

**PROPOSED RULE 1407.1. EMISSIONS OF TOXIC AIR CONTAMINANTS FROM  
ALLOY STEEL, CHROMIUM ALLOY, STAINLESS STEEL,  
AND SUPERALLOY MELTING OPERATIONS**

(a) Purpose

The purpose of this rule is to gather information regarding toxic air contaminant emissions from alloy steel, chromium alloy, stainless steel, and superalloy melting operations.

(b) Applicability

This rule shall apply to the owner or operator of any facility conducting alloy steel, chromium alloy, stainless steel, and superalloy melting operation(s), including but not limited to, smelters (primary and secondary), foundries, die-casters, and other miscellaneous melting processes.

(c) Definitions

For the purpose of this rule, the following definitions shall apply:

- (1) ALLOY STEEL is a steel that is alloyed with a variety of elements, in addition to carbon, in total amounts between 1.0% and 50% by weight.
- (2) CASTING is the formation of metallic parts or casts by pouring molten metal into a mold and core assembly or into a mold for ingots, sows, or cylinders.
- (3) CHROMIUM ALLOY is any metal that is at least 0.5% chromium by weight.
- (4) DIE-CASTER is any facility, operation, or process where molten metal is forced under pressure into a mold cavity.
- (5) DUCT SECTION is any length of duct, including angles and bends, which is contiguous between processes, emission collection systems, emission control devices, or ventilation inlets or outlets. Examples include ducting between a furnace and heat exchanger; baghouse and scrubber; and scrubber and blower, or the exhaust stack itself.
- (6) EMISSION COLLECTION SYSTEM is any equipment, including the associated ducting, installed for the purpose of directing, taking in, confining, and conveying an air contaminant.

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- (7) EMISSION CONTROL DEVICE is any equipment installed in the ventilation system of a point source or after the emission collection system designed to reduce toxic metal air contaminants and dust emissions from metal melting operations.
- (8) EMISSION POINT is any location where molten metal is or can be exposed to air, including, but not limited to, furnaces, crucibles, refining kettles, ladles, tap holes, pouring spouts, and slag channels.
- (9) FACILITY is any real or personal property which is located on one or more contiguous or adjacent parcels of property in actual contact or separated solely by a public roadway or other public right-of-way and is owned or operated by the same person or person(s), corporation, government agency, public district, public officer, association, joint venture, partnership, or any combination of such entities.
- (10) FOUNDRY is any facility, operation, or process where metal or a metal alloy is melted and cast.
- (11) FUGITIVE METAL EMISSIONS are emissions of metal-containing material from locations other than emission point sources including, but not limited to, foot and vehicular traffic and storage piles where the dust forming material at the emission source contains metals.
- (12) METAL any ferrous (iron-based) metals and alloys and non-ferrous (non-iron-based) metals and alloys. Examples of metals include, but are not limited to, iron, stainless steel, and their iron-based alloys and aluminum, brass, bronze, cadmium chromium, copper, gold, lead, manganese, mercury, nickel, platinum, silver, tin, titanium, tungsten, and zinc, and their non-ferrous alloys.
- (13) METAL MELTING FURNACE is any apparatus in which metal is brought to a liquid state including, but not limited to, blast, crucible, cupola, direct arc, electric arc, hearth, induction, pot, and sweat furnaces, and refining kettles, regardless of the heating mechanism.
- (14) MOLTEN METAL is metal or metal alloy in a liquid state, in which a cohesive mass of metal will flow under atmospheric pressure and take the shape of the container in which it is placed.
- (15) POINT SOURCE is any process or equipment used for melting operations to process alloy steel, chromium alloy, stainless steel, and superalloy.
- (16) RERUN SCRAP is any material that has been generated at the facility as a consequence of casting or forming process, but has not been coated or surfaced with any material containing arsenic, cadmium, chromium, or nickel, intended for re-melting, including but not limited to, sprues, gates, risers, foundry returns, and similar material.

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- (17) SCRAP is any metal or metal-containing material that has been discarded or removed from the use for which it was produced or manufactured and which is intended for reprocessing. SCRAP does not include rerun scrap.
- (18) SLAG is the inorganic by-product material discharged, in melted state, from the smelting process.
- (19) SMELTER is any facility, operation, or process where heat is applied to ore in order to melt out a base metal.
- (20) STAINLESS STEEL is a steel alloy with a minimum of 10.5% chromium content by mass.
- (21) STEEL is a metal alloy of iron and carbon and other elements.
- (22) SUPERALLOY is a heat-resisting metal alloy based on nickel, nickel-iron, or cobalt.

