



# Maricopa County

Air Quality Department

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## **Air Quality Performance Test Guidelines For Compliance Determination In Maricopa County**

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## 1. INTRODUCTION

Performance testing, source testing, stack testing and compliance testing are all terms for the same requirement. Where modeling estimates the ground level concentration some distance from the point of release, performance testing is a direct measurement of emissions at the point of release. Performance tests are conducted according to established procedures in order to quantify emissions and provide an objective means for determining compliance with established emission limits.

From a technical and legal standpoint, a performance test is often the ultimate determination of compliance. While the test may be manpower and equipment intensive, the results are of great significance to both the regulatory agency and the facility. The results often determine the course of enforcement discussions between the agency and the facility. Considering the significance attached to the results, it is important that the test be performed in a valid representative manner. The complex nature of the various test methods place great responsibility on agency, facility and testing personnel to ensure each test is an accurate representation of a facility's actual emissions. Due to the precision and accuracy required for acceptable test results, it is recommended that the tests be performed by experienced professionals.

The purpose of this document is to provide guidance for facilities and test companies conducting air quality performance tests in Maricopa County. It will assist in planning and preparing for testing, conducting the test, and preparing a complete and accurate test report. Failure to incorporate the items specified for test protocols will be cause for rejection of the test protocol which may delay testing. Failure to incorporate the items specified for test reports will be cause for rejection of the test report which may delay compliance determination.

This guidance is not intended to supersede any specific requirements of the Environmental Protection Agency's Test Methods. Nor does it relieve a facility or the contracted test company from fulfilling their obligations as described by their permit and the applicable County, State, and Federal rules and regulations. It should be utilized as a means to improve the process of planning, conducting, and reporting performance tests.

The Air Quality Performance Test Guidelines are available electronically on the Maricopa County Air Quality Department (hereafter, MCAQD) website.

## 2. TEST PLANNING

**2.1 Test Methods** - Testing should be performed in strict accordance with procedures specified in the *Code of Federal Regulations*, Title 40, Part 60 (Standards of Performance for New Stationary Sources, Appendix A), Part 61 (National Emission Standards for Hazardous Air Pollutants, Appendix B), Part 63 (National Emission Standards for Hazardous Air Pollutants for Source Categories, Appendix A) and Part 51 (Requirements for Preparation, Adoption, and Submittal of Implementation Plans, Appendix M); and in the *Maricopa County Air Pollution Control Rules*. Any deviation to the sampling or analytical procedures must be described in the test protocol and receive MCAQD approval prior to testing. Where federal test methods are not available for the pollutants of concern, or the nature of the test site makes their use impractical, other methods may be proposed. Justification for alternate test methods must be provided which thoroughly explains the applicability of the proposed test for a particular site and pollutant.

Adherence to the standardized procedures for sampling and analyses is essential. Unless a deviation to a test method is proposed and approved, MCAQD will assume that testing will follow the reference method verbatim. EPA involvement may be required for some deviations.

**2.2 Test Companies** – MCAQD does not have a certification or approval program for test companies. Nor can we make any recommendations for or against a test company. Any test company is allowed to conduct performance tests in Maricopa County. The Source Evaluation Society website ([www.sesnews.org](http://www.sesnews.org)) maintains a nationwide list of stack testing companies. Please note that selection of a test company is not limited to those that appear on this list.

**2.3 Pre-Test Site Surveys** - It is strongly recommended that an on-site pre-test survey be performed with the test company to establish stack dimensions, sample port locations or installation requirements, scaffolding or lift equipment requirements, electrical power requirements, operating conditions and safety requirements and procedures. Any non-scheduled maintenance or changes shall be avoided for two weeks prior to the test for system stabilization. The facility should also confirm stack accessibility by removing caps from sample ports and verify that all monitoring instrumentation is installed and working properly.

**2.4 Test Protocols** - A test protocol is required to be submitted to MCAQD to establish consistency and ensure that proper test methods and procedures are employed. The test protocol is a complete description of the process and control equipment, demonstration requirements, proposed test methods, and sampling location. Any proposed deviations from the test methods must also be included for approval.

