



Five steps to determine whether your facility needs an air permit.

The 1970 Clean Air Act (CAA) set national ambient air quality standards (NAAQS) for six “criteria” pollutants – sulfur dioxide (SO₂), nitrous oxides (NO_x), carbon monoxide (CO), particulate matter (PM), lead (Pb), and ozone (regulated as volatile organic compounds or VOC). The CAA was amended in 1977 to authorize EPA standards for “prevention of significant deterioration” (PSD) to maintain good air quality where it already existed. Further amendments to the CAA in 1990 added, among other things, a program to regulate a list of 187 hazardous air pollutants (HAPs) called maximum achievable control technology (MACT) standards and Title V permits (also known in Kansas as Class I permits). Because the need for permits is based on a facility’s **potential** emissions of either criteria or hazardous air pollutants, or both, many small businesses were required to obtain some type of operating permit. Although EPA has the regulatory authority for air permitting, it can delegate the authority or approve a state implementation plan giving authority to individual states. EPA has approved Kansas’ air permitting SIP and thus has transferred air permitting authority here to the state. Consequently, the state of Kansas has the authority to issue permits for facilities within its borders.

Air operating permits

Two main types of permits are issued under the Kansas Air Quality Act – construction permits and operating permits. Construction permits are applicable to **projects** (new emission units and/or modification of existing emission units) and operating permits are applicable to the **entire facility**. In other words, for construction permits/approvals, the facility would be required to evaluate the increase in potential to emit (PTE) and applicable requirements for the project only. For operating permits, the facility would be required to evaluate the PTE and applicable requirements for the entire facility.

New or existing facilities that add new emission sources or modify existing emission sources of air pollutants (e.g., a new paint booth or a new natural gas oven), must evaluate these new or modified emission sources to determine whether they need a **construction permit or approval**. During preconstruction review, the Kansas Department of Health and Environment (KDHE), Bureau of Air (BOA) ensures that proposed construction projects at new and existing facilities can meet applicable Kansas and federal air quality requirements. A construction permit or approval is required **BEFORE** a facility can install and operate a new source or modify an existing source of air pollutants.

The second type of permit – a **Class I or II air operating permit** – is required for major sources of air pollutants. A major source is defined as a facility with the potential to annually emit –

- 10 tons or more of any HAP;
- 25 tons or more of any combination of HAPs; or
- 100 tons or more of any other regulated air pollutant including SO₂, NO_x, CO, PM₁₀, Pb, and VOC.

Air regulations can be complex and confusing to many business owners, particularly small business owners who frequently do not have the same resources to devote to environmental compliance as larger businesses do.

Consequently, the Kansas Small Business Environmental Assistance Program (SBEAP), in conjunction with KDHE BOA has developed this fact sheet to describe in **five steps** how to determine whether your facility requires an air construction approval or permit, or an air operating permit.

Step 1: List all air pollution-emitting equipment or operations (emission unit or source) in your facility.

As defined by Kansas Administrative Regulation (KAR) 28-19-200(x), an emission source is “[a]ny machine, equipment, device, or other article or operation that directly or indirectly releases contaminants into the outdoor atmosphere.” So, an emission source can be a

device, such as a paint booth or a natural gas space heater, or an activity such as loading/unloading or welding operations. An emission unit is “[a]ny part or activity of a stationary source that emits or would have the potential to emit any regulated pollutant or any pollutant listed under 42 U.S.C. §7412(b) of the federal Clean Air Act.” Note: The terms emission source and emission unit are often used interchangeably.

Examples of Emission Units and Emission Sources		
Turbines	Boilers	Abrasive Blasting
Compressors	Loading operations	Valves and vents
Generators	Solid waste incinerators	Material storage/transfer
Paint booths	Wastewater collection and treatment	Haul roads
Burn-off ovens	Transfer operations	Degreasing tanks
Degassing (lines, pumps, vessels)	Conveyors	Welding
Engines	Tank truck loading/unloading	Painting

Emission units do not have to be connected to a stack or vent. You can also combine emission units, or even view the entire facility as an emission unit. Say, for example, your facility has only three paint booths. A paint booth would be considered an emission unit because it has the potential to emit pollutants through coatings or solvents used in conjunction with painting operations. You can consider each of the paint booths as a separate emissions unit, combine the three paint booths into a single emissions unit, or view the entire facility as an emissions unit. The definition of an emission source is very broad and includes almost any industrial or process equipment.

