

**Final Regulation Order  
for the Rulemaking To Consider Amendments to  
Regulations for the State Ambient Air Quality Standards for  
Suspended Particulate Matter and Sulfates**

Note: Language to be added is underlined and Language to be removed is shown in strikeout. Asterisks (\*\*\*\*) indicate that a portion of the regulation is not included here.

Note: Section 70200, Table of Standards, no changes are proposed to standards for any substances not listed.

New section 70100.1 and amendments to sections 70100 and 70200 (Table of Standards) of title 17, California Code of Regulation, as noticed on May 3, August 15, and October 10, 2002 to read as follows:

Subchapter 1.5. Air Basins and Air Quality Standards

**Article 2. Ambient Air Quality Standards**

**Section 70100. Definitions.**

- (a) Ambient Air Quality Standards. Ambient air quality standards are specified concentrations and durations of air pollutants which reflect the relationship between the intensity and composition of pollution to undesirable effects.
- (b) Most Relevant Effects. "Most Relevant Effects," shown in the Table of Ambient Air Quality Standards, are the effects which the standards are intended to prevent or abate.
- (c) Parts Per Million (ppm). Parts per million is a volumetric unit of gas concentration, which is numerically equal to the volume of a gaseous contaminant present in one million volumes of air.
- (d) Micrograms Per Cubic Meter ( $\mu\text{g}/\text{m}^3$ ). Micrograms per cubic meter is a unit of concentration which is numerically equal to the mass of a contaminant (in micrograms) present in a one cubic meter sample of air, measured at EPA reference conditions (corrected to 25 degrees Celsius, 760 torr). (40 CFR Part 50.3, November 25, 1971).
- (e) Equivalent Method. "Equivalent Method" is any procedure for measuring the concentration of a contaminant, other than that specified in the air quality standard for the contaminant, which can be shown to the satisfaction of the Air Resources Board to give equivalent results at or near the level of the air quality standard.

(f) Visual Range. "Visual Range" is the distance at which a black object on the horizon has a 2 percent contrast with the horizon sky. This distance can be calculated from a measured light extinction coefficient,  $B_{ext}$ , by the formula:  $V_r = 3.912$  divided by  $B_{ext}$ .

(g) Oxidant. Oxidant is a substance that oxidizes a selected reagent that is not oxidizable by oxygen under ambient conditions. For the purposes of this section, oxidant includes ozone, organic peroxides, and peroxyacyl nitrates but not nitrogen dioxide. Atmospheric oxidant concentrations are to be measured with ozone as a surrogate by ultraviolet photometry, or by an equivalent method.

(h) Carbon Monoxide (CO). Carbon Monoxide is a colorless gas, odorless under atmospheric conditions, having the molecular form CO.

(i) Sulfur Dioxide (SO<sub>2</sub>). Sulfur dioxide is a colorless, irritating gas under atmospheric conditions, having the molecular form SO<sub>2</sub>.

(j) Suspended Particulate Matter (PM<sub>4010</sub>). Suspended particulate matter (PM<sub>4010</sub>) refers to atmospheric particles, solid and liquid, except uncombined water as measured by a (PM<sub>4010</sub>) sampler which collects 50 percent of all particles of 10 μm aerodynamic diameter and which collects a declining fraction of particles as their diameter increases and an increasing fraction of particles as their diameter decreases, reflecting the characteristics of lung deposition. Suspended particulate matter (PM<sub>4010</sub>) is to be measured by ~~the size selective inlet high volume (SSI) PM<sub>40</sub> sampler method in accordance with ARB Method P, as adopted in August 22, 1985, or by an equivalent (PM<sub>40</sub>) sampler method~~ a California Approved Sampler (CAS) for PM10, for purposes of monitoring for compliance with the Suspended Particulate Matter (PM<sub>4010</sub>) standards. Approved samplers, methods, and instruments are listed in Section 70100.1(a) below. A CAS for PM10 includes samplers, methods, or instruments determined by the Air Resources Board or the Executive Officer to produce equivalent results for PM10 with the Federal Reference Method (40 CFR, part 50, Appendix M, as published in 62 Fed. Reg., 38763, July 18, 1997).