Postponement of the test, or rejection of the test results may occur if the test method requirements are not met.

The facility and test company shall both identify a representative who will participate in coordinating the test. The facility representative shall be able to identify all of the process and control equipment operating parameters needed to establish the system's operating conditions during testing. For compliance determinations, representative normal operating conditions may include a worst case scenario that will allow the facility to demonstrate compliance at all times of operation.

Attachment 1 identifies the minimum requirements of a complete test protocol. Please note that this is a general list; the required information will vary depending on the facility and the pollutants of interest. The protocol should follow this format and input should be provided for each item to assure protocol approval. All pages of the test protocol shall be identified by a unique page number. A complete submittal will minimize the possibility of a test rejection as a result of improper sampling or data collection methods.

A separate test protocol shall be submitted for each piece of equipment tested. The test protocol shall be submitted at least 30 calendar days prior to the scheduled test date unless otherwise specified in permit conditions or regulations.

Performance testing shall not be conducted without an approved test protocol as required in the facility's permit conditions. Failure to submit a test protocol for review will result in the rejection of the test results.

**2.5 Test Protocol Submittal Forms** – The Performance Test Protocol Submittal Form provides specific test information in short answer or yes/no format. Most questions also require citation of the section and page numbers in the test protocol where the question is more fully addressed. The checklist requires signatures from representatives of both the facility and the test company. The checklist can be found at <http://www.maricopa.gov/aq/divisions/compliance/air/pdf/PerformanceTestProtocolSubmittalForm.pdf>. A completed checklist shall accompany every test protocol submitted to MCAQD. A complete and accurate checklist will minimize delays in test protocol approval that could possibly result in test postponement.

**2.6 Confidentiality Claims** - Any confidentiality claims shall be accompanied by a notice of confidentiality pursuant to ARS §49-487(c) that precisely identifies the information that should be considered confidential and protected from disclosure to the public. The notice shall contain sufficient supporting information to allow MCAQD to evaluate whether such information satisfies the requirements related to trade secrets or

how the information could cause substantial harm to the facility's competitive edge. MCAQD will not, however, consider any emissions data confidential information.

When claiming confidentiality, two copies of the test protocol shall be submitted: one complete copy that includes the confidential information and a second copy for public record with the confidential information removed. The confidential test protocol should be marked as such on the cover with the pages on which the confidential material can be found identified at the beginning of the protocol. Each page that contains confidential information should also be clearly marked.

**2.7 Test Protocol Reviews** – MCAQD will review the test protocol to ensure that it satisfies the testing requirements in the facility's air quality permit and applicable regulations. The technical review will confirm the use of appropriate test methods, analytical procedures and sampling durations. After obtaining any additional information from the facility or the test company necessary to complete review of the test protocol, MCAQD will provide formal notice of approval or disapproval to the facility and test company. Modifications or additions to the test protocol may be required to ensure that the test results meet the regulatory requirements. Any disagreements regarding such modifications/additions must be resolved prior to the test date.

**2.8 Test Date Notifications** – The facility has the responsibility to notify MCAQD of the scheduled test date and time at least two weeks prior to the test so that a MCAQD observer may be present. Tests shall be conducted during normal business hours unless other arrangements have been approved due to extenuating circumstances. Failure to provide adequate notification could lead to rejection of all test results.

### **3. PERFORMANCE TESTING**

Performance test results can have a significant impact on the continued operation of the process; therefore, it is important that the test be performed in a valid and representative manner.

The facility has the primary responsibility of assuring that they are ready for the test when the test team arrives at the site. Prior to testing, the facility and/or test company shall provide performance test facilities as specified by MCAQD to include:

1. Sampling ports adequate for the applicable test methods,
2. Safe sampling platforms, as required,
3. Safe access to the sampling platforms, and
4. Suitable power source for the sampling and testing equipment.

Process and control device operating parameters recorded during testing are often compared to future operations at the facility. The specific operating parameters required will vary from one facility or process type to another. It is the facility's responsibility to ensure that any operating parameters requested by MCAQD are properly documented.

