



From The Home Inspector

Why Test for Carbon Monoxide?

By John Woodmansee

Is carbon monoxide(CO) testing of gas and oil fueled appliances required in a home inspection? No. But a few home inspectors do measure CO production. CO is produced when fuel does not burn as completely as possible, and it is poisonous and sickening to us breathing creatures. It is called "the invisible killer" because it has no odor, color or taste. Healthy people can tolerate low levels of CO, but infants and folks with health and breathing problems are susceptible to even low levels like 10 ppm (parts/million). In the 1980's The American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE) developed a standard for CO levels stating that continuous exposure indoors for an eight hour period should not exceed 9 ppm.

Home inspectors worry about any condition that might introduce CO into the indoor air and affect the humans and pets there. We do this by looking for conditions and equipment that would cause a build-up of CO.

CO production from a water heater, furnace, space heater, gas log heater, cooking range or pool heater shows how effectively the fuel is burning. If the CO level is high then something is wrong with (a) the combustion appliance, (b) the venting of exhaust gases, or (c) the supply of oxygen for proper combustion of the fuel. Here are some of the guidelines for this inspection work:

1. If the appliance is vented to the outside air (all furnaces, pool heaters & water heaters, and some gas log heaters), then there must be no spillage shortly after the venting system has established its drafting effect, sucking all the exhaust gases out of the house. Many appliances release some fuel odor and exhaust when they go through the first moments of their burn cycle, and this is acceptable.

2. CO levels of up to 100 ppm, measured in the flue gases, are acceptable for VENTED appliances. Often we will drill a small hole in the smoke pipe (called "vent connector") to measure the gases, then patch the hole with a plug or aluminum tape. Vented style gas logs in fireplaces can be measured with probe into the damper, and that damper should have a hold-open safety clamp installed to avert the damper being shut while the heater is burning.

3. Again, the rule for VENTED appliances is NO SPILLAGE of exhaust gases. Often we inspectors will create a worse case scenario by closing all doors and windows, then turning on the furnace blower, kitchen range vent and clothes dryer to see if any of these air-sucking appliances will cause the combustion appliance to back-vent and spill exhaust into the house. This routine is especially important in the case of a water heater or furnace installed near a clothes dryer, and especially where these appliances are confined to a small room.

4. In the case of UNVENTED gas heaters (a) in a fireplace with damper sealed, (b) in a fake fireplace enclosure, or (c) a free-standing room heater, the rule is that the heater should not make the CO level rise above 9 ppm over a several hour period. Since we aren't around for hours to do such a test, we have to be creative. One thing for sure, if the heater does not spill gases with more than 9 ppm CO into the room, then indoor air will be less than 9 ppm.

5. Gas cooking ranges are usually not vented to the outside air by a range hood. That's unfortunate. I advise folks to install a vented hood because it is best to exhaust out heat, cooking odors and the combustion products of the range. Ovens are notorious for generating lots of CO, and should be tested in both BAKE and BROIL modes if there are separate burners for those modes. CO levels of 300-400 ppm are common, but something less than 100 ppm seems attainable in many ranges; and a technician may be able to "tune" the burners for cleaner burning. No matter how well-behaved the range is, it should never be used to heat the house.

6. Home inspectors look for other signs of combustion problems: sooting around burners, corrosion of the smoke pipe, scorching marks from flame rollout around burners, distortion of flames when the blower runs in a furnace, soapy-like odor to the flue gases, etc. Skilled combustion technicians measure other things and often disassemble appliances. They look at draft pressure, temperature of the heated air, CO production over a long period, cracks in the heat exchanger, etc.

7. Why not simply recommend the use of inexpensive carbon monoxide detectors? The sad truth is that Underwriters Laboratory (UL) approval allows for a CO detector not to show a digital readout or signal trouble until the CO concentration is above 30 ppm. Then it must not "honk" until the concentration is above 70 ppm for as long as four hours. Thus, the UL approved detector that one buys in the store is woefully crude and may only alarm when people and pets are already getting sick from CO poisoning. That is not my idea of an honest safety monitor. I direct my clients to the website www.aeromedix.com where one can order the battery-powered, CO Experts monitor (\$140) which alarms at CO levels as low as 10 ppm. This is a resource where private pilots buy their safety equipment.

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