

**QUALITY ASSURANCE PLAN**  
**FOR**  
**ELECTRET DEVICES**

Name of Measurement Specialist: \_\_\_\_\_

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

## Table of Contents

<b><u>Section</u></b>	<b><u>Page</u></b>
A. Organization	
B. Introduction	
C. Business and Affiliate Responsibilities	
D. Measurement Procedures	
E. Device Information	
F. Direction of the Daily Business Operations	
G. Building Types and Testing Protocols	
H. Chain of Custody	
I. Quality Control Measures	
J. Validation and Reporting	
K. Confidentiality Waiver	

**A. Organization**

Title of individual who signed the current business application \_\_\_\_\_

The business may have one or more affiliated measurement specialists who oversee the daily operations of the business, including performing the required quality assurance and quality control functions and managing the affiliation process and all affiliates.

The reporting structure between the individual who signed the application, the measurement specialist(s), and the affiliates is as follows:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**B. Introduction**

Quality assurance (QA) consists of activities required to provide confidence that measurement data are of the required precision and accuracy. Quality Control is the process which allows an organization to compare their measurements to acceptable standards. A QA program adds to an individual’s understanding of the methods they use and provides early detection of problems so that they can be rectified quickly and completely.

The purpose of this QA plan is to: set policies, performance goals, and objectives; identify responsibilities; establish procedures for assessing performance relative to quality; and to define corrective actions when needed. Only with such documentation can the validity of measurement results be defended. The QA plan defines the commitment to provide customers with accurate, valid, reproducible, and defensible radon measurements which may be used to make critical decisions about radiation related environmental health.

**C. Business and Affiliate Responsibilities**

The business and all affiliates submit an annual renewal application in accordance with N.J.A.C. 7:28-27.

If changes in certification information are made after renewal, an amendment is required in accordance with N.J.A.C. 7:28-27.3(j) by submitting to the Department, in writing, the information to be changed. The amendment will be operative and implemented only after the Department reviews, approves, and confirms the change in writing.

\_\_\_\_\_ will, at all times, maintain affiliation with at least one certified radon measurement specialist or an individual who has received an

acknowledgment notice to become a radon measurement specialist.

This QA plan is prepared in accordance with N.J.A.C. 7:28-27.14 to ensure the reliability and validity of radon measurements. It will be provided to each affiliate upon affiliation, annually, and whenever revisions are made to the procedures that the affiliates must follow.

**D. Measurement Procedures**

All radon testing will be performed in accordance with N.J.A.C. 7:28-27, the authorized measurement protocols for each building type, and the business’s certification, QA plan, and radiological safety plan. Testing will be conducted by an affiliate only with a device that is identified on the business certification and is listed on a nationally recognized organization’s approved list of test equipment that can be used to test for radon.

**E. Device Information**

Testing will be conducted by an affiliate only with an electret device listed below and after passing one authorized proficiency test for the device:

Manufacturer	Model

\_\_\_\_\_ has been approved by the Department to use these devices. Manufacturers operating instructions are available.

**F. Direction of the Daily Business Operations**

One or more certified radon measurement specialists will direct the daily operation of the business. They will:

1. Ensure that the business and its affiliates are in compliance with the business’s most recent certification and N.J.A.C. 7:28-27.
2. Prepare and sign affiliation forms.
3. Review the chain of custody form and client report for all tests; and the voltage from the electret reader.
4. Approve, verify, and sign the reports sent to the client and to the Department.

5. Prepare, sign, implement, and ensure compliance with the QA plan.
6. Prepare, sign, implement, and ensure compliance with the radiological safety plan.
7. Ensure that the required records are kept.
8. Prepare and submit the business's annual certification application, and amend the certification as needed throughout the year.
9. Ensure that each affiliate passes a proficiency test before conducting testing for all models of devices they are using.
10. Ensure that only electret readers with valid calibration dates are used for analysis. If the expiration date has passed, the test will be invalid and will not be reported.
11. Ensure that duplicates and blanks are within the control limits or take appropriate actions.
12. Ensure the results of spike testing are in range.
13. Ensure the electric voltage drift is within range.
14. Ensure results of reference cells are within range.
15. Perform investigations if device(s) and/or reader(s) are out of range or outside of control limits as described in Section I of this plan.

