RadEye Selection Guide

08/2012

Handheld Detection
for Any Scenario

Thermo SCIENTIFIC

RadEye Product Family

With the RadEye Product Family, Thermo Fisher Scientific offers a wide range of advanced handheld instruments for radiation detection, gamma dose rate measurements and area monitoring.
This guide offers a brief description and technical characteristics for each instrument. For more detailed technical specifications, please contact your local sales representative or your appropriate customer service assistant.

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RadEye Product Family

Features

- Rugged and reliable
- Large graphic display
- Lightweight instruments, starting from 160 g
- Simple and intuitive user interface
- Easily configured for specific tasks
- Durable and shock resistant
- Accurate with excellent EMI immunity
- Low power technology
- Use of rechargeable standard-size batteries

RadEye - The next generation of radiation meters

Thermo Scientific offers a comprehensive range of advanced instruments for radiation detection, dose rate and contamination measurements.

The characteristic features of this versatile pocket meter are the small size, the ease and flexibility of operation and its superior measurement performance, which is provided by the use of sophisticated low power technology. Fully automated self-diagnosis minimizes required maintenance.

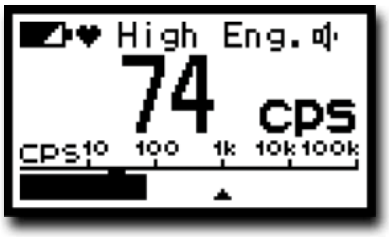
All essential functions are easily accessed, even while wearing protective gloves.

The top-mounted alarm-LED can be seen while the instrument is worn in a belt-holster. A built-in vibrator and an earphone-output provide silent alarming for use in very noisy environments.

Menu operation

All of the parameters can be easily modified on the RadEye or using the optional software. These menu operations can also be reconfigured to simplify the instrument and to avoid any faulty operation. Navigation is made easy by a clear and intuitive interface.

1. Opens the configuration menu.
   Once the menu is opened, features are selected by 1 2 3 4
2. Additional information (e.g., the accumulated dose, remaining time in a certain radiation field as well as mean and maximum measuring values) can be displayed.
3. On-switch and key lock - similar operation to your mobile phone.
4. 5 Operation of the audible indicator and alarm acknowledgement.

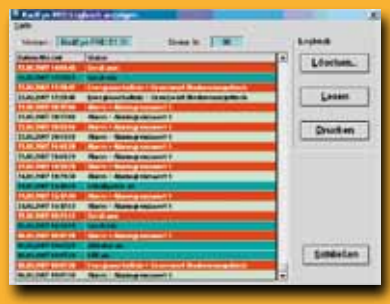


RadEye software

All settings and the data analysis can be done using the optional Windows®- based PC-software, and an accompanying reader device. In order to allow post-event analysis, the latest 1,600 dose rate values are stored in the data memory. For each datalogging interval both the mean and the maximum measurement values are stored.

Changes in configuration, along with alarms and errors, are saved in the RadEye memory. These events can be read out via the “logbook”. It is shown as a table and can be saved to the PC or printed. The logbook has a maximum of 250 data sets. Several events that occur at the same time are saved as one record. On the display every event is shown in one line for a clear view.

RadEye PRD configuration



RadEye PRD logbook

RadEye PRD history

RadEye PRD/PRD-ER

Search and Find

Features

- High quality PMT for excellent response from 30 keV
- EMI immunity much better than photodiode instruments
- NaI(Tl)-Detector for high response to SNM and RDD´s
- True dose and dose rate calculation avoids significant overestimation of low gamma energies
- Automatic background update, (i.e., no user action necessary)
- NBR allows very low alarm levels for artificial radioactivity
- Designed to meet ANSI 42.33/1, 42.32 and IEC 62401
- Energy response behavior in Roentgen

RadEye PRD

The "orphan source" phenomena is a serious global problem as sources showing up unexpectedly in scrap yards, border crossings or numerous other public locations are a significant potential threat. The RadEye PRD represents a high-performance measuring device for anyone responsible for finding radiation sources whether they be first preventers (border guards, customs officers) or first responders (emergency services and law enforcement).

The RadEye PRD is 5,000 - 100,000 times more sensitive than a typical electronic dosimeter.

When looking for lost or hidden radiation sources or contaminated materials, it is paramount to use a tool with high sensitivity and high selectivity.

The RadEye PRD achieves this through a special technique based on our patented Natural Background Rejection (NBR) technology. It is the only instrument of its type and size to achieve this.

The RadEye PRD incorporates a high sensitivity NaI(Tl) scintillation detector with a miniature photo-multiplier allowing the detection of very low radiation levels with particular emphasis on gamma emissions below 400 keV. Thus, in case of a nuclear accident, the RadEye PRD is ideal for sensitive I-131 detection and measurement.

Detector	NaI(Tl)-detector with high quality micro photomultiplier; software switch for R or Sv energy response and calibration
Measuring range	PRD: 1 µR/h - 25 mR/h [0.01 µSv/h – 250 µSv/h] PRD-ER: 1 µrem/h - 10 rem/h [0.01 µSv/h – 100 mSv/h]
Overrange indication	PRD: Tested up to 1,000 R/h [10 Sv/h] PRD-ER: Tested up to 10,000 rem/h [100 Sv/h]
Energy range (+/- 30 %)	60 keV - 1.3 MeV, excellent detection from 30 keV
Response for Cs-137 (662 keV)	1.5 cps per µR/h [150 cps per µSv/h]
Response for Am-241 (60 keV)	30 cps per µR/h [2000 cps per µSv/h]
Linearity error (Cs-137)	PRD: max. ± 10 % PRD-ER: max. ± 20 %
Enhanced alarming sensitivity by NBR	Yes, down to 1 µR/h [0.01 µSv/h] at low gamma energies
Cosmic radiation background	Suppression typically > 95 %

RadEye PRD #4250671
Factory calibrated in exposure rate R/h

RadEye PRD #425067120
Factory calibrated in H*(10) µSv/h

RadEye PRD/PRD-ER

Search and Find and Gamma Safety Surveys

Applications

- Search and Safety
- Security
- First responders
- Steel and Recycling
- Environmental Monitoring

RadEye PRD-ER

Special proprietary circuitry allows the energy compensated dose and dose rate measurement up to 100 mSv/h (or 10 rem/h). Thus the RadEye PRD-ER is the ideal tool for both interdiction and response.

Unlike instruments using two different detectors for the low dose rate range and the high dose rate range, the single detector arrangement in the RadEye PRD-ER offers the following unique advantages over the whole measuring range:

- Consistent angular dependence
- No mutual shielding of neighboring detectors
- Consistent energy response
- No transition range with annoying hysteresis effects
- No high activity source for function test of high dose rate detector required

With the help of the RadEye PRD-ER test adapter, users can check the full detector performance on a regular basis – without the need of a high dose rate calibration facility.

RadEye PRD-ER #425067102
Factory calibrated in exposure rate R/h
Yellow front cover

RadEye PRD-ER #425067122
Factory calibrated in H*(10) µSv/h
Yellow front cover

RadEye PRD-ER #425067104
Factory calibrated in exposure rate R/h
Black front cover

Lutetium Test Adapter for PRD and PRD-ER

For additional information please see pages 37-38.

RadEye variants PRD-S and PRD-ER-S

The special firmware variants RadEye PRD-S # 425067130 and RadEye PRD-ER # 425067135 includes the capability for scaler measurement.

For additional information please ask for a separate data sheet.

RadEye PRD-S gamma laboratory kit # 425069015, e.g. for sensitive measurement of small food samples.

RadEye GN

High Sensitivity Gamma Neutron Pagers

Features:

- Pocket-sized gamma neutron pager
- Very high neutron and gamma sensitivity
- Ideal for law enforcement officers and first responders
- Immediate classification of gamma source (NORM/non-NORM)
- Energy compensated gamma dose rate
- Dual gamma/neutron display
- No false neutron alarms for even intense gamma sources

New!

The new Thermo Scientific RadEye™ GN Gamma Neutron Pager combines the superior performance of the Thermo Scientific RadEye PRD Gamma Pager with a very high neutron sensitivity that exceeds the time-to-alarm requirements of ANSI 42.32 and IEC 62401. Furthermore the RadEye GN shows a significantly enhanced performance of the built-in NBR circuitry (NBR = Natural Background Rejection). It is now even more capable of differentiating artificial sources from NORM than previous RadEye™ PRDs, due to the resolution and stability of the scintillator material.

