

Guthrie County Board of Health

Regulations

Chapter VII

Radon Control Methods

Chapter 137 of the 2005 Code of Iowa specifies in Section 137.7 the following powers of the County Board of Health to include:

- 1. May provide such personal and environmental health services as may be deemed necessary for the protection and improvement of the public health.*
- 2. May charge reasonable fees for personal health services.*

Under the authority granted by Chapter 137 therefore the following regulations of the Guthrie County Board of Health have been promulgated and shall become effective.

Section 1 These regulations contain requirements for new construction within Guthrie County regarding radon-resistant construction.

Section 2 Definition of terms

- 1.** Sub-slab depressurization system (passive) is a system designed to achieve lower sub-slab air pressure relative to indoor air pressure by use of a vent pipe routed through the conditioned space of a building and connecting the sub-slab area with outdoor air, thereby relying on the convective flow of air upward in the vent to draw air from beneath the slab.
- 2.** Sub-slab depressurization system (active) is a system designed to achieve lower sub-slab air pressure relative to indoor air pressure by use of a fan-powered vent drawing air from beneath the slab.
- 3.** Drain tile loop is a continuous length of drain tile or perforated pipe extending around all or part of the internal or external perimeter of a basement or crawl space footing.
- 4.** Radon gas is a naturally-occurring, chemically inert, radioactive gas that is not detectable by human senses. As a gas, radon can move readily through particles of soil and rock and can accumulate under the slabs and foundations of homes where it can easily enter into the living space through construction cracks and openings.
- 5.** Soil-gas retarder is a continuous membrane of 6-mil (0.15mm) polyethylene or other equivalent material used to retard the flow of soil gases into a building.
- 6.** Sub-membrane depressurization system is a system designed to achieve lower sub-membrane air pressure relative to crawl space air pressure by use of a vent drawing air from beneath the soil-gas retarder membrane.

Section 3 Requirements

- 1. General** The following construction techniques are intended to resist radon entry and prepare the building for post-construction radon mitigation, if necessary.
- 2. Sub-floor preparation** A layer of gas-permeable material shall be placed under all concrete slabs and other floor systems that directly contact the ground and are within the walls of the living spaces of the building, to facilitate future installation of a sub-slab depressurization system, if needed. The gas-permeable layer shall consist of one of the following:
 - a)** A uniform layer of clean aggregate, a minimum of 4" thick. The aggregate shall consist of material that will pass through a 2" (51 mm) sieve and shall be retained by a ¼" (6.4 mm) sieve.
 - b)** A uniform layer of sand a minimum of 4" thick, overlain by a layer of geotextile draining matting designed to allow the lateral flow of soil gases.
 - c)** Other materials, systems or floor designs with demonstrated capability to permit depressurization across the entire sub-floor area.
- 3. Soil-gas retarder** A minimum 6-mil (0.15mm) [or 3-mil (0.075 mm) cross-laminated] polyethylene or equivalent flexible sheeting material shall be placed on top of the gas-permeable layer prior to casting the slab or placing the floor assembly to serve as a soil-gas retarder by bridging any cracks that develop in the slab or floor

assembly and to prevent concrete from entering the void spaces in the aggregate base material. The sheeting shall cover the entire floor area with separate sections of sheeting lapped at least 12". The sheeting shall fit closely around any pipe, wire, or other penetration of the material. All punctures or tears in the material shall be sealed or covered with additional sheeting.

4. Entry routes Potential radon entry routes shall be closed in accordance with Sections 3.4(a) through 3.4(j).

a) Floor openings Openings around bathtubs, showers, water closets, pipes, wires, or other objects that penetrate concrete slabs or other floor assemblies shall be filled with a polyurethane caulk or equivalent sealant applied in accordance with the manufacturer's recommendations.

b) Concrete joints All joints in concrete slabs or between slabs and foundation walls shall be sealed with a caulk or sealant. Gaps and joints shall be cleared of loose material and filled with polyurethane caulk or other elastomeric sealant applied in accordance with the manufacturer's recommendations.

c) Condensate drains Such drains shall be trapped or routed through non-perforated pipe to daylight.

d) Sumps Sump pits open to soil or serving as the termination point for sub-slab or exterior drain tile loops shall be covered with a gasketed or otherwise sealed lid. Sumps used as the suction point in a sub-slab depressurization system shall have a lid designed to accommodate the vent pipe. Sumps used as a floor drain shall have a lid equipped with a trapped inlet.

e) Foundation walls Hollow block masonry foundation walls shall be constructed with either a continuous course of solid masonry, one course of masonry grouted solid, or a solid concrete beam at or above finished ground surface to prevent passage of air from the interior of the wall into the living space. Where a brick veneer or other masonry ledge is installed, the course immediately below that ledge shall be sealed. Joints, cracks, or other openings around all penetrations of both exterior and interior surfaces of masonry block or wood foundation walls below the ground surface shall be filled with polyurethane caulk or equivalent sealant. Penetrations of concrete walls shall be filled.

