



## **Supplemental B: Standards of Practice for Radon Measurement and Testing**

The quantitative measurement of Radon Gas in residential construction will follow EPA Protocols for Radon Gas measurement with additions or exclusions, the entirety of which are listed below. This is in addition to the Inspector Nation Code of Conduct/Ethics. The aforementioned protocols include the following references:

- EPA 402-R-93-003, June 1993. Protocols for Radon and Radon Decay Product Measurements in Homes. Retrieved from [www.epa.gov/radon](http://www.epa.gov/radon).
- EPA 402/K-13/002, September 2013 (revised). Home Buyers and Sellers Guide to Radon. Retrieved from [www.epa.gov/radon](http://www.epa.gov/radon)
- EPA 402/K-12/002, May 2012. A Citizen's Guide to Radon. Retrieved from [www.epa.gov/radon](http://www.epa.gov/radon)
- CRCPD Publication E-02-2, February 2002, Published by Conference of Radon Control Program Directors, Inc. Criteria for Certification of Radon Service Providers, the Accreditations of Radon Chambers and Laboratories, and the Approval of Measurement Devices.

In addition to the references provided, the following definitions must be first described.

1. Individual Unit: Housing unit for one tenant or family
2. Common Area: Heated and cooled space enclosed space such as a lobby, foyer or hall.
3. Corner Unit: Individual Unit that has at least two adjacent exterior walls
4. Interior Unit: Individual Unit that has one to two exterior walls that are not adjacent
5. Building: Structure that houses all units and all common areas
6. Building Section: Single row of units in a building that does not deviate more than 45 degrees from any median line drawn through the structures.
7. Minimum Test Count: The least number of tests deemed to be acceptable to determine the Radon risk for a Building
8. Test Kit: A passive Radon Gas test kit or canister, such as an activated charcoal canister, alpha track device, or liquid scintillation canisters

### **B.1 Scope of Practice**

The Certified Radon Inspection Specialist shall:



1. Obtain a contract of service between their own company and their customer, outlining the extent of their services provided.
2. Maintain an internal Quality Assurance plan consisting of all requirements described in B.6
3. Perform Radon measurement tests in single and multi-family residential construction for the purposes of Real-Estate transactions
4. Perform Short Term (ST) tests with a minimum duration of 48 hours
5. Educate the public on proper protocols for testing a privately owned residential building for personal knowledge.
6. Quantify levels of Radon Gas per liter of air using a Radon Gas measurement device, and issue a mitigation decision based on the EPA determined threshold value of 4.0 pCi/L, as detailed in their Quality Assurance plan and described in B.6
7. Document and maintain environmental conditions as described in B.2.
8. Deliver a structured report detailing all components identified in B.7.
9. Adhere to the Inspector Nation Code of Conduct as detailed in B.8.

The Certified Radon Inspection Specialist shall not:

1. Directly recommend, refer, or demonstrate a particular bias towards any Radon Gas Mitigation company
2. Disclose the results of the Radon measurement test with any other individual than the customer to which they have a direct contract.
3. Perform Radon measurement tests on commercial, industrial, or non-residential structures.

## **B.2 Radon Measurement: Interference Resistant Procedures**

The Certified Radon Inspection Specialist shall:

1. Attempt to maintain closed home conditions for at least 12 hours prior to the beginning of each Radon Measurement test, with exterior openings opened for entry/exit only.
2. Avoid testing during extreme weather conditions or periods of heavy rain.
3. Document environmental conditions external to the Radon measurement device prior and during each test through the use of interference resistant devices such as:
  - a. Tamper-resistant window and door tape
  - b. Humidity and/or Temperature data loggers
  - c. Barometric pressure data logger
  - d. Pre- and Post-test instrument photographs



- e. Device placement grids
- f. Educational documents such as:
  - i. Informational pamphlets
  - ii. Direct customer communication
  - iii. Informational Door Hang Tags
- g. Built-in tamper monitoring sensors in modern continuous monitors
- 4. Maintain an accurate test log for each measurement test containing the following information:
  - a. Weather Conditions before and after each test
  - b. Building Structure Type (Basement, Crawl-Space, Slab, Combination)
  - c. Foundation Ventilation Source (Mechanical, Natural, Dehumidifier, Supply Air)
  - d. Attic Ventilation Source (Gable, Ridge, Soffit, Fan, Static, Vent, Cupola)
  - e. HVAC System (Type, Currently Operating, # of zones, Energy Type)
- 5. Ensure undisturbed and safe placement of each measurement device, adhering to the following standards:
  - a. Place device in a location that satisfies the following conditions:
    - i. 20 inches above floor level
    - ii. 3 feet from exterior openings
    - iii. 1 foot from exterior walls
    - iv. 4 inches from any other object/wall/furniture
  - b. Choose a room placement in a dwelling that is not near any water, fan, areas of high temperature and/or humidity, or in a high foot-traffic location which may interfere with the distribution of Radon Gas in the area.
    - i. Examples of Acceptable Locations
      - 1. Bedrooms
      - 2. Living Rooms
      - 3. Playrooms
    - ii. Examples of Poor/Unacceptable Locations
      - 1. Garages
      - 2. Closets
      - 3. Hallways
      - 4. Crawl-Space
      - 5. Laundry Room
      - 6. Kitchen
      - 7. Bathroom



