TABLE OF STANDARDS FOR AMBIENT AIR QUALITY

Pollutant	Adverse level [1]	Serious level [2]	Emergency level
Photochemical pollutants (hydrocarbons, ozone, oxidant, and photochemical aerosols).	Oxidant index, 0.15 p.p.m. for 1 hour by the potassium iodide method (eye irritation, damage to vegetation, and visibility reduction).	([4 5])	([4 6]).
Nitrogen dioxide	0.25 p.p.m. for 1 hour (coloration of the atmosphere during daylight hours).	3 p.p.m. for 1 hour (bronchoconstriction).	([7]).
Carbon monoxide	Not applicable	30 p.p.m. for 8 hours, or 120 p.p.m. for 1 hour (interference with oxygen transport by blood).	([8]).
Sulfur dioxide	1 p.p.m. for 1 hour or 0.3 p.p.m. for 8 hours (damage to vegetation).	5 p.p.m. for 1 hour (bronchoconstriction.	10 p.p.m. for 1 hour (severe distress in human subjects).
Hydrogen sulfide	0.1 p.p.m. for 1 hour (sensory irritation).	([9])	([10]).
Sulfuric acid	([11])	([11])	([12]).
Ethylene	0.5 p.p.m. for 1 hour or 0.1 p.p.m. for 8 hours (damage to vegetation).	Not applicable	Not applicable.
Hydrogen fluoride	([13])	([14])	Do.
Lead	Not applicable	([15])	([15]).
Particulate matter	Sufficient to reduce visibility to less than 3 miles when relative humidity is less than 70 percent.	Not applicable	Not applicable.
Carcinogens	Not applicable	([16])	Do.

[1] Level at which there will be sensory irritation, damage to vegetation, reduction in visibility, or similar effects.
[2] Level at which there will be alteration of bodily function or which is likely to lead to chronic disease.
[3] Level at which it is likely that acute sickness or death in sensitive groups of persons will occur.
[4] Hydrocarbons are a group of substances most of which, normally, are toxic only at concentrations in the order of several hundred parts per million. However, a number of hydrocarbons can react photochemically at very low concentrations to produce irritating and toxic substances. Because of the large number of hydrocarbons involved, the complexity of the photochemical reactions, and the reactivity of other compounds such as nitrogen dioxide and ozone, it is not yet possible to establish serious and emergency levels for hydrocarbons. From the public health standpoint, the concentration of those hydrocarbons which react photochemically should be maintained at or below the level associated with the oxidant index defined in the adverse standard.
[5] Ozone, at 1 p.p.m. for 8 hours daily for about a year, has produced bronchiolitis and fibrositis in rodents. Extrapolation of these data to man is difficult. Functional impairment data have been reported; at 1.25 p.p.m. some effect is observed on residual volume and diffusing capacity. The variability of the tests was not reported. Additional data would be needed before a standard is set.
[6] A value of 2.0 p.p.m. of ozone for 1 hour may produce serious interference with function healthy persons and the assumption is made that this might cause acute illness in sensitive persons.
[7] Nitrogen dioxide, at concentrations above 2.5 p.p.m., causes acute damage to sensitive plants. 1 p.p.m. for 8 hours will produce significant growth reduction, expressed as fresh and dry weight, with no visible lesions of damage. High levels (150 to 220 p.p.m.) in short exposures produce fibrotic changes in the lungs of man that may end fatally.
[8] Given certain assumptions concerning ventilatory rates, acute sickness might result from a carbon monoxide level of 240 parts per million for 1 hour in sensitive groups because of inactivation of 10 percent of the body's hemoglobin. In any event it is clear that when a population exposure limit has been set for carbon monoxide, because of exposures from other sources, community air pollution standards should be based on some fraction of this limit.
[9] Hydrogen sulfide is not known to produce chronic disease in humans but there may be durable sequelae from acute exposures. The disagreeable odor may interfere with appetite in sensitive groups of persons at about 5 parts per millioni At high concentrations loss of the sense of smell occurs. This has been reported at 100 parts per million for exposures lasting 2 to 15 minutes. Conjunctivitis and mild respiratory tract irritation have been reported at levels of 50 to 100 parts per million for 1 hour.
[10] Acute sickness and death with neurotoxicity may occur at concentrations of several hundred parts per million. It is very unlikely these levels will occur in community air pollution.
[11] A sulfuric acid mist level of 1 mg./M^3 with an average particle size of 1 μ will produce a respiratory response in man. It is not possible to generalize from this for all air pollution conditions, because under natural conditions, particle size will vary. Only with large droplets would sensory irritation be produced without other physiological effects.
[12] A level of 5 mg./M^3 of sulfuric acid mist for a few minutes produces coughing and irritation in normal individuals. Presumably, it could cause acute illness in sensitive groups of persons in a period of 1 hour.
[13] Hydrogen fluoride and other airborne fluorides settle upon and some are absorbed into vegetation. When forage crops containing 30 to 50 p.p.m. of fluoride measured on a dry-weight basis are regularly consumed over a long period the teeth and bones of cattle may show changes, depending upon age, nutritional factors, and the form of fluoride ingested. Such changes may or may not have any economic effect. Fluorides at these levels do not necessarily cause injury to the forage plants themselves. However, injury may be produced in certain species of vegetation upon long-term exposure to low levels of atmospheric fluorides.
[14] The irritating properties of hydrogen fluoride in experimental human exposure have been manifested by desquamation of the skin, at concentrations of 2 to 5 p.p.m. Mucous membrane irritation also occurs from hydrogen fluorides but quantitative data are not adequate to support a standard.
[15] It is clear that lead levels should be set on the basis of average values for long periods. While data are abundant concerning human response to 8-hour-a-day, 5-day-a-week exposures, data are insufficient for the effects of the continuous exposure inherent in community air pollution. While laboratory studies will be pursued with vigor, it becomes very important that local agencies collect data on existing lead levels. Since lead exposures are from multiple sources, community air pollution standards should be based on a portion of the total limit for population exposure.
[16] Carcinogens include a few organic compounds such as some polycyclic hydrocarbons and some metals such as arsenic and chromium. Studies on effects of such substances are currently underway, but there are not sufficient data at present to set standards. In the meantime, it is recommended that concentrations of carcinogens in air should be kept as low as possible.