

Potential Air Regulations for Boilers

(New Source Performance Standard Subpart Dc)

Does this information apply to my facility?

This fact sheet applies to facilities that propose to install or modify boilers that have a total heat input capacity greater than or equal to (\geq) 10 and less than or equal to (\leq) 100 million BTU/hr. These boilers may burn natural gas, gasoline, fuel oil, wood, coal, or alternative fuels. It is important to calculate emissions for this equipment and evaluate the need for a Kansas Department of Health and Environment (KDHE) air permit or approval **prior to installation**. Combustion emissions from boilers are typically regulated based on the amount of nitrogen oxides (NO_x), carbon monoxide (CO), sulfur oxides (SO_x), particulate matter (PM), and volatile organic compounds (VOCs) that result from burning fuel. These common pollutants negatively impact the environment and human health and are monitored to prevent environmental degradation.

What regulations might apply to my boilers?

Proposed boilers at your facility may be subject to more than one type of *environmental* regulation:

- Kansas Air Quality Act standards:
 - Air construction permit/approval
 - Air operating permit (Class I or Class II)
 - PM/opacity – KAR 28-19-31 through 32
- NSPS (new source performance standards)

What is PTE?

When evaluating a proposed boiler's need for a permit, you must consider your potential emissions, also known as your potential to emit (PTE). PTE is the amount of emissions that would be produced if you operated 24/7 (8,760 hours per year) with no pollution control devices. PTE is typically measured in tons/year, but if you modify existing equipment or want to install new equipment, you may need to know PTE in lbs/hour and lbs/24-hour period. The flow chart, Figure 2, takes into account these various units so all that you need is the total heat input capacity in BTU/hr.

Boiler information to have on hand

A few important numbers are necessary when evaluating a boiler and determining PTE. Check with the boiler supplier for new boilers. For existing boilers, check purchasing records, operating manual, and 'name plate' located on the boiler to find the following essential information:

- Heat input capacity (BTU/hr)
- Type of fuel (natural gas, fuel oil, etc)
- Low NO_x burner
- Date of installation (for existing boilers)

Kansas Air Quality Act standards

If you are going to modify existing equipment or install new equipment, you may need a construction approval or construction permit from KDHE. This type of permit looks specifically at the increase in emissions from the new or modified equipment. The application forms (and a completed example form) are available at www.kdheks.gov/air-permit/download.html under the bullet "Construction Permit Application." Be sure to include Equipment Form 6-1.0 with the application, available at www.kdheks.gov/air-permit/process equip desc.html.

NOTE: Emissions from boilers installed *at the same time* should be evaluated together for an approval or permit. To determine whether you need an approval or a permit, see the flow chart at the end of this fact sheet.

A Kansas air operating permit, on the other hand, is an evaluation of *all* emission sources at your facility. If total emissions exceed certain thresholds, then an operating permit is needed. Details and threshold levels for the Kansas Air Quality Act standards are found in the fact sheet, "What is the Air Quality Act?" at www.sbeap.org/publications/airqual.pdf.

If you exceed the threshold for an air operating permit and would become a major source (Class I), you may be able to take a restriction to ensure you never exceed that threshold and avoid major source status. Instead, you can become a Class II source, which has fewer requirements.

The Kansas air quality regulations also limit emissions of particulate matter (PM) from indirect heating equipment such as boilers. Limits for small boilers are presented in Tables 1 and 2.

Table 1 – Kansas PM Emission Limits for Indirect Heating Equipment

Total Input Capacity (MMBTU/hr)	Emission Limit (lb/MM BTU)
10 or less	0.60
>10 and \leq 50	0.41
>50 and \leq 100	0.35

Table 2 – Kansas Opacity Emission Limits for Indirect Heating Equipment

Equipment	Opacity Limit
New (>Jan 1, 1971)	20%
Existing (\leq Jan 1, 1971)	40%

What if I've already installed the boiler?

If you have installed or modified a boiler after June 9, 1989, and it has never been evaluated for air emissions, you may need to apply for a construction permit or approval (see *Kansas Air Quality Standards* section of this guidance document). However, KDHE has developed an expedited approval process if the boiler meets the following conditions:

- The boiler is greater than or equal to 10 MMBTU/hr and less than or equal to 100 MMBTU/hr.
- The addition of the boiler does not change the facility's requirement to obtain an operating permit in accordance with K.A.R. 28-19-500 et seq.
- The boiler is not subject to and does not cause the facility to become subject to 40 CFR Part 63 requirements.
- The fuel burned in the boiler contains no more than 0.5 weight percent sulfur.

The expedited boiler application is available on the KDHE Web site at www.kdheks.gov/air-permit/download.html.

