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Radon Reduction in New Home Construction

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Radon may cause serious health dangers and homeowners are encouraged to test their homes for radon levels.

Radon gas results from uranium breaking down in soil and rock. It can then get trapped inside homes. If high radon levels are found the cost of radon reduction (mitigation) is not overwhelming for most homeowners. But, your best protection is to prevent radon from entering your home. It is more cost efficient to incorporate radon prevention steps before and during construction than after a home has been completed. Contractors and homeowners should consider construction methods that will help eliminate problems with radon by minimizing pathways for soil gas to enter the home.

Although there are no standard tests to determine the radon risk prior to new home construction, it is possible to compare the soil and rock conditions of your area with similar areas. The type and permeability of the soil will affect the way radon can move toward your home. The only way to know radon levels is by testing the home after it has been built. Including radon reducing construction methods is good insurance if after construction tests show high radon levels. The Nebraska Health Department can provide a booklet titled *Radon-Resistant Construction Techniques for New Residential Construction*.

In constructing basements and slabs, steps can be taken to reduce pathways for radon entry:

- Use polyethylene vapor barrier under the slab.
- Pour and dry concrete with no cracks.
- Install flexible expansion joint material around floor and wall joints.
- Remove wooden grade stakes and fill those holes as the floor is being finished.

- Seal around all pipes and wires coming through the slab or below ground walls.
- Seal sump pits.
- Seal hollow block foundation walls in basements on top. They should also be coated with a high quality vapor and water sealant on the outside.
- Seal doors, openings, ducts, pipes, and electrical penetrations between a basement and any connecting crawl space.
- Select building materials less likely to increase radon levels. Rocks for a fireplace chimney, for example, may be a source of unwanted radon.

Even if a home is built following radon prevention steps there is still a possibility of having a radon problem. Foundation floors can be poured with some added protection built in. Vapor barriers placed on top of the soil can be covered with a 4" layer of gravel 3/4" in diameter. The sub-slab is then poured on top of this gravel. If radon becomes a problem this gravel layer will provide an area where sub-slab suction can be installed to draw the radon away. This sub-slab suction system has been an effective means of reducing medium to high radon levels.

A home can also be built with a continuous system of perforated pipes around the house. These drain tiles are commonly used to draw water away from the home. By attaching an exhaust fan to the system, radon can also be removed from the home. The drain tile will need a water-filled trap below the freeze line to prevent air from entering the system.

Have adequate ventilation in crawl spaces and basements. If air is pulled out of the house on upper levels, negative pressure is created in the basement and will draw air and possibly radon into the home. Sealing places where air can escape from the upper levels of the home will prevent this problem.

Air pressure can also be a problem if you are using exhaust fans or appliances like a clothes dryer or furnace which draws inside air and then exhausts it out of the house. Installing fresh air intakes for appliances will help air pressure in the house remain balanced. Weather sealing around doors and windows, especially on the windy side of the house, will help prevent a negative air pressure as well as save energy. Air-to-air heat exchange systems help neutralize any imbalance between indoor and outdoor air pressure.

Information Sources

- *A CITIZEN'S GUIDE TO RADON — What It Is And What To Do About It.* US EPA Aug 1986
- *RADON REDUCTION METHODS — A Homeowner's Guide.* US EPA Aug 1986
- US News and World Report September 26, 1988 p. 62-63.
- ACHP Appendix J

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