The RadEye GN identifies to the user whether the alarms are due to gamma or neutron by a different colored alarm LED, different tones and flashing the count rate/dose rate display readings with an inverted display background of the alarming channel or both channels as appropriate. The device also has different audible alarms, discriminating between elevated background/NORM and any artificial isotope alarm. The gamma and neutron audible alarms are clearly different. This gives the RadEye GN audible and visual identification using NBR of the type of material detected.

In conjunction with the optional moderator (# 425067177), the RadEye GN pager can be transformed into an even more powerful gamma/neutron search device at very little additional cost. An estimation of the neutron dose rate can thus be achieved for perimeter marking as well.

NBR = Natural Background Rejection
The NBR measurement method has been developed by Thermo Fisher Scientific, for extremely fast discrimination between natural and artifical gamma radiation. Many thousands of devices, based on this technology, are in use worldwide.

The display has large 8 mm numerals and large clear radiation units:

It includes a quick-view bar graph of current count-rate / dose-rate and alarm set points, including the floating sigma alarm point, if utilized.

The display also shows alarm status:

- Artificial low energy alarm
- Artificial mid energy alarm
- Artificial high energy alarm
- NORM balanced alarm
- Gross gamma count or dose rate alarms (2 alarm levels)
- Gross neutron count rate alarm
- Gamma dose alarm (2 alarm levels)
- Safety alarm (gamma)

A bright orange LED for gamma alarms and a bright blue LED for neutron alarms is viewable from the front and above. When a dual gamma and neutron alarm is detected, both LEDs flash. Both readings on the display are flashed with a reversed background. The RadEye GN can be fitted with the Bluetooth™ (#425067087) back that can be set to talk to a PC, or to other devices for networking.

Technical details of the Thermo Scientific RadEye GN Gamma Neutron Pager

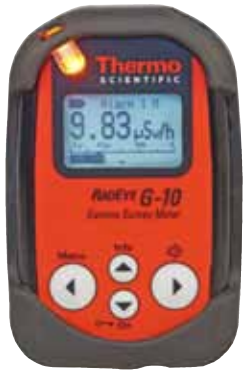
Size	96 mm x 61 mm x 31 mm
Weight	160 g
Battery life time	> 300 h
Detection capability	Gamma count-rate from 30 keV to 1.3 MeV Energy compensated gamma doserate from 45 keV to 1.3 Mev (H*(10)) from 1 µRem/h to 25 mRem/h (0,01 µSv/h to 250 µSv/h) Neutron count-rate from 0,1 to 1000 cps
Gamma efficiency	900 cps per µSv/h (Am-241); 130 cps per µSv/h (Cs-137); 60 cps per µSv/h (Co-60)
Neutron efficiency	4.3 cps/20,000 n/s Cf-252; shielded in 1 cm lead 25 cm in front of instrument with 30 cm x 30 cm x 15 cm PMMA phantom. Exceeds ANSI 42.32 and IEC 62401 alarm requirements
Order number	RadEye GN: #4250630

RadEye G/G-10

Gamma Safety Surveys

Applications

- Gamma surveys from background up to personal safety levels
- First Responders
- Nuclear Power Industry
- Radiography
- Radiation Protection
- Radiography
- G-10 is for H-10 deep dose rate measurements



Wide range survey meter RadEye G-10 (SI-units) and RadEye G (US-market)

The RadEye G and RadEye G-10 are lightweight and very rugged instruments designed for quick and reliable measurement of gamma dose rates.

Modern electronic circuitry guarantees excellent linearity over six decades of radiation intensity: from background level to 100 mSv/h (10 R/h) - with unlimited overrange indication. Both devices incorporate a large energy compensated GM-tube for precise dose rate measurement for gamma and X-ray.

Detector	Energy compensated GM-tube
Measuring range	RadEye G: 50 µR/h - 10 R/h RadEye G-10: 0.5 µSv/h - 100 mSv/h [50 rem/h - 10 rem/h]
Energy range (according to IEC 60846-1)	RadEye G: 45 keV - 3 MeV RadEye G-10: 50 keV - 3 MeV
Count rate for Cs-137 (662 keV)	17 cps per mR/h [1.7 cps per µSv/h]

RadEye	Color front cover	Order no.
RadEye G-10	red	# 4250676
RadEye G-10	white	# 425067602
RadEye G-10 PTB	red	# 4250675
RadEye G	black	# 4250674
RadEye G	yellow	# 425067401

Common features of RadEye G and GF series

Key features

- Pocket size
- Accurate
- Lightweight
- Large graphic display with clear prefix and bar graph
- Extreme low power consumption for permanent operation
- Energy compensated up to 3 MeV

Check source

To ensure top functionality of the RadEye G series, we offer a test adapter based on 200 kBq Ba-133 - exempt quantity referring to e.g. NRC/IAEA/EU regulations. # 425067072

For use in the US, a 5 µCi Cs-137 test adapter is available as well. # 425067075CS137

RadEye GF/GF-10

High Range Gamma Surveys

Applications

- High range measurement
- Radiography
- Safety

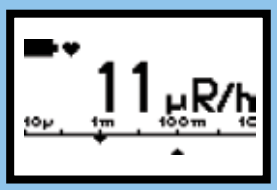
High range gamma survey meter RadEye GF-10 (SI-units) and RadEye GF (US-market)

The intelligent ratemeter algorithm (ADF mode) guarantees that even the smallest changes in dose rate are immediately detected, while at the same time, random fluctuations are effectively suppressed.

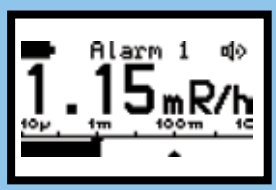
All essential functions are easily accessed while wearing protective gloves. The alarm-LED can be seen while the instrument is worn in a belt-holster. The instrument is also equipped with a built-in vibrator and an earphone-output for silent alarming or use in very noisy environment.

Detector	Energy compensated GM-tube
Measuring range	RadEye GF: 0.5 mR/h - 300 R/h RadEye GF-10: 5 µSv/h - 3 Sv/h [0.5 mrem/h - 100 rem/h]
Energy range (according to IEC 60846-1)	RadEye GF: 45 keV - 3 MeV RadEye GF-10: 50 keV - 3 MeV
Count rate for Cs-137 (662 keV)	RadEye GF: 1.3 cps per mR/h RadEye GF-10: 0.13 cps per µSv/h

RadEye GF: # 425067475 RadEye GF-10: # 425067675



Background measurement
Alarm thresholds - two triangles in the bar graph, indication low



Alarm level 1 exceeded
"Alarm 1" and "speaker" signs show up
Absence of trend arrow indicates stable radiation level - reading can be taken

Approaching a source
Alarm thresholds - not yet exceeded.
Trend arrow indicates increasing radiation level

RadEye G-Ex series

Intrinsically Safe Gamma Surveys

Features

- Intrinsically safe according to ATEX standards
- Efficient and reliable dose and dose rate measurements
- Large, clear and backlit display for error-free readings
- Rugged and reliable
- Lightweight, only 160 g (5.6 oz.)
- Low power technology

New!

RadEye G-Ex series - intrinsically safe personal radiation detectors

In emergency response and in industry flammable and explosive materials like gases, dust and fibers can occur. In such potentially explosive atmospheres it is necessary to use ATEX certified devices for your measurements.

The Thermo Scientific RadEye G-Ex series comprises four versions of intrinsically safe handheld devices for gamma and dose rate measurements. They are designed according to the latest ATEX standards to meet the needs of their operator in and around hazardous areas.

Devices certified as "intrinsically safe" are designed to be unable to release sufficient electrical or thermal energy to cause ignition of flammable materials like gas, dust or particulates.

Beside the ATEX tags, the visual difference between the RadEye versions is noted by the orange color of the front panel of the intrinsically safe versions.

Inside, the RadEye G-Ex devices have been re-engineered to reduce energy safety issues and avoid the generation of heat and electrical sparks. They are premium products designed for ultimate safety and accurate dose rate measurements.

ATEX Certification RadEye G-Ex Instruments

II 2G-EX ia IIB T4

	ATEX examination mark. This sign is required on all devices used in European hazardous areas.
II 2G	Classification of zones. II = device is approved for all non-mining areas. 2 = category of the device, here it means that the device is rated for the second most hazardous areas. G = designates atmosphere, in this case gas, vapors and mist.
Ex	Explosion protection based on European Ex-regulations.
ia	Explosion protection type, "ia" is the highest level of protection.
IIB	Gas group for average reactive gases (except hydrogen, acetylene or disulfide)
T4	Temperature class gives the user the maximum temperature of a surface that may be in contact to the Ex atmosphere under fault conditions. T4 is rated at 135 °C.

