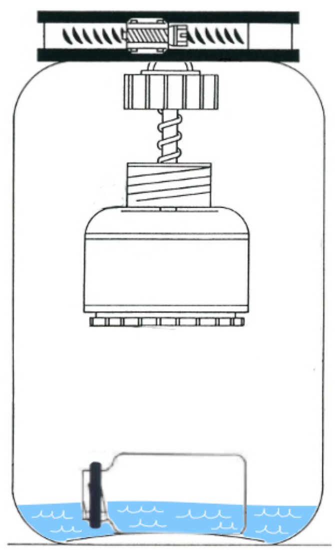
RAD ELEC INC.



Radon in Water User's Manual

Version 3.1
25 August 2022

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Introduction

Even though the risk of developing cancer from ingesting radon in water is relatively low, the indoor levels of radon in air can be increased from the presence of radon in water.

The versatile E-PERM® System used in conjunction with the Radon in Water Test Kit provides the radon professional with all the equipment needed to conduct radon in water measurements. In order to make successful radon in water measurements, a basic working knowledge of the E-PERM® System is required.

If radon in water concentrations are elevated, this can increase in the radon in air concentration.

Using the Radon in Water Test Kit, water samples are acquired using the included vials, and then exposed to a suspended E-PERM® placed inside a large sealed measurement jar. The radon in air is calculated, which is then used to determine the initial radon in water concentration.