When conducting a performance test, great care must be taken collecting the data. The goal is complete and accurate information at representative conditions. In order to accomplish this, it is essential to coordinate testing with production and maintain contact between the facility and test team throughout the test. The following items are considered additional guidance for the data collection phase beyond the requirements provided in the individual test methods:

**3.1 Test Observations** - MCAQD attempts to provide a regulatory observer for each performance test. In the event that MCAQD has approved testing without a regulatory observer present, all data sheets shall be scanned and emailed to MCAQD (if requested) within 24 hours of completing each test run. In the event that a change to the test procedures is necessary without a regulatory observer present, the test company shall contact MCAQD for approval prior to proceeding with the unapproved methodology. Unapproved modifications to the approved test methods may result in rejection of the test results.

**3.2 Audit Samples** – EPA audit samples provide the opportunity to check the accuracy of the test company's sampling procedures and/or laboratory's analytical procedures and can be initiated by the facility, test company or MCAQD. MCAQD shall be notified at least 30 days prior to the test date if either the facility or test company requests audit samples. The laboratory or test company shall call MCAQD with the analyses results of the audit samples prior to analyzing the performance test samples. If the audit sample results are within the acceptable range, MCAQD will give approval for the performance test samples to be analyzed. Otherwise, the laboratory will be informed that they do not have the correct results and additional analyses must be attempted.

**3.3 Traverse Point Locations** - The traverse point locations shall be clearly marked on the probe or pitot tube and shall include the port extension length, when applicable.

**3.4 Cyclonic Flow Checks** - Testing for the absence of cyclonic gas flow must be performed with the process operating in the same manner as it will during the test. This verification shall be conducted prior to the test and the results shall be presented in the test report.

**3.5 Number of Test Runs** - In accordance with 40 CFR Part 60 Section 60.8 and Maricopa County Air Pollution Control Rule 270, each performance test is to consist of three separate test runs, and the arithmetic mean of the results shall apply. "In the event that a sample is accidentally lost or conditions occur in which one of the three runs must

be discontinued because of forced shutdown, failure of an irreplaceable portion of the sample train, extreme meteorological conditions or other circumstances beyond the owner or operator's control, compliance may, upon MCAQD approval, be determined using the arithmetic mean of the results of the two other runs." MCAQD will not allow one test run to be excluded unless these conditions are met.

**3.6 Data Documentation** – Non-erasable ink must be used to record data. In the event of an error, the data-taker crosses through the erroneous value with a single line, records the correct value above it, and initials the change. Strip charts and data-logger data must be clearly identified with the date, test start/stop times, parameters being recorded concurrently (with a clear and concise method of identifying each), span values, test run number, and individual tracking the data. MCAQD's observer may request that photocopies or electronic data be made available prior to leaving the facility.

**3.7 Time Keeping** - All field data sheets shall document the exact starting and stopping times for each set of data collected.

**3.8 Units of Measure** - Units of measure shall be consistent with the test method and within the test report and units must also be consistent with previous information supplied for the facility.

**3.9 Calibration Gases** – All calibration gases must be prepared in accordance with the EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards. If EPA Traceability Protocol gases cannot be obtained due to a lack of NIST standards, certified gas standards with an accuracy of  $\pm 2\%$  or better must be used. Gases shall be of the proper concentrations according to the test methods and pollutant concentrations being measured. Documentation from the gas supplier must be provided to verify that the certified concentration was valid at the time of testing. Tests conducted with any expired calibration gases must be voided. Alternatively, the expired gases may be reanalyzed and the recertification values shall be used. Upon discovery, MCAQD must be notified in writing of any testing that has been performed with expired calibration gases.

**3.10 Sample Times and Volumes** – Unless otherwise specified in test methods, permit conditions, regulations or written approval, each test run shall have a minimum sampling time of 60 minutes and a minimum sampling volume of 30 dry standard cubic feet (dscf). Longer sampling times or volumes may be necessary for variable processes where sampling during an entire batch cycle may be necessary.

