fountain solution used on that press:

(1) Maintain the as-applied VOC content of the fountain solution at or below five percent (5%), by weight, and use no alcohol in the fountain solution.

(2) If the fountain solution contains alcohol, maintain the as-applied VOC content of the fountain solution at or below one and six-tenths percent (1.6%), by weight.

(3) If the fountain solution contains alcohol, maintain the as-applied VOC content of the fountain solution at or below three percent (3%), by weight, and refrigerate the fountain solution to below sixty (60) degrees Fahrenheit.

(c) The owner or operator of a sheet-fed offset lithographic printing press shall meet one (1) of the following requirements for the fountain solution used on that press:

(1) Maintain the as-applied VOC content of the fountain solution at or below five percent (5%), by weight, and use no alcohol in the fountain solution.

(2) If the fountain solution contains alcohol, maintain the as-applied VOC content of the fountain solution at or below five percent (5%), by weight.

(3) If the fountain solution contains alcohol, maintain the as-applied VOC content of the fountain solution at or below eight and one-half percent (8.5%), by weight, and refrigerate the fountain solution to below sixty (60) degrees Fahrenheit.

(d) The owner or operator of a non-heatset web offset lithographic printing press shall maintain the as-applied VOC content of the fountain solution at or below five percent (5%), by weight, and use no alcohol in the fountain solution.

(e) Where it can be demonstrated that an offset lithographic printing press cannot be operated with fountain solutions meeting the requirements of this rule, the owner or operator may submit a petition to the commissioner requesting a site-specific reasonably available control technology (RACT) plan as specified in 326 IAC 8-1-5.

(f) The owner or operator of an offset lithographic printing press or letterpress printing press shall meet the following requirements for cleaning materials:

(1) Use not more than one hundred ten (110) gallons per rolling twelve (12) month period of cleaning materials that exceed both of the following requirements:

(A) An as-applied VOC content less than seventy percent (70%), by weight.

(B) An as-applied VOC composite partial vapor pressure less than ten (10) mmHg at twenty (20) degrees Celsius (sixty-eight (68) degrees Fahrenheit).

(2) When not in use, all cleaning materials and solvent-laden shop towels shall be kept in closed containers.

(Air Pollution Control Division; 326 IAC 8-16-4; filed Nov 3, 2009, 3:31 p.m.: 20091202-IR-326090221FRA)

326 IAC 8-16-5 Compliance dates

Authority: IC 13-14-8; IC 13-17-3-4; IC 13-17-3-11
Affected: IC 13-15; IC 13-17

Sec. 5. The owner or operator of an offset lithographic or letter press printing press that is subject to this rule shall comply with the requirements of this rule no later than April 1, 2011, or upon initial startup of the press for new presses.

(Air Pollution Control Division; 326 IAC 8-16-5; filed Nov 3, 2009, 3:31 p.m.: 20091202-IR-326090221FRA)

326 IAC 8-16-6 Compliance test methods

Authority: IC 13-14-8; IC 13-17-3-4; IC 13-17-3-11
Affected: IC 13-15; IC 13-17

Sec. 6. (a) Compliance with the add-on control requirements shall be determined by performing emission tests as follows:

(1) Run at typical operating conditions and flow rates compatible with scheduled production during any emission testing.

(2) The initial emission test shall be performed, within ninety (90) days after the compliance date or within one hundred eighty (180) days after initial startup for new presses. An emission test conducted prior to April 1, 2011, may be accepted if the owner or operator provides records showing that:

(A) the test was conducted in accordance with a testing protocol approved by IDEM;

(B) a U.S. EPA approved emission test method was employed; and

(C) the operation of the press or presses was consistent with the current operating conditions and operating capacity.

(3) 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 gauge. Continuous dryer air flow monitoring is not required.

(4) The test methods and procedures in 326 IAC 8-1-4(d) through 326 IAC 8-1-4(f) shall be followed. If the limit of twenty (20) ppmv is being met, only the VOC concentration of the exit exhaust shall be determined. The following test requirements apply:

(A) To prevent condensation when using 40 CFR 60, Method 25*, the probe should be heated to at least the gas stream temperature, typically close to three hundred fifty (350) degrees Fahrenheit.

(B) To prevent condensation when using 40 CFR 60, Method 25A* 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 (350) degrees Fahrenheit.

(b) VOC (alcohol) content of as-applied fountain solution shall be determined by using an accurate hydrometer to measure the alcohol content of the fountain solution. The hydrometer shall have a visual, analog, or digital readout with an accuracy of five tenths percent (0.5%).

(c) VOC content of as-applied fountain solution or cleaning materials shall be determined in accordance with the following:

(1) Analysis by 40 CFR 60, Method 24*.