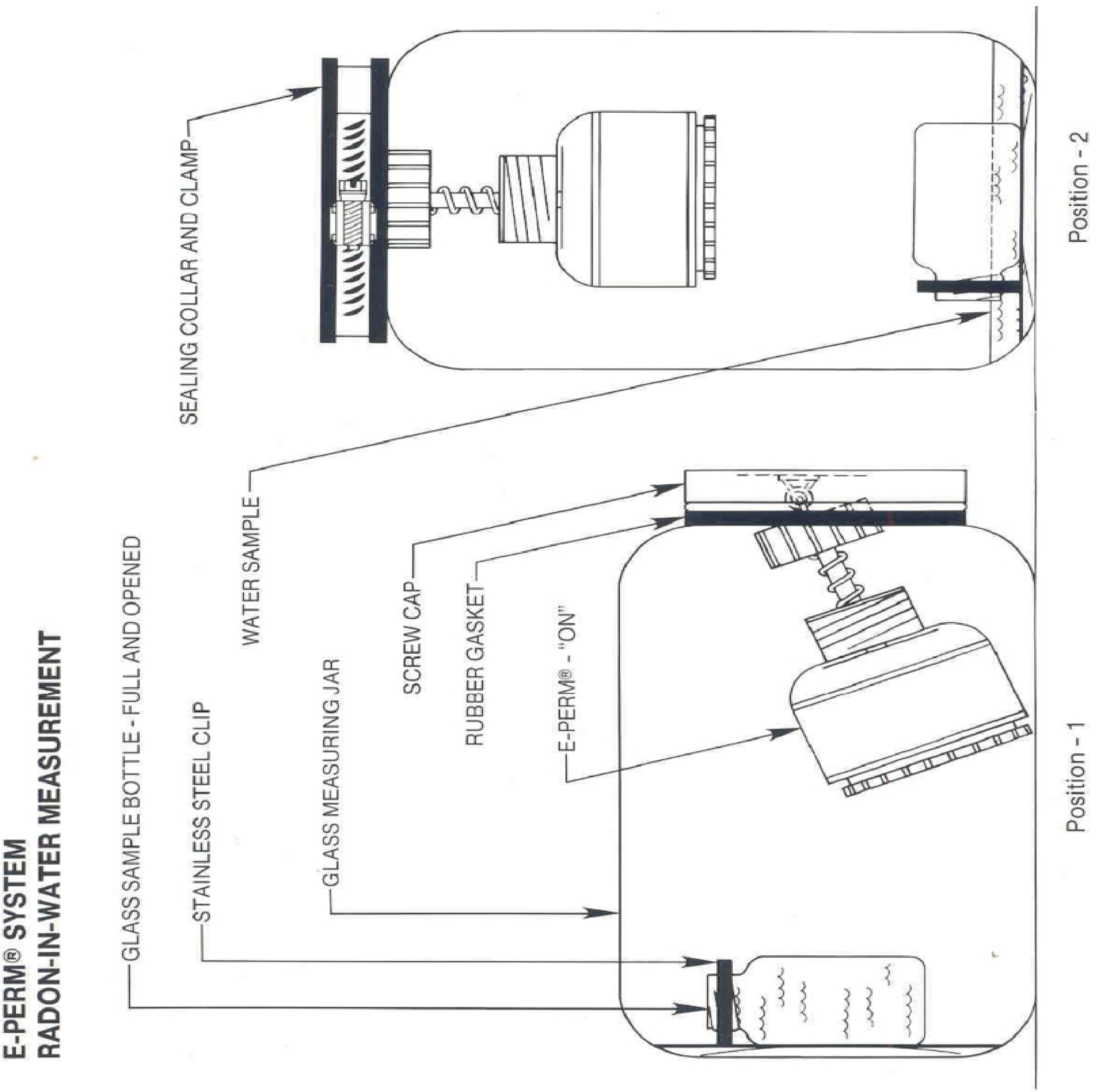
Test Kit Components

Each Radon in Water E-PERM® Test Kit includes the following:

- **2 Measurement Jars** (3.7 Liter)
- **2 Sampling Jar Lids** (replacements can be ordered from Rad Elec, if needed)
- **2 Leak-Tight Adjustable Lid Collars**
- **10 Sample Collection Vials** (either small, large, or a mixture of both)
- **Manual**
- **Flash Drive** (containing spreadsheets, PDFs, and other digital goodies)

A basic working knowledge of E-PERMs® is required in order to conduct successful radon in water tests using this kit.

Radon in Water Measurement Diagram



Sources of Radon in Water

Radon is a naturally occurring radioactive gas present in the soil underneath homes. When radon comes into contact with the subsoil water (typically in aquifers), some of the radon can dissolve into the water. The groundwater in these aquifers is then extracted with wells, after which it enters into a house. As a result, well water usually contains a higher radon concentration than water from rivers, lakes, or reservoirs (because the radon in these bodies of water is released into the outdoor air through the aeration of the surface water).

The highest radon in water concentrations are typically found in private wells.

Private wells are used as a source of domestic water supply in a large number of single family homes across the country. Wells can also be used as a water source for small and large communities, although community water supplies are typically distributed after required processing (which takes time, can involve aeration, and allows the radon in the water to decay). As such, radon in the municipal water supply is generally much lower than that from private wells supplying water directly to a home. Generally speaking, municipal water supplies range from 100 to 5,000 pCi/L, with some exceptions.

Radon concentrations in private wells can have values ranging from several hundred to many thousands of pCi/L. In some geographic regions, depending upon the geology, the radon concentrations can be extremely high. As a general estimate for homes, 10,000 pCi/L of radon in water can increase the radon in air concentration by approximately 1.0 pCi/L. The primary health concern with radon in water is in the additional amount of radon added into the air.

Risks from Radon in Water

The risk of developing cancer from ingesting water is relatively low; however, when the radon in water is released into the home environment from the use of basic applicances or bathroom fixtures, indoor radon levels can increase substantially. Homes that receive water directly from private wells are most likely to be affected, and the general estimate – although this can vary from one home to the next, depending on its water usage – is that for every 10,000 pCi/L found in the water supply, approximately

1.0 pCi/L will be "released" into the home's indoor radon concentration. Although the USEPA has not declared an action level for radon in water, the ANSI-AARST MW-RN 2020 standard (published in 2020 and available online) has **recommended an action level of 4,000 pCi/L (≥ 150 Bq/L)**. If the radon in water concentration meets or exceeds this recommended action level, a remediation method should be employed.

The recommended action level for radon in water is **4,000 pCi/L (150 Bq/L)**.

The National Academy of Sciences (NAS) released a report on "Risk Assessment of Radon in Drinking Water" on September 15, 1998. Although over two decades old, this report contains a comprehensive accumulation of scientific data on radon in drinking water. The highlights from this report can be found on Rad Elec's website (in the Publications section).

The NAS Report states that some cancer deaths result each year from exposure to radon in water. The primary health risk from radon in drinking water is lung cancer due to inhaling radon discharged from water used in the home. Although it is a small risk relative to the risk of breathing radon in indoor air, there is some risk of stomach cancer from drinking water contaminated with radon. Radon enters the indoor air of a home through normal water usage (such as showering, laundry, cooking, bathing, etc.) with more radon being released when the water is hot. When water containing radon is brought into a home, the radon can outgas into the indoor air (although it is estimated that only about 1% to 2% of the total radon found in indoor air comes from the radon released from drinking water).

