

BOILERS AND PROCESS HEATERS EMISSION REGULATION BYLAW CONSOLIDATED

THIS IS A CONSOLIDATION, FOR REFERENCE PURPOSES, OF:

- “Greater Vancouver Regional District Boilers and Process Heaters Emission Regulation Bylaw No. 1087, 2008”.
(Adopted October 24, 2008)
- “Greater Vancouver Regional District Boilers and Process Heaters Emission Regulation Amending Bylaw No. 1190, 2013”.
(Adopted October 25 2013)

As of October 25, 2013

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BOARD AND INFORMATION SERVICES, METRO VANCOUVER.

Greater Vancouver Regional District
Boilers and Process Heaters Emission Regulation Bylaw No. 1087, 2008

WHEREAS:

- A. The Greater Vancouver Regional District has enacted the Greater Vancouver Regional District Air Quality Management Bylaw No. 1082, 2008; and
- B. That Bylaw contemplates that the Board of the Greater Vancouver Regional District may establish emission regulations.

NOW THEREFORE the Board of Directors of the Greater Vancouver Regional District in open meeting duly assembled enacts as follows:

General

- 1 This Bylaw may be cited for all purposes as the “Greater Vancouver Regional District Boilers and Process Heaters Emission Regulation” (in this Bylaw, “this Emission Regulation”).
- 2 (1) This Emission Regulation is an emission regulation for the purposes of section 26 of the Greater Vancouver Regional District Air Quality Management Bylaw No. 1082, 2008 (“the Bylaw”), and is deemed to be an integral part of the Bylaw.

(2) Terms defined in the Bylaw, or incorporated by reference into the Bylaw, have the same meaning in this Emission Regulation.
- 3 An operator who is in compliance with the Bylaw and this Emission Regulation is exempt from section 5 of the Bylaw and from section 6(2) and (3) of the Environmental Management Act, in relation to the discharge of air contaminants from the combustion of natural gas, propane and biomass, if the operator also complies with any further restrictions or conditions imposed under the Environmental Management Act.

Definitions

- 4 In this Emission Regulation:

“**biomass**” means:

- (a) wood or wood products;
- (b) uncontaminated wood waste, such as mill ends, wood chips, shavings, sawdust, sander dust, clean construction waste, hog fuel, and clean dimensional lumber from deconstruction;
- (c) manufactured wood fuel;
- (d) vegetative or agricultural products as specifically authorized by the district director;
- (e) organic matter used as fuel that has been demonstrated to the satisfaction of the

Definition replaced by Bylaw 1190, 2013

district director to burn as cleanly as wood or uncontaminated wood waste;

but, unless otherwise authorized by the district director, does not include substances that contain any of the following:

- (f) glue, paint or preservative, or foreign substances harmful to humans, animals or plants when combusted;
- (g) wood, wood products, or wood waste with chloride content greater than 0.05 percent dry basis;
- (h) wood, wood products, or wood waste with moisture content greater than 60 percent dry basis;
- (i) manure;
- (j) recyclable post consumer waste;
- (k) paper or paper products; or
- (l) demolition waste other than clean dimensional lumber from deconstruction; or
- (m) other waste containing materials other than uncontaminated wood waste;

“boiler” means any combustion equipment fuelled solely by natural gas, propane or biomass that produces hot water or steam, but does not include:

- (a) waste heat boilers;
- (b) sulphur plant reaction furnaces, steam reformer heaters and steam cracking heaters in the refined petroleum products industry as identified in the North American Industry Classification System (NAICS) code 324110; and
- (c) process heaters;

“capacity” means:

- (a) for boilers or process heaters fuelled by natural gas or propane, the maximum rate of energy input to each boiler or process heater;
- (b) for boilers or process heaters fuelled by biomass, the maximum rate of energy output from each boiler or process heater;

