



SOURCE EMISSIONS MONITORING TEST GUIDELINES – Version 2.0

**Connecticut Department of Energy &
Environmental Protection (DEEP)
Bureau of Air Management
Source Emissions Monitoring
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The DEEP SEM Unit has updated and revised the SEM Emissions Test Guidelines as part of its' LEAN Initiative to launch its new compliance emissions testing and Relative Accuracy Test Audit operational procedures.

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Section 1. Introduction

Emission tests are performed in the State of Connecticut for the purposes of (1) determining what the actual emissions of a pollutant are, (2) determining compliance with air pollution permits and regulations, and (3) for conducting Continuous Emissions Monitoring (CEM) relative accuracy test audits (RATA). All emissions testing must be conducted in accordance with procedures prescribed by or acceptable to the Department of Energy and Environmental Protection (hereinafter referred to as the "DEEP"). These guidelines are designed to ensure standardization of test requirements, standards regarding test equipment and competence of persons intending to perform emission tests. Failure to follow these guidelines or provide the information required may result in the rejection of the test and/or test program.

The source owner or operator should review all applicable permits, federal and state regulations and enforcement orders prior to completing the intent to test form and an emission test protocol. Reference test and analysis methods for stack testing and CEM relative accuracy testing are as specified in Title 40, Code of Federal Regulations (CFR) ¹, Parts 51, 60, 61, 63 and 75. The reference methods and equipment requirements must be strictly complied with, unless otherwise specified and agreed to by the DEEP.

Intent to Test (ITT) Forms and attachments (when applicable), test protocols for non-standard test protocols, emissions test reports, and completed Compliance Certification forms and any associated correspondence should be submitted to the Source Emissions Monitoring (SEM) to DEEP.SEM@ct.gov address. Section 3 of these Guidelines outline the revised ITT procedures.

Section 2. Clean Air Act National Stack Testing Guidance

The requirements contained in US EPA's Clean Air Act National Stack Testing Guidance are hereby incorporated by reference. They are available at the following web address:

<http://www2.epa.gov/compliance/clean-air-act-national-stack-testing-guidance>

Section 3. Selection of the Measurement Site

Selection of the measurement site must be in accordance with Reference Method 1 of 40 CFR Part 60. Plan and elevation drawings of the duct and stack configuration must be submitted to the DEEP in accordance with the following:

A. Stack Testing

1. Existing Sources

For an existing source, drawings must be submitted with the test protocol described below showing the plan and elevation view of the ducting and stack arrangement. The drawings must include the position of all processes or operations venting to the stack or duct to be tested. It must also include the position of the sampling ports relative to the nearest upstream and downstream gas flow directional or duct dimensional change; and

¹ [Code of Federal Regulations \(eCFR\)](#)

2. New or Modified Sources

For a new or modified source, design drawings as specified above must be submitted to the SEM unit prior to construction (as well as with the test protocol). A representative of the SEM unit may also perform an inspection of the proposed sample port locations during the construction phase.

B. Relative Accuracy Testing

For relative accuracy testing, the measurement site must be selected in accordance with the applicable relative accuracy test procedures contained in 40 CFR 60, 61, 63 and/or 40 CFR 75 (as may be applicable).

Section 4. Intent to Test (ITT) Forms (DEEP) & Performance Test Notifications (EPA)

The DEEP has released two new ITT Forms to separate the compliance emissions test procedures from the CEMS relative accuracy test auditing procedures: “ITT Form for Compliance Emissions Testing” and “ITT Form for CEMS Relative Accuracy Test Audit” which replace the former (combined) ITT Form.

Regardless of which form is submitted, the DEEP has also implemented an additional subcategory for the ITT process: Standard versus Non-Standard test protocols.

A. Standard and Non-Standard Test Protocols

ITT Forms must be received by the SEM unit within the applicable timeframe specified below, unless a more stringent requirement is specified in an applicable regulation, permit or enforcement order.

ITT Forms must be sent electronically to DEEP.SEM@ct.gov. Hard copies of the ITT forms may also be submitted but must also be sent electronically.

