

Highlights

- Available in alpha/beta and alpha-only configurations
- Activity determinations for up to two different alpha-emitting isotopes with simultaneous beta reporting
- Uses an alpha peak-shape fitting algorithm that is more accurate than region-of-interest or tail-fitting methods of radon background subtraction
- Can perform Radon Working Level Measurements on filters of known sample volume and age.
- Automatic minimum-count time mode with complete data logging (including spectral data)
- Live "strip chart" display of activity, detection limit, action level, and elapsed time
- American or SI units
- Built-in battery backup

Description

The Bladewerx Integrated Sample Counter, SabreISC™, is a field deployable alpha/beta sample counter that provides high-sensitivity alpha and beta activity determinations on filters and swipes. It can perform real time compensation for radon-decay products while measuring other alpha-emitting isotopes-of-interest. Samples no longer need to be stored for several days for radon progeny to decay before being able to assess longer-lived activity. The SabreISC

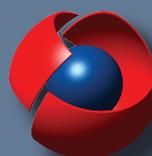
can be configured with up to two alpha-emitting isotopes-of-interest and has the unique ability to match an unknown peak to the nearest radionuclide in the user-editable isotope table. It simultaneously measures beta and is a fully integrated instrument with a high resolution color touchscreen and electronically controlled sample drawer. It is available in alpha/beta and alpha-only configurations.

Ruggedized Construction

SabreISC is enclosed in a metal housing with a sturdy handle and features an electronically driven sample drawer with interchangeable sample holders that provide for repeatable sample geometry for up to 2-inch diameter filters and swipes. The solid-state ion-implanted detector, detector power supply, amplifier, multi-channel analyzer, and PC are all built-in to the housing. Removing the upper cover provides clear access to all the internal components. The SabreISC is designed for convenient benchtop use with its incredibly small-footprint and internal 1-hr battery-backup. Weighing less than 7 lbs. (3 kg), the SabreISC is the lightest computer controlled sample counter available with LCD touchscreen operation. When equipped with the Extended Portability option, which includes a second battery, the SabreISC is easily transported and used in the field for 4 hours.

Display and Control

The integrated SabreISC analysis and control software is a Microsoft® Windows 7-based application that provides complete instrument control, calibration, data analysis, and data logging capabilities. A 7-inch diagonal WVGA high-resolution (800 x 480) color display and touchscreen provides for a clear and intuitive user interface. Spectrum analysis and separation of radon decay products is possible through the use of the well-proven Bladewerx alpha peak-shape fitting algorithm. For simplified energy calibration, the user interface employs simple hold and drag operations to position peak locators on the spectral display. Another time-saving feature is the minimum count time mode where—based on user-defined action level and confidence bounds—the instrument sample count is terminated as soon as the user-defined constraints are met.

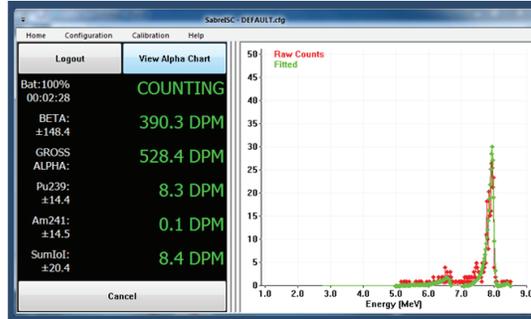


Radon Concentration Mode

The SabreISC provides for a radon concentration (i.e. Working Level) determination of a fixed air sample, allowing the user to enter the sample time for the filter, the sample volume, and aging time after removal from the fixed sampler. During a radon concentration count, the algorithm monitors the decay times of individual radon and thoron decay products to determine the ^{222}Rn and ^{220}Rn concentrations, along with their respective equilibrium levels. Customers accustomed to doing Kuznetz or modified-Tsivoglou counts will find this mode saves time and reduces complexity.