(d) Operational Information Survey Requirements

Within [90 Days After Date of Adoption], the owner or operator of a facility conducting alloy steel, chromium alloy, stainless steel, and superalloy melting operation(s) shall submit an Operational Information Survey that includes:

- (1) Casting techniques or processes performed;
- (2) Finishing activities or operations performed;
- (3) For each metal melting furnace:
  - (A) South Coast Air Quality Management District (SCAQMD) application or permit number and Device ID, if applicable;
  - (B) The equipment make, model, serial number, date of manufacture, and date of installation;
  - (C) Furnace type;
  - (D) Size and capacity;
  - (E) Minimum, average, and maximum weight of metal processed per batch and per day, based on data from calendar year 2017;
  - (F) Fuel type, if gas fired, include British Thermal Unit (BTU) gas rating and burner age;
  - (G) Refractory information, including, but not limited to, type of refractory brick and refractory coating, chromium content, frequency of refractory brick replacement and refractory coating application, based on data from calendar year 2017;
  - (H) Minimum, average and maximum operating temperatures;

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- (I) The equipment make, model, serial number, date of manufacture, and date of installation of associated Emission Collection System(s) and/or Emission Control Device(s), and corresponding South Coast Air Quality Management District application or permit number and Device Identification Number (ID), if applicable; and
  - (J) Metals and alloys melted; and
  - (4) Housekeeping activities routinely performed, including schedule, method(s) used, and location(s) of activities.
- (e) Source Test Requirements
- (1) In submitting the Source Test Protocol and conducting emissions testing, capture efficiency testing, and Materials Composition Testing pursuant to paragraphs (e)(2) through (e)(11), the owner or operator of a facility conducting alloy steel, chromium alloy, stainless steel, and superalloy melting operation(s) shall source test the metal melting furnace:
    - (A) With an emissions control device;
    - (B) Melting the alloy with the highest chromium concentration processed in the facility;
    - (C) Operating with the highest throughput, if there are multiple furnaces that meet subparagraph (e)(1)(A) and (e)(1)(B); and
    - (D) Operating all furnaces during the source test if multiple furnaces are vented to a single control device unless otherwise restricted by permit condition.
  - (2) The owner or operator of a facility conducting alloy steel, chromium alloy, stainless steel, and superalloy melting operation(s) shall submit a Source Test Protocol to the Executive Officer for approval no later than [60 Days After Date of Adoption] or as required by a SCAQMD permit. Source Test Protocols shall follow the procedures specified in *SCAQMD Guidelines for the Development of Rule 1407.1 Source Test Protocols*.
  - (3) The Executive Officer will approve or reject the Source Test Protocol and notify the owner or operator. Approval or rejection will be based on whether the Source Test Protocol was prepared consistent with paragraph (e)(1) and *SCAQMD Guidelines for the Development of Rule 1407.1 Source Test Protocols*. If the Source Test Protocol is rejected:
    - (A) Within 30 days of the date of notification by the Executive Officer of Source Test Protocol rejection, an owner or operator shall revise and resubmit a Source Test Protocol that corrects all identified deficiencies.

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- (B) The Executive Officer will either approve the revised and resubmitted Source Test Protocol or modify the Source Test Protocol and approve it as modified.
- (4) No later than 90 days after approval of the Source Test Protocol, the owner or operator of a facility conducting alloy steel, chromium alloy, stainless steel, and superalloy melting operation(s) shall perform the following source tests for mass emissions and concentration on the metal melting furnace and associated emissions collection system and emissions control device pursuant to paragraph (e)(1):
  - (A) Particulate matter;
  - (B) Multiple metals; and
  - (C) Hexavalent chromium.
- (5) The owner or operator of a facility conducting alloy steel, chromium alloy, stainless steel, and superalloy melting operation(s) shall conduct source tests representative of typical operating conditions in the facility and in accordance with the following applicable test methods as approved by the Executive Officer:
  - (A) Particulate matter by:
    - (i) SCAQMD Method 5.1 – *Determination of Particulate Matter Emissions from Stationary Sources Using a Wet Impingement Train;*
    - (ii) SCAQMD Method 5.2 – *Determination of Particulate Matter Emissions from Stationary Sources Using Heated Probe and Filter;*  
or
    - (iii) SCAQMD Method 5.3 – *Determination of Particulate Matter Emissions from Stationary Sources Using an In-Stack Filter;*
  - (B) Multiple metals by CARB Method 436 – *Determination of Multiple Metal Emissions from Stationary Sources;* and
  - (C) Hexavalent chromium by CARB Method 425 – *Determination of Total Chromium and Hexavalent Chromium Emissions from Stationary Sources.*
- (6) At the time the source tests are conducted, the owner or operator of a facility conducting alloy steel, chromium alloy, stainless steel, and superalloy melting operation(s) shall perform capture efficiency testing. Data and results shall include quantitative velocity measurements using a hot-wire anemometer, a vane anemometer, or a device or method approved by the Executive Officer and qualitative visual demonstration using smoke generators.
- (7) At the time the source tests are conducted, the owner or operator of a facility conducting alloy steel, chromium alloy, stainless steel, and superalloy melting