“current total erected cost” means cost of complete replacement of the boiler or process heater (purchased, constructed and installed), expressed in Canadian dollars, adjusted for inflation to the date of calculation, including burners, burner management and control systems but excluding the stack, flue gas ducting, feedwater system and fuel delivery system;

Definition added by Bylaw 1190, 2013

“deconstruction” means demolition by systematic disassembly of a building or structure resulting in the reuse, recycling or recovery of a large proportion of the non-hazardous building materials;

Definition added by Bylaw 1190, 2013

“dimensional lumber” means a wood product manufactured by sawing logs into rough size lumber or cants (square timbers) which are edged, resawn to final dimension and cut to length, and which is typically used in structural framing;

“effective date” means the date of final adoption of the bylaw for the enactment of this Emission Regulation;

“existing boiler or process heater” means any boiler or process heater which, on the effective date, existed and was operational;

“facility capacity” means the sum of the individual capacities of all boilers or process heaters operating at the same location, facility or complex burning the same fuel, or as determined by the district director;

“good engineering practice” in relation to stack height means the height in accordance with methods set out in the applicable handbooks of the American Society of Heating, Refrigerating and Air Conditioning Engineers;

“low NOx boiler or process heater” means a boiler or process heater from which emissions of NOx in the preceding year have not exceeded 60 mg/m³ at any time;

“manufactured wood fuel” means wood pellets and wood pucks derived from virgin wood waste residuals only, with a chloride content not exceeding 0.05 percent dry basis, or as otherwise authorized by the district director;

“modified boiler or process heater” means an existing boiler or process heater fuelled by natural gas or propane which, after the effective date, has undergone:

- (a) a modification or improvement, involving a burner change, to the combustion process or the capacity of the existing boiler or process heater where the cost of the modification or improvement exceeded 12% of the current total erected cost of the existing boiler or process heater, or
- (b) any maintenance or repair where the cost of the maintenance or repair exceeded 50% of the current total erected cost of the existing boiler or process heater;

or for an existing boiler or process heater fuelled by biomass which, after the effective date, has undergone:

- (c) an increase in its capacity of 25% or more;

“MW” means megawatt;

“new boiler or process heater” means any boiler or process heater which, on the effective date, was not operational;

“nitrogen oxides (NOx)” means the sum of nitric oxide and nitrogen dioxide in flue gas, collectively expressed as nitrogen dioxide (NO₂);

“operator” includes:

- (a) a person who holds any interest in a boiler or process heater, including a lessee, but not including a secured creditor; and
- (b) a person who has management or control, direct or indirect, over the operations of a boiler or process heater;

“performance tune-up” means the process of inspection, testing and maintenance procedures used to restore a boiler to its efficient state, given its age and other parameters;

Definition added by Bylaw 1190, 2013

“process heater” means any combustion equipment fuelled by natural gas, propane or biomass for the purpose of transferring heat to material being processed other than by direct contact with the flue gas, but does not include:

- (a) boilers;
- (b) any process used to chemically transform ore or intermediate products into bulk metallic products; or
- (c) unfired waste heat recovery systems used to recover sensible heat from the exhaust of any combustion equipment;

“ultra low NOx boiler or process heater” means a boiler or process heater from which emissions of NOx in the preceding year have not exceeded 20 mg/m³ at any time;

“waste heat boiler” means any boiler that is designed to primarily recover sensible heat energy from the exhaust of combustion equipment.

Application of Emission Regulation

- 5** This Emission Regulation applies to boilers and process heaters with a facility capacity of 50 MW or less.

Registration

- 6** An operator of one or more boilers or process heaters fuelled by natural gas or propane with a facility capacity of greater than 3 MW, but not exceeding 50 MW, must register in accordance with procedures approved by the district director.
- 7** An operator of a boiler or process heater fuelled by biomass with a facility capacity of 50 MW or less, must register in accordance with procedures approved by the district director.
- 8** All operators of existing boilers and process heaters specified in section 6 or 7 must register by March 31, 2009.
- 9** All operators of new or modified boilers and process heaters specified in section 6 or 7 that commence operations after the date on which this Emission Regulation is enacted must register within three months of commencing operations.

