



**Printers'  
National  
Environmental  
Assistance  
Center**

## **Fact Sheet**

**PNEAC**

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### **Understanding Air Pollution Permits**

Printers, both large and small, need to be aware of the revisions to air pollution permitting requirements that are being imposed across the country. In the quest for continuing air pollution emission reductions, an increasing number of printers and other businesses are now subject to Environmental Protection Agency (EPA) and state/local air pollution control permits because of their volatile organic compound (VOC) and to a lesser degree, hazardous air pollutant (HAP) emissions. The purpose of this fact sheet is to review the current status of air permitting that printers of all sizes could possibly be required to meet.

VOC emissions are tightly controlled because they lead to the formation of ozone in the lower atmosphere. Ozone is a reactive form of oxygen and is a component of smog. EPA has established acceptable levels of ozone that can be present in the lower atmosphere. Areas exceeding the specific ozone level are classified as not in attainment with the standard. Non-attainment areas are further classified as to the severity of the ozone problem and can be marginal, moderate, serious, severe, or extreme. Congress, through the 1990 Clean Air Act Amendments, has established detailed requirements for states with nonattainment areas to implement in order to clean up the air allowing them to meet the ozone standard. The Act also details those measures that states with attainment areas need to implement in order to maintain their clean air status. These requirements include a new federal operating permit program under Title V of the act, specific VOC emission reduction measures, and timelines for completion.

The release of toxic chemicals into the air has received considerable attention by both environmental and community groups who want to know specifically how much of a specific toxic chemical they are being exposed to and the types of adverse health effects this exposure can cause. The 1990 Clean Air Act Amendments has identified 188 Hazardous Air Pollutants (HAPs) that are of a particular concern. Congress has directed EPA to establish an operating permit program for businesses that emit HAPs above certain thresholds and to require these businesses to reduce those emissions through very stringent control requirements called Maximum Available Control Technology (MACT). A MACT

standard has been established for the printing industry and focuses on emissions from flexographic and rotogravure operations.

Air pollution control requirements are divided into two separate, but related requirements. The first involves permit requirements and the second is the imposition of specific control requirements. It is important to understand that there are thresholds associated with each of these separate requirements and the need to obtain a permit does not necessarily mean that a printer will have control requirements imposed on its facility. Permits serve several roles. They provide an inventory of air pollution sources. States and local agencies use these inventories in their planning process for either the further reduction of air pollution or maintenance of current air quality.

The permit also serves as the legal document that incorporates any applicable control requirements designed to reduce the emissions of certain pollutants. The last important function of permits is that they provide a facility with the legal basis for operation. Permits should be viewed as a "contract" or agreement between the printer and the permitting authority. This contract is legally binding and will contain terms and conditions that must be met by the printer. Failure to meet these terms and conditions can subject the printer to an enforcement action.

### Types of Permits

Permits can be issued in several different formats ranging from the simple one-page variety to the very complex. Some state and local agencies require a permit-to-construct before any new facility can be built or, more importantly, before a new piece of equipment like a printing press can be installed. Technically, a printer is not allowed to accept delivery of a new piece of equipment or even begin any work to modify a piece of equipment without having a valid construction permit. In fact, any "pre-construction activity" such as moving existing equipment to make room for new equipment, pouring of concrete, or making arrangement for utility connections is prohibited until a construction permit is obtained. The state/local agencies with a permit-to-construct program will also generally require a permit-to-operate as well. In some cases, the construction permit can also serve as the operating permit. It is also important to know that other state/local agencies without a permit-to-construct program can have a permit-to-operate program. It is imperative that the printer learns and understands the specific permitting requirements applicable to their operation.

Permits-to-operate look very similar to permits-to-construct and will contain all applicable and enforceable operating conditions and control requirements. They may also contain recordkeeping and reporting requirements. Operating permits will have a specified period of effectiveness. Some permits require an annual renewal, but more permits are now being written with a five-year term.

Besides the construction/operating permit systems described above, some state/local permitting authorities have a "registration permit" system for those businesses or individual pieces of equipment that do not emit a large amount of air pollution. Typically, these types of "permits" are less complex and do not require the facility to provide a significant amount of detail in the application forms. For example, the state of Ohio has a registration permit program for sheetfed offset lithographic presses that emit less than 3 tons per year of VOCs. As long as the press's emissions stay below this level, an operating permit is not required. However, an application for registration needs to be submitted in order to demonstrate compliance.

