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Ask a Builder

By Cold Climate Housing Research Center Staff

The "Ask a Builder" series is dedicated to answering some of the many questions Fairbanks residents have about building, energy and the many other parts of home life.

Wood Stoves Need Air Too

There is plenty of prescriptive information available to ensure that oil- and gas-fired appliances are installed to operate safely. But unfortunately there is very little prescriptive information available in the code books regarding the safe operation of wood stoves. Often, codes will defer to the stove manufacturer's installation instructions for safe installation and performance. Unfortunately manufacturer's product literature can vary greatly, as can the conditions in the house under which the stove will be operated.

In Fairbanks, there exists a huge variety of wood stoves, with everything from barrel stoves and custom-welded fireboxes on up to factory-built (and tested) sealed combustion systems with catalytic converters. We also have some of the some of the tightest homes in the world and periods of extreme cold that are capable of creating large air pressure differences not only between indoors and outdoors, but also between different levels inside the house.

With so many variables in home tightness, stove design, and outdoor temperatures, the bottom line is that ALL fuel burning appliances must have an adequate air supply to burn safely and efficiently. Of particular concern in a tight house is the fact that all exhaust appliances must also have an adequate supply of air. To operate safely, a house must be able to withstand a "worst-case draft test." This means that when all exhaust fans in the home are running at the same time, they cannot create enough negative pressure to backdraft harmful gases from any combustion appliance into the home, including the wood stove. Often backdrafting from a wood stove is noticeable, but not always, and carbon monoxide in the exhaust is odorless and colorless.

Local codes are very clear that if a home contains a fuel-burning appliance, a carbon monoxide detector must be installed: *"Where a fuel-fired appliance is installed or replaced in an existing dwelling and approved carbon monoxide alarm shall be installed outside of each separate sleeping area in the immediate vicinity of the bedrooms."* Many commercially available high efficiency "air tight" wood stoves have provisions to install direct vent combustion air kits. In virtually all cases, this involves installing ducting from the stove to the outside, since combustion air is assumed to be outdoors. If the air supply isn't directly attached to the stove (per manufacturer instructions), then it should be within the same air space shared by the stove, not in another part of the house separated by a door. A means to open and close the air supply may also be desirable so that cold air isn't being introduced into the home when the stove isn't operating.

Another consideration is the placement and construction of the chimney. If the chimney is not sufficiently insulated and lower than the top level of the home's conditioned space, then it is likely that backdrafting will occur even with adequate combustion air provided for the wood stove. Wood stoves in the basement of a multi-story house are particularly susceptible to these problems. Opening a nearby door or window until a strong draft is established is a common and temporary solution.

If you have any questions regarding combustion air, consult an expert. An engineer, certified stove installer, or certified chimney sweep can be a valuable resource and help design a supply air system and chimney to safely meet site specific conditions.

Ask a Builder articles promote home awareness for the Cold Climate Housing Research Center (CCHRC). If you have a question, e-mail us at akhomewise@cchrc.org. You can also call the CCHRC at (907) 457-3454