1. Standard Test Protocols (Due 60-days in advance of proposed test date)

Following are examples of test drivers that require Standard Test Protocols:

- a. NSR Permit – for recurring testing (after an initial performance test);
- b. Annual RATA – after a certification RATA is performed;
- c. NSPS testing – recurring testing pursuant to 40 CFR Part 60 Subpart KKKK;

Standard Test Protocols require the submittal of a completed ITT Form and do not require a separate test protocol. Submittal of completed ITT Forms are due 60-days in advance of proposed test dates. The DEEP will not issue formal approval letters for Standard test protocols.

2. Non-Standard Test Protocols (Due 90-days in advance of proposed test date)

Non-Standard test protocols require more time to review to ensure that program requirements will be met and are required for the following test drivers but are not limited to:

- a. Initial performance testing;
- b. Testing that proposes the use non EPA Reference Method;

- c. All VOC sources;
- d. MWC sources performing testing pursuant to RCSA Section 22a-174-38; and
- e. Initial Certification RATA for new CEMS or new equipment;
- f. Any variance from the requirement to test at 90% of MRC

Non-Standard test protocols require additional attachments (a detailed test protocol that meets the requirements of this Section of these Guidelines). These must be submitted 90-days in advance and the DEEP will issue formal protocol approval or rejection letters.

Note: Initial CEMS RATA Certifications require that a CEMS Plan be submitted with the CEMS RATA ITT Form and test protocol that meets the requirements of Section 8 of these Guidelines.

Test Protocol Content

The Emission Test Protocol will be evaluated for its conformance to applicable test methods and process conditions. The protocol must include, at a minimum, the following information:

1. A schematic diagram of each sampling train, including construction materials;
2. The type or types of media to be used to determine each gas stream component;
3. Sample recovery, clean-up methods and solvents to be used (sample recovery procedures must be performed on-site);
4. A sample of all field data sheets to be used during the test;
5. Sampling area description:
 - a. Stack configuration;
 - b. Sampling port locations; and
 - c. Sampling point locations for each port.
6. A written description of process operations and monitoring to include, but not be limited to, the descriptions of the following:
 - a. Material usage and associated recordkeeping;
 - b. Throughput rates and monitoring (e.g., feed, fuel flow and steam flow rates);
 - c. Maximum Rated Capacity (MRC) of equipment and parameters to be monitored to show MRC;
 - d. Typical (and, if necessary, historical) operating levels; and
 - e. Control equipment operation and monitoring (as applicable).
7. A description of each test method to be used;
8. Quality assurance/quality control procedures; and
9. Provide equations and reference methods used to calculate emissions in lb./hour, lb./MMBTU – be explicit and provide step-by-step calculations. Ensure where required to use Reference Method 2 flowrate data for mass emissions rate calculations.)

VOC Sources

The DEEP does not accept the use of EPA Reference Method 25A to determine VOC emissions on a mass basis. For guidance to best handle VOC sources that require emissions measurement in pounds VOC/hour please reference the following guidance:

[“Measuring and Reporting Emissions on a Mass VOC Basis”](#)

B. Performance Test Notifications - EPA Region 1

Note: The DEEP has different nomenclature than EPA but this helps ensure that the DEEP enforces the separate state requirements or overlapping EPA and State requirements.

<u>EPA</u>	<u>DEEP</u>
Notification	ITT Form
Test Plan	Protocol

It's the responsibility of the source to ensure that compliance is met with both state and federal test requirements. Often state and federal test requirements may overlap particularly when a New Source Review permit cites a federal test requirement (such as the RICE Rule). EPA uses different terms and the performance test starts with a *test notification* but sometimes also requires submittal of a complete site specific test plan. Subsequently, EPA Region 1 must be notified of a pending test as well as the DEEP within the required deadline(s) specified in a given Federal Rule (40 CFR Part 60, Part 61, Part 62, Part 63, or Part 75). Such test notifications should be submitted to the EPA Region 1 Air Compliance Clerk below.

Although a test notification starts the clock with regards to a federal driven test requirement, EPA does not have a separate form. DEEP forms serve as "test notifications" for EPA purposes. EPA requires that a copy of a completed Intent to Test Form and test protocol be sent to the following address.

