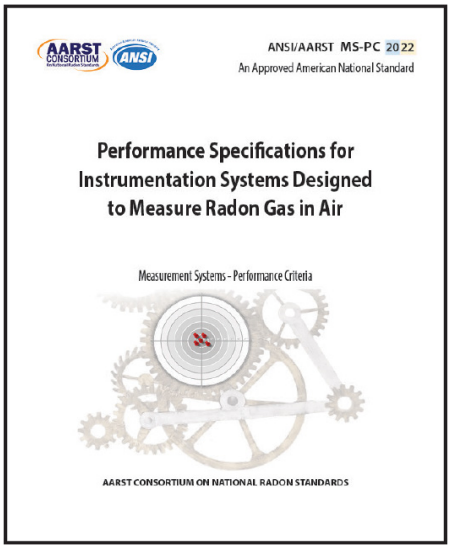
Public Review of more revisions to MS-PC 2022

Performance Specifications for Instrumentation Systems Designed to Measure Radon Gas in Air

The proposed revisions to MS-PC address two new chapters regarding consumer-grade electronic radon monitors. The purpose is to set precedence on appropriate quality, accuracy disclosures and uniform purchaser instructions for such monitors that lack critical features required for professional use monitors.

This standard specifies minimum performance criteria and testing procedures for instruments and/or systems designed to quantify the concentration of 222Rn gas in air. These are consistent with general performance criteria applicable to the wide variety of radon measurement devices used for indoor measurements, primarily in residential environments or buildings not associated with the possession or handling of radioactive materials. Also included is a description of documentation necessary for demonstration of compliance with this standard.



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Public Review: MS-PC 26-7

COMMENT DEADLINE: **August 3rd, 2026**

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

Public Reviewed Item and Its Date: MS-PC 26-7

- **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

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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 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.

Notices

Notice of right to appeal: Bylaws for the AARST Consortium on National 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 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."

10 CONSUMER-GRADE ELECTRONIC RADON MONITORS

Informative—Listed Consumer-Grade Electronic Radon Monitors are radon measurement devices that meet certain minimum performance criteria outlined in MS-PC but are not designed with functions to assure reliability of radon measurements, which are required for test devices used by measurement professionals. As such, measurements from these devices are not suitable as the sole measurement method for making decisions whether radon reduction (mitigation) is needed.

10.1 Compliance Assessment

These consumer-grade electronic radon monitors are not suitable for professional use because they are not configured to be calibrated in the future.

Because such devices sold to citizens still serve purposes of health and environmental protection, manufacturers desiring product listing to show a demonstrated level of quality shall enter into a contract with an independent program that requires compliance with this Section 10. The contract, as required in Section 11 (Proficiency Program Contract), shall establish a legal relationship that is consistent with contractual requirements established in ISO 17065 *(Conformity assessment — Requirements for bodies certifying products, processes and services)*.

10.2 Performance Criteria

The consumer-grade electronic radon monitors shall meet all requirements specified in Section 7 (Performance Testing and Testing Criteria), including STAR chamber evaluations, and in Section 8 (Documentation) for acceptable verification of quality.

10.3 User Instruction Pamphlet

An owner's manual shall be provided with each purchased device that includes all content required in this Section 10.3.

10.3.1 *Lettering and labeling*

The lettering for text required in Section 10.3 and 10.4 shall be of a color in contrast to the color of the background on which the lettering is applied, with lettering that is not less than 3/16 inch (5 mm) in height. Bold type indicated in these sections shall be rendered as bold type in the owner's manual.

10.3.2 *Specific user advisories*

The following or comparable text shall be provided in the user instruction pamphlet to include bold type as indicated.

> Device Name (e.g., ***The Radon 222 Monitor™***)
>
> The design of the *model name* monitor ™ has been independently verified, and the device purchased has been checked to be within ± 25% accuracy. This device will eventually lose this accuracy and it cannot be corrected.
>
> **Advisory #1: Do not** rely only on measurements from consumer-grade electronic radon monitors to make personal decisions, including during real estate transactions, for determining whether radon reduction (mitigation) is needed. It is recommended, before deciding whether mitigation is warranted, that a radon measurement be conducted by a professional or with professional-grade devices conducted in accordance with ANSI/AARST MAH standards of practice.
>
> **Advisory #2:** Conduct a side-by-side measurement with another radon measurement device or test kit that is approved for professional use:
>
> 1. Shortly after you receive your device, and
> 2. At least once every 12 months after that.

> Note—Many test kits listed for professional use are inexpensive.
> For test devices and laboratories nationally listed for professional use, see the National Radon Proficiency Program (NRPP) https://nrpp.info/ ; the National Radon Safety Board (NRSB) https://nrsb.org/ ; or contact your state radon office for further information https://sosradon.org/state-radon-contact-map .