FAQ (frequently asked questions)

My boiler/generator can use different fuels. What do I do?
If your equipment can use more than one fuel, you must calculate your emissions as though you use each fuel 24/7, even if one is only used for backup. After estimating emissions from both fuel types, use the value that is the "worst" of the two. Although many boilers may not trigger the thresholds due to natural gas use, the fuel oil backup often triggers the permitting threshold. See Figure 2.

I have low-NO_x burners – how does that help?

A low-NO_x burner is a type of gas burner that can be installed on natural gas-fired boilers to significantly reduce

formation of nitrogen oxides (NO_x). Boilers with low-NO_x burners often have fewer permitting requirements than conventional boilers.

My water heaters are for domestic use only. Are they regulated?

Water heaters for domestic use only do not need to be included when evaluating your need for permits. Domestic use includes production of hot water for on-site personal use and is not related to industrial processes. This also includes fuel use related to food preparation for consumption on the premises.

What's the difference between MBTU and MMBTU?

When talking about boilers and emergency generators, the heat input capacity is typically shown in BTU/hr. BTU is a unit of energy called a British thermal unit. Because this unit is so small, you'll likely see an M or MM in front of the BTU/hr. In this case, M stands for thousand and MM for million. For example, 10 MBTU/hr would be 10,000 BTU/hr and 10 MMBTU/hr would be 10 million BTU/hr.

Are emissions from emergency generators regulated?

If you have an emergency generator that is only used to supply emergency power and not used to supplement power needs during peak hours (for example, you don't routinely operate it in the summer), you only need to fill out a simplified application for approval. This form is available at www.kdheks.gov/air-permit/forms/Emergency_Gen_App.pdf. When evaluating your need for an air construction approval or permit, you can assume the emergency generator operates 500 hours per year. However, if you use the generator to supplement power needs, then your PTE calculations must be based on 8,760 hours per year.

NSPS (new source performance standards)

In addition to possibly being subject to Kansas operating permit requirements, boilers could be subject to federal NSPS regulations. Boilers installed or modified after June 9, 1989, with a heat input capacity greater than or equal to 10 million BTU/hr (≥ 10 MMBTU/hr) but less than or equal to 100 million BTU/hr (≤ 100 MMBTU/hr), are subject to NSPS Subpart Dc. The following flow chart may help determine whether you need to comply with this federal regulation.

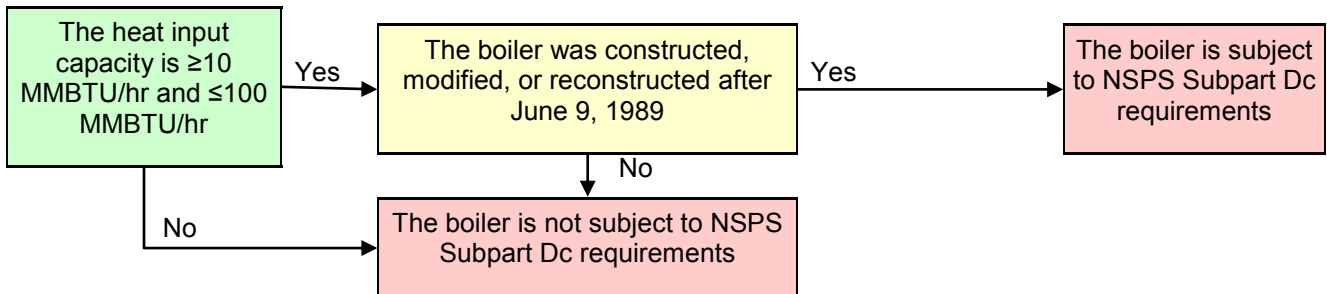


Figure 1: Is your boiler subject to NSPS (new source performance standards) Subpart Dc?

The NSPS regulation for small boilers is at 40 Code of Federal Regulations (CFR) Part 60, Subpart Dc and available on the KDHE Web site at www.kdheks.gov/air-permit/forms/40_CFR_Part_60_Subpart_Dc.pdf. If you operate or are installing a boiler with heat input capacity greater than 100 MMBTU/hr, contact KDHE or refer to 40 CFR Part 60, Subpart Db.

NSPS requirements

If your boiler is subject to NSPS, then in addition to following the Kansas regulations explained earlier in this fact sheet, you need to follow some federal regulations. This fact sheet discusses requirements for boilers burning natural gas, fuel oil, wood, and alternative fuels. If your boiler burns coal, refer to the regulations or contact KDHE for specific requirements.

Performance tests. Affected boilers must run a performance test for SO₂ and/or PM within 60 days after achieving the maximum production rate at which it will be operated, and not later than 180 days after the initial startup. A performance test is not required if any of the following conditions are met:

- Input capacity is <30MMBTU/hr
- Burn natural gas only
- Burn oil with ≤0.5 wt% sulfur (need certification from supplier, see Reporting section)
- Not subject to SO₂ requirements under 40 CFR Part 60.42c (may still need a performance test for PM)
- Not subject to PM and/or opacity requirements under 40 CFR Part 60.43c (may still need a performance test for SO₂)

Initial notification. For each affected boiler, submit the following information to KDHE *permitting section* and EPA Region 7 (see addresses on page 3).

