MAINE DEPARTMENT OF ENVIRONMENTAL PROTECTION BUREAU OF AIR QUALITY PERFORMANCE TESTING GUIDANCE

This document provides guidance regarding the procedures and documentation required when conducting air emissions performance testing at facilities licensed by the Maine Department of Environmental Protection (Department), Bureau of Air Quality (BAQ).

Each performance testing process consists of certain mandatory components:
Performance Test Protocol, Protocol Meeting, Performance Test, and Performance Test Report. Each of these components is addressed in the following sections.

A. Overview of Air Emissions Performance Testing

A performance test, also known as an "emissions test," "compliance test," or "stack test," is conducted to measure the amount or rate of an air pollutant being emitted from an emissions point at a stationary source. The performance test is conducted following specific procedures developed by the U.S. Environmental Protection Agency (EPA) or, depending on the pollutant and facility involved, following an acceptable method developed by another organization. Alternative methods or deviations from a promulgated method must receive approval prior to the test.

A complete list of EPA test methods is available at https://www.epa.gov/emc. The performance test and report must provide data that is adequate to determine compliance with the standards specified in the facility's Air Emission License or required by State or Federal Regulations.

The Emissions Testing Unit of the Bureau of Air Quality's Division of Licensing and Compliance oversees the submittal, review, and data entry and control of all performance tests conducted in the State of Maine. The testing process consists of the following steps:

B. Performance Test Protocol

In general, the performance test protocol (protocol) must be submitted to the BAQ Emissions Testing Unit at least thirty (30) days prior to the date of the actual emissions test. In some instances, the thirty-day timeframe may be waived (or a regulation may have a different timeframe). All waivers require prior approval by the BAQ Emissions Testing Unit.

Some regulations may require the protocol be submitted earlier than 30 days in advance or that a copy be provided to EPA. Such requirements supersede this guidance. Please contact the BAQ Emissions Testing Unit if you are unsure about any protocol requirements.

The protocol, at a minimum, must contain the following:

1. Table of Contents

    a. Table of contents.
    b. List of figures.
    c. List of tables.

2. Introduction & Summary

   a. Name of emission testing company project manager.
   b. Name of facility for which testing is being performed.
   c. Staff assignments, responsibilities, and contact information for consultants and the facility.
   d. Summary of test, including type of pollutant(s) to be tested for (e.g., particulate matter (PM), NO_x, SO_2, VOC, etc.), purpose, and objective of the test(s).
   e. Responsible groups or organizations, industry, name of plant, plant location, air pollution control equipment, emissions points and sampling locations, and expected dates of test.
   f. Test schedule.
   g. Pre-test activities.

3. Source Description

   a. Identification/Source Description
      (1) Source license number.
      (2) Type of combustion or process being tested at the facility.
      (3) Type and quantity of all fuel consumed in the process including schematics of fuel flow from delivery through all tanks, pumps, and meters to the burners; where appropriate, the type and quantity of raw and finished materials used in the process, including schematics of material flow through all relevant equipment from delivery through finished product.
      (4) Description of any cyclical or batch operations, which would tend to produce variable emissions with time, and the impact of such variable emissions on the tested emission rate.
      (5) All relevant operating parameters used to regulate the process and parameter values representative of the facility's normal process and operating conditions.
      (6) Maximum design operating capacity of the applicable process(es).
      (7) Operating capacities of the process(es) representative of the facility's normal operating conditions that will be maintained during the test.
      (8) Where applicable, the identification and description of all soot blowing equipment found on each boiler and a soot blow schedule (including duration of soot blow cycles) representative of normal operation for each boiler.
      (9) A detailed sketch, with dimensions, indicating the flow of exhaust gases from the process, through the emission control equipment and associated ductwork, to the stack.

   b. Control Equipment
      (1) Type of emission control device(s), including design capacity and efficiency.
      (2) Pollutant(s) controlled by the emission control device.
      (3) All relevant operating parameters used to monitor the performance of the emission control device(s) and parameter values representative of the emission control device's normal operating condition.
      (4) Identification of all factors having an impact on emission control device performance.
      (5) Manner in which control equipment is to be operated during the test.