(2) Analytical data derived from a material safety data sheet (MSDS) or equivalent information from the supplier as long as it is based on 40 CFR 60, Method 24*.

(3) If diluted prior to use, a material balance calculation that combines 40 CFR 60, Method 24* analytical data or supplier information for the concentrated materials used to prepare the fountain solution or cleaning material and the proportions in which they are mixed to make the as-applied material.

(d) Temperature requirements for refrigeration shall be determined with a thermometer or other temperature detection device capable of reading to five-tenths (0.5) degree Fahrenheit.

(e) The composite partial vapor pressure of a cleaning material shall be determined according to the following:

(1) Determine the identity and quantity of each compound in a blended organic solvent using the manufacturer's product formulation data.

(2) Determine the vapor pressure of each pure VOC component by using one (1) of the following:

(A) Standard reference texts.

(B) ASTM Method D2879-92*, ASTM International, 100 Barr Harbor Drive, West Conshohocken, Pennsylvania 19428.

(3) Calculate the composite partial vapor pressure of the cleaning material by using the following formula:

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

Where: Wi = Weight of the "i"th VOC compound, in grams
Ww = Weight of water, in grams
Wc = Weight of exempt compound, in grams
MWi = Molecular weight of the "i"th VOC compound, in g/g-mole
MWw = Molecular weight of water, in g/g-mole
MWc = Molecular weight of exempt compound, in g/g-mole
PPc = VOC composite partial vapor pressure at 20□C (68□F), in mmHg
VPi = Vapor pressure of the "i"th VOC compound at 20□C (68□F), in mmHg

*These documents are incorporated by reference. Copies may be obtained from the Government Printing Office, 732 North Capitol Street NW, Washington, D.C. 20401 or are available for review and copying at the Indiana Department of Environmental Management, Office of Air Quality, Indiana Government Center North, Tenth Floor, 100 North Senate Avenue, Indianapolis, Indiana 46204.

(Air Pollution Control Division; 326 IAC 8-16-6; filed Nov 3, 2009, 3:31 p.m.: 20091202-IR-326090221FRA; errata filed Nov 18, 2009, 3:42 p.m.: 20091216-IR-326090221ACA; errata filed Jan 7, 2011, 1:18 p.m.: 20110126-IR-326090221ACA)

326 IAC 8-16-7 Monitoring and record keeping

Authority: IC 13-14-8; IC 13-17-3-4; IC 13-17-3-11

Affected: IC 13-15; IC 13-17

Sec. 7. (a) The owner or operator of a press that is subject to the add-on control requirements of section 4(a) of this rule shall comply with the following:

(1) Install, calibrate, maintain, and operate temperature monitoring and recording equipment as follows:

(A) For catalytic oxidizer control systems, the temperature monitoring and recording equipment shall monitor the gas temperature upstream of the catalyst bed at least once every fifteen (15) minutes by an analog or digital recording device.

The catalyst bed material shall be inspected annually for general catalyst condition and any signs of potential catalyst depletion.

The source 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 also 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.

(B) For thermal and regenerative oxidizer control systems, the temperature monitoring and recording equipment shall monitor and record the oxidizer operating temperature at least once every fifteen (15) minutes.

(C) The temperature needed to achieve compliance with the control systems described in clauses (A) and (B) shall be established during testing which demonstrates compliance with the emission standard. The temperature shall be computed as the time-weighted average of the temperature values recorded during the test. The source must maintain the oxidizer at a three (3) hour average temperature not less than fifty (50) degrees Fahrenheit below the average temperature observed during the most recent stack test which demonstrates continuous compliance. Temperature monitoring is required only when a connected printing press is operational.

(2) Collect and record or maintain at the subject source for a period of five (5) years the following information:

(A) The results of any required stack test to demonstrate compliance with the requirements of section 6(a)(4) of this rule.

(B) The operating parameters for any required control device as specified in subdivision (1).

(C) A log or record of any time when the control device or monitoring equipment, or both, are not in operation when any associated press is in operation.

(b) The owner or operator of a heatset web or sheet-fed offset lithographic printing press using alcohol shall measure the following:

(1) The VOC (alcohol) content, in accordance with section 6(b) of this rule, of any altered fountain solution, at the time of alteration, in percent by weight, of the fountain solution employed in the press using an hydrometer, as follows:

(A) A standard solution shall be used to calibrate the hydrometer for the type of alcohol used in the fountain solution, in accordance with manufacturer's specifications, against measurements performed to determine compliance.

(B) The hydrometer must be corrected for temperature at least once per eight (8) hour shift or once per batch of fountain solution prepared or modified, whichever is longer.