NAS recommends that the Alternative Maximum Contamination Level (AMCL) be set at a level which would "result in a contribution of radon from drinking water to radon levels in indoor air equivalent to the national average concentration in outdoor air." This means that (according to the 10,000:1 ratio) an AMCL of 4,000 pCi/L leads to an increase in the indoor radon concentration by approximately 0.4 pCi/L.

USEPA Recommendations

The USEPA proposed regulations to reduce public health risks by limiting exposure to radon in 1999. Under this proposal, individual States were encouraged to developed a Multimedia Mitigation Program (MMP) to reduce exposure to radon, focusing on the reduction of radon in indoor air, while also reducing radon in drinking water to 4,000 pCi/L or lower. If a State does not have an MMP, the individual municipalities in that State are responsible for reducing radon levels in drinking water to 4,000 pCi/L or lower. The USEPA's recommended regulations for radon in water only apply to public water supplies, and are not applicable to private wells.

The analysis of water samples to determine the radon concentrations found in drinking water is a useful tool in trying to diagnose the cause of high radon in air concentrations in homes. Radon in water analysis can be used to confirm or rule out radon in water as the cause of elevated radon levels in the home.

If the radon in water concentration is determined to be the cause for high indoor air radon concentrations, then mitigation of the problem may have to include treating well water for removal of radon. The most effective radon in water reduction method is point-of-entry treatment, which removes radon from the water right before it enters a home. There are two main types of point-of-entry devices that remove radon from water:

- Granular Activated Carbon (GAC) filters, which use activated carbon to remove radon.
- Aeration devices, which bubble air through the water and carry radon gas out into the atmosphere through an exhaust fan.

If indoor radon concentrations are already low, then the measurement of radon in water may not be necessary.

The E-PERM® Method of Measuring Radon in Water

To perform radon in water measurements, it is necessary that the radon professional is already familiar with the E-PERM® System (and therefore capable of making radon in air measurements). The first step – which is of critical importance to making accurate radon in water measurements – is to collect the water samples (in either the smaller ~68 mL sample vials, or the larger ~136 mL sample vials). This will be explained in greater detail later in the manual. When the test is ready to commence, each vial will be placed in the bottom of the large measurement jars. An E-PERM® is then placed in each of the measurement jars, suspended in the air above the water. The lids of the measurement jars are closed (and sealed) in order to make them "radon-tight". Radon reaches equilibrium between the water and air, which the E-PERM® measures. At the end of the desired exposure period, the measurement jars are opened, and the E-PERMs® are removed. The deployment information (such as the sample collection time, initial and final electret voltages, and start/end times of the exposure period) is entered into either the Rad Elec Radon in Water spreadsheet or the Radon Report Manager software, and the radon in water concentration will be calculated.

E-PERMs® are widely used as indoor radon detectors, and are not affected by 100% relative humidity. Therefore, because of this property, it is possible to conduct measurements of radon in water using electret ion chambers. Dr. Kotrappa and W. Jester describe the basis for the analysis in detail in the following publication, which can be found on Rad Elec's website (www.radelec.com):

P. Kotrappa and W.A. Jester. "Electret Ion Chamber Radon Monitors Measure Dissolved ^{222}Rn in Water." *Health Physics* 64:397-405 (1993).

Collecting a Radon in Water Sample

The basic sampling and analysis process must be carried out carefully to minimize the loss of radon during collection and transport. Keep the delay between the collection time and the analysis time as short as possible to minimize measurement errors. The analysis of the sample should be initiated as soon as possible after receiving the sample in the lab. To ensure accuracy, no more than 2-3 days should elapse between sample collection and the beginning of the analysis, if the water sample is to be mailed.

If the sample is being collected from a private well, it is recommended to use the smaller ~68 mL sample vial. Collect three (3) samples from the water supply at the same time. Two of these samples will be used in the radon in water measurement, but the third sample will only be used if the test needs to be repeated, or if it is discovered that one of the original samples was collected incorrectly (such as having a large air bubble, etc.).

Use of Large-Volume (~136 mL) Sample Vials

If it is believed that the radon in water concentrations are going to be very low, such as with municipal water supplies which are generally less than 300 pCi/L, better accuracy will be achieved using the larger ~136 mL sample vials and an exposure period of 48 hours.

Rad Elec recommends collecting three water samples from the same source. This provides you with an extra sample, just in case you need to repeat the analysis.

