

# Ambient Air Quality Standards

| Pollutant                                         | Averaging Time          | California Standards <sup>1</sup>  |                                                        | National Standards <sup>2</sup>                         |                                   |                                                                     |
|---------------------------------------------------|-------------------------|------------------------------------|--------------------------------------------------------|---------------------------------------------------------|-----------------------------------|---------------------------------------------------------------------|
|                                                   |                         | Concentration <sup>3</sup>         | Method <sup>4</sup>                                    | Primary <sup>3,5</sup>                                  | Secondary <sup>3,6</sup>          | Method <sup>7</sup>                                                 |
| Ozone (O <sub>3</sub> ) <sup>8</sup>              | 1 Hour                  | 0.09 ppm (180 µg/m <sup>3</sup> )  | Ultraviolet Photometry                                 | —                                                       | Same as Primary Standard          | Ultraviolet Photometry                                              |
|                                                   | 8 Hour                  | 0.070 ppm (137 µg/m <sup>3</sup> ) |                                                        | 0.070 ppm (137 µg/m <sup>3</sup> )                      |                                   |                                                                     |
| Respirable Particulate Matter (PM10) <sup>9</sup> | 24 Hour                 | 50 µg/m <sup>3</sup>               | Gravimetric or Beta Attenuation                        | 150 µg/m <sup>3</sup>                                   | Same as Primary Standard          | Inertial Separation and Gravimetric Analysis                        |
|                                                   | Annual Arithmetic Mean  | 20 µg/m <sup>3</sup>               |                                                        | —                                                       |                                   |                                                                     |
| Fine Particulate Matter (PM2.5) <sup>9</sup>      | 24 Hour                 | —                                  | —                                                      | 35 µg/m <sup>3</sup>                                    | Same as Primary Standard          | Inertial Separation and Gravimetric Analysis                        |
|                                                   | Annual Arithmetic Mean  | 12 µg/m <sup>3</sup>               | Gravimetric or Beta Attenuation                        | 12.0 µg/m <sup>3</sup>                                  | 15 µg/m <sup>3</sup>              |                                                                     |
| Carbon Monoxide (CO)                              | 1 Hour                  | 20 ppm (23 mg/m <sup>3</sup> )     | Non-Dispersive Infrared Photometry (NDIR)              | 35 ppm (40 mg/m <sup>3</sup> )                          | —                                 | Non-Dispersive Infrared Photometry (NDIR)                           |
|                                                   | 8 Hour                  | 9.0 ppm (10 mg/m <sup>3</sup> )    |                                                        | 9 ppm (10 mg/m <sup>3</sup> )                           | —                                 |                                                                     |
|                                                   | 8 Hour (Lake Tahoe)     | 6 ppm (7 mg/m <sup>3</sup> )       |                                                        | —                                                       | —                                 |                                                                     |
| Nitrogen Dioxide (NO <sub>2</sub> ) <sup>10</sup> | 1 Hour                  | 0.18 ppm (339 µg/m <sup>3</sup> )  | Gas Phase Chemiluminescence                            | 100 ppb (188 µg/m <sup>3</sup> )                        | —                                 | Gas Phase Chemiluminescence                                         |
|                                                   | Annual Arithmetic Mean  | 0.030 ppm (57 µg/m <sup>3</sup> )  |                                                        | 0.053 ppm (100 µg/m <sup>3</sup> )                      | Same as Primary Standard          |                                                                     |
| Sulfur Dioxide (SO <sub>2</sub> ) <sup>11</sup>   | 1 Hour                  | 0.25 ppm (655 µg/m <sup>3</sup> )  | Ultraviolet Fluorescence                               | 75 ppb (196 µg/m <sup>3</sup> )                         | —                                 | Ultraviolet Fluorescence; Spectrophotometry (Pararosaniline Method) |
|                                                   | 3 Hour                  | —                                  |                                                        | —                                                       | 0.5 ppm (1300 µg/m <sup>3</sup> ) |                                                                     |
|                                                   | 24 Hour                 | 0.04 ppm (105 µg/m <sup>3</sup> )  |                                                        | 0.14 ppm (for certain areas) <sup>11</sup>              | —                                 |                                                                     |
|                                                   | Annual Arithmetic Mean  | —                                  |                                                        | 0.030 ppm (for certain areas) <sup>11</sup>             | —                                 |                                                                     |
| Lead <sup>12,13</sup>                             | 30 Day Average          | 1.5 µg/m <sup>3</sup>              | Atomic Absorption                                      | —                                                       | —                                 | High Volume Sampler and Atomic Absorption                           |
|                                                   | Calendar Quarter        | —                                  |                                                        | 1.5 µg/m <sup>3</sup> (for certain areas) <sup>12</sup> | Same as Primary Standard          |                                                                     |
|                                                   | Rolling 3-Month Average | —                                  |                                                        | 0.15 µg/m <sup>3</sup>                                  |                                   |                                                                     |
| Visibility Reducing Particles <sup>14</sup>       | 8 Hour                  | See footnote 14                    | Beta Attenuation and Transmittance through Filter Tape | No National Standards                                   |                                   |                                                                     |
| Sulfates                                          | 24 Hour                 | 25 µg/m <sup>3</sup>               | Ion Chromatography                                     |                                                         |                                   |                                                                     |
| Hydrogen Sulfide                                  | 1 Hour                  | 0.03 ppm (42 µg/m <sup>3</sup> )   | Ultraviolet Fluorescence                               |                                                         |                                   |                                                                     |
| Vinyl Chloride <sup>12</sup>                      | 24 Hour                 | 0.01 ppm (26 µg/m <sup>3</sup> )   | Gas Chromatography                                     |                                                         |                                   |                                                                     |

