

Radon Resistant New Construction (RRNC)

It is possible and practical to build a new home to prevent elevated levels of radon gas, which exists in the ground, from entering the home. In brief, the evidence-based physical interventions that prevent radon entry into the living space are (1) channeling radon from below the ground and foundation into a pipe that exhausts safely to the outdoors and (2) sealing the foundation and other building components so radon can't go around the pipe to enter the home.

Four states do have statewide RRNC Codes, but local jurisdictions must adopt them. Nineteen states do not have statewide RRNC codes, but do have some local jurisdictions that have RRNC codes. Seven states do have state wide RRNC Codes that apply to designated jurisdictions. Twenty States and three Districts/Territories do not have any state wide or local jurisdictions that have RRNC Codes.

List of state and local RRNC Codes:

<http://www.epa.gov/radon/building-codes-radon-resistant-new-construction-rrnc#states>

Which Codes Address Radon-Resistant Techniques for New Homes?

The most common residential codes that address radon-resistant building techniques are:

Appendix F of the 2006 International Residential Code (IRC): Radon Control Methods Exit(Available for purchase from ICC for \$130.00)

ASTM E1465-08: Standard Practice for Radon Control Options for the Design and Construction of New Low-Rise Residential Buildings Exit (Available for purchase from ASTM Intl for \$55.00)

Section 49.2.5 of NFPA 5000TM: Radon Control Methods, The National Fire Protection Association's Building Construction and Safety Code Exit (Available for purchase from NFPA for \$77.50)

ANSI/AARST has released "RRNC 2.0 Reducing Radon in New Construction of 1 & 2 Family Dwellings and Townhouses" to control for radon in the construction of new residential homes. The standard, designated CCAH-2013, is written in code language. Copies are available for \$45 each for non-members, \$30 each for AARST members from the [American Association of Radon Scientists and Technologists](http://www.aarst.org).

Elements of an RRNC law:

- **Standard/Methodology.** A state (or local) government can enact RRNC by changing the building code to require Appendix F of the *International Residential Code* (IRC), the consensus standard ANSI-AARST CCAH *Reducing Radon in New Construction of 1 and 2 Family Dwellings and Townhouses*, or both.
- **Performance Assurance Options.** Fan. Electrical connection rough-in (passive system) or fan installation and activation (active system). Radon Test. Test result, provision of a radon test kit, or information to get testing.
- **Geographic Scope.** A state or local policy can cover homes in all areas or focus on counties that have been designated high and moderate risk zones based on average radon data. Since homes in all zones have been found to have high radon levels, two states (IL MN) protect homes in all areas regardless of radon risk designation.
- **Type of Housing Protected.** Three states (IL NJ WA) cover all types of housing; four states (MA MD MI MN) limit protection to one and two family homes and townhouses (the housing types governed by the IRC, the only model code that contains a radon policy); and one state (OR) covers apartments as well as one and two family homes and townhouses.

Basic Elements of a Passive Radon Reduction System

Building In Radon Control

Radon is a tasteless, colorless and odorless gas

occurring naturally in soil and rock. Radon is a leading cause of lung cancer, second only to cigarette smoking.

Installing a radon system during construction of a structure doesn't cost a lot, and enhances the value of the property.

How a radon system works.

Crushed stone under the house provides an

easy pathway for the radon to migrate towards the vent piping, where it is drawn upwards and released safely into the atmosphere.

The mitigation system will lower radon levels even without a fan, but it may not be enough. A fan may be required. A simple radon test will provide the answer.

1 PVC Pipe carries radon from under the slab to above the roof.

A straight run of piping reduces friction losses. Piping MUST NOT be in an exterior wall; interior locations allow the thermal conduction of heat to cause air in the pipe to rise. Attic section needs space for the fan if required. Proper venting requires the pipe to extend above the roof. Four inch PVC pipe is best for system quietness and efficiency.

2 Plastic Sheeting is placed on top of the crushed stone. The plastic is part of an air barrier between the basement and the subslab, and also is a moisture blocking layer.

Ensure plastic is not punctured during pouring or working of concrete.



3 Electrical Junction Box

in case a radon fan is needed later.
NEC requires a plugged fan to be within 6 feet of an outlet. Vent pipe and junction box placement need to account for this.

4 Seal and Caulk all openings in the concrete floor.

As part of an air barrier between the subslab and the basement, seal the floor-wall joints and control joints with urethane caulking, and the sump lids with silicon caulking. If a fan needs to be installed after testing, this barrier will prevent basement air from being drawn down under the subslab.

5 Crushed Stone under the slab allows radon to move freely underneath the house.

Four to six inches of washed and clean 2B stone is best.

Important. After the home is occupied, only home owners or state certified radon contractors may install fans or work on the radon system.

A radon test should be preformed immediately after the house is occupied, and a fan installed if results are greater than 4 pC/L.

More information at <http://sosradon.org/rrnc>