4. Sampling Locations

   a. Pursuant to 40 CFR, Part 60, Reference Method 1:
      (1) An elevation view with dimensions of the stack configuration indicating the location of the sampling ports and distances to the nearest upstream and downstream flow interferences.
      (2) A cross-sectional sketch of the stack at the sampling location with dimensions indicating the location of the sampling traverse points.
   b. Estimated flue gas conditions at sampling locations, including temperature, moisture content, and velocity pressure.

5. Sampling and Analytical Procedures

   a. A description of the emission testing equipment including a schematic diagram of the sampling train.
   b. A description of the sampling and analysis procedures. Any variation from an applicable standard Reference Test Method shall be indicated, and justification for each variation from the Reference Test Method shall be supplied and approval requested from the Department or EPA.
   c. A list of the process and control equipment logs and operating data required to document the representativeness of normal process and operating conditions, which will be collected at regular intervals during the sampling periods.
   d. Description of sample recovery and sample analysis.
   e. Discussion of any problematic sampling or analytical conditions.
   f. Description of any modifications and reason for them.
      [See section E.2 for discussion of different modification levels and their requirements.]

6. QA/QC Activities

   a. Copies of all field data sheet forms to be used during the tests, including those used to monitor process and emission control equipment operations.
   b. A description of the procedures for maintaining the integrity of the samples collected, including chain of custody and quality control assurance.
   c. Sufficient documentation to demonstrate the validity of the data submitted pursuant to Source Description section.
   d. Quality objectives.
   e. Both an internal and external quality assurance (QA) program.
   f. QC check lists.
   g. QC control limits.
   h. QA audits: type of audit, limits of acceptability, supplier of audit material, audit procedure, and audit data sheet/QC check list.
   i. For sample identification and custody: person responsible, sample identification and chain-of-custody procedure, sample identification label, chain-of-custody form, sample log sheet.

7. Reporting and Data Reduction Requirements

   Examples of data summary tables: include units (e.g., lb/MMBtu, lb/ton of product, dscm corrected to 6% O_2). *[See example in Appendix A.]*

8. Plant Entry and Safety

   a. Safety responsibilities: person responsible for ensuring compliance with plant entry, health, and safety requirements; facility person or safety officer who has the authority to impose or waive facility restrictions; and tester who has the authority to negotiate with facility person any deviations from the facility restrictions; facility safety requirements, such as watching a safety video;
   b. Safety program: briefly describe test contractor's health and safety program
   c. Safety requirements/emergency response plan
   d. Test site organization: list the key tasks and task leaders
   e. Test preparation: construction of special sampling and analytical equipment, modifications to the facility, services provided by the facility (electrical power, compressed air, water, etc.), access to sampling sites, and sample recovery area description.

The protocol will be reviewed by the BAQ Emissions Testing Unit and/or the compliance inspector assigned to the facility. If there are any errors or omissions that need to be addressed, they will contact the test company or facility.

C. Protocol Meeting

A protocol meeting shall be held at the request of any party involved in this process including, but not limited to, the facility or the Department.

D. Performance Test

The performance test must follow the preapproved protocol as well as the following general conditions:

1. All performance testing shall be conducted according to the procedures specified in one of the following:

   a. *Standards of Performance for New Stationary Sources,* 40 C.F.R. Part 60, Appendix A;
   b. *National Emission Standards for Hazardous Air Pollutants for Source Categories,* 40 C.F.R. Part 63, Appendix A; or
   c. Other applicable federal or state regulations; or
   d. As approved by the Department and/or EPA.

   Typically, a valid test shall consist of three runs. A fourth "soot-blow" run may be required for combustion sources that have intermittent soot blowing. Any variation in the sampling or analytical procedure or alternate test method shall be indicated in the protocol and receive approval by the Department prior to testing.

2. The Department may require that an agency observer, or multiple agency observers, be present during any testing or laboratory analysis.

3. The test location shall be safe for all concerned.

4. Prior to the protocol meeting (if required), the sampling location shall be inspected by the source for acceptable test conditions and safety and be modified if necessary before the commencement of the performance test.

5. All emission data submitted to or obtained by the Department, including the Protocol and Performance Test Report, is considered public information.

