FINAL REGULATION ORDER

AIRBORNE TOXIC CONTROL MEASURE FOR EMISSIONS
OF TOXIC METALS FROM NON-FERROUS METAL MELTING

Adopt new section 93107, Title 17, California Code of Regulations to read as follows:

93107 Airborne Toxic Control Measure for Emissions of Toxic Metals from Non-Ferrous Metal Melting

(a) Definitions. For the purposes of this section, the following definitions shall apply:

(1) "Aluminum and aluminum-based alloys" means any metal that is at least 80% aluminum by weight.

(2) "ARB Test Method 5" means the test method specified in Title 17, California Code of Regulations, section 94105.

(3) "Clean Aluminum Scrap" means scrap that is composed solely of aluminum or aluminum alloys (including anodized aluminum) and that is free of paints, coatings, rubber, or plastics.

(4) "Copper or copper-based alloy" means any metal that is more than 50 percent copper by weight, including but not limited to brass and bronze.

(5) "District" means the air quality management district or air pollution control district with jurisdiction over the facility.

(6) "Dust forming material" means any material containing more than 15 percent by weight of particulate matter less than 0.84 millimeter (mm) equivalent diameter as determined by ASTM C136-84a "Standard Method for Sieve Analysis of Fine and Coarse Aggregates" using a number 20 U.S. Bureau of Standards sieve with 0.84-mm square openings or an alternate method deemed acceptable by the district Air Pollution Control Officer or Executive Officer.

(7) "Emission collection system" means equipment which is installed for the purpose of directing, taking in, confining, and conveying an air contaminant and which conforms to specifications for design and operation given in Industrial Ventilation, Manual of Recommended Practices, 20th edition, 1988, published by the American Conference of Government and Industrial Hygienists, which is incorporated by reference herein.

(8) "Emission point" means 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. A mold or die in which metal is cooling is not considered an emission point.

(9) "Enclosed storage area" means any space used to contain materials that has a wall or partition on at least three sides or three-quarters of its circumference and that screens the material stored therein to prevent emissions of the material to the air.

(10) "Facility" means any real or personal property being used for metal melting activities, which is located on one or more contiguous or adjacent parcels of property in actual contact or separated only by a public roadway or other public right-of-way, and owned or operated by the same person or persons, corporation, government agency, public district, public officer, association, joint venture, partnership, or any combination of such entities.

(11) "Fugitive emission control" means any equipment, activity, or process carried out to reduce emissions resulting either from the storage or handling of dust forming materials or material collected by a particulate matter control system or the removal of particulate matter from metal melting or pouring that has settled on the ground or other surfaces, or that has escaped from a properly designed and operated emission collection system.

(12) "Good Operating Practices" means specific activities necessary to maintain the original collection and control efficiencies of the air pollution control equipment as designed. These activities include but are not limited to verifying operating specifications such as cleaning cycles, air flow, and velocity; and inspecting equipment such as duct work, blowers, and components of the control equipment through a general maintenance and inspection program.

(13) "Hard Lead" means any alloy containing at least 90 percent lead and more than 0.001 percent arsenic by weight or 0.001 percent cadmium by weight.

(14) "Molten metal" means 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 a container in which it is placed.

(15) "Metal melting furnace" means any apparatus in which metal in a container is brought to a liquid state, including but not limited to reverberatory, cupola, induction, direct arc furnaces, sweat furnaces, and refining kettles. "Metal melting furnace" does not include any apparatus in which the metal is heated but does not reach a molten state such as a sintering furnace or an annealing furnace.

(16) "New sand" means any sand not exposed to the casting process.

(17) "Non-ferrous metal" means lead, copper, zinc, cadmium, arsenic, aluminum, and their alloys.

(18) "Particulate matter" or "PM" means any solid material, except uncombined water, which exists in a finely divided form at standard conditions of temperature and pressure (293 K and 760 mm mercury).

(19) "Particulate matter control system" means any device or series of devices designed and operated in a manner intended to remove fine particulate matter (< 10 um) from an air or gas stream.

(20) "Person" shall have the same meaning as defined in Health and Safety Code section 39047.

(21) "Process emission control" means any equipment installed and operated to control emissions of toxic metals from any emission point as defined in subsection (a)(8).

(22) "Pure Lead" means any alloy that is at least 90 percent lead and contains no more than 0.001 percent cadmium by weight and 0.001 percent arsenic by weight.

(23) "Ringlemann Chart" means the Ringlemann Chart published in the United States Review of Mine Information Circular No. 1C8333, (May 1967), as specified in Health and Safety Code section 41701(b).