(k) ~~Fine Total~~ Suspended Particulate Matter (PM2.5). ~~Fine Total~~ suspended particulate matter (PM2.5) refers to suspended atmospheric particles of ~~any size~~, solid and liquid, except uncombined water as measured by a PM2.5 sampler which collects 50 percent of all particles of 2.5 μm aerodynamic diameter and which collects a declining fraction of particles as their diameter increases and an increasing fraction of particles as their diameter decreases, reflecting the characteristics of lung deposition. ~~Fine Total~~ suspended particulate matter (PM2.5) is to be measured by ~~the high volume sampler method or by an equivalent method~~ a California Approved Sampler (CAS) for PM2.5 for purposes of monitoring for compliance with the Fine Particulate

Matter (PM2.5) standards. Approved samplers, methods, and instruments are listed in Section 70100.1(b) below. A CAS for PM2.5 includes samplers, method, and instruments determined by the Air Resources Board or the Executive Officer to produce equivalent results for PM2.5 with the Federal Reference Method (40 CFR, part 50, Appendix L, as published in 62 Fed. Reg., 38763, July 18, 1997).

(l) Visibility Reducing Particles. Visibility reducing particles are atmospheric particles which significantly scatter or absorb light. The effect of these particles on light extinction is to be determined by instrumental monitoring of light scattering and absorption by ARB Method V, as adopted August 18, 1989, or by an equivalent method.

(m) Hydrogen Sulfide (H<sub>2</sub>S). Hydrogen sulfide is a colorless gas having the molecular form H<sub>2</sub>S.

(n) Nitrogen Dioxide (NO<sub>2</sub>). Nitrogen dioxide is a red-brown gas, odorless under atmospheric conditions, having the molecular form NO<sub>2</sub>.

(o) Lead (particulate). Lead (particulate) is suspended particulate matter containing lead (Pb).

(p) Sulfates. Sulfates are the water soluble fraction of suspended particulate matter (PM10) containing the sulfate radical (SO<sub>4</sub>) ion (SO<sub>4</sub><sup>2-</sup>) including but not limited to strong acids and sulfate salts, as measured by ~~AHL Method No. 61 (Turbidimetric Barium Sulfate) (December 1974, as revised April 1975 and February 1976) or equivalent method~~ MLD Method 007 (based on high-volume size-selective inlet (SSI) sampling and ion chromatography), dated January 19, 1988.

(q) Vinyl Chloride. Vinyl chloride is a colorless gas with the molecular form ~~CH<sub>2</sub>-CHCl~~; chloroethene.

(r) Ozone. Ozone is a colorless gas with a pungent odor, having the molecular form O<sub>3</sub>.

(s) Extinction Coefficient. The "Extinction Coefficient" of a homogenous air mass is the natural logarithm of the fractional transmission of a beam of light per kilometer along the beam's path.

NOTE: Authority cited: Sections 39600, ~~and~~ 39601 and 39606, Health and Safety Code. Reference: Sections 39602 and 39606~~(b)~~, Health and Safety Code.

## **Section 70100.1. Methods, Samplers, and Instruments for Measuring Pollutants.**

(a) PM10 Methods. The following samplers, methods, and instruments are California Approved Samplers for PM10 for the purposes of monitoring for compliance with the Suspended Particulate Matter (PM10) standards:

(1) Federal Reference Method for the Determination of Particulate Matter as PM10 in the Atmosphere (40 CFR, Chapter 1, part 50, Appendix M, as published in 62 Fed. Reg., 38753, July 18, 1997).