Air Compliance Clerk
US EPA Region I
Air Technical Unit OES04-2
5 Post Office Square, Suite 100
Boston, MA 02109-3912
E-mail: Schwartz.Sandra@epa.gov
Phone: (617) 918-1204 Fax: (617) 918-0204

Section 5. Performance Test Timeframes (Including Waivers and Extension)

Table 5 below lists the performance test timeframes for both Federal and State driven test requirements. Please be attentive to overlapping test requirements. For test requirements driven by Federal requirements, there are no regulatory mechanisms to extend a deadline for stack testing required by the federal NSPS, NESHAP, and MACT programs, with the exception of testing delayed by a force majeure event. A force majeure event is defined in the federal subparts of those programs as:

"Circumstances beyond the control of the affected facility, its contractors, or any entity controlled by the affected facility that prevents the owner or operator from complying with the regulatory requirement to conduct performance tests within the specified time frame despite the affected facility's best efforts to fulfill the obligation."

Examples of such events are acts of nature, acts of war or terrorism, or equipment failure or safety hazard beyond the control of the affected facility. For test requirement driven by a Federal Rule, an extension of the test deadline must be solicited directly from EPA well in advance of the proposed test deadline.

Table 5 - Performance Test Deadlines

Regulation	Performance Test	Timeframe
NSR Permit & 40 CFR 60 – New Source Performance Standards (NSPS)	Initial	Within 180 days after the initial startup date or within 60 days after reaching maximum production rate [40 CFR §60.8(a)] or at such other times specified by part 60 or any corresponding NSR Permit.
	Recurring	As specified in the corresponding NSR permit the NSPS subparts. It could range from 8760 hours of operation to up to 5 years from the previous stack test.
40 CFR 61 – National Emission Standards for Hazardous Air Pollutants (NESHAP)	Initial	a. Within 90 days after the effective date, for an existing source or a new source which has an initial startup date before the effective date.
		b. Within 90 days after initial startup, for a new source which has an initial startup date after the effective date. [40 CFR §61.13(a)]
	Recurring	The DEEP may require to test emissions from the source at any other time when the action is authorized by section 114 of the Act. [40 CFR §61.13(b)]
40 CFR 63 -NESHAP for Source Categories: Maximum Achievable Control Technology (MACT)	Initial	Within 180 days of the compliance date, or within 180 days after startup of the source, whichever comes later [40 CFR §63.7]
Nitrogen Oxides (NOx) RACT [RCSA §22a-174-22e]	Initial	No later than one year after the source becomes subject to RCSA §22a-174-22e. Phase 1 and Phase 2 have different deadlines.
	Recurring	Any owner or operator of a stationary source who has not installed and operated a continuous emissions monitor at such source shall conduct emission testing once every 63 months from the date of the previous test or 63 months from the date the previous test was due, whichever is earlier. [RCSA §22a-174-22e(l)]
Municipal Waste Combustor (MWC) Regulation [RCSA §22a-174-38]	Initial	As specified in the corresponding NSR permit
	Recurring	Annual performance test for dioxin/furan, particulate matter, hydrogen chloride, cadmium, lead, mercury and fugitive ash at least once per calendar year. Such test shall be conducted no less than nine(9) Calendar months and no more than fifteen (15) calendar months following the previous performance test for such pollutant or the frequency as specified in RCSA §22a-174-38(i)(3). [RCSA §22a-174-38 (i)].
Sewage Sludge Incinerators [Connecticut General Statutes (CGS) §22a.191a(b)]	Initial	As specified in the corresponding NSR permit
	Recurring	Annual Performance Test for the presence of mercury, metals and hydrocarbons in the air emissions of each such incinerator
Initial Relative Accuracy Test Audit	Initial	Timeframe is specified in the applicable permit or regulation
Ongoing Annual Relative Accuracy Test Audit	Recurring	Every four calendar quarters for sources subject to 40 CFR Part 60 RATA; Every 2 or 4 QA operating quarters (calendar quarter in which there are at least 168 unit or stack operating hours) but no less than 8 calendar quarters plus a grace period for sources subject to Part 75 RATAs.

Section 6. Conducting the Stack Test

A. Process Operating Conditions

1. Stack Testing

Emission values obtained from any test program may be considered valid only for the process operating conditions existing during testing. The source must be operated at or above ninety percent (90%) of maximum capacity during emissions testing.