- Within 30 days after starting construction or reconstruction, submit
 - date of original construction or reconstruction,
 - design heat input rating, and
 - types of fuels burned.

The EPA does not have a specific initial notification form; however, the KDHE boiler application could serve as an acceptable form. The expedited boiler application is available on the KDHE Web site at www.kdheks.gov/air-permit/download.html.

- Within 15 days after startup, submit the NSPS notification form available at www.kdheks.gov/air-permit/indexCE.html

Subsequent notification. If any physical or operational change (i.e., change in fuel type) to an existing facility may increase the emission rate of an air pollutant to which a standard applies, then submit the following information to KDHE *permitting section* and EPA Region 7:

60 days or as soon as practicable before the change is commenced, submit the following:

- information describing the change
- present and proposed emission control systems
- productive capacity of the facility before and after change
- expected completion date of the change

Reporting. If reporting is required, it must be submitted every six months to KDHE *compliance section*, due 30 days after the reporting period. Include the calendar dates of the reporting period.

- *Natural gas is the only fuel burned in the affected boiler* (even if other fuel is used for backup) – no reporting requirements if backup fuel not burned
- *Natural gas is primary fuel but backup fuel was burned during reporting period* – report total amount of backup fuel burned during six-month period
- *Distillate oil-fired boilers* – if fuel is added to the boiler during the reporting period, submit fuel-supplier certification that includes
 - name of the oil supplier;
 - statement from the oil supplier that the oil complies with ASTM D396 specifications; and
 - sulfur content of the oil.
- *Residual oil-fired boilers* – if fuel is added to the boiler during the reporting period, submit fuel-supplier certification that includes
 - name of the oil supplier;
 - location of the oil when the sample was drawn for analysis to determine sulfur content;
 - sulfur content of the oil from which the shipment came (or of the shipment itself); and
 - method used to determine sulfur content of the oil.
- *Wood or other fuel* – meet the conditions of your permit.

Record keeping. All records must be kept for at least two years. Document and keep in your files information on

- occurrence and duration of any startup, shutdown, or malfunction in the operation of an affected boiler;
- any malfunction of air pollution control equipment; or
- any periods during which a continuous monitoring system or monitoring device is inoperative.

Record and maintain records of the amount of each fuel combusted during each operating day. There are provisions to keep monthly records instead. Consult the regulations [40 CFR Part 60.48c (g)(2) and (3)].

Emission limits. Two pollutants are of concern, sulfur dioxide (SO₂) and particulate matter (PM). Table 3 summarizes emission limits for boilers burning fuel oil or wood. If a boiler burns **only** natural gas or **only** oil with 0.5 or less percent sulfur by weight, there are no emission limits. If your boiler burns coal or some other fuel, refer to the regulations or contact KDHE for specific requirements.

Alternative fuels

Some boilers can burn alternative fuels such as tallow, soybean oil, or biodiesel. The NSPS Subpart Dc regulation addresses emission limits for oil mixed with other fuels and wood mixed with other fuels, but does not address these alternative fuels if used alone. If installing a boiler to use an alternative fuel or if changing the fuel type in an existing boiler, contact KDHE for specific requirements.

Table 3 – NSPS Emission Limits

Pollutant	Applicability ¹			Emissions Limit(s)		Fuel Type	
	C	R	M	Date	(lb/MMBTU) (% removal)		
SO ₂	X	X	X	>Jun 9, 1989	0.5	N/A	oil
	X	X	X	>Jun 9, 1989	N/A	N/A	oil, ≤ 0.5 wt% S
	X	X	X	>Jun 9, 1989	contact KDHE		oil mix with other fuels
	X	X	X	>Jun 9, 1989	N/A	N/A	natural gas
PM	X	X	X	≤Feb 28, 2005	0.10	N/A	≥30 MMBTU/hr; >30% wood, wood mix w/other fuels
	X	X	X	≤Feb 28, 2005	0.30	N/A	≥30 MMBTU/hr; ≤30% wood, wood mix w/other fuels
	X	X	X	>Feb 28, 2005	0.030	N/A	≥30 MMBTU/hr; oil, wood, or mix
			X	>Feb 28, 2005	0.051	99.8%	≥30 MMBTU/hr; oil, wood, or mix
			X	>Feb 28, 2005	0.10	N/A	≥30 MMBTU/hr; >30% wood
	X	X	X	>Feb 28, 2005	N/A	N/A	oil, ≤ 0.5 wt% S
	X	X	X	>Jun 9, 1989	N/A	N/A	natural gas
	X	X	X	>Jun 9, 1989	<20% opacity (6 min ave)		>30 MMBTU/hr oil, wood

