

Nebraska Radon Resistant New Construction (RRNC)

Summary of the Law Effective September 1, 2019

The purpose of the Radon Resistant New Construction Act is to protect public health and welfare from exposure to radon, the second leading cause of lung cancer next to smoking. RRNC utilizes design elements and construction techniques that passively resist radon entry and prepare a building for an active post construction mitigation system.

LB130 amends the state building code to adopt sections of the International Building Code (IBC), the International Residential Code (IRC), and the International Existing Building Code. It requires those standards and the minimum standards for RRNC adopted under section 76-3504 to be enforced by a county, city, or village as part of its local building code if they adopt or generally conform to the state building code.

The building code requires that a passive radon mitigation system be installed in all new construction, residential dwellings and original construction commercial structures. New construction does not include additions or remodeling of existing structures. New construction is defined as any original construction of a single-family home or a multifamily dwelling, including apartments, group homes, condominiums, townhouses or any original construction of a building used for commercial, industrial, educational or medical purposes.

Three approaches are utilized during RRNC.

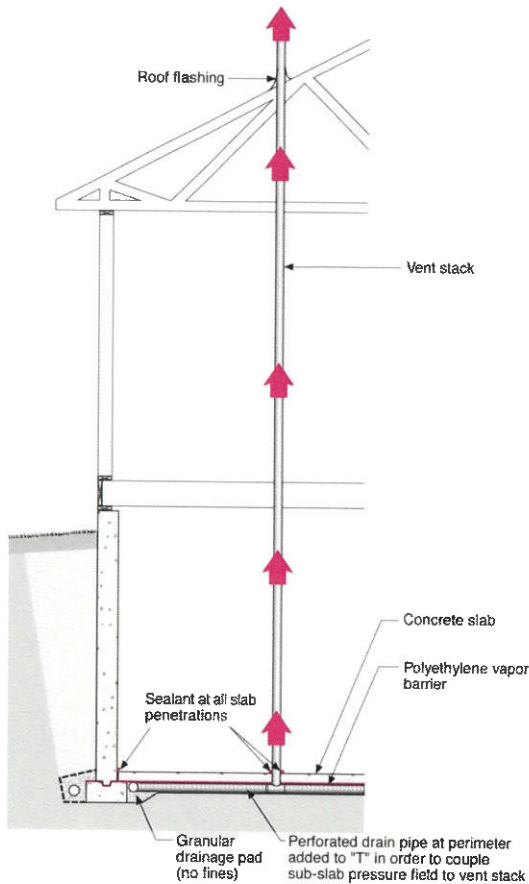
- Prevent radon entry by using barrier methods.
- Reduce the radon entry driving forces.
- Passive radon reduction system installation that relies on natural pressure differentials and the upward movement of air inside the pipe resulting from heated air rising and escaping through a supplied opening, thus causing an indoor pressure level lower than that in the soil gas beneath or surrounding the building.

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Design Elements



A passive sub-slab depressurization system shall be installed during construction in basement or slab-on-grade buildings.

➤ **Vent Pipe Requirements:** A minimum 3-inch diameter ABS, PVC or equivalent gas-tight pipe shall be embedded vertically into the sub-slab permeable material before the slab is cast. A "T" fitting or equivalent method shall be used to ensure that the pipe opening remains within the sub-slab permeable material. If the building has a sump pit or drain-tile system, a minimum 3-inch diameter ABS, PVC or equivalent gas-tight 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 or connected to it through a drainage system. The vent pipe shall be extended up through the building floors, and terminate at least 12 inches above the roof in a location at least 10 feet away from any window or other opening into the conditioned spaces of the building that is less than 2 feet below the exhaust

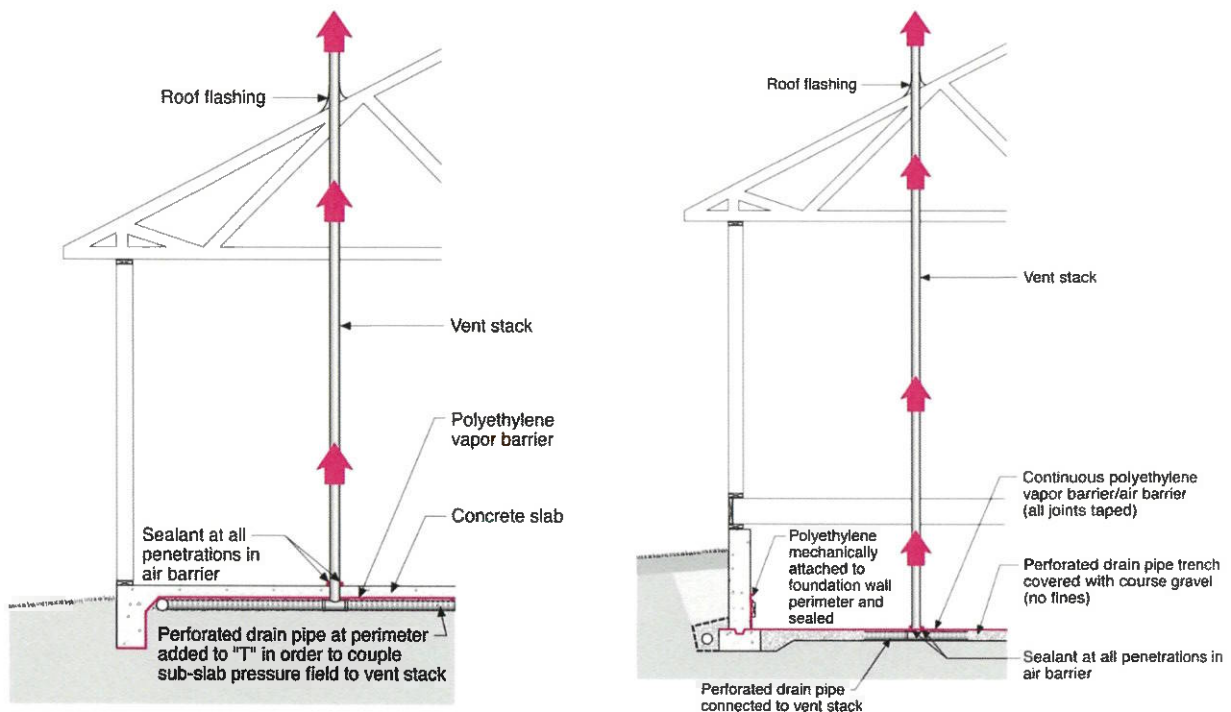
point, and 10 from any window or other opening in adjoining or adjacent buildings. In buildings where footings or other barriers separate the sub-slab gas-permeable material, each area shall be fitted with an individual vent pipe. Vent pipes shall connect to a single vent that terminates above the roof or each individual vent pipe shall terminate separately above the roof. All exposed and visible interior radon vent pipes shall be identified with at least one label on each floor and in accessible attics. Such label shall read "Radon Reduction System". **Recommendations:** Avoid 90-degree angles in the vertical pipe run and use sweeps if turns are needed. Due to Nebraska climate it's recommended all ABS, PVC or other gas-tight pipe be Schedule 40 or greater.