For fountain solutions to which VOC containing material is added at the source with automatic feed equipment, VOC content shall be determined for the as-applied fountain solution based on the setting of the automatic feed equipment that makes additions of VOC containing material up to a pre-set level. The equipment used to make automatic additions must be installed, calibrated, operated, and maintained in accordance with manufacturer's specifications.

(2) The temperature, in degrees Fahrenheit, of the fountain solution, on a daily basis, as measured at the recirculating tank, if the owner or operator refrigerates the fountain solution to comply with the VOC content limit.

(c) The owner or operator of an offset lithographic printing press shall maintain records for each batch of fountain solution prepared for use in the press as follows:

(1) The volume and VOC content of each concentrated alcohol substitute added to make the batch of fountain solution.

(2) The volume of alcohol added to make the batch of fountain solution.

(3) The volume of water added to make the batch of fountain solution.

(4) The calculated VOC content of the final mixed batch.

(5) The date and time the batch was prepared.

(6) As an alternative to the records required by subdivisions (1) through (5), an owner or operator may maintain a recipe log that identifies all mix ratio recipes used to prepare the as-applied fountain solution, as follows:

(A) Records shall be maintained identifying the recipe used to prepare each batch of fountain solution for use in the press, the date and time when the batch was prepared, and a confirmation that the batch was prepared in accordance with the recipe.

(B) Each recipe shall be maintained in the mix ratio recipe log for a period of five (5) years from the date the mix ratio recipe was last prepared. Each mix ratio recipe shall clearly identify the following:

(i) The VOC content of each concentrated alcohol substitute added to make the batch of fountain solution, based upon the manufacturer's laboratory analysis using 40 CFR 60, Method 24*.

(ii) The proportions in which the fountain solution is mixed, including the addition of alcohol or water, or both.

The proportion may be identified as:

(AA) a volume when preparing a discrete batch; or

(BB) the settings when an automatic mixing unit is employed.

(iii) The calculated VOC content of the final mixed recipe.

(7) For fountain solutions containing alcohol substitutes purchased with less than five percent (5%) VOC content before dilution, the owner or operator may maintain a current

MSDS with VOC content determined by 40 CFR 60, Method 24* and does not need to keep records of VOC dilution and addition.

(d) The owner or operator of a non-heatset web offset lithographic printing press shall document all periods of time when alcohol is used in the press's fountain solution and the amount of alcohol used in each instance. The use of alcohol in fountain solutions for non-heatset web offset lithographic printing presses is prohibited per 326 IAC 8-16-4(d) *[section 4(d) of this rule]*.

(e) The owner or operator of an offset lithographic printing press or letterpress printing press shall maintain monthly records of the following information:

(1) The total amount, in gallons, of each cleaning material used.

(2) The VOC content or VOC composite vapor pressure of all cleaning material used.

(3) The total amount, in gallons, of each cleaning material used that exceed the allowable VOC content or VOC composite partial vapor pressure.

(4) The total amount, in gallons, of all inks used.

(f) An owner or operator of a heatset web offset lithographic printing or heatset web letterpress printing press that is exempt from the add-on control requirements in section 4(a) of this rule shall maintain monthly records of the following information:

(1) The total pounds of each ink used.

(2) The VOC content of each ink.

(3) The hours of operation of each press.

(g) All records required by this rule shall be maintained at the source for a period of five (5) years.

*These documents are incorporated by reference. Copies may be obtained from the Government Printing Office, 732 North Capitol Street NW, Washington, D.C. 20401 or are available for review and copying at the Indiana Department of Environmental Management, Office of Air Quality, Indiana Government Center North, Tenth Floor, 100 North Senate Avenue, Indianapolis, Indiana 46204.

(Air Pollution Control Division; 326 IAC 8-16-7; filed Nov 3, 2009, 3:31 p.m.: 20091202-IR-326090221FRA; errata filed Nov 18, 2009, 3:42 p.m.: 20091216-IR-326090221ACA; errata filed Jan 7, 2011, 1:18 p.m.: 20110126-IR-326090221ACA)

326 IAC 8-16-8 Reporting requirements for monitoring and record keeping information

Authority: IC 13-14-8; IC 13-17-3-4; IC 13-17-3-11
Affected: IC 13-15; IC 13-17

Sec. 8. The owner or operator shall notify the department of any exceedances of requirements in section 4 of this rule within forty-five (45) days after the instance occurs.

