Air Emissions and Printers

The Clean Air Act and Amendments and KDHE's Air Quality Act and Regulations

While many printers are small facilities, some shops may have air emissions which need to comply with the Clean Air Act and Amendments (CAAA) and Kansas Air Quality Act and Regulations, administered by the Kansas Department of Health and Environment (KDHE). What kinds of air emissions are regulated?

Volatile organic compounds (VOCs) are principal components in atmospheric pollution that react with air and other pollutants in the air to form ozone and other harmful photochemical oxidants dangerous to human health and the environment. VOCs are emitted from solvent-based heat-set inks, fountain solutions, and press and screen cleaning solvents. Mineral spirits, toluene, MEK, and xylene are just a few of the VOCs emitted from printing operations.

Hazardous air pollutants (HAPs) can cause cancer and reproductive problems, as well as cause environmental damage. Hazardous air pollutants have killed people swiftly when large quantities were released; the 1984 release of methyl isocyanate at a pesticide manufacturing plant in Bhopal, India, killed approximately 4,000 people and injured more than 200,000. EPA refers to chemicals that cause serious health and environmental hazards as (HAPs) or air "toxics" and because of their inherit danger, these types of emissions are regulated more stringently than VOCs. HAPs are found in many of the same printing materials that contain VOCs: heat-set inks, press and screen cleaning solvents, and fountain solution additives.

Criteria pollutants

Under the Clean Air Act, EPA is also required to set National Ambient Air Quality Standards (NAAQS) for certain "criteria" pollutants considered harmful to public health and the environment. The Clean Air Act establishes two types of national air quality standards: primary standards set limits to protect public health, including the health of "sensitive" populations such as asthmatics, children, and the elderly; secondary standards set limits to protect public welfare, including protection against decreased visibility, and damage to animals, crops, vegetation, and buildings.

NAAQS establish a maximum level for criteria pollutants allowed in the ambient atmosphere anywhere in the United States. A geographic area that meets or does better than the NAAQS primary standard is called an "attainment" area; areas that don't meet the primary standard are called "nonattainment" areas. Businesses that operate in nonattainment areas must usually comply with additional local air regulations, to help that area reduce local emissions and meet NAAQS. This is true for printers located in Johnson and Wyandotte counties in the greater Kansas City area.

There are six sets of criteria pollutants, some of which are found in printing operations:

- Ozone (O3) is a gas composed of three oxygen atoms. It is not usually emitted directly into the air, but at ground level it is created by a chemical reaction between oxides of nitrogen (NOx) and volatile organic compounds (VOCs) in the presence of heat and sunlight. "Good" ozone occurs naturally in the stratosphere, approximately 10 to 30 miles above the earth's surface, and forms a layer that protects life on earth from the sun's harmful rays. In the earth's lower atmosphere, ground-level ozone is considered "bad" because of its ability to cause permanent lung damage

after long-term exposure and because of its harmful effects on plants and ecosystems.

- Nitrogen oxides (NOx) and sulfur oxides (SOx), which contribute to smog, are generated from fuel-burning equipment such as boilers, furnaces, and press dryers.
- Particulate matter, or PM, is the term for particles found in the air, including dust, dirt, soot, smoke, and liquid droplets. Particles can be suspended in the air for long periods of time. Some particles are large or dark enough to be seen as soot or smoke. Others are so small that individually they can only be detected with an electron microscope. PM is generally emitted from paper dust created by cutting, folding, and binding operations in print shops.
- Carbon monoxide, or CO, is a colorless, odorless gas that is formed when carbon in fuel is not burned completely. In cities, 85 to 95 percent of all CO emissions may come from motor vehicle exhaust; however, CO is also emitted from other industrial sources with fuel burning operations, such as boilers and furnaces.
- Lead is a metal found naturally in the environment as well as in manufactured products. Major sources of lead emissions have historically been motor vehicles such as cars and trucks, and industrial sources such as metal processing facilities. Printing operations that use lead linotype processed on site may be regulated.

