



## 2023 Air Pollution Inventory

## Fuel Burning Form For Fuel Burned in Boilers

## GENERAL PROFILE OF BOILER DATA FOR REPORTING YEAR 2023

<b>Facility Name</b>	No. of boiler stacks	
	No. of functioning boilers	
	No. of boilers added since Reporting Year 2023	
<b>Address</b>	No. of boilers permanently retired since Reporting Year 2022	
	No. of boilers connected via a breeching to 1 stack	
	No. of boilers connected via another breeching to another stack	
<b>Contact</b>	No. of boilers using 1 fuel	
	No. of boilers using 2 fuels	
	No. of boilers using 3 fuels	
<b>Date</b>	Other boilers (specify)	
<b>Phone</b>		

Emission Factors for boilers typically installed in RI are listed on the back side of this page. These factors can be used to estimate your air releases. Air pollution control equipment, if any, would reduce your emissions according to its efficiency. The "S" beside the Emission Factor for SO<sub>x</sub> indicates that you must multiply the Emission Factor by the % sulfur in the fuel burned.

For example, for #2 oil with a sulfur content of 0.3%, the emission factor becomes  $144(.3) = 43.2$  pounds SO<sub>x</sub>/1000 gallons of fuel oil burned.

The emission factors provided on the back of this page were published in AP-42, Chapters 1.3 and 1.4 in the February , 1998 revision.

NO<sub>x</sub> emission factors were calculated based on average New England fuel bound nitrogen in residual oil as per guidance developed by NESCAUM (New England States for Coordinated Air Use Management.) The estimated emission rate from this nitrogen content is 0.5 Lb/MMBtu or 75 lb/1000 gallons of fuel burned. If your facility has analyses specific to its fuel oil supplies, the following equation may be used to determine the emission factor for #6 fuel oil NO<sub>x</sub> emissions:  $\text{lb NO}_x/1000 \text{ gallons} = 20.54 + 104.39(N)$ .

Emission Factors are also available for other fuels such as waste oil, coal, wood, solid waste, etc. Please call for them if needed.

Return to: [Dem.AirInventory@dem.ri.gov](mailto:Dem.AirInventory@dem.ri.gov)

Air Pollution Inventory, Office of Air Resources

235 Promenade Street, Providence, RI 02908-5767

Air Pollution Inventory Form F2, page 1

Means that these emission factors and SCC Code(s) were applicable for estimating emissions from your facility

Classif./Fuel/Boiler info.	SCC Code	Total PM	SOx	NOx	VOC	CO	PM2.5 PRI*	PM10PRI*	NH3	Units "pounds per
<b>Utility companies (SIC 4911)</b>										
#6 oil, normal firing	1-01-004-01	9.19(S)+4.72	162.7(S)	75	0.76	5	6.407	8.791	0.8	1000 gallons
Nat. Gas/over 100 MMBtu/	1-01-006-01	7.6	0.6	280	5.50	84	7.6	1.9	3.2	Million cubic feet
<b>Industrial Boilers (SIC 2000 - 3999)</b>										
#6 oil/> 100 MMBtu/Hr	1-02-004-01	9.19(S)+4.72	162.7(S)	75	0.28	5	8.46	10.68	0.8	1000 gallons
#6 oil/< 100 MMBtu/Hr	1-02-004-02	9.19(S)+4.72	159(S)	75	0.28	5	8.46	10.68	0.8	1000 gallons
#4 oil/> 100 MMBTU/Hr	1-02-005-04	Emission factors fall between those for #6 and #2 fuel oil								
#4 oil/<100MMBTU/Hr	1-02-005-04	check your analysis								
#2 oil/> 100MMBTU/Hr	1-02-005-01	3.3	144(S)	24	0.20	5	0.25	1	0.8	1000 gallons
#2 oil/<100MMBTU/Hr	1-02-005-02	3.3	144(S)	20	0.20	5	0.25	1	0.8	1000 gallons
Nat. Gas/> 100 MMBtu/Hr	1-02-006-01	7.6	0.6	280	5.5	84	--	--	3.2	Million cubic feet
Nat. Gas/< 100 MMBtu/Hr	1-02-006-02	7.6	0.6	100	5.5	84	--	--	3.2	Million cubic feet
Nat. Gas/< .3 MMBtu/Hr	NA	7.6	0.6	94	5.5	40	--	--	3.2	Million cubic feet
Propane (LPG)	1-02-010-02	0.6	0.1(S)	19	0.5	3.2	--	--		1000 gallons
<b>Commercial/Institutional Boilers (SIC 4000-4899, 4920-9999)</b>										
#6 oil/> 100 MMBtu/Hr	1-03-004-01	9.19(S)+4.72	162.7(S)	75	1.13	5	4.36	9.2	0.8	1000 gallons
#6 oil/< 100 MMBtu/Hr	1-03-004-01	9.19(S)+4.72	159(S)	75	1.13	5	4.36	9.2	0.8	1000 gallons
#4 oil/> 100 MMBTU/Hr	1-03-005-04	Emission factor fall between those for #6 and #2 fuel oil								
#4 oil/<100MMBTU/Hr	1-03-005-04	check your analysis								
#2 oi/> 100MMBTU/Hr	1-03-005-01	3.3	144(S)	24	0.34	5	0.83	1.08	0.8	1000 gallons
#2 oil/<100MMBTU/Hr	1-03-005-01	3.3	144(S)	20	0.34	5	0.83	1.08	0.8	1000 gallons
Residential furnace	NA	1.7	144(S)	18	0.713	5	0.83	1.08	0.8	1000 gallons
Nat. Gas/> 100 MMBtu/Hr	1-03-006-01	7.6	0.6	280	5.5	84	--	--	0.49	Million cubic feet
Nat. Gas/<100 MMBtu/Hr	1-03-006-03	7.6	0.6	100	5.5	84	--	--	0.49	Million cubic feet
Nat. Gas/< .3 MMBtu/Hr	NA	7.6	0.6	94	5.5	40	--	--	0.49	Million cubic feet
Propane (LPG)	1-03-010-03	0.4	0.1(S)	14	0.5	1.9	--	--		1000 gallons

Note: If stack test or CEM data are available they should be used in lieu of these factors. Please attach a copy of the stack test results or note if CEM data were used. Additional emission factors are available for controlled burners.

