



Controlling Indoor Air Quality

By Sydney G. Roberts, Ph.D., Southface

In last month's *Atlanta Building News* feature on indoor air quality, it was stated that studies conducted by the Environmental Protection Agency proved that indoor air can be two to five times more polluted than outdoor air and that builders' decisions play a large role in determining the quality of air inside a home. Poor indoor air quality may result in health problems, which include respiratory difficulties and allergies and can affect the home owner's quality of life.

Indoor air quality issues arise when pollutants have a pathway to the people inside a building. Air quality can be improved by eliminating and separating the pollutant from the building, as well as through proper ventilation and air filtering.

The most effective step a builder can take is to eliminate pollutants during construction. This can be achieved, in part, by using materials with lower levels of volatile organic compounds or formaldehyde content that give off gases over time and become irritants. Another important strategy in eliminating or reducing pollutants is to control what is being created in the space that could be harmful.

One of the most important ways to control indoor air quality is to practice combustion safety. The combustion process creates byproducts that can create possible health effects such as headaches, dizziness, sleepiness, watery eyes, breathing difficulties and can lead to death. The pollutants caused from combustion include nitro-

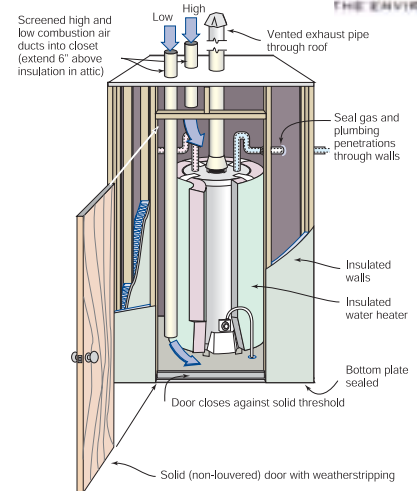
gen and sulfur oxides, water vapor, carbon dioxide and carbon monoxide.

In designing a structure to ensure healthy indoor air quality, a good rule to follow is that combustion air and breathing air should never mix. Following that rule means that combustion appliances such as water and space heaters and furnaces should be located in a non-conditioned space or preferably be sealed combustion (direct vent) units that are located in the conditioned space.

High-efficiency furnaces (rated 90 percent or higher) that are sealed to eliminate combustion safety concerns can be placed inside the building envelope. Proper installation calls for two PVC pipes that function in two very different ways. One pipe brings combustion air from the outside into the combustion chamber; the second pipe exhausts the combustion byproducts out of the structure.

Because the system is sealed and can be placed anywhere in the home, it often opens up greater options for bringing the entire system inside the building envelope and efficiently laying out ductwork. Since metro Atlanta is primarily a heating climate, the more efficient a furnace, the more home owners will save in energy and money over the long run. Home buyers will not only appreciate the money savings and energy efficiency but also the value of better indoor air quality and improved safety.

Similarly, sealed-combustion power vented water heaters bring outside air in for combustion



and vent combustion byproducts out through a PVC pipe. Because they will not back draft, they, too, can be installed inside the building envelope.

An option for atmospherically vented (open combustion) appliances, both furnaces and water heaters, is to locate them inside a combustion closet. A combustion closet is a room that is sealed and separated from the living space and has combustion air supplied through a vent system, usually high and low vents. The combustion closet is outside the building envelope and must have continuous insulation and air barrier.

The best approach is to frame and seal the combustion closet prior to installation of any systems; then cut holes of the correct size, making the area easier to seal. (Refer to the fact sheet available at www.southface.org to learn how to properly construct a combustion closet.)

Electric heat pumps and electric water heaters also obviate combustion safety concerns.

Traditional open gas-log fireplaces can be unsafe and will affect indoor air quality when in use. Open fireplaces vent through the chimney or not at all, therefore relying heavily on indoor air for combustion. (Remember the combustion safety rule: don't burn air you breathe.) Because there is no pathway for gases to escape the structure, a health hazard is created. Traditional gas-log fireplaces are no longer the only option, as safer, modern options are available in the form of sealed combustion gas-log fireplaces. These newer fireplaces provide the warmth and glow of traditional gas fireplaces without the health risks.

Carbon monoxide and smoke detectors and alarms, which alert residents to dangerous indoor air conditions, should be placed outside of sleeping areas.

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