If your shop emits any of the air pollutants mentioned above, you must evaluate the emissions from these operations. The Clean Air Act Amendments (CAAA) regulate these emissions in several ways:

- By the actual emissions of volatile organic compounds (VOC) and regulated hazardous air pollutants (HAP).
- By a company's potential emissions of the above pollutants, if used at your normal rate of use, 24 hours a day, 7 days a week, 365 days a year. This is called your potential-to-emit, or PTE.
- By additional regulations to control pollution from certain industrial sectors responsible for the bulk of emissions of VOC or a particular HAP or group of HAPs. These industrial sectors are called "source categories" by EPA, and the agency issued a list of HAP source categories in 1992. Source categories usually are defined by Standard Industrial Code (SIC) or North American Industrial Code (NAIC) numbers. There are also several additional regulations for the printing sector.

National Emissions Standards

Source category regulations

National emissions standards for hazardous air pollutants (NESHAP) were established for existing and new "major" source categories to control hazardous air pollutants (HAP) emissions. With the Clean Air Act Amendments of 1990, the risk-based NESHAP standards were replaced in favor of technology-based maximum achievable control technology (MACT) standards, proven in industrial settings to reduce pollutants from specific operations to acceptable levels. MACTs have been established for many industries traditionally known to emit HAP, including certain printing operations. A MACT rule was established for publication rotogravure, and product and packaging rotogravure; and wide-web flexographic printing includes organic HAP emission limits. The HAP emitted by the facilities covered by this final rule include xylene, toluene, ethylbenzene, methyl ethyl ketone, methyl isobutyl ketone, methanol, ethylene glycol, and certain glycol ethers.

The MACT standard limits the amount of HAP that can be emitted by the following types of printing processes:

- Publication rotogravure printers. These printers can show compliance with the

MACT by limiting their organic HAP emissions to 8 percent (by weight) or less of the amount of volatile materials used. If you use only HAP-based materials, you must recover 92% of the HAP used each month.

- Product and packaging rotogravure and wide-web flexographic printers. Printers must use controls that will capture at least 95% of all organic HAP emissions from their presses, and emissions from each press cannot exceed 0.20 pounds of HAP per pound of solids applied or 0.04 pounds of HPA per pound of ink or other materials applied.
- Printers can meet these limits by using low- to no-HAP inks or materials such as water-based or UV inks, or by using certain control devices such as solvent recovery systems or incinerators, or by using a combination of alternative coatings and control devices. EPA promotes compliance through pollution prevention, eliminating the need for printers to install additional control equipment.

Existing printers had to be in compliance with this MACT by May 30, 1999; new or reconstructed emission sources at covered print shops must be in compliance upon startup. For a detailed explanation of this regulation, see the MACT standard fact sheet in the CAAA appendix following this section.

Local emission standards

Local emission limits may be imposed on printers in areas that are considered "nonattainment" under the National Ambient Air Quality Standards, or NAAQS. The air quality in Kansas City in the early and mid '90s exceeded the NAAQS for ozone caused by excessive VOC and NOx, forcing KDHE to impose additional VOC limits on packaging rotogravure, publication rotogravure, flexographic, and lithographic printers in Wyandotte and Johnson counties. These limits apply only to major sources or those print shops that have the potential to emit 100 tons of VOC. These requirements continue to be imposed on existing and new print facilities in order to help meet the NAAQS for ozone concentrations. Printers in these areas are required to reduce emissions from their operations by several approaches that are considered reasonable available management technology (RACT) requirements. These RACT rules consist of several options companies may use to limit VOC emissions from their facility:

- Set limits on VOC content of ink, fountain solutions, and /or cleaning solvents, and require recordkeeping to verify all of such material use on a daily or monthly basis. Solvent vapor pressure may also be restricted as a means of VOC reduction. (See proposed solvent metal cleaning rule in appendix of this section.)
- Use a "control device" that reduces, recaptures, or incinerates VOC from cleaning systems, presses, and dryers. Detailed recovery, monitoring, and recordkeeping are also required to verify that each control device meet certain minimum standards.
- Use specific work practices that limit VOC escape.