10.3.3 *Specific QC instructions*

The following or equivalent text shall be provided in the user instruction pamphlet to include bold type as indicated.

> **Conducting side-by-side reliability tests:**
> Place the test devices side-by-side between 4 and 8 inches apart in the lowest level that could be occupied of the building. Windows and doors of the building must be closed other than normal entry and exit for 12 hours before and throughout the test period.
>
> 1. Start the test for the device approved for professional use, following instructions for that device. This test period must be at least 48 hours.
> 2. Then start the test for the *model name* monitor™ following instructions for "starting a new test".
> 3. After a period of not less than 48 hours or longer if required by the professional use device, stop the tests. Write down the average radon concentration indicated by *model name* monitor™. Once the results from the device approved for professional use are obtained, compare the results.
>
> If both test results are less than 4 pCi/L, it is difficult to judge reliability. If, however, test results greater than 4 pCi/L differ by more 25%, you may wish to conduct another side-by-side comparison test to validate the percentage of error being demonstrated by this individual *model name* monitor™. If the difference between the two devices exceeds 25%, consider replacing your monitor.

10.3.4 *Starting each new test*

The manufacturer shall provide clearly stated instructions on how to start and end each test event. The manufacturer shall also make it clear that without stopping the test, the test result is the average of the entire duration since the current test was started. The manufacturer shall supplement these instructions with clarification on the incremental durations during the test to achieve a reliable measurement value with a statistical error of < 14%.

10.3.5 *Device specifications*

User instructions provided with each purchased device shall include the device specifications in a table compliant with **Exhibit 10.3.5.** Other device specifications shall be provided in a different table, paragraph, or list.

Exhibit 10.3.5 Required device specifications to provide in instruction manuals

Model name **Monitor™ Specifications**	**Limits of this device**	
Minimum Test Duration for any statistically reliable value	4 pCi/L (150 Bq/m^3) _____[1] Hours	8 pCi/L (300 Bq/m^3) _____[1] Hours
Radon Sensitivity Range	Low: ____[2] pCi/L (____[2] Bq/m^3)	High: ____v pCi/L (____[2] Bq/m^3)
Temperature Limits	Low: _____[2]°F (_____[2]°C)	High: _____[2]°F (_____[2]°C)
Relative Humidity Limits	RH Low: _____[2] %	RH High: _____[2] %

Alert Features ❑ Yes ❑ No	Prior 24-hour average accessible	Alerts if ___[3] day average ≥ 4 pCi/L
Device Calibration Features	This device may lose accuracy over time and cannot be recalibrated to restore the accuracy of measurements	
Power Supply Specifications		

1 As determined by device sensitivity in counts per hour per pCi/L
2 As verified in documented evaluations
3 7 days, or the range of days, of elevated concentrations detected before alert features activate.

10.4 Validation of Specifications

In addition to evidence of quality required of professional listed devices, the manufacturer shall provide evidence before device listing for validating specifications, to include:

a. Device counts per hour (cph), per picocurie per liter (pCi/L)
The counts per hour per pCi/L will be compared by the proficiency program with the table to determine time durations required before the device provides acceptably accurate measurement values. These values shall be provided in the user pamphlet instructions; and

b. Each specification in **Exhibit 10.3.5.**

Table 10.4

Counts Per Hour (cph) entered in the first field of this table will produce statistical error regarding the test duration and as it applies to two different concentration values.

	Device Resolution		
	1	cph	Counts per hour per pCi/L
	4	8	Targeted pCi/L Values for Comparison
Hour	% Error	% Error	
1	50.0	35.4	Color Key (potential counting error)
2	35.4	25.0	Red is ≥ 14%
3	28.9	20.4	Orange is ≥ 10%
4	25.0	17.7	Light orange is ≥ 6%
5	22.4	15.8	Yellow is less than 6%
6	20.4	14.4	
7	18.9	13.4	
8	17.7	12.5	
9	16.7	11.8	
10	15.8	11.2	
11	15.1	10.7	
12	14.4	10.2	
13	13.9	9.8	
14	13.4	9.4	
15	12.9	9.1	
16	12.5	8.8	
17	12.1	8.6	
18	11.8	8.3	
19	11.5	8.1	
20	11.2	7.9	
21	10.9	7.7	
22	10.7	7.5	
23	10.4	7.4	
24	10.2	7.2	

10.5 Packaging and Advertisement Advisories

A logo provided by the proficiency program that lists the product as suitable for consumer use shall be printed on product packaging in a prominent location and provided in advertisements. The packaging shall be accompanied by the following or equivalent advisory "Not for professional or private use to determine whether radon reduction (mitigation) is needed, including during real estate transactions." Lettering size and format shall comply with **Section 10.3.1**.