RadEye G-10-Ex: # 425067660
RadEye GF-10-Ex: # 425067670
RadEye G-Ex: # 425067460
RadEye GF-Ex: # 425067470

RadEye G-Ex series

Intrinsically Safe Gamma Surveys

Applications

- Hazmat teams
- Fire brigades
- Refineries
- Oil platforms
- Locations with risk of explosion
- Marines and Coast Guard

Measuring range	RadEye G-10-Ex: From 0.5 µSv/h to 100 mSv/h RadEye GF-10-Ex: From 5 µSv/h to 3 Sv/h	SI-units
Sensitivity (Cs-137, 660 keV)	RadEye G-10-Ex: ~1.9 cps/µSv/h RadEye GF-10-Ex: ~0.13 cps/µSv/h	

Measuring range	RadEye G-Ex: From 50 µR/h to 10 R/h RadEye GF-Ex: From 0.5 mR/h to 300 R/h	USA
Sensitivity (Cs-137, 660 keV)	RadEye G-Ex: ~17 cps/mR/h RadEye GF-Ex: ~1.3 cps/mR/h	

Dose	0.5 µSv to 10 Sv
Linearity error	max. +/- 10 % in the measuring range
Alarm thresholds	Two each thresholds for dose and dose rate
Energy range	45 keV – 3 MeV according to IEC 60846-1
Working temperature	-20 °C ... + 50 °C
Relative humidity	10 ... 90 % at 35 °C
Protection degree	IP 65 according to EN 60 529
ATEX classification	II 2G Ex ia IIB T4 IBExU10ATEX1096
Size	96 x 61 x 31 mm without rubber protector
Weight	approx. 160 g, including 2 batteries
Internal memory	The latest 1600 measured values are saved and can be read out via PC-program. Logbook with 250 entries for changes of configuration, occurring alarms and errors

Check source

To keep the radiation detector functionality of the RadEyeG and RadEyeG-10 we offer a test adapter based on 200 kBq Ba-133 - exempt quantity referring to e.g. NRC/IAEA/EU regulations. # 425067072

For use in the U.S., a 5 µCi Cs-137 test adapter is available as well. # 425067075CS137

RadEye G20-10/G20-ER10

Gamma Surveys Including X-rays

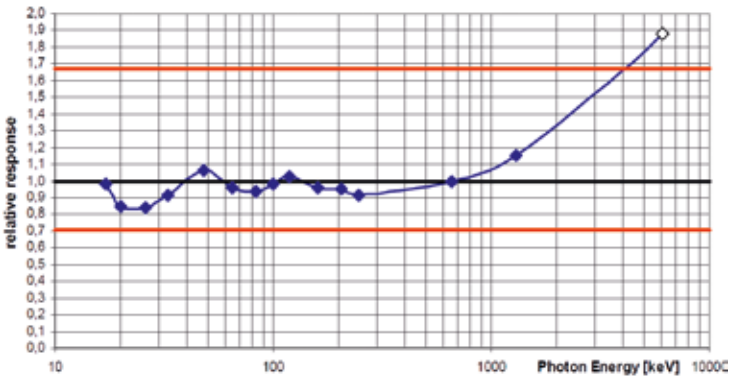
Features

- Energy compensated measurements from low energy to high energy
- Low level measurements are easier and more stable than Ion Chambers
- Leight weight (300 g), excellent grip with and without gloves
- Rugged and compact design, thick rubber protective cover
- Low cost of ownership with > 500 h operation time with 2 AAA batteries – rechargeable NiMH-cells can be used
- Menu-driven user interface results in low training cost and immediate familiarity
- Huge internal data memory for both scaler results and continuous data recording
- Bright backlit LCD display – plain text messages – different languages can be selected
- Audible indication: single pulse or chirper mode proportional to count rate
- Earphone output for operation in loud environment

RadEye G20-10/G20-ER10

The RadEye G20-10 and G20-ER10 are excellent gamma survey meters with a flat energy response curve from 17 keV to 3 MeV according to ambient equivalent dose H*(10).

The devices are suitable for dose rate measurements for X-ray scanner and for medical isotopes including I-125.



RadEye G20-10 and RadEye G20-ER 10 Relative Gamma Response for H*(10)

Gamma test adapter (50 g Lu_2O_3) for RadEye G20/ G20-ER and portable scintillation detectors: # 4254948

- 62 mm diameter, 7 mm height (aluminum housing) 55 mm diameter, 3 mm height (Lu_2O_3 ceramics)
- Induced net dose rate for RadEye G20: 0.25 µSv/h (25 µrem/h).
- Time requirement for response verification approximately 5 minutes

For immediate response verification a 200 kBq Ba-133 (exempt quantity) or other gamma test sources can be used.

For additional information please see pages 37-38.

RadEye G20-10: # 4250687
RadEye G20-ER10: # 425068710
Holster for RadEye G20/B20: # 425068519

RadEye B20/B20-ER

For Alpha/Beta Surface Contamination

Applications

General radiation protection for:

- Homeland security
- Fire departments
- Emergency response
- Hospitals
- Nuclear power industry
- Pharmaceutical industry
- Universities

RadEye B20/B20-ER

The RadEye B20/B20-ER models are the best choice for contamination and dose rate measurements. They are modern, compact and measure alpha, beta, gamma and X-ray radiation.

The RadEye B20/B20-ER models can also be used for accurate dose rate surveys if used with correct energy compensated doserate filter (17 keV– 3 MeV).

For emergency response purposes alpha and beta contamination can be discriminated using another optional filter. The RadEye B20 will automatically switch to the proper measuring unit, if an auto detection filter is fitted to the face of the B20 detector. This automatic function helps to avoid accidental misuse.

The instrument is part of the growing RadEye family of high-end stand-alone meters, which are designed to exceed the most demanding user expectations.

B20 is for normal measurements, B20-ER is for high range measurements.

Features

- Lightweight (300 g), excellent grip with and without gloves
- Rugged and compact design, thick rubber protective cover
- Low cost of ownership with > 500 h operation time with 2 AAA batteries – rechargeable NiMH-cells can be used
- Menu-driven user interface results in low training cost and immediate familiarity
- Huge internal data memory for both scaler results and continuous data recording
- Bright backlit LCD display – plain text messages – different languages can be selected
- Easy adaptation to different tasks by supervisor configuration, calibration, selection of measuring units
- Versatile operation modes:
  - Scaler/Timer with preset count and preset time for sample measurements
  - Continuous ratemeter mode for frisker operation
  - Dose rate mode
- Audible indication: single pulse or chirper mode proportional to count rate
- Earphone output for operation in loud environment
- IR PC Interface or Bluetooth® as option
- Advanced Windows® software is available as option

RadEye B20: # 4250685
RadEye B20-ER: # 425068510
Holster for RadEye B20/G20: # 425068519

RadEye B20/B20-ER

Surface Contamination/Gamma Survey

Application	Contamination αβγ	Contamination βγ	Dose Rate H*(10)	Dose Rate H´07
Autodetection Filter	No Filter	Alpha Blocker 425068581	H*(10)Filter 425068582	H´07 Filter 425068583
RadEye B20 / B20-ER				
Filter Code displayed at the LCD	No Code	(α Blocker)	(H*(10))	(H´07)
Related Units	cps cpm Bq/cm² Bq dpm dps	cps cpm Bq/cm² Bq dpm dps	Sv/h rem/h	Sv/h rem/h

Automatic recognition of the filter by the RadEye's processor

Automatic recognition of the filter by the RadEye's processor

Detector	1 pancake GM-tube, window dia. 44 mm (1.7"); 1.8 – 2.0 mg/cm²
Measuring range (gamma dose rate) Uncompensated (662 keV) or with opt. energy filter:	0 - 2 mSv/h [0 - 200 mrem/h] RadEye B20 0 - 100 mSv/h [0 - 10 rem/h] RadEye B20-ER
Measuring range (contamination):	0 - 10 kcps RadEye B20 0 - 500 kcps RadEye B20-ER
2 π efficiency (ref. to 50 mm diameter without rubber sleeve):	Am-241: 28 %; Co-60: 25 %; Sr/Y-90: 36 %; C-14: 19 %
Energy range (according to IEC 60846-1); with gamma energy filter H*(10) and H´(0.07)	17 keV – 3 MeV
Weight and maximum dimensions	300 g (0.7 lb.); 13 x 7 x 6 cm (5.2" x 2.8" x 2.4")
Alarm indication	LED, sound, vibrator