Please see KAR 22-19-71 (printing operations), KAR 28-19-75 (solvent metal cleaning), and KAR 28-19-76 (lithography printing operations), in the appendix following this section, for detailed descriptions of RACT requirements to limit VOC emissions in Johnson and Wyandotte counties.

Note: *Some printers may be exempt from the Kansas City RACT requirements, based on the size of their presses and federally enforceable permit restrictions, such as limiting operational hours, that will limit a company's potential to emit (PTE) pollutants.*

Wyandotte County has its own air pollution control agency and receives permit applications and drafts permits on behalf of KDHE for Wyandotte County Air Emission Sources.

Kansas Air Quality Program guidance and assistance is available from:

- Kansas Department of Health and Environment, Bureau of Air and Radiation
  David Peter, Permit Engineer
  785-296-1615
  dpeter@kdhe.state.ks.us

- Rasha Allen, Permit Engineer
  785-296-1693
  rallen@kdhe.state.ks.us

- Small Business Environmental Assistance Program
  1-800-578-8898
  www.sbeap.org
  SBEAP@ksu.edu

- Wyandotte County Health Department, Department of Air Quality
  Bruce Anderson
  913-573-6700
  bandersen@wycokck.org

- Johnson County Health Department, Air Quality Program
  Mike Booth
  913-492-0402
  Michael.booth@jocoks.com

Now that you have a good background on the types of regulations and what is regulated, let's look at the amount of emissions that can put printers into the air permitting arena.

Does your shop need an air permit?

Emission limits and permitting

The Clean Air Act Amendment (CAAA) regulations divide facilities into two groups based on the amount, in tons, of regulated air emissions. These are "major sources" and non-major or "area sources." A facility is a "major source" if it has the potential to emit (PTE) 100 tons per year (TPY) of VOCs or other criteria pollutants, 10 tons per year or more of a single HAP, or 25 tons per year or more of all combined HAP emissions. Any facility with a potential to emit below the major source level is considered an "area source" (however, not all area sources will need to get an air permit). EPA can regulate area sources that emit hazardous air pollutants by requiring them to use MACT for their operations that emit HAP.

Permit types

Class I, also known as Title V, permits are for major emission sources or those that emit or have the potential-to-emit more than 100 tons per year (tpy) of VOCs, 10 tpy of a single HAP, or 25 tpy of all combined HAPs from their facility. Major sources are required to obtain a Title V, or Class I permit, unless they choose to limit their PTE by limiting their operating hours or changing material uses to reduce their PTE. In this case, the company may be able to operate under a less expensive, less stringent Class II or "synthetic minor" permit. (See the Kansas air regulations in K.A.R. 28-19-500(a) in the CAAA appendix following this section.)

Class II permits are for potential major sources that will limit their PTE below major thresholds with federally enforceable permit restrictions. This means that the company must use acceptable and documentable methods to verify the operating restriction. This documentation may consist of restricted operating hours; use of pollution control equipment, pollution prevention measures, or process rate restrictions; or increased amount of materials restricted (see K.A.R. 28-19-540 (a)).

If you are a minor source (actual and potential emissions below the major source threshold)

but your potential emissions later exceed the major source threshold, you have six months from the time you exceed the threshold to submit a Class II permit.

Class II permits-by-rule are for companies, such as printers, that have been identified as a solvent evaporative "source"; these emission sources must meet the traditional requirements of a Class II permit and perform the following:

- Purchase or use less than 9 tons of VOCs or HAPs per year.
- Purchase or use less than 90 tons of VOCs and less than 9 tons of any single HAP, or 22.5 tons of any combination of HAPs.
- Maintain records on site showing material usages; this must be updated monthly.
- Submit a report if you exceed the 85% level of restriction.
- Obtain a new permit if restrictions are violated.