- **Sump Pit Requirements:** 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. A sump used as the suction point in a sub-slab depressurization system shall have a lid designed to accommodate the vent pipe. Sump pits used as a floor drain shall have a lid equipped with a trapped inlet.
- **Power Source Requirements:** In order to provide for future installation of an active radon mitigation 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.

- **Aggregate Recommendations:** Four inches of clean aggregate, smaller than 2 inches in diameter but larger than ¼ inch in diameter or four inches of sand overlain with drainage material should be spread under all areas that will be covered by concrete slabs and are within the home's walls. Soil-gas collection mats or drainage mats may also be used. This layer allows lateral flow of soil gasses to move freely under the slab and enter an exhaust vent pipe.
- **Soil-gas retarder/Vapor Barrier Recommendations:** A minimum 6 mil polyethylene sheeting or 3-mil cross-laminated, overlapped 12 inches at the seams and fitted closely around all pipe, wire or other penetrations, should be placed over the aggregate in a basement or slab-on-grade design prior to casting the slab. In crawlspaces, the polyethylene sheeting is lapped a minimum of 12 inches at the joints and shall extend to all foundation walls enclosing the crawl space area. Access doors, other openings or penetrations between basements and adjoining crawlspaces should be closed, gasketed or otherwise filled to prevent air leakage. This is the primary soil gas barrier in a crawlspace and serves to bridge any cracks that may form after the basement slab has cured.
- **Vent pipe "T" Recommendations:** A "T" fitting made of 3 or 4 inch diameter polyvinyl chloride (PVC) or acrylonitrile butadiene styrene (ABS) piping is inserted horizontally beneath the sheeting and connected to a 3 or 4 inch diameter fitting to a vertical vent pipe installed through the vapor barrier. The "T" allows soil gases to enter the vent pipe with little resistance.
- **Perforated pipe Recommendations:** A 3 or 4 inch diameter perforated pipe is laid horizontally under a crawl space's vapor barrier and connects to the PVC or ABS vent pipe "T". The perforated pipe provides numerous openings for soil gases to enter the vent assembly. In buildings where interior footings or other barriers separate the sub-slab aggregate or polyethylene sheeting, each area should be fitted with an individual perforated pipe. Perforated pipes should connect to a single vent riser that terminates above the roof or each individual perforated pipe may connect to multiple vent pipes that terminate separately above the roof.
- **Vent pipe drainage Recommendations:** All components of the radon vent pipe system should be installed to provide positive drainage to the ground beneath the slab or polyethylene sheeting.
- **Roof Exhaust Recommendations:** Flashing or a roof boot should be installed around the vent pipe where it exits the roof to prevent leakage.
- **Sealing Recommendations:** Openings around bathtubs, showers, pipes, wires, floor assemblies or other object that penetrate concrete slabs and all control joints should be filled with a polyurethane caulk or equivalent sealant material. Hollow block masonry foundations walls should 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 the passage of air from the interior of the wall into conditioned space. Where a

brick veneer or other masonry ledge is installed, the course immediately below that ledge shall be sealed.

- **Duct Recommendations:** Ductwork passing through or beneath a slab should be of seamless material unless the air-handling system is designed to maintain continuous positive pressure within the ducting. Ductwork in crawlspaces should have all seams and joints sealed by closure systems.
- **Combination Foundation Recommendations:** Combination basement/crawlspace or slab-on-grate/crawlspace foundations should have separate radon vent pipes install in each type of foundation area. Each vent pipe should terminate above the roof or should be connected to a single vent that terminates above the roof.



Passive to Active Conversion Requirement

A building contractor or a subcontractor of a building contractor may convert a passive radon mitigation system to an active radon mitigation system in accordance with rules and regulations adopted and promulgated by the department under the Radiation Control Act for radon mitigation, but the contractor or subcontractor is not required to be a radon mitigation specialist to convert such system. A radon mitigation specialist shall conduct any post-installation testing of such systems.

Exempt Projects

New construction after the effective date shall not be required to use RRNC techniques if the project utilizes the design of an architect or licensed engineer. Projects located in Zone 3 counties with a radon concentration of less than 2.7 pCi/l are exempt or if a local building official makes a determination, after review of relevant guidelines for the intended use of the structure and property conditions determines the structure will not be used for residential occupancy.

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