For fuel burning sources, MRC is based on maximum gross heat input as specified in the NSR permit. For MWCs, MRC is based on steam load in pounds per hour. For VOC sources, MRC is based on material throughput i.e. lb./hour of VOCs. Refer to the NSR permit to determine worst case operational configuration for VOC sources that have multiple lines or products venting to a common incinerator/oxidizer.

Any variance from the requirement to test at 90% of MRC must be presented in the ITT form and must be approved by the DEEP in advance of the test. Operation of equipment at rates differing from those existing during testing may place the equipment in violation.

It is recognized, however, that there are specific processes that may warrant testing at less than 90% of maximum capacity (e.g., a process with a control or removal efficiency of a specified pollutant, in which lower inlet loading to a control device may result in worst case operating conditions). Therefore, on a case-by-case basis, the DEEP may approve emission tests conducted at less than 90% of maximum capacity, provided a sufficient justification for a different testing condition is submitted with the test protocol.

2. Relative Accuracy Testing

For relative accuracy testing, the process operating level must be as specified in 40 CFR 60, 61, 63 and/or 40 CFR 75 (as may be applicable).

B. Representative Conditions

Applicant must submit records showing operating conditions of the control equipment, such as the RTO operating temperature, Ammonia feed rate for the SCR, etc., to justify that testing would be conducted at the representative conditions. The DEEP will not allow resetting of the control equipment operating parameters to achieve the desired test results.

C. Test Stoppages and Postponements

A source must never stop or postpone a performance test solely because the testing showed that the emissions unit being tested was exceeding or might exceed an emission standard, or might otherwise fail the test. Depending on the circumstances surrounding the stoppage, the facility may be found in violation of the requirement to conduct a stack test, the underlying regulatory requirement, or both.

Once a test is initiated, at least 1 run must be completed and data submitted to the DEEP within 24 hours.

1. Non-Title V Source Stoppage

If a performance test is stopped or postponed for any reason, the source must contact the DEEP SEM (DEEP.SEM@ct.gov) Supervisor not later than the end of the first business day after the occurrence. Testing may not be stopped solely due to failing or possibly failing results.

2. Major Source Stoppage (Title V Source)

Once started, if a performance test is stopped or postponed for any reason, the source must contact the DEEP SEM Supervisor as soon as possible, and in no case later than the end of the first business day after the occurrence. The stopped test should be reported by the owner/operator to the DEEP CACU in a [Title V deviation report](#). Testing may not be stopped or postponed solely due to failing or possible failing results. The source must take a failed test into consideration as part of its annual compliance certification and Air Quality will report the failed test in the national air data system. Moreover, Air Quality may start enforcement action and assess penalties consistent with the HPV Policy and CAA Civil Penalty.

3. Postponements

When a source cannot conduct an emissions test on some or all of its emissions units because they are shut down, inoperable, unable to achieve the required load, or not on site, then the source must notify the DEEP in writing before performance testing is due, either in a submitted protocol or by separate correspondence at least three days before the proposed test date. The DEEP will evaluate the circumstances surrounding the proposed postponement to determine if this action would violate a permit condition or an applicable requirement. The DEEP will not allow postponement of a test to avoid a performance test failure or other violation.

4. Interrupted Testing

For situations outside of the source's control, for example if a test was interrupted because of insufficient fuel or an interrupted fuel supply, then the DEEP can be notified and testing should be resumed within 24-hours of availability of such fuel.

For example, if a testing performed at a MWC is interrupted because they have insufficient trash to maintain load requirements, then an interrupted test must be resumed within 24 hours of initiating Run 1, if the testing is stopped for a legitimate reason and not just to avoid an exceedance. So if a source completes a two hour metals run and they run out of trash to conduct the rest of the program, they would get two days to complete the set of three runs before they would have to start over and repeat the earlier run(s).

Test runs must be consecutive and may not be interrupted to service the equipment in any way. For example, if Run 1 was completed but a 2nd run was paused for a time period more than 10 – 15 minutes to service the equipment and reduce emissions that is not acceptable. The equipment must be run at normal operations, with no changes or adaptations made to its air pollution controls or other parameters. Each raw data set must be submitted in a test report. An additional run in excess of the accepted protocol may not be performed without securing DEEP approval.

