



COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF AIR QUALITY

GENERAL PLAN APPROVAL AND/OR GENERAL OPERATING PERMIT APPLICATION INSTRUCTIONS

General Permit BAQ-GPA/GP-1: Small Gas & No. 2 Oil Fired Combustion Units

GENERAL INFORMATION

1. Any combustion units proposing to operate under the general plan approval and/or operating permit (BAQ-GPA/GP-1), must comply with the terms and conditions specified therein. Failure to conform with the applicable laws, rules and regulations and terms and conditions of this permit, for any reason, is grounds for the revocation or suspension of the permittee's approval to operate under this permit.
2. BAQ-GPA/GP-1 cannot be used to cover the installation of a combustion unit where the emission increases from the installation of the new combustion unit and other emission increases that have occurred would subject the facility to prevention of significant deterioration (25 Pa. Code Chapter 127, Subchapter D) or New Source Review (25 Pa. Code Chapter 127, Subchapter E) requirements. Guidance in this regard may be obtained by contacting the Department.
3. BAQ-GPA/GP-1 is applicable to combustion units with a rated capacity less than 50 million Btu per hour of heat input fueled by natural gas supplied by a public utility, liquified petroleum gas or by commercial fuel oils which are No. 2 or lighter, with viscosity less than or equal to 5.82 C St and which meet the sulfur content requirements of Pa. Code Section 123.22.
4. An applicant for BAQ-GPA/GP-1 may use a portable gas analyzer for meeting the sampling and testing requirements prescribed in Condition 7 of the General Permit. The Department's minimum acceptable specifications and requirements for portable gas analyzers and a sample method of emission calculations are illustrated on pages 2 and 3.
5. An applicant for BAQ-GPA/GP-1 must fulfill the requirements regarding the filing of compliance review forms according to the regulations (25 Pa. Code Section 127.412).
6. BAQ-GPA/GP-1 is issued for a term of five years. The application fee schedule is described in Condition 12 of the General Permit. An application for renewal with a renewal fee must be submitted 30 days prior to expiration of the permit.
7. The application and fees are to be submitted to the respective Regional Office.
8. If the combustion units at the facility cannot be regulated by the requirements of this general permit, an applicant must apply for a plan approval under Chapter 127, Subchapter B in lieu of this general plan approval BAQ-GPA/GP-1.

DEP's Minimum Acceptable Specifications and Requirements for Portable Gas Analyzers

Exhaust NO_x emissions may be determined using a Portable Gas Analyzer, which meets at a minimum the following specifications and requirements:

Specifications:

Analyzer Calibration Error:	Less than plus or minus 5% over High, Medium and Zero gas concentration of Calibration Gas
Sampling System Bias:	Less than plus or minus 5% Calibration Gas
Interference Performance Check:	Less than plus or minus 6% Calibration Gas
Resolution:	NO and NO ₂ - 1 PPM, O ₂ - 0.1%

High gas (optional but recommended): Concentration equivalent to 80-100% of the instrument span or a maximum of 4 times the emission concentration, whichever is less.

Medium gas: Concentration approximately equivalent (plus or minus 20%) to the emission concentration

Zero gas: Concentration less than 0.25% of the instrument span. Ambient air may be purified by passing it through a charcoal filter or through one or more impingers containing a solution of 3% H₂O₂

Requirements:

The analyzer should demonstrate linearity across a three point (high, medium, and zero gas) calibration curve that brackets the emission concentration.

Manufacturers' tolerance for Calibration should not exceed plus or minus 2% of the tag values.

The NO_x emission rate may be reported as lbs/hr, which can be calculated from measured PPM number using fuel flow rate, F-factor and heating value of fuel. The equation to determine mass emission rate using EPA's Method 19 "F-factor" is shown in Appendix A.

Mass Basis NOx/CO Emission Calculations using EPA's Method 19 "F-factor":

From EPA Test Method 19 under Appendix A-7 of 40 CFR Part 60

Factor Fd = 9190 dry standard cubic feet per 10⁶ Btu for distillate oil (table 19-2; A-7).

The emission rate can be calculated using the following equation:

$$Em: Cd * Fd * 20.9 / (20.9 - \%O_2) * v * GCV$$

Where,

Em	=	Pollutant emission rate in lbs/hr
Cd	=	Pollutant concentration in lbs/dscf
Fd	=	Average F-factor on a dry basis, dscf per 10 ⁶ Btu (9190 dscf per 10 ⁶ Btu for No.2 fuel oil - table 19-2)
%O ₂	=	Exhaust oxygen concentration in percent, measured on a dry basis
v**	=	Fuel oil rate in gallons per hour
GCV	=	Higher heating value of the fuel oil in mmBtu/gallon

** - The fuel oil rate may be measured by means of a standard flow meter in gals/hr.

The following conversion factors from table 19-1 of EPA Test Method 19 under Appendix A-7 of 40 CFR Part 60 may be used to convert the NOx and CO concentrations in PPM to lb/scf

<u>To convert from</u>	<u>To Cd</u>	<u>Multiply By</u>
PPM NOx	lb/scf	1.194 * 10 ⁻⁷
PPM CO	lb/scf	0.7268 * 10 ⁻⁷

Sample Calculation for Mass Basis Emission Calculations using EPA's Method 19 "F-factor":

Assuming NOx measured as 60 ppm @ 7% O₂, Fuel Rate - 250 gal/hr, GCV=138000 Btu/gal for No. 2 oil.

Mass emission,

$$Em = (60 * 1.194 * 10^{-7}) \frac{lbs}{dscf} * \frac{9190 dscf}{10^6 Btu} * \frac{(20.9)}{(20.9 - 7)} * 250 \frac{gal}{hr} * 138000 \frac{Btu}{gal}$$

$$= 3.42 \text{ lbs/hr}$$

$$= 14.96 \text{ tons/yr.}$$