Excellent grip with gloves

Holster with neckband for RadEye B20/G20 versions, safety locking at the neckband: #425068519

First responder laboratory kit *

Pelican case # 425069011 containing:

- Sample changer for use with the RadEye B20
- Sample planchets with different lip heights
- Disposable gloves, spatula
- 50 mm paper filters

Space for optional items:

- Data cable and desktop holder
- User manual
- Lutetium-Oxide test adapter
- RadEye B20/B20-ER
- Additional RadEye (PRD or N)
- Two removable energy filters

* Please order a RadEye B20 or B20-ER separately

Lutetium Test Adapter

High precision, low energy test adapter for performance verification # 425068571

- 9 g natural Lutetium-Oxide with 50 Bq/g (1.4 nCi/g)
- Due to half life of 37,000 million years of Lu-176, there are no error-prone half life corrections necessary by the user
- Extremely uniform activity content and surface emission rate
- Identical surface emission rate for each test source

New!

Extensions for RadEye instruments

Using the extensions, the hand is much less exposed if the RadEye B20/B20 ER comes close to a source.

For more information please see page 35.

425067177

RadEye NL

Neutron Search and Find

Features

- Rapid warning of neutron radiation fields
- Applicable as an area monitor
- Exceeds the neutron response requirements of ISO 22188
- Ideal complement to passive and active neutron dosimeters
- Detection of neutron shielding deficiencies and source presence
- Ideal complement to Rem-counters
- No spill-over from gamma radiation up to 10 mSv/h (1 R/h)
- Ideal for verification of neutron fields when dealing with unknown radiation sources
- "No false neutron alarms due to gammas"
- Can be used in high gamma dose rate fields
- Can be made into dose rate device

RadEye NL

The RadEye NL closes a gap in the classical product spectrum of the radiation measurement technology.
While conventional Rem-counters with a He-3 or BF3 tube are usually heavy and bulky instruments, the RadEye NL is a compact and lightweight device, even in use with a moderator.

Weight	160 g (5.6 oz.)
Dimensions	96 x 61 x 31 mm (3.8 x 2.4 x 1.2")
Detector	He-3 tube with 2.5 bar absolute pressure
Sensitivity when worn at the body (RadEye NL)	approx. 0.2 cps per µSv/h (2 cps per mRem/h) for Cf-252, detects 0.01 µg Cf-252 in typically 2 - 3 s for 25 cm (10") distance
Background	approx. 0.003 cps at 300 m above sea level
Gamma spill-over	< 0.2 cps at 10 mSv/h (1 R/h) Cs-137 radiation
Measuring units	Count rate (cps) moving average over 10 s Mean value and peak value over any time period
Operation time (2 AAA alkaline batteries)	approx. 500 h
Calibration factors	The calibration factors for selected work places with known neutron spectra can be entered [mrem/h, µSv/h].

Provisonal values for the measured ambient dose equivalent H*(10) response of the moderated RadEye NL, with the bottom of the moderator oriented toward to neutron source.

	Neutron Energy (MeV)	Measured H*(10) Response (Moderator 'Bottom') (cps / µSv hr^{-1})
Van de Graaff	0.14	0.98
Van de Graaff	0.57	0.32
Am-Li	0.47*	0.64
Cf (D_2O-moderated)	0.54*	1.05
Cf (bare)	2.10*	0.24
Am-Be	4.20*	0.18

*Mean energy of radionuclide-based source spectrum

RadEye NL: # 4250678

Applications

- Users of industrial neutron sources (e.g., in geology and material testing)
- Operators and users of accelerators in medical science and research
- Radiation protection staff and inspectors of nuclear facilities
- First responders and law enforcement officers

The RadEye NL is normally worn in a holster. In order to use it as a handheld survey meter and to increase the efficiency for fast neutrons, the RadEye NL can be put into an optional moderator with handle.

RadEye NL moderator: # 425067110

For simultaneous gamma and neutron dose rate measurements a RadEye G-10 can be fixed to the moderator.

Holder for optional second RadEye: # 425067073

While the RadEye NL is worn in a Rem-holster close to the body, the handheld RadEye G-10 displays the measurements of both devices. Thereby the communication between the two RadEye instruments is enabled via two optional RadEye Bluetooth communication battery covers (page 36).

RadEye BTcom battery cover: # 425067087
RadEye Rem-holster with boron inlet: # 425067710
RadEye BTcom Combo with 2 ea. paired BTcom battery covers # 425068102

RadEye NL Area Monitor with additional alarm unit.

RadEye Area Monitor: # 4250680
Alarm unit: # 425068010

RadEye AB100

Simultaneous and separate Alpha/Beta Contamination Measurements

Features

- Lightweight (900 g), excellent grip with or without gloves
- Rugged and compact design
- Low cost of ownership
- Menu-driven user interface
- Huge internal data memory
- Bright backlit LCD display – plain text messages – different languages can be selected
- Easy adaptation to different tasks
- Supervisor configuration, calibration, selection of measuring units
- Versatile operation modes:
  - Scaler/Timer with preset count and preset time for sample measurements
  - Continuous ratemeter mode for frisker operation
  - Alpha, beta and alpha + beta modes
  - Gross or net counting
- Audible indication: single pulse for alpha, chirper mode for beta - proportional to count rate
- Easy adaptation to different tasks

Applications

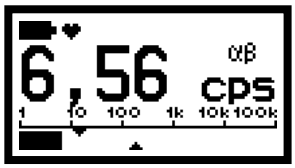
General radiation protection for

- Civil defense
- Fire brigades
- Hospitals
- Nuclear industry
- Pharmaceutical industry

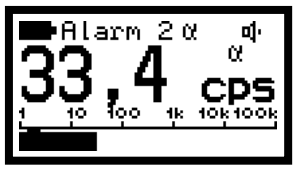
RadEye AB100

The RadEye AB100 is a modern contamination meter for surface contamination measurements with excellent alpha/beta discrimination. The user can select the proper calibration factor within a list of isotopes (e.g., Bq, Bq/cm², dpm).

The instrument is part of the growing RadEye family of high-end stand-alone meters, which are designed to meet the most demanding user expectations.

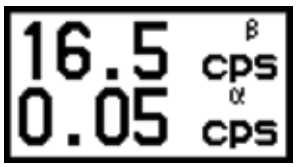


Simultaneous measurement of alpha, beta and gamma radiation



Alpha alarm is indicated

Scaler mode



Dual display

Efficiency (per surface emission)	Am-241: 36 % (α) Co-60: 23 % (β) Sr/Y-90: 49 % (β)
Gamma response (Cs-137)	approx. 40 s^{-1}/(µSv/h) 0.4 s^{-1}/(µR/h)
Window thickness/ Active area	Thickness: 0.87 mg/cm² aluminized plastic film Sensitive area of 69 x 145 mm [2.71" x 5.71"]; Open area of approx. 85 %
Dimensions/ Weight	355 x 100 x 180 mm [14 x 4 x 7.1"] / approx. 0.9 kg [2 lb.]

RadEye AB100: # 4250683

Features

- The RadEye X survey meters can operate with virtually any manufacturer's GM probe, with dual phosphor α/β, NaI(Tl) and plastic probes and proportional detectors
- Up to 16 different probe configurations are selectable in a submenu
- Easy to replace probes in the field, with a simple button-push
- Weighs only 160 g (5.6 oz.) with rubber protection, without cable
- 110 x 67 x 62 mm (4.3 x 2.6 x 2.4")
- Versatile operation modes
- RadEye BTcom cover for Bluetooth® communication

RadEye X series

As part of the growing RadEye product family of high-end stand-alone meters, the RadEye X series is designed to exceed the most demanding user expectations.

The RadEye X series comprises three different types of modern and compact multi-purpose survey meters that fit most any external counter tubes that have already been in use (e.g., the nuclear industry):

- RadEye GX for Geiger-Mueller detectors
- RadEye SX for scintillation detectors
- RadEye PX for proportional detectors

General count rate and surface contamination measurements can be performed as well as dose rate measurements. Due to the clear and large display, all essential functions and software parameters can be easily accessed. The display and the alarm-LED can be seen while the instrument is worn in the transparent case.