Not all emissions units are required to be included in your emissions assessments. Several categories of activities are exempt. Please refer to KDHE’s ["Permit Frequently Asked Questions"](#)¹ webpage which discusses Class I operating permit exempt activities. More information about required content for operating permit applications is available through the Kansas Environmental Information System, or [KEIMS](#).²

Step 2: Calculate air pollution emissions for your facility.

As indicated above, whether your facility needs a permit is based on your potential emissions, not your actual emissions. Your facility’s PTE is based on the maximum design capacity of a stationary source to emit a pollutant under its physical and operational design. PTE calculations are based on 24-hour operation, 365 days per year, and operations at maximum capacity. PTE calculations also do not include pollution control devices or practices, unless there is an inherent bottleneck, a physical or operational limitation that is part of the design of the facility or emission unit. Bottlenecks prevent operation of equipment at 100% capacity and can be considered when calculating PTE. Be sure, though, that the bottleneck isn’t resolved in the future, thus changing your PTE.

Once you’ve identified your emission sources, you need to calculate the PTE for each pollutant associated with the source. Remember, pollutants you need to track are the criteria pollutants [SO₂, NO_x, CO, PM/PM₁₀/PM_{2.5}, lead, and VOCs (for ozone)] and the 187 HAPs.

For fuel combustion units (e.g., ovens and boilers), you calculate emissions for each fuel used. If the source can use different types of fuel, PTE calculations are based on the fuel that generates the highest potential emissions (worst-case scenario). For other equipment, you calculate emissions based on materials used.

Methods of calculation include the following, from the most preferred to the least preferred:

- CEMS
- Stack tests
- Material balance
- Emission factors
- Engineering judgment
- Other approved method

Sample PTE calculation using material balance:

A facility 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. The paint contains 40% volatile organic compounds (VOCs) by weight.

Actual emissions

$$(3,000 \text{ gal/yr}) \times (9.85 \text{ lbs./gal}) \times (0.40 \text{ lbs. VOC/lb. of paint})$$

$$= (11,820 \text{ lbs. of VOC/year}) \times (1 \text{ ton}/2,000 \text{ lbs.})$$

$$= 5.9 \text{ tons of VOC/year}$$
Potential emissions

$$(5.9 \text{ tons of VOC}) \times (8,760 \text{ potential hours}/2,000 \text{ actual hours})$$

$$= 25.8 \text{ potential tons VOC/year}$$

The blue paint also contains xylene (a HAP) at 30% by weight, so you follow the same calculation for each HAP.

Actual emissions

$$(3,000 \text{ gal/yr.}) \times (9.85 \text{ lbs./gal}) \times (0.3 \text{ lbs. xylene/lb. of paint})$$

$$= (8,865 \text{ lbs. of xylene/year}) \times (1 \text{ ton}/2,000 \text{ lbs.})$$

$$= 4.4 \text{ tons of xylene/year}$$
Potential emissions

$$(4.4 \text{ tons of xylene}) \times (8,760 \text{ potential hours}/2,000 \text{ actual hours})$$

$$= 19.3 \text{ potential tons xylene/year}$$
Sample PTE calculation using emission factors

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

The first step is going to the [EPA Emission Factors/AP-42³](#) website 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 (SO₂ and SO₃), NO_x, CO and PM/PM₁₀.

The second step would be determining if the boiler has a capacity > 100 million Btu/hr. or < 100 million BTU/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 you can burn a maximum of 76 gallons per hour, the boiler's capacity is determined to be (150,000 BTU/gallon) x (76 gallons/hour) = 11,400,000 BTU/hour or 11.4 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; the emission factor for SO₃ is 2S.

Now, calculate your PTE.

Emission factor for SO₂ = (157 x 5 lbs./1,000 gallons of oil) = 0.785 lbs./gallon

PTE SO₂ = (0.785 lbs./gallon) x (76 gallons/hr.) x (8,760 hours per year)

PTE SO₂ = 523,000 pounds per year

PTE SO₂ = 261 tons SO₂ per year

Emission factor for SO₃ = (2 x 5 lbs. per 1,000 gallons of oil) = 0.01 lbs./gallon

PTE SO₃ = (0.01 lbs./gallon) x (76 gallons/hr.) x (8,760 hours per year)

PTE SO₃ = 6,658 pounds per year

PTE SO₃ = 3.3 tons SO₃ per year

Your PTE for SO_x is (261 tons) + (3.3 tons) = 264 tons/year.

