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## Connecticut Department of Public Health School Radon Testing Guidance

*Purpose: This fact sheet has been prepared to provide AARST-NRPP and/or NRSB certified radon measurement professionals with instructions on how to properly test for the presence of radon in schools in Connecticut.*

### **Background**

- Radon is a naturally occurring radioactive gas that can cause lung cancer. It comes from the natural breakdown of uranium which is found in soil and rock all over the United States. Radon travels through soil and enters buildings through cracks and other holes in the foundation.
- Radon is colorless, odorless, and tasteless. Therefore, the only way to know whether an elevated level of radon is present in any room of a school is to test.
- The EPA's investigations of radon in schools were initiated in 1988 with a study of schools in Fairfax County, Virginia. As the result of a nationwide survey of radon levels in schools, it is estimated that nearly one in five U.S. schools have at least one ground contact room with short-term radon levels above 4.0 pCi/L; the level at which the EPA suggests mitigation.
- It is recommended that all schools nationwide be tested for radon. The EPA estimates that more than 70,000 schoolrooms in use today have high short-term radon levels.
- According to Connecticut General Statute Section 10-220(d)(2), *'prior to January 1, 2008, and every three years thereafter, for every school building that is or has been constructed, extended, renovated, or replaced on or after January 1, 2003 a local or regional board of education shall provide for a uniform inspection and evaluation program of the indoor air quality within such buildings,... The inspection shall include,... (B) radon levels in the air;...'*

### Initial Approach

- Meet with the school's facility manager to obtain a small floor plan of the building and to discuss school structure and dynamics. Ask if school is under renovation currently or renovations are planned for the near future. Also, meet with school's principle or superintendent to discuss the EPA's protocols regarding communication with students, parents, and staff.
- Conduct a walk-through inspection to determine testing areas and record the information on the floor plan of the building.
- The school administration shall conduct an informational meeting with representatives of parent and teacher organizations to provide an overview of the scheduled radon testing. The individual responsible for radon testing should attend to address any questions/concerns.
- Two weeks prior to the scheduled radon testing, the school administration shall notify parents of students and staff with a letter (Attachment A) informing them of the scheduled radon testing accompanied by appropriate radon educational materials (Attachment B).

***Radon in Schools*** pamphlets can be obtained by calling the DPH Radon Program in advance. An electronic version can be emailed for distribution to staff and hard copies are available for distribution to parents.

**Initial Testing**  
*Placement of Testing Devices*

**Number of Test Kits Needed:**

- Obtain enough short-term passive test devices to conduct initial radon testing in all frequently occupiable rooms that come in contact with the ground within the school. In other words, the lowest occupiable level will be tested unless the school is built into a hillside in which case upper floors may need to be tested as well. Frequently occupiable rooms are usually classrooms, offices, laboratories, cafeterias, libraries, and gymnasiums. Areas such as rest rooms, hallways, stairwells, elevator shafts, utility closets, and storage closets need not be tested. Use the attached worksheet to calculate the number of test kits required (Attachment C).
- Duplicates and blanks shall accompany all testing activities to provide assurance of the quality of the measurements.
  - Duplicates are pairs of detectors deployed in the same location, side-by-side, and 4 inches apart for the same measurement period. They shall be placed in **10%** of all measurement locations in a school building to measure precision.
  - Blanks are used to determine whether the manufacturing, shipping, storage, or processing of the detector has affected the accuracy of the measurements. Blanks are unwrapped but not opened and immediately rewrapped at the end of the exposure period. The number of blanks shall be **5%** of the detectors deployed or 25 whichever is less.

Duplicate and blank testing devices must be shipped and labeled in the same manner as the other testing devices so that the analytical laboratory cannot distinguish them. For example, a test device is placed in Room 233 accompanied by a duplicate test device. The location name marked on the tracking sheet for the first device is "Room 233" while the location name marked on the tracking sheet for the duplicate device is "Room 233D". In other words, a duplicate location name of "Duplicate of Room 233" is not acceptable. Blanks should be named in a similar way, such as "Room 233B" as opposed to "Blank of Room 233".