Fees

- 10** All operators must pay a registration fee of \$100.
- 11** The registration fee is waived for all boilers and process heaters registered by March 31, 2009.

- 12 Each year, beginning June 30, 2009, each registered operator of a boiler or process heater must pay to the District a fee of \$200 plus the total emission fees calculated in accordance with Appendix 1 for each calendar year or portion thereof, payable by June 30 of each calendar year, or upon registration if registration occurs after June 30 of that year.
- 13 No fees are payable for residential or institutional boilers, or residential or institutional process heaters.
- 14 No fees are payable for boilers or process heaters that operate in a mixed residential and commercial setting, provided that the commercial component is no more than 30% of the total floor space.
- 15 No fees are payable for one or more commercial or industrial boilers, or one or more commercial or industrial process heaters with a facility capacity of 3 MW or less.
- 16 The district director may authorize alternative calculation methods for the emission fees calculated in section 12.

General Requirements and Standard Conditions

- 17 Every boiler and process heater, and related emission control works, must be maintained and operated in the manner prescribed by the manufacturer of the boiler, process heater or emission control works.
- 18 No operator may bypass any control works required to comply with the emission requirements of Appendix 2, except with the prior written authorization of the district director. In the event of an emergency, an operator may bypass such works only for such period as is necessary to effect a shutdown of the boiler or process heater.
- 19 Every operator of a boiler or process heater must initiate corrective action immediately upon discovering a breakdown or malfunction, emergency, or other condition which prevents the continuous use of any works required to meet the requirements under section 24 or 25. Every operator must take all reasonable steps to minimize the discharge of air contaminants during any such conditions.
- 20 In the event of an emergency or condition beyond the control of the operator which prevents the continuous use of any works required to meet the emission limits in sections 24 or 25, the operator must take appropriate remedial action, immediately notify Metro Vancouver at 604-436-6777, and take any other actions specified by the district director to protect the environment including stopping discharge of air contaminants.

Section
replaced by
Bylaw 1190,
2013

- 21 (1) No operator of a boiler or process heater fuelled by biomass may discharge any air contaminant without submitting, for approval, a biomass fuel management plan as set out in Appendix 3.

(2) Every operator must adhere to the approved biomass fuel management plan at all times and provide records as may be required by the district director to demonstrate compliance with the plan.

(3) Biomass must be stored and handled in a manner that minimizes fugitive particulate matter emissions.

22 All concentrations specified in this Emission Regulation for boilers or process heaters fuelled by natural gas or propane are referenced at 3 percent oxygen content in stack gas corrected to dry conditions at 20° Celsius and a pressure of 101.325 kilopascals.

23 All concentrations specified in this Emission Regulation for boilers or process heaters fuelled by biomass are referenced at 8 percent oxygen content in stack gas corrected to dry conditions at 20° Celsius and a pressure of 101.325 kilopascals.

Emission Limits

24 Subject to section 26, emissions from a new or modified boiler or process heater fuelled by natural gas or propane must comply with the emission limits specified in section 1 of Appendix 2.

25 Subject to section 26, emissions from a boiler or process heater fuelled by biomass must comply with the applicable emission limits specified in section 2 of Appendix 2.

26 Fuel oil may be used as a standby fuel provided that:

- (1) The fuel does not have a sulphur content exceeding 15 mg/kg, unless otherwise authorized by the district director;
- (2) The opacity of emissions from the use of standby fuel does not exceed ten percent;
- (3) The quantity and duration of standby fuel use must be recorded and records maintained for a period of three years. Records must be available for inspection by an officer;
- (4) The total use of standby fuels for any boiler or process heater must not exceed 350 hours per calendar year.

Emission Stack

27 Emissions from all boilers or process heaters must be discharged from a stack that is designed, built and maintained in accordance with good engineering practice.