If you expect the radon in water concentration to be especially low (i.e. if it comes from a public water supply), Rad Elec recommends using large sample vials and extending the analysis period to 48 hours.

Procedure to Collect a Water Sample

1. Choose the faucet closest to the water's point of entry into the home. If there is an aerator installed, either remove it or choose another faucet. It is best to select the closest source to the well; typically ouside the house (if available) is considered a good option.

2. If possible, attach tubing to the faucet (or a hose to the spigot) and place the end in a bowl or bucket. This is to limit the water's exposure to air in the path between the faucet and the bowl, as the radon will escape readily from the water through aeration or agitation.

3. Allow the cold water to run approximately ten to twenty minutes (at a medium rate) in order to ensure the water sample will come directly from the well (and not from connecting pipes or water tanks). There should be a noticeable decrease in water temperature when the water has been properly flushed. The bucket or bowl from the previous step will be overflowing with water.

The water sample collection technique is very important! Make sure there are no air bubbles in the vials.

4. Open and gently lower the three sampling vials to the bottom of the bowl or bucket, trying not to agitate the water. Immerse the vial caps, too. Make sure that there are no air bubbles trapped in the vials or in the caps. This is critically important, as any air bubbles will bias the results negatively.

5. Screw the caps tightly onto the sample vials while they are still immersed in the water, being careful to do so with minimal agitation to the water (and taking extra care to avoid trapping any air bubbles in the vials).

6. Pack the sample vials carefully, and take them back to the lab or office. Keep the delay between the sample collection and the analysis as short as possible in order to minimize measurement errors. The sample analysis should be initiated as soon as possible.

Performing the Radon in Water Measurement Analysis

The following procedures should be followed as soon as possible after collecting the water samples. The radon in water measurement should be conducted in an area of low radon background, such as upper floors or outside, in order to minimize the residual radon in the measurement jars.

1. Immediately prior to the start of the measurement, prepare the E-PERM® by measuring the initial voltage (IV) of the electrets, and then loading them securely into S Chambers. Unscrew the top of the S Chamber, so that the electret ion chamber is in the "ON" position.

2. Lay the large measurement jar horizontally on its side. Make sure the measurement jar's lid, sealing collar, and a screwdriver are nearby.

> Valid E-PERM® configurations for radon in water analyses are either SST (short-term electret in S Chamber) or SLT (long-term electret in S Chamber).

3. While the measurement jar remains in a horizontal position, gently open the cap of the sample vial (with the water sample that was collected in the previous section). Insert the open bottle all the way to the bottom of the jar into the clip (see Position 1 on the Measurement Diagram).

4. Hang the open E-PERM® onto the hook located on the inside of the cap of the measurement jar, and then screw the cap onto the jar. Carefully bring the measurement jar to the vertical position, which will allow the water in the sampling vial to spill to the bottom of the measurement jar. It does not matter if some of the water remains in the sample vial (see Position 2). Quickly tighten the cap onto the large measurement jar to prevent any radon from leaking out.

5. Install the rubber sealing collar around the cap with the smaller (and skinnier) portion of the collar flush with the white cap, and the thicker side closest to the glass measurement jar. Tighten the clamp around the collar with a screwdriver, while keeping the measurement jar vertical (see Position 2 on the Measurement Diagram).

6. Record the start date and time of the analysis period.

7. Shake the jar *very gently* (move only the water; make sure not to fracture the sample vial against the measurement jar) to accelerate the release of radon into the measurement jar. Store the measurement jar in a vertical position where it will not be distured for the desired exposure period (usually 1-2 days). It is **not** recommended to use an exposure period of less than 24 hours.

8. After the desired exposure period has passed, loosen the clamp and remove the collar. Unscrew the lid of the measurement jar and remove the E-PERM®.

9. Record the date and time of the removal, which represents the conclusion of the analysis period. Close the E-PERM®, which will stop ionization from occuring inside the electret ion chamber.

10. When ready to analyze the radon in water concentration, remove the electrets from the ion chambers, and record their **final voltages**. Using either the Radon in Water spreadsheet or the Radon Report Manager software, enter all the recorded variables collected throughout the sample acquisition and analysis periods in order to calculate the radon in water concentration.

Electrets whose final voltages are **below** 100 volts should be retired from service.

11. Remove the sample vial and discard the water from both the measurement jar and the sample vial. Rinse with low-radon water and allow both the vial and measurement jar to dry.