(see K.A.R 28-19-542 and the factsheet "*Solvent users: Do you need an air permit?*" in the appendix of this section)

Class III permits are for companies that are not required to obtain a Class I or II permit, that operate an incinerator, or that are subject to one of the following:

- New Source Performance Standard
- MACT rules
- RACT rules (see K.A.R. 28-19-575)

Construction permits

You may be required to obtain a KDHE permit to install and operate new equipment, such as new presses, boilers, or emergency generators that emit VOC, HAP, or NOX emissions. For many small printers, the emissions are usually considered insignificant and no permits are required. Depending on the amount of actual or potential emissions from the new equipment or process, a KDHE permit may be needed for a single press or for the entire shop.

Note: *You must have KDHE authorization before you install or operate equipment, if you exceed VOC, HAP, or NOX thresholds requiring a construction or operating permit.*

During preconstruction review, the Kansas Department of Health and Environment (KDHE) ensures that proposed construction projects at new facilities and modifications at existing facilities can meet applicable Kansas and federal air quality requirements.

Any proposed print shop, bindery equipment, or press addition/modification with potential to emit air pollutants which is not exempt from permitting, or that is located in a maintenance area and does not meet the exceptions for RACT requirements, is required to obtain a construction permit prior to constructing or installing equipment. If a proposed modification will increase the actual emissions from the shop to exceed the limits for exemption from permitting or exceed the limits for RACT requirements, the shop will need to get an air construction permit.

You will need a construction permit if the PTE of the new modification or equipment, or the increase in PTE for the facility, exceeds the levels shown in Table 1. (see KAR 28-19-300(a)(1))

Table 1 — Construction permit thresholds

Pollutant	PTE threshold
PM	25 t/yr
PM10	15 t/yr
SO x	40 t/yr
CO	100 t/yr
VOC	40 t/yr
NO x	40 t/yr
Lead	0.6 t/yr
HAPs (Individual)	10 t/yr
HAPs (Any combination)	25 t/yr

If a construction permit is required for a new facility or a modification of an existing facility, you must submit an appropriate application to KDHE Bureau of Air and Radiation for a permit to construct, summarizing the proposed equipment installation/modification or operational changes.

If it is determined that an existing shop, which has never had a permit and is not a Title V major source, needs an air permit, the department may require the owner or operator to apply for both an air construction permit and an air operation permit. The owner or operator may be required to provide a summary of past and present compliance with air pollution requirements.

What if I'm not sure my new or modified equipment needs a construction permit? You can request a preconstruction meeting with the Kansas Department of Health and Environment, Bureau of Air and Radiation, or with your local air pollution control agency to which the department has delegated permitting authority. If you don't need a construction permit, you may only need a construction approval (See K.A.R. 28-19-300(b)) if the equipment or modification's potential to emit (or your increase in potential to emit) equals or exceeds the thresholds in Table 2, but not those listed above in Table 1.

The primary differences between a construction permit and a construction approval are that the construction permit process has a public comment period where people can voice their concerns to KDHE, whereas the approval process does not; and the permit requires an application fee, while there is not a fee associated with an approval. The fee is equivalent to 0.05% of the capital cost of the proposed activity.

P2 tips

Reducing emissions from printing operations can be achieved by changes in ink composition or by changing the ink technology, such as the use of ultraviolet inks. However, changes in solvent usage for cleaning, blanket washing, etc. can greatly affect the amount of emissions from the operational processes. Air emissions should be reduced at the source where possible. If they are never produced in the first place, then your company and your local environment won't have to pay when they evaporate into the shop or go out the stack. The following P2 opportunities should be considered to help to reduce emissions and materials use in printing operations:

- Use spray or plunger cans for cleaning solvents.
- Use spot application of solvents for stubborn ink residues rather than general over

Table 2 — Construction approval thresholds

Pollutant	PTE threshold
PM	5lbs/hr
PM10	2 lbs/hr
SO 2 or SO 3	2 lbs/hr
CO	50 lbs/24-hr period
VOC (all except Wyandotte and Johnson counties)	50 lbs/24-hr period
VOC (Wyandotte and Johnson counties)	15 lbs/24-hr period or 3 lbs/hr
NO x	50 lbs/24-hr period
Lead	0.1 lbs/hr

application of solvent.

