

CARBON MONOXIDE LEVELS & RISKS

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CO Level	Action	CO Level	Action
1-4ppm	Normal levels in human tissues produced by body.	50ppm	US OSHA recommended 8 hour maximum workplace exposure. Maximum NCI level for unvented appliances.
3-7ppm	6% increase in the rate of admission in hospitals of non-elderly for asthma. (Shepherd-1999)	70ppm	1st alarm level of UL2034 approved CO Alarms-1-4 hours. 3rd alarm level for NSI 3000-30 seconds. NSI 3000 Low Level CO Monitor cannot be silenced by reset button.
5-6ppm	Significant risk of low birth weight if exposed during last trimester. (Ritz & Yu-1999)	100ppm	Maximum NCI CO level during run cycle in all vented appliances (stable). Maximum NCI CO for all oil appliances. Ambient level requires evacuation.
5ppm	1st visual display on NCI 3000 Low Level CO Monitor.	200ppm	First listed level (established in 1930) healthy adults will have symptoms: headaches, nausea. NIOSH & OSHA recommend evacuation of workplace. Maximum "Air Free" CO for vented water heater and unvented heaters. (ANSI Z21) UL approved alarms must sound between 30 - 60 minutes (NSI 3000-30 seconds).
9ppm	ASHRAE standard for allowable spillage from vented appliances, indoors, for 8 hours exposure daily. EPA standard for outdoors for 8 hours and a maximum 3 times per year. (Clean Air Act)	400ppm	Healthy adults will have headaches within 1-2 hours. Life threatening after 3 hours. Maximum "Air Free" CO in all vented heating appliances. (ANSI Z21) Maximum EPA levels for industrial flue exhaust. UL Alarms must alarm within 15 minutes (NSI 3000-30 seconds). Maximum recommended light-off CO for all natural draft appliances - NCI (except oil).
10ppm	Outdoor level of CO found associated with a significant increase in heart disease deaths and hospital admissions for congestive heart failure. (JAMA, Penny) 1st ambient level occupants should be notified-NCI Protocol.	800ppm	Healthy adults will have nausea, dizziness, convulsions within 45 minutes. Unconscious within 2 hours then Death (established in 1930). Maximum "Air Free" CO for unvented gas ovens. (ANSI Z21)
15-20ppm	First level World Health Organization lists as causing impaired performance, decrease in exercise time and vigilance. 1st alarm level for NCI 3000 Low Level CO Monitor-5 minutes.	800ppm+	Death in less than one hour.
25ppm	Maximum allowable in a Parking Garage. (International Mechanical Code)	800-1000 ppm	Maximum light-off induced draft equipment.
27ppm	21% increase in cardio respiratory complaints. (Kurt-1978)	2000ppm	EPA standard for new vehicle emissions.
30ppm	Earliest onset of exercise induced angina. (World Health Organization) 1st visual display on UL2034 approved CO Alarm-Must not alarm before 30 days.	3000 ppm+	Typical emissions from propane lift trucks, gasoline powered tools, etc. Death in less than 30 minutes.
35ppm	US NIOSH recommended 8 hour maximum workplace exposure. EPA standard for outdoors for 1 hour and a maximum of 1 time per year. Level many fire departments wear breathing apparatus before entering. 2nd ambient level occupants should be notified and space ventilated. 2nd alarm level for NSI 3000 Low Level Monitor-5 minutes.		