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operation(s) shall perform Materials Composition Testing pursuant to paragraphs (f)(2) and (f)(3) of the following materials:

- (A) All raw material(s);
  - (B) Molten material;
  - (C) Final product;
  - (D) Slag;
  - (E) Dross; and
  - (F) Baghouse catch.
- (8) The owner or operator of a facility conducting alloy steel, chromium alloy, stainless steel, and superalloy melting operation(s) may use alternative or equivalent source test methods and materials composition tests as defined in 40 CFR Part 60.2, if approved in writing by the Executive Officer.
- (9) The owner or operator of a facility conducting alloy steel, chromium alloy, stainless steel, and superalloy melting operation(s) shall use a test laboratory approved under the SCAQMD Laboratory Approval Program for the source test, capture efficiency testing, and Metals Composition Testing. If there is no approved laboratory, then the testing procedures used by the laboratory may be submitted to the Executive Officer, who may approve these procedures on a case-by-case basis based on SCAQMD protocols and procedures.
- (10) The owner or operator conducting alloy steel, chromium alloy, stainless steel, and superalloy melting operation(s) shall notify the Executive Officer in writing at least 10 calendar days prior to conducting any test required by this subdivision.
- (11) No later than 60 days after the completion of the source tests, the owner or operator of a facility conducting alloy steel, chromium alloy, stainless steel, and superalloy melting operation(s) shall submit to the Executive Officer, using a format approved by the Executive Officer, reports from source tests, capture efficiency, and materials composition testing conducted.
- (f) Metals Composition Testing
- (1) The owner or operator of a facility conducting alloy steel, chromium alloy, stainless steel, and superalloy melting operation(s) not required to source testing requirements pursuant to subdivision (e) shall perform Materials Composition Testing for one batch representative of melting the alloy with the highest chromium concentration processed in the facility pursuant to subdivision (f) of the following
- (A) All raw material(s);
  - (B) Molten material;

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- (C) Final product;
  - (D) Slag; and
  - (E) Dross.
- (2) Metals composition testing shall determine the content of arsenic, cadmium, chromium, hexavalent chromium, and nickel in percent by weight.
- (3) Metals composition testing shall be in accordance with the following test methods most applicable to the sample matrix and as approved by the Executive Officer:
- (A) U.S. EPA 200.7 – *Determination of Metals and Trace Elements in Water and Wastes by Inductively Coupled Plasma-Atomic Emission Spectrometry*;
  - (B) U.S. EPA 6010D – *Inductively Coupled Plasma-Optical Emissions Spectrometry*;
  - (C) U.S. EPA 6020B – *Inductively Coupled Plasma-Mass Spectrometry*;
  - (D) U.S. EPA 6200 – *Field Portable X-Ray Fluorescence Spectrometry for the Determination of Elemental Concentrations in Soil and Sediment*;
  - (E) U.S. EPA 7196A – *Chromium, Hexavalent (Chelation/Extraction)*; and/or
  - (F) U.S. EPA 7199 – *Determination of Hexavalent Chromium in Drinking Water, Groundwater and Industrial Wastewater Effluents by Ion Chromatography*.
- (g) Recordkeeping Requirements
- (1) Between January 1, 2019 and January 1, 2020, the owner or operator of a facility conducting alloy steel, chromium alloy, stainless steel, and superalloy melting operation(s) shall keep records of the following:
- (A) For each metal melting furnace, monthly records of run hours and weight and type of raw materials processed, including additives, alloys, ingots, scrap, and reruns;
  - (B) For each batch of raw material, vendor information; and
  - (C) For each baghouse, records of weight of the baghouse catch per container and date collected.
- (2) The owner or operator of a facility conducting alloy steel, chromium alloy, stainless steel, and superalloy melting operation(s) shall maintain records for a period of not less than three years and make such records available to the Executive Officer upon request.
- (3) No later than February 1, 2020, the owner or operator of a facility conducting alloy steel, chromium alloy, stainless steel, and superalloy melting operation(s) shall

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submit to the Executive Officer, using a format approved by the Executive Officer, records pursuant to paragraph (g)(1).

(h) Exemptions

Equipment and operations subject to the requirements of Rules 1420 – Emissions Standard for Lead, 1420.1 – Emission Standards for Lead and Other Toxic Air Contaminants from Large Lead-Acid Battery Recycling Facilities, or 1420.2 – Emission Standards for Lead from Metal Melting Facilities, shall be exempt from the requirements of this rule.

DRAFT





South Coast Air Quality Management District

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

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## **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.