

Questions and Answers on Radon

Please note that the answers in this document pertain to ANSI/AARST standards and industry best practices and do not represent HUD policy or HUD requirements.

Radon Mitigation

How does radon mitigation differ for homes with crawl spaces versus slab on grade?

In a crawl space you lay down a vapor barrier and remove the soil gas from under that barrier through a perforated pipe loop. In slab on grade (or basement) homes you also remove soil gas from under the house, but you do that typically by making a hole through the slab creating an air pocket and drawing air from there.

Where in the foundation/basement should a radon mitigation system should be installed?

Ultimately, it should be installed in the most convenient location it is allowed to be in. It does not need to be centrally located in the middle of the footprint of the house to work.

Are there cases where mitigation systems have not been effective?

All homes can be mitigated; some homes take a lot of time, money, or work to meet the engineering challenge of radon reduction.

How can tenants report radon remediation violations if a landlord refuses to remediate?

With the exception of Maine and Illinois, which require tenant property testing and mitigation, there is no recourse for this. Our tenancy laws in the US are weak in this regard. The best-case scenario in other states is for tenants to sue or threaten to sue to get let out of the lease without penalty under air quality rules, but tenants should contact a tenancy lawyer in their local jurisdiction.

Would mitigation be different for a building where the levels are 2-4 pCi/L versus >4 pCi/L?

The ASD systems work if you start at 6,000 pCi/L (an actual measurement fixed by ASD), 600 pCi/L, 60 pCi/L, or 6 pCi/L. However, when starting with long-term radon averages under 4.0 pCi/L, it is difficult to predict how much additional reduction can be achieved; it is likely, but not guaranteed, that you will reduce levels below 2.0 pCi/L.

What are solutions in very rural areas that do not have large numbers of engineers or contractors?

DIY measurement projects may be the best choice, but personnel performing DIY testing ought to be NRPP certified for measurement and have appropriate large building measurement training. A similar approach for mitigation is recommended.

Is ventilation the best way to mitigate? Can you just crack a window?

For single-family residences (+duplexes/row house situations) active soil depressurization (ASD) is the most cost-effective means for long-term radon control. For large buildings, generally ASD will still be the best option, but ventilation approaches or mixed ASD/ventilation approaches may be viable. Radon values will return to their average indoor value within 12 hours of reclosing the window. Under certain weather conditions or certain building conditions, having a window open could actually increase indoor radon values.

Do radon systems require specific distances from windows/air intakes like SVI systems?

Yes. The installation requirements are in the SGM-SF and SGM-MFLB ANSI/AARST standards.

What is the average cost of installing a radon mitigation system in a residential structure?

The national average cost for a simple ASD system in a single-family home is currently \$2000-\$2500.

Can a professional radon mitigator advise a crew to perform mitigation work without them being radon certified?

When mitigation work is provided by a certified/state credentialed individual, they may use laborers, but the certified/licensed individual MUST be on site providing direct oversight.

How and where do people get trained and credentialed to perform both testing and mitigation? Are there prerequisites for either or both?

Measurement certification: 16-hour NRPP/NRSB/state-approved measurement course + passing score on NRPP/NRSB national measurement exam + application to the certifying body (NRPP/NRSB/state credentialing agency which includes fees and a quality assurance plan)

Mitigation certification: 16-hr approved measurement course + 24-hr NRPP/NRSB/state-approved mitigation course + passage of NRPP/NRSB mitigation exam + application to the certifying body

Are building permits required to install mitigation systems?

While most building codes will not require a permit to install a mitigation system, if there is an in-force electrical code ALL requirements of the electrical code MUST be followed, along with any installation restrictions around gas meters/electrical panels/etc.

What are maintenance costs of a mitigation system, and who is qualified to perform maintenance?

The primary maintenance costs of a mitigation system are the operations costs associated with the system. For example, in an ASD system the cost is the electrical cost of the fan operation.

These costs can be estimated and per ANSI/AARST mitigation systems are to be estimated in the OM&M plan given to the client. In terms of performing the maintenance: all needed activities + schedule of such activities are outlined in the OM&M plan. Many can be performed by the client or contracted out to the mitigation company.

What are options to avoid NSRB certification if our local contractors have the ODH certification, which is almost identical to the federal standard?

The MAP Guide requires NSRB or NRPP certification. Thus, this requirement cannot be avoided for HUD projects for which the MAP Guide is applicable.

If you have a mitigation system, how do you know it is still working 10 years later?

Ongoing radon testing is necessary to verify system effectiveness. For single-family structures with an ASD system, retest every 2 years with verification between tests of continued fan operation. For large buildings, retest the mitigated spaces ever 2 years and the whole building ever 5 years with appropriate system operation verification as laid out in the OM&M manual.

What are the pros and cons of different mitigation methods and construction methods/materials?