- Keep ink containers covered to prevent skin over. Investigate new non-skinning ink systems.
- Use petroleum-based cleaning solvents that can be diluted with water before application. Conduct trials to find the best mix.
- Use low-vapor pressure solvents.
- Evaluate and use water-based cleaning solutions.
- Use solvent sinks for cleaning parts to reduce once-used solvent cleaning of press parts.
- Install an explosion-proof centrifuge or dry cleaning units for wringing shop towels dry (cost-effective for midsize and large users of towels).
- Recycle press cleaning solvent using a fully enclosed solvent recovery system.
- Reuse dirty solvent for the first noncritical cleaning step, followed by uncontaminated solvent.
- Reuse lightly soiled shop towels for noncritical cleaning.
- Use alcohol substitutes in the fountain solution.
- Keep solvents in closed containers and parts washers.
- Hand wring or gravity drain (with false-bottomed storage drums) soiled shops towels to recover as much solvent as possible for recycling.

Potential to emit (PTE)

Based on the guidelines above, you may be thinking–there's no way our shop emits that amount of VOC or HAP! But PTE is based on your shop's ability to emit VOC and HAP if it were operated around the clock, 365 days per year, based on your current material usages. This can add up quick, and some shops have found that they do have the potential to emit above the threshold limits given above.

So, how do I calculate my potential to emit?

Many materials contain significant quantities of regulated hazardous air pollutants (HAPs), such as toluene, xylene, methyl ethyl ketone (MEK), or methyl isobutyl ketone (MIBK). The amount of HAPs or volatile organic compounds (VOCs) your facility has the potential to release or emit will determine if your business is required to obtain an operating permit and/or comply with other regulatory requirements. This will require you to perform an emissions' inventory.

Air emissions can be calculated using a "material balance approach"–what goes in must come out–in this case as a VOC or HAP. Essentially, this will assume that every VOC or HAP that comes into your facility will be emitted into the air. The amount of VOCs and HAPs in each product used at your facility should be totaled for an entire year. Some may find it easier to use a database to track these emissions; however, the initial determination can be done as follows:

First, determine materials with regulated VOCs and HAPs. Gather all MSDSs for all products used at your facility. Look in the section that lists the composition or ingredients to determine if that material contains VOCs or HAPs. This section will give you the names of each material present in the product, percentage of that ingredient, and its Chemical Abstract Service (CAS) number. You will need all of this material to identify your VOC and HAP. Some MSDSs may also give the "total" VOC content of the material. Be sure and include:

- blanket wash/roller wash/press wash/type wash
- parts cleaner (solvent)
- inks
- varnishes
- coatings
- cleaning solvents, including screen reclamation chemicals
- adhesives

- alcohol or alcohol substitutes (including fountain solution concentrate)
- proofing system solutions (if alcohol or solvent based)
- any other VOC/HAP-containing products you use (in excess of 25 gal/product/year), such as film cleaner

Note: *Exempt VOCs.*
A federal VOC is both photochemically reactive (contributes to the formation of ozone) and contains carbon (this lets out NOx). However, there are some compounds that have been determined, from a federal perspective, to have negligible photoreactivity such as acetone, and perchloroethylene, and these are considered "exempt" VOC. However, these materials may still be considered hazardous air pollutants. The following materials are considered exempt VOCs:

- methane
- ethane
- 1,1,1-Trichloroethane
- methylene chloride
- chlorofluorocarbons
- bromofluorocarbons
- acetone
- perchloroethylene
- methyl acetate

Next, using the product MSDS and list of HAPs provided below, identify each material containing a VOC or HAP and list it in the table provided. Note the VOC and/or HAP, its percentage content in each product, and the amount of that product used in one year at your facility.