## **G. Building Types and Testing Protocols**

The current building types \_\_\_\_\_ and affiliates are approved to test and the protocols that must be followed are CHECKED below:

- Residential single-family buildings following the most current revisions of "Protocol for Conducting Measurements of Radon and Radon Decay Products in Homes," ANSI/AARST MAH-2019 as supplemented and amended
- Residential multifamily buildings (apartment, townhouse, condominium, other) following the most current revisions of "Protocol for Conducting Measurements of Radon and Radon Decay Products in Multifamily Buildings," ANSI/AARST MAMF-2017 as supplemented and amended
- Non-residential large buildings following the most current revisions of "Protocol for Conducting Measurements of Radon and Radon Decay Products in Schools and Large Buildings," ANSI/AARST MALB-2014 as supplemented and amended
- Schools following the most current revisions of "Protocol for Conducting Measurements of Radon and Radon Decay Products in Schools and Large Buildings," ANSI/AARST MALB-2014 as supplemented and amended

An affiliate can only test multifamily, large and/or school buildings if he or she has taken the required eight-hour training course for these building types. The affiliate will provide \_\_\_\_\_ with a copy of the training course certificate so the name of all affiliates who will test these building types can be identified on the business application or via amendment to the business certification.

## H. Chain of Custody

A chain of custody form must be completed in its entirety for every device. An affiliate must completely fill in 1 through 19 below for each test. Numbers 7 and 14 through 17 must be filled in while in the field performing the test. An individual not subject to certification, such as a building owner, must fill in 1 and 3 through 17 below for each test.

1. Test location including address, city, State, zip code, incorporated municipality, and county
2. Client address, city, State, and zip code, if different than test location
3. Device
4. Device model number for portable devices
5. Device serial number or reference number
6. Floor where the test was conducted: zero is the basement, one is the first floor, etc.
7. Whether closed building conditions, as provided in the applicable authorized measurement protocol, were met
8. The type of building in which the test was performed: residential, non-residential, or school
  - a. If the building is residential, whether it is a single-family, condominium, townhouse, apartment or other building; and
  - b. If the building is a school, the school's name, New Jersey Department of Education school code, and room number of the location tested
9. Structure type: basement, crawlspace, slab on grade, or combination
10. Test type: standard, blank, or duplicate
11. Whether the test was conducted at a child care center
12. Whether the test was conducted as part of a real estate transaction
13. Whether the test was conducted after mitigation
14. The certification number of the individual or the signature of the owner who deployed the device
15. The time and date the device was deployed
16. The certification number of the individual or the signature of the owner who retrieved the device
17. The time and date the device was retrieved
18. The calibration expiration date for the electret reader that the affiliate used for the test

Only chain of custody forms that are approved by the Department as part of the business application or as an amendment will be used for testing. Affiliates must ensure that they are using the correct chain of custody form for each test.

Department-approved chain of custody forms are attached for each device and building type.

## **I. Quality Control Measures**

### **Proficiency Testing**

An affiliate can only conduct radon testing with an electret device model after he or she provides proof of passing one authorized proficiency test for the reader of that device model at an approved radon chamber facility. Authorized proficiency testing must be conducted in accordance with N.J.A.C. 7:28-27.6(a). A list of approved chambers are available at <https://nrpp.info/devices/performance-testing-calibrations/> and <https://www.nrsb.org/radon-chambers/nrsb-accredited-chambers/>.

### **Calibration**

Each electret reader will have a current calibration certificate prior to adding it

to the business's certification.