- Spikes shall be included in one testing activity per month to measure bias in the normal measurement process. Count the total number of test devices placed in all the schools where testing has occurred or is planned for the designated month. The number of spikes shall be **3%** of the detectors deployed during that month, with a maximum of 6 per month.
  - Spikes are used to measure bias. Ask your device manufacturer for a spiking service referral and use a private radon chamber (laboratory). Bowser-Morner, Inc. of Ohio is an example of a company that provides this service.

Spikes are test devices sent to a spike service laboratory for spiking in a radon chamber. The test devices will be exposed in the chamber at a certain level that will be provided

by the spike service laboratory. The test devices should be exposed in the chamber for the same amount of time you plan on conducting testing in your designated school. The spiked test devices shall be shipped via overnight delivery to arrive in time to include in your sample shipment.

Like duplicates and blanks, the spiked test devices must be shipped and labeled in the same manner as the other testing devices so that the analytical laboratory cannot distinguish them. The spiked test devices shall be named to be recognized by the tester but blind to the lab.

#### **Test Conditions Needed:**

- Testing shall be preceded by 12 hours of closed building conditions.
- Testing shall be conducted:
  - Under closed conditions for a minimum of 48 hours,
  - During the coldest months of the year (November 1<sup>st</sup> - March 31<sup>st</sup>), and
  - During weekdays while school is in session with HVAC systems operating normally.
- Testing shall **not** be conducted:
  - During abnormal weather conditions such as major storms or high winds,
  - During structural changes to a school building and/or the renovation, or
  - During replacement of the HVAC system(s).

#### **How to Test:**

- All school rooms must be tested on the same start date. Canister identification numbers, locations, and start date/time will be recorded on a device tracking sheet (Attachment D).
- Use a brightly colored warning sheet to place beneath the test device (Attachment E).

- Test devices must be placed:
  - away from any drafts, vents, appliances (e.g., computers, projectors, etc.),
  - 20 inches above the floor,
  - 3 feet away from any exterior doors or windows,
  - 3 feet away from any exterior or interior wall,
  - 4 inches away from other objects,
  - away from heat, areas of high humidity, out of direct sunlight, and where they are least likely to be disturbed.

The devices should be left in place for three or four days to ensure optimum results (testing should take place over at least 2 days (48 hours) but shall not exceed 7 days).

For larger spaces, place one detector for every 2,000 square feet.

#### **Retrieval of Testing Devices**

- Retrieve all testing devices from each location in the school building on the same day and complete the device tracking sheets by marking down the end date/time.
  - Make comments if the devices appear to have been tampered with or if windows are found to be open instead of closed.
- Make photocopies of the tracking sheets to keep as a record of the testing event.
- Package all testing devices neatly and securely to ensure proper shipment. Mail devices to the analytical laboratory immediately after retrieval or the next morning at the latest. Be sure each shipment parcel contains a copy of the tracking sheets.
  - Overnight or two-day delivery is preferred for out-of-state labs.
  - Communicate with the analytical laboratory to inquire about preferences for shipping methods and to provide the lab with a schedule of your planned testing activities.

### Interpretation of Initial Results

- Review the results of the initial testing and highlight any results that are at or above 4.0 pCi/L.
- Compare the duplicate results by calculating the Relative Percent Difference (RPD).

$$RPD = \frac{|Initial\ Result - Duplicate\ Result|}{Average\ of\ Both\ Results} \times 100$$

If results over 4.0 pCi/L differ by 25% or more, the data quality should be questioned. In this case, you should call the processing laboratory to investigate the situation further and notify the school that a few results are in question; therefore, the room associated with the questionable duplicate may need to be retested.

- Check to be sure that the blank results are at or near 0.0 pCi/L to ensure accuracy of the device. If they are not, call the analytical laboratory and/or test device supplier to investigate further and notify the school that the problem is being investigated.
- Check to be sure that the spike results are accurate by calculating how close the measured value is to the target value.

$$\frac{Target\ Value - Measured\ Value}{Target\ Value}$$

The calculation should be  $\pm 10\%$ . If the measured value is way off from the target value, investigate further and notify the school that the problem is being investigated.