28 For boilers or process heaters fuelled by biomass, the minimum stack height must be 20 metres above ground level unless otherwise approved by the district director.

*Section
replaced by
Bylaw 1190,
2013*

Air Quality Dispersion Modelling

29 (1) No operator of a boiler or process heater fuelled by biomass may discharge any air contaminant prior to conducting, at the operator's expense, dispersion modelling in accordance with the requirements set out in Appendix 4 .

(2) The district director may require any operator to conduct, at the operator's expense, dispersion modelling of boiler or process heater emissions.

*Section
replaced by
Bylaw 1190,
2013*

Emission testing requirements for boilers or process heaters fuelled by natural gas or propane

30 An operator of a boiler or process heater fuelled by natural gas or propane must conduct emission testing as required by the district director.

Emission testing requirements for boilers or process heaters fuelled by biomass

*Section
replaced by
Bylaw 1190,
2013*

31 (1) An operator of a boiler or process heater fuelled by biomass must conduct emission testing to determine concentrations of filterable particulate matter, carbon monoxide, nitrogen oxides, and total volatile organic compounds as provided in this section.

(2) Operators of new or modified boilers or process heaters fuelled by biomass must conduct emission testing required in subsection (1) within three months of commencing operation of the new or modified boiler or process heater, or as otherwise authorized by the district director, and at the intervals specified in subsection (4).

(3) Operators of existing boilers or process heaters fuelled by biomass must conduct emission testing required in subsection (1) within six months of the effective date of this Emission Regulation, and at the intervals specified in subsection (4).

(4) Operators of boilers or process heaters fuelled by biomass must conduct emission testing required in subsection (1) as follows:

(a) Once every calendar year with a minimum of 300 days and a maximum of 430 days between each emission test where facility capacity exceeds 1 MW.

(b) As may be required by the district director where facility capacity does not exceed 1 MW.

(5) The district director may vary the frequency of emission testing and the air contaminants to be tested for any operator.

(6) A minimum of three working days advance notice must be given prior to any emission testing. Notification must be given to Metro Vancouver at 604-436-6777.

*Section
replaced by
Bylaw 1190,
2013*

32 (1) All emission testing under this Emission Regulation must be conducted while the boiler or process heater is operating at no less than 75% capacity and with operating conditions and fuel characteristics typical of the operations of that boiler or process heater over the preceding year, or as otherwise authorized by the district director.

(2) Operators must maintain a record of the type, source and amount of fuels burned during any emission test.

33 All emission testing under this Emission Regulation must be conducted in accordance with the methodology specified by the district director.

Record Keeping and Reporting Requirements

34 Every operator of one or more boilers or process heaters fuelled by natural gas or propane with a facility capacity greater than 3 MW and every operator of a boiler or process heater fuelled by biomass must keep accurate records and supporting documentation setting out, in respect of each of its boilers, process heaters and works:

(1) a record of all inspections and maintenance including without limitation, the date and time of the inspection or maintenance, the condition of the boiler, process heater or works observed during the inspection or maintenance, combustion analysis data pertaining to the boiler or process heater, and the name and signature of a responsible person who is able to verify the information contained in the record;

(2) for natural gas or propane, the type and amount of fuels burned;

(3) for biomass, the type, source and amount of fuels burned;

35 Every operator required to keep records and supporting documentation in accordance with section 34 must keep all records and supporting documentation for at least 3 years after the date of preparation or receipt thereof.

36 Upon the demand of the district director or an officer, an operator must make the records under section 34 available for inspection or must deliver such records to the district director in the manner that the district director requires, within 48 hours.

37 Emission test results under sections 30 or 31 must be submitted to the district director:

(1) within five working days of testing, if the test results indicate that any of the emission limits specified in Appendix 2 have been exceeded; or

(2) in any other case, within 60 days of testing.

