

**SUBCHAPTER G: GENERAL MONITORING AND TESTING  
REQUIREMENTS  
DIVISION 1: COMPLIANCE STACK TESTING AND REPORT  
REQUIREMENTS  
§117.8000, §117.8010  
Effective June 25, 2015**

**§117.8000. Stack Testing Requirements.**

(a) When required by this chapter, the owner or operator of a unit subject to this chapter shall conduct testing according to the requirements of this section.

(b) The unit must be operated at the maximum rated capacity, or as near as practicable. Compliance must be determined by the average of three one-hour emission test runs. Shorter test times may be used if approved by the executive director.

(c) Testing must be performed using the following test methods:

(1) Test Method 7E or 20 (40 Code of Federal Regulations (CFR), Part 60, Appendix A) for nitrogen oxides (NO<sub>x</sub>);

(2) Test Method 10, 10A, or 10B (40 CFR Part 60, Appendix A) for carbon monoxide (CO);

(3) Test Method 3A or 20 (40 CFR Part 60, Appendix A) for oxygen (O<sub>2</sub>);

(4) for units that inject ammonia or urea to control NO<sub>x</sub> emissions, the Phenol-Nitroprusside Method, the Indophenol Method, or the United States Environmental Protection Agency Conditional Test Method 27 for ammonia;

(5) Test Method 2 (40 CFR Part 60, Appendix A) for exhaust gas flow and following the measurement site criteria of Test Method 1, §11.1 (40 CFR Part 60, Appendix A), or Test Method 19 (40 CFR Part 60, Appendix A) for exhaust gas flow in conjunction with the measurement site criteria of Performance Specification 2, §8.1.3 (40 CFR Part 60, Appendix B); or

(6) American Society for Testing and Materials (ASTM) Method D1945-91 or ASTM Method D3588-93 for fuel composition; ASTM Method D1826-88 or ASTM Method D3588-91 for calorific value; or alternate methods as approved by the executive director and the United States Environmental Protection Agency.

(d) United States Environmental Protection Agency-approved alternate test methods or minor modifications to the test methods specified in subsection (c) of this section may be used, as approved by the executive director, as long as the minor modifications meet the following conditions:

(1) the change does not affect the stringency of the applicable emission specification;

(2) the change affects only a single source or facility application.

(e) An owner or operator that chooses to install or relocate a boiler or process heater temporarily at an account for less than 60 consecutive calendar days may substitute the following in lieu of the requirements of subsections (b) - (d) of this section for stack testing required by this chapter. For the purposes of this subsection, the term "relocate" means to newly install at an account, as defined in §101.1 of this title (relating to Definitions), a boiler or process heater from anywhere outside of that account.

(1) The owner or operator may use the results of previous testing conducted on the same boiler or process heater conducted according to subsections (b) - (d) of this section or a manufacturer's guarantee of performance. If previous testing is used, the owner or operator of the site temporarily installing the boiler or process heater shall maintain a record of the previous test report as specified by the recordkeeping requirements under this chapter applicable to the site.

(2) The owner or operator shall physically remove the boiler or process heater from the account no later than 60 consecutive calendar days after the unit was installed at the account or comply with the testing requirements as specified in subsections (b) - (d) of this section.

(3) Extensions to the 60 consecutive calendar days limitation of this subsection will not be provided.

Adopted June 3, 2015

Effective June 25, 2015

### **§117.8010. Compliance Stack Test Reports.**

Compliance stack test reports of testing performed in accordance with §117.8000 of this title (relating to Stack Testing Requirements), or if otherwise specified in this chapter, must include the following minimum contents.

(1) Introductory information. Background information pertinent to the test must include:

(A) company name, address, and name of company official responsible for submitting report;

(B) name and address of testing organization;

(C) names of persons present, dates, and location of test;

(D) schematic drawings of the unit being tested, showing emission points, sampling sites, and stack cross-section with the sampling points labeled and dimensions indicated;

(E) description of the process being sampled; and

(F) facility identification number used to identify the unit in the final control plan.