10.6 Active Alert Features

Products marketed as active alert monitors suitable for warning occupants of a mitigation system failure require two features:

a) Quick accessibility to the average concentration for the previous 24 hours; and

b) Features that alert occupants or other responsible individuals if the average radon concentration across 7 days or similar delayed activation has met or exceeded the action level.

The alert mechanism shall include one or more of the following warning signals:

a) Audible notification that is clear and distinct; or

b) Visual light notification that is vividly observable; or

c) Notification by telemetric means, such as by email or other electronic communication.

10.7 Manufacturing Quality Control

10.7.1 ***Quality Assurance Programs***

Manufacturers shall create, maintain, and retain evidence of complying with a quality assurance program (QAP) that outlines quality control procedures for each component within the monitor. The QAP shall be provided with applications for listing. An updated QAP shall be provided to the proficiency program listing the device to include disclosure, descriptions, and technical reports that validate continued measurement reliability whenever the device listed is modified.

10.7.2 ***Batch Verification Checks***

All devices sold shall have been checked for producing measured values individually or as a batch in a chamber or other known radon environment that is related, or traced, with an unbroken chain of documentation and associated estimates of uncertainty, to a standard maintained by a nationally or internationally recognized reference facility. The measurement devices monitoring concentrations in the chamber or radon environment shall be acceptable to the proficiency program as suitable for this purpose.

10.7.2.1 ***Environment/Chamber***

The chamber concentration for verification shall be between 10 and 80 pCi/L. Calibration durations shall be 24 hours or longer, starting after the radon and decay product concentrations in the detection volume of the instrument monitoring the environment have reached equilibrium, and the device checked has reached count-rate equilibrium. Sufficient counts shall be accrued during the calibration exposure to ensure that the uncertainty due too few counts (i.e., counting statistics) is not the largest component of uncertainty.

If there are documented evaluations, such as from the manufacturer, demonstrating the lack of effect of an interference, such as temperature or relative humidity, and such evaluation reports are available to auditors or other credentialing authorities (subject to confidentiality agreements), then calibration for these devices does not need to include exposures in different magnitudes of these interferences.

10.7.7 *Acceptability for Sales*

Listed devices that respond with greater than 25% relative percent difference from the monitored environment during the event shall not be sold. It is permissible to sell devices that have been adjusted and rechecked to demonstrate they have met the 25% relative percent difference requirement.

11 PROFICIENCY PROGRAM CONTRACT

11.1 Applicability

ANSI/AARST MS-PC only requires proficiency programs to have a contractual relationship with manufacturers if establishing a program for listing or otherwise recognizing Consumer-Grade Electronic Radon Monitors as described in **Section 10.1 (Compliance Assessment)**.

The contractual relationship required in **Section 10.1** shall address the provisions specified in this **Section 11** and be consistent with the requirements established in ISO 17065 *(Conformity assessment — Requirements for bodies certifying products, processes and services)*.

11.2 Legal responsibility

The proficiency program shall be a legal entity.

11.3 Listing agreement

11.3.1 The proficiency program shall have a legally enforceable agreement for the provision of listing each Consumer-Grade Electronic Radon Monitor.

11.3.2 The proficiency program shall ensure its listing agreement requires that the manufacturer comply, at a minimum, with the following:

a) the manufacturer of the radon monitor fulfils the listing requirements, which shall include compliance with all provisions in **Section 10 (Consumer-Grade Electronic Radon Monitors)** of the latest publication of ANSI/AARST MS-PC and implementing appropriate changes when the proficiency program communicates them;

b) the manufacturer does not make claims regarding the radon monitor that are not consistent with the scope of the listing. Consumer-Grade Electronic Radon Monitors shall be denoted as "Listed" and **shall not** be described as "Approved" or any other term that indicates endorsement of the product.

c) the manufacturer does not use its product listing in such a manner as to bring the proficiency program into disrepute and does not make any statement regarding its product listing that the proficiency program may consider misleading or unauthorized;

d) upon suspension, withdrawal, or termination of listing, the manufacturer discontinues its use of all advertising matter that contains any reference thereto and takes action as required by the proficiency program (e.g. the return of listing documents) and takes any other required measure;

e) the manufacturer informs the proficiency program, without delay, of changes that may affect its ability to conform to the proficiency program requirements.

11.4 The proficiency program shall exercise the control as specified by the listing program scheme over ownership, use, and display of any mechanisms for indicating a product is listed.

11.5 Incorrect references to the listing program scheme, or misleading use of licenses, certificates, marks, or any other mechanism for indicating a product is listed, found in documentation or other publicity, shall be dealt with by suitable action as determined by the proficiency program.