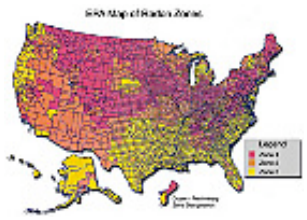
Building Out Radon

- It's easy to build houses that minimize indoor radon levels.

By Stacy Hunt

Radon in homes causes lung cancer. It's as simple as that. In fact, as the Number 1 cause of lung cancer after smoking, it's classified as a "class A carcinogen" — right up there with asbestos and arsenic.

In the past, the connection between radon and cancer was highly contested, but new and significant studies have put this argument to bed. "These findings effectively end any doubts about the risks to Americans of having radon in their homes," said Tom Kelly, director of EPA's Indoor Environments Division. "We know that radon is a carcinogen. This research confirms that breathing low levels of radon can lead to lung cancer."



The EPA Radon Map shows the risk of radon in general areas. More precise information is available from state radon coordinators.

Luckily, the issue of radon in homes is easily addressed, particularly during new construction, when the simple technology needed to equip a home for radon mitigation is easy to install. Although many building codes do not require radon resistant construction, there is absolutely no reason why these techniques shouldn't be employed.

Radon is a colorless and odorless gas that comes from uranium and radium, substances that can be found anywhere in the world. Radon in the soil is more common in certain areas of the country, but the possibility of having high levels of radon exists everywhere. The EPA classifies radon risk in three zones: Zone 1 has the highest risk of high radon exposure, and Zone 3 has the lowest.

Radon can enter homes through a combination of three situations:

- The soil is permeable enough to allow gas to move freely.
- There are passages through the foundation that allow the gas to enter the home.
- Pressure dynamics in the soil and home allow the gas to enter through these passages.

The EPA recommends that all homes in Zone 1 have passive systems installed, but many other agencies suggest the systems regardless of the zone. It is very possible to have a radon problem even in a low risk zone.

Some people question installing a system before you know there's a problem. Why not test the lot first? The answer is twofold:
1. It is impossible to accurately test a vacant lot. Without the house, there is no way to tell whether radon concentrations in the home will be high enough to cause concern.
2. Installing the system during construction is cheap and simple, and it ensures that any radon problem found in the future can be addressed quickly and easily.

It makes sense to install a passive system and test the finished home. It's a relatively simple matter to install an in-line fan later if necessary.

Types of radon systems
There are two types of sub-slab depressurization radon systems: passive and active.

Quite simply, a passive system prevents radon from entering the home by using barriers placed during construction, and it allows radon to leave the house using the home's own natural airflow and pressures and a carefully placed pipe. An active system uses the same barriers and pipe but also adds a mechanical fan to proactively remove radon from the home. The configuration of a radon system will vary with the design of the home — namely, the foundation type.

All passive systems, regardless of foundation type, should have the same basic features:

- A gas permeable layer under the home, such as a layer of gravel, to allow gas to move freely under the home-
- Plastic sheeting installed over the gas permeable layer to prevent the gas from entering the home
- A vent pipe that directs gas up and out over the home, rather than into it
- Sealing and caulking around all openings in the foundation floor to prevent gas from leaking into the home
- A junction box in case an active system must be installed later

In addition to these features, an active system will have a small in-line fan at the end of the vent pipe to mechanically draw the gas out.

Cost vs. benefit
Installing a passive system include improves indoor air quality and provides ease of upgrade if an active system is necessary. As a bonus, radon-resistant construction techniques (barriers and foundation air sealing) improve energy efficiency by reducing air leakage through the foundation.

Installing a passive system in every home that you build ensures that if a radon issue is found after construction, reducing radon in the home will be as simple as adding a small fan. The materials needed to build using radon-resistant strategies (i.e., gravel, piping and plastic sheeting) are readily available and inexpensive. The cost of installing a passive system runs between $300 and $500 — half of the $800 to $1,000 expense of retrofitting a home.

And this simple feature can be marketed to your potential customers as an individual benefit or as part of a focus on improving indoor air quality. A radon mitigation system tells your customers that you care about their well-being — and that's good for everyone.

For more information about radon and building radon-resistant houses, visit these sources:

Environmental Protection Agency
National Radon Safety Board
The National Environmental Health Association National Radon Proficiency Program

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