



Here's How to Figure Your Potential to Emit

What is "potential to emit?"

Potential to emit, or PTE, is the maximum amount of air pollution your facility can emit if

- each process unit is operated at 100 percent of its physical and operational design capacity;
- materials that emit the most air pollution are used 100 percent of the time;
- all of the equipment is operation 24 hours per day, 365 days per year (8,760 hours per year); and
- no pollution control equipment is used.

PTE is the basis of the Kansas air operating permit program. You must know your potential emissions to determine which, if any, air operating permit you need.

You will need an air operating permit if you have potential or actual emissions equal to, or exceeding, 10 tons of a single hazardous air pollutant (HAP); 25 tons of any combination of HAPs; or 100 tons of any regulated pollutant including sulfur oxides (SO_x), nitrous oxides (NO_x), volatile organic compounds (VOC), carbon monoxide (CO), or particulate matter less than ten microns (PM₁₀).

Common HAPs found in solvent tanks and paints and coatings include toluene and xylene.

What emissions do I include?

You need to include emissions from your manufacturing processes and auxiliary activities. Auxiliary activities can include boiler and generator emissions, degreasing, painting and cleanup activities, and tank loading and unloading. Federally designated fugitive emission sources such as cement plants and lime plants also need to include their fugitive emissions.

How do I calculate my potential emissions?

- 1) Identify your emissions units. An emission unit is an activity that emits or has the potential to emit pollution to the air. Emissions units do not always connect to a vent or a stack.
- 2) List all possible pollutants from these units, including NO_x, SO_x, CO, VOCs, PM-10 and HAPs. A listing of current HAPs can be found at KDHE's Web site in spreadsheet format at www.kdheks.gov/emission/download/HAP_list.xls. You can also view the list at EPA's Web site at www.epa.gov/ttn/atw/188polls.html.
- 3) Calculate your emissions. Solvent evaporative sources (such as surface coating and printing and cleaning solvents) can calculate their actual and potential emissions using the method shown in Example 1.

For additional information on solvent use and if an air permit is needed, please view the SBEAP fact sheet *Solvent Users: Do you need an Air Permit?* at www.sbeap.org.

Example 1

Consider a facility that operates a paint booth 2,000 hours a year and uses 3,000 gallons of blue paint with a density of 9.85 pounds per gallon. Assuming the paint is 25% volatile organic compound (VOC) by weight, the actual and potential emissions are calculated as follows.

Actual Emissions

$$\begin{aligned} & (3000 \text{ gallons of paint}) \times (9.85 \text{ lbs per gallon of paint}) \\ & \times (0.25 \text{ lbs VOC per pound of paint}) \\ & = 7,388 \text{ lbs of VOC per year} \\ & = \mathbf{3.7 \text{ tons of VOC per year}} \end{aligned}$$

Potential Emissions

$$\begin{aligned} & 3.7 \text{ tons of VOC per year} \times \frac{8760 \text{ potential hours}}{2000 \text{ actual hours}} \\ & = \mathbf{16.2 \text{ potential tons VOC per year}} \end{aligned}$$

The most common method for estimating non-solvent emissions is to use EPA's AP-42 emissions factors.

Using emission factors

Emission factors tell you how much of each type of air pollutant is generated from a manufacturing process. This will sometimes be based on a per unit of output or hours of operation basis (e.g. 10 pounds PM-10 per ton of steel produced or 10 pounds of VOC per hour of production).

If your equipment manufacturer or vendor can't supply them, emission factors for your process may be available from EPA at the AP-42 Clearinghouse for Inventories and Emission Factors or on WebFIRE – Factor Information Retrieval system, both of which can be found on EPA's Web site (www.epa.gov/ttn/chieff/efpac/index.html).

Example 2

Consider a facility with a No. 6 oil fired boiler that is normal firing and low NO_x, that can burn a maximum of 76 gallons/hour. The weight percentage of sulfur in the oil is 5%. The PTE for SO₂ and SO₃ would be calculated as shown.

The first step is going to the "Emissions Factor/AP42" link at the EPA Web site given above and looking under Chapter 1 External Combustion Sources, Section 1.3 Fuel Oil Combustion. You would find that Table 1.3-1 contains emission factors for sulfur oxides.

The second step would be determining if the boiler has a capacity greater than 100 Million Btu/hr or less than 100 Million BTU per hour, which is how the table is divided. Many times, a boiler's input capacity can be found on its nameplate.

Finding that No. 6 oil has 150,000 BTUs/gallon, and knowing that you can burn a maximum of 76 gallons per hour, the boiler's capacity is determined to be

$$(150,000 \text{ BTU/gallon}) \times (76 \text{ gallon/hour}) = 11,400,000 \text{ BTU/hour or } 11.4 \text{ Million BTU/hr}$$

Looking in the table for boilers > 100 million BTU/hr, the emission factor for SO₂ is found to be 157S, where S is weight percentage of sulfur in the oil; and the emission factor for SO₃ is 5.7S.

Now calculate your PTE.

$$\text{Emission factor for SO}_2 = (157 \times 5 \text{ lbs per } 1000 \text{ gallons of oil}) = 0.785 \text{ lbs/gallon}$$

$$\text{PTE SO}_2 = (0.785 \text{ lbs/gallon}) \times (76 \text{ gallons/hr}) \times (8760 \text{ hours per year})$$

$$\text{PTE SO}_2 = 523,000 \text{ pounds per year}$$

$$\text{PTE SO}_2 = 261 \text{ tons SO}_2 \text{ per year}$$

$$\text{Emission factor for SO}_3 = (5.7 \times 5 \text{ lbs per } 1000 \text{ gallons of oil}) = 0.0285 \text{ lbs/gallon}$$

$$\text{PTE SO}_3 = (0.011 \text{ lbs/gallon}) \times (76 \text{ gallons/hr}) \times (8760 \text{ hours per year})$$

$$\text{PTE SO}_3 = 18,970 \text{ pounds per year}$$

$$\text{PTE SO}_3 = 9.5 \text{ tons SO}_3 \text{ per year}$$

Your PTE for SO_x are (261 tons) + (9.5 tons) = 270.5 tons/year.

How to limit my PTE?

If your actual emissions are below the major source thresholds but your potential emissions are above the thresholds, you may want to limit your potential emissions by applying for a Class II permit. A Class II permit requires minimal record keeping and is simpler than a Class I permit. Limiting process rates, hours of operation, or amount of material processed, as well as installing air pollution control equipment are all methods of reducing your PTE. Restrictions on PTE must be federally enforceable, meaning the limitation can be measured and regulators can enforce it. If you apply for a Class II permit, make sure your permit provides the flexibility to meet your business' operating needs while satisfying your air quality obligations.

How can you limit your PTE and maintain operating flexibility? Pollution prevention can help. If you eliminate the need to clean with an organic solvent or identify a no- or low-emitting cleaning system in place of a vapor degreaser at your facility, you could reduce your actual emissions and PTE and not have to restrict your hours of operation or production. Switch from conventional paint to a high-solids paint which contains less solvent. There are other options that may work for your process to help limit your emissions.

Contact SBEAP technical assistance at K-State at 800-578-8898, if you would like help calculating your emissions and identifying ways to reduce them.

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