- Obtain additional short-term test devices for follow-up testing in rooms with radon results at or above 4.0 pCi/L. Do not forget to include additional QA/QC measurements (duplicates and blanks).
- Provide a summary of initial test results to the school administration.
- If initial test results are over 20 pCi/L, the school administration shall notify parents and staff as soon as possible, but no later than one week after results have been received.

**Note:** The EPA does not recommend that schools use a single short-term test as the basis for determining whether action needs to be taken to reduce radon levels. A follow-up measurement to confirm an initial short-term measurement of 4.0 pCi/L or higher should be conducted before making such a decision.

### **Follow-Up Measurements**

- Follow-up testing (when needed) shall start within one month after receiving the initial test results. Follow-up testing must be made in the same location and under the same conditions as the initial measurement.

### **Interpretation of Follow-Up Test Results**

- Take action to reduce the radon level if the average of the initial and follow-up measurement is 4.0 pCi/L or more.
- Provide school administration with a complete report that includes all results and interpretations.
- Recommend that school administration hire a radon mitigation professional certified by AARST-NRPP and/or NRSB to reduce elevated radon levels identified through testing. The CT DPH list of qualified professionals can be found on the Program website: [www.ct.gov/radon](http://www.ct.gov/radon). This list is updated regularly so be sure to obtain the most recently revised copy to provide to the school.

### **Completion and Reporting**

- Fill out and sign the CT DPH *Initial School Radon Measurement Report Form* (Attachment F). The form shall be sent within five working days of providing the school with a complete report. The form should be emailed or sent to the following address:

Attn: School Radon Testing Program  
Connecticut Department of Public Health, Radon Program  
410 Capitol Avenue, MS # 12-RAD  
P.O. Box 340308  
Hartford, CT 06134

[DPH.RadonReports@ct.gov](mailto:DPH.RadonReports@ct.gov)

If you email the reporting form, do not also send a hard copy in the mail.

- School administrators shall notify parents and staff of radon testing results in a brief summary as soon as possible but no later than one month after follow-up test results are received. A copy of the complete report shall be kept in the main office of the school for parents and staff to view. If elevated radon levels exist, the notification should include the school's plan to reduce the levels.

### Re-Evaluation

- School rooms with radon mitigation systems require re-evaluation of the mitigated rooms every two years to ensure the system is working to reduce the radon levels. This is considered part of system maintenance and does not require a re-evaluation form to be filled out.
- School rooms NOT needing mitigation require a re-evaluation every three years in 10% of the original rooms tested and a different 10% in each future re-evaluation period. Fill out and sign the *School Radon Re-Evaluation Report Form* (Attachment F). The form shall be sent within five working days of providing the school with the radon results. The form should be emailed or sent to the following address:

Attn: School Radon Testing Program  
Connecticut Department of Public Health, Radon Program  
410 Capitol Avenue, MS # 12-RAD  
P.O. Box 340308  
Hartford, CT 06134

[DPH.RadonReports@ct.gov](mailto:DPH.RadonReports@ct.gov)

If you email the form, do not also send a hard copy in the mail.

**For more information or technical guidance, please contact the State of Connecticut  
Department of Public Health Radon Program at:**

**Phone: 860-509-7300**

**Email: [DPH.RadonReports@ct.gov](mailto:DPH.RadonReports@ct.gov)**

**Website: [www.ct.gov/radon](http://www.ct.gov/radon)**



**ATTACHMENT A**  
Template Letter

(Date)

(Name of School)

(Street Address)

(Town, State, Zip Code)

Dear Parents and Staff:

The administration of the (insert name of school) would like to provide you with notification that initial radon-in-air testing will be conducted on (insert date). Per Connecticut General Statute § 10-220(d)(2), schools are required to periodically inspect and evaluate the indoor air quality of school buildings. This required inspection and evaluation of indoor air quality includes the evaluation of radon in air.

