

Attachment 1

C.T. Male Associates

Saint-Gobain Performance Plastics Corporation
Merrimack, NH Facility

Combustion
Emissions Summary

EMISSIONS OF AIR CONTAMINANTS FROM COMBUSTION SOURCES

Combustion Source	NO _x		SO ₂		CO		PM		VOC	
	Hourly (lb/hr)	Annual (ton/yr)	Hourly (lb/hr)	Annual (ton/yr)	Hourly (lb/hr)	Annual (ton/yr)	Hourly (lb/hr)	Annual (ton/yr)	Hourly (lb/hr)	Annual (ton/yr)
Process Burners	6.46	28.30	0.039	0.17	5.43	23.77	0.49	2.15	0.36	1.56
RTO Burner	0.97	4.25	0.0058	0.026	0.82	3.57	0.07	0.32	0.05	0.23
No. 2 Fuel Oil/Boiler	0.22	0.98	0.0024	0.010	0.056	0.24	0.022	0.10	0.0038	0.017
Diesel Fuel/Generator	0.51	0.13	7.0E-04	1.7E-04	0.55	0.14	0.04	0.01	0.51	0.13
Diesel Fuel/Fire Pump	1.13	0.28	0.00	0.00	1.41	0.35	0.085	0.02	1.13	0.28
Total	9.30	33.9	0.05	0.21	8.25	28.1	0.72	2.60	2.05	2.22

* - Annual Emissions refer to annual limit based on 500 hours per year of operation of emergency generator and fire pump, all other annual based on 8,760 hours/year.

Corrections made by NHDES staff 09/14/2019.

EMISSIONS OF AIR CONTAMINANTS FROM NATURAL GAS COMBUSTION

Known Data:

1. Tower Coaters have natural gas-fired heaters, each having the heat input rating listed below
2. Actual amount of natural gas combusted in Calendar Year 2018 = 822,050 Therms, which equates to 82205 MMBTU
3. Additional combustion source associated with proposed RTO will be less than 10 MMBTU/hr; actual size to be determined

Listing of Combustion Sources at the Facility:

Identifier	Details	Heat Input
Tower MA	Tower Heat Source	3,900,000 BTU/hr
Tower MB	Tower Heat Source	7,500,000 BTU/hr
Tower MC	Tower Heat Source	4,500,000 BTU/hr
Tower MR	Tower Heat Source	4,500,000 BTU/hr
Tower MD	Tower Heat Source	9,000,000 BTU/hr
Tower QX	Tower Heat Source	7,500,000 BTU/hr
Tower MG	Tower Heat Source	6,000,000 BTU/hr
Tower MP	Tower Heat Source	7,500,000 BTU/hr
Tower MQ	Tower Heat Source	4,500,000 BTU/hr
Tower MS	Tower Heat Source	4,500,000 BTU/hr
MTM Exhaust	MTM Heat Source	3,000,000 BTU/hr
R&D Coater	Coater Heat Source	2,000,000 BTU/hr
Heat Clean	Heat Clean Source	1,500,000 BTU/hr
RTO Burner	(Preliminary Sizing)	9,900,000 BTU/hr
TOTAL COMBINED HEAT INPUT		75,800,000 BTU/hr

Corrections made by NHDES staff 09/14/2019.

65,900,000 (Without RTO)

Emission Factors:

As per AP-42, Chapter 1.4 for Small Boilers (<100 MMBtu/hr) (7/98 Edition)

Contaminant Name	Natural Gas Emission Factor (lb/Million SCF)	Natural Gas Emission Factor (lb/MMBTU)*
NO _x	100	0.09804
SO ₂	0.6	0.00059
CO	84	0.08235
PM	7.6	0.00745
VOC	5.5	0.00539

* - Per AP-42, divide Emission Factor (lb/Million SCF) by 1,020 to obtain Emission Factor (lb/MMBTU)

Hourly and Annual Potential to Emit:

PTE (lb/hr) = Max. firing rate (MMBTu/hr) * Emission Factor (lb/MMBTu); Annual PTE = Hourly PTE * 8,760 hr/yr

Contaminant Name	Hourly PTE Total (lb/hr)	Annual PTE Total (lb/yr)	Annual PTE Total (tons/yr)
NO _x	7.43	65,099	32.5
SO ₂	0.04	390.6	0.20
CO	6.24	54,683	27.3
PM	0.56	4,948	2.5
VOC	0.41	3,580	1.8

Hourly PTE Total (lb/hr) w/o RTO	Annual PTE Total (lb/yr) w/o RTO	Annual PTE Total (tons/yr) w/o RTO
6.46	56596	28.3
0.04	340	0.2
5.43	47541	23.8
0.49	4301	2.2
0.36	3113	1.6

