

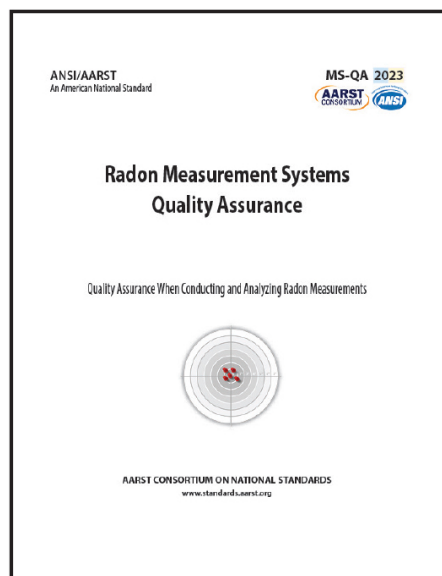
# Public Review of revisions to MS-QA 2023

## Radon Measurement Systems Quality Assurance

In response to public comments, the attached content is being proposed for revision to ANSI/AARST MS-QA 2023.

ANSI/AARST standards are available for review free and for purchase at [www.standards.aarst.org](http://www.standards.aarst.org). A link to ensure you receive future public review notices can be found at [www.standards.aarst.org/public-review](http://www.standards.aarst.org/public-review).

This standard of practice specifies minimum requirements for quality systems designed to quantify the concentration of  $^{222}\text{Rn}$  gas in air by qualified professionals (QPs) and laboratories, whose data are intended to be used to determine the need for, or success of, radon mitigation.



---

Public Review: MS-QA 25-9

**COMMENT DEADLINE: October 12th, 2025**

---

### REQUESTED PROCESS AND FORM FOR FORMAL PUBLIC REVIEW COMMENTS

Submittals (MS Word preferred) may be attached by email to [StandardsAssist@gmail.com](mailto:StandardsAssist@gmail.com)

- 1) Do not submit marked-up or highlighted copies of the entire document.
  - 2) If a new provision is proposed, text of the proposed provision must be submitted in writing. If modification of a provision is proposed, the proposed text must be submitted utilizing the strikeout/underline format.
  - 3) For substantiating statements: Be brief. Provide abstract of lengthy substantiation. (If appropriate, full text may be enclosed for project committee reference.)
- 

### REQUESTED FORMAT

**Public Reviewed Item and Its Date:** MS-QA 25-9

- **Name:** Affiliation:
- **Clause or Subclause:**
- **Comment/Recommendation:**
- **Substantiating Statements:**

*Repeat the four bullet items above for each comment.*

---

### Intellectual rights

**NOTE:** Commenters that choose to submit comments shall be deemed to have done so at their sole discretion and acceptance that work product resulting from comments and other participation shall be wholly owned by the publisher (AARST), to include all national and international publishing and intellectual rights associated with the work product creation and publication.

---

## AARST Consortium on National Standards

Website: [www.standards.aarst.org](http://www.standards.aarst.org) Email: [Standards@aarst.org](mailto:Standards@aarst.org)

527 N Justice Street, Hendersonville, NC 28739

### The Consortium Consensus Process

The consensus process developed for the AARST Consortium on National Radon Standards and as accredited to meet essential requirements for American National Standards by the American National Standards Institute (ANSI) has been applied throughout the process of approving this document.

### Continuous Maintenance

This standard is under continuous maintenance by the AARST Consortium on National Standards for which the Executive Stakeholder Committee has established a documented program for regular publication of addenda or revisions, including procedures for timely, documented, consensus action on requests for change to any part of the standard.

User Tools: User tools are posted online ([www.standards.aarst.org/public-review](http://www.standards.aarst.org/public-review)) as they become available (such as templates for field notices, inspection forms, interpretations and approved addenda updates across time).

### Notices

Notice of right to appeal: Bylaws for the AARST Consortium on National Standards are available at [www.standards.aarst.org/public-review](http://www.standards.aarst.org/public-review). Section 2.1 of Operating Procedures for Appeals (Appendix B) states, "Persons or representatives who have materially affected interests and who have been or will be adversely affected by any substantive or procedural action or inaction by AARST Consortium on National Standards committee(s), committee participant(s), or AARST have the right to appeal; (3.1) Appeals shall first be directed to the committee responsible for the action or inaction."