(2) Summary information. Summary information must include:

(A) a summary of emission rates found, reported in the units of the applicable emission limits and averaging periods, and compared with the applicable emission specification;

(B) the maximum rated capacity, normal maximum capacity, and actual operating level of the unit during the test (in million British thermal units, horsepower, or megawatts, as applicable), and description of the method used to determine such operating level;

(C) the operating parameters of any active nitrogen oxides (NO<sub>x</sub>) control equipment during the test (for example, percent flue gas recirculation, ammonia flow rate, etc); and

(D) documentation that no changes to the unit have occurred since the compliance test was conducted that could result in a significant change in NO<sub>x</sub> emissions.

(3) Procedure. The description of the procedures used and description of the operation of the sampling train and process during the test must include:

(A) a schematic drawing of the sampling devices used with each component designated and explained in a legend;

(B) a brief description of the method used to operate the sampling train and the procedure used to recover samples; and

(C) deviation from reference methods, if any.

(4) Analytical technique. A brief description of all analytical techniques used to determine the emissions from the source must be provided.

(5) Data and calculations. All data and calculations must be provided, including:

(A) field data collected on raw data sheets;

(B) log of process operating levels, including fuel data;

(C) laboratory data, including blanks, tare weights, and results of analysis; and

(D) emission calculations.

(6) Chain of custody. A listing of the chain of custody of the emission or fuel test samples, as applicable, must be provided.

(7) Appendix. The appendices must include:

(A) calibration work sheets for sampling equipment;

(B) collection of process logs of process parameters;

(C) brief resume/qualifications of test personnel; and

(D) description of applicable continuous monitoring system, as applicable.

(8) Monitor certification reports. Monitor certification reports must contain:

(A) information that demonstrates compliance with the certification requirements of §117.8100(a) or (b) of this title (relating to Emission Monitoring System Requirements for Industrial, Commercial, and Institutional Sources) for any continuous emissions monitoring system or predictive emissions monitoring system, as applicable; and

(B) the relative accuracy test audit information specified in 40 Code of Federal Regulations Part 60, Appendix B, Performance Specification 2, §8.5.

Adopted May 23, 2007

Effective June 14, 2007

**SUBCHAPTER G: GENERAL MONITORING AND TESTING  
REQUIREMENTS  
DIVISION 2: EMISSION MONITORING  
§§117.8100, 117.8110, 117.8120, 117.8130, 117.8140  
Effective June 14, 2007**

**§117.8100. Emission Monitoring System Requirements for Industrial, Commercial, and Institutional Sources.**

(a) Continuous emissions monitoring system (CEMS) requirements. When required by this chapter, the owner or operator of any CEMS shall comply with the following.

(1) Except as specified in paragraph (5) of this subsection, the CEMS must meet the requirements of 40 Code of Federal Regulations (CFR) Part 60 as follows:

(A) §60.13;

(B) Appendix B:

(i) Performance Specification 2, for nitrogen oxides (NO<sub>x</sub>) in terms of the applicable standard (in parts per million by volume (ppmv), pounds per million British thermal units (lb/MMBtu), or grams per horsepower-hour (g/hp-hr)). An alternative relative accuracy requirement of ± 2.0 ppmv from the reference method mean value is allowed;

(ii) Performance Specification 3, for diluent; and

(iii) Performance Specification 4, for carbon monoxide (CO), for owners or operators electing to use a CO CEMS; and

(C) after the final applicable compliance date or date of required submittal of CEMS performance evaluation, conduct audits in accordance with §5.1 of Appendix F, quality assurance procedures for NO<sub>x</sub>, CO, and diluent analyzers, except that a cylinder gas audit or relative accuracy audit may be performed in lieu of the annual relative accuracy test audit (RATA) required in §5.1.1. If the optional alternative relative accuracy requirement of subparagraph (B)(i) of this paragraph (or equivalent) from the reference method mean value is used, then an annual RATA must be performed.