6. All information required to be logged during testing shall be recorded at the following regular time intervals:

   a. For a run of 90 minutes or less – 10-minute intervals
   b. For a run of greater than 90 minutes – 15-minute intervals

7. A cyclonic flow check shall be performed prior to each performance test.

8. All performance testing shall be conducted under circumstances representative of the source's normal process and operating conditions unless otherwise required by the underlying regulation or requested by the Department. Any changes to the testing as proposed in the protocol need to be approved by the Department.

E. Performance Test Report

The Performance Test Report is due thirty (30) days after the completion of testing, unless the underlying requirement includes an alternate timeframe. Variations from this need prior approval. The Performance Test Report shall contain all pertinent data concerning the tests, including a description of the process and operating conditions under which the tests were conducted, the results of the tests (including a conclusion of compliance or non-compliance with the applicable standard), and test procedures. While the exact format of the test report may vary, the following items are considered minimum requirements. Note that this list is not necessarily inclusive; additional elements of the test report may be required as necessary to ensure the completeness of the report.

1. <u>Introduction</u>

   a. Source identification (including license number), location, and date(s) of tests.
   b. Purpose of test(s).
   c. Description of source being tested.
   d. Name and affiliation of person in charge of conducting the source test.
   e. Data attesting to the representativeness of source or processes in operation during the testing.

f. General identification information for the facility including a mailing address, the physical address, the owner or operator or responsible official (where applicable) and his/her email address, and the appropriate Federal Registry System (FRS) number for the facility.
g. Purpose of the test including the applicable regulation(s) requiring the test, the pollutant(s) and other parameters being measured, the applicable emission standard and any process parameter component, and a brief description.
h. Identification of the company conducting the performance test, including the primary office address, telephone number, and the contact for the test program including his/her email address.
i. Identification of any deviations from the emissions test protocol and the reasons for them.

2. Summary of Results

a. Operating and emission data reported in the units of the applicable emission standard(s).
b. Comparison with the applicable emission standard.
c. Summary sheet of results.
d. Field test changes and problems.

3. Source Description

a. Description of process, including operation of emission control equipment.
b. Type and quantity of all fuel consumed in the process during the test(s); and where appropriate, the type and quantity of raw and finished materials used in the process during the test(s).
c. All relevant operating parameters used to regulate the process (including firing rate or total fuel burned), and parameter values recorded during the test(s).
d. All relevant operating parameters used to monitor the performance of the emission control device(s) and parameter values recorded during the test(s).
e. Description of the emission unit tested including fuel burned, control devices, and vent characteristics (in sampling and analytic procedures); the appropriate source classification code (SCC); the permitted maximum process rate (where applicable); and the sampling location.
f. Production schedules (hours/day, days/week, weeks/year, and peak periods).
g. Discussion of any problematic sampling or analytical conditions.

4. Sampling and Analytical Procedure

a. Description of the sampling train and field procedures.
b. Description of recovery and analytical procedures.
c. Sketch indicating sampling port location(s) relative to process, emission control equipment, upstream and downstream flow disturbances.
d. Sketch of cross-sectional view of stack indicating traverse point locations.
e. Names and titles of all personnel (including operators and supervisory staff) and organizations participating in the test(s).
f. Description of sampling and analysis procedures used and any modifications to standard procedures, record of process operating conditions that demonstrate the applicable test

conditions are met, and values for any operating parameters for which limits were being set during the test.

5. Test Results and Discussion

   a. Detailed tabulation of results including process operating conditions and flue gas conditions.
   b. Discussion of the results relative to operating parameters and applicable emission standards.
   c. Detailed discussion of and justification for any divergence from normal sampling procedures or operating conditions which could have affected test results or the representativeness of the test results.
   d. Visible Emission observations performed during the test(s) (as applicable).

6. Calculation and Data Reduction Methods

   Description and presentation of computational methods, including equation format used to obtain final emission results from field data.

7. QA/QC

   a. Quality assurance procedures and results.
   b. QA Audit.
   c. QA/QC problems.