**3.11 Sample Identification and Handling** - All samples and filters must be labeled and uniquely numbered to ensure positive identification throughout the sampling and analyses procedures. Identification shall be provided for each container with the number

of the container recorded on the field forms, the chain of custody sheets and on the analyses data forms. Chain of custody sheets shall be updated any time a sample changes hands. This includes samples taken to an in-house laboratory. Samples with limited hold times or requiring special handling, such as refrigeration, must have this information available on the chain of custody sheet.

**3.12 Detection Limits** – A reasonable attempt must be made to obtain results that are greater than the method detection limit. There are several ways to potentially increase the pollutant concentration above the detection limit, including (1) increasing the sample volume, (2) concentrating the sample, and (3) using high-sensitivity analytical techniques. If appropriate steps are not taken, the results that are below the detection limit could be considered unacceptable. If the results for a sample are less than the analytical detection limit, despite reasonable efforts to obtain detectable results, the detection limit shall be utilized in the emissions calculations. For reagent blank values less than the analytical detection limit, a value of zero shall be used.

**3.13 Leak Checks** – Immediately following every sampling run and prior to any change in sampling train components, a leak check of the entire sampling train must be conducted. Pretest leak checks are recommended, but not mandatory. For isokinetic sampling, the leakage rate at the highest vacuum during the run must not exceed the lesser of 0.02 cfm or 4% of the average sampling rate. For constant rate sampling, the leakage rate at the highest vacuum during the run must not exceed 2% of the sampling rate. All leak checks must be conducted as specified in the approved test method. MCAQD may allow correction of the sample volume on a case-by-case basis using the following criteria:

- The reason for the excessive leakage, if known
- The measured leakage rate versus the allowable leakage rate
- The average vacuum during testing versus that during the leakage rate determination
- The number of test runs in the series that have leakage rates in excess of the allowable

**3.14 Records Retention** - Test companies should be aware that the records retention requirement for facilities is a minimum of five years. Consequently, any field notes, laboratory analyses sheets and original data sheets shall also be retained for this time period.

## **4. TEST REPORTING**

**4.1 Test Reports** - A copy of the test report shall be submitted to MCAQD within 30 days following the test date or the last test date when conducting a series of consecutive

tests unless otherwise specified in permit conditions or regulations. If circumstances prevent report submission within the required time frame, MCAQD approval must be requested as soon as possible. A description of the circumstances will be required for evaluation.

A separate test report shall be submitted for each piece of equipment tested. In addition to reporting the results, the test report shall include descriptions of the facility, the sampling and analytical methodology used, the process operating conditions, all raw field and lab data, and calculation methods. Field and lab data shall include copies of all original field data sheets (computer generated copies of the field data may be included but not substituted for original hand-written sheets), clearly labeled strip chart records (may require color copies for clarity), laboratory analyses, calculations and instrument calibrations. Non-detect sample results shall be reported at the detection limit and this value shall be used in emissions calculations.

The test report is a stand-alone document and may repeat information supplied in the permit application. However, the test report will serve as evidence to both the agency and the facility as a demonstration of the compliance status of the facility. Therefore, completeness is important with respect to content and quality. Presentation in an understandable and organized manner will lend credibility to the report.

Attachment 2 identifies the minimum requirements of a complete test report. Please note that this is a general list; the required information will vary depending on the facility and the pollutants of interest. The report should follow this format and input should be provided for each item to assure report approval. All pages of the test report shall be identified by a unique page number. A complete submittal will minimize the possibility of a test rejection as a result of insufficient data. A facility's obligation has not been fulfilled until a complete test report has been received. However, compliance determination will not be made until the test report has been thoroughly reviewed.

