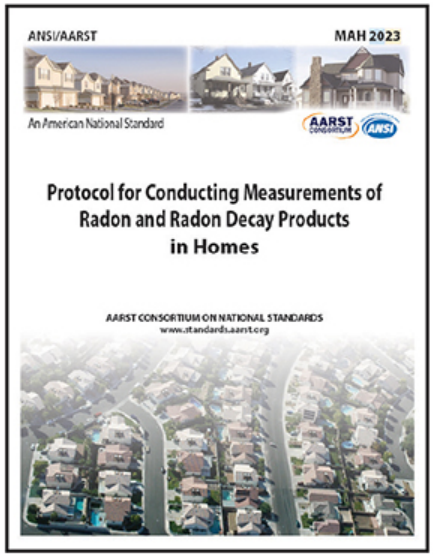
Public Review of Proposed Addenda Updates to MAH 2023

Protocol for Conducting Measurements of Radon and Radon Decay Products in Homes.

Consistent with our continuous maintenance program, the proposed revisions are primarily the result of public comments. The process is directed improving ANSI/AARST MAH 2023.



This standard of practice specifies procedures and minimum requirements when measuring radon concentrations in single-family residences for determining if radon mitigation is necessary to protect current and future occupants.

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

Public Review: MAH addenda 26-08

COMMENT DEADLINE: **September 28, 2026**

REQUESTED PROCESS AND FORM FOR FORMAL PUBLIC REVIEW COMMENTS

Submittals (MS Word preferred) may be attached by email to standards@aarst.org

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, use 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: *MAH addenda 26-8*

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

Repeat the four bullet items above for each comment.

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

Rights to Appeal: All directly and materially interested parties who have been, or will be, adversely affected by a decision made by a Standards Development Committee (SDC) or the Consortium Executive Stakeholder Committee (ESC) in the implementation of AARST Consortium on National Standards procedures have the right to appeal.

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MAH Addenda 2

TOPIC 1 TESTING PROTOCOL (REAL ESTATE)

These revisions clarify for all parties which protocol is required for home sales.

3.0 CHOOSING A TEST LOCATION

2.5.1 *Test options*

Testing is to be conducted in accordance with procedures required in either:

a) Table 5.2—Time-sensitive testing protocol where a single testing event is used to quickly determine if mitigation is necessary. This protocol is for situations where mitigation decisions are needed relatively quickly, such as within several days or weeks. For tests conducted in relationship to a home sale, the time-sensitive testing protocol is required in order to be acceptable.

TOPIC 2 WHERE TO TEST

These revisions speak to changing all initial tests to include ground contact locations with advisories that other locations may also be considered. This change will reduce confusion of where to test as well as help avoid misleading test results that can often occur in other portions of a building.

3.1 Choosing a Floor or Level of a Home

3.1.1 ~~*Time-sensitive testing protocol*~~

A test is to be conducted in the lowest level of the home that could be occupied. If the lowest level is not finished but could serve as a work area, playroom, or extra bedroom ~~at some time in the future, then~~ , a test is to be conducted in this level of the home.

Note—For those who do not expect to spend much time in the lowest level, consider also testing in an upper lived-in area of the home. Testing other ground contact rooms and rooms over crawl spaces should also be considered.

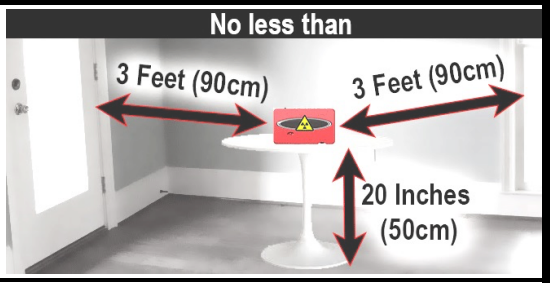
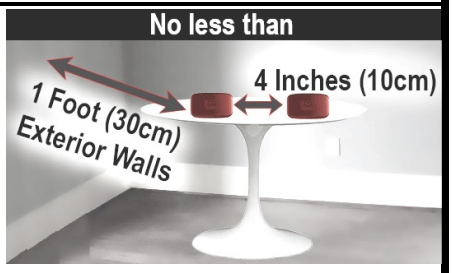
~~3.1.2 *Extended testing protocol*~~

~~When there are no immediate time constraints, a test is to be conducted in the lowest level of the home that is occupied. If the lowest level serves as a work area, playroom or an additional bedroom, a test is to be conducted in this level of the home.~~

~~*Informative Advisory* Tests conducted in areas above a basement can fail to characterize a radon hazard if heating systems are not active during the test. For this situation, it is best to test when the heating systems are active or in the lowest level that could be occupied.~~

TOPIC 3 TESTS CONDUCTED NEAR DRAINS

These revisions add a distance between test devices and observable and potential openings to soil.