ASD mitigation will almost always have a lower cost of installation and operation than ventilation approaches. Always ask your mitigation companies to include the estimated operations costs for their bids over the expected lifetime of the system(s).

Are there any partnerships/programs to incentivize people/companies to use radon-resistant construction or make it easier for them to do so?

The National Radon Program Services would be happy to host a webinar on RRNC installation guidelines for single-family and large buildings. Many common errors can be corrected by the general contractor receiving even minimal instruction in correct installation.

What are online resource recommendations for learning more about this?

The radon-resistant new construction standards for single family and large buildings are the best references: <https://standards.aarst.org/>.

Are there specs for radon mitigation that can be downloaded and provided to the contractors?

The ANSI/AARST standards are available to freely view: <https://standards.aarst.org/>. [Downloading them involves a \\$75 fee per standard.](#)

Are there flyers about radon prevention and control measures that can be downloaded and distributed?

EPA documents can be found here: <https://www.epa.gov/radon>

NRPS documents can be found here: <https://sosradon.org/epa-publications>

Most (but perhaps not all) states also have in-house publications: <https://sosradon.org/state-fact-sheets>

How can multiple methods of testing devices be used to determine the most effective areas for pressure field extension? Are there certain areas in a home that allow for the most air pathways, and what areas should be avoided?

Technically, pressure field extension (PFE) can only be determined using a pressure manometer taking direct pressure readings below the slab/foundation. Sometimes, real-time radon monitors can be used inside to identify areas of different relative radon levels, which may better inform suction point selection.

How do you choose the best company for testing and mitigation?

According to the [EPA Consumer's Guide to Radon Reduction](#), always do the following:

- 1) Check for NRPP/NRSB/state credentials as a minimum requirement
- 2) Request a list of references of previous jobs you can contact
- 3) If the project requires large building work, ask for specific examples of previous large building mitigation projects the company has conducted.

How long does mitigation take?

For most standard single-family homes, ASD systems can be installed in a day or less. For large buildings, depends on the project and type(s) of mitigation efforts. Post-mitigation clearance testing cannot begin less than 24 hours after system start-up and must be done within 30 days.

What are other options if you have only one room or unit with high radon levels?

In a single-family structure ASD would still be the recommended correction. In large buildings, this is situationally dependent. Either ASD for that unit or an attempt at a ventilation approach with something like an HRV or ERV.

Passive versus active units: when is each required?

Passive radon systems will only provide radon reduction when installed during the point of construction of the building. Additionally, passive radon systems do not guarantee that the radon levels will be below 4 pCi/L; testing after construction is still necessary. For existing structures, active mitigation is necessary.

Can radon vents be installed in mobile homes?

Yes.

How effective is clay geology at mitigating radon intrusion?

This is dependent on 1) the radon source strength and 2) moisture content of the clay; clay geology is not a mitigation technique for radon intrusion.

Are there any exciting innovations you are seeing in testing or mitigation?

The current focus on radon mitigation efforts is to emphasize both 1) effective radon control and 2) minimization of operational costs. Appropriate use of system design diagnostics can generate immense energy savings over the life of the system compared to more 'traditional' system installations

For rehab projects: radon testing is performed prior to the rehab, and results are less than 4 pCi/l. The rehab work will not disturb the lowest level of the building (whether basement floor, slab, foundation). Is it necessary to perform a radon test when rehab is complete?

According to the standards, it's always a good idea to retest after any rehab work pertaining to the heating/cooling system or building envelope because the indoor radon levels could be affected by such work.

Would balanced ventilation systems (ERVs and HRVs) be a method of mitigation versus exhaust-only ventilation?

Active depressurization systems are the most efficient mitigation method for single-family homes. For large buildings, ERVs or HRVs could be an option, but consult a radon mitigation professional with experience in mitigation radon in large buildings.

If it's pointless to test the ground before building, how does one plan for the radon stack/venting in building plans if the true radon levels cannot be determined until the house is built if you're not building in area with known high levels in existing homes?

Radon-resistant new construction is increasingly being required in counties with known higher risks of high radon levels. For areas without such requirements, installation of a passive ventilation system can lower the radon levels; if the radon levels are later found to be high, installing a fan to convert the passive system to an active system is relatively simple and less costly than installing a mitigation system.

Do you have a list of labs that sell test kits and analyze test results?

[NRPP Approved Laboratories - NRPP](#)

[Accredited Laboratories \(AC, LS, AT\) - National Radon Safety Board \(nrsb.org\)](#)

Should we mitigate if the basement had high level but the rest of the unit had low levels?

If the basement is a finished space that occupants could sleep in or spend more than 2 hours a day, then mitigate.

If a home has a passive system, should testing still be conducted? If testing finds the level is actionable, would the mitigation then be to add in a fan?

Correct. A passive system can reduce the radon levels, but those levels could still exceed 4.0 pCi/L and a test is the only way to know. A fan would then be installed in the attic to change the passive system to an active mitigation system.