(2) The owner or operator shall monitor diluent, either oxygen (O<sub>2</sub>) or carbon dioxide (CO<sub>2</sub>), unless using an exhaust flow meter that meets the flow monitoring specifications of 40 CFR Part 60, Appendix B, Performance Specification 6 or 40 CFR Part 75, Appendix A.

(3) One CEMS may be shared among units or among multiple exhaust stacks on a single unit, provided:

(A) the exhaust stream of each stack is analyzed separately; and

(B) the CEMS meets the certification requirements of paragraph (1) of this subsection for each stack while the CEMS is operating in the time-shared mode.

(4) Each individual stack must be analyzed separately for units with multiple exhaust stacks.

(5) As an alternative to paragraph (1) of this subsection, an owner or operator may choose to comply with the CEMS requirements of 40 CFR Part 75 as follows:

(A) general operation requirements in Subpart B, §75.10(a)(2);

(B) certification procedures and test methods in Subpart C, §75.20(c) and §75.22;

(C) recordkeeping requirements of the monitoring plan in Subpart D, §75.53(a) - (c);

(D) appropriate specifications and test procedures in Appendix A, as follows:

(i) §1 (Installation and Measurement Location);

(ii) §2 (Equipment Specifications);

(iii) §3 (Performance Specifications);

(iv) §4 (Data Acquisition and Handling Systems);

(v) §5 (Calibration Gas);

(vi) §6 (Certification Tests and Procedures); and

(vii) meet either the relative accuracy requirement of 40 CFR Part 75 in percentage only, or the alternative relative accuracy requirement of  $\pm 2.0$  ppmv from the reference method mean value; and

(E) appropriate quality assurance/quality control procedures in Appendix B, as follows:

- (i) §1 (Quality Assurance/Quality Control Program); and
- (ii) §2 (Frequency of Testing).

(6) The CEMS is subject to the approval of the executive director.

(b) Predictive emissions monitoring system (PEMS) requirements. When required by this chapter, the owner or operator of any PEMS shall comply with the following.

(1) The owner or operator shall monitor diluent, either O<sub>2</sub> or CO<sub>2</sub>:

(A) using a CEMS:

(i) in accordance with subsection (a)(1)(B)(ii) of this section;

or

(ii) with a similar alternative method approved by the executive director and the United States Environmental Protection Agency; or

(B) using a PEMS.

(2) Any PEMS must meet the requirements of 40 CFR Part 75, Subpart E, except as provided in paragraphs (3) and (4) of this subsection.

(3) The owner or operator may vary from 40 CFR Part 75, Subpart E if the owner or operator:

(A) demonstrates to the satisfaction of the executive director and the United States Environmental Protection Agency that the alternative is substantially equivalent to the requirements of 40 CFR Part 75, Subpart E; or

(B) demonstrates to the satisfaction of the executive director that the requirement is not applicable.

(4) The owner or operator may substitute the following as an alternative to the test procedure of Subpart E for any unit:

(A) perform the following alternative initial certification tests:

(i) conduct initial RATA at low, medium, and high levels of the key operating parameter affecting NO<sub>x</sub> using 40 CFR Part 60, Appendix B:

(I) Performance Specification 2, subsection 13.2, pertaining to NO<sub>x</sub>, in terms of the applicable standard (in ppmv, lb/MMBtu, or g/hp-hr). An alternative relative accuracy requirement of  $\pm 2.0$  ppmv from the reference method mean value is allowed;

(II) Performance Specification 3, subsection 13.2, pertaining to O<sub>2</sub> or CO<sub>2</sub>; and

(III) Performance Specification 4, subsection 13.2, pertaining to CO, for owners or operators electing to use a CO PEMS; and

