

State of Connecticut  
Department of Public Health  
**RADON PROGRAM**  
**Sample Collection Protocol**  
**For Radon in Water**

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**Sample collection containers:**

Only glass containers sealed with TFE or foil-lined caps shall be used to collect samples of water for radon analysis using liquid scintillation.

**Prior to sample collection:**

A representative sample of the water in the distribution system or well should be collected by the homeowner or by a radon professional listed by the Connecticut Department of Public Health. Therefore, the aerator on the tap must be removed and the system should be flushed for an adequate amount of time (approximately 15 minutes).

There are two methods for collecting water samples of radon analysis using liquid scintillation. They are described below.



**I. The Immersion Technique**

*(For laboratories that supply glass vials for water collection that do not contain a scintillation cocktail.)*

After the purging period the sample is collected as follows to minimize the loss of radon from the sample collected:

1. A length of flexible plastic tubing is attached to the spigot, tap, or other connection, and the free end of the tubing is placed at the bottom of a small container, or 300-600ml beaker. Make sure that the delivery tube does not let bubbles into the sample.
2. Fill the glass sample vial to prevent it from floating;
3. Fill the container or beaker, slowly, until the container overflows.
4. Place the delivery tubing two-thirds of the way into the glass vial, and fill the glass vial with water so that at least 50-100ml of water is displaced (i.e., water volume is displaced around two times). This will ensure that the bottle is flushed with fresh water.
5. After the bottle has been flushed, the tubing is removed from the vial, which can remain resting on the bottom of the container.
6. Carefully place a TFE or foil-lined cap on the glass vial *while it is still submerged*. If this is not possible, you may elect to carefully lift the vial out of the container or beaker and seal it using a TFE or foil-lined cap.
7. Once the sealed glass vial is removed from the bucket, it is inverted and checked for bubbles that would indicate headspace.
  - a. If there are visible bubbles, empty the container and repeat the sampling collection.

- b. If there are no visible air bubbles, the outside of the sealed bottle is wiped dry, and the cap is sealed in place with electrical tape, wrapped clockwise.
8. After the sample bottle is sealed, a second (duplicate) sample is collected in the same fashion from the same container.
9. Record the date and time of the sample collection for each vial.



## **II. Syringe Technique**

(For laboratories that supply radon-in-water test kits that contain the 'liquid scintillation cocktail'.)

After the purging period the sample is collected as follows to minimize the loss of radon from the sample collected:

1. Attach a sampling funnel and tubing to the faucet.
2. Turn on the water and allow a steady flow for two minutes.
3. Slow the water flow and invert the funnel (mouth up). Adjust the flow so that the pool water in the funnel cavity is not turbulent.
4. Insert the needle of a 20 mL hypodermic syringe below the water surface and withdraw several mL of water and discard. Repeat this rinse several times.
5. Withdraw 12-15 mL of water slowly to minimize air bubbles. Invert syringe to eject any air bubbles and retain 10 mL of water.
6. Place the syringe needle under the surface of an appropriate organic accepting liquid scintillation cocktail contained in a glass scintillation vial and slowly eject the water from the syringe into the cocktail.
7. Slowly withdraw the syringe and tightly cap the vial using a TFE or foil-lined cap.
8. After the glass vial is sealed, a second (duplicate) sample is collected in the same fashion.
9. Record the date and time of the sample collection for each vial.

### **Transport and analysis:**

The sample(s), once received by the laboratory, should be allowed to equilibrate to room temperature before processing. Counting should begin within four days.



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Immersion technique excerpted from Standard Methods for the Examination of Water and Wastewater, 20<sup>th</sup> ed. (1998). 7500-Rn *Liquid Scintillation Method*, pp. 7-39 through 7-42.