kromek ✛
detect image identify

Industry leading isotope ID performance

D5 RIID

- Real-time isotope ID

- Best-in-class, wearable RIID

- State-of-the-art efficiency enables superior spectral and Reachback quality for accurate adjudication

- IP67 rated and MIL-STD-810G, w/ Change 1 rugged military standard compliance

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 provides a unique tool of high-performance and versatility in a wearable package for Homeland Security, Industrial and Military personnel.

Functions:

- Real time search and ID, Confirmation Mode, Reachback
- Gamma alarm, neutron alarm, dose rate, high dose alarm, over range alert, accumulated dose alarm
- Vibration and audio alarms
- Alarm thresholds are configurable using the provided Kromek software platform
- Meets and exceeds ANSI N42.34 (2015)
- Rugged military MIL-STD-810G, w/Change 1 standard compliance

Sensitivity

The D5 RIID exceeds the performance of a 2" Ø × 2" NaI scintillator, which is the largest size conventional scintillator that is available in an existing handheld instrument.

Using the intrinsic photo peak efficiency and energy resolution to evaluate detector performance as defined by the PRF-JPdL-RND-RIID-001 w/ AMENDMENT 3, the D5 RIID's area efficiency is 62% higher with 3.5% energy resolution than a 2" Ø × 2" NaI detector with 7% energy resolution at 662 keV.

Stored Information

Internal memory within the D5 RIID detector can store over 100,000 spectral data files in industry standard ANSI N42.42 format.

Field Proven Technology

The D5 RIID was a customer led technology development in collaboration with the Defense Threat Reduction Agency (DTRA) which has undergone a full test matrix in Oakridge.

False alarm rate

With less than 1 in 24 hours false alarm rate, the D5 RIID far exceeds ANSI N42.34 standard of 1 in 1 hour, eliminating nuisance alarms during daily operation.

Device power

Versatile battery management system consisting of:

- An internal rechargeable battery that can be used exclusively and charged via the USB port.

- Two standard AA batteries that can be accessed and replaced without using any tools. When present, the AA batteries will be used as the primary power source. When they are drained or removed, the D5 RIID will revert to using the internal battery for continued operation.

Interfacing

The D5 RIID's display screen is optimised for working in both high and low light, while providing an extensive colour palette for eye-catching alarms and alerts. The stored N42 files can be extracted via USB, Bluetooth or WiFi onto a PC or Android mobile device for Reachback procedure. Its universal API enables integration with user deployed applications (Mobile Field Kit, ATAK, etc.).

Available Options

- Ruggedized cases provide storage and protection for the D5 RIID and ancillary equipment.
- Protective sleeves that provide an enhanced grip and additional drop protection
- Belt or MOLLE strap wearable carry pouch
- Interactive user training app and personnel training records management system

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	X	X	X	Industrial
Barium-133	X		X	Industrial
Caesium-137	X	X	X	Industrial
Cobalt-57	X		X	Industrial
Cobalt-60	X	X	X	Industrial
Europium-152			X	Industrial
Fluorine-18			X	Medical
Gallium-67	X	X	X	Medical
Iodine-123			X	Medical
Iodine-131	X	X	X	Medical
Iridium-192	X	X	X	Industrial
Lutetium-177			X	Medical
Lutetium-177m			X	Medical
Molybdenum-99		X	X	Medical
Neptunium-237		X	X	SNM
Plutonium-239	X	X	X	SNM
Plutonium, reactor grade in various shielding	X	X	X	SNM
Plutonium, weapons grade in various shielding	X	X	X	SNM
Potassium-40	X		X	Norm
Radium-226	X	X	X	Norm
Sodium-22			X	Industrial
Technetium-99m	X	X	X	Medical
Thallium-201	X	X	X	Medical
Thorium-232	X	X	X	Norm
Uranium-235	X	X	X	SNM
Uranium-238	X	X	X	SNM
Uranium, depleted in various shielding	X	X	X	SNM
Uranium, highly enriched in various shielding	X	X	X	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.
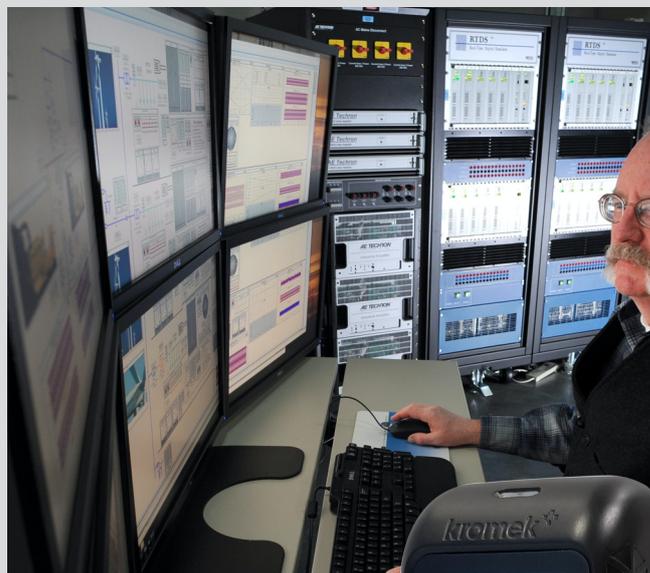
Sensor Networking

The D5 RIID can be easily integrated into a customer's networked platform as the alarm, dose, isotope ID and Reachback files are given as an output by the detector. This enables a single control point for multiple integrated sensors, rather than using each one individually.

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 70 mm
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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