



MOST COMMONLY-USED RADON GAS TESTING DEVICES

ADVANTAGES AND DISADVANTAGES

CONTINUOUS RADON MONITOR (ACTIVE):

Continuous radon monitoring devices include instruments that record real-time continuous measurements of radon gas. Air is either pumped or diffused into a counting chamber. The counting chamber is typically a scintillation cell or ionizing chamber. Scintillation counts are processed by electronics, and radon concentrations for predetermined intervals are stored in the instrument's memory or transmitted directly into a printer.

Advantages of Continuous Radon Monitors:

- 48 hour reading display.
- Relatively good precision.
- Can track hourly variations.
- Can be down loaded or printed on site.
- Can indicate when tampering or ventilation occurs.

Disadvantages of Continuous Radon Monitors:

- Equipment is costly.
- Requires trained and licensed operator.



ACTIVATED CHARCOAL (PASSIVE):

An airtight container with activated charcoal is opened in the area to be sampled, and radon in the air is adsorbed in the charcoal granules. At the end of the sampling period, the container is sealed and sent to a laboratory for analysis.

Advantages of Activated Charcoal Device:

- Convenient and economical.
- Can be used for a 48 hour test.
- Unobtrusive and makes no noise.
- Requires no power.
- Can be obtained through the mail.

Disadvantages of an Activated Charcoal Device:

- Limited to short term sampling.
- Biased towards later periods of exposure.
- No printout available for the sampling period.
- Must wait on test results from laboratory.
- Does not provide an indication of changes in radon concentration during the measurement period.



ALPHA TRACK DETECTION (PASSIVE):

The detector is a small piece of special plastic or film inside a small container. The air being tested moves through a filter covering a hole in the container. When alpha particles from radon and its decay products strike the detector, they cause damage tracks. At the end of the test, the container is sealed and returned to a laboratory for reading.

Advantages of Alpha Track Detection:

- Convenient and economical.
- Can measure long-term characteristics.
- Unobtrusive and makes no noise.
- Requires no power.
- Can be obtained through the mail.

Disadvantages of Alpha Track Detection:

- Long measurement period necessary (91 days to a year).
- Precision errors, especially at low radon concentrations.



CHARCOAL LIQUID SCINTILLATION (PASSIVE):

This method employs a small vial containing activated charcoal for sampling radon. After an exposure of 2-7 days, the vial is sealed and returned to a laboratory for analysis. While the absorption of radon into the charcoal is the same as for the Activated Charcoal method, analysis is accomplished by treating the charcoal with a scintillation fluid and then analyzing the fluid using a scintillation counter.

Advantages of Liquid Scintillation:

- Convenient and economical.
- Unobtrusive and makes no noise.
- Requires no power.
- Can be obtained through the mail.
- Methodology can be used to measure radon in water.

Disadvantages of Liquid Scintillation:

- Limited to short term sampling
- Biased towards later periods of exposure
- Does not provide indication of changes in radon concentration during the measurement period.



ELECTRET ION CHAMBER (PASSIVE):

An electrostatically-charged disk detector (electret) is situated within a small container (ion chamber). During the measurement period, radon moves through a filter-covered opening in the chamber where the ionization resulting from the decay of radon and its progeny reduces the voltage on the electret. A calibration factor relates the measured drop in voltage to the radon concentration.

Advantages of Electret Ion Chambers:

- Can be used for short and long term radon measurements.
- Electret can be re-used until voltage drops below the operation voltage for the device used -200 volts.

Disadvantages of Electret Ion Chambers:

- Sensitive to external gamma radiation, which should be corrected for.
- Sensitive to altitude changes, which should be corrected for.
- Electret can be damaged by touching the surface, surface contamination, or impact.
- Pre/post voltages must be measured at the same temperatures.
- Does not provide indication of changes in radon concentration during the measurement period.

