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- If a sump pit is installed, a sealed or gasketed sump lid is required.
- Use polyurethane caulk or elastomeric sealant to fill joints, cracks, or other openings in foundation walls.
- At least one course of masonry block foundation walls, either at or above grade need to be filled using a solid masonry block, masonry grouted solid, a bond beam or a solid concrete beam. This step must be done regardless of whether the insulation is installed on the interior or exterior of the block walls.

#### #4 Locate and Install Vent Pipe

- Install a 3" or 4" ABS or PVC gastight pipe from the subslab base that runs all the way through the building floors and terminates at least 12-inches above the surface of the roof.
- The pipe can be connected to a sump pump OR into an interior drain tile system OR the pipe has to be installed into the gravel with a "T" fitting; then a 10-foot section of perforated pipe has to be connected to each side of the "T" fitting. This pipe section can include elbows.
- Route the pipe through the conditioned space and out through the roof. **This route needs to be as straight as possible. Minimize the use of elbows and horizontal piping.**

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- Locate the end of the pipe that terminated on the roof at least 10-feet away from any window or other opening in the dwelling that is less than two-feet below the exhaust point. The pipe termination must also be at least 10-feet from any window or other opening in adjoining or adjacent buildings.

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- Make sure there is enough space around the vent pipe to allow for the installation of a fan in the attic. This space needs to be a minimum of 24-inches in diameter, centered on the vent stack, and must extend for a minimum vertical distance of three-feet.
- A single vent pipe can be used if all types of foundations (ie. combination crawl/basement) in the dwelling allow soil gases to flow freely between them. This includes interior footings and other barriers if airflow through them has been established.

#### #5 Label Vent Pipe

- Label the vent pipe at least once per floor and in accessible attics with the words "Radon Reduction System".

#### #6 Locate Electrical Receptacle

- Add on electrical receptacle in the attic near the vent stack where a fan could be located.

*If you would like more information on radon resistant construction, please contact your Building Department.*

## REQUIREMENTS

# RADON

## City of Alexandria Building Department

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## What is Radon?

Radon is a radioactive gas. It comes from uranium and radium in soils, which can be found everywhere in the world. Uranium is present in rocks such as granite and shale. Uranium breaks down to radium, which then decays into radon. This gas can easily move up through the soil into the atmosphere. Natural deposits of uranium and radium, not man-made sources, produce most of the radon present in the air.

People cannot see, taste, feel or smell radon. There is no way to sense the presence of radon.

Radon levels are commonly expressed in picocuries per liter of air (pCi/L), where a picocurie is a measure of radioactivity.

The national average of indoor radon levels in homes is about 1.3 pCi/L. Radon levels outdoors, where radon is diluted, average about 0.4 pCi/L.

Radon in the soil can be drawn into a building and can accumulate to high levels. Every building or home has the potential for elevated levels of radon. All homes should be tested for radon, even those built with radon-resistant construction. EPA recommends taking action to reduce indoor radon levels when levels are 4 pCi/L or higher.

Radon is classified as a Class A carcinogen (known to cause cancer in humans). Some other Class A carcinogens are arsenic, asbestos and benzene.

## How Does Radon Enter a Home?

Four main factors drive radon entry into homes. All of these factors exist in most homes throughout the country.

- 1) Uranium is present in the soil nearly everywhere in the United States.
- 2) The soil is permeable enough to allow radon to migrate into the homes through the slab, basement or crawl space.
- 3) There are pathways for radon to enter the basement, such as small holes, cracks, plumbing penetrations, or sumps. All homes have radon entry pathways.
- 4) An air pressure difference between the basement or crawl space and the surrounding soil draws radon into the home.

**Does Foundation Type Affect Radon Entry?**  
*No, All convention house construction types have been found to have radon levels exceeding the action level of 4 pCi/L.*

## RADON RESISTANT CONSTRUCTION

*Effective June 1, 2009, the installation of a passive radon system is required for all NEW single-family, two-family and multi-family dwellings built to Chapter 1322, the Minnesota Residential Energy Code. This requirement does not apply to residential additions, alterations and repairs.*

### Radon Reduction Systems—Two Types

**PASSIVE**—depends upon stack effect to draw radon out of the soil, and out of the home

**ACTIVE**—depends upon an in-line fan to draw radon out of the soil, and out of the home.

**Passive systems** are called “radon ready” systems because homeowners can inexpensively add a ventilation fan to the system and turn them into an active system.

## RADON SYSTEM INSTALLATION

### Summary of Steps

#### #1 Subfloor Preparation Options:

- Add a 4-inch uniform layer of 1/2 to 1-1/2-inch clean aggregate; OR
- A 4-inch layer of sand (native or fill) covered with geotextile drainage matting; OR
- Other systems that will permit sub-slab depressurization (ie. Form-a-Drain system).

#### #2 Install Soil Gas Retarder

Lay 6-mil poly over entire subfloor area

- Poly has to be lapped at least 12-inches
- All punctures or tears have to be sealed or covered with pieces of poly

#### #3 Seal Entry Routes

Seal all entry points to prevent radon from entering the basement or crawl space.

- Use polyurethane caulk or elastomeric sealant on openings around bathtubs, showers, pipes, wires, etc.
- Use polyurethane caulk or elastomeric sealant on all concrete joints and the joint between the slab and foundation wall.

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