(ii) conduct an F-test, a t-test, and a correlation analysis using 40 CFR Part 75, Subpart E at low, medium, and high levels of the key operating parameter affecting NO<sub>x</sub>:

(I) calculations must be based on a minimum of 30 successive emission data points at each tested level that are either 15-minute, 20-minute, or hourly averages;

(II) the F-test must be performed separately at each tested level;

(III) the t-test and the correlation analysis must be performed using all data collected at the three tested levels;

(IV) waivers from the statistical tests and default reference method standard deviation values for the F-test may be allowed according to the *TNRCC PEMS Protocol Draft*, May 16, 1994;

(V) the correlation analysis may only be temporarily waived following review of the waiver request submittal if:

(-a-) the process design is such that it is technically impossible to vary the process to result in a concentration change sufficient to allow a successful correlation analysis statistical test. Any waiver request must also be accompanied with documentation of the reference method measured concentration, and documentation that it is less than 50% of the emission limit or standard. The waiver must be based on the measured value at the time of the waiver. Should a subsequent RATA effort identify a change in the reference method measured value by more than 30%, the statistical test must be repeated at the next RATA effort to verify the successful compliance with the correlation analysis statistical test requirement; or

(-b-) the data for a measured compound (e.g., NO<sub>x</sub>, O<sub>2</sub>) are determined to be autocorrelated according to the procedures of 40 CFR §75.41(b)(2). A complete analysis of autocorrelation with support information must be submitted with the request for waiver. The statistical test must be repeated at the next RATA effort to verify the successful compliance with the correlation analysis statistical test requirement; and

(VI) all requests for waivers must be submitted to the executive director for review. The executive director shall approve or deny each waiver request;

(B) further demonstrate PEMS accuracy and precision for at least one unit of a category of equipment by performing RATA and statistical testing in accordance with subparagraph (A) of this paragraph for each of three successive quarters, beginning:

(i) no sooner than the quarter immediately following initial certification; and

(ii) no later than the first quarter following the final compliance date; and

(C) after the final applicable compliance date, perform RATA for each unit:

(i) at normal load operations;

(ii) using the Performance Specifications of subparagraph (A)(i)(I) - (III) of this paragraph; and

(iii) at the following frequency:

(I) semiannually; or

(II) annually, if following the first semiannual RATA, the relative accuracy during the previous audit for each compound monitored by PEMS is less than or equal to 7.5% (or within  $\pm 2.0$  ppmv) of the mean value of the reference method test data at normal load operation; or alternatively:

(-a-) for diluent, is no greater than 1.0% O<sub>2</sub> or CO<sub>2</sub>, for diluent measured by reference method at less than 5% by volume; or

(-b-) for CO, is no greater than 5.0 ppmv.

(5) The owner or operator shall, for each alternative fuel fired in a unit, certify the PEMS in accordance with paragraph (4)(A) of this subsection unless the alternative fuel effects on NO<sub>x</sub>, CO, and O<sub>2</sub> (or CO<sub>2</sub>) emissions were addressed in the model training process.

(6) The PEMS is subject to the approval of the executive director.

(c) Monitoring system certification reports. Reports of any RATA performed in accordance with this section must comply with §117.8010 of this title (relating to Compliance Stack Test Reports).

Adopted May 23, 2007

Effective June 14, 2007

**§117.8110. Emission Monitoring System Requirements for Utility Electric Generation Sources.**

(a) Continuous emissions monitoring system (CEMS) requirements. When required by this chapter, the owner or operator of any CEMS shall comply with the following.

(1) The CEMS must be installed, calibrated, maintained, and operated in accordance with 40 Code of Federal Regulations (CFR) Part 75 or 40 CFR Part 60, as applicable.

(2) One CEMS may be shared among units, provided:

(A) the exhaust stream of each unit is analyzed separately; and

(B) the CEMS meets the applicable certification requirements of paragraph (1) of this subsection for each exhaust stream.