All settings and the data analysis can be done by an optional Windows®-based PC-software and a reader device. The last 1,600 mean and maximum values of the count rate or dose rate are recorded internally and can be read out via a serial interface. Additionally, the instruments log the last 250 alarms, error messages and changes of the configuration.

Operation modes:

- Scaler/Timer with preset count and preset time for sample measurements
- Continuous ratemeter mode for frisker operation
- Dose rate mode

The Thermo Scientific RadEye BTcom cover provides wireless communication and data transfer between the RadEye X series and a PC.

RadEye X series

Features

- Universal interface via non-proprietary coax cable
- Connection to a large variety of probes
- Approved detectors can be kept in use
- Improved performance, (e.g., measuring range, built - in datalogging, computer interface)
- 90 % weight and size reduction compared to conventional survey meters
- Compatible to all RadEye accessories

Technical details RadEye X series

Measured quantities	Count rate (cps, cpm), surface contamination (Bq, dps, dpm, Bq/cm^2), dose rate (R/h, Sv/h, rem/h)	
Background subtraction	In count rate and contamination mode	
Measuring range (Default)	RadEye GX: 10,000 cps RadEye SX: 100,000 cps RadEye PX: 100,000 cps	extendable by individual probe calibration
Probe cables	RG 58, max. 1.5 m (59") – MHV connector, different (probe-side) HV connectors available, please call us	
High voltage range	RadEye GX: 350 V…1100 V with output impedance 1 MΩ RadEye SX: 300 V…1400 V with output RadEye PX: 300 V…1400 V with output	
Probe library	16 different detectors with corresponding high voltage, calibration factor, dead time correction, overload threshold, detector area and timeout for detector failure.	
Alarm threshold	Two alarm thresholds for count rate, activity, dose and dose rate each	
Audible alarm intensity	80 dB at a distance of 30 cm (11.8")	
Working temperature	-20 °C ... + 50 °C (-4 °F ... 122 °F)	
Relative humidity	10 ... 90 % at 35 °C (95 °F) not condensing	

Operating voltage	1,8... 4 V, battery low voltage starting from 2.3 V	
Scaler/timer	Preset count, preset time	
EMC	Disturbance emission: EN 61000-6-3, immunity : EN 61000-6-2	
Size	110 x 67 x 62 mm (4.3" x 2.6" x 2.4"), with rubber protection, without cable	
Weight	Around 160 g (0.35 lb.) including AAA cells and protection sleeve	
Internal memory	The last 1600 measured values are saved and can be read out via PC program. Max and mean value of count rate and dose rate. The time interval is factory preset to 120 s by default. As well scaler measurements and momentaneous readings can be stored manually. Logbook with 250 entries for changes of configuration, occurring alarms and errors	
Averaging filters	Ratemeter filter type: Advanced Digital Filter (ADF), Digital RC-Filter with time constant, 1 s...180 s, depending on count rate and count rate change.	
Battery life time	RadEye GX: > 500 h RadEye SX: > 500 h RadEye PX: Approx. 200 h	Depends on external detector (required high voltage and dynode chain impedance), for instrument alone

RadEye GX: # 4250692
RadEye SX: # 4250693
RadEye PX: # 4250694

RadEye GX

For External Geiger Detectors

Features

- Accepts a wide range of GM-detectors
- Dose rate measurement
- Contamination measurement
- Parameters for up to 16 different probes can be stored in the memory

RadEye GX

Compact multi-purpose survey meter for Geiger-Mueller detectors.

The RadEye GX can store data of up to 16 individually adjusted and calibrated probes.

RadEye GX: # 4250692

New!

RadEye GX-L

The economy version is limited to a count rate of 10,000 cps (600,000 cpm), and is perfect for connection of contamination detectors.

RadEye GX-L: # 425069205

RadEye SX

For External Scintillation Detectors

Features

- Accepts a wide range of dual phosphor (α/β), NaI(Tl) and plastic probes
- Dual channel display
- Count rate measurements
- Dose rate measurements
- Surface contamination measurements
- Parameters for up to 16 different probes can be stored in the memory

RadEye SX

Compact multi-purpose survey meter for scintillation counter tubes.

RadEye SX: # 4250693

High Sensitivity Gamma Food Monitor

Routine inspections for radiation in food are performed most economically and user friendly with the Thermo Scientific High Sensitivity Gamma Laboratory Kit.

It supports the laboratory and also field measurement program for contamination resulting from a nuclear accident.

Gamma Food Monitor: # 425069025

New!

RadEye SX with DP6

A large, dual phosphor scintillation probe for monitoring personnel, tools and work areas with efficient alpha/beta discrimination. Adapter for connecting the RadEye SX to the detector types: AP5A, AP5B, BP19A, BP19B, DP6A, DP6B. Adapter # 425069360

A hand probe with a lightweight and rugged design for general purpose alpha/beta survey and frisking. Adapter for connecting the RadEye SX to the detector types: HP380A, HP380B, HP380AB, AP2/4A, AP4/4B, BP7/4A, BP7/4B, DP2/4A, DP2/4B, AP4/4A, AP4/4B, BP4/4A, BP4/4B. Adapter # 425069361

RadEye SX with HP 380 AB

RadEye SX with DP8

A probe with rectangular-shaped 600 cm^2 windows for monitoring large-area flat alpha/beta surface contamination. Adapter for connecting the RadEye SX to the detector types: AP6A, AP6B, BP17A, BP17B, DP8A, DP8B. Adapter # 425069363

A floor monitor probe with a choice of ruggedized 600 cm^2 scintillation alphas, betas, or alphas and betas simultaneously. Adapter for connecting the RadEye SX to the FLM3. Adapter # 425067079

RadEye SX with FLM3

RadEye SX with SPA3

A rugged, high-sensitivity gamma detector used for pulse-height applications. Adapter for connecting the RadEye SX to the SPA3. Adapter # 425069365

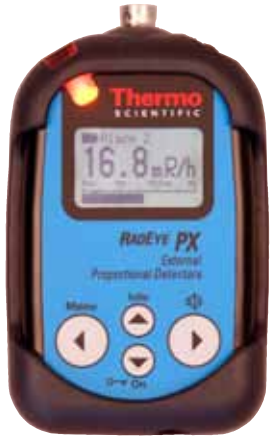
RadEye PX

For External Proportional/Neutron Detectors

Features

- The RadEye PX can operate with proportional detectors
- Lightweight, only 160 g (5.6 oz.)
- Compact size, 110 x 67 x 62 mm (4.3 x 2.6 x 2.4“)
- Dose rate measurements
- Surface contamination measurements
- Parameters for up to 16 different probes can be stored in the memory

RadEye PX is for Proportional detectors such as He-3 and BF_3 neutron detectors and an excellent replacement for the much larger and heavier E-600 and ASP-2 style meters.



RadEye PX

Compact multi-purpose survey meter for proportional detectors. Count rate and surface contamination measurements can be performed as well as dose rate measurements in combination with gas filled proportional counter tubes.

For neutron dose rate measurements, which are typically operated in combination with He-3 or BF_3 based Rem-counters, the new RadEye PX meter is an excellent replacement for the much larger and heavier E-600 and ASP-2 style meters.

RadEye PX: # 4250694

Adapter for connecting the RadEye PX to the NRD general purpose neutron “REM-ball“. Adapter # 425069501 enables the use of NRD instruments previously connected to other survey meters.

RadEye PX with NRD: # 4250695

RadEye PX with WENDI: #425069461

Adapter for connecting the RadEye PX to the WENDI wide energy range neutron detector. Adapter # 425069460 enables the use of WENDI instruments previously connected to other survey meters.

RadEye NBR

Portable High Sensitivity Gamma Radiation Monitor

New highly sensitive Thermo Scientific radiation detector system for fast discrimination between natural and artificial gamma radiation.

Key Features:

- Alarm on small traces of artificial gamma radiation
- Ideal for detection of shielded sources
- Weighs approx. 3 kg only
- One hand operation

The RadEye™ NBR is a combination of the Thermo Scientific RadEye SX multi-purpose meter and the FHZ 674 NBR detector. Even in case of large variations of the natural background during the search, very small contributions of artificial gamma radiation can be detected by a NBR detector (Natural Background Rejection). Especially for shielded or remote gamma sources, the RadEye NBR system will generate unambiguous audible and visual alarm indication within seconds, even if the incremental dose rate is just in the order of 0,01 µSv/h or less.

