**Q&A**

**Carbon Monoxide – What You Can’t Smell WILL Hurt You**

**Q:** “I have a carbon monoxide alarm in my home, so I don’t need to worry about CO affecting my indoor air quality, right?”

**A:** Carbon monoxide (CO) is a deadly gas that is a byproduct of the combustion process. If you have an attached garage or a gas burning appliance, like a water heater, furnace, oven or fireplace, there is a high likelihood that CO is spilling into your living environment when the appliance is operating, even if the appliance has a chimney.

So, that’s what the alarm is for, right? **Wrong!** Carbon monoxide, even in small quantities, can cause serious health problems, particularly in children and the elderly. Millions of unsuspecting homeowners are exposed to low levels of CO and don’t even know it, as, unfortunately, UL (Underwriter’s Laboratories) listed CO alarms don’t go off until you and your family have been exposed to 70 ppm (parts per million) for over three and a half hours. Most international limits for unsafe levels of CO, including OSHA and World Health Organization guidelines, are between 15 and 35 ppm. Manufacturers of CO alarms lengthened their response times due to high levels of alarm activity. I supposed it’s easier to modify the alarm than to correct widespread CO problems.
But, the problem can be corrected. For instance, most people never have their homes or appliances tested for CO safety. We often assume that because an appliance is new, installed by a professional, or inspected by a local code official, that it is operating safely. But, this assumption can be a dangerous one. Because every house is different, appliances are not pre-optimized to fit any specific site. Venting systems, combustion air, duct systems, additional appliances in the building, and building pressures can all affect appliance operation. In addition to these site variables, it is likely that your equipment has been loaded and unloaded on trucks and transported several times, and vibration and shock can cause components to shift and move. The only way to truly know if your new equipment is operating safely and efficiently is to test it once it’s been installed.

The inability for a chimney to draft is closely linked to combustion safety and efficiency. The most common cause of a non-drafting chimney is a negative pressure in the mechanical room. Negative pressures often result from excessive air leakage in the upper portion of the house or duct leakage at the air handler itself. The best way to counteract draft issues is to pressurize the mechanical room when the appliance is operating. However, it is possible to have a draft in the chimney while having an appliance that won’t vent correctly.

To illustrate this concept, let’s look at a standard gas water heater. Most gas water heaters have a draft continued on page 42
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hood on top of them that looks something like a bell. This device actually separates the chimney from the water heater, with the intention of letting room air into the chimney, apparently to assist in drafting. But, this scenario leaves us with no control over how much combustion air is supplied to the fire. Being able to adjust the amount of combustion air supplied to the fire is what determines our ability to minimize CO levels and maximize the appliance’s efficiency. Due to the inclusion of the standard draft hood, we are left to chance when it comes to safely operating this appliance.

There is hope, however. The only way to safely vent one of these gas hot water heaters is to modify the appliance by connecting the chimney to the appliance and incorporating a barometric damper. By adjusting the damper, one can control how much combustion air enters the appliance. This damper not only controls draft, but also controls how efficiently the gas is burned.

This example reminds us that just because a manufacturer can sell a product and you can have it professionally installed doesn’t mean that it’s a “plug-and-play” device that will work automatically. All appliances that burn gas should be optimized in-field to ensure the occupants’ safety.

Safety is important for all of us. Whether you’re building a home for yourself, for a client, or have combustion appliances in your existing home, creating a safe living environment should be at the top of your list. Don’t risk your safety with combustion appliances; besides, why guess when you can measure?

Isaac Savage is founder and president of Home Energy Partners and an active member of the New Life Journal Green Home Experts board. He can be reached at 828-350-1155 x302.