Because of the 1990 Clean Air Act Amendments, another type of operating permit was created called a Title V operating permit. These permits have a five-year term limit and are federally enforceable. They specify all control requirements, emission limits, recordkeeping, compliance reporting, compliance certification, and monitoring requirements. Title V permits only apply to certain types of facilities and are administered by the state/local agencies, but reviewed and approved by USEPA. A federally enforceable permit is one that can be enforced by EPA. As a result of the Title V operating permit program, a new type of operating permit called a Federally Enforceable State Operating Permit (FESOP). FESOP permits only apply to certain types of printing operations, but as the name implies, they are state/local agency issued permits that can be enforced by EPA. Generally, the types of permits that most printers have to obtain are issued by the state/local are not federally enforceable.

Title V and FESOP permits are unlike any permitting program that has been in place in the past. They require a detailed analysis of a facility's emission sources and must address the future utilization of the equipment and materials. Completing the permit application cannot be simply delegated to the "engineering" department because it requires input from the operating, sales and marketing, and administration. Current and future strategic business decisions have to be made within the context of the Title V permitting process. Modifications and changes to the permit will be difficult and time consuming to accomplish and the printer could lose a business opportunity as a result.

The need to obtain an air pollution control permit depends on the applicable thresholds that have been set by the state/local air pollution control agency. The thresholds can be based on several different parameters. Some state/local agencies use the actual emission rate or amount while others use potential emissions. Some permitting authorities do not use an emission-based threshold, but use an actual material consumption rate basis to determine if permits are required.

## Permitting Thresholds

Permitting thresholds can vary quite dramatically and are driven by federal, state, and local requirements. The permitting thresholds can be for either an individual piece of equipment (e.g., press) or the entire facility (e.g., presses, coaters, bindery, and prepress). They can be expressed in pounds per hour, pounds per day, pounds per month, tons per year, or based on some type of material consumption limit.

For example, in New York City, all printers regardless of their emission rate are required to have a permit. In the remainder of New York State, any printer with total VOC actual emissions less than 12.5 tons per year must obtain a registration permit. Those with actual emissions greater than 12.5 and less than 25 tons per year must obtain a state facility permit and those with potential emissions greater than either 25 or 50 tons per year must obtain a Title V permit. The Illinois EPA requires a permit for any printer that uses more than 750 gallons per year of VOCs, while Pennsylvania has both an actual and potential emission permit thresholds.

The threshold for the new federal Title V operating permit uses a facility's annual potential emissions (e.g., potential to emit) to determine applicability and applies to both VOC and hazardous air pollutant (HAP) emissions. The HAP threshold for permitting is 10 tons per year for a single HAP chemical and 25 tons per year for all HAP single chemical(s) or HAP categories combined. These thresholds are universal in that they apply across the entire country and are not tied to any attainment or nonattainment classification.

The Title V thresholds for VOC emissions are dependent upon the geographical location and severity of the non-attainment problem. The only extreme area is Los Angeles, CA and the threshold is 10 tons per year. Severe areas like Chicago, IL, Philadelphia, Pa, and New York City area have thresholds of 25 tons per year. Serious areas like Atlanta, GA and the entire ozone transport region have thresholds of 50 tons per year. The ozone transport region includes the entire area bound by Pennsylvania, Maryland, District of Columbia, Delaware, New York, New Jersey, Connecticut, Massachusetts, New Hampshire, Vermont, Rhode Island, and Maine. Moderate and Marginal areas such as St. Louis, MO have thresholds of 100 tons per year. The new nonattainment classification system can extend to several counties that physically touch the nonattainment area.

FESOP permits can be called by different names, but as the name implies, they are federally enforceable operating permits. Printing operations whose potential emissions exceed the Title V permit threshold with actual emissions below the threshold can qualify for a FESOP permit. Among the other applicable control requirements, FESOP permits will contain additional limits on hours of operation, input material consumption rates, or emissions that will ensure that the facility will not emit pollution at rates greater than the major source threshold. FESOP permits are generally not as rigorous as Title V permits and do not have the same fee structure associated with them.

