



South Coast Air Quality Management District

# Draft SCAQMD Guidelines for the Development of Rule 1407.1 Source Test Protocols

August 2018

## **INTRODUCTION**

A Rule 1407.1 source test protocol specifies which source will be tested and how emissions and samples will be sampled, analyzed, and reported. Source test protocols establish procedures to ensure results are accurate and representative of a source's emissions. Once SCAQMD evaluates and approves a test protocol, the owner or operator of a facility conducting alloy steel, chromium alloy, stainless steel, and superalloy melting operation(s) can be reasonably assured that test results will be accepted if the source test protocol is followed.

## **PREPARING A TEST PROTOCOL**

The test protocol shall include the following sections: Cover Page; Table of Contents; Introduction; Equipment Description and Process Operation; Testing Methodology; Quality Assurance/Quality Control (QA/QC) Procedures; Calculations Procedures; and Report Information and Format.

### *Cover Page*

The Cover Page shall include the following:

- 1.) The name of the facility and facility identification number;
- 2.) The metal melting furnace and associated emissions collection system and emissions control device to be tested pursuant to Rule 1407.1 paragraph (e)(1);.
- 3.) The principal author's company, name, job title, address, phone number, and e-mail address;
- 4.) The date of the protocol submittal, given in a month, day, and year format (mm/dd/yy); and
- 5.) The signature of the principal author.

### *Table of Contents*

The Table of Contents shall identify each section with their commencing page numbers. Each page of the source test protocol (including, but not limited to sample forms, copies of SCAQMD Permits, and third party reports) must have a unique and sequential page number.

### *Introduction*

The Introduction shall include the following:

- 1.) The name of facility, facility identification number, mailing address, and equipment address, if different from the mailing address;
- 2.) The facility contact name, job title, phone number, and e-mail address;
- 3.) The name of the source testing laboratory, mailing address, contact name, phone number, and e-mail address;

- 4.) The name of the analytical laboratory, mailing address, contact name, phone number, and e-mail address; and
- 5.) The number of testing days and the estimated test date(s).

Equipment Description and Process Operation

The Equipment Description and Process Operation shall include the following information for the source to be tested:

- 1.) A justification for selection of the metal melting furnace and associated emissions collection system and emissions control device to be tested pursuant to Rule 1407.1 paragraph (e)(1);
- 2.) The information requested in Rule 1407.1 paragraph (d)(3);
- 3.) A copy of the SCAQMD Permit(s), if applicable;
- 4.) How the fuel usage will be monitored;
- 5.) The typical operating conditions of the device;
- 6.) The operating conditions of the device at the time of the test and a justification that the testing conditions are representative of normal operations;
- 7.) A description of what is produced at the facility and how it is produced, including, but not limited to, the final specifications of those products;
- 8.) A description of what will be produced during the test, details of the melt, and the final specifications of the product and a justification that this is representative of the alloy with the highest concentration processed;
- 9.) Control parameters for the control device, if applicable;
- 10.) A schematic of the exhaust stack showing the stack location in terms of the number of duct diameters to the nearest upstream/downstream flow disturbances;
- 11.) Whether there is access to the sampling ports, ample room to place testing equipment at the sampling port, and a platform available,
- 12.) A flow diagram and a stepwise description explaining the equipment's operation with respect to the facility's process. Include a schematic of the equipment, fuel lines, instruments, control device, and other major ancillary equipment. Also include all emission points (or potential emission points), and bypass stacks in the schematic;
- 13.) The location and specifications of process monitoring instruments. Information for process monitoring instruments shall include:
  - The dates the process monitoring instruments were last calibrated;
  - Any documentation which can verify the process monitoring instrument's accuracy; and

- If the instruments report output which needs to be corrected to standard conditions and, if so, how is the output corrected, and what other calibrated instruments are need to adjust the raw measurement;
- 14.) The configuration of the exhaust stream, including the positioning of dampers, the presence of dilution flow, or whether flow is partially emitted through bypass stacks; and
- 15.) Whether there are special safety considerations when collecting samples or performing the laboratory analysis

Testing Methodology

The Testing Methodology shall include the following:

- 1.) The test methods that will be employed to determine emissions, capture efficiency, and materials composition;
- 2.) A general description which summarizes each proposed method. List and justify all proposed deviations to the standard test method. For instrumental methods, submit a detailed description of the sampling and analytical system. This description shall include specifics, such as the sampling procedures, sample preparation, analytical principle of each instrument, the available analytical ranges, lower detection limits, sample conditioning equipment, materials for construction of sample lines, a sampling flow schematic, the instrument stripchart manufacturer, frequency of data recording, etc;
- 3.) Which ambient parameters will be monitored during the test;
- 4.) Which equipment parameters will be recorded;
- 5.) A description of how the parameters will be monitored;
- 6.) Whether the process monitoring instruments are calibrated and if there are records to confirm the accuracy and precision of the instrument;
- 7.) The frequency the readings from 3 - 5 are recorded;
- 8.) Whether the sampling equipment requires a special set-up and/or warm-up period with pre-test and post-test diagnostics;
- 9.) The parameters that will be monitored to assure the proper or timely operation of the sampling equipment, such as the conditioning temperature, orifice pressures, instrument response time, etc;
- 10.) How exhaust flow conditions, such as stratification or cyclonic flow, will be addressed during the test. If these conditions have been addressed in previous testing, include detailed results.
- 11.) Problems unique to specific equipment and how they will be addressed;