(Insert radon professional company) will conduct the radon testing. To test for radon in air, small canisters containing charcoal will be placed in each of the occupiable rooms that are in contact with the ground. These canisters will be left in place for two to five school days. You will be informed of radon test results and interpretations as soon as possible. If elevated radon levels are found, steps will be taken to correct the problem using methods suggested by the United States Environmental Protection Agency (EPA).

Please read the enclosed educational pamphlet describing radon and the school testing program effort. If you have further questions or concerns regarding radon, please feel free to contact the (local health department) at (XXX) XXX-XXXX, or the Connecticut Department of Public Health Radon Program at (860) 509-7300.

Thank you, in advance, for your cooperation.

Sincerely,

\_\_\_\_\_  
(Name)

Superintendent of Schools or Principal of School

# **ATTACHMENT B**

Pamphlet

# Radon In Schools

Every School  
Should take  
this  
Simple Test.



Revised July 2023



**ATTACHMENT C**  
Work Sheet

## School Radon Testing Program Worksheet for Determining the Number of Test Kits Needed

**Item 1.** Number of rooms less than 2,000 square feet in contact with the ground: \_\_\_\_\_

**Item 2.** List rooms that exceed 2,000 square feet and their size estimate, then divide by 2,000 to calculate the number of test kits needed for each large room:

		A	B	C
	Large Rooms	Area (in square feet)	Divide A by 2,000 square feet to get value for B	Round B up to a whole number
(For Example)	Gymnasium	13,491	$13,491 / 2,000 = 6.7455$	7
1				
2				
3				
4				
5				
6				
7				
8				
9				

**Item 3.** Add up all values in Column C to calculate how many additional tests kits are needed:

\_\_\_\_\_

**Item 4.** Add the values from Items 1 and 3 to determine the amount of test kits needed not including duplicates and blanks:

D= \_\_\_\_\_

**Item 5.** Take the value figured in Item 4 and multiply it by 0.10 to calculate the number of duplicates needed (round up to the nearest whole number):

E= \_\_\_\_\_

**Item 6.** Take the value from Item 4 and multiply it by 0.05 to calculate the number of blanks needed (round up to the nearest whole number):

F= \_\_\_\_\_

**Item 7.** Add up the values in Items 4, 5, and 6 to figure out **total number of test kits needed**:

D + E + F = \_\_\_\_\_

# **ATTACHMENT D**

## Tracking Sheet

**SCHOOL TESTING TRACKING SHEET**

School Name: \_\_\_\_\_ Weather Conditions: \_\_\_\_\_

School Location: \_\_\_\_\_ \*Type of Radon Test: \_\_\_\_\_

Name of Tester: \_\_\_\_\_ Telephone #: \_\_\_\_\_

Mailing Address: \_\_\_\_\_  
\_\_\_\_\_

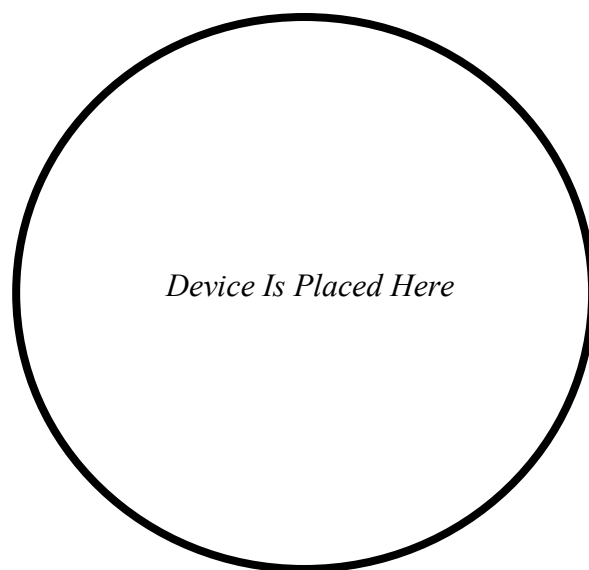
Detector ID #	Location	Start Date	Start Time	End Date	End Time	Additional Comments