Table 3.3	***Requirements for Test Locations Within a Room***
Detectors shall be located NOT less than:	▪ 3 feet (90 cm) from exterior doors, windows or other potential openings to the outdoors. ▪ 3 feet (90 cm) from large openings to soil and any plumbing drains and floor drains. ▪ 20 inches (50 cm) above the floor.  ▪ *1 foot (30 cm) from the exterior wall of the building.* ▪ *1 foot (30 cm) below the ceiling.* ▪ *4 inches (10 cm) from other test detectors and objects or surfaces that are above or to the side of the detector.*  *Exception: Less than 4 inches (10 cm) is permitted for detectors that are not affected by nearby proximity to other objects. Confirm manufacturer or laboratory requirements or recommendations prior to exercising this exception.*

TOPIC 4 ERV

These revisions attempt to clarify concerns when HVAC equipment is temporarily adding ventilation that is a condition that is not representative of average occupied conditions.

4.1 Closed-Building Protocol Requirements

Closed-building conditions, as they are for occupied conditions in winter heating seasons or summer cooling seasons, are required when short-term test results are used for mitigation decisions. Closed-building conditions in accordance with Tables 4-A, 4-B and Exhibit 1 are required to be:

a) initiated 12 hours prior to the test for tests lasting less than 72 hours; and

b) maintained throughout the test period for tests lasting 2 to 90 days.

Table 4-A	**ESSENTIAL CLOSED-BUILDING PROTOCOL REQUIREMENTS**
Windows	Keep closed on all levels of the building including areas not being tested
Exterior doors (except for momentary entry and exit)	
Heating and cooling systems	Set to normal occupied operating conditions with temperature settings between 65˚and 80˚ F (18˚ - 27˚ C)

Equipment that, for seasonal comfort or energy savings, increases the amount of outdoor air entering the building	Do not operate unless set to operate only at the lowest ventilation rate that occurs most of the year
Whole-house attic or window fans	Do not operate
Fireplaces (that burn solid, liquid or gas fuels unless a primary/normal source of heat for the building)	
Clothes dryers, range hoods and bathroom fans	Avoid excessive operation
Required building operation also includes components itemized for clarification in Exhibit 1	

EXHIBIT 1. Additional Clarification ON CLOSED BUILDING PROTOCOL Requirements

Mechanical Ventilation Systems that can temporarily ventilate with outdoor air for seasonal comfort or energy savings	
Window air conditioners	**Operate in recirculation mode only**
Evaporative cooling systems (e.g., swamp coolers)	**Do not operate and do not cover**
Energy recovery or heat recovery ventilators	**Do not operate** **Operation of permanently installed ventilation systems that bring outdoor air into the home throughout the year is only permitted to continue during the test so long as:** **a) the system is set to the lowest ventilation condition that occurs most the year ~~for any season,~~ and** **b) all thermostats in the building are set to normal occupiable temperatures.**

TOPIC 5 POST-MIT TEST LOCATIONS

These revisions clarify the need to identify while setting test devices if a mitigation system is present.

6.0 CONDUCTING THE TEST

6.1 Verify Compliance with Required Test Conditions

6.1.4 *Mitigation systems*

An inspection for determining if the building has a mitigation system and if it is operating is to be conducted before starting the test.

TOPIC 6 POST-MIT TEST LOCATIONS

These revisions clarify a required location for post-mitigation and other test locations to consider.

7.3.3 *Where to retest after mitigation*

Evaluations for the effectiveness of mitigation efforts or systems **shall** include conducting a test ~~to be conducted in the same location(s) as the pre-mitigation test(s) or~~ in the lowest level that could be occupied as required in Section 3.1. . ~~to help ensure the safety of current and future occupants who may use these areas~~.

To conduct a complete evaluation, testing is to be conducted:

a) in ~~the same~~ other location(s) ~~as the~~ where pre-mitigation test(s) were conducted

~~In addition, a post-mitigation test is to be conducted~~

b) in the lowest livable area above any crawl space that is structurally isolated from occupiable or tested rooms and,

c) in the room(s) immediately adjacent to the outside exhaust air location for ASD where mitigation systems exhaust below the roof.

