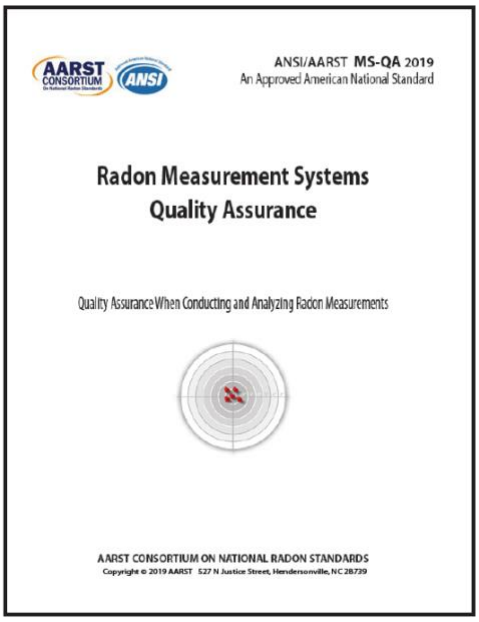
Harmonization and ongoing updates for
MS-QA and MS-PC Quality Assurance Standards For Radon Measurement



MS-QA Updates 6/22 Read me

These proposed revisions address several items that include updates related certification or listing programs, clarity, corrections, and harmonized definitions with device performance protocol ANSI/AARST MS-PC-2022. The proposed revisions are applicable to the following ANSI/AARST publication:

— MS-QA 2019

Latest published versions of those standards are available for comparison at www.standards.aarst.org where all ANSI/AARST standards can be found for review at no charge and for purchase.

The current mitigation standards committee roster (consensus body) can be linked to from www.standards.aarst.org/public-review. The current work project includes (1) harmonization, where possible, for all portions of these documents to read the same for the same tasks; (2) update based on new experiences, and (3) renderings that are more conductive to stakeholders who are involved in compliance assessment.

Public Review: MS-QA Updates *6-22*

COMMENT DEADLINE: **August 8th, 2022**

REQUESTED PROCESS AND FORM FOR FORMAL PUBLIC REVIEW COMMENTS

Submittals (MS Word preferred) may be attached by email to 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

Title of Public Review Draft: **MS-QA Updates *6-22***

- **Name:** Affiliation:
- **Clause or Subclause**:
- **Comment/Recommendation**:
- **Substantiating Statements**:
- [___] Check here if your comment is supportive in nature and does not require substantive changes in the current proposal in order to resolve your comment.

Repeat the five bullet items above for <u>each</u> comment.

Requested registration of your contact information and copyright release.

ONE TIME REGISTRATION
CONTACT INFORMATION AND COPYRIGHT RELEASE

NOTE: AARST Consortium on National Radon Standards encourages original commentary on its standards. Commenters that choose to submit comments without an author's signature (due to difficulties in timeliness, proximity or other) shall be deemed to have done so at their sole discretion and have thereby acknowledged and accepted the copyright release herein. If commenters submit comments authored by others, those comments must also be accompanied by a signed copyright release from the author of the original comment. The original comment author and representing commenters may be asked to engage in dialog supporting their position.

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Copyright Release:
I hereby grant the AARST National Radon Standards Consortium the non-exclusive royalty rights, including non-exclusive royalty rights in copyright, in my proposals and I understand that I acquire no rights in publication of this standard in which my proposals in this or other similar analogous form is used. I hereby attest that I have the authority and am empowered to grant this copyright release.

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PLEASE SHIP TO: *StandardsAssist@gmail.com* Commenters are responsible for informing the standards assistant staff a when changing contact information or other preferences.

Notice regarding unresolved objections: While each committee seeks to resolve objections, please notify the committee responsible for an action or inaction if you desire to recirculate any unresolved objections to the committee for further consideration. Notice of right to appeal. (See Bylaws for the AARST Consortium on National Radon Standards - Operating Procedures for Appeals available at www.radonstandards.us, Standards Forum, Bylaws): (2.1) 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 Radon 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.

AARST Consortium on National Radon Standards

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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 Radon 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) 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 Radon Standards are available at 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 Radon 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."

Proposed Maintenance Updates for MS-QA 6/22

Radon Measurement Systems Quality Assurance

Commentary/Rationale: The proposed revision to Section 3.2 is to align with ANSI Essential Requirements 2021 when personal or product certifications or listings are required by a standard.