*Section
replaced by
Bylaw 1190,
2013*

Continuous Emission Monitoring Requirements for boilers or process heaters fuelled by biomass

38 (1) An operator of a boiler or process heater fuelled by biomass where facility capacity exceeds 1 MW, must install and operate a Continuous Emission Monitoring System ("CEMS") at an appropriate location on any biomass boiler exhaust.

(2) The CEMS shall be installed, certified and operated in accordance with a Quality Assurance/Quality Control (QA/QC) plan approved by the district director.

(3) An operator of a boiler or process heater fuelled by biomass with a facility capacity that does not exceed 3 MW shall measure emissions of carbon monoxide and oxygen using the CEMS as required in this section.

(4) An operator of a boiler or process heater fuelled by biomass with a facility capacity exceeding 3 MW shall measure carbon monoxide, oxygen and opacity using the CEMS as required in this section.

39 (1) An operator of a boiler or process heater fuelled by biomass where facility capacity does not exceed 1 MW, must install and operate a CEMS at an appropriate location on any biomass boiler exhaust.

*Section
added by
Bylaw 1190,
2013*

(2) The CEMS shall be installed, certified and operated in accordance with a Quality Assurance/Quality Control (QA/QC) plan approved by the district director.

(3) An operator shall measure emissions of oxygen using the CEMS as required in this section.

(4) No operator of a boiler or process heater fuelled by biomass may discharge any air contaminants without adherence to a carbon monoxide monitoring plan approved by the district director.

Tune-ups for boilers or process heaters fuelled by biomass

Section added by Bylaw 1190, 2013

40 (1) An operator of a boiler or process heater fuelled by biomass must conduct a biennial performance tune-up according to procedures recommended by the boiler manufacturer and approved by the district director.

(2) Each biennial performance tune-up must be conducted no more than 26 months after the previous tune- up.

Read a first time this _____ day of _____.

Read a second time this _____ day of _____.

Read a third time this _____ day of _____.

Reconsidered, passed and finally adopted by the Board of Directors of the Greater Vancouver Regional District this _____ day of _____.

Chair

Secretary

Appendix 1 – Air Contaminant Emission Fees for Boilers and Process Heaters

1 “Air contaminant emission fees” (Z) are calculated as follows:

$$Z = A \times B \times C \times D \times E \times F$$

Where:

A = the concentration of air contaminant in milligrams per cubic metre (mg/m³) determined in accordance with section 2 of this Appendix;

B = volume of flue gas in cubic metres per gigajoule of fuel energy input (m³/GJ) for natural gas, propane or biomass, as specified by the district director;

C = the facility capacity in MW (or GJ per hour), as provided by the operator;

D = 5,256 hours per year

E = 1/10⁹ (a conversion factor to convert from mg to tonnes); and

F = the corresponding fee per tonne of air contaminant listed in column 2 of Table 1.

Table 1 – Air Contaminant Emission Fees per Tonne of Air Contaminant

Column 1	Column 2
Air contaminant	Emission fee per tonne of air contaminant
Particulate Matter (filterable and condensable from combustion sources)	\$300
Nitrogen Oxides (NOx)	\$50
Total volatile organic compounds (photoreactive)	\$100
Total volatile organic compounds (non-photoreactive)	\$30

Table replaced by Bylaw 1190, 2013

2 (1) Unless otherwise specified by the district director, flue gases from boilers and process heaters fuelled by natural gas or propane are deemed to have the following concentrations of air contaminants for the purpose of emission fee calculations:

(a) Particulate matter (filterable and condensable): 12 mg/m³;

(b) Nitrogen oxides (NOx), as follows:

(i) 20 mg/ m³ from ultra low NOx boilers or process heaters;

(ii) 60 mg/m³ from low NOx boilers or process heaters;

(iii) 160 mg/m³ from all other boilers or process heaters;

- (2) Unless otherwise specified by the district director, flue gases from boilers and process heaters fuelled by biomass are deemed to have the following concentrations of air contaminants for the purpose of emission fee calculations:
- a) Nitrogen oxides: 200 mg/m³;
 - b) Condensable particulate matter: 15 mg/m³;
 - c) Filterable particulate matter: 10 mg/m³;
 - d) Total volatile organic compounds:
 - i) of which 9 mg/m³ are photoreactive, and
 - ii) 11 mg/m³ are non-photoreactive.
- 3 “**Total emission fees**” are calculated as the sum of all air contaminant emission fees applicable for annual emissions authorized by this Emission Regulation.