~~Informative Advisory - When an ASD system exhausts below the roof, it is recommended to conduct an additional test in the room(s) immediately adjoining the outside exhaust location.~~

TOPIC 7 TEST DEVICE USE AND QA PLANS

These revisions clarify for testing professionals two overall requirements and several quality assurance requirements

8.0 ADDITIONAL PROTOCOLS FOR PROFESSIONAL SERVICES

8.1 Qualified Measurement Services

To be considered qualified for providing measurement services in homes, the person(s) or team, regardless of business organizational structure, **shall** operate under a quality assurance plan that includes the following requirements for quality of personnel and practices:

a) Operations **shall** be conducted under the responsible charge of a qualified measurement professional;

b) Test devices **shall** be used in compliance with both this standard and instructions provided by the manufacturer that relate to device-specific needs;

c) Individuals who place and retrieve radon measurement devices **shall** be qualified for their apportioned task, as permitted by statute, state licensure or certification program; and

d) Individuals deemed qualified to place, retrieve, and analyze data obtained from radon measurement devices **shall** be qualified measurement professionals.

8.2 Measurement Strategy for Home Sales

For tests conducted ~~during~~ in relationship to a home sale, testing strategies outlined in Section 5.2 for Time-Sensitive Testing **are required** in addition to, or as required by local statutes where applicable.

8.1.2 *QA plans are required*

Any person or entity providing radon measurement services **shall** establish, maintain, and follow a quality assurance program that is compliant with ~~reflective of national requirements such as found in the~~ ANSI/AARST MS-QA (Radon Measurement Systems Quality Assurance) or a similar program as required by the authority having jurisdiction (AHJ) where the test is being conducted. The program **shall** comply with requirements in a) and b) of this Section 8.1.2.

a) The quality assurance program **shall** include written procedures and ongoing evidence for meeting quality assurance objectives that, among other things, include a system to record and monitor:
   1. results of quality control check measurements,
   2. training and qualifications of staff, and
   3. protocol compliance and chain of custody.

b) Quality control check measurements for persons or entities conducting radon measurement services in homes and other buildings **shall** include:
   1. Annual Calibration and 10% comparison checks for each continuous monitor instrument; and
   2. 10% duplicate measurements, 5% blanks measurements and 3% spiked measurements for passive devices as defined in Section 2.3.3 (Test device types)

   Note—Section B of the attached MAH Companion Guidance provides descriptions of quality control check measurements.

TOPIC 8 TEST DEVICE USE AND QA PLANS

These revisions clarify for testing professional two overall requirements and several quality assurance requirements

8.3 Prior Notification

Because failure to comply with required conditions often occurs when residents are not properly informed about the necessary test conditions for test durations lasting up to 90 days, procedures for notification **shall** comply with requirements in a), b) and c) of this Section 8.3.

a) Responsible notification includes determining whether the building is new, occupied, and who will be responsible for closed-building conditions prior to and during the measurement period;

b) Information about required test conditions **shall** be communicated in writing when practicable ~~and documented in records~~ to the person responsible for the home prior to the 12-hour closed-building requirement; ~~and~~ ~~t~~ The notification event **shall** be documented in test site records; and

c) Communications to clients or parties responsible for the property **shall** include essential elements of closed-building requirements portrayed in Table 4-A.

   Note—Exhibit 2 provides an example of a written notice that complies with this requirement.

8.4 Minimum Requirements for Efforts to Verify Test Conditions

To fulfill minimum requirements for verifying test conditions for test durations lasting up to 90 days, all of the following steps are **required**:

a) Inform the person responsible for building operation of the required test conditions.

b) Post notification of a Radon Test in Progress in conspicuous locations stating the required conditions of the test as portrayed in Table 4-A.

   Note—Exhibit 4 provides an example door hanger notice that complies with this requirement.

c) Request a signature on a noninterference agreement and note in the report if this document was not signed.

TOPIC 9 RELIABILITY OF MEASUREMENTS

These revisions clarify how several details are to be reported.

8.5 Test Reports

Results **shall** be provided in a report that meets requirements in 8.5.1 through 8.5.9.

8.5.2 *Measurement results*

Test reports **shall** comply with all of the following requirements.

a) The test report **shall** contain the result for each measurement location. The report **shall** also include:

1. the detector model or type, the detector serial number(s) and the name and identification number of the service or organization used to analyze detectors; ~~and~~
2. the beginning and ending dates and times of the exposure period; and ~~information on the detector locations such as a diagram, photos, or narrative description~~
3. narrative description for the test locations, to include floor level and room tested. It is permitted to additionally provide diagrams or photos.