HAP emissions will be calculated for your facility using AP-42 factors.

\*PM10 Primary and PM25 Primary factors assume 1% sulfur in fuel

Please contact the Office for assistance at DEM.AirInventory@dem.ri.gov or 401-222-2808

## STACK INFORMATION FOR BOILERS

**Facility Name**

**Contact Name**

**Phone**

This form has enough space to record data for up to 3 stacks and 3 boilers with 2 fuels a piece. You may photocopy this page to report additional equipment. For boilers using other fuels, RIDEM will supply a different form on request. If the information on this form has not changed since 2022 Form F2, page 2 may be copied and submitted for RY23. If one stack handles emissions from multiple boilers, report stack data only once. Show clearly which boilers are associated with each stack.

Attach summarized EPA Methods 1-7 stack test results if witnessed & approved.

☐ Necessary elements are checked. Others are for verifying emissions estimates.

	Stack number		
☐	Stack height above ground (ft.)		
☐	Stack diameter (ft.)		
	Stack exit temp ( F )		
	Stack exhaust gas flow rate (acfm)		
	Smoke alarm/opacity monitor?	☐ Yes ☐ No	☐ Yes ☐ No
	NOx CEM?	☐ Yes ☐ No	☐ Yes ☐ No
	NOx control w/ ammonia or urea?	☐ ammonia ☐ urea	☐ ammonia ☐ urea
	Boiler number (what you call it)		
	RI DEM Approval No.		
	Installation date (year)		
	Boiler brand		
☐	Input: MMBtu/Hr	MMBtu/hr	MMBtu/hr
	Flue Gas Recirculation?	☐ Yes ☐ No	☐ Yes ☐ No
	Burner installation date (year)		
	Low NOx burner?	☐ Yes ☐ No	☐ Yes ☐ No
☐	Fuel type	# _____ oil   natural gas	# _____ oil   natural gas
☐	Oil sulfur limit (%)		
	Normal firing rate		
	Maximum firing rate		

Return to: DEM.AirInventory@dem.ri.gov  
 Air Pollution Inventory, Office of Air Resources  
 235 Promenade Street, Providence, RI 02908-5767

**EXAMPLE**

**STACK INFORMATION FOR BOILERS**

XYZ Company  
 Facility Name

XXXXXXXXXX  
 Contact Name

111-1111  
 Phone

This form has enough space to record data for up to 3 stacks and 3 boilers with 2 fuels apiece. You may photocopy this page to report additional equipment. For boilers using other fuels, RIDEM will supply a different form on request. If the information on this form has not changed since 2022 Form F2, page 2 may be copied and submitted for 2023. If one stack handles emissions from multiple boilers, report stack data only once. Show clearly which boilers are associated with each stack.

Attach summarized EPA Methods 1-7 stack test results if witnessed & approved.

☞ Necessary elements are checked. Others are for verifying emissions estimates.

☞	Stack number	1					
☞	Stack height above ground (ft.)	135					
☞	Stack diameter (ft.)	3					
	Stack exit temp ( F)	450					
	Stack exhaust gas flow rate (acfm)	1500					
	Smoke alarm/opacity monitor?	☞ Yes	☞ No	☞ Yes	☞ No	☞ Yes	☞ No
	NOx CEM?	☞ Yes	☞ No	☞ Yes	☞ No	☞ Yes	☞ No
	NOx control w/ ammonia or urea?	☞ ammonia	☞ urea	☞ ammonia	☞ urea	☞ ammonia	☞ urea
	Boiler number (what you call it)	1		2			
	RI DEM Approval No.	na		123			
	Installation date (year)	1966		May 1981			
	Boiler brand	B&W		Cleaver Brooks			
☞	Input: MMBtu/Hr	33 MMBtu/hr		18 MMBtu/hr		MMBtu/hr	
	Flue Gas Recirculation?	☞ Yes	☞ No	☞ Yes	☞ No	☞ Yes	☞ No
	Burner installation date (year)	1983					
	Low NOx burner?	☞ Yes	☞ No	☞ Yes	☞ No	☞ Yes	☞ No
☞	Fuel type	# 6 oil	natural gas	# 6 oil	natural gas	# oil	natural gas
☞	Oil sulfur limit (%)	1		1			
	Normal firing rate	82 gph	12,300 cu.ft/hr	45 gph			
	Maximum firing rate	220 gph	33,000cu.ft/hr	120 gph			

Approximate Conversions

Boiler Horsepower	x .0419	= MMBtu/hr (input)
1000 lb steam/hr	x 1	= MMBtu/hr
max. gph #2 oil	x .140	= MMBtu/hr
max gph #4 or #6 oil	x .150	= MMBtu/hr
gph #2 oil x 140	x 140	=ft3/hr natural gas
gph #4 or #6 oil	x 150	=ft3/hr natural gas

