

Minimum Requirements for
Refresher Radiation Safety Training for Radon Professionals

Purpose/scope:

All individuals employed or affiliated with the business should have the radiation safety training for awareness of the radiological risk factors associated with radon and remain State certified to perform radon testing and/or mitigation activities.

Introduction:

Radioactivity is the process whereby an unstable nucleus spontaneously disintegrates or decays by emitting particles or waves in an effort to get rid of excess energy. The energy that is emitted and transmitted through matter is called radiation. A radioactive substance emits radiation.

Discussion:

Radon is a naturally occurring, chemically inert, invisible and odorless radioactive gas. It travels easily through small crevices between particles of soil and rock. Radon-222 decays in several steps to form radioactive isotopes with short half-lives. These isotopes are commonly referred to as Radon Decay Products (RDPs), also known as radon progeny or radon daughters. Radon has a half life of 3.8 days. As such, it has enough time to move from the radium source where it is produced, into buildings where the radon and some of its RDPs can be inhaled, and deliver a dose of radiation to the lung tissues.

The RDPs have the following characteristics:

- are short lived (all less than 30 minutes)
- have static electric charges
- are chemically reactive
- are solid particles (rather than in the gaseous form)

The above properties of RDPs mean that they easily attach themselves to solid objects such as dust, smoke, walls, floors and clothing. Radon and RDPs release radioactive energy in the form of alpha particles that can damage lung tissue and can cause lung cancer.

Radon gas concentration is expressed in picoCuries per Liter (pCi/L). This is a measure of how much radiation is in a liter of air; a liter is about the size of a quart.

RDPs are measured in Working Levels (WLs). If the WL is known, multiply WL by 200 to get an estimated measure in pCi/L.

There is no truly “safe” level of radon since lung cancer can result from very low exposures to radon; however, the risk decreases as the radon concentration decreases. The more radon that one

is exposed to, and the longer the exposure, the greater the risk of developing lung cancer. It is estimated that radon is the second leading cause of lung cancer in the United States resulting in 15,000 to 22,000 deaths/year.

The main concern related to health risks is caused from exposure to radon and RDPs while working in places with potentially high radon levels. The best way to minimize exposure to radon is to follow the ALARA (As Low As Reasonably Achievable) safety practices.

At a minimum, the practices identified below shall be followed by all radon testers and mitigation workers entering buildings where the radon level is unknown or above 4pCi/L.

1. For radon testing:
 - i. Limit the amount of time spent in elevated radon areas, for example, basements or crawl spaces;
 - ii. Respond to questions or concerns of clients in a low radon area, for example, upper floors or patios during field visits;
 - iii. Analyze samples in a low radon area. An exception would be those cases in which continuous real time monitoring is used to monitor mitigation system performance or to alert workers to the presence of high radon levels;
 - iv. Calibrate/set up radon testing equipment prior to entering an elevated radon area.

2. For radon mitigation work:
 - i. Provide the pre-mitigation radon test result from the building in which a mitigation system is being installed to the mitigation workers before the start of mitigation activities;
 - ii. Ventilate the mitigation working area to the extent practicable;
 - iii. Limit the time spent in potentially high radon concentration areas, for example, crawl spaces and other confined spaces, to the extent consistent with performing diagnostic work;
 - iv. Do not take breaks/lunches in elevated radon areas.
 - v. Vent sub-slab suction system exhaust gases outdoors, preferably above roof eaves and away from potentially occupied areas;
 - vi. Allow only the number of persons necessary to carry out mitigation work to be present in the building being mitigated;
 - vii. Prohibit smoking in buildings being mitigated.

The radon or radon progeny exposure for each individual resulting from the radon tests and mitigation activities will be tracked and records maintained regularly by the radon businesses.

Certification of Radon Testers and Mitigators, N.J.A.C. 7:78-27.34 states the following regulatory requirements:

- (e) - Each certified radon measurement and mitigation specialist and technician shall track their exposure to radon progeny if a potential for exposure exceeds one working level month per year (WLM/year).
- (h) - Individual workers with estimated work related exposures exceeding two WLM/year shall not be assigned mitigation work in higher radon level buildings on a continuing basis.
- (i) - The certified radon mitigation specialist shall notify workers in writing of estimated exposures quarterly. At any time when estimated exposure of a worker could potentially exceed four WLM/year, an investigation shall be conducted and actions shall be taken to reduce exposure to the worker.
- (j) - No employee shall be permitted to receive exposure from inhalation of radon progeny in excess of four WLM/year in one calendar year.