(b) Predictive emissions monitoring system (PEMS) requirements. When required by this chapter, the owner or operator of any PEMS shall comply with the following.

(1) The owner or operator shall monitor diluent, either oxygen or carbon dioxide:

(A) using a CEMS:

(i) in accordance with subsection (a) of this section; or

(ii) with a similar alternative method approved by the executive director and the United States Environmental Protection Agency; or

(B) using a PEMS.

(2) Any PEMS for units subject to the requirements of 40 CFR Part 75 must meet the requirements of 40 CFR Part 75, Subpart E, §§75.40 - 75.48.

(3) Any PEMS for units not subject to the requirements of 40 CFR Part 75 must meet the requirements of either:

(A) 40 CFR Part 75, Subpart E, §§75.40 - 75.48; or

(B) §117.8100(b) of this title (relating to Emission Monitoring System Requirements for Industrial, Commercial, and Institutional Sources).

Adopted May 23, 2007

Effective June 14, 2007

**§117.8120. Carbon Monoxide (CO) Monitoring.**

When required by this chapter, the owner or operator shall monitor carbon monoxide (CO) exhaust emissions from an affected unit using one or more of the following methods:

(1) install, calibrate, maintain, and operate a:

(A) continuous emissions monitoring system (CEMS) in accordance with §117.8100(a) or §117.8110(a) of this title (relating to Emission Monitoring System Requirements for Industrial, Commercial, and Institutional Sources; and Emission Monitoring System Requirements for Utility Electric Generation Sources), as applicable; or

(B) predictive emissions monitoring system (PEMS) in accordance with §117.8100(b) or §117.8110(b) of this title, as applicable; or

(2) sample CO as follows:

(A) with a portable analyzer (or 40 Code of Federal Regulations (CFR) Part 60, Appendix A reference method test apparatus) after manual combustion tuning or manual burner adjustments conducted for the purpose of minimizing nitrogen oxides (NO<sub>x</sub>) emissions whenever, following such manual changes, either of the following occur:

(i) NO<sub>x</sub> emissions are sampled with a portable analyzer or 40 CFR Part 60, Appendix A reference method test apparatus; or

(ii) the resulting NO<sub>x</sub> emissions measured by CEMS or predicted by PEMS are lower than levels when CO emissions data was previously gathered; and

(B) sample CO emissions using the test methods and procedures of 40 CFR Part 60 in conjunction with any relative accuracy test audit of the NO<sub>x</sub> and diluent analyzer.

Adopted May 23, 2007

Effective June 14, 2007

### **§117.8130. Ammonia Monitoring.**

When required by this chapter, one of the following ammonia monitoring procedures must be used to demonstrate compliance with the applicable ammonia emission specifications of this chapter for gas-fired or liquid-fired units that inject urea or ammonia into the exhaust stream for nitrogen oxides (NO<sub>x</sub>) control.

(1) Mass balance. Ammonia emissions are calculated as the difference between the input ammonia, measured by the ammonia injection rate, and the ammonia reacted, measured by the differential NO<sub>x</sub> upstream and downstream of the control device that injects urea or ammonia into the exhaust stream. The ammonia emissions must be calculated using the following equation.

Figure: 30 TAC §117.8130(1)

$$NH_3 @ O_2 = \left[ \left( \frac{a}{b} \times 10^6 \right) - c \right] \times d$$

Where:

NH<sub>3</sub>@O<sub>2</sub> = ammonia parts per million by volume (ppmv) at reference oxygen. Reference oxygen on a dry basis is 3.0% for boilers and process heaters; 0.0% for fluid catalytic cracking units (including carbon monoxide (CO) boilers, CO furnaces, and catalyst regenerator vents); 7.0% for boilers and industrial furnaces that were regulated as existing facilities by the United States Environmental Protection Agency 40 Code of Federal Regulations Part 266, Subpart H (as was in effect on June 9, 1993), wood-fired boilers, and incinerators; 15% for stationary gas turbines (including duct burners used in turbine

exhaust ducts), gas-fired lean-burn engines, and lightweight aggregate kilns; and 3.0% for all other units;