Compared to the well-known system FHT 40 NBR, battery operation time has been increased by 5 times, weight has been reduced by 1 kg and, as an additional eature, the possible presence of artificial radiation is indicated on a 0 to 200 %-scaled bar graph (100 % = NBR alarm set point). This feature is extremely helpful during any active search mission. Furthermore, following multiple user suggestions, the audible indication for positive detection of artificial radiation is now well distinguished from the typically much more frequent gross gamma alarms that are caused by changing background conditions. Unlike the FHT 40 NBR, where the dose rate range is extended up to 1 Sv/h (FH 40 G-10 as control unit), the RadEye NBR dose rate range is limited to 100 µSv/h. For higher dose rates, the use of an additional gamma survey meter (e.g. the RadEye G-10) is recommended.

NBR = Natural Background Rejection
The NBR measurement method has been developed by Thermo Fisher Scientific, for extremely fast discrimination between natural and artifical gamma radiation. Many thousands of devices, based on this technology, are in use worldwide.

RadEye NBR

Portable High Sensitivity Gamma Radiation Monitor

Operational Areas:

- First responders / Fire brigades
- Security professionals
- Environmental monitoring
- Remediation

New!

The RadEye NBR system # 4250751 consists of RadEye SX, FHZ 674 NBR detector, detector cable and rugged carrying case.

Technical specification of the Thermo Scientific RadEye SX

Order number	# 4250693
Measured quantities (with FHZ 674 NBR)	Count rate (cps, cpm), dose rate (Sv/h, rem/h), NBR
Probe cables	RG 58, max. 1.5 m (59") – MHV connector
High voltage range	300 V…1400 V with output impedance 2 MΩ, typically 600 V for FHZ 674 NBR
Alarm threshold	Two alarm thresholds for count rate, dose and dose rate each, NBR
Audible alarm intensity	80 dB at a distance of 30 cm (11.8")
Working temperature	-20 °C ... + 50 °C (-4 °F ... 122 °F)
Scaler/Timer	Preset count, preset time
EMC	Disturbance emission: EN 61000-6-3, Immunity: EN 61000-6-2
Size	110 mm x 67 mm x 62 mm (4.3" x 2.6" x 2.4"), with rubber protection, without cable
Weight	Around 160 g (5.6 oz) including 2 ea. AAA cells and protection sleeve
Internal memory	The last 1600 measured values are saved and can be read out via PC program. Max and mean value of count rate and dose rate. The time interval is factory preset to 120 s by default. As well scaler measure ments and momentaneous readings can be stored manually. Logbook with 250 entries for changes of con figuration, occurring alarms and errors
Battery life time	Typically 150 h with FHZ 674 NBR

For detailed information about the Radeye SX and the connectivity options of further probes please ask for a separate data sheet.

Technical specification of the Thermo Scientific FHZ 674

Order number	# 4250750
Detection Sensitivity	approx. 4000 cps per µSv/h at 662 keV, highly sensitive from 15 keV (front), respectively 30 keV (side)
Energy response (H*(10))	Exceeds IEC 62533* requirements (+/- 30 % for Am-241, Cs-137, Co-60)
Dose rate range (Cs-137)	0.01 µSv/h to 100 µSv/h
Weight	2800 g excluding shoulder strap (200 g) and RadEye SX (160 g)
Dimensions	308 mm x 230 mm x 110 mm

*IEC 62533 Highly sensitive hand-held instruments for photon detection of radioactive material.

Recommended alternative test adapters for HV-fine adjustment and test indication of artificial (= non-background) gamma alarms.

Exempt check source Cs-137	3.7 kBq (0.1 µCi), sealed in a 1" resin chip	# SM149479010
Lutetium Test Adapter 50 g Lu2O3	approx. 50 Bq/g Lu-176, 62 mm dia. chip (aluminium housing)	# 4254948
Lutetium Test Adapter 36 g Lu2O3	approx. 50 Bq/g Lu-176; for use with Radeye PRD as well	# 425067071

RadEye HEC

Stand-alone scaler counter

Features

- Simultaneous alpha/beta measurements
- 800 hours battery operation
- Non-volatile data storage
- Customized library of up to 16 test sources with automated half life correction
- Library of up to 16 nuclide efficiencies
- Simple detector performance verification with 9 g Lutetium Test Adapter

RadEye HEC - alpha/beta sample counter

The RadEye HEC is a sample counting system that provides simultaneous alpha and beta measurements.

The system incorporates a 2" (5 cm) dual scintillation phosphor mated to a sliding drawer accommodating a 2" (5 cm) diameter sample. Using a height-adjustable sampling area the drawer permits the use of different sample types and must slide fully to the rear to initiate the counting.

The housing is made of durable plastic to withstand even rough handling. The built-in handle, in combination with the battery option, allows up to 800 hours field use before the batteries have to be charged again.

The last 4500 values of the measured data in the selected measuring unit are recorded internally and can be read out via serial or USB interface. Additionally the RadEye HEC logs the last 250 alarms, errors and changes of the configuration. All events can be read out via serial interface. A real time clock is provided to add a time stamp to all buffer data.

The characteristic features of the RadEye HEC are the use of sophisticated low power technology components, well known from all RadEye versions, and microprocessor based fully automatic self checks. No maintenance is required.

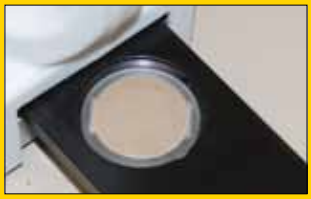
Detector	2" (5 cm) diameter alpha and beta sensitive scintillator
Efficiency	Typical 2 π efficiencies (50 mm sources) Alpha: ^{239}Pu typical 85 % (surface deposition) ^{241}Am typical 75 % (activated Al-layer of 6 µm) Beta: ^{99}Tc typical 45 % ^{90}Sr-^{90}Y typical 70 % ^{14}C typical 20 %
Background	<70 counts per minute (cpm) in the beta channel and < 2 cpm in the alpha channel in a background of 0.25 µSv/h (25 µR/h) gamma
Crosstalk	^{241}Am alpha to beta crosstalk < 10 %, ^{90}Sr-^{90}Y beta to alpha crosstalk 0.1 %
Sample drawer	2.03" (51.6 mm) diameter x 0.38" (9.6 mm) thick maximum. The sample thickness can be adjusted between 5/16" (3.2 mm) to 1/8" (7.9 mm). The sample holder and slide are black anodized for ease of decontamination
Mechanical	Single package design to allow for portability
Units	Counts, cpm, cps, Bq, Bq/cm², dpm, dps
Count time	User selectable count time between 1 second and several hours
Preset count	User selectable between 1 and 9999
Background update	User selectable count time 1 second to 60 minutes utilized in background subtraction of sample counts

RadEye HEC

Stand-alone scaler counter

Alarms	User-defined alarm limits on samples
Calibration	Via PC program
PC-software	Standard RadEye.exe > version 1.17
Power supply	100-240 VAC, 50-60 Hz
Count storage	Datalog samples using sequential up to 4500 samples. Each data point will include sample ID, sample count result, time and date
Temperature	0 to 50 °C (32 to 122 °F)
Humidity	10 to 90 % non-condensing
Count range:	1 to 6 million cpm (100, 000 cps) for beta and 1 to 0.6 million cpm (10,000 cps) for alpha
Audible	The RadEye HEC audible output is used to signal: - When the sample has completed its count - Whenever an alarm occurs (when activated) - Presence of alpha radiation (when activated)
Size and weight	15 x 4.75 x 12" (38.1 x 12.1 x 30.5 cm); 9 lbs. (4.1 kg)
Testing	CE approved

RadEye HEC accessories



Lutetium Test Adapter 9 g for RadEye HEC sample counting system # 425068571

Upgrade Kit for HandECount (with Palm™ Computer) available # 425069704

RadEye Area Monitor

Applications

- Nuclear Power
- Nuclear Process
- Industrial
- Personal/Worker Safety

RadEye Area Monitor

The RadEye Area Monitor is an application suitable for several different RadEye types. The following applications are possible:

- Gamma dose rate measurement (RadEye G)
- Highly sensitive alarm indication for radioactive gamma sources (RadEye PRD)
- Detection of neutron sources (RadEye NL)

The wall-mounted RadEye Area Monitor extends the application range to convenient and cost-effective gamma and neutron area monitoring. In case of exceeding a preset threshold, the system sets off an audible/optical alarm and the RadEye can be immediately used as a portable instrument.