8.5.3 *Continuous monitor reports*

Additional requirements for continuous radon monitor test results include:

a) hourly data **shall** ~~either~~ be included in the test report ~~or provided to the client upon request~~;

~~b) the calibration date of continuous monitor(s) shall be included on the test report; and~~

b) the expiration date that is one year after the instrument's most recent calibration **shall** be included on the test report; and

c) removal of portions of hourly data imbedded within the contiguous sampling period reported (such as to account for weather or other conditions) **shall** invalidate the measurement.

Exceptions:

1. The first 4 hours of data after starting a test are to not be used ~~be discarded~~ in calculating the reported test result or incorporated into the result using system correction factors (EPA 402-R-92-004, EPA 1992);
2. The first 12 or more hours after starting a test are to not be used ~~be discarded~~ in calculating the reported test result average ~~as required~~ for meeting closed-building requirements in Sections 4, 6.1.2 and 7.3.2 b; and
3. The first 24 or more hours after starting a test are to not be used ~~be discarded~~ in calculating the reported test result average as required in Section 7.3.2 b after activation of a mitigation system fan or completion of other mitigation efforts, for evaluation of post-mitigation effectiveness.

8.5.3.1 Where hourly data is not used in calculating the reported test result average, the report **shall** include a statement for which data was not used and the reason why.

~~8.5.4 *Reliability of the measurements*~~

~~A specific client occupant advisory and description shall be included in the test report of observed building conditions or other factors that may cause the test to not reflect the client's risk from radon.~~

~~8.5.5 *Quality control of test conditions*~~

~~Quality control records when testing homes shall include records of observed test conditions, as specified in Table 8.5.4. These test event records shall be either included in the test report or provided to the client upon request.~~

8.5.4 *Reliability of the measurements*

Quality control records when testing homes for test durations lasting up to 90 days **shall** include records of observed test conditions, as specified in Table 8.5.4. These test event records **shall** be either included in the test report or provided to the client upon request. An ~~specific client~~ occupant advisory and description to include what actions were taken **shall** be included in the test report for any of the observed building conditions identified in Table 8.5.4 that may cause the test not to reflect ~~the client's~~ occupant risk from radon.

Table 8.5.4 Quality Control Records / Test Conditions	*Example Test Event Log Y = to report*
8.5.4.1 Temporary Conditions	
1. The home ~~was vacant and~~ not operated under occupied operating conditions;	❑Y ❑N ❑NA ❑U
2. Systems were temporarily ventilating with outdoor air for seasonal comfort or energy savings during the test period, including:	❑Y ❑N ❑NA ❑U
a. Closable passive crawl space vents that were open during the test but would be closed more than 50% of the year for energy savings, comfort or to prevent frozen pipes,	❑Y ❑N ❑NA ❑U
b. Window air conditioners did not have closed outside air dampers,	❑Y ❑N ❑NA ❑U
c. Evaporative cooling systems were operating or not covered,	❑Y ❑N ❑NA ❑U
d. Energy recovery ventilators, heat recovery ventilators or economizer ventilation systems:	❑Y ❑N ❑NA ❑U
— Was an ERV or HRV operating.	
If so, what was the system ventilation setting. ~~the system was not set to the lowest outdoor air ventilation rate that occurs most all seasons. the year~~	❑Y ❑N ❑NA ❑U
— not all thermostats in areas served by these systems were set to normal occupiable temperatures;	❑Y ❑N ❑NA ❑U
3. Sub-slab return ducts were observed; and	❑Y ❑N ❑NA ❑U
4. Weather events occurred that were unusually severe for local weather.	❑Y ❑N ❑NA ❑U
8.5.4.2 Deviations from Protocol	
1. Observed noncompliance with required conditions, such as closed-building conditions 12 hours prior to, or during the test period;	❑Y ❑N ❑NA ❑U
2. Observed deviation from a normal occupiable indoor temperature; and	❑Y ❑N ❑NA ❑U
3. Noninterference controls indicate concerns regarding protocol compliance. *Note—Non-interference controls can include moved devices, compromised tamper seals and observed anomalies in test data.*	❑Y ❑N ❑NA ❑U
Non-interference agreement not signed or refusal to sign such agreement	❑Y ❑N ❑NA ❑U

Note—For this example method of logging observed conditions: Y=yes, N=no, NA=not applicable and U=unknown.

TOPIC 10 MITIGATION OBSERVATIONS

These revisions clarify how observance of mitigation systems are to be reported.

