Control Techniques Guideline For Offset Lithography and Letterpress

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A final CTG entitled *Control Techniques Guidelines for Offset Lithographic Printing and Letterpress Printing* was issued by the United States Environmental Protection Agency (EPA) on October 5, 2006. State and local air pollution control authorities with subject ozone nonattainment areas have until October 5, 2007 to act on the document. The CTG contains a series of recommendations for state and local air pollution control authorities to implement as regulations to reduce the emissions of volatile organic compounds (VOCs) from printing operations.

The state and local air pollution control authorities may elect to ignore the CTG, adopt the recommendations without any change, or adopt the recommendations with modifications. If a state or local air pollution control authority already has an existing regulation, they may ignore the recommendations in the CTG or modify their rule to incorporate any requirements that may be different. If the state or local air pollution control agency decides to either ignore the recommendations or not modify an existing regulation, they will have to justify the inaction to EPA.

The following is a brief summary of the provisions contained in the draft CTG. The CTG can be downloaded in its entirety at www.gain.net.

Applicability – In order to determine what size printing operation must meet the requirements that are outlined in the CTG, EPA recommended an applicability level that is based on the amount of VOC emissions that are released. The applicability threshold is not an emission limit, but only a way to identify which facilities EPA believes must meet the requirements to reduce VOC emissions.

The applicability threshold for this CTG would be any printing operation that actually emits more than 15 pounds of VOC per day before consideration of controls. The 15 pound per day is a facility–wide, not a per–press, threshold, which means that the daily emissions from all presses need to be added together to determine if the requirements need to be met. The 15 pound per day threshold is not an average, but an absolute limit and if it is ever exceeded in any one day, then any rule based on this threshold becomes immediately applicable. Since the threshold is based on emissions before consideration of controls, a controlled heatset operation with emissions of less than 15 pounds per day may still be subject to the CTG recommendations since uncontrolled emissions could be more that the threshold. The 15 pound per day emission level equates to using only about two gallons of cleaning solvent per day.

In response to comments by PIA/GATF, EPA will also allow state and local air pollution control authorities to use a monthly applicability threshold of 450 pounds per month or an annual threshold of 3 tons per year.

Exemptions - Due to comments by PIA/GATF, EPA is exempting any press that has one gallon or less of total fountain solution and small sheetfed presses, which are defined as those that are 11 x 17 inches or less, from the fountain solution requirements.

VOC Content Limits for Inks - Due to the low volatility of the solvents used in 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.

Pollution Control Devices - The use of pollution control devices such as an oxidizer is not being recommended for sheetfed or nonheatset web presses. However, the CTG recommends that heatset presses with **potential** ink oil emissions greater than twenty-five tons per year duct their dryer exhaust to an oxidizer or other type of pollution control device capable of removing or destroying at least 90% by weight for pollution controls installed before the date that the state develops and implements a rule based on the CTG. The term potential means that the printer must assume that the press runs 24 hours per day, 7 days per week and 52 weeks per year at a maximum ink consumption rate for all press units. Printers who take permits with emission limit of less than 25 tons per year of ink oil emissions can avoid the use of a control device.

For new oxidizers, defined as those installed after the state or local air pollution control authority implements the recommendations as a rule, the minimum destruction efficiency will be 95% by weight of the VOC in the dryer exhaust.

As an alternative to the destruction efficiency, EPA is allowing for the use of an outlet concentration only. If the printer can show that the outlet concentration is less than 20 parts per million measured as hexane, they are deemed to be in compliance. Measuring the outlet concentration is an excellent alternative for those presses that use a combined dryer and oxidizer or when the printer consistently prints light coverage work that would not generate a high inlet concentration.

EPA has exempted two types of heatset presses from using pollution control devices due to the high cost associated with using these types of devices to reduce VOC emissions. Small heatset presses, those defined as presses with a width of 22 inches or less and presses used to print books have been exempt from the pollution control device requirement.

VOC Content Limits for Fountain Solutions - The VOC content limits for fountain solution are based on the type of lithographic printing, use of alcohol, and refrigeration of the fountain solution. The recommended limits are as follows:

- Sheetfed presses - The limits have been set at 5% by weight for non-refrigerated fountain solutions and 8.5% by weight for those refrigerated below 60°F. Sheetfed printers can use isopropyl alcohol, alcohol substitutes, or a combination of both at these limits.

- Heatset web offset presses - The limit for isopropyl alcohol is 1.6%, by weight, without refrigeration and 3% by weight if refrigerated below 60°F. The limit for alcohol substitutes is 5%, by weight, with no refrigeration requirement.

- Nonheatset web presses - The use of isopropyl alcohol is prohibited. The limit for substitutes is 5%, by weight, with no refrigeration requirement.

VOC Limits for Cleaning Solutions – The recommended 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::

- Cleaning solutions with 70 percent by weight VOC content, or;

- Cleaning solutions with composite VOC vapor pressures of less than 10 mm of mercury (Hg) at 20°C (68°F) with no limit on VOC content.

In addition, an allowance was provided to use 110 gallons per year of cleaning solution solvents that do not meet the vapor pressure or VOC content limit.

Retention and Emission Factors – Retention and emission factors that EPA hade previously recommended were included in the CTG as follows:

- Retention of VOC in heatset inks - A 20% retention factor is recommended, which means only 80% of the VOC in the ink is emitted during the printing process and is available for capture and control by an oxidizer or other add-on pollution control device.

