kromek®
detect image identify

The World's Smallest and Lightest RIID with the Ultimate Detection Performance

D5 RIID

- Ultra-fast identification of isotopes
- High sensitivity
- Isotope ID of distant sources 50x better than ANSI standard
- Ultra-low false alarm rate
- High accuracy dose measurement
- Greater than 24 hours battery life
- Easy to use < 10 minutes training
- Seamless integration into customer networks
- Ruggedized for use in the harshest environments

Military

As the smallest and lightest all-in-one RIID, the D5 RIID is designed to be used on extended adjudication missions. The detector resolution and advanced algorithm enables rapid identification of potential radioactive threats.

This allows accurate in-field adjudication of Special Nuclear Materials (SNM), even when heavily masked during tactical response missions.

Border and Homeland Security

The D5 RIID's small size and weight along with high sensitivity make it ideal for prolonged one-handed security screening operations, as well as discreet monitoring within airports and other critical infrastructures.

The accurate isotope ID performance enables efficient adjudication of radiation alarms, to help minimise disruption while giving reliable information for operational decision making. The stored files can be easily sent to third party experts for Reachback and adjudication.

The D5 RIID blends world leading, high performance radioisotope identification capability with useability, ergonomics and ruggedization to make the ultimate device for Homeland Security and military applications.

Functions:

- Real time isotope identification in Search Mode
- Ability to collect spectral data over a longer period in Confirmation Mode
- Save and view ANSI N42.42 files
- Extract ANSI N42.42 files for viewing on spectral software
- Send files directly from the field using Reachback functionality

Sensitivity and Accuracy

The D5 RIID combines small form factor with powerful radiometric performance. The D5 RIID's detector crystal performance exceeds the performance of a 2" x 2" sodium iodide scintillator, which is the largest size conventional scintillator that is available in existing handheld instruments. With enhanced sensitivity and a medium resolution of 3.5%, the D5 RIID has an area efficiency which is 62% higher when compared with the conventional RIID. The high sensitivity of the device means that any source can be accurately detected, even very low activity sources.

An extensive built-in isotope library enables the D5 RIID to detect and identify mixed, shielded or heavily masked isotope configurations and confirm radionuclide identification across naturally occurring radioactive materials (NORM), industrial, medical, and special nuclear materials. It meets both ANSI N42.34 and the more demanding US Department of Homeland Security Domestic Nuclear Detection Office (DNDO) technical capability standards.

Identifying Sources from Further Away

The D5 RIID has unparalleled performance when detecting and identifying isotopes at very low dose levels, meaning that radioactivity will never be missed. Identification of distant sources is between 40 and 50 times better than the default global standard of performance criteria for these hand-held instruments: ANSI N42.34. This means measurements can be carried out faster, from further away and operator safety is ensured, as they are at a lower risk of higher dose rates.

Resolution

The D5 RIID is a medium resolution (3.5%) device, which ensures higher quality Reachback spectral data when compared with low resolution devices. Any spectral peaks are more clearly defined, thereby allowing for simpler, quicker, and more accurate decision making at the times when it is most needed.

The World's Smallest and Lightest RIID

The D5 RIID is only 660g, compared with legacy instruments often weighing more than 2kg. Measuring 173 x 79 x 41mm, the D5 RIID is light and unobtrusive enough to be both belt and body worn. It is also ideal for prolonged one-handed operation and is easily usable by someone in full PPE.

Ruggedized for Use in the Harshest Environments

The D5 RIID is ruggedized to withstand harsh and challenging

environments. It has an operational range of -20°C to +50°C and functions regardless of humidity, temperature shock, being dropped or fully submerged in water.

Battery Life

As missions get longer, the endurance of portable RIIDs is critical. The D5 RIID's enhanced battery life – in excess of 24 hours – is achieved via a dual system. The device combines an internal rechargeable battery with a set of replaceable AA-sized batteries allowing for speedy in field replacement, without the need for any additional tools and while wearing PPE. Either option can be used in isolation, or the two systems can be used in unison, which removes the need for an external charging station.

Low False Alarm Rate

While constantly scanning for threats and maintaining a high level of sensitivity, a low false alarm rate is essential. With a false alarm rate of just one in 24 hours, the D5 RIID consistently delivers accurate information without excess nuisance alarms.