8.5.6 *Report radon mitigation system status (if applicable)*

Quality control records when testing homes **shall** include records of observed test conditions, as specified in Table 8.5.6. Where a mitigation system or efforts to mitigate radon are observed, the test report **shall** include:

a) a statement that a mitigation system was observed and whether it appeared to be operating.

b) a statement regarding the condition of any temporary or passive radon mitigation strategies that are not permanent installations, and

c) a statement on the limits of the inspection. Providing a statement in the report that the test company offers no findings as to the proper installation and operation of the mitigation system is permitted.

8.5.6.1 A description **shall** be included in the test report for any of the observed conditions identified in Table 8.5.6.

Note—Section A of the attached MAH Companion Guidance provides general inspection considerations for radon mitigation systems.

Table 8.5.6	**Quality Control Records / Mitigation Systems/Efforts**	*Example Test Event Log*
	Mitigation System Observed	
ASD System(s)		
1.	Did you witness an ASD mitigation system?	❑Y ❑N
2.	Did it appear operational?	❑Y ❑N ❑NA ❑U
3.	Any concerns observed?	*Specify*
	Other mitigation systems/efforts	
1.	Did you witness a passive mitigation system?	❑Y ❑N ❑U
2.	Did you witness active mitigation efforts that were not ASD?	❑Y ❑N ❑U
3.	Did you witness any temporary mitigation efforts that are not permanent modifications to the building?	❑Y ❑N ❑U
4.	Any concerns observed?	*Specify*

Note—For this example method of logging observed conditions: Y=yes, N=no, NA=not applicable and U=unknown.

TOPIC 11 LONG-TERM GUIDANCE (HARMONIZE)

These revisions clarify the difference between required retests and retests recommended when the degree changed conditions may be more difficult to pinpoint.

Table 8-B **Reporting Low Concentrations**

EQUIVALENT STATEMENTS FOR THESE ADVISORIES SHALL BE INCLUDED IN THE REPORT

- Consider fixing the building if test results indicate radon concentrations greater than half the action level, (e.g., between 2 and 4 pCi/L).
- Note that tests conducted when heating systems are active both day and night are more likely to provide a clear characterization of potential radon hazards.

Advisories required regarding continued protection against long-term exposure to a radon hazard

- Retest the building at least every 5 years or, to verify continued effectiveness of radon mitigation systems or efforts, at least every 2 years.
- Retest in conjunction with any sale of new or existing buildings.
- ~~In addition, be certain to test again when any of the following circumstances occur:~~
- Retest after a new addition is constructed or alterations for building reconfiguration or rehabilitation occur;
- Retest if a ground contact area not previously tested is occupied, or a home is newly occupied.
- Where the following changes to the structure are observed and substantial, testing to verify continued low exposure to radon gas should be considered:
  - ✓ heating or cooling systems are significantly altered, resulting in changes to air pressures or pressure relationships;
  - ✓ ventilation is significantly altered by extensive weatherization, changes to mechanical systems or comparable procedures;
  - ✓ significant openings to soil occur due to:
    - groundwater or slab surface water control systems that are altered or added, ~~(e.g.,~~ such as sumps, perimeter drain tile, shower/tub retrofits, etc.; or,
    - natural settlement causing major cracks to develop;
  - ✓ earthquakes, construction blasting, or formation of sink holes nearby; or
  - ✓ a mitigation system is altered~~,~~ or modified ~~or repaired~~.

~~‡ Note – Where appropriate, recommendations can include retesting within a year during a condition time that more closely aligns with the building operating condition that lasts the longest each year based on descriptions provided in predominant normal occupied building operating condition, as described in informational Table 7.2.2 b. Recommendations can further include guidance on test durations for such testing that are longer than 7 days.~~

These revisions speak to clarifying

8.5.9 *Statement of Test Limitations*

The report **shall** describe the general limitations of the test. An example is the following statement: "There is an uncertainty with any measurement result due to ~~statistical variations and other~~ a variety of factors that cause ~~such as~~ daily and seasonal variations in radon concentrations. ~~Variations may be due to~~ Such factors may include changes in the weather, operation of the dwelling, or even possible interference with the necessary test conditions."

~~Informative Advisory - The report should describe the general limitations of the test. An example is the following: "There is an uncertainty with any measurement result due to statistical variations and other factors such as daily and seasonal variations in radon concentrations. Variations may be due to changes in the weather, operation of the dwelling, or possible interference with the necessary test conditions."~~