Hourly PTE Total (lb/hr) RTO only	Annual PTE Total (lb/yr) RTO only	Annual PTE Total (tons/yr) RTO only
0.97	8502	4.3
0.01	51	0.03
0.82	7142	3.6
0.07	646	0.3
0.05	468	0.2

Annual (2018) Natural Gas Combustion Related Emissions:

Annual (lb/yr) = Amount of Natural Gas Combusted (MMBTu/yr) * Emission Factor (lb/MMBTu)

Contaminant Name	Annual Emissions Total (lb/yr)	Annual Emissions Total (tons/yr)
NO _x	8,059	4.03
SO ₂	48.36	0.02
CO	6,770	3.38
PM	612.5	0.31
VOC	443.3	0.22

NHDES corrected the calculations of actual 2018 emissions based on correct annual therms reported in the 2018 Annual Emissions Report. SGPP spreadsheet submitted 8/29/2019 included 82,934 MMBtu/yr in the calculations.

Attachment 1 (continued)

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Merrimack, NH Facility

Boiler
Emission Calculations

EMISSIONS OF AIR CONTAMINANTS FROM BOILER

Known Data:

1. Heat input for existing No. 2 Fuel Oil Fired Boiler (exempt unit) listed below.
2. Actual amount of fuel oil combusted in Calendar Year 2018= 0 gallons.

Listing of Combustion Sources at the Facility:

Identifier	Details	Heat Input
Boiler System	No. 2 Fuel Oil Fired	1,560,000 BTU/hr

Emission Factors:

As per AP-42, Chapter 1.3 for Boilers <100 MMBtu/hr (5/2010 Edition)

Contaminant Name	No. 2 Fuel Oil Emission Factor (lb/1,000 Gal.)	No. 2 Fuel Oil Emission Factor (lb/MMBtu)*
NO _x	20	0.14286
SO ₂ **	0.213	0.00152
CO	5.0	0.03571
PM	2.0	0.01429
VOC/NMTOC	0.34	0.00243

* - Per AP-42, divide Emission Factor (lb/1,000 gal.) by 140 to obtain Emission Factor (lb/MMBTU)

** - SO₂ emission factor per AP-42 is 142 x % Sulfur (assumed 15 ppm sulfur content in fuel oil)

Hourly and Annual Potential to Emit:

PTE (lb/hr) = Max. firing rate (MMBtu/hr) * Emission Factor (lb/MMBtu); Annual PTE = Hourly PTE * 8,760 hr/yr

Contaminant Name	Hourly PTE Total (lb/hr)	Annual PTE Total (lb/yr)	Annual PTE Total (tons/yr)
NO _x	0.22	1,952.23	1.0
SO ₂	0.0024	20.79	0.01
CO	0.056	488.06	0.2
PM	0.022	195.22	0.1
VOC/NMTOC	0.004	33.19	0.02

Attachment 1 (continued)

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Emergency Generator
Emissions

EMISSIONS OF AIR CONTAMINANTS FROM COMBUSTION IN EMERGENCY GENERATOR

Known Data:

- a. Existing Diesel Fuel Fired Emergency Generator Unit installed in 2015
- b. Unit is a Kohler generator 40REOZJC (80 hp/0.466 MMBtu/hr engine)

**Corrections made by NHDES staff 09/05/2019.
Emission factors were mixed up between the
emergency engine and fire pump.**

Assumptions:

- a. Unit has the unrestricted potential to operate 8,760 hours per year
Hours of operation capped at 500 hours per year per Env-A 600

Emission Factors:

From EPA Tier 3 Limits or Sulfur Content Limit in Diesel Fuel

Contaminant Name	Emission Factor (g/hp-hr)	Emission Factor (lb/hp-hr)	Emission Factor (lb/MMBtu)	
Particulate Matter (PM)	0.29828	0.000657595	0.09394212	Tier 3 Limit
Sulfur Dioxide (SO ₂) [*]			0.0015	15 ppm S Limit
Oxides of Nitrogen (NO _x) ^{**}	3.50479	0.007726739	1.10381990	Tier 3 Limit
Carbon Monoxide (CO)	3.7285	0.008219935	1.17427649	Tier 3 Limit
Total Organic Compounds (TOC) ^{**}	3.50479	0.007726739	1.10381990	Tier 3 Limit