Disclaimer: The AARST Consortium on National Standards strives to provide accurate, complete and useful information. The AARST Consortium on National Standards will make every effort to correct errors brought to its attention. However, neither the AARST Consortium on National Standards, its sponsoring organization the American Association of Radon Scientists and Technologists nor any person contributing to the preparation of this document makes any warranty, express or implied, with respect to the usefulness or effectiveness of any information, method or process disclosed in this material. Nor does AARST or the AARST Consortium on National Standards assume any liability for the use of, or for damages arising from the use of, any information, method or process disclosed in this document. It is the sole responsibility of radon practitioners using this standard to stay current with changes to the standard and to comply with local, state and federal codes and laws relating to their practice.

These proposed revisions speak to field operations when conducting dupes (comparison checks), blanks and spikes for quality control of electret ion chamber detectors (EIC), alpha track detectors (ATD), and charcoal adsorption devices (CAD). They add clarity on how to conduct these quality control checks and draw a distinction relative to proficiency testing of laboratories that can be conducted with blind testing procedures.

## 2 DEFINITIONS

**Accuracy:** The degree of agreement between the ~~observed~~ value produced by the instrument or measurement system being evaluated (X) and the conventionally true value (T) of the quantity being measured. The degree of agreement is often expressed as the difference between X and T:  $(X - T)$ , or as a percentage relative to T:  $(100 [X - T] / T)$ .

**Blind:** A type of *performance test* of the **analytical** capability of a method in which a sample is not identified as a *performance test* to the analyst.

~~Note—When QC detectors are processed at an analysis laboratory, best practices dictate that they should be treated and labeled as other routinely returned detectors and should not to be identified as QC detectors. As sometimes required by state regulators or as part of coordinated QC efforts with the laboratory, it may be acceptable to identify QC detectors to the analyst.~~

**Performance Test:** A Performance Test, or blind performance test, is a blind spike in which the radon reported by the device user or laboratory is compared by an independent party, such as a chamber or proficiency program, to the established chamber concentration in which the device was exposed. Performance Test criteria historically includes an IRE of no more than 25%. ~~Independent verification is a demonstration of quality that is valuable to third parties such as certification bodies (State or private) and consumers.~~

## 3 REQUIREMENTS FOR ALL METHODS

### 3.3 Validation of Performance

#### 3.3.2 Field Operations— ~~Blind~~ Blanks and Spikes

When field blanks and field spikes are processed at an independent analysis laboratory, they shall be identified as "QAQC," to the analyst or analysis laboratory including those reserved for blind testing. This facilitates removal of these QAQC test results when laboratories report to public health databases.

~~Informative advisory—When field blanks and field spikes are processed at an independent analysis laboratory, they should be treated and labeled as other returned detectors and are not to be identified as blanks or spikes to the analyst because the objective of field QC is to monitor the stability of field operations and procedures.~~

~~If there are more restrictive requirements, including those by credentialing authorities that may require the demonstration of a minimum proportion of QC detectors and chain of custody, then that authority supersedes this standard.~~

There is no prohibition on performance testing as an independent verification of a laboratory's quality by conducting blind blanks, spikes or comparison checks. The analysis laboratory shall however be promptly informed of the blind test results or reference chamber values after receiving the reports from the laboratory.

## 5 QC FOR FIELD OPERATIONS USING EIC, alpha track detectors (ATD), and charcoal adsorption devices (CAD) METHODS

### 5.2 Field Operations (EIC, ATD, CAD) Blanks

#### 5.2.1 Field Operation Blanks—Frequency and Procedures

Users of EIC, ATD, and CAD detectors are responsible for setting aside at least 5% of the number of measurements or a maximum required of 25 per month to be used as blanks. If using detectors with different configurations, even when from the same manufacturer, the same requirement applies for each different configuration, including differences in both the design of the detector as well as the type and source of the sensitive material used in the CADs and ATDs

(Note—Section 7.4 (Lab Quality Control of Detector Materials) describes quality tracking for laboratories.)

Procedures related to detector packaging and shipping, such as opening and immediately closing detectors, shall be done in conformance with manufacturer recommendations for handling *blanks*.