2. An electret reader will be calibrated annually by the affiliated certified individual or an individual with an acknowledgement notice who owns or leases the device.
3. If the business owns the electret reader, the business will have the device calibrated.
4. The calibration will be completed no more than 12 months prior to the submission of the initial or renewal radon measurement business application.
5. Calibration will be performed by an approved radon chamber facility or the device manufacturer.
6. It is the responsibility of a certified individual to ensure that the electret reader has a current calibration certificate prior to using the device, whether the individual or a certified business owns or leases the device.

### **Duplicate Testing**

All tests must be duplicate tests for time-sensitive tests in accordance with the ANSI/AARST protocols in section G above.

For all other types of testing, duplicate testing requirements are as follows and as specified in the authorized radon measurement protocols for specific building types:

1. Throughout each month, the business will ensure that the lesser of 10 percent duplicates or 50, for each device type, are distributed among New Jersey tests conducted by affiliates and individuals not subject to certification, such as a building owner.
2. Duplicate testing will be conducted as per the applicable radon measurement protocols.
3. The relative percent difference (RPD) will be calculated for each duplicate pair and the following minimum criteria will be used for all duplicate analyses:

<u>Average of the two test devices</u>	<u>Warning Limit Triggered</u>	<u>Control Limit Triggered</u>
≥ 4.0 pCi/L	RPD > 28.0%	RPD > 36.0%
2.0 – 3.9 pCi/L	RPD > 50.0%	RPD > 67.0%
< 2.0 pCi/L	Absolute value of the difference between the two tests is >1 pCi/L if both tests are above the minimum detectable concentration	n/a

4. If more than five percent of the checks fall within the warning limit or more than one percent of the checks fall outside the control limit for a device, an investigation will be conducted, corrective action will be taken, and the investigation and corrective action will be documented in writing.
5. If the limit continues to be exceeded, the affected device(s) will be taken out of service until the problem is identified, corrected, and documented in writing.

**Blank Testing**

Blank testing requirements are as follows:

1. Throughout each month, the business will ensure that the lesser of five percent blanks or 25 are conducted and distributed among New Jersey tests conducted by affiliates and individuals not subject to certification, such as a building owner.
2. If blank results fall outside the control limit of  $\geq 2$  volts, or as recommended by the manufacturer for that configuration, an investigation will be conducted, corrective action will be taken, and the investigation and corrective action will be documented in writing.
3. If the limit continues to be exceeded, the affected device(s) will be taken out of service until the problem is identified, corrected, and documented in writing.
4. Devices for blank measurements will be distributed, along with instructions for deploying the devices among all the places where the devices are stored, transported, and deployed, including:
  - a. Side-by-side with the test
  - b. At the certified business’s location
  - c. At the affiliate’s office and storage area
  - d. In the vehicles that transport the devices
5. Blank devices will be distributed and deployed in the following manner:

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## **Electret Quality Control**

Spike testing requirements for electret readers are as follows:

1. The business will conduct spike testing for electret readers that it owns.
2. If a device is affiliate-owned, the certified individual will conduct spike testing and will submit the results to the business.
3. Spike tests will be conducted at a rate of three per 100 tests, with a minimum of three per year and a maximum of six per month.
4. The relative percent error (RPE) will be calculated.
5. If the RPE falls outside the warning limit of >20% or outside the control limit of >30%, an investigation will be conducted, corrective action will be taken, and the investigation and corrective action will be documented in writing.

Electret voltage drift will be evaluated as follows:

1. From each shipment of electret devices from the manufacturer, the device owner will set aside the lesser of five percent or 10, which shall be evaluated at least weekly for voltage drift and results documented in writing.
2. If a device is affiliate-owned, the certified individual will submit the results weekly to the business.
3. If the voltage loss is more than one volt per week over a three-week test period for short-term electrets, or one volt per month over a three-month test period for long-term electrets, an investigation will be conducted, corrective action will be taken, and the investigation and corrective action will be documented in writing.
4. If the limit continues to be exceeded, the affected device will be taken out of service until the problem is identified, corrected, and documented in writing.