(24) "Scrap" means 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 sprues, gates, risers, foundry returns, and similar material intended for remelting that has been generated at the facility as a consequence of casting or forming processes but has not been coated or surfaced with any material containing cadmium, arsenic, or nickel.

(25) "Solder" means any metal in which the sum of the lead and the tin is greater than 50 percent by weight and which is used for the purpose of joining two metals or of joining a metal to any other material.

(26) "Type Metal" means any lead-based alloy used for linotype machines.

(b) Requirements

No person shall operate a non-ferrous metal melting furnace unless the facility is in compliance with all the requirements specified in subsections (b)(1) through (b)(3).

(1) Emission Collection System

(A) All emission points shall be equipped with an emission collection system designed and operated according to criteria specified in subsection (a)(7). The design criteria and operating parameters shall be specified as conditions of the authority to construct and the permit to operate granted by the district to the source for the equipment.

(B) Good operating practices shall be used by the facility, and demonstrated through a maintenance plan or procedures approved by the district, to maintain air movement and emission collection efficiency by the system consistent with the design criteria for the system. The maintenance plan shall specify at a minimum the following:

(i) Maximum allowable variation from designed values of operating parameters, such as air velocity in the hood and ducts and pressure drop across the control device.

(ii) Areas to be visually inspected, such as the clean side of the baghouse and ducts operating under positive pressure, and the required frequency of such inspections.

(iii) Methods of documenting compliance with these requirements such as a log of such inspections and records of observations and measurements.

(2) Process Emission Control

The gas stream from the emission collection system required by subsection (b)(1) shall be ducted to a particulate matter control device meeting the requirements of this section.

(A) The particulate matter control device shall reduce particulate matter emissions by 99 percent or more.

(B) The temperature of the gas stream entering any particulate matter control device that is part of an emission collection system shall not exceed 360 degrees F. A device to be used for making this measurement shall be maintained at the facility and shall be made available to a district representative upon his or her request.

(C) The owner or operator of the facility shall demonstrate compliance with subsection (b)(2)(A), by conducting an initial source test to verify the 99 percent reduction in particulate matter as determined by means of an emissions test conducted in accordance with ARB Test Method 5. The district Air Pollution Control Officer or Executive Officer may require additional source testing to verify continued compliance or when the process is changed. Particulate matter reduction shall be calculated using the following equation:

$$\frac{[\text{Mass in} - \text{Mass out}]}{\text{Mass in}} \times 100 = \text{particulate matter reduction}$$

where:

Mass in	=	Mass of particulate matter at the inlet to the control device
Mass out	=	Mass of particulate matter at the outlet of the control device
Mass	=	Sum of filter catch, probe catch, impinger catch, and solvent extract.

(D) Testing Access

The owner or operator of any facility subject to subsection (b)(2) of this regulation shall provide access and sampling ports sufficient to perform testing in accordance with ARB Test Method 5. Ducts and stacks shall have sampling ports so placed as to satisfy minimum requirements for method 5 testing with regard to flow disturbances, or acceptable

alternative requirements as approved by the Air Pollution Control Officer or Executive Officer of the district.

(3) Fugitive Emission Control

(A) No activity associated with metal melting at a facility including furnace operation, casting, emission control system operation, and the storage, handling, or transfer of any materials (except new sand) shall discharge into the air any air contaminant, other than uncombined water vapor, for a period aggregating more than three minutes in any hour which is:

(i) Half as dark or darker in shade as that designated as Number 1 on the Ringlemann Chart, as published by the United States Bureau of Mines, or

(ii) Of such opacity as to obscure an observer's view to a degree equal to or greater than smoke as described in subsection (b)(3)(A)(i) or 10% opacity.

(B) Dust-forming material including, but not limited to, dross, ash, or feed material shall be stored in an enclosed storage area or stored in a manner which meets the requirements of subsection (b)(3)(A).

(C) Material collected by a particulate matter control system shall be discharged into closed containers or an enclosed system that is completely sealed to prevent any dust from getting out.

(D) Surfaces that are subject to vehicular or foot traffic shall be vacuumed, wet mopped, or otherwise maintained in accordance with a district-approved maintenance plan. The plan shall specify, at a minimum: the areas to be cleaned, the method to be used, the required frequency of the cleaning activities, and a method of documenting the completion of the required activities. The plan shall be designed and carried out in a way which will meet the requirements of subsection (b)(3)(A).