f) Damp-proofing The exterior surfaces of portions of concrete and masonry block walls below the ground surface shall be properly damp-proofed.

g) Air-handling units Air-handling units in crawl spaces shall be sealed to prevent air from being drawn into the unit. Units with gasketed seams or units that are otherwise sealed by the manufacturer to prevent leakage are exempt.

h) Ducts Duct work passing through a crawl space or beneath a slab shall be of seamless material unless the air-handling system is designed to maintain continuous positive pressure within such ducting. Joints in such duct work shall be sealed to prevent air leakage.

i) Crawl space floors Openings around all penetrations through floors above crawl spaces shall be caulked or otherwise filled to prevent air leakage.

j) Crawl space access Access doors and other openings or penetrations between basements and adjoining crawl spaces shall be closed, gasketed, or otherwise filled to prevent air leakage.

5. Passive sub-membrane depressurization system In buildings with crawl space foundations, the following components of a passive sub-membrane depressurization system shall be installed during construction. Buildings in which an approved mechanical crawl space ventilation system or other equivalent system is installed are exempt.

a) Ventilation Crawl spaces shall be provided with vents to the exterior of the building. The minimum net area of ventilation openings shall comply with appropriate standards.

b) Soil-gas retarder The soil in crawl spaces shall be covered with a continuous layer of minimum 6-mil polyethylene soil-gas retarder. The ground cover shall be lapped a minimum of 12" at joints and shall extend to all foundation walls enclosing the crawl space area.

c) Vent pipe A plumbing tee or other approved connection shall be inserted horizontally beneath the sheeting and connected to a 3" or 4" diameter fitting with a vertical vent pipe installed through the sheeting. The vent pipe shall be extended up through the building floors, terminate at least 12" above the roof in a location at least 10' away from any window or other opening into the conditioned spaces of the building that is less than 2' below the exhaust point, and 10' from any window or other opening in adjoining or adjacent buildings.

6. Passive sub-slab depressurization system In basement or slab-on-grade buildings, the following components of a passive sub-slab depressurization system shall be installed during construction.

a) Vent pipe A minimum of a 3" diameter ABS, PVC, or equivalent gas-tight pipe shall be embedded vertically into the sub-slab aggregate or other permeable material before the slab is cast. A Tee fitting or equivalent method shall be used to ensure that the pipe opening remains within the sub-slab permeable material. Alternatively, the 3" pipe shall be inserted directly into an interior perimeter drain tile loop or through a sealed sump cover where the sump is exposed to the sub-slab aggregate or connected to it through a drainage system.

b) Exhaust pipe The pipe shall be extended up through the building floors, terminating at least 12" above the surface of the roof in a location at least 10' away from any window or other opening into the conditioned spaces of the building that is less than 2' below the exhaust point and 10' from any window or other opening in adjoining or adjacent buildings.

c) Multiple vent pipes In buildings where interior footings or other barriers separate the sub-slab aggregate or other gas-permeable material, each area shall be fitted with an individual vent pipe. Such vent pipes may be connected and terminate as one roof vent.

7. Vent pipe drainage All components of the radon vent pipe system shall be installed to provide positive drainage to the ground beneath the slab or soil-gas retarder.

8. Vent pipe accessibility Radon vent pipes shall be accessible for future fan installation through an at-tic or other area outside the habitable space. The radon vent pipe need not be accessible in an attic space where an approved roof-top electrical supply is provided for future use.

9. Vent pipe identification All exposed and visible interior radon vent pipes shall be identified with at least one label on each floor and in accessible attics. The label shall read: "Radon Reduction System" or an equivalent statement.

10. Combination foundations Combination basement/crawl space or slab-on-grade/crawl space foundations shall have separate radon vent pipes installed in each type of foundation area. Each radon vent pipe shall terminate above the roof.

11. Building depressurization Joints in air ducts and plenums in unconditioned space shall be properly sealed.

12. Power source To provide for future installation of an active sub-membrane or sub-slab depressurization system, an electrical circuit terminated in an approved box shall be installed during construction in the attic or other anticipated location of vent pipe fans.

Section 4 Inspection During the construction of the home, the Dept. shall have the authority to inspect for compliance with these regulations. Should it be determined that sections of these rules are not being complied with the Dept. shall direct compliance with the rules where feasible. The owner of the building shall be notified of any violation of these rules in as timely a fashion as is reasonably possible.

Section 5 Failure to comply Failure to comply with these rules is a violation of Board of Health rules and subject to a misdemeanor violation. Either the owner, contractor, or both may be charged with said violation.

Section 6 Severability Should any section of these rules be found invalid, it shall not affect the validity of other sections.

These regulations were submitted to the Guthrie County Board of Health at the March 18, 2007 meeting.

A public hearing was held on these regulations at the April 18, 2007 meeting. The regulations were approved at this meeting.

The regulations received final approval at the April 24, 2007 meeting of the Guthrie County Board of Supervisors.