

# CARBON MONOXIDE LEVELS AND RISKS

| 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<br>Maximum NCI level for Unvented appliances   |
| 3-7ppm   | 6% increase in the rate of admission in hospitals of non-elderly for asthma. (Sheppard-1999)   | 70ppm    | 1st Alarm level of UL2034 approved CO Alarms- 2-4 hours<br>3rd Alarm level for NSI 3000 - 30 seconds<br>NSI 3000 Low Level Monitor cannot be silenced by reset button  |
| 5-6ppm   | Significant risk of low birth rate if exposed during last trimester (Ritz & Yu-1999)   | 100ppm   | Maximum NCI CO level during run cycle in all vented appliances(stable)<br>Maximum NCI CO for all oil appliances  |
| 5ppm     | 1st visual display on NSI 3000 Low Level CO Monitor  | 200ppm   | First listed level(established in 1930) healthy adults will have symptoms-headaches, nausea<br>NIOSH & OSHA recommend evacuation of workplace<br>Maximum "Air Free" CO for vented water heater and unvented heaters (ANSI Z21)<br>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<br>Maximum "Air Free" CO in all vented heating appliances (ANSI Z21)<br>Maximum EPA levels for industrial flue exhaust<br>UL Alarms must alarm within 15 minutes (NSI 3000 – 30 seconds)<br>Maximum recommended light-off CO for all 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)<br><br>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)<br>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<br><br>1st Alarm level for NSI 3000 Low Level CO Monitor-5 minutes  | 800ppm+  | Death in less than one hour  |
| 25ppm    | Maximum allowable in a Parking Garage (International Mechanical Code)  | 2000ppm  | EPA standard for new vehicle emissions   |
| 27ppm    | 21% increase in cardio respiratory complaints (Kurt-1978)  | 3000ppm+ | Typical emissions from propane lift trucks, gasoline powered tools etc.<br><br>Death in less than 30 minutes.  |
| 30ppm    | Earliest onset of exercise induced angina (World Health Organization)<br>1st visual display on UL2034 approved CO Alarm-Must not alarm before 30 days  |          |  |
| 35ppm    | US NIOSH recommended 8 hour maximum workplace exposure<br><br>EPA standard for outdoors for 1 hour and a maximum of 1 time per year<br><br>Level many fire departments wear breathing apparatus before entering<br><br>2nd ambient level occupants should be notified and space ventilated<br><br>2nd Alarm level for NSI 3000 Low Level Monitor-5 minutes |          |  |

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