Isotope library far exceeds ANSI N42.34 and the more stringent DNDO TCS standard

Isotope	ANSI N42.34	DNDO TCS	D5 RIID	Category
Americium-241	✓	✓	✓	Industrial
Barium-133	✓	-	✓	Industrial
Caesium-137	✓	✓	✓	Industrial
Cobalt-57	✓	-	✓	Industrial
Cobalt-60	✓	✓	✓	Industrial
Europium-152	-	-	✓	Industrial
Fluorine-18	-	-	✓	Medical
Gallium-67	✓	✓	✓	Medical
Iodine-123	-	-	✓	Medical
Iodine-131	✓	✓	✓	Medical
Iridium-192	✓	✓	✓	Industrial
Lutetium-177	-	-	✓	Medical
Lutetium-177m	-	-	✓	Medical
Molybdenum-99	-	✓	✓	Medical
Neptunium-237	-	✓	✓	SNM
Plutonium-239	✓	✓	✓	SNM
Plutonium, reactor grade in various shielding	✓	✓	✓	SNM
Plutonium, weapons grade in various shielding	✓	✓	✓	SNM
Potassium-40	✓	-	✓	Norm
Radium-226	✓	✓	✓	Norm
Sodium-22	-	-	✓	Industrial
Technetium-99m	✓	✓	✓	Medical
Thallium-201	✓	✓	✓	Medical
Thorium-232	✓	✓	✓	Norm
Uranium-235	✓	✓	✓	SNM
Uranium-238	✓	✓	✓	SNM
Uranium, depleted in various shielding	✓	✓	✓	SNM
Uranium, highly enriched in various shielding	✓	✓	✓	SNM

Isotope ID performance excels for mixed, shielded and heavily masked cases

Industrial

The D5 RIID is also ideal for expert users with responsibility for responding to radiation incidents and making informed decisions. The isotope ID accuracy, as well as the high spectral quality enables accurate isotope identification and classification even in mixed sources.

Sensor Networking

The D5 RIID can interface with or be integrated into existing systems, including smartphones, to enable Reachback capability. Spectral results with enhanced resolution obtained in the field can be transmitted immediately to an offsite laboratory for secondary adjudication.

The D5 RIID can also link to a network of hubs and sensors to give a real-time overview of a radiological threat. Critically, the connectivity and sensitivity of the D5 RIID allows the building of customised national or local systems using the same sensor.

D5 RIID Detector Specification

Detector type	CLLBC - Gamma and Neutron detection
Detector Size	1.5” diameter x 1.5” long
Gamma Energy Range	30 keV to 3 MeV
Dose Accuracy	± 10% for Cs137
Maximum Dose Rate	100mSv/h
Gamma Resolution	Typically 3.5% @ 662 keV
Area Efficiency*	1.62 relative to a 2” x 2” Ø NaI
Neutron Detector Gamma Rejection	Better than 10^{-7} meets ANSI N42.34 (2015) section 6.7
Operational Temperature Range	-20ºC to 50ºC
Temperature Shock	As per ANSI N42.34
Extreme Temperature Startup	As per ANSI N42.34
Humidity	Up to 93% RH
Moisture/Dust	IP65
Wired Interface	USB-C
Wireless Interface	Bluetooth Wi-Fi 802.11a/b/c/g/n
Firmware Updating	Update over USB
Display	2.8” colour antiglare with backlight suitable for both high and low light
LED	Gives peripheral information about device performance
Alarm Notifications	Visual, Audio and Vibration
Device Size	187 x 80 x 70mm
Device Weight	660 g (1.47 lb)
File Storage	ANSI N42.42
Confirmation Mode	30 sec to 5 minutes
False Alarm Rate	Less than one alarm in every 24 hours
Isotope ID	ANSI N42.34 (2015)
Rugged Military Standard Compliance	Designed to meet MIL-STD-810G
Calibration Stabilisation	Sourceless Natural Atmospheric
Battery Life	> 24 hours
Rechargeable Battery	Lithium ion
Replaceable Batteries	3 x AA
Alarm A Weighted Volume at 30cm	> 80dB
Alarm Frequency	2000Hz
Warm Up Time	30 seconds

* Area Efficiency = $A\varepsilon_{662\ keV}$ /$R_{662\ keV}$1.5

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