D. Test Observations

DEEP representatives may audit the field test procedures and process operation during testing. At a minimum, the following information will need to be supplied during each test program:

1. Prior to testing, calibration data as specified by the applicable test methods must be made available to the DEEP representative auditing the test. Frequency of calibration must be as specified by the appropriate test methods;
2. During field testing, the DEEP's representative may collect copies of test data sheets and process documentation; and
3. Whenever an audit sample is required, the DEEP will review and approve audit samples proposed by lab vendors for use during a performance test effort. These results will remain confidential and will be used to analyze the test results. Failure to meet the audit criteria will result in rejection of the test results.

Section 7. Submittal of Test Reports

Unless a more stringent requirement is specified in an applicable regulation, permit or enforcement order, the following report submittal deadlines shall apply:

Table 7 - Test Report Submittal Deadlines

Regulation	Report Submittal Deadline
40 CFR 60 – New Source Performance Standards (NSPS)	60 days if it is not otherwise specified in the NSPS
40 CFR 61 – National Emission Standards for Hazardous Air Pollutants (NESHAP)	Within 31 days after completion of the test [40 CFR §61.13(f)]
40 CFR 63 –Maximum Achievable Control Technology (MACT)	Within 60 days after the test is completed unless another time frame is specified in the applicable subpart [40 CFR §63.9(h)(2)(i)(G)]
Nitrogen Oxides (NOx) RACT [RCSA §22a-174-22e]	Within 60 days after emission tests are conducted [RCSA §22a-174-22e]
Municipal Waste Combustor (MWC) Regulations [RCSA §22a-174-38]	Within 60 days after tests are conducted
Sewage Sludge Incinerators [Connecticut General Statutes §22a-191a(b)]	Within 60 days after tests are conducted
New Source Review (NSR) permit	Within 60 days after tests are conducted
Initial Performance Testing pursuant to NSR	Within 180 days after the initial startup date or within 60 days after reaching maximum production rate [40 CFR §60.8(a)] or at such other times specified by part 60 or any corresponding NSR Permit.?
Initial Relative Accuracy Test Audit	Deadlines are specified in applicable permit or regulation
Ongoing Relative Accuracy Test Audit	Within 30 days following the close of the calendar quarter in which the test is conducted

Section 8. Test Report Contents

Test reports should also be submitted electronically to DEEP.SEM@CT.gov, however, any test report exceeding 50 pages must *also* be submitted in a hard copy format.

The test report must include, at a minimum a completed Compliance Certification Form and the following information:

1. Compliance Certification Form for each unit tested and attached as a cover page for the test report;
2. Summary of the test program;
3. Key personnel involved in the test program;
4. Description of the process and operation (include schematic diagrams where applicable);
5. Description of the control equipment (include schematic diagrams where applicable);
6. Description of the flue gas sampling locations (with schematic diagrams where applicable);
7. Description of process sampling locations/ procedures (with schematic diagrams where applicable);
8. Test objectives and matrix;
9. Description of any test changes (i.e., deviations from the test protocol) and/ or problems encountered;
10. **Step-by-step calculations** demonstrating how and what data was utilized to calculate emissions;
11. Test results and emission limitations in tabular form including averages. The units of measurement must be consistent with units in the applicable permit, regulation or enforcement order;
12. A photocopy of all actual field data sheets used during the test. If any field data sheets are illegible, legible transcribed copies must also be included;
13. A breakdown of each formula use and calculations to arrive at emissions in each unit (ppmv, lb./hr., lb./MMBTU, micrograms/ACM, etc.)
14. Copies of all pre and post calibration data;
15. Quality assurance/ quality control documentation;
16. Fuel sampling results where applicable;
17. Process data (including percent of MRC) in tabular form averaged over each test period; and
18. Laboratory data sheets and laboratory QA/QC.

Section 9. Helpful Source Testing Web Links

1. [SEM Web Address \(CT-DEEP\) ITT Form/Compliance Certification Form](#)
2. [Emission Measurement Center \(EPA\):](#)
3. [Code of Federal Regulations \(E-CFR\):](#)
4. [DEEP Source Monitoring Regulations for CEMS and COMS](#)
5. [DEEP Stack Testing Regulations](#)
6. [National Emission Test Guidelines](#)
7. EPA Audit sample program