

TABLE C-1 Comparison of Regulations and Guidelines Pertinent to Indoor Environments^a
(The user of any value in this table should take into account the purpose for which it was adopted and the means by which it was developed.)

	Enforceable and/or Regulatory Levels			Nonenforced Guidelines and Reference Levels			
	NAAQS/EPA (Ref. C-4)	OSHA (Ref. C-5)	MAK (Ref. C-2)	Canadian (Ref. C-8)	WHO/Europe (Ref. C-11)	NIOSH (Ref. C-13)	ACGIH (Ref. C-1)
Carbon dioxide		5000 ppm	5000 ppm 10,000 ppm [1 h]	3500 ppm [L]		5000 ppm 30,000 ppm [15 min]	5000 ppm 30,000 ppm [15 min]
Carbon monoxide ^c	9 ppm ^g 35 ppm [1 h] ^g	50 ppm	30 ppm 60 ppm [30 min]	11 ppm [8 h] 25 ppm [1 h]	90 ppm [15 min] 50 ppm [30 min] 25 ppm [1 h] 10 ppm [8 h]	35 ppm 200 ppm [C]	25 ppm
Formaldehyde ^h		0.75 ppm 2 ppm [15 min]	0.3 ppm 1 ppm ⁱ	0.1 ppm [L] 0.05 ppm [L] ^b	0.1 mg/m ³ (0.081 ppm) [30 min] ^p	0.016 ppm 0.1 ppm [15 min]	0.3 ppm [C]
Lead	1.5 µg/m ³ [3 months]	0.05 mg/m ³	0.1 mg/m ³ 1 mg/m ³ [30 min]	Minimize exposure	0.5 µg/m ³ [1 yr]	0.050 mg/m ³	0.05 mg/m ³
Nitrogen dioxide	0.05 ppm [1 yr]	5 ppm [C]	5 ppm 10 ppm [5 min]	0.05 ppm 0.25 ppm [1 h]	0.1 ppm[1 h] 0.02 ppm [1 yr]	1 ppm [15 min]	3 ppm 5 ppm [15 min]
Ozone	0.12 ppm [1 h] ^g 0.08 ppm	0.1 ppm	j	0.12 ppm [1 h]	0.064 ppm (120 µg/m ³) [8 h]	0.1 ppm [C]	0.05 ppm ^k 0.08 ppm ^l 0.1 ppm ^m 0.2 ppm ⁿ
Particles ^e <2.5 µm MMAD ^d	15 µg/m ³ [1 yr] ^o 35 µg/m ³ [24 h] ^o	5 mg/m ³	1.5 mg/m ³ for <4 µm	0.1 mg/m ³ [1 h] 0.040 mg/m ³ [L]			3 mg/m ³ [C]
Particles ^e <10 µm MMAD ^d	150 µg/m ³ [24 h] ^o		4 mg/m ³				10 mg/m ³ [C]
Radon				800 Bq/m ³ [1 yr]			
Sulfur dioxide	0.03 ppm [1 yr] 0.14 ppm [24 h] ^g	5 ppm	0.5 ppm 1 ppm ⁱ	0.38 ppm [5 min] 0.019 ppm	0.048 ppm [24 h] 0.012 ppm [1 yr]	2 ppm 5 ppm [15 min]	2 ppm 5 ppm [15 min]
Total particles ^e		15 mg/m ³					

a. Numbers in brackets [] refer to either a ceiling or to averaging times of less than or greater than eight hours (min = minutes; h = hours; y = year; C = ceiling; L = long-term). Where no time is specified, the averaging time is eight hours.

b. Target level is 0.05 ppm because of its potential carcinogenic effects. Total aldehydes limited to 1 ppm. Although the epidemiological studies conducted to date provide little convincing evidence that formaldehyde is carcinogenic in human populations, because of this potential, indoor levels should be reduced as much as possible.

c. As one example regarding the use of values in this table, readers should consider the applicability of carbon monoxide concentrations. The concentrations considered acceptable for nonindustrial, as opposed to industrial, exposure are substantially lower. These lower concentrations (in other words, the ambient air quality standards, which are required to consider populations at highest risk) are set to protect the most sensitive subpopulation, individuals with pre-existing heart conditions.

d. MMAD = mass median aerodynamic diameter in microns (micrometers). Less than 3.0 µm is considered respirable; less than 10 µm is considered inhalable.

e. Nuisance particles not otherwise classified (PNOC), not known to contain significant amounts of asbestos, lead, crystalline silica, known carcinogens, or other particles known to cause significant adverse health effects.

f. See Table C-2 for the U.S. EPA guideline.

g. Not to be exceeded more than once per year

h. The U.S. Department of Housing and Urban Development adopted regulations concerning formaldehyde emissions from plywood and particleboard intended to limit the airborne concentration of formaldehyde in manufactured homes to 0.4 ppm. (24 CFR Part 3280, HUD Manufactured Home Construction and Safety Standards). In addition, California Air Resources Board Regulation §93120, entitled "Airborne Toxic Control Measure to Reduce Formaldehyde Emissions from Composite Wood Products" has specific chamber-based requirements for composite wood products sold in California C-47.

i. Never to be exceeded

j. Carcinogen, no maximum values established

k. TLV for heavy work

l. TLV for moderate work

m. TLV for light work

n. TLV for heavy, moderate, or light workloads (less than or equal to two hours)

o. 62FR38652 - 38760, July 16, 1997

p. Epidemiological studies suggest a causal relationship between exposure to formaldehyde and nasopharyngeal cancer, although the conclusion is tempered by the small numbers of observed and expected cases. There are also epidemiological observations of an association between relatively high occupational exposures to formaldehyde and sinonasal cancer.