You would continue using the emission factors for NO_x, CO, and PM/PM₁₀ to find your total emissions for this emission unit.

Although these calculations are not difficult, they can be tedious, particularly if you have a number of different sources that generate many different criteria pollutants and HAPs.

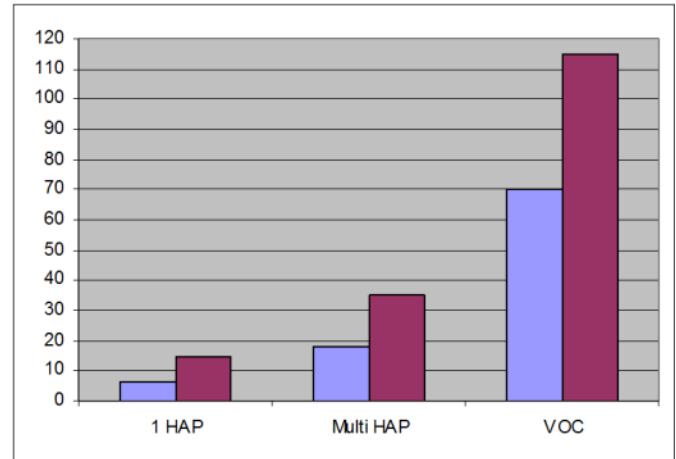
Consequently, SBEAP has devised a number of tools to simplify this calculation process for you. These can be found on the SBEAP website. You can also contact representatives from the KDHE BOA or from SBEAP to assist in your PTE calculations.

Step 3: Compare results of your calculations with regulatory thresholds for construction permits or air operating permits, and determine if the facility is required to obtain a construction approval or permit, or air operating permit based on the type of project.

Now that you have the PTE for each criteria pollutant and HAP generated at your facility, all you have to do is compare those numbers to emission thresholds for KDHE permits.

Class II air operating permit threshold

As shown in the graph below, if your potential emissions (red) are above the major source threshold, but your actual emissions (blue) are below the major source threshold, you can apply for a Class II air operating permit, which is more streamlined and less costly than a Class I air operating permit. The Class II air operating permit will have federally enforceable permit conditions that will limit potential emissions to below Class I major source thresholds.



As shown in the PTE example above, the painting operations had a PTE for xylene of 19.3 tons/year, which exceeds the 10 tons per individual HAP per year threshold for a Class I air operating permit, but has actual emissions of only 4.4 tons/year of xylene. Therefore, this facility could apply for a Class II air operating permit and accept federally enforceable permit conditions to maintain its emissions below the Class I threshold.

Some projects are required to obtain a construction approval or permit in accordance with K.A.R. 28-19-300, even if potential emissions from the project are less than the construction approval/permit thresholds. These projects include the following: (1) the emission unit is an affected source for the acid rain program; (2) the emission unit is a major source of HAPs; (3) the emission unit is an incinerator; (4) the emission unit is subject to a New Source Performance Standard (K.A.R. 28-19-720, which generally adopts 40 CFR Part 60 by reference); (5) the emission unit is subject to a National Emission Standard for Hazardous Air Pollutants (K.A.R. 28-19-735, which generally adopts 40 CFR Part 61 by reference); or (6) the emission unit is subject to a maximum achievable control technology for hazardous air pollutants (K.A.R. 28-19-750, which generally adopts 40 CFR Part 63 by reference).

<u>Pollutant</u>	<u>PTE threshold</u>
Lead or lead compounds	0.1 pounds per hour
SO ₂ or SO ₃	2 pounds per hour
PM ₁₀	2 pounds per hour
PM	5 pounds per hour
PM/PM ₁₀ (Ag-related)	5 pounds per hour
NO _x	50 pounds per 24 hours
CO	50 pounds per 24 hours
(Areas except Wyandotte/Johnson Counties)	
VOCs	50 pounds per 24 hours
(Wyandotte/Johnson Counties)	
VOCs	3 pounds per hour
	15 pounds per 24 hours

<u>Pollutant</u>	<u>PTE threshold</u>
Lead	0.6 tons per year
PM _{2.5}	10 tons per year
PM ₁₀	15 tons per year
PM	25 tons per year
PM (Ag-related)	100 tons per year
SO ₂ or SO ₃	40 tons per year
VOC	40 tons per year
NO _x	40 tons per year
CO	100 tons per year
HAPs (individual) HAPs	10 tons per year
(Any combination)	25 tons per year

<u>Pollutant</u>	<u>PTE threshold</u>
SO ₂ or SO ₃	100 tons per year
VOC	100 tons per year
NO _x	100 tons per year
CO	100 tons per year
PM ₁₀ /PM _{2.5}	100 tons per year
HAPs (individual)	10 tons per year
HAPs (any combination)	25 tons per year

Some facilities are required to obtain a Class I operating permit even if potential emissions from the facility do not exceed the major source threshold. These facilities include but are not limited to landfills subject to New Source Performance Standard (40 CFR Part 60) Subpart WWW and hospital/medical/infectious waste incinerators subject to New Source Performance Standard Subpart Ec.