- Retention of VOC in sheetfed and nonheatset inks web inks - A 95% retention factor is recommended, which means only 5% of the VOC in nonheatset inks is released to the environment as an air emission.

- Retention of VOC in shop towels - EPA recommends a 50% % retention factor for cleaning solutions meeting the 10 mm of mercury (Hg) at 20°C (68°F) VOC composite vapor pressure if the contaminated shop towels were kept in closed containers.

- Carryover of VOC into Heatset Web Offset Dryers - EPA recognizes that a portion of the VOC contained in inks, fountain solutions, and automatic blanket wash systems on heatset presses is captured in the press dryer for control by add-on pollution control devices. For inks, EPA recommends a100% capture efficiency, meaning all the VOC in the ink that is not retained is assumed to be captured in the press dryer. EPA is not suggesting any formal capture efficiency testing for heatset dryers is required, only that the printer demonstrate that the air flow in the dryer is negative to the surrounding press room air.

  For fountain solutions containing alcohol substitutes, EPA recommends a 70% carryover efficiency. For automatic blanket wash systems, a 40% carryover efficiency is recommended when washes with a vapor pressure of less than 10 mm of Hg are used.

Compliance Demonstration – The following are the recommended testing and monitoring requirements to demonstrate compliance with the limits for fountain solutions, cleaning solvents, and for certain heatset web offset presses, pollution control devices.

Fountain Solution VOC Content

- The determination of the VOC content in fountain solution can be made by calculation using data supplied by the vendor or direct measurement using a variety of approaches.

- For automix systems, EPA recommends that the unit be properly operated and initially and periodically calibrated. Records of calibrations need to be maintained. If additions of VOC occur to the fountain solution, retesting or a calculation is required to demonstrate that the VOC content limit is not exceeded.

- For measurements, EPA recommends either the use of Method 24 or the use of a hydrometer, refractometer, or conductivity meter. The hydrometer, refractometer, or conductivity meter needs to be calibrated against the VOC content limit for the fountain solution and some lower VOC content [e.g., no VOC (i.e., the water used in the fountain solution), the desired VOC content, or some point in between] and verifying that the reading for the on press material is in the proper range.

- When isopropyl alcohol is being used, EPA recommends that the concentration be measured once per 8-hour shift using a refractometer, hydrometer, or conductivity meter. The once-per-shift monitoring requirement can be waived or extended to a longer frequency if six months record-keeping indicates that the process consistently meets the VOC limits.

- When refrigeration is used to allow the use of higher VOC content fountain solutions, EPA recommends the temperature of the fountain solution be periodically monitored and recorded using a thermometer or other temperature detection device capable of reading to 0.5^{o}F. This monitoring shall be used to ensure that a refrigerated fountain solution is below 60^{o}F at all times. The temperature monitor shall be attached to a continuous recording device like a strip chart, recorder, or computer.

- EPA recommends there be no requirement to monitor the VOC content of fountain solutions using alcohol substitutes.

Cleaning Solvents

- The determination of the VOC content in cleaning solutions can be made by calculation, using data supplied by the vendor or direct measurement.

- The determination of the VOC composite vapor pressure of cleaning solutions can be made by using data supplied by the vendor.

- For measurements, EPA recommends the use of Method 24 or the use vendor supplied data based on Method 24.

- EPA recommends continuous cleaning equipment be equipped with flow meters to monitor water and cleaning solution flow rates. The flow meters shall be calibrated so that the VOC content limit is being met.

Add-on Pollution Control Devices

- EPA recommends the use of EPA Method 1 or 1A, as appropriate, to select the sampling sites. The control device sampling sites for determining efficiency in reducing total organics (less methane and ethane) from the dryer exhaust shall be before the control device inlet (after the dryer) and at the outlet of the control device.

- EPA recommends the use of EPA Method 2, 2A, 2C, or 2D, as appropriate, to determine the volumetric flow rate of the exhaust stream.

- EPA recommends the use of EPA Method 25 or 25A to determine the VOC concentration of the exhaust stream entering and exiting the control device. For thermal and catalytic incinerators, USEPA Method 25 shall be used, except in cases where the actual or allowable outlet VOC concentration of the control device is less than 50 ppmv in the form of carbon (C1), in which case USEPA Method 25A shall be used. The probe and filter for USEPA Method 25A should be heated to the gas stream temperature, typically closer to 350^{o}F.

- EPA recommends that the add-on control device be installed and operated with a calibrated temperature monitoring device. The temperature at the inlet of a catalytic or outlet of thermal oxidizer shall be continuously monitored with a recorder having an accuracy of 0.5^{o}F.

- For control device efficiency testing, EPA recommends the press(es) be run at typical operating conditions and flow rates.

- EPA recommends the dryer pressure be maintained lower than the pressroom air pressure so that air flows into the dryer at all times when the press is operating. A 100% emissions capture efficiency for the dryer shall be demonstrated using an airflow direction measuring device.

Recordkeeping Requirements

EPA recommends daily records be kept on add-on control device operating parameters, VOC content determinations of fountain solutions and cleaning solutions, temperature of fountain solutions, amount of cleaning solution used for manual and automatic cleaning, and any corrective actions taken for exceeding any of the requirements.