(c) Exemptions

(1) Small Quantity Exemptions. Facilities are exempt from subsections (b)(1), (b)(2), and (b)(3) if they meet either of the following conditions:

(A) melt a total of no more than one ton per year of all metals, or

(B) melt no more than the listed quantities of any one of the specific metals listed in Table I.

Table I

Metal	Exemption Limit (tons per year)
Pure Lead	400
Hard Lead	200
Aluminum Scrap	125
Aluminum Ingot containing more than 0.004 percent cadmium or 0.002 percent arsenic	125
Solder	100
Zinc Scrap	30
Copper or copper-based alloys (except scrap) containing more than 0.004 percent cadmium or 0.002 percent arsenic	30
Type Metal (lead for linotype machines)	25

(i) For facilities melting more than one of the metals listed in Table I, eligibility for exemption shall be determined using the following calculation:

For each metal listed in Table I, divide the quantity melted by the specific exemption limit listed.

Sum the resulting fractions for all the metals.

If the sum does not exceed 1.0, the facility qualifies for exemption under subsection (c)(1).

(2) Metal or Alloy Purity Exemption. Facilities or furnaces which do not melt scrap except clean aluminum scrap and which melt a metal or alloy (other than the metals listed in Table I) which is shown by the facility operator to have a content of no more than 0.004 percent of cadmium and no more than 0.002 percent of arsenic are exempt from subsections (b)(1), (b)(2), and (b)(3).

A facility granted an exemption under subsection (c)(1)(B) may also be granted exemption for all metals that meet the purity limits in this subsection.

(3) Clean Aluminum Scrap Exemption. Furnaces used exclusively to process clean aluminum scrap or a mixture of clean aluminum scrap and aluminum ingot to produce extrusion billet are exempt from subsections (b)(1) and (b)(2).

(4) Exemption for Aluminum Furnaces. The combustion chamber in a reverberatory furnace is exempt from the requirements of subsections (b)(1) and (b)(2) if the furnace meets both of the following conditions:

(A) The furnace is used solely to produce aluminum and aluminum-based alloys, and

(B) The furnace is constructed with a charging well or similar device in which feed is added to molten metal in a separate chamber.

(5) Aluminum Pouring Exemption. Ladles, launders or other equipment used to convey aluminum from a melting or holding furnace to casting equipment is exempt from the requirements of subsections (b)(1) and (b)(2).

(d) Compliance Schedule

(1) Application for exemption from control requirements. Facilities seeking exemption under subsections (c)(1) or (c)(2) or (c)(3) shall apply and submit evidence of eligibility for exemption to the district no later than six months after the district adopts regulations enacting this control measure.

(2) Emission control requirements. Facilities subject to this section shall apply to the district for an authority to construct the emission collection system and the air pollution control equipment necessary to comply with subsection (b) no later than 12 months after the district adopts the regulations enacting this control measure. These facilities shall be in compliance no later than 24 months after the district adopts the regulations enacting this control measure.

(e) Recordkeeping

(1) Facilities subject to subsection (b) shall maintain on site for a period of two years, and make available to a district representative upon request, a record of:

(A) The results of any source testing required by the district to demonstrate that the particulate matter control device(s) are operating as required by subsection (b)(2)(A).

(2) Facilities seeking exemption under subsections (c)(1) or (c)(2) or (c)(3) shall maintain for two years a record of the amount and type of metal processed in those furnaces including results of analyses as required to support exemption under subsection (c)(2). These records shall be made available to a representative of the district upon request.

(f) Applicable Material Testing Methods.

One of the following methods or an alternate method deemed acceptable by the district Air Pollution Control Officer or Executive Officer and by the Executive Officer of the Air Resources Board shall be used.

Sampling for these methods shall comply with ASTM E 88-58 (1986), "Standard Practice for Sampling Nonferrous Metals and Alloys in Cast Form for Determination of Chemical Composition".

(1) To determine the composition of alloys defined in section (a)(1) and to determine the cadmium content of aluminum alloys to evaluate eligibility for exemption under section (c)(2) one of the following shall be used:

(A) ASTM E 227-67 (1982), "Standard Method for Optical Emission Spectrometric Analysis of Aluminum and Aluminum Alloys by the Point-to-Plane Technique";

(B) ASTM E 607-90, "Standard Test Method for Optical Emission Spectrometric Analysis of Aluminum and Aluminum Alloys by the Point-to-Plane Technique, Nitrogen Atmosphere"; or

(C) ASTM E 1251-88, "Standard Test Method for Optical Emission Spectrometric Analysis of Aluminum and Aluminum Alloys by the Argon Atmosphere, Point-to-Plane, Unipolar Self-Initiating Capacitor Discharge".