\*Note: AC = Activated Charcoal Adsorption Device      LS = Charcoal Liquid Scintillation  
          AT = Alpha Track Detectors                              CR = Continuous Radon Monitor  
          EC = Electret Ion Chamber



**ATTACHMENT E**  
Example Warning Sheet

**DO NOT TOUCH, MOVE, OR  
DISTURB UNDER  
ANY CIRCUMSTANCES!  
(KEEP WINDOWS CLOSED)**



**RADON TESTING  
IN PROGRESS**

**(The test device and its contents are not harmful!)**

**Please note if windows were opened at any time during the test and how long they were open or if the test was disturbed in any way. Thank you for your full cooperation.**

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**ATTACHMENT F**  
Reporting Forms



# STATE OF CONNECTICUT

DEPARTMENT OF PUBLIC HEALTH  
RADON PROGRAM

## INITIAL SCHOOL RADON MEASUREMENT REPORT FORM

\*Please use the *Re-Evaluation Report Form* for 3-year re-evaluations.

July 2023



The following form must be submitted to the Connecticut Department of Public Health Radon Program within ten (10) business days of providing a final written report of radon measurement activities to school personnel.

**Do not send test results or other documents.**

Submit this signed form by **email** to the Radon Program at:

[DPH.RadonReports@ct.gov](mailto:DPH.RadonReports@ct.gov)

**Name of School:**

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**Address:**

(Street, town, zip code)

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**Measurement Company:**

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**Measurement Professional:**

**NRPP/NRSB Certification #:**

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*Please provide the following summary information:*

**Dates of Testing:**

(deployment/retrieval dates. Include confirmatory testing dates if necessary)

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**Total # of Rooms Tested**

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**Total # of Rooms Requiring Re-Testing:**

---

**Total # of Rooms Where Average Results Were at or above 4.0 pCi/L:**

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Radon measurement activities were carried out in accordance with United States Environmental Protection Agency protocols and the Connecticut Department of Public Health Radon Program's *School Radon Testing Guidance* at the location described above.

\_\_\_\_\_  
Measurement Professional / NRPP/NRSB #

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

\_\_\_\_\_  
School Designee / Title

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date



Phone: (860) 509-7300  
Telephone Device for the Deaf (860) 509-7191  
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**STATE OF CONNECTICUT**  
 DEPARTMENT OF PUBLIC HEALTH  
 RADON PROGRAM  
 SCHOOL RADON **RE-EVALUATION** REPORT FORM



July 2023

The following form must be submitted to the Connecticut Department of Public Health Radon Program within ten (10) business days of providing a final written report of radon measurement activities to school personnel.

**Do not send test results or other documents.**

Submit this signed form by **email** to the Radon Program at:  
[DPH.RadonReports@ct.gov](mailto:DPH.RadonReports@ct.gov)

**Name of School:** \_\_\_\_\_

**Address:**

(Street, town, zip code)

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

**Measurement Company:** \_\_\_\_\_

*Please provide the following summary information:*

**Dates of Testing:**

(Deployment/retrieval dates. Include confirmatory testing dates, if applicable.)

\_\_\_\_\_

**Total # of Rooms Tested:**

\_\_\_\_\_

**Total # of Rooms Requiring Re-Testing:**

\_\_\_\_\_

**Total # of Rooms Where Average Results Were at or above 4.0 pCi/L:**

\_\_\_\_\_

Radon measurement activities were carried out in accordance with United States Environmental Protection Agency protocols and the Connecticut Department of Public Health Radon Program's *School Radon Testing Guidance* at the location described above.

\_\_\_\_\_  
 Measurement Professional / NRPP/NRSB #

\_\_\_\_\_  
 Signature

\_\_\_\_\_  
 Date

\_\_\_\_\_  
 School Designee / Title

\_\_\_\_\_  
 Signature

\_\_\_\_\_  
 Date



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