The E-PERM® can be reused for another measurement after waiting at least three hours to allow the radon progeny inside the electret ion chamber to decay.

If the radon in water concentration was unusually high, rinse both the measurement jar and sample vial with municipal water (or water that has been boiled).

Calculating Results

Radon in water concentrations can be calculated using the included spreadsheets (found on the flash drive included in your test kit), or from within the Radon Report Manager software. Both of these methods can calculate concentrations in either **US units** (pCi/L, feet, µR/hr) or **SI units** (Bq/L, meters, and nGy/hr).

This section will demonstrate how to calculate results manually. If you'd prefer to use either the spreadsheets or software, you can skip this section (unless you're curious to see how the numbers are crunched).

1 Make sure that you have collected all of the appropriate variables:

Variable	Explanation
Water Sample Collection Location	Such as "outside spigot" or "kitchen sink".
Water Sample Collection Date and Time	Record the date and time as soon as you seal the sample vial.
Water Sample Volume	Either the smaller ~68 mL vial or the larger ~136 mL vial.
Analysis Period Start Date and Time	The analysis period **begins** when the exposed water sample and electret ion chamber are sealed inside the large measurement jar.
Analysis Period End Date and Time	The analysis period **ends** immediately after opening the sealed measurement jar and closing the electret ion chamber.
Gamma Background	Record the gamma background at the measurement analysis location, **not where the water sample was collected**. Estimates for the USA and Canada can be found at the end of this manual.
Elevation	Record the elevation (in feet or meters above sea level) where the measurement analysis took place, **not where the water sample was collected**.
Average Water Temperature	Record the average water temperature throughout the measurement analysis period, which can be assumed to be the temperature of the room where the analysis took place. **This is not the temperature of the water sample when it was collected.**
E-PERM® Configuration	The two valid electret ion chamber configurations for radon in water measurements are either SST (short-term electret loaded into S chamber) or SLT (long-term electret loaded into S chamber).
Electret Voltages	Both the initial voltage (IV) and the final voltage (FV) will be required to calculate the radon concentration in water.

2

Look up Constants (A, B, and G) for the specific E-PERM® configuration, as shown in the table below. For most radon in water measurements, the SST configuration (short-term electret loaded into an S chamber) will work just fine. If you expect the radon in water concentration to be especially high, you may want to choose the SLT configuration (long-term electret loaded into an S chamber).

E-PERM® Configuration	Constant A	Constant B	Constant G
SST	0.314473	0.260619	0.087
SLT	0.031243	0.021880	0.087

3

Calculate the Electret Ion Chamber Calibration Factor (EIC CF) using Constants A and B from Step 2, with the following equation:

$$\text{EIC CF} = A + \left(B \times \ln\left(\frac{IV + FV}{2}\right)\right)$$

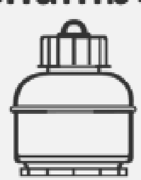
Where...

- A = Constant A
- B = Constant B
- $\ln$ = Natural Logarithm ($\log_e$)
- IV = Initial Voltage
- FV = Final Voltage

4

Note the elevation of the exposure site (in feet), and calculate the Elevation Correction Factor (ElevCF). If you are measuring the elevation in meters, this value can be converted to feet by dividing it by 3.28084.

S Chambers



For Elevations <= 4000 feet

$$\text{ElevCF} = 1$$

For Elevations > 4000 feet

$$\text{ElevCF} = 0.79 + \left(\frac{6 \times \text{Elevation(ft)}}{100000}\right)$$

5 Estimate (or measure) the environmental background radiation of the exposure site. The background gamma units should be in μR/hr (microroentgens per hour). If you are measuring the background gamma in nGy/hr (nanograys per hour), these units can be converted to μR/hr by taking the nGy/hr value and dividing it by 8.7. In lieu of background measurement, please refer to the chart of average gamma radiation levels for each US state and Canadian province located at the end of this manual.

The exposure site is where the measurement is being conducted, **not where the water sample was collected.**

6 Calculate the **analysis period (TA)** between the beginning and end of the exposure. The analysis period begins when you suspend and open the electret ion chamber inside the measurement jar, and ends when you close it. This value should be in days (and calculated out to the thousandths decimal place). For example, an analysis period of 76 hours would be 3.167 days (76 ÷ 24 = 3.167).

7 Calculate the **radon concentration in air** using the values that you've determined in Steps 1 through 6. The results will be in picoCuries per Liter (pCi/L), although there will be a chance to convert the results to SI units when the measurement is concluded. This value represents the radon concentration inside the measurement jar throughout the analysis period. Now let's calculate the radon concentration in water.