3.2 Approved Devices and Qualified Laboratories

Conformance with this standard requires the use of devices approved through a Device Evaluation Program and laboratories certified or accredited by a laboratory approval program that meets requirements:

a) as established in certification requirements of the National Radon Proficiency Program (NRPP), ~~or~~ the National Radon Safety Board (NRSB) or equivalent program that verifies compliance with the most current version of ANSI/AARST *MS-PC*; or

b) as required by local jurisdictions that have a program for evaluating and approving devices.

Footnote: [1] Note that identification of the two competing certification bodies listed is not an endorsement of either program.

Commentary/Rationale: A commenter expressed confusion, compared to EPA, on whether or not "Comparison checks" were required for each device or spread across several CRMs. Because EPA text recommended (i.e., should) rather than requiring dupes, they were confused by MS-PC.

4 CONTINUOUS RADON MONITORS (CRM) QC

All the requirements described in Section 3 apply to each individual CRM instrument. ~~CRMs, and field~~ Field operations for using CRM devices require QC procedures that include:

1. Instrument Checks
2. *Comparison Checks*, and
3. *Calibrations*

Commentary/Rationale: Comments had been received about an inconsistency relative to warning and control limits for duplicates where both test results are below 2 pCi/L. These proposed amendments seek to correct editorial mistakes that resulted in the inconsistency.

3.5 Default Minimum Criteria for Warning and Control Limits—Duplicates and Spikes

3.5.2 *Warning and Control Limits* for *Duplicate and Comparison Checks*

Minimum warning and control limits required in this standard are:

c) If the average of a *duplicate* pair or *comparison check* is less than 2 pCi/L (75 Bq/m^3), the warning limit is reached when there is a difference between the two results of more than 1.0 pCi/L (37 Bq/m^3). ~~, if either results are not less than the *minimum detectable concentration* (MDC).~~

4.2.3 *CRM Comparison Check—Warning and Control Limits*

In all cases, warning and control limits shall be equal to or more stringent than:

c) If the average of the two measurements is less than 2 pCi/L, ~~the criterion is met if the absolute value of the difference between the two results is less than 1.0 pCi/L, or both results are less than the *minimum detectable concentration* (MDC).~~ the warning limit is reached when there is a difference between the two results of more than 1.0 pCi/L (37 Bq/m^3).

Commentary/Rationale: Revisions above result in replicated changes to the following tables.

Table 4.1: Criterion for CRM Comparison Checks (Duplicates if identical systems)

Table 5.4: Criteria for Duplicates Using ATD, CAD and EIC Methods

Table 7.1: Temporary Default Criteria for Lab Duplicates/Recounts

Average Concentration	*Warning Limit RPD*	*Control Limit RPD*
< 2.0 pCi/L (< 75 Bq/m^3)	Absolute value of the difference between the results is > 1.0 pCi/L (37 Bq/m^3)~~, or both are less than the MDC~~	~~Absolute value of the difference between the results ≤ 1.0 pCi/L (37 Bq/m^3), or both are less than the MDC~~

DEFINITIONS

The following additions to definitions result from harmonization efforts with MS-PC 2022.

Alpha Track Detector (ATD): Radon detector constructed from a piece of plastic, typically of either allyl diglycol carbonate or cellulose nitrate, inside a chamber usually made of electrically conducting plastic. Radon diffuses passively into the chamber, where it subsequently decays. Alpha particles emitted from radon and two of its short-lived progeny, ^{218}Po and ^{214}Po, strike the plastic detector and create damaged volumes or "latent tracks." The plastic is etched in a caustic solution, which produces tracks that are visible with a microscope because the latent tracks are more soluble than the surrounding undamaged material in such a solution.
The plastic is scanned and the track density is determined in terms of tracks/mm^2. A calibration factor, determined through exposures of devices in a STAR, is used to convert the track density to a value of integrated concentration in the unit of Bq-h/m^3 or pCi-days/liter. The average radon concentration during the exposure is determined by dividing the integrated concentration by the length of time of the exposure.

Accuracy – the degree of agreement between the observed value (*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).

Aged Air – air that has been stored and isolated for at least 30 days before use to allow the radon in it to decay to an insignificant concentration.

Bias – systematic or persistent distortion of a measurement process that causes errors in one direction. Bias is determined by measuring the positive or negative difference from the conventionally true value, often as a percentage of the conventionally true value.

Conventionally True Value – the best estimate of the value of a quantity determined by a primary or secondary standard, or by a reference instrument that has been calibrated against a primary or secondary standard. For the purpose of this standard, the average radon concentration value reported by the facility that exposes a device in a STAR is considered to be the conventionally true value.

Measurement Method – the combination of air sample collection system design, detector technology and analysis procedure, including software, used in the instrumentation to make radon measurements.