### Potential to emit

Potential to emit (PTE) is defined as the greatest amount of emissions that could be released from a piece of equipment or facility based on its maximum design capacity or maximum production. Potential to emit determinations must assume the equipment will run 24 hours/day 365 days/year or 8,760 hours/year. The only way to avoid these assumptions is to have federally enforceable limits imposed on an operation that either limit the hours of operation, material input rate, or require the use of an add-on control device such as an oxidizer. There exists considerable controversy in how PTE is to be calculated, and how it applies to printers. Because printers produce a variety of products with various coverages, the amount of ink, fountain solution, coating, and other materials applied change the job and are difficult to characterize in PTE calculations.

There are at least three different ways to calculate potential emissions from a printing press. The first method is a worst case. It assumes 100% application of all input materials such as inks, coatings, fountain solutions, and cleaning solvents on all cylinders at maximum press speed for 8,760 hours/year. In a study performed on a printer using water-based flexography and letterpress to manufacture corrugated boxes, their 5 tons per year actual emissions climbed to 4,000 tons by assuming the worst case scenario. While this method is not realistic, some state agencies insist that printers use this method. The second method, which is preferred by industry, takes the actual average annual hourly emission rate and multiplies it by 8,760 hours/year. In the same study performed on the corrugated manufacturer, the potential emissions using this approach would be 20 tons/year.

The third method further confuses the permitting threshold determination. Some states including Illinois and Wisconsin, use a maximum theoretical emission (MTE) rate for rule applicability. The concept of MTE is the same as PTE in that it requires that a printer assume equipment is running at its maximum design capacity or maximum production rate for 24 hours/day 365 days/year or 8,760 hours/year. It does not allow for any reduction in emissions due to limits on the hours of operation, material input rate, or use of an add-on control device such as an oxidizer.

Because of the way PTE is applied, it has affected many small printers with extremely low actual emissions. Simply because their potential emissions made them "major sources," they are subject to more stringent regulation. EPA has recognized that small businesses that are not physically capable of emitting the "potential" described in the regulations should not be subjected to the requirements being imposed on the much larger major sources. These small businesses possess neither the technical nor financial resources to respond to these requirements.

### EPA PTE Guidance

On April 14, 1998, the Environmental Protection Agency released its Potential To Emit (PTE) Guidance for Specific Source Categories. The guidance was issued for state and local air pollution control agencies to use in setting rules to exempt small sources of air pollution from being subject to full regulation. It can be downloaded from <http://www.epa.gov/ttnsbap1/access.html>.

As described above, the current air pollution control regulations could cause individual printing operations to be considered "major sources" of air pollution and required to obtain a Title V operating permit based on their potential, not actual, air pollution emissions. The new Potential To Emit (PTE) Guidance for Specific Source Categories will allow state and local air pollution agencies to exempt individual small businesses from being considered "major sources".

The EPA PTE guidance document will allow state and local air pollution control agencies to establishing rules exempting small sources of VOC and HAP emissions from being considered "major" sources. Printers qualifying under the guidance would not be subject to a Title V or Federally Enforceable State Operating Permit and all of the control requirements that are applied to these types of operations.

The guidance utilizes a "cap" approach. If a source can demonstrate through records that actual emissions are less than 50 percent of the major source threshold for their given area, the source will be treated as a minor source. To further simplify determinations for small printers, a quick reference threshold chart was created with consumption levels for those materials that account for the largest source of VOC or HAP emissions in a printing operation. Indicators were established for each printing process type (see chart below). For example, a sheetfed offset lithographic printer typically has two principal sources of VOC emissions or environmental indicators-cleaning solvents and fountain solution additives, namely isopropyl alcohol. If the printing establishment is located in Pittsburgh, a marginal ozone non-attainment area, it could use 14,275 gallons of cleaning solvent and fountain solution additives combined before it would be considered a major source.

Even if printers exceed the levels listed in the table, they can still take advantage of this guidance if their total actual emissions do not exceed more than 50 percent of the major source threshold definition. A technical support document to the guidance has been prepared by EPA and contains the formulas to be used in calculating emissions.

Furthermore, the environmental indicators identified have to account for 90 percent or more of the emissions released from the facility. If other activities-ink jetting, for instance-contribute more than 10 percent of the emissions, then the table provided in the EPA guidance cannot be used and printers must calculate their actual emissions to determine if they qualify under the guidance.