Appendix 2 – Air Contaminant Emission Limits for Boilers and Process Heaters

Emission Limits for New or Modified Boilers and Process Heaters Fuelled by Natural Gas or Propane

- 1 Operators of all new or modified boilers and process heaters fuelled by natural gas or propane must not cause or allow the emissions of nitrogen oxides (NOx) to exceed a concentration of 60 mg/m³ of flue gases.

Emission Limits for Boilers and Process Heaters Fuelled by Biomass

- 2 Operators of boilers or process heaters fuelled by biomass must not cause or allow the emissions from any boiler or process heater to exceed the emission limits specified in Table 2.

Table 2 – Emission Limits for Boilers and Process Heaters Fuelled by Biomass

Column 1	Column 2			
	Emission Limits			
Facility Capacity	Filterable Particulate Matter (mg/m ³)	Carbon monoxide (ppmv)	Total Volatile Organic Compounds (mg/m ³)	Opacity (%)
Greater than 3 MW	10	250	20	5
Less than or equal to 3 MW	18	250	20	5

Section replaced by Bylaw 1190, 2013

Appendix 3– Biomass Fuel Management Plan

A biomass fuel management plan must include but not be limited to the following:

1. Documented fuel specifications, including:
 - a. description of acceptable fuels (e.g., hog, sawdust, bark, clean woodwaste, etc),
 - b. acceptable fuel sizing (typical range), and
 - c. acceptable moisture content (typical range).
2. Quality assurance plan, including:
 - a. testing plan (including frequency and parameters),
 - b. visual inspection plan (i.e., inspection of pile, feed system), and
 - c. procedure for rejecting off-quality fuel.
3. Storage Plan, including:
 - a. maximum storage times, and
 - b. storage of off-quality materials.
4. Record Keeping Requirements, including:
 - a. fuel purchases (quantity, source),
 - b. fuel use (quantity, source), and
 - c. rejected loads and reason(s) for rejection.

Appendix 4 – Dispersion Modelling for Boilers and Process Heaters Fuelled by Biomass

- 1 Any operator of a boiler or process heater fuelled by biomass must obtain district director approval and conduct air quality dispersion modelling prior to the discharge of any air contaminants.
- 2 Air quality dispersion modelling must be conducted according to the most recent version of the Guidelines for Air Quality Dispersion Modelling in British Columbia published by the British Columbia Ministry of Environment.
- 3 Any operator of a boiler or process heaters fuelled by biomass where facility capacity does not exceed 3 MW must determine the ambient concentrations of the air contaminants in Column 2 of Table 3 over the averaging time listed in Column 3 using, at minimum, a screening model assessment.
- 4 Any operator of a boiler or and process heater fuelled by biomass where facility capacity exceeds 3 MW must determine the ambient concentrations of the air contaminants in Column 2 of Table 3 over the averaging time listed in Column 3 using, at minimum, a refined model assessment.

Table 3 – Ambient Air Quality Criteria for Dispersion Modelling

Column 1	Column 2	Column 3
Facility Capacity	Air contaminant	Averaging time(s)
≤ 3 MW	Nitrogen oxides (measured as NO ₂)	1-hour
	Inhalable particulate matter (PM ₁₀)	24-hour
	Fine particulate matter (PM _{2.5})	24-hour
>3 MW to 50 MW	Nitrogen oxides (measured as NO ₂)	1-hour and annual
	Inhalable particulate matter (PM ₁₀)	24-hour and annual
	Fine particulate matter (PM _{2.5})	24-hour and annual