**4.2 Test Report Submittal Forms** - The Performance Test Report Submittal Form is designed to verify inclusion of all general information required in a test report. This is accomplished by a series of questions with yes/no answers and citation of the section and page numbers in the test report where the question is more fully addressed. The checklist requires signatures from representatives of both the facility and the test company. The checklist can be found at [http://www.maricopa.gov/qa/divisions/permit\\_engineering/docs/pdf/PerformanceTestReportSubmittalForm.pdf](http://www.maricopa.gov/qa/divisions/permit_engineering/docs/pdf/PerformanceTestReportSubmittalForm.pdf). A completed checklist shall accompany every test report submitted to MCAQD. A complete and accurate checklist should help ensure submittal of a complete test report. Please note that since this is a generic form, there may be instances where additional information is required in the test report due to the nature of the test.

**4.3 Confidentiality Claims** - Any confidentiality claims shall be accompanied by a notice of confidentiality pursuant to ARS §49-487(c) that precisely identifies the information that should be considered confidential and protected from disclosure to the public. The notice shall contain sufficient supporting information to allow MCAQD to evaluate whether such information satisfies the requirements related to trade secrets or how the information could cause substantial harm to the facility's competitive edge. MCAQD will not, however, consider any emissions data confidential information.

When claiming confidentiality, two copies of the test report shall be submitted: one complete copy that includes the confidential information and a second copy for public record with the confidential information removed. The confidential test report should be marked as such on the cover with the pages on which the confidential material can be found identified at the beginning of the report. Each page that contains confidential information should also be clearly marked.

**4.4 Test Report Reviews** – MCAQD will perform a cursory review of the test report to confirm that the report appears to contain all of the required components. If the report is incomplete, MCAQD will notify the facility and/or test company of the deficiencies in the test report, the items needed to complete the report review, and a due date for the requested items. MCAQD will perform a detailed, technical review of the report including verification of all calculations. Once the review is complete, formal notice of approval or disapproval will be provided to the facility and test company with any non-compliance test results handled according to established procedures.

## **ATTACHMENT 1**

### **PERFORMANCE TEST PROTOCOL REQUIREMENTS**

#### **1. COVER INFORMATION**

Facility name, mailing address and physical address of equipment (if different).  
Manufacturer, model number and unit identification number of equipment tested.  
Air quality permit number.  
Test company name and address.

#### **2. FACILITY INFORMATION**

Facility name, mailing address and physical address of equipment (if different).  
Facility contact name, telephone number and fax number.  
Air Quality permit number and a copy of the applicable permit conditions.  
General description of overall facility operations with normal and maximum  
operating schedules (hr/dy, dy/wk, wk/yr).  
Safety precautions and equipment required on site.  
Facility access if other than by front lobby.

#### **3. TEST COMPANY INFORMATION**

Test company name and address.  
Test company contact name, telephone number and fax number.  
Laboratory name, address, contact name, telephone number and fax number.

#### **4. TEST INFORMATION**

Purpose of test including a list of all applicable regulations and regulatory  
requirements.  
Test schedule including the proposed date and estimated start time of test.  
Identification of all pollutants to be measured including applicable emission  
limits and demonstration requirements.  
A synopsis of the test methods and analyses procedures to be used, including  
methods to be performed concurrently.  
Documentation of all proposed deviations from the specified sampling  
procedures with justification.  
A description of the sampling equipment to be used including schematic  
diagrams, if appropriate.  
The number and length of sampling runs which will constitute a complete test.

#### **5. EMISSION POINT INFORMATION**

Drawing with actual dimensions indicating the exhaust gas flow direction from  
the process, through the control equipment, and to the emission point.

- A dimensioned diagram of the inlet duct and/or stack showing the sampling locations with the distances downstream and upstream from flow disturbances per EPA Test Method 1.
- Cross-sectional sketch of the inlet duct and/or stack at the sampling locations that include the sample port identifications (e.g. A and B), traverse point locations and port lengths.
- Estimated inlet duct and/or stack gas conditions at the sampling locations such as temperature, moisture content and volumetric flow rate. Specific test methods may require additional estimated parameters such as estimated VOC concentration for EPA Test Method 25A calibration gas selections.