~~Informative advisory—When blanks are processed at an independent analysis laboratory, the deployment period represented to an independent analysis laboratory shall be consistent with that of other deployed detectors or as stated by the manufacturer as the optimal deployment period for that detector.~~

Once deployed for evaluating lack of influence of factors encountered outside the measured environment during storage, transit and field operations, the detectors shall be sent to the analyst or analysis laboratory. Blanks shall be identified as “QAQC” to the analyst or analysis laboratory including those reserved for blind testing. The test duration reported to the analyst or analysis laboratory shall be compatible with manufacturer recommended deployment periods for the specific detector. The range of test conditions reported, such as temperature, humidity, location and weather, shall be consistent with those that represent normal test conditions. Once receiving test results, the analysis laboratory shall be promptly informed that this was a blank.

### 5.3 Field Operations (EIC, ATD, CAD) Spikes

*Spikes* provide evidence of a continued accurate measurement system operation by comparing reported spike analyses results to a recognized reference authority for radon concentration. Documentation of within-limit *spikes* is necessary to support the validity of measurements. ~~Spikes should be labeled and treated as other returned detectors and are not to be identified as spikes to the analyst.~~

Detectors to be spiked shall be submitted to an approved reference chamber for exposure to a known concentration of radon soon after purchase. The reference chamber shall be instructed to send the exposed samples to the analyzing laboratory with dates and times of the chamber exposure. Spikes shall be identified as “QAQC” to the analyst or analysis laboratory. The professional shall compare the measured value reported by the analyzing laboratory to the known concentration value reported by the reference chamber for inclusion in QC evaluations and records. The analysis laboratory shall be promptly informed of the reference chamber values after receiving the test results from the laboratory.

### 5.4 Field Operations (EIC, ATD, CAD) Duplicates

#### 5.4.1 Field Operation Duplicates—Frequency and Procedures

Field operation *duplicates* are to be deployed in approximately one in 10 measurements, or 10% the time. Large projects involving more than 20 measurements are to include some *duplicates*.

Conducting duplicates is to include exposing identical, *collocated devices* (see Definitions) simultaneously for at least 48 hours, submitting them for analysis without identification as "side-by-side" ~~duplicates (blind)~~ and then comparing the two results. The results of each *duplicate* pair are to be recorded and plotted on control charts for evaluation.

---

## TOPIC 2

## CRM

---

These proposed revisions speak to clarity on quality control comparison checks for continuous radon monitors (CRM) as intended and as revised relative to when purchasing a new device or receiving it back subsequent to calibration.

### 4 CONTINUOUS RADON MONITORS (CRM) QC

#### 4.2 CRM Comparison Checks

##### 4.2.1 CRM Comparison Checks—Frequency and Procedure

Comparison checks for each instrument are to be made with approximately every tenth deployment in the field measurement (i.e., 10%), so that the checks are distributed across the range of conditions, operators and usage patterns experienced by the radon measurement provider.

CRMs used in a *comparison check* are to be operated in the manner that they are typically deployed in the normal course of business. The results of *comparison checks* shall be recorded and analyzed so that the QP better understands the expected imprecision during routine, stable operations (e.g., "in-control" conditions). This practice can identify malfunctions or damage during shipping and handling.

~~Informative advisory—It is recommended that~~ Routine procedures for beginning chain of custody of CRMs when they are received, either new or from recalibration, include a *comparison check* with another CRM. or an intercomparison prior to test results released from the instrument are reported to be valid. This procedure helps validate both instrument performance and calibration. Options include:

- a) a collocated *comparison check*, as defined in this section 4.2.1, or
- b) an intercomparison with another calibrated CRM, though not necessarily of the same device model, for a duration of not less than 12 hours

This practice can identify malfunctions or damage during shipping and handling.

---

## TOPIC 3 LABORATORIES

---

These proposed revisions speak to clarifying procedures at laboratories that analyze charcoal adsorption detectors using Gamma Spectroscopy technology.

### 8 LAB QA FOR CHARCOAL ADSORPTION DEVICES—Gamma Spectroscopy METHODS

#### 8.1.1 Equipment Maintenance

All system components are to be ~~regularly~~ maintained according to manufacturing instructions and verified for functionality when operating to analyze detectors. Concerns are to be logged and relayed to the quality manager or persons responsible for *data validation* of test results.