¹ C = constructed, R = reconstructed, M = modified

Contact Information

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 1000 SW Jackson, Suite 310
 Topeka, KS 66612-1366
 Phone: 785-296-1570

**US EPA Region 7 - Air Permitting/
 Compliance Branch**
 901 N. 5th Street
 Kansas City, KS 66101
 Phone: 913-551-7003

**K-State Small Business
 Environmental Assistance Program**
 133 Ward Hall
 Manhattan, KS 66506-2508
 Phone: 800-578-8898
www.sbeap.org

While every effort was made to accurately reflect the requirements of 40 CFR Part 60, Subpart Dc, if any conflicts appear in this guidance document, the federal and state regulations will take precedence.

Published November 2009



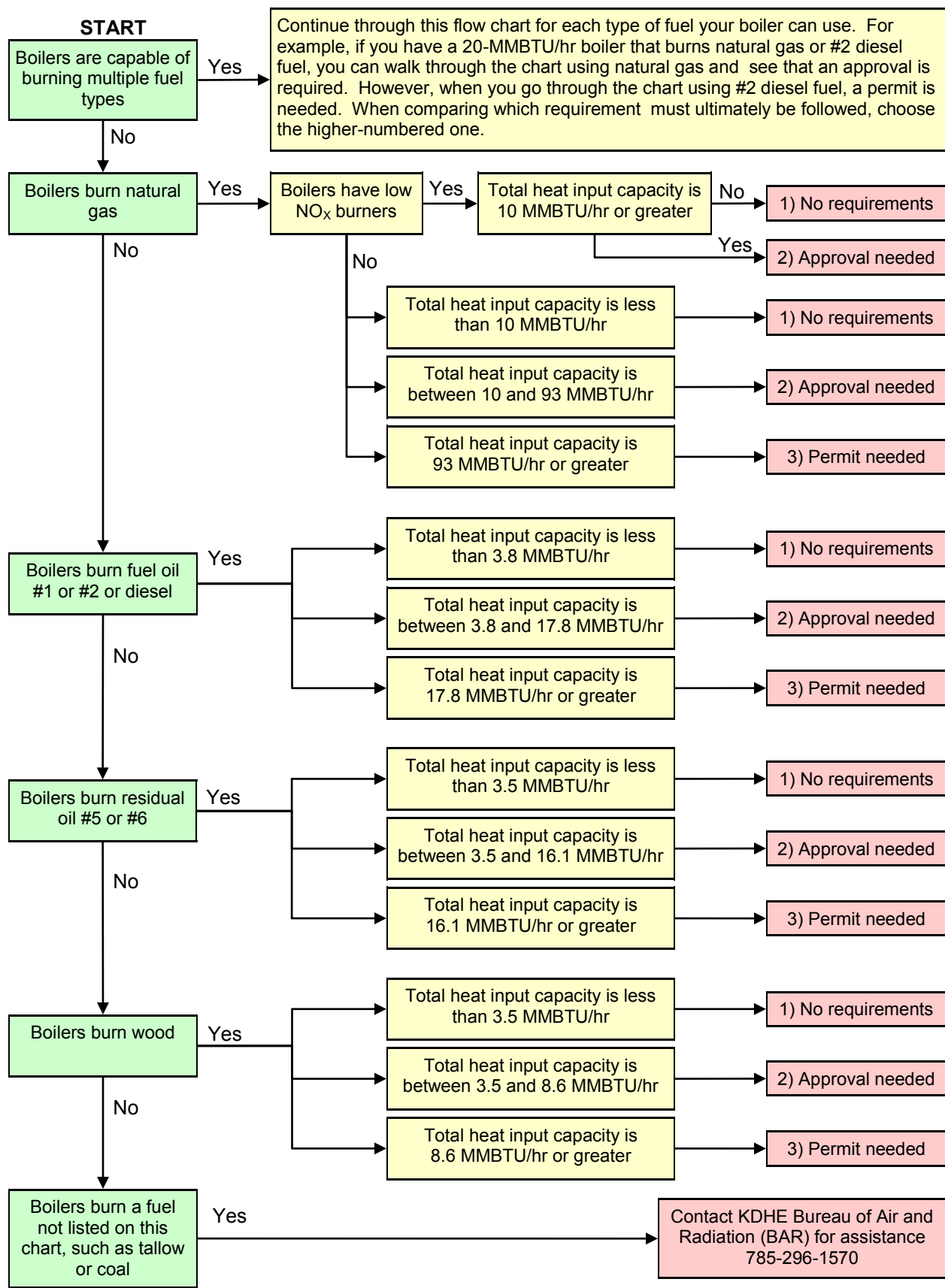


Figure 2: Do you need an approval or permit?