- Area monitor and flexible handheld instrument in one
- No additional handheld instrument for locating the source is necessary
- In case of power failure the RadEye is still operational due to rechargeable batteries and built-in battery charger
- Simultaneous gamma and neutron monitoring with two RadEye Area Monitors

1. Alarm Indication

Acoustical and optical alarm is indicated by the RadEye Area Monitor and the optional external alarm indicator.

Horn and bright flash light can be acknowledged even if radiation level is still elevated.

2. No need for an additional portable instrument!

Authorized staff takes the RadEye out of the box.

3. Finding the radiation source

4. Re-insertion of the RadEye

The green light of the external indicator turns on once the RadEye is reinstalled in the box. Now the Area Monitor is ready for action again.

The RadEye Area Monitor can be complemented with an external alarm unit with horn and beacon. An occurring alarm can be acknowledged remotely controlled. Thereby the alarm unit should not be installed at a distance of >10 m (other lengths upon request).

RadEye Area Monitor: # 4250680

RadEye Area Monitor: Enclosure with transparent door; car adapter; AC/DC adapter with 2 m cable + connector; red light on enclosure; RS 232 interface 9 pin D-SUB connector (watertight); connector for external alarm unit. The RadEye has to be ordered separately.

Additional alarm unit # 425068010

Additional external alarm unit consisting of: 5 m cable with connector fitting to connector at 4250680; small box with latching relay and acknowledgement button; 5 m cable between the box, strobe and horn with wall mount holder.

RadEye GR

Wireless radiation detection system for grapple installation

Features

- Rugged radiation detection and alarm system
- Small size – negligible load capacity reduction
- Enhanced sensitive for low gamma energies
- Superior value - small investment and low cost of ownership
- Multiple portable RadEye R display units possible
- Extremely high battery lifetime
- Nearly maintenance free
- Very straightforward installation process
- Simple and comprehensive datalogging and reporting via RadEye Safety Kit Software (pages 33-34)
- Only one person required for radiation test
- Real time monitoring and system integration on request

RadEye GR - Wireless radiation detection system for grapple installation

Long recognized as providing leading-edge vehicle and portable radiation monitoring solutions to the metal recycling industry, Thermo Scientific's RadEye GR grapple-mounted radiation detection system is the latest application-specific system designed to minimize the threat of radioactive material in the scrap metal stream.

The Thermo Scientific RadEye GR is a radiation detection device designed and proven through extensive testing for the extreme forces and harsh conditions experienced when installed in a grapple. While the detector inside the RadEye GR grapple monitor is smaller than the detectors used in a portal monitor at the entrance of a facility, it more than makes up for any loss in sensitivity as the RadEye GR detector is much closer (law of $1/r^2$ for the radiation field) and the radioactive source is less shielded by the surrounding scrap. Furthermore, the contact time is longer than for a portal monitor which is the other critical element in determining sensitivity. Therefore, the RadEye GR grapple monitor is an extremely powerful tool to detect radioactive threats in the scrap and should be considered for use in addition to the portal monitors already found at most facilities.

The detector unit is installed quickly and easily at most of the common grapple types. Its compact size takes a minimum of space and so does not significantly impact the grapple's carrying capacity.

The RadEye GR provides superior response to radiation exactly at the energy range of importance to catch shielded radiation sources.

The battery powered receiver RadEye R displays current readings, annunciates alarms and logs data wirelessly whether you are in the cabin of the crane or nearby the grapple. Multiple RadEye R units can receive data from one grapple detector over a distance > 100 m (at 1mW transmitting power).

For details, please ask for additional product information.

RadEye Safety Kit

Features

- Accessory for RadEye PRD/PRD-ER and RadEye R
- Highly sensitive to gamma radiation
- Compact, rugged and lightweight
- Advanced personal radiation protection
- Provides precise periodic measurement sampling and documentation with enclosed software
- Suitable for vehicle surface scans and area monitoring

RadEye PRD Safety Kit - in conjunction with RadEye PRD, PRD-ER and RadEye R

The Thermo Scientific RadEye PRD is the first choice for highly portable, personal radiation detection in the recycling industry. The well-proven RadEye, which has served thousands of law-enforcement and homeland security professionals since 2005, is also available in conjunction with an application-tailored "RadEye Safety Kit." Geared specifically to the industrial user, this configuration provides the following advantages and possibilities:

- Small size and belt holster means it can be worn at all times for non-stop vigilance at any facility
- Adapter and extender poles allows the user's reach to be extended up to 14 feet (4 m) enabling easier and faster searching
- Data capture hardware and software allow target vehicle radiation data to be tagged with user input meta-data, for better quality control/documentation
- Lutetium test adapter uses naturally occurring material of very low specific activity to verify the performance of your PRD or other radiation detection instrumentation safely and accurately

Radiation detection is personal protection

The Thermo Scientific RadEye PRD offers unmatched sensitivity to gamma radiation and true dose rate calculation. When worn in its holster, the RadEye PRD protects its owner at all times, long before radiation health concerns come into consideration. With this roving detector orphan sources may be found at your facility. The RadEye short handle provides dramatic reduction in the dose rate at the user's hand, if the RadEye PRD is close to the source (compared to the RadEye PRD directly held in the hand). Optional 4 ft. (1.2 m) and 14 ft. (4 m) extensions ease the measurement of vehicle loads or piles of suspicious material. The large backlit LCD, the bright Alarm-LED and the built-in vibration alarm facilitate the ease of use of this instrument while the nylon holster and rubber shock protection ensure its durability and reliability.

RadEye Safety Kit

Content of the RadEye PRD Safety Kit # 425067193

2 Holster for the RadEye PRD

3 Universal RadEye PRD "snap in" adapter

4 RadEye PRD Test Adapter (natural lutetium oxide)

5 Short handle for "snap in" of the universal RadEye PRD adapter

6 USB to the RadEye PRD's IR port adapter cable

7 RadEye PRD desktop stand with mounting support of the adapter cable

8 Special application-specific software and handbook

The RadEye has to be ordered separately!

1 High sensitivity gamma pager

RadEye PRD:
up to 25 mR/h # 4250671
up to 250 µSv/h # 425067120

RadEye PRD-ER:
up to 10 R/h # 425067102
up to 100 mSv/h # 425067122

Options:
425067076: 1.2 m extension
425067076-59: 59'' extension (America only)
425067077: 4.0 m telescopic extension

Scanning for contamination is assurance of quality

If the RadEye PRD is used for the manual scanning of in- or outbound vehicles, then the application-specific RadEye Software documents via printing of the scanning protocol that no radiation was found in the inspected load. Additional text information such as "Company," "Material," "Weight," etc. may be entered and stored or printed with the measurement values.

Recording and documentation

- Vehicle surface scans
- Work days/weeks
- Simple area monitoring

The software "GateCheck.exe," in combination with a RadEye R, provides precise periodic measurement sampling and documentation. Thus it is easy for the user to get a daily protocol of all loadings.

RadEye extensions

RadEye telepole

1 Telepole for 2 ea. RadEye units with Bluetooth communication capability. # 425067175

Features

- High quality
- Free adjustable segments
- Durable material selection
- Professional design
- Max. length with/without RadEye: 2325 mm/2280 mm
- Min. length with/without RadEye: 800 mm/845 mm
- Total weight with/without 2 each RadEye devices: 2.4 kg/2.1 kg

RadEye extensions

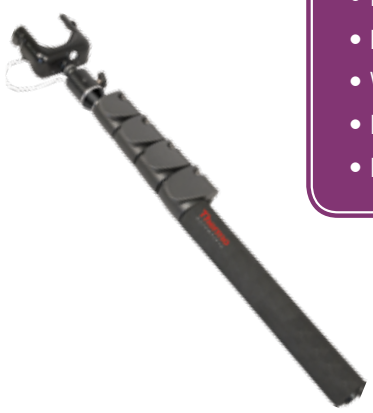
1 RadEye adapter with connector to the handle or extensions: # 425067078 (without RadEye)

2 Short handle, length 0.35 m: # 425067075 (without RadEye)

3 Aluminum extension, length 1.2 m: # 425067076 (without RadEye)

4 Telescopic extension up to 4.0 m: # 425067077 (without RadEye)

RadEye extension



RadEye extension # 425067177

Features

- High quality
- Durable material selection
- Reach up to 1.5 m / 5 ft.
- Four free adjustable segments
- Handle with convenient grip
- Professional and durable design
- Weight: 630 g
- Max length: 1520 mm / ~ 5 ft.
- Min length: 460 mm / 18"

RadEye BTcom Cover

Features

- Suitable for communication to PCs with Bluetooth® interface
- Fits all RadEye versions (except RadEye AB100)
- Low power consumption
- Fast and easy installation
- Lightweight, only 11 g (0.4 oz.)
- No external power supply needed

New!