Hazardous Air Pollutant Chemical (HAP) List

50000	Formaldehyde
51285	2,4-Dinitrophenol
51796	Ethyl carbamate
53963	2-Acetylaminofluorene
56235	Carbon tetrachloride
56382	Parathion
57147	1,1-Dimethylhydrazine
57578	beta-Propiolactone
57749	Chlordane
59892	N-Nitrosomorpholine
60117	4-Dimethylaminoazobenzene
60344	Methylhydrazine
60355	Acetamide
62533	Aniline
62737	Dichlorvos
62759	N-Nitrosodimethylamine
63252	Carbaryl
64675	Diethyl sulfate
67561	Methanol
67663	Chloroform
67721	Hexachloroethane
68122	N,N-Dimethylformamide
71432	Benzene
71556	Methyl chloroform
72435	Methoxychlor
72559	DDE (1,1-dichloro-2,2-bis(p-chlorophenyl) ethylene)
74839	Methyl bromide
74873	Methyl chloride
74884	Methyl iodide
75003	Ethyl chloride
75014	Vinyl chloride
75058	Acetonitrile
75070	Acetaldehyde
75092	Methylene chloride
75150	Carbon disulfide
75218	Ethylene oxide
75252	Bromoform
75343	Ethylidene dichloride
75354	Vinylidene chloride
75445	Phosgene
75558	1,2-Propylenimine
75569	Propylene oxide
76448	Heptachlor
77474	Hexachlorocyclopentadiene

77781	Dimethyl sulfate
78591	Isophorone
78875	Propylene dichloride
78933	Methyl ethyl ketone
79005	1,1,2-Trichloroethane
79016	Trichloroethylene
79061	Acrylamide
79107	Acrylic acid
79118	Chloroacetic acid
79345	1,1,2,2-Tetrachloroethane
79447	Dimethylcarbamoyl chloride
79469	2-Nitropropane
80626	Methyl methacrylate
82688	Pentachloronitrobenzene
84742	Dibutyl phthalate
85449	Phthalic anhydride
87683	Hexachlorobutadiene
87865	Pentachlorophenol
88062	2,4,6-Trichlorophenol
90040	o-Anisidine
91203	Naphthalene
91225	Quinoline
91941	3,3'-Dichlorobenzidine
92524	Biphenyl
92671	4-Aminobiphenyl
92875	Benzidine
92933	4-Nitrobiphenyl
95476	o-Xylene
95487	o-Cresol
95534	o-Toluidine
95807	Toluene-2,4-diamine
95954	2,4,5-Trichlorophenol
96093	Styrene oxide
96128	1,2-Dibromo-3-chloropropane
96457	Ethylene thiourea
98077	Benzotrichloride
98828	Cumene
98862	Acetophenone
98953	Nitrobenzene
100027	4-Nitrophenol
100414	Ethylbenzene
100425	Styrene
100447	Benzyl chloride
101144	4,4'-Methylenebis(2-chloroaniline)
101688	4,4'-Methylenediphenyl diisocyanate
101779	4,4'-Methylenedianiline
105602	Caprolactam (Removed 6/18/96)
106423	p-Xylene
106445	p-Cresol
106467	1,4-Dichlorobenzene
106503	p-Phenylenediamine
106514	Quinone
106887	1,2-Epoxybutane
106898	Epichlorohydrin
106934	Ethylene dibromide
106990	1,3-Butadiene
107028	Acrolein
107051	Allyl chloride
107062	Ethylene dichloride
107131	Acrylonitrile
107211	Ethylene glycol
107302	Chloromethyl methyl ether
108054	Vinyl acetate
108101	Methyl isobutyl ketone
108316	Maleic anhydride
108383	m-Xylene
108394	m-Cresol
108883	Toluene
108907	Chlorobenzene
108952	Phenol
110543	Hexane
111422	Diethanolamine
111444	Dichloroethyl ether
114261	Propoxur
117817	Bis(2-ethylhexyl)phthalate
118741	Hexachlorobenzene
119904	3,3'-Dimethoxybenzidine
119937	3,3'-Dimethylbenzidine
120809	Catechol
120821	1,2,4-Trichlorobenzene
121142	2,4-Dinitrotoluene
121448	Triethylamine
121697	N,N-Dimethylaniline
122667	1,2-Diphenylhydrazine
123319	Hydroquinone
123386	Propionaldehyde
123911	1,4-Dioxane
126998	Chloroprene
127184	Tetrachloroethylene
131113	Dimethyl phthalate
132649	Dibenzofuran
133062	Captan
133904	Chloramben