Steps 1 through 7 calculate the radon concentration in air normally, as detailed in the E-PERM® User's Manual.

8 Determine the **time delay (TD)** between the sample collection date/time and the beginning of the analysis period. This value should be in days, just like in Step 6.

9 Using the **time delay** that you calculated in Step 8, determine Constant C1 by using the formula below, where 0.1814 represents the decay constant of radon in units per day and *e* stands for the exponential constant (approximately ~2.718).

$$\text{Constant C1} = e^{0.1814 \times TD}$$

10 Calculate the **corrected air volume (V_{corr})** using the equation below. The total volume of the large measurement jar is 4.044 liters, but we must account for the amount of displaced air due to the E-PERM®, the water sample, and the vial. As long as you are using the official Rad Elec water vials, your corrected air volume will be one of the following:

$$V_{corr} = 4.044 - \begin{matrix} 0.0657 \\ \text{or} \\ 0.123 \end{matrix} - \begin{matrix} 0.033 \\ \text{or} \\ 0.054 \end{matrix} - 0.224 = \begin{matrix} 3.7213 \\ \text{or} \\ 3.6430 \end{matrix}$$

- 4.044: Measurement Jar Volume (in Liters)
- 0.0657: Small Vial Water Volume
- 0.123: Large Vial Water Volume
- 0.033: Small Vial Glass Volume
- 0.054: Large Vial Glass Volume
- 0.224: E-PERM® Volume
- 3.7213: Small Vial
- 3.6430: Large Vial

11 Calculate the **Ostwald Coefficient (L)**, which represents the solubility of radon in water as a function of its temperature. Record the average temperature of the water sample throughout the analysis period, and – in lieu of actually measuring the water sample – can be assumed to be the temperature of the room where the analysis took place (usually between 18-21 °C). Please be sure to use Celsius when calculating the Ostwald Coefficient.

$$L = (0.52842332 - 0.108844754) \times e^{(-0.051255005 \times {}^{\circ}C_{H_2O})}$$

12 Using the **analysis period (TA)**, **corrected volume (V_{corr})**, and **Ostwald Coefficient (L)**, we are ready to calculate Constant C2 using the equation below, where V_{H2O} is 0.066 for the small vial and 0.123 for the large vial.

$$C2 = \frac{\left(\frac{V_{corr}}{V_{H_2O}} + L\right) \times 0.1814 \times TA}{1 - e^{(-0.1814 \times TA)}}$$

13 You're nearly done! In order to calculate the radon concentration in water, solve for the equation below using Constants C1 and C2, along with the radon concentration in air inside the jar **(RnC_{air})**:

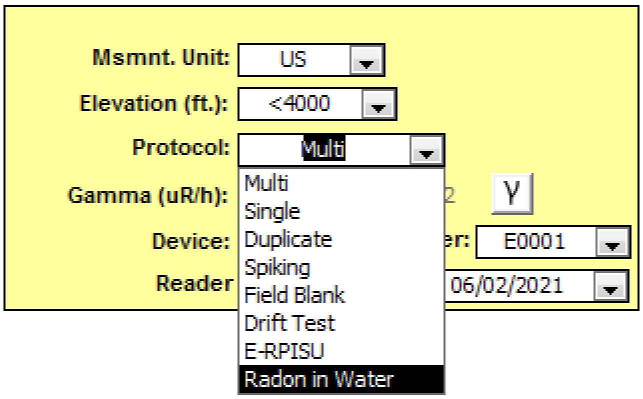
$$\text{Radon Concentration in Water} = RnC_{air} \times C1 \times C2 \times 1.15$$

14 Repeat Steps 1 through 13 with your duplicate sample, or conduct a new analysis with any additional samples.

The radon concentration in water will be in picoCuries per Liter (pCi/L). In order to convert this result to Becquerels per Liter (Bq/L), multiply the results by 0.037.