## **6. CONTROL EQUIPMENT INFORMATION**

- Complete description of the emission control system including the manufacturer, model number, rated capacity, rated efficiency and unit identification number.
- Control equipment data to be collected during the test to ensure representative operation, who will be responsible for recording the data (facility or test team) and the frequency of collection.
- Acceptable limits of control equipment operating parameters.
- Description of any gas conditioning prior to the control equipment.
- Description of any adjustments to or maintenance procedures performed on the control equipment for the previous six months including any adjustments or maintenance expected up to the scheduled test date.
- Description of any equipment modifications, failures or malfunctions occurring during the last five years.
- Summary of all emissions-related engineering evaluations conducted on the system during the last five years.

## **7. PROCESS EQUIPMENT INFORMATION**

- Complete description of the process operation including a process flow sheet, if helpful.
- Type and quantity of raw and finished materials used in the process.
- Description of any cyclical or batch operations which would tend to produce variable emissions with time.
- Maximum rated capacity of the process.
- Actual maximum achieved capacity of the process.
- Target process rate proposed for testing (the process or production rate of the process during testing shall be the maximum allowable rate for which the facility will be permitted to operate).
- Actual capacity of the process during the previous six month period.
- Normal and maximum process operating schedule (hr/dy, dy/wk, wk/yr).

Process data to be collected during the test to ensure representative operation, who will be responsible for recording the data (facility or test team) and the frequency of collection.

## **8. QUALITY CONTROL INFORMATION**

Copies of all field data sheets to be used during the test.

Chain of custody procedures (e.g. sample container numbering scheme and chain of custody records).

Field quality assurance/quality control procedures (e.g. field blanks, sample storage and transport methods and applicable sample holding times).

Laboratory quality assurance/quality control procedures (e.g. manner and frequency of blanks, spikes and standards).

Statement that calibration sheets for the dry gas meter, pitot tube, nozzle, calibration gases and any other test equipment will be made available prior to the start of testing.

## **ATTACHMENT 2**

### **PERFORMANCE TEST REPORT REQUIREMENTS**

#### **1. COVER INFORMATION**

Facility name, mailing address and physical address of equipment (if different).  
Manufacturer, model number and unit identification number of equipment tested.  
Air quality permit number.  
Test date.  
Test company name and address.

#### **2. TEST INFORMATION**

Purpose of test including a list of all applicable regulations and regulatory requirements.  
Type of process and control equipment.  
Type of pollutants sampled.  
List of all applicable regulations and regulatory requirements.  
Test date.  
Project participants and titles (facility representatives, test team members, consultants and regulatory observers).

#### **3. SUMMARY OF RESULTS**

Detailed tabulation of results including process operating conditions and inlet duct and/or stack gas conditions.  
Discussion of significance of results relative to applicable limits and demonstration requirements.  
Discussion of all deviations from normal sampling procedures or operating conditions that occurred.  
Documentation of all process or control equipment upset conditions that occurred during the testing.  
Results of all audit sample analyses required, if applicable.  
A description of all changes made to the process or control device since the last performance test, if applicable.

#### **4. PROCESS AND CONTROL EQUIPMENT INFORMATION**

Complete description of the emission control system including the manufacturer, model number, rated capacity, rated efficiency and unit identification number.  
Complete description of the process operation including a process flow sheet, if helpful.  
Actual capacity of the process during the test.  
Description of any adjustments to or maintenance procedures performed on the control equipment for the six months prior to testing.

## 5. SAMPLING AND ANALYTICAL PROCEDURES

Brief description of test methods utilized.

Brief description of analytical procedures.

Description of any procedures that deviated from the specified procedures.

## 6. APPENDICES

Complete test results with one complete set of sample calculations for each test method or pollutant using actual test data.

Copies of all field data sheets.

Copies of all laboratory data including quality assurance/quality control (e.g. blanks, spikes and standards).

Copies of all chain of custody forms verifying the integrity of the samples.

Copies of all test equipment calibration sheets for the dry gas meter, orifice meter, pitot tube, nozzle and any other test equipment utilized.

Calibration gas certification sheets for each calibration gas used.

Process and control equipment data.