- 12.) The proposed sampling time. The total sample volume for each sample must be sufficient to achieve analytical results at least three (3) times greater than the method detection limit. Alternatively, collect a minimum sample volume of 150 dry standard cubic feet (dscf) for each sample, assuming the following method detection limits from CARB Methods 425 and 436:
  - Cr6  $\leq$  0.02  $\mu\text{g/l}$ ,
  - As  $\leq$  2.1  $\mu\text{g/l}$ ,
  - Cd  $\leq$  0.01  $\mu\text{g/l}$ , and
  - Ni  $\leq$  0.07  $\mu\text{g/l}$ ;
- 13.) Any special sampling considerations due to the nature of the emissions or stack configuration requiring accommodations for lengthy heated lines, saturated moisture content, interferences, toxic emissions, hygroscopic particles, or other non-routine sampling conditions;
- 14.) How the samples are to be analyzed once the collection at the source is completed:
  - Which analytical procedures will be performed. These methods and procedures shall provide the sensitivity to detect the anticipated emission concentrations, be recognized by the SCAQMD, and represent the most current and reliable means for analysis;
  - Which analytical laboratories will perform the analysis and if these laboratories are SCAQMD approved, if applicable;
  - What the laboratory's detection limits are for the proposed analysis.
  - How blank analyses will be handled; and
  - Any deviations to the recognized analytical test procedure;
- 15.) A signed statement confirming that the test laboratory qualifies as an independent laboratory, per SCAQMD Rule 304(k) definitions; and
- 16.) A current approval letter, that the testing lab is a SCAQMD Laboratory Approval Program (LAP) testing lab or Executive Approval.

#### QA/QC Procedures

The QA/QC Procedures shall include:

- 1.) Sample field data sheets, calibration forms, and equipment maintenance records. Where possible, standardized forms shall be used (see the SCAQMD Source Test Manual for standard data sheets and forms);
- 2.) Calibration procedures of the field and laboratory instruments. Indicate whether calibration and maintenance schedules comply with the Chapter III procedures of

- the SCAQMD Source Test Manual. If not, justify the reason for deviating from the SCAQMD procedures;
- 3.) Sampling handling, chain-of-custody, and sample storage procedures employed by the testing laboratory. Provide assurances that the samples will be properly stored at the required environmental conditions in a tamper-proof and secure container;
  - 4.) Sample forms for verifying that the sampling equipment (including glassware, filters, canisters, bags, tubing, etc.) will be properly cleaned and stored prior to field and laboratory use;
  - 5.) QA/QC procedures employed by the analytical laboratory. Example QA/QC topics for analytical laboratories include: instrument calibration procedures, matrix spiking, duplicate injections, blank analyses, control samples, and interference checks;
  - 6.) For low level analyte measurements, include a discussion of:
    - Special cleaning procedures, such as acid washing of equipment;
    - The purity level of analytical reagents;
    - Low level calibrations, especially if close to the detection limit;
    - A limited storage time prior to analysis;
    - Handling of field blanks; and,
    - Replicate analyses; and
  - 7.) Calibration data of instruments.

#### Calculations Procedures

Calculations Procedures shall include:

- 1.) The proposed formulas to calculate gaseous concentration, exhaust flow, mass emissions, etc. based on measurements of the raw data;
- 2.) Sample forms showing how intermediate calculations will be used to arrive at the final result. If constants are used, provide derivations showing how the constants were determined. If the calculation form is formatted as a spreadsheet, include cell formulas so that the calculations may be reviewed. In order to demonstrate the use of the calculation form or spreadsheet, provide a numerical example using hypothetical realistic data set;
- 3.) How the bias or drift correction factors will be determined and applied, if applicable; and
- 4.) How low concentrations will be expressed, and take in consideration issues such as whether the data will be used for compliance or modeling purposes.

*Report Information and Format*

Report information and Format shall include:

- 1.) How the report will be organized. Whether or not it follows the general outline of the source test report described in Chapter II of the SCAQMD Source Test Manual. If not, explain how the proposed format differs;
- 2.) Identification of each section of the report in the order that they will be presented in the report and an explanation of what topics will be discussed in each section. Indicate which section(s) will contain the raw field data, analytical results, calculations, calibration results, facility data, copy of the SCAQMD Permit(s), etc.;
- 3.) Items to be submitted with the full laboratory package, which at a minimum shall include, sample preparation, raw analytical data, instrument calibrations, QA/QC checks, and calculations;
- 4.) A description of how digitized media will be presented, (e.g. digitized pictures, DVD videos, scanned images, or computer spreadsheets); and
- 5.) A confirmation that the report will include all elements from the Source Test Protocol, as discussed in these guidelines.

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