140885	Ethyl acrylate
151564	Ethyleneimine
156627	Calcium cyanamide
302012	Hydrazine
334883	Diazomethane
463581	Carbonyl sulfide
510156	Chlorobenzilate
532274	2-Chloroacetophenone
540841	2,2,4-Trimethylpentane
542756	1,3-Dichloropropene
542881	Bis(chloromethyl) ether
584849	2,4-Toluene diisocyanate
593602	Vinyl bromide
624839	Methyl isocyanate
680319	Hexamethylphosphoramide
684935	N-Nitroso-N-methylurea
822060	Hexamethylene diisocyanate
1120714	1,3-Propane sultone
1319773	Cresol/Cresylic acid
1330207	Xylenes
1332214	Asbestos
1336363	Polychlorinated biphenyls
1582098	Trifluralin
1634044	Methyl tert-butyl ether
1746016	2,3,7,8-Tetrachlorodibenzo-p-dioxin
7550450	Titanium tetrachloride
7647010	Hydrochloric acid
7664393	Hydrogen fluoride
7723140	Phosphorus
7782505	Chlorine
7803512	Phosphine
8001352	Toxaphene
N/A	1,2,3,4,5,6-Hexachlorocyclyhexane
N/A	2,4-D (2,4-Dichlorophenoxyacetic Acid)
N/A	4,6-Dinitro-o-cresol
NA	Antimony Compounds
NA	Arsenic Compounds
NA	Beryllium Compounds
NA	Cadmium Compounds
NA	Chromium Compounds
NA	Cobalt Compounds
NA	Coke Oven Emissions
NA	Cyanide Compounds1
NA	Fine mineral fibers3
NA	Glycol ethers2
NA	Lead Compounds
NA	Manganese Compounds
NA	Mercury Compounds
NA	Nickel Compounds
NA	Polycyclic Organic Matter4
NA	Radionuclides (including radon)5
NA	Selenium Compounds

VOC and HAP Inventory Form for: ______________________________

Inventory date: ____________________

Product Identification	VOC and %	HAP 1 and %	HAP 2 and %	HAP 3 and %	Yearly Usage

Note: Your potential to emit, or PTE, is the maximum amount of air pollution your facility can emit if:

- Materials that emit the most air pollution are used 100 percent of the time.
- All of the equipment is operating 24 hours per day, 365 days per year.
- No pollution control equipment is used.

There are 8760 total hours in one year; this is the number you must use to "ramp up" your material usages to a full-time yearly figure. Using this number, the (PTE) can be determined by multiplying actual total pounds of each HAP and each VOC by the ratio:

8760 hours per year/actual operating hours

If your shop only works 40 hours/wk, your actual operating hours = 2080 hours.
So, 8760/2080 = 4.3 You will multiply your actual VOC and HAP yearly totals used by this number to calculate your PTE.

Actual emissions of HAPs and VOCs can be determined if you know the total quantity of product used annually, density of the product, and weight percent of HAPs or VOCs. This information will allow you to calculate the amount of HAPs and VOCs in your product.