8. Supporting Documentation

   a. Copies of all field data collected during the test(s), including sampling data sheets and process operating logs and charts.
   b. Copies of all analytical laboratory data, including oil samples, where appropriate.
   c. Calculation sheets or computer input and output data.
   d. Sampling equipment and laboratory calibration data.
   e. Cyclonic flow check data.
   f. Copies of continuous emission monitor data and/or continuous opacity monitor data collected during the test(s) as applicable.
   g. Calibration sheets for the dry gas meter, orifice meter, pitot tube, and temperature thermocouples.
   h. Calibration sheets for all process equipment and parameter monitors from which required data will be recorded.
   i. A list of pre-weighed filters that were used (where applicable) during emission testing, including identification and tare weights.
   j. Chain of custody documentation as applicable.
   k. Example calculations for reported results.
   l. Gas cylinder certifications.

All charts, logs, and data sheets shall be clearly marked such that all required information is easily ascertained. All charts, logs, and data sheets shall be clearly marked to indicate the beginning and end of each test run as well as all periods of delay during test sampling.

If at any point, either prior to, during, or after the performance test, there are any questions please feel free to contact the BAQ Emissions Testing Unit either at (207) 287-7644 or at StackTestDEP@maine.gov.

F. Additional Information

1. Protocol and Report Submission

   Both protocols and performance test reports may be submitted to the Department electronically by emailing to StackTestDEP@maine.gov. Alternatively, protocols and reports may be submitted on CD or in print (hard copy) by mailing to:

   Maine Department of Environmental Protection
   Bureau of Air Quality
   Attn: Emissions Testing Unit
   17 State House Station
   Augusta, ME 04333-0017

   The physical address (for Fed Ex or UPS shipments) is 25 Tyson Drive.

   Some regulations specifically require submission of information through EPA's Electronic Reporting Tool (ERT). Regardless of such requirements, all protocols and performance test reports shall also be submitted to the Department as described above.

2. Modifications of Testing Methods

   If your facility wishes to propose a deviation from a required test method, that deviation shall be approved by the delegated agency prior to the test.

   a. New Source Performance Standards (NSPS) Testing Methods:
      NSPS classifies changes into two categories, minor and major. Minor changes may be submitted in the testing protocol and approved by the Department while major changes must be approved by EPA Office of Air Quality Planning and Standards (OAQPS).

      For further information of the difference between minor and major changes, please contact the BAQ Emissions Testing Unit or review EPA's guidance documents titled "*How to Review and Issue Clean Air Act Applicability Determinations and Alternative Monitoring*," EPA 305-B-99-004, (February 1999).

   b. National Emission Standards for Hazardous Air Pollutants (NESHAP) Testing Methods:
      NESHAP (also known as MACT) classifies changes into three categories according to 40 C.F.R. §§ 63.90 and 63.91(g); minor, intermediate, and major.

      Minor changes may be submitted in the protocol and approved by the Department, intermediate changes must be approved by the Department via written correspondence, and major changes shall be requested via written correspondence with EPA OAQPS.

For further information of the difference between minor, intermediate, and major changes, please contact the Department's Emissions Testing Unit or review EPA's guidance documents titled "*How to Review and Issue Clean Air Act Applicability Determinations and Alternative Monitoring*," EPA 305-B-99-004, (February 1999).

3. Extensions

In some instances, extensions may be requested, and upon Department and/or EPA approval, granted. Such requests are taken on a case-by-case basis.

4. Waivers

In some instances, waivers may be requested, and upon Department and/or EPA approval, granted. Such requests are taken on a case-by-case basis.

G. Appendix A

Attached Example of Summary Table

Company Name **Air Emission License #**

Test Location
Stack Test Company
Date of Test

Equipment Tested
Emissions Control
Stack Moisture
Flow Rate
Oxygen %
Temperature (°F)
CO2 %
% Operating Load
Steam Load (KPPH)

Pollutant Tested For	PM
Reference Test Method	5

	Result	Limit	Unit	Pass/Fail
Emissions Conc 1			gr/dscf	
Emissions Conc 2				
Emissions Mass			lbs/hr	P

Pollutant Tested For	CO
Reference Test Method	10

	Result	Limit	Unit	Pass/Fail
Emissions Conc 1			ppm	
Emissions Conc 2				
Emissions Mass			lbs/hr	P

Add sections as needed.