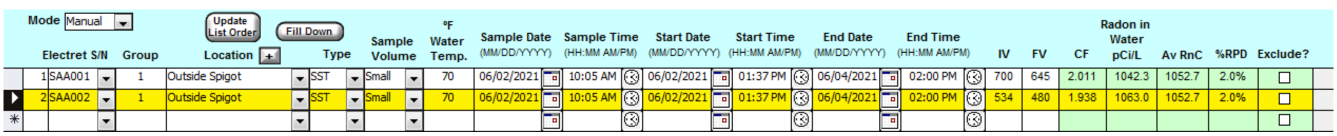
Radon Report Manager Integration

In order to calculate a radon in water measurement with the Radon Report Manager software, create a new record and select "Radon in Water" from the Protocol dropdown menu (located in the yellow Required Information section of the Record Database window). In nearly all other aspects, this process very much mirrors a normal radon-in-air data entry, with the following caveats:



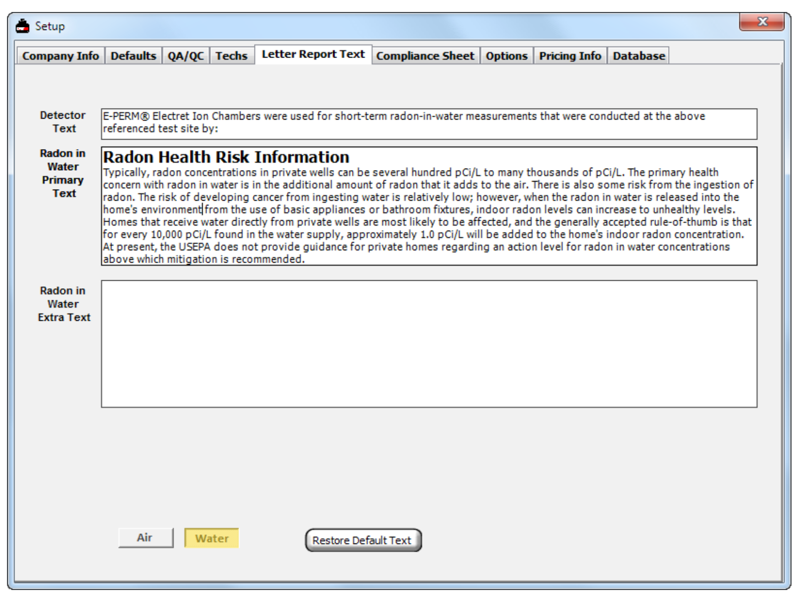
- Sample Vial Size (small or large)
- Sample Collection Date
- Sample Collection Time
- Water Temperature

The water temperature represents the average water temperature throughout the entire duration of the analysis period, and can be assumed to be the temperature of the room where the analysis took place.



	Electret S/N	Group	Location	Type	Sample Volume	°F Water Temp.	Sample Date (MM/DD/YYYY)	Sample Time (HH:MM AM/PM)	Start Date (MM/DD/YYYY)	Start Time (HH:MM AM/PM)	End Date (MM/DD/YYYY)	End Time (HH:MM AM/PM)	IV	FV	CF	Radon in Water pCi/L	Av RnC	%RPD	Exclude?
1	SAA001	1	Outside Spigot	SST	Small	70	06/02/2021	10:05 AM	06/02/2021	01:37 PM	06/04/2021	02:00 PM	700	645	2.011	1042.3	1052.7	2.0%	☐
2	SAA002	1	Outside Spigot	SST	Small	70	06/02/2021	10:05 AM	06/02/2021	01:37 PM	06/04/2021	02:00 PM	534	480	1.938	1063.0	1052.7	2.0%	☐
*																			☐

The Letter Report text for a radon in water measurement is distinct from the normal radon in air text, and can be customized to suit your needs. In order to edit the text for radon in water customer letters, click on the Setup button from the Main Menu, then head over to the Letter Report Text tab. Click on the "Water" toggle button in the lower left corner of the window, and you will be able to edit the text that appears in radon-in-water reports.



Sample Test Report

ABC Radon Testing Company

123 Main Street
Frederick, MD 21704
(555) 555-1234
info@abcradon.com

Radon in Water Test Report

Batch #: 060421-1

Customer:
Random Customer
555 Bismuth Blvd.
Frederick MD 21704

Test Site:
Random Customer
555 Bismuth Blvd.
Frederick MD 21704

E-PERM® Electret Ion Chambers were used for short-term radon-in-water measurements that were conducted at the above referenced test site by: New Company

The Results are as follows:

Serial No.	Type	Location	Sample Collection	Test Start Date	Test End Date	Results (pCi/L)
SAA001	SST	Outside Spigot	02-Jun-2021 10:05 AM	02-Jun-2021 01:37 PM	04-Jun-2021 02:00 PM	1042.3
SAA002	SST	Outside Spigot	02-Jun-2021 10:05 AM	02-Jun-2021 01:37 PM	04-Jun-2021 02:00 PM	1063.0