The specific samplers approved are:

- (A) Andersen Model RAAS10-100 PM10 Single Channel PM10 Sampler, U.S. EPA Manual Reference Method RFPS-0699-130, as published in 64 Fed. Reg., 33481, June 23, 1999.
- (B) Andersen Model RAAS10-200 PM10 Single Channel PM10 Audit Sampler, U.S. EPA Manual Reference Method RFPS-0699-131, as published in 64 Fed. Reg., 33481, June 23, 1999.
- (C) Andersen Model RAAS10-300 PM10 Multi Channel PM10 Sampler, U.S. EPA Manual Reference Method RFPS-0669-132, as published in 64 Fed. Reg., 33481, June 23, 1999.
- (D) Sierra (currently known as Graseby) Andersen/GMW Model 1200 High-Volume Air Sampler, U.S. EPA Manual Reference Method RFPS-1287-063, as published in 52 Fed. Reg., 45684, December 1, 1987 and in 53 Fed. Reg., 1062, January 15, 1988.
- (E) Sierra (currently known as Graseby) Andersen/GMW Model 321B High-Volume Air Sampler, U.S. EPA Manual Reference Method RFPS-1287-064, as published in 52 Fed. Reg., 45684, December 1, 1987 and in 53 Fed. Reg., 1062, January 15, 1988.
- (F) Sierra (currently known as Graseby) Andersen/GMW Model 321-C High-Volume Air Sampler, U.S. EPA Manual Reference Method RFPS-1287-065, as published in 52 Fed. Reg., 45684, December 1, 1987.
- (G) BGI Incorporated Model PQ100 Air Sampler, U.S. EPA Manual Reference Method RFPS-1298-124, as published in 63 Fed. Reg., 69624, December 17, 1998.
- (H) BGI Incorporated Model PQ200 Air Sampler, U.S. EPA Manual Reference Method RFPS-1298-125, as published in 63 Fed. Reg., 69624, December 17, 1998.
- (I) Rupprecht & Patashnick Partisol Model 2000 Air Sampler, U.S. EPA Manual Reference Method RFPS-0694-098, as published in 59 Fed. Reg., 35338, July 11, 1994.
- (J) Rupprecht & Patashnick Partisol-FRM Model 2000 PM10 Air Sampler, U.S. EPA Manual Reference Method RFPS-

1298-126, as published in 63 Fed. Reg., 69625, December 17, 1998.

(K) Rupprecht & Patashnick Partisol-Plus Model 2025 PM10 Sequential Air Sampler, U.S. EPA Manual Reference Method RFPS-1298-127, as published in 63 Fed. Reg., 69625, December 17, 1998.

(L) Tisch Environmental Model TE-6070 PM10 High-Volume Air Sampler, U.S. EPA Manual Reference Method RFPS-0202-141, as published in 67 Fed. Reg., 15566, April 2, 2002.

(2) Continuous samplers:

(A) Andersen Beta Attenuation Monitor Model FH 62 C14 equipped with the following components: louvered PM10 inlet, volumetric flow controller, automatic filter change mechanism, automatic zero check, and calibration control foils kit\*.

(B) Met One Beta Attenuation Monitor Model 1020 equipped with the following components: louvered PM10 size selective inlet, volumetric flow controller, automatic filter change mechanism, automatic heating system, automatic zero and span check capability\*.

(C) Rupprecht & Patashnick Series 8500 Filter Dynamics Measurement System equipped with the following components: louvered PM10 size selective inlet, volumetric flow control, flow splitter (3 liter/min sample flow), sample equilibration system (SES) dryer, TEOM sensor unit, TEOM control unit, switching valve, purge filter conditioning unit, and palliflex TX40, 13 mm effective diameter cartridge\*.

(b) PM2.5 Methods. The following samplers, methods, and instruments are California Approved Samplers for PM2.5 for the purposes of monitoring for compliance with the Fine Particulate Matter (PM2.5) standards:

(1) Federal Reference Method for the Determination of Particulate Matter as PM2.5 in the Atmosphere, 40 CFR, part 50, Appendix L, as published in 62 Fed. Reg., 38714, July 18, 1997 and as amended in 64 Fed. Reg., 19717, April 22, 1999. These must use either the WINS impactor or the U.S. EPA-approved very sharp cut cyclone (67 Fed. Reg., 15566, April 2, 2002) to separate PM2.5 from PM10. The specific samplers approved are:

(A) Andersen Model RAAS 2.5-200 PM2.5 Ambient Audit Air Sampler, U.S. EPA Manual Reference Method RFPS-0299-128, as published in 64 Fed. Reg., 12167, March 11, 1999.