The electret reader will be checked as follows:

1. The device owner will zero the electret reader and check the reference cells and document results at least weekly.
2. If a device is affiliate-owned, the certified individual will submit the results weekly to the business.
3. If the manufacturer's limits are exceeded, the affected device will be taken out of service until the problem is identified, corrected, and documented in writing.

## **Report to Management**

Each calendar quarter, a certified specialist responsible for the daily operations of the business will prepare and submit to the individual who signed the application in accordance with N.J.A.C. 7:28-27.4, a written report of the results of duplicate tests, blank tests, authorized proficiency tests, calibrations, spike tests, voltage drift, zeroing, and reference cell checks, and any corrective action.

## J. Data Validation and Reporting

A radon test is identified as invalid if the test does not meet the requirements of the authorized measurement protocols, the QA plan, or N.J.A.C. 7:28-27. When a test is invalidated:

1. The reason for invalidating the test will be clearly documented on the client report form.
2. The test result will not be reported on the client report form or otherwise provided to the client.
3. The test will not be reported to the Department.
4. A record of the invalid test will be kept and available for inspection by the Department.

A valid radon test is reported to the Department or to the client only when the test is performed by an affiliate or by an individual not subject to certification, such as a building owner, and it is reviewed by a measurement specialist.

Test results may be disclosed by the business as follows:

1. To the individual owner of the building.
2. To the individual identified in N.J.A.C. 7:28-27.3(c) when the owner of the building is other than an individual.
3. To the buyer in the case of a prospective sale when the buyer contracts for the test.
4. To the certified individual who performed the test.
5. To the owner's legal representative, including an attorney or real estate agent, acting in accordance with a written agreement the attorney or agent has with the owner.
6. To anyone when a confidentiality waiver form is signed by the owner.

Only client reports that are approved by the Department as part of the business application or as an amendment will be used for reporting. \_\_\_\_\_

client reports include the following information:

1. Business name, address, telephone number, and certification number;
2. Device;
3. Device calibration expiration date, for portable devices and electret readers;
4. Owner's address;
5. Address tested, if different from 5 above;
6. Test start date and time;
7. Test stop date and time;
8. Floor tested;
9. Test results in pCi/L;
10. Printed name, signature, and certification number of the measurement specialist who reviewed the report;
11. Report date; and
12. The statement: "This notice is provided to you by a business certified by the New Jersey Department of Environmental Protection to perform radon measurements. N.J.S.A. 26:2D-73 requires that no person shall disclose to any individual, except the Department of Environmental Protection or the

Department of Health the address or owner of a nonpublic building that the person has tested or treated for the presence of radon, unless the owner of the building waives, in writing, this right of confidentiality. In the case of a prospective sale of a building which has been tested for radon, the seller shall provide the buyer, at the time the contract of sale is entered into, with a copy of the results of that test and evidence of any subsequent mitigation or treatment, and any prospective buyer who contracts for the testing shall have the right to receive the results of that testing.”

The client reports include a reference to the Department’s website at [www.njradon.org](http://www.njradon.org) for the most recent version of the testing and mitigation guidance document that is approved by the Department.

Client reports are attached.

#### **K. Confidentiality Waiver**

Affiliates will use the confidentiality waiver form to obtain written authorization from the owner to provide an address and corresponding radon test result to an individual other than the building owner, or the buyer in the case of a prospective sale.

Only a waiver that is approved by the Department as part of the business application or as an amendment will be used during testing. The waiver includes the following information:

1. A statement indicating that the owner or their legal representative agrees to release the information;
2. The name and signature of the owner or their legal representative as provided at N.J.A.C. 7:28-27.3(c);
3. The name and signature of the affiliate; and
4. The date that the owner or representative signs the document.

The confidentiality waiver is attached.