(2) To determine alloy composition as defined in subsections (a)(13) and (a)(22), ASTM E 117-64 (1985), "Standard Method for Spectrographic Analysis of Pig Lead by the Point-to-Plane Technique" shall be used.

(3) To determine alloy composition as defined in section (a)(25), ASTM E 46-87, "Test Method for Chemical Analysis of Lead- and Tin-Base Solder" shall be used.

(4) To determine cadmium concentration in zinc and zinc alloys to evaluate eligibility for exemption under section (c)(2), ASTM E 536-84 (1988), "Standard Test Method for Chemical Analysis of Zinc and Zinc Alloys" shall be used.

(5) To determine cadmium concentration in copper and copper-based alloys to evaluate eligibility for exemption under section (c)(2), ASTM E 53-86a, "Standard Test Methods for Chemical Analysis of Copper" shall be used.

(6) To determine arsenic concentration in copper or copper-based alloys to evaluate eligibility for exemption under section (c)(2), ASTM E 62-89, "Standard Test Method for Chemical Analysis of Copper and Copper Alloys" shall be used.

(7) To determine arsenic content in aluminum or zinc (or any other alloy in which determination of arsenic by spectrochemical methods is compromised by interference) to evaluate eligibility for exemption under section (c)(2), EPA method 7061 (Revision 1, December, 1987), "Arsenic (Atomic Absorption, Gaseous Hydride)", published in U.S. EPA Test Methods for Evaluating Solid Waste Physical and Chemical Methods. First Update (3rd Edition), January, 1988; EPA/530/SW-846.3-1; PB 89-14876, shall be used in the following manner.

(A) For aluminum alloys, sample digestion shall employ the hydroxide digestion technique given in appendix A to this control measure.

(g) Alternative Compliance Option.

A district may approve an alternative approach to compliance proposed by the facility operator, if the facility operator demonstrates to the satisfaction of the district Executive Officer or Air Pollution Control Officer that the alternative is enforceable, achieves the same or better reductions in emissions and risk, and achieves these reductions within the same time period as required by this airborne toxic control measure.

The alternative approach shall also be consistent with the federal Clean Air Act. The district shall revoke this approval if the facility operator fails to adequately implement the alternative approach or the alternative approach does not reduce emissions as required. The district shall notify the state board whenever it proposes to approve an alternative approach to compliance to this airborne toxic control measure.

NOTE: Authority cited: Sections 39600, 39601, 39650, 39655, and 39666, Health and Safety Code.

Reference: Sections 39650 and 39666, Health and Safety Code.

Adopted by the Air Resources Board on January 14, 1993

APPENDIX A

Digestion of Metal Aluminum Sample for Determining As

1. Introduction:

Metal Aluminum cannot react with nitric acid or concentrated sulfuric acid. It can dissolve in dilute sulfuric acid or hydrochloric acid. Active hydrogen, generated during the acid digestion process, will reduce arsenic to AsH_3, which will escape from solution, resulting in a low or negative arsenic value. The proposed method sets up a protocol to dissolve metal alumina without loss of arsenic.

2. Reagent:

3M NaOH, 10% $HgSO_4$ Solution, 30% H_2O_2
1:1 H_2SO_4, Concentrated HNO_3, Tiling Copper

3. Procedure:

3.1 Dissolve
3.1.1 Dissolve using NaOH (Method 1)

Weigh 0.5g of metal aluminum sample to a 125ml Erlenmeyer flask, add 15 ml of 3M NaOH solution, allow to react and dissolve about 20 min. Again add 10ml of 3M NaOH, continue reaction until no gas bubbles are present and the sample is dissolved completely.

3.1.2. Dissolve using $HgSO_4$ (Method 2)

Weigh 0.5g of metal Aluminum sample to a 125ml Erlenmeyer flask, add 10ml of 10% $HgSO_4$ solution and 5ml of 30% H_2O_2. After 20 minutes, add appropriate amount of $HgSO_4$. Allow reaction to continue until no gas bubbles are present. Add metal copper strips (large surface area) into the sample solution. After 10 minutes, withdraw the copper strips and add new copper strips. Repeat until the surface of copper strips in sample solution do not change to a silver color. Withdraw all copper strips from sample solution.

3.2. Digestion:

Add 3ml of concentrated HNO_3, 5ml of 1:1H_2SO_4 into the sample solution obtained from 3.1.1 or 3.1.2. Heat slowly and evaporate the sample solution until SO_3 fumes are present for 5 minutes. Cool and dilute the sample to 50.0ml. Determined As by Atomic Absorption method.