- a = ammonia injection rate (in pounds per hour (lb/hr))/17 pound per pound-mole (lb/lb-mol);
- b = dry exhaust flow rate (lb/hr)/29 lb/lb-mol;
- c = change in measured NO<sub>x</sub> concentration across catalyst (ppmv at reference oxygen); and
- d = correction factor, the ratio of measured slip to calculated ammonia slip, where the measured slip is obtained from the stack sampling for ammonia during an initial demonstration of compliance required by this chapter and using the methods specified in §117.8000 of this title (relating to Stack Testing Requirements).

(2) Oxidation of ammonia to nitric oxide (NO). Convert ammonia to NO using a molybdenum oxidizer and measure ammonia slip by difference using a NO analyzer. The NO analyzer must be quality assured in accordance with the manufacturer's specifications and with a quarterly cylinder gas audit with a 10 parts per million by volume (ppmv) reference sample of ammonia passed through the probe and confirming monitor response to within  $\pm 2.0$  ppmv.

(3) Stain tubes. Measure ammonia using a sorbent or stain tube device specific for ammonia measurement in the 5.0 to 10.0 ppmv range. The frequency of sorbent/stain tube testing must be daily for the first 60 days of operation. After the first 60 days of operation, the frequency may be reduced to weekly testing if operating procedures have been developed to prevent excess amounts of ammonia from being introduced in the control device and when operation of the control device has been proven successful with regard to controlling ammonia slip. Daily sorbent or stain tube testing must resume when the catalyst is within 30 days of its useful life expectancy. Every effort must be made to take at least one weekly sample near the normal highest ammonia injection rate.

(4) Other methods. Monitor ammonia using another continuous emissions monitoring system or predictive emissions monitoring system procedure subject to prior approval of the executive director.

Adopted May 23, 2007

Effective June 14, 2007

**§117.8140. Emission Monitoring for Engines.**

(a) Periodic testing. When required by this chapter, the owner or operator of any stationary internal combustion engine shall test engine nitrogen oxides (NO<sub>x</sub>) and carbon monoxide (CO) emissions as follows.

(1) The methods specified in §117.8000 of this title (relating to Stack Testing Requirements) must be used.

(2) The owner or operators shall sample:

(A) on a biennial calendar basis; or

(B) within 15,000 hours of engine operation after the previous emission test, under the following conditions:

(i) install and operate an elapsed operating time meter; and

(ii) submit, in writing, to the executive director and any local air pollution agency having jurisdiction, biennially after the initial demonstration of compliance:

(I) documentation of the actual recorded hours of engine operation since the previous emission test; and

(II) an estimate of the date of the next required sampling.

(3) Engines used exclusively in emergency situations are not required to conduct the testing specified in paragraph (2) of this subsection.

(b) Proper operation. When required by this chapter, the owner or operator of any stationary internal combustion engine shall check the engine for proper operation by recorded measurements of engine NO<sub>x</sub> and CO emissions at least quarterly and as soon as practicable within two weeks after each occurrence of engine maintenance that may reasonably be expected to increase emissions, oxygen sensor replacement, or catalyst cleaning or catalyst replacement. Stain tube indicators specifically designed to measure NO<sub>x</sub> concentrations may be acceptable for this documentation, provided a hot air probe or equivalent device is used to prevent error due to high stack temperature, and three sets of concentration measurements are made and averaged. Portable NO<sub>x</sub> analyzers are also acceptable for this documentation. Quarterly emission testing is not required for those engines whose monthly run time does not exceed ten hours. This exemption does not diminish the requirement to test emissions after the installation of controls, major repair work, and any time the owner or operator believes emissions may have changed.

Adopted May 23, 2007

Effective June 14, 2007