See footnotes on next page ...

1. California standards for ozone, carbon monoxide (except 8-hour Lake Tahoe), sulfur dioxide (1 and 24 hour), nitrogen dioxide, and particulate matter (PM<sub>10</sub>, PM<sub>2.5</sub>, and visibility reducing particles), are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.
2. National standards (other than ozone, particulate matter, and those based on annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest 8-hour concentration measured at each site in a year, averaged over three years, is equal to or less than the standard. For PM<sub>10</sub>, the 24 hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 µg/m<sup>3</sup> is equal to or less than one. For PM<sub>2.5</sub>, the 24 hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard. Contact the U.S. EPA for further clarification and current national policies.
3. Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.
4. Any equivalent measurement method which can be shown to the satisfaction of the ARB to give equivalent results at or near the level of the air quality standard may be used.
5. National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.
6. National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.
7. Reference method as described by the U.S. EPA. An "equivalent method" of measurement may be used but must have a "consistent relationship to the reference method" and must be approved by the U.S. EPA.
8. On October 1, 2015, the national 8-hour ozone primary and secondary standards were lowered from 0.075 to 0.070 ppm.
9. On December 14, 2012, the national annual PM<sub>2.5</sub> primary standard was lowered from 15 µg/m<sup>3</sup> to 12.0 µg/m<sup>3</sup>. The existing national 24-hour PM<sub>2.5</sub> standards (primary and secondary) were retained at 35 µg/m<sup>3</sup>, as was the annual secondary standard of 15 µg/m<sup>3</sup>. The existing 24-hour PM<sub>10</sub> standards (primary and secondary) of 150 µg/m<sup>3</sup> also were retained. The form of the annual primary and secondary standards is the annual mean, averaged over 3 years.
10. To attain the 1-hour national standard, the 3-year average of the annual 98th percentile of the 1-hour daily maximum concentrations at each site must not exceed 100 ppb. Note that the national 1-hour standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the national 1-hour standard to the California standards the units can be converted from ppb to ppm. In this case, the national standard of 100 ppb is identical to 0.100 ppm.
11. On June 2, 2010, a new 1-hour SO<sub>2</sub> standard was established and the existing 24-hour and annual primary standards were revoked. To attain the 1-hour national standard, the 3-year average of the annual 99th percentile of the 1-hour daily maximum concentrations at each site must not exceed 75 ppb. The 1971 SO<sub>2</sub> national standards (24-hour and annual) remain in effect until one year after an area is designated for the 2010 standard, except that in areas designated nonattainment for the 1971 standards, the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standards are approved.  
  
Note that the 1-hour national standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the 1-hour national standard to the California standard the units can be converted to ppm. In this case, the national standard of 75 ppb is identical to 0.075 ppm.
12. The ARB has identified lead and vinyl chloride as 'toxic air contaminants' with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.
13. The national standard for lead was revised on October 15, 2008 to a rolling 3-month average. The 1978 lead standard (1.5 µg/m<sup>3</sup> as a quarterly average) remains in effect until one year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978 standard, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.
14. In 1989, the ARB converted both the general statewide 10-mile visibility standard and the Lake Tahoe 30-mile visibility standard to instrumental equivalents, which are "extinction of 0.23 per kilometer" and "extinction of 0.07 per kilometer" for the statewide and Lake Tahoe Air Basin standards, respectively.