Average Radon in Water Concentration in: Outside Spigot **1052.7 pCi/L**

Sample Collected By: Joe Tech #123456789
Analyzed By: Joe Tech #123456789
Reader S/N: E0001 **Reader Calibration Due:** 02-Jun-2022

Radon Health Risk Information

Typically, radon concentrations in private wells can be several hundred pCi/L to many thousands of pCi/L. The primary health concern with radon in water is in the additional amount of radon that it adds to the air. There is also some risk from the ingestion of radon. The risk of developing cancer from ingesting water is relatively low; however, when the radon in water is released into the home's environment from the use of basic appliances or bathroom fixtures, indoor radon levels can increase to unhealthy levels. Homes that receive water directly from private wells are most likely to be affected, and the generally accepted rule-of-thumb is that for every 10,000 pCi/L found in the water supply, approximately 1.0 pCi/L will be added to the home's indoor radon concentration. At present, the USEPA does not provide guidance for private homes regarding an action level for radon in water concentrations above which mitigation is recommended.

Signature: *Sample Signature* Date: *04-Jun-2021*

Estimated Background Gamma Table

State	µR/hr	nGy/hr
Alabama	**6.5**	56.6
Alaska	**7.3**	63.5
Arizona	**8.0**	69.6
Arkansas	**6.5**	56.6
California	**6.6**	57.4
Colorado	**11.8**	102.7
Connecticut	**7.8**	67.9
District of Columbia	**6.4**	55.7
Delaware	**6.1**	53.1
Florida	**5.3**	46.1
Georgia	**7.0**	60.9
Hawaii	**7.3**	63.5
Idaho	**8.7**	75.7
Illinois	**7.1**	61.8
Indiana	**7.4**	64.4
Iowa	**7.5**	65.3
Kansas	**7.7**	67.0
Kentucky	**7.3**	63.5
Louisiana	**5.4**	47.0
Maine	**7.5**	65.3
Maryland	**6.2**	53.9
Massachusetts	**7.3**	63.5
Michigan	**7.4**	64.4
Minnesota	**7.4**	64.4
Mississippi	**5.4**	47.0
Missouri	**7.4**	64.4
Montana	**8.6**	74.8
Nebraska	**7.7**	67.0
Nevada	**7.6**	66.1
New Hampshire	**7.4**	64.4
New Jersey	**7.1**	61.8
New Mexico	**10.4**	90.5
New York	**7.3**	63.5
North Carolina	**6.9**	60.0
North Dakota	**7.8**	67.9
Ohio	**7.3**	63.5
Oklahoma	**7.6**	66.1
Oregon	**7.4**	64.4
Pennsylvania	**6.6**	57.4
Rhode Island	**7.0**	60.9
South Carolina	**6.7**	58.3
South Dakota	**7.8**	67.9
Tennessee	**6.9**	60.0
Texas	**6.1**	53.1
Utah	**9.3**	80.9
Vermont	**7.4**	64.4
Virginia	**6.4**	55.7
Washington	**7.4**	64.4
West Virginia	**7.7**	67.0
Wisconsin	**7.5**	65.3
Wyoming	**10.4**	90.5

Province / Territory	µR/hr	nGy/hr
Alberta	8.6	**74.8**
British Columbia	8.0	**69.6**
Manitoba	7.6	**66.1**
New Brunswick	7.5	**65.3**
Newfoundland & Labrador	7.5	**65.3**
Nova Scotia	7.5	**65.3**
Northwest Territories	8.4	**73.1**
Nunavut	7.6	**66.1**
Ontario	7.4	**64.4**
Prince Edward Island	7.5	**65.3**
Quebec	7.5	**65.3**
Saskatchewan	8.2	**71.3**
Yukon	8.0	**69.6**

Afterword

If you've made it this far, thanks for reading our Radon in Water User's Manual. We at Rad Elec are dedicated to listening to our customers' suggestions, so please contact us if you have any feedback to improve our equipment or this document. We hope that you find this methodology to be an accurate, robust, and cost-effective addition to the catalog of Rad Elec radon measurement equipment.

If you'd like to learn more about the research behind measuring radon in water using electret ion chambers, you can find several articles on our website (www.radelec.com), located in the Publications section (in the Documentation menu).

Please contact us if you have any questions, concerns, or brilliant ideas!

E-PERM®

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