- c. Ensure room placement adheres to placement criteria specified in the type of residential construction the test is being conducted in (B.3-B.5)
6. Ensure conditions in the house are similar to typical lived-in home, with the following conditions:
  - a. Installed Radon Mitigation systems are operating/running
  - b. Combustion/air vents are not closed
  - c. Furnace and Air Conditioners (that recycle indoor air) are on
  - d. Internal/External air exchange systems are off (ex: attic fans)
7. Proper client education is performed prior to each Radon measurement test, using the following methods:
  - a. Direct communication will all parties about the necessary test conditions
  - b. Including a direct statement in all contracts detailing the required home conditions and having all parties agree to help maintain these conditions.
  - c. Inform the client of interference-resistant devices that are in place.
  - d. Including the option to invalidate test results at the discretion of the Certified Radon Inspection Specialist.

### **B.3 Radon Measurement: Personal Knowledge**

The Certified Radon Inspection Specialist shall:

1. Educate home-owners on the potential health risks and hazards imposed by the presence of elevated levels of Radon Gas in a residential building.
2. Educate home-owners on the standard practices of Radon measurement testing for their own personal knowledge
3. Inform the client on typical interference-resistant protocols and device placements as described in B.2, with the following additions:
  - a. Locate the test device in the lowest lived-in area of your home
  - b. Choose to re-test your home if you finish a lower level of your home in which you plan to use as a lived-in space.
4. Advise the homeowner to perform the following testing protocol:
  - a. Perform an initial Short Term (ST) test using a canister-type device, and based on results perform one of three follow-up options
    - i. If the results are less than the EPA threshold of 4.0 pCi/L, follow up with a ST test only if the lowest lived-in level of the home changes. There is no need for remedial action.



- ii. If the results are greater than 4.0 pCi/L and less than 10.0 pCi/L, you may choose to perform one of the following:
  1. Perform a follow-up Long Term (LT). If the result is greater than 4.0 pCi/L, then mitigation may be needed.
  2. Perform a follow-up ST test. If the average of the two tests is greater than 4.0 pCi/L, then mitigation may be needed.
- iii. If the results are greater than 10.0 pCi/L, perform a second ST test. If the average of the two results are greater than 4.0 pCi/L, then mitigation may be needed.
- b. If the final determined level is greater than 4.0 pCi/L, then the home-owner should contact a Radon Professional to advise them on the situation.
- c. In any other case, no remedial action or further testing is required unless they choose to retest on their own in the future.
5. Advise the client that if they find elevated levels of Radon Gas in their home, they should contact a Radon Professional for remedial action or a follow-up.

The Certified Radon Inspection Specialist shall not:

1. Insist that a home-owner not self-test and instead hire a Certified Professional
2. Improperly educate a home-owner on any topic in the interest of personal gain.
3. Advise against self-testing for personal knowledge.

## **B.4 Radon Measurement: Real-Estate Transactions**

The Certified Radon Inspection Specialist shall:

1. Perform a Radon Gas measurement test as described in B.2, and using one of the three following test configuration options:
  - a. Sequential Testing
    - i. Perform an initial ST test, then a second ST test at a later time period.
    - ii. Perform both canister-type Radon Gas measurement tests in the same location in the home.
    - iii. Report the average of the two tests.
  - b. Simultaneous Testing
    - i. Perform two ST tests at the same time
    - ii. Report the average of the two tests.
  - c. Single Test



- i. Perform one test using a continuous monitor capable of reporting hourly Radon Gas levels
  - ii. Report the average level over the entire test period.
2. Locate the test device in the lowest potentially lived-in area of the home
3. Perform a Relative Percent Difference (RPD) calculation when the Sequential or Simultaneous testing option is performed:
  - a. Take the difference between the two test results
  - b. Take the average of the two test results
  - c. Take the calculated difference and divide it by the calculated average, then multiply the result by a factor of 100.
    - i. 
$$RPD = \frac{Test1 - Test2}{(Test1 + Test2)/2} * 100$$
4. Properly interpret the resultant test data and RPD results based on the following three possible situations:
  - a. Both tests are reporting results less than 4.0 pCi/L
    - i. Recommend a re-test if RPD is greater than 67%
  - b. Both tests are reporting results greater than 4.0 pCi/L
    - i. Recommend a re-test if higher test result is over two times the lower test result
  - c. One test reports results less than 4.0 pCi/L, and the other reports results greater than 4.0 pCi/L
    - i. Recommend a re-test if RPD is greater than 36%
5. Recommend a re-test if any interference resistant protocol in place, as described in B.2, indicates that tampering or improper test conditions existed, or if the interpretation of the calculated RPD recommends a re-test take place.