Alpha Peak-Shape-Fitting

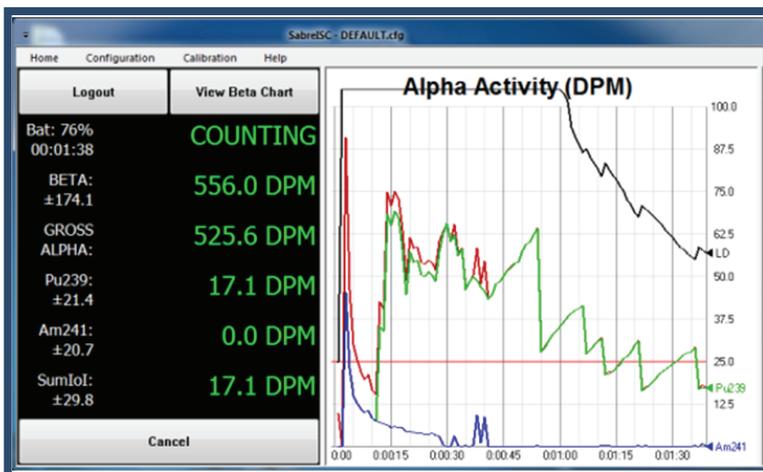
A state-of-the-art peak shape fitting algorithm is used to fit the alpha spectrum data and to model each of the radon progeny plus up to two user-defined isotopes-of-interest. Alpha peak shape fitting is a technique that uses the profile of an alpha isotope peak to create a composite curve of multiple peaks which best fit the actual spectrum. Because the individual nuclide peaks are independently determined, the separation of nuclides is not impacted by the radon equilibrium state or peak ratio changes during the decay process. Precise fitting of the ^{218}Po tail results in excellent resolution of alpha-emitters below 5.5 MeV, in many cases allowing the software to resolve ^{239}Pu from ^{241}Am .



The SabreISC also includes a “match” mode where each radionuclide in the user-editable Isotope List is tested against the spectrum and the isotope with the “best fit” is reported. This feature allows the customer to set the primary isotope-of-interest for the radionuclide of highest likelihood, and let the software test for any other possible activity sources.

Sample Logging and Reporting

At the termination of a count, a hard-copy sample analysis report can be printed or saved to a USB drive. In addition, the SabreISC software creates a database of the results of each user-initiated count—whether the count completed normally, was cancelled, or finished with an activity above the action level. The database uses the comma-separated-variable (*.csv) format, recognized by most spreadsheet and database software.



Specifications

Detector and Sample Holder

- Detector: Solid-state ion-implanted silicon
1-inch detector: 450 mm² active area
2-inch detector: 2000 mm² active area
- Sample Holder: interchangeable holders accept most filters, swipes, smears and planchets to 2" diameter
- Efficiency (4-Pi):
Alpha: 25% (typ.)
Beta: 16% (^{36}Cl)

Data Analysis

- MCA: 1024-channel ADC binned to 256 channel spectrum
- Alpha peak-fitting algorithm for ^{212}Po , ^{214}Po , ^{218}Po and two additional radionuclides (e.g. ^{239}Pu and ^{241}Am)
- Net Beta Activity (radon-subtracted)
- Both fixed and automatic count time modes (auto-mode terminates count after activity and detection limit are both below the action level, or if activity is above the action level and reading is within a user-defined confidence level)
- Max Count Rate: 600,000 cpm (alpha + beta)
- Source Response Check diagnostic
- Calibration: Electro-plated stainless steel source required for efficiency calibration.
Alpha: ^{241}Am or ^{239}Pu recommended
Beta: ^{36}Cl recommended
- Alpha Energy Range: 1.0 - 10.0 MeV
- Beta Energy Range: 100 KeV - 4 MeV

Physical

- Weight: 6.85 lbs (3.10 kg)
- Size: 8.5" w x 6.5" h x 12" d (21 x 16 x 30cm)
- Temperature: 0 to 122 °F (-20 to 50°C)
- Humidity: 5 to 100% (non-condensing)
- 2 USBs for printer/memory/keyboard/mouse
- Power: A/C Adapter with 12 vdc @ 3.3 A

Base Models

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| BIN-SABR-ISC-1 | SabreISC with 1-inch Alpha detector and 47mm sample holder |
| BIN-SABR-ISC-2 | SabreISC with 2-inch Alpha detector and 47mm sample holder |

Options

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|---------------|---|
| BIN-ISC-OPT1 | Beta Measurement |
| BIN-ISC-OPT2 | Extended Battery Life |
| BIN-ISC-OPT8 | Gamma Guard Detector |
| BIN-ISC-HOLD1 | 37mm Sample Holder |
| BIN-ISC-HOLD2 | Whatman Filter Card Holder |
| BIN-ISC-HOLD3 | NFS Filter Card Holder |
| BPT-PRINT1 | Portable battery-powered ink-jet printer for immediate hard-copy Sample Reports |