(B) Graseby Andersen Model RAAS 2.5-100 PM2.5 Ambient Air Sampler, U.S. EPA Manual Reference Method RFPS-

- 0598-119, as published in 63 Fed. Reg., 31991, June 11, 1998.
- (C) Graseby Andersen Model RAAS 2.5-300 PM2.5 Sequential Ambient Air Sampler, U.S. EPA Manual Reference Method RFPS-0598-120, as published in 63 Fed. Reg., 31991, June 11, 1998.
  - (D) BGI Inc. Models PQ200 and PQ200A PM2.5 Ambient Fine Particle Sampler, U.S. EPA Manual Reference Method RFPS-0498-116, as published in 63 Fed. Reg., 18911, April 16, 1998.
  - (E) Rupprecht & Patashnick Partisol-FRM Model 2000 Air Sampler, U.S. EPA Manual Reference Method RFPS-0498-117, as published in 63 Fed. Reg., 18911, April 16, 1998.
  - (F) Rupprecht & Patashnick Partisol Model 2000 PM-2.5 Audit Sampler, as described in U.S. EPA Manual Reference Method RFPS-0499-129, as published in 64 Fed. Reg., 19153, April 19, 1999.
  - (G) Rupprecht & Patashnick Partisol-Plus Model 2025 PM-2.5 Sequential Air Sampler, U.S. EPA Manual Reference Method RFPS-0498-118, as published in 63 Fed. Reg., 18911, April 16, 1998.
  - (H) Thermo Environmental Instruments, Incorporated Model 605 "CAPS" Sampler, U.S. EPA Manual Reference Method RFPS-1098-123, as published in 63 Fed. Reg., 58036, October 29, 1998.
  - (I) URG-MASS100 Single PM2.5 FRM Sampler, U.S. EPA Manual Reference Method RFPS-0400-135, as published in 65 Fed. Reg., 26603, May 8, 2000.
  - (J) URG-MASS300 Sequential PM2.5 FRM Sampler, U.S. EPA Manual Reference Method RFPS-0400-136, as published in 65 Fed. Reg., 26603, May 8, 2000.
  - (K) BGI Inc. Model PQ200-VSCC PM2.5 Sampler, U.S. EPA Manual Equivalent Method EQPM-0202-142, as published in 67 Fed. Reg., 15567, April 2, 2002.
  - (L) BGI Inc. Model PQ200A-VSCC PM2.5 Sampler, U.S. EPA Manual Equivalent Method EQPM-0202-142, as published in 67 Fed. Reg., 15567, April 2, 2002.
  - (M) Rupprecht & Patashnick Partisol-FRM Model 2000 PM2.5 FEM Air Sampler, U.S. EPA Manual Equivalent Method EQPM-0202-143, as published in 67 Fed. Reg., 15567, April 2, 2002.
  - (N) Rupprecht & Patashnick Partisol Model 2000 PM2.5 FEM Audit Sampler, U.S. EPA Manual Equivalent Method EQPM-0202-144, as published in 67 Fed. Reg., 15567, April 2, 2002.

(O) Rupprecht & Patashnick Partisol-Plus Model 2025 PM-2.5 FEM Sequential Sampler, U.S. EPA Manual Equivalent Method EQPM-0202-145, as published in 67 Fed. Reg., 15567, April 2, 2002.

(2) Continuous samplers:

- (A) Andersen Beta Attenuation Monitor Model FH 62 C14 equipped with the following components: louvered PM10 size selective inlet, very sharp cut or sharp cut cyclone, volumetric flow controller, automatic filter change mechanism, automatic zero check, and calibration control foils kit\*.
- (B) Met One Beta Attenuation Monitor Model 1020 equipped with the following components: louvered PM10 size selective inlet, very sharp cut or sharp cut cyclone, volumetric flow controller, automatic filter change mechanism, automatic heating system, and automatic zero and span check capability\*.
- (C) Rupprecht & Patashnick Series 8500 Filter Dynamics Measurement System equipped with the following components: louvered PM10 size selective inlet, very sharp cut or sharp cut cyclone, volumetric flow control, flow splitter (3 liter/min sample flow), sample equilibration system (SES) dryer, TEOM sensor unit, TEOM control unit, switching valve, purge filter conditioning unit, and palliflex TX40, 13 mm effective diameter cartridge\*.