## **B.5 Radon Measurement: Multi-Family Homes**

The Certified Radon Inspection Specialist shall:

1. Adhere to standards described in B.4, in addition to provisions specifically designed for multiple family buildings (buildings consisting of 5 or more units):
2. Perform the following duties prior to each test series:
  - a. Obtain a floorplan of the building
  - b. Determine locations necessary for a proper multi-unit test.
  - c. Establish communication with housing manager or building supervisor



- i. Establish a preferred means of contacting/informing residents of future testing, which are typically one or more of the following:
        1. Notices in common areas
        2. Notices delivered to individual units or mailboxes
        3. Building-wide email lists
      - ii. Establish if a building representative will be able to accompany you to each unit as needed.
    - d. Have building manager aid you in educating the community on the test series.
    - e. Ensure closed home conditions are maintained building wide as described in B.2.
    - f. Begin the test series
  3. Design a Radon Gas measurement test location/configuration diagram for the specified building floorplan based on the following conditions and building features:
    - a. Test at least 25% of all units within the multi-family building
    - b. Corner Units:
      - i. Simultaneous Testing in each corner unit on the 1<sup>st</sup> floor only
    - c. Interior Units:
      - i. Test 25% of all remaining units on the 1<sup>st</sup> floor, rounding up to the nearest full test
      - ii. Place tests in non-adjacent units only
    - d. Multiple Floors:
      - i. Place the same number of tests on additional floors as interior tests on the first floor, plus one additional unit
      - ii. Alternate the position of each test device on each subsequent floor.
    - e. Blank Testing:
      - i. Total number of test devices is less than 10 units, perform 1 blank test
      - ii. Total number of test devices is greater than 10 units, perform 1 blank test per 10 tests
    - f. Mitigation Decision:
      - i. Calculate the RPD for each simultaneous test performed, and take an appropriate action based on the results as in B.4.
        1. Retest entire building if any RPD is greater than the corresponding threshold
      - ii. Based on one of two possible situations, perform the following action:
        1. Any sequential test is greater than 4.0 pCi/L
          - a. Mitigate that Building/Section
        2. Any single canister test is greater than 4.0 pCi/L



- a. Perform Additional Test to Exercise Sequential Option
- b. Mitigate entire building/section if the average is greater than 4.0 pCi/L and the RPD is below the corresponding threshold

## **B.6 Quality Assurance**

The Certified Radon Inspection Specialist shall:

1. Maintain internal company documentation detailing your own quality assurance plan containing the following components:
  - a. Annual device calibration records
  - b. Annual continuing education records
  - c. Standardized client education documentation and recommendations
  - d. Correct procedures for Radon Measurement testing
  - e. Quality Control procedures which include anti-interference methods
  - f. Annual Quality Control documentation to ensure that you have performed double sampling/testing in at least 10% of all tests conducted
  - g. Proper business and testing record keeping for each client/test
    - i. Property Address
    - ii. Test Data
    - iii. Results
    - iv. Signed Copies of Contracts
    - v. Reports Delivered

## **B.7 Reporting**

The Certified Radon Inspection Specialist shall:

1. Deliver an accurate report to each client after a Radon Gas measurement is completed without any determined need for an additional follow-up or re-test.
2. Ensure that each delivered report contains the following components:
  - a. Your Contact Information and Certification Number
  - b. The contact information of each Client
  - c. Radon Gas Measurement Device Type and Serial Number
  - d. Date of Testing
  - e. Start/Stop Times of measurement
  - f. Numeric results from the Radon Gas test





- i. Report Radon Gas level with 1 decimal point
- ii. Report the RDP calculation with 3 decimal points
- g. A Mitigation Recommendation based on the data results
- h. Any deviations from closed house conditions or indicated by your interference resistant protocols as described in B.2.
- i. Test log of testing conditions as described in B.2.

## **B.8 Code of Conduct**

The Certified Radon Inspection Specialist shall:

1. Observe and maintain the set code of professional conduct as outlined by Inspector Nation, and detailed on [sop.inspectornation.com](http://sop.inspectornation.com)
2. Respect and maintain the privacy of clients, particularly in regard to test results
3. Maintain standard business ethical practices
4. Follow the set code of conduct guidelines listed below:
  - a. Maintain and Adhere to an Accurate and Up to Date QA Plan
  - b. Do your best to ensure your QC data is as accurate as possible
  - c. Keep yourself current in the field and stay informed.
  - d. Satisfy your continued education requirements
  - e. Present your certification number with each report and in your QA plan
  - f. Ensure that services provided are of an acceptable quality (accuracy/precision) in a timely matter
  - g. Maintain client privacy and confidentially, especially in regard to test results.
5. Inform Inspector Nation of any criminal or civil complaints and/or charges that are levied against you while you are a current certification holder or Inspector Nation member.