Some printing operations will not qualify under the new guidance, including printers with actual emissions greater than 50 percent of the major source threshold and those using add-on control devices such as after-burners or oxidizers. Because of the complexities associated with control devices, printers utilizing control devices were excluded from the new guidance, even though their actual emissions could be below 50 percent of the major source threshold.

To help these printers, EPA has been petitioned to accept an approach that better approximates a printer's ability to run at maximum conditions. For these printers, a more realistic approach to determining PTE would be to take the actual average hourly emission rate and multiply it by 8,760 hours per year.

This approach provides a better approximation of printers' ability to run at maximum production capacities by extrapolating the current actual emissions into potential emissions that better reflect a realistic increase in production. This approach assumes printers would continue to produce the same mix of jobs, but they would be produced every hour in the year. Even though printers cannot physically run a press 8,760 hours per year, this takes into account any variations due to ink coverages and increases in productivity. Printers can readily determine actual average emissions based on material balances and hours of operation from production data. The EPA's current approach requires printers to make assumptions about material use and equipment utilization that are open to challenge by the agency.

## VOC and HAP Emission Calculations

Besides finding the appropriate threshold to determine whether a permit is required, the printer must also determine their VOC/HAP emission levels. This is accomplished by first deriving material use information. The materials to consider include, but are not limited to inks, extenders, diluents, fountain solutions, fountain solution additives, coatings, cleaning solutions, and other miscellaneous chemicals. Material use is typically defined as the amount purchased minus the change in inventory, minus the amount discarded. The amount released is determined by multiplying the amount used by the VOC content and if appropriate, an emission factor. An emission factor is the number used to reflect the actual release of materials. For example, a 5% emission factor for VOCs is applied to all sheetfed offset lithographic inks. Studies conducted by the printing industry have shown that 95% of VOCs in lithographic inks are retained by the substrate. For more information see the other PNEAC fact sheet(s) on determining VOC and HAP emissions from the appropriate printing process.

## Summary

Every printer, whether operating a large or small facility, must know and understand the air pollution permit regulations applicable to their facility. Knowing and complying with these regulations are crucial for printers because it allows them to legally operate their businesses under the current regulatory requirements. Even if a printer is not legally required to have a permit in order to operate their business, it is equally important to know and have proven and documented that they are not subject to the regulation. This aspect of the printer's business needs to be actively managed just like other important aspects of the business. In the long run, an active approach benefits the printer rather than the alternative of ignoring regulations, where it will ultimately become an enforcement action and a business liability.

## Material Consumption Rates For Offset Lithography

<b>Printing Process</b>	<b>Extreme 10 TPY VOC</b>	<b>Severe 25 TPY VOC</b>	<b>Serious and OTR* 50 TPY VOC</b>	<b>Moderate and Marginal 100 TPY VOC</b>	<b>Hazardous Air Pollutants 10 TPY Single HAP 25 TPY HAPs Total</b>
Sheetfed (nonheatset) Offset Lithography	1,425 gallons of cleaning solvent and fountain solution additives	3,550 gallons of cleaning solvent and fountain solution additives	7,125 gallons of cleaning solvent and fountain solution additives	14,275 gallons of cleaning solvent and fountain solution additives	1,333 gallons of material containing single HAP.  3,333 gallons of all HAP containing materials
Nonheatset Web Offset Lithography	1,425 gallons of cleaning solvent and fountain solution additives	3,550 gallons of cleaning solvent and fountain solution additives	7,125 gallons of cleaning solvent and fountain solution additives	14,275 gallons of cleaning solvent and fountain solution additives	1,333 gallons of material containing single HAP.  3,333 gallons of all HAP containing materials
Heatset Web Offset Lithography -- uncontrolled	10,000 pounds of ink, cleaning solvent, and fountain solution additives	25,000 pounds of ink, cleaning solvent, and fountain solution additives	50,000 pounds of ink, cleaning solvent, and fountain solution additives	100,000 pounds of ink, cleaning solvent, and fountain solution additives	1,333 gallons of material containing single HAP.  3,333 gallons of all HAP containing materials

\* OTR- Section 184 of the Clean Air Act established the Ozone Transport Region which includes the entire area defined by Pennsylvania, Maryland, District of Columbia, Delaware, New York, New Jersey, Connecticut, Massachusetts, New Hampshire, Vermont, Rhode Island, and Maine.

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