Step 4: Apply for the appropriate approval or permit if you exceed the thresholds, or are otherwise required to obtain an approval or permit.

After you've used your PTE calculations to determine whether your facility requires a construction permit or approval, or a Class I or II air operating permit, you will need to apply for a permit electronically via KEIMS. Some process equipment [permitting forms](#)⁴ can be found on the KDHE website, but most are only available through KEIMS.

In addition to a general operating permit application for crushed and broken stone facilities, KDHE developed several streamlined Class II air operating permit applications for specific facility types. These "permits by rule" include the following:

- Sources with actual emissions less than 50% of the major source threshold
- Hot-mix asphalt facilities
- Organic solvent evaporative sources
- Reciprocating engines

Note: Your Class I permit will include all federally enforceable requirements for your facility, and your construction approval or permit will include all federally enforceable requirements for your project at the time of permit issuance. Be sure to review your permit frequently and note all compliance dates for reporting and performance tests.

For construction permits, you will need to submit the Notification of Construction or Modification form and all appropriate process/equipment description forms that apply to your facility.

This publication was created by Kansas State University's Pollution Prevention Institute through the Small Business Environmental Assistance Program (SBEAP). SBEAP's mission is to help Kansas small businesses comply with environmental regulations and identify pollution prevention opportunities. SBEAP is funded through a contract with the Kansas Department of Health and Environment. SBEAP services are free and confidential. For more information, call 800-578-8898, send an e-mail to sbeap@ksu.edu, or visit our Web site at www.sbeap.org. Kansas State University is an EEO/AA provider.

KDHE also has expedited construction approval applications for boilers, and compression- and spark-ignition emergency generators through KEIMS.

Step 5: If the equipment or entire facility is exempt because potential emissions do not exceed the thresholds and the facility is not otherwise required to obtain an approval or permit, maintain records of your initial assessment, continue to track emissions, and be prepared to provide these records to inspectors.

Also, please note that if your facility does not require either a Class I or II air operating permit, it still may fall under various air quality area source rules, which have specific notification and compliance requirements. A list of these [EPA area source NESHAP rules](#)⁵ are on the EPA website. SBEAP also has information and tools to assist small businesses with several area source rules, including gasoline-dispensing facilities, paint-stripping and miscellaneous surface-coating operations, metal fabrication and finishing, and stationary reciprocating internal combustion engines.

Webpage references

1. <https://www.kdheks.gov/air-permit/faq.html>
2. <https://www.kdheks.gov/bar/doi-keims-panels.html>
3. <https://www.epa.gov/air-emissions-factors-and-quantification/ap-42-compilation-air-emission-factors>
4. https://www.kdheks.gov/air-permit/process equip_desc.html
5. <https://www.epa.gov/stationary-sources-air-pollution/national-emissions-standards-hazardous-air-pollutants-area-source-0>

KANSAS STATE UNIVERSITY

Notice of nondiscrimination Kansas State University prohibits discrimination on the basis of race, color, ethnicity, national origin, sex (including sexual harassment and sexual violence), sexual orientation, gender identity, religion, age, ancestry, disability, genetic information, military status, or veteran status, in the university's programs and activities as required by applicable laws and regulations. The person designated with responsibility for coordination of compliance efforts and receipt of inquiries concerning the nondiscrimination policy is the university's Title IX Coordinator: the Director of the Office of Institutional Equity, equity@ksu.edu, 103 Edwards Hall, 1810 Kerr Drive, Kansas State University, Manhattan, Kansas 66506-4801. Telephone: 785-532-6220 | TTY or TRS: 711. The campus ADA Coordinator is the Director of Employee Relations and Engagement, who may be reached at charlott@ksu.edu or 103 Edwards Hall, 1810 Kerr Drive, Kansas State University, Manhattan, Kansas 66506-4801, 785-532-6277 and TTY or TRS 711. Revised Aug. 29, 2017.