* - Emission factor based on 15 PPM sulfur

** - Emission factors for VOC and NO_x each assumed to be total of Tier 3 Limit for NMHC + NO_x

Tier 3 limits (in g/kw-hr) = 4.7 for NO_x+NMHC; 5.0 for CO; and 0.4 for PM. Conversion factor from g/kw-hr to g/hp-hr = 0.7457

Details of Emergency Generator Unit at Facility

Identifier	Manufacturer	Fuel Type	Rating (hp)	Rating (BTU/hr)
40REOZJC	Kohler/John Deere	Diesel Fuel	80	466,000

Emission Calculations

Hourly Emissions (lb/hr) = (Max. Firing Rate {MMBtu/hr}) * (Emission Factor {lb/MBTU})

Potential Annual Emissions (lb/yr) = Hourly Emissions (lb/hr) * 8,760 (hr/yr)

Annual Emission (lbs/yr) = Unit Firing Rate (MMBtu/hr) * 500 (hr/year)¹ * Emission Factor (lb/MMBTU)

Contaminant Name	Hourly Emissions (lb/hr)	Potential to Emit (lb/yr)	Annual Emissions [500 Hrs/Yr] (ton/yr)
Particulate Matter (PM)	0.04	383.5	0.01
Sulfur Dioxide (SO ₂)	0.0007	6.1	1.7E-04
Oxides of Nitrogen (NO _x)	0.51	4,506	0.1
Carbon Monoxide (CO)	0.55	4,794	0.1
Total Organic Compounds (TOC)	0.51	4,506.0	0.1

¹ - Maximum allowed rate based on 500 hours per year limit established in Env-A 600.

Attachment 1 (continued)

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Fire Pump
Emissions

EMISSIONS OF AIR CONTAMINANTS FROM COMBUSTION IN FIRE PUMP

Known Data:

- a. Existing Fire Pump Unit installed in 2015
- b. 110 HP emergency Clarke Model JU4H-UF AD 5G emergency fire pump combusting Diesel Fuel

Assumptions:

- a. Unit has the unrestricted potential to operate 8,760 hours per year
Hours of operation capped at 500 hours per year per Env-A 600

**Corrections made by NHDES staff 09/05/2019.
Emission factors were mixed up between the
emergency engine and fire pump.**

Emission Factors:

From EPA Tier 3 Limits or Sulfur Content Limit in Diesel Fuel

Contaminant Name	Emission Factor (g/hp-hr)	Emission Factor (lb/hp-hr)	Emission Factor (lb/MMBtu)	
Particulate Matter (PM)	0.22371	0.000493196	0.07045659	Tier 3 Limit
Sulfur Dioxide (SO ₂) [*]			0.0015	15 ppm S Limit
Oxides of Nitrogen (NO _x) ^{**}	2.9828	0.006575948	0.93942119	Tier 3 Limit
Carbon Monoxide (CO)	3.7285	0.008219935	1.17427649	Tier 3 Limit
Total Organic Compounds (TOC) ^{**}	2.9828	0.006575948	0.93942119	Tier 3 Limit

* - Emission factor based on 15 PPM sulfur

** - Emission factors for VOC and NO_x each assumed to be total of Tier 3 Limit for NMHC + NO_x

Tier 3 limits (in g/kw-hr) = 4.0 for NO_x+NMHC; 5.0 for CO; and 0.3 for PM. Conversion factor from g/kw-hr to g/hp-hr = 0.7457

Details of Emergency Generator Unit at Facility

Identifier	Manufacturer	Fuel Type	Rating (hp)	Rating (BTU/hr)
JU4H-UF AD 5G	Clarke	Diesel Fuel	110	1,200,000

Emission Calculations

Hourly Emissions (lb/hr) = (Max. Firing Rate {MMBtu/hr}) * (Emission Factor {lb/MBTU})

Potential Annual Emissions (lb/yr) = Hourly Emissions (lb/hr) * 8,760 (hr/yr)

Annual Emission (lbs/yr) = Unit Firing Rate (MMBtu/hr) * 500 (hr/year)¹ * Emission Factor (lb/MMBTU)

Contaminant Name	Hourly Emissions (lb/hr)	Potential to Emit (lb/yr)	Annual Emissions [500 Hrs/Yr] (ton/yr)
Particulate Matter (PM)	0.08	740.6	0.02
Sulfur Dioxide (SO ₂)	1.80E-03	15.8	4.50E-04
Oxides of Nitrogen (NO _x)	1.13	9,875	0.3
Carbon Monoxide (CO)	1.41	12,344	0.4
Total Organic Compounds (TOC)	1.13	9,875.2	0.3

¹ - Maximum allowed rate based on 500 hours per year limit established in Env-A 600.