

Radon in Schools

What is Radon?

Radon is a radioactive gas that does not have color, taste, or odor. It is from the natural breakdown of uranium, which is found in most soil types in Indiana and the United States. Radon can move from the ground into buildings through cracks and holes in the foundation. Radon decays into radioactive particles that can be trapped in your lungs. Small bursts of radiation are released as the particles break down, which can cause lung damage. Radon is estimated to cause 21,000 lung cancer deaths a year, making it the second leading cause of lung cancer, after smoking. School is the second largest contributor of radon exposure for children and staff, after the home.

Radon levels can vary between buildings that are next door to each other because of differences in construction. Factors that impact radon entering your school include:

1. The concentration of radon in the soil gas and permeability of the soil under the building
2. The structure and construction of the building
3. The type, operation, and maintenance of the heating, ventilation, and air-conditioning (HVAC) system

HVAC systems can influence radon in schools through:

1. Ventilation
 - Increasing ventilation dilutes the radon concentration with outdoor air
 - Decreasing ventilation allows radon gas to build up
2. Pressurizing
 - Pressurizing a building keeps radon out
 - Depressurizing a building draws radon in

The only way to know the radon levels in your school is to test for radon.

Radon Testing

Radon testing in schools is highly recommended by the Indiana Department of Health, but not required by Indiana law. The EPA action level for radon is 4 pCi/L. The only way to know the radon concentration in a room is to test. There are two types of radon test: short-term and long-term. Short term tests take between two days and three months and long-term test are longer than 3 months. Tests should be done with certified radon testing devices, which are approved by the National Radon Proficiency Program (NRPP) and the National Radon Safety Board (NRSB).

ISDH recommends following the testing protocol found in the current version of ANSI/AARST MALB-2014 with 1/2021 REVISIONS "Protocol for Conducting Measurements of Radon and Radon Decay Products in Schools and Large Buildings"
<https://standards.aarst.org/>

Testing should be conducted in all rooms that are frequently occupied in contact with the ground along with 10% of occupied second and third floor rooms and at least 1 test for floors four and above. Use the chart below to determine which rooms in your school should be tested.

Foundation Type	Testing Recommendations
Slab-on-Grade Design	Measure frequently occupied rooms in contact with the ground.
Open-Plan or Pod Design	Measure each section separately. If moveable walls are absent or inoperable, measure the pod as one room with detectors every 2,000 square feet.
Crawl Space Design	Measure frequently occupied rooms directly above the crawl space.
Basement Design	Measure all frequently occupied basement rooms, rooms with floor or wall ground contact, and rooms directly above basement space that is not frequently occupied.

Initial radon testing identifies rooms that have a potential for elevated radon levels during the school year. It is recommended that the test should be conducted under the following conditions:

1. Closed conditions: windows and doors should be closed except for normal exit and entry.

2. Conditions are required to be closed for 12 hours prior to and during tests lasting less than 4 days. For tests 4 days or longer, closed conditions are recommended 12 hours prior to and during the test.
3. HVAC operation should be normal for 2-5 day tests.
4. During colder months, October through March.
5. During normal weather and barometric conditions. Tests should not be conducted during storms and high winds.
6. During normal operation of the building. Structural and HVAC system changes should not be going on during the test.

A list of radon testing professionals can be found on the Indiana State Department of Health website at <https://www.in.gov/isdh/24346.htm>.

Retesting:

If you have initial test results at or above 4 pCi/L, additional testing and possibly mitigation is needed. Test results between 4 pCi/L and 8 pCi/L should be followed up with a short term continuous monitoring test or a long term test. Results that are equal to or greater than 8 pCi/L require quick action and another short-term test should be conducted. If results are near 100 pCi/L, contact ISDH-Indoor Air Program at 317-351-7190 and consider relocating until levels are reduced.

If test results are below 4 pCi/L and no mitigation is needed, all frequently occupied rooms in contact with the ground should be retested in the future. EPA recommends at least once every 5 years. As buildings age, cracks and other structural changes can change the amount of radon that enters. Testing should also be done before and after major renovations or changes to the HVAC system are made.

Reducing Radon:

If testing reveals high radon levels, there are mitigation options to lower the level of radon in your school. Since school buildings are more complicated structures than houses, a mitigation strategy should be developed by a licensed Radon Mitigation Professional. A list of Indiana licensed mitigators can be found at <https://www.in.gov/isdh/24346.htm>. Studies conducted by the EPA indicate that the following are effective mitigation strategies for school buildings:

1. Active sub-slab depressurization (ASD): venting radon gas from beneath the building slab.
2. HVAC pressurization/ventilation: using the HVAC system to pressurize and ventilate the building.

The strategy used to reduce radon levels in your school building depends on local building code requirements, building construction, occupancy patterns, and radon levels

Resources:

- EPA's Radon in Schools: <https://www.epa.gov/radon/radon-schools>
- EPA's *Radon Measurement in Schools* guide: https://www.epa.gov/sites/production/files/2014-08/documents/radon_measurement_in_schools.pdf
- ISDH Radon: <https://www.in.gov/isdh/24346.htm>
- National Radon Proficiency Program (NRPP) Approved Testing Devices: <http://aarst-nrpp.com/wp/certification/approved-devices/>
- National Radon Safety Board (NRSB) Approved Testing Devices: <http://www.nrsb.org/devices/device-listings/>
- Minnesota Department of Health-Guidance for Radon Testing in Minnesota Schools: https://www.health.state.mn.us/communities/environment/air/docs/schools/radon_testing_schools18.pdf
- New Jersey Department of Environmental Protection- School Radon Testing Program Sample Letter to Parents: https://www.njradon.org/download/sr_pn.pdf