\*Instrument shall be operated in accordance with the vendor's instrument operation manual that adheres to the principles and practices of quality control and quality assurance as specified in Volume I of the "Air Monitoring Quality Assurance Manual", as printed on April 17, 2002, and available from the California Air Resources Board, Monitoring and Laboratory Division, P.O. Box 2815, Sacramento CA 95814, incorporated by reference herein.

Note: Authority cited: Sections 39600, 39601 and 39606, Health and Safety Code. Reference: Sections 39014, 39606, 39701, and 39703(f), Health and Safety Code.

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**Section 70200. Table of Standards.\*\*\***

Substance	Concentration and Methods*	Duration of Averaging Periods	Most Relevant Effects	Comments
Suspended Particulate Matter (PM <sub>10</sub> )	50 µg/m <sup>3</sup> PM <sub>10</sub> **  30 µg/m <sup>3</sup> PM <sub>10</sub> ** 20 µg/m <sup>3</sup> PM <sub>10</sub> ** SSI Method in accordance with Method P California Approved Sampler as listed in section 70100.1(a)	24 hour sample  24 hour samples, annual geometric arithmetic mean	Prevention of excess deaths, <u>illness and restrictions in activity from short- and long-term exposures. Illness outcomes include, but are not limited to, respiratory symptoms, bronchitis, asthma exacerbation, emergency room visits and hospital admissions for cardiac and respiratory diseases. Sensitive subpopulations include children, the elderly, and individuals with pre-existing cardiopulmonary disease, from short-term exposures and of exacerbation of symptoms in sensitive patients with respiratory disease. Prevention of excess seasonal declines in pulmonary function, especially in children.</u>	This standard applies to suspended matter as measured by PM <sub>10</sub> sampler, which collects 50% of all particles of 10 µm aerodynamic diameter and collects a declining fraction of particles as their diameter increases, and an increasing fraction of particles as their diameter decreases, reflecting the characteristics of lung deposition.
Fine Suspended Particulate Matter (PM <sub>2.5</sub> )	12 µg/m <sup>3</sup> PM <sub>2.5</sub> ** California Approved Sampler as listed in section 70100.1(b)	24 hour samples, annual arithmetic mean	Prevention of excess deaths and <u>illness from long-term exposure. Illness outcomes include, but are not limited to, respiratory symptoms, asthma exacerbation, and hospital admissions for cardiac and respiratory diseases. Sensitive subpopulations include children, the elderly, and individuals with pre-existing cardiopulmonary disease.</u>	This standard applies to fine suspended matter as measured by PM <sub>2.5</sub> sampler, which collects 50% of all particles of 2.5 µm aerodynamic diameter and collects a declining fraction of particles as their diameter increases, and an increasing fraction of particles as their diameter decreases, reflecting the characteristics of lung deposition.
Sulfates	25 µg/m <sup>3</sup> total sulfates, AIHL #64 (Turbidimetric Barium Sulfate) MLD Method 007	24 hours	a. Decrease in ventilatory function b. Aggravation of asthmatic symptoms c. Aggravation of cardio-pulmonary disease d. Vegetation damage e. Degradation of visibility f. Property damage	This standard is based on a Critical Harm Level, not a threshold value.

\* Any equivalent procedure which can be shown to the satisfaction of the Air Resources Board to give equivalent results at or near the level of the air quality standard may be used.

\*\* These standards are violated when concentrations exceed those set forth in the body of the regulation. All other standards are violated when concentrations equal or exceed those set forth in the body of the regulation.

\*\*\* Applicable statewide unless otherwise noted.

\*\*\*\* These standards are violated when particle concentrations cause measured light extinction values to exceed those set forth in the regulations.



Note: Authority cited: Sections 39600, 39601(a) and 39606(b), Health and Safety Code.  
Reference: Sections 39014, 39606(b), 39701 and 39703(f), Health and Safety Code;  
Western Oil and Gas Ass'n v. Air Resources Bd. (1984) 37 Cal.3d 502.