(Air Pollution Control Division; 326 IAC 8-16-8; filed Nov 3, 2009, 3:31 p.m.: 20091202-IR-326090221FRA)

326 IAC 8-16-9 Retention factors and capture efficiencies

Authority: IC 13-14-8; IC 13-17-3-4; IC 13-17-3-11
Affected: IC 13-15; IC 13-17

Sec. 9. For the purpose of determining VOC emissions from offset lithographic printing presses, the following retention factors and capture efficiencies shall be used:

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

(A) A twenty percent (20%) VOC retention factor shall be used for heatset inks printed on absorptive substrates, 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) A ninety-five percent (95%) VOC retention factor shall be used for sheet-fed and non-heatset web inks printed on absorptive substrates, meaning five percent (5%) of the VOC in the ink is emitted during the printing process.

(C) A fifty percent (50%) VOC retention factor shall be used for cleaning material VOC in shop towels for cleaning materials with a VOC composite partial vapor pressure of not more than ten (10) mmHg at twenty (20) degrees Celsius (sixty-eight (68) degrees Fahrenheit) if the contaminated shop towels are kept in closed containers, meaning fifty percent (50%) 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 the 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 percent (100%) 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 percent (70%) VOC carry over efficiency shall be used for fountain solutions containing alcohol substitutes.

(C) A forty percent (40%) VOC carry over efficiency shall be used for automatic blanket wash solutions with a VOC composite partial vapor pressure of not more than ten (10) mmHg at twenty (20) degrees Celsius (sixty-eight (68) degrees Fahrenheit).

(Air Pollution Control Division; 326 IAC 8-16-9; filed Nov 3, 2009, 3:31 p.m.: 20091202-IR-326090221FRA)

326 IAC 8-16-10 Requirements on compliance certification

Authority: IC 13-14-8; IC 13-17-3-4; IC 13-17-3-11
Affected: IC 13-15; IC 13-17

Sec. 10. The owner or operator of an offset lithographic printing or letterpress printing operation shall submit to the department a compliance certification not later than thirty (30) days after the compliance date. The compliance certification shall contain the following, where applicable:

(1) A description of the control requirements to which the operation is subject.

(2) A description of the add-on control system or systems at the source.

(3) A description of the monitoring devices at the source.

(4) A description of compliance records required by section 7 of this rule.

(5) The results of any compliance tests, including documentation of test data.

(6) A statement by the owner or operator of the lithographic printing or letterpress printing operation as to whether the offset lithographic printing or letterpress printing press has complied with the requirement or requirements to which it is subject.

(Air Pollution Control Division; 326 IAC 8-16-10; filed Nov 3, 2009, 3:31 p.m.: 20091202-IR-326090221FRA)

326 IAC 8-16-11 Record keeping requirements for exempt sources

Authority: IC 13-14-8; IC 13-17-3-4; IC 13-17-3-11
Affected: IC 13-15; IC 13-17

Sec. 11. (a) An owner or operator of an offset lithographic printing or letterpress printing source that is exempt from the requirements of this rule based on the threshold applicability in section 1(a) of this rule shall maintain records:

(1) specified in subdivision (4)(A) and (4)(C) for sheet-fed or non-heatset web presses and the pounds of ink, cleaning solvent and fountain solution additives for heatset web presses in order to demonstrate that the material use threshold in subdivision (3) has not been exceeded; or

(2) as specified in subdivision (4)(A) through (4)(F) in order to demonstrate that the emission threshold in section 1(a) of this rule has not been exceeded.

(3) Material use thresholds are as follows:

Type of Offset Lithographic Printing Operation	Twelve (12) Month Rolling Threshold (twelve (12) consecutive month period on a rolling basis)
Sheet-fed or 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

A source that employs a combination of printing technologies that includes a heatset web offset printing press or presses must maintain records specified in subdivision (4)(A) through (4)(F) demonstrating actual emissions are less than three (3) tons per rolling twelve (12) month period.

(4) As specified under subdivision (2), an owner or operator of an offset lithographic printing or letterpress printing source shall maintain the following records on a monthly basis:

(A) The total gallons of each cleaning solvent used.
(B) The VOC content of each cleaning solvent.
(C) The total gallons of each fountain solution used.
(D) The VOC content of each fountain solution.
(E) The total pounds of each ink used.
(F) The VOC content of each ink.

(b) An owner or operator of an offset lithographic printing or letterpress printing source that is exempt from the add-on control requirements of this rule based on the applicability criteria in section 2(1) of this rule shall maintain the following records on a monthly basis:

(1) The total pounds of each ink used.
(2) The VOC content of each ink.
(3) The hours of operation of each press.

(c) Records required by subsection (a) shall be submitted to the department within thirty (30) days of the receipt of a written request. If the records are not available, the source shall be considered to be subject to the requirements in section 4 of this rule.

(Air Pollution Control Division; 326 IAC 8-16-11; filed Nov 3, 2009, 3:31 p.m.: 20091202-IR-326090221FRA; errata filed Nov 18, 2009, 3:42 p.m.: 20091216-IR-326090221ACA)