RadEye BTcom cover

The Thermo Scientific RadEye BTcom cover is the latest accessory development for the successful RadEye product family.

It is designed to provide Bluetooth® communication between the RadEye devices and a PC equipped with Bluetooth® technology. Also, data from one RadEye instrument can be displayed on another RadEye as a second measurement device.
Typical applications: display of RadEye NL neutron data or RadEye B20 contamination data as second line in gamma RadEye display.

The cover fits all types of RadEye (except the RadEye AB 100) and is powered by the internal batteries of the RadEye instrument.

The plug and play installation is extremely easy and needs no special requirements or qualifications. Once installed the RadEye BTcom cover has a coverage of about 15 m (49.2 ft.) at line-of-sight conditions and may be used worldwide without registration.

The RadEye BTcom cover comes in a transparent plastic box together with a short manual and a CD with the RadEye BTcom cover manual, RadEye.exe update installation file and some additional information about the RadEye product family. # 425067087

In addition we also offer a factory predefined set of two BTcom covers to ensure an immediate and secure communication between two RadEye devices. # 425068102

Degree of protection	IP54 (when applied to a RadEye)
Working temperature	-25 °C to +50 °C (-13 °F to +122 °F)
RF transmission	Bluetooth® V2.0 + EDR, SPP profile (serial port protocol), +4 dBm output power max. (Class 2), -82 dBm receive sensitivity
Range	10m at line-of-sight-condition
Baud rate	115.2 kBd (8 data bits, no parity, 1 stop bit)
Size and weight	59 x 36 x 10 mm (2.3 x 1.4 x 0.4"); 11 g (0.4 oz.)
Operating voltage	1.5 - 3 V (powered by standard AAA cells of the RadEye)
Power consumption	Battery voltage: 3.0 V; 4.3 mA (standby); 5.5 mA (connected) 19.5 mA (cyclic readout: 1 s); 7.4 mA (cyclic readout: 10 s)

Features of Lutetium Test Adapters

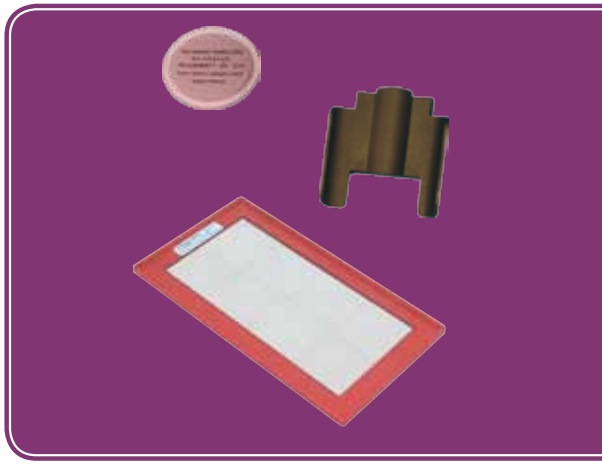
- A 3.7E10 year half-life means:
  - no need for error-prone half-life corrections
  - no need for reoccurring purchase of the (decayed) check sources
- The adapters provide a highly reproducible and uniform activity content of 50 Bq/g (1.3 nCi/g)
- All test adapters of the same type have virtually the same activity!
- Beta-type adapters provide nearly identical surface emission rates
- The design of special shape enclosures and high density Lu_2O_3 ceramics minimize the required activity for small size detectors

Thermo Scientific Lutetium Test Adapters

Lutetium Test Adapters are a real smart alternative to conventional check sources and offer a lot of unique advantages to our customers using radiation detectors.

Conventional test sources for radiation monitors suffer from a number of inherent problems: Every source is an individual and unique item regarding activity and surface emission rate. Sources from different manufacturers may have different spectra from the emitted particles depending on the production process. Furthermore, large area test sources may have variations of the emission rate over the different sections of the surface and, in many cases, the user needs to correct for the decay of the radioisotope. The thin active surface is always a delicate part of the source.

Lutetium Test Adapters contain the isotope Lu-176 with 38 billion years half-life (= much longer than the age of the universe) and a natural abundance of 2.6 %, which yields a specific activity of approximately 50 Bq/g of the pure element Lutetium. The unique feature of using a chemically pure bulk substance containing the radioisotope in its natural abundance results in a totally constant and homogeneous surface emission rate. Each and every source of the same surface area has the same beta emission rate, regardless of small variances in the thickness of the Lutetium-oxide ceramics. Furthermore, due to their natural origin and low specific activity, in respect to many national regulations these adapters are not considered as radioactive material. These new test adapters can contribute to a reduction of calibration cost and instrument downtime, as well as to an increased user confidence and familiarity with “his” or “her” instrument.



Beta/gamma test adapters

High precision, low energy test adapters for performance verification of the RadEye B20 and other instruments with pancake detector.

Lutetium Test Adapter with 9 g Lu_2O_3: # 425068571

50 mm diameter, 3 mm height (acrylic glass housing)

40 mm diameter, 1mm height (Lu_2O_3 ceramics inlet)

Typical net count rate for RadEye B20: 6 cps

For more information please ask for a special paper: “Test Adapters Based on Natural Lutetium - a Discussion of Benefits versus Conventional Check Sources”.

RadEye Test Adapters

Test adapters for large area beta contamination probes with an inherently homogeneous surface emission rate of 0.8 particles per cm²•s - perfect for training and calibration.
Lutetium Test Adapter with 80 g Lu_2O_3: # 425068371
Size: 120 mm x 200 mm x 5 mm total; 110 cm² (74 x 148 mm) Lu_2O_3 surface.

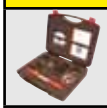
Lutetium Test Adapter for RadEye PRD variants and RadEye GN

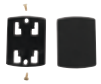
A specially shaped housing, matching the contours of the RadEye instrument, contains 36 g of natural Lu_2O_3 ceramic material. This test adapter is used to verify and fine-adjust the gamma performance of the RadEye PRD and GN: Quick, save, easy and precise.
Typical net count rate for RadEye PRD: 100 cps
Indication of "low energy" NBR alarm.
A carrying case is included.
425067071

Thoriated (2 %) Tungsten Test Adapter for RadEye GN

A specially shaped housing, matching the contours of the RadEye instrument, contains 10 g of thoriated (2 %) tungsten welding rods. This test adapter can be used to simulate neutron alarms in the training mode of the RadEye GN. Furthermore, the alarm behavior performance in respect to NORM can be checked: # 425063015

	Part number	Description	G/G-10/GF/GF-10	PRD/PRD-ER	GN	B20/B20-ER	G20-10/G20-ER10	NL	GX/SX/PX	NBR	AB100	HEC	Ex series	R
Extension poles														
	425067075 425067076 425067077	Short handle Aluminum extension, length 1.2 m 2 segment telescopic exten. up to 4 m; All extension poles require 425067078	•	•	•	•	•	•						
	425067078	RadEye adapter with connector to 425067075, 425067076, 425067077	•	•	•	•	•	•						
	425067177	4 segment telescopic extension up to 1.5 m (including holder for RadEye)	•	•	•	•	•	•						
Energy filters for RadEye B20, B20-ER														
	425068581	Alpha rejection filter				•								
	425068582	Gamma filter, H*(10) compensation (deep dose equivalent)				•								
	425068583	Gamma filter, H'07 compensation (shallow dose equivalent)				•								
Data communication														
	425067087 425068102	RadEye BTcom battery cover Two factory paired BTcom covers	•	•	•	•	•	•	•	•				
	425069951	User software "RadEye.Exe"	•	•	•	•	•	•	•	•	•	•	•	•
	425069952	Calibration software "Cal-RadEye.Exe"	•	•	•	•	•		•	•			•	
	4254026	Data cable USB via desktop holder 425067060 and AB100 direct	•	•	•	•	•	•	•	•	•		•	•
	4254029	Data cable RS 232 via desktop holder 425067060 and AB100 direct	•	•	•	•	•	•	•	•