1)**Determine the amount of material used.**
The quantity of product used can be taken from purchasing records, provided you maintain an essentially constant inventory. If you are disposing of waste materials and have records to show the amount of HAPs or VOCs in the waste, that amount can be subtracted from the total used since it was not emitted into the air.

2)**Determine the density of the material.**
Typically, the total density of the product can be found on the MSDS sheet. Either the density will be specifically listed as pounds per gallon, or it will be given as specific gravity. If specific gravity is given, multiplying the reported number by 8.3 pounds per gallon will give the density of the product.

density = specific gravity x 8.3 lbs/gal

3)**Determine the weight percent of the HAP or VOC.**
Often times, the weight percent of HAPs or VOCs are given on the MSDS. If your MSDS happens to give you volume percents rather than weight percents, you can either request from your vendor that an MSDS with weight percents be sent to you, or you will have to do a quick calculation to get the weight percent of the particular pollutant.

HAP wt% = (HAP density) x (product volume) x (HAP volume%) / 100

Determining your VOC weight percent is a little different because VOCs are contributed by many chemicals in your product. The easiest way to calculate your VOC weight percent is by the following:

Wt% VOC = 100 – wt% of solids – wt% of water – wt% of any exempt VOCs

One such exempt VOC material is acetone. Again, often times your MSDS will specify the amount of VOCs in your product.

4)**Bringing it all together...actual and potential emissions.**
Now that you have all your information, you can calculate your actual and potential emissions for your pollutants of concern.

Actual emissions = product volume used annually x product density x wt% of pollutant

(Actual emissions must be done for each HAP, in each product. This number will be

used to ramp up material usage to a round-the-clock projection of material use for one year.)

Potential emissions = actual emissions x (8760 hours / actual operating hours)

Now, by comparing your potential emissions with the threshold requirements for an air operating permit (listed below), you can determine if your facility meets any of the emission thresholds based on PTE.

- 10 tons of any single HAP
- 25 tons of any combination of HAPs
- 100 tons or more of any other regulated air pollutant in a single year, including nitrous oxides (NOx), sulfur oxides (SOx), particulate matter (PM), carbon monoxide (CO), and VOCs

You must use these numbers to determine the type of permit your facility must have.

Some printers are required to submit their previous year's total air emissions in an Annual Air Emission Inventory Report by April 1 of each year. The annual reports serve the following purpose:

- allow KDHE to track emissions and maintain an accurate state inventory of emissions
- demonstrate that a printer is in compliance with its permit
- document emission reductions that can be used to offset future growth
- calculate and collect annual emission fees, which support the Kansas air Quality Program

Note: *You must pay for your emissions on a per ton basis if you have actual annual emissions in excess of the following thresholds.*

Annual Emission Fee Thresholds

Pollutant	Actual Emissions tons per year (tpy)
HAPs (Individual)	10 tpy
HAPs (Any combination)	25 tpy
VOC	100 tpy
Nitrogen Oxides (NOx)	100 tpy
Sulfur Dioxide (SO2)	100 tpy
Particulate Matter <10 microns (PM10)	100 tpy

There is an annual 4,000-ton-per-pollutant cap on charges incurred.

Who must submit an annual air emission inventory report?

You must submit an annual air emission inventory if your shop:

- has a Class I Operating Permit
- has a Class II Operating Permit

Risk management plans

Do I need a risk management plan?
Section 112(r) of the Clean Air Act requires some large printers to prepare a risk management plan to prevent the accidental release of toxic chemicals. It should be noted that all printers, regardless of size, are subject to the general duty clause under CAA 112(r). The CAA general duty clause directs owners and operators of stationary sources to identify hazards that may result from accidental releases, to design and maintain a safe facility, and to minimize the consequences of releases when they occur.

Note: *Wyandotte County Air Permitting Authorities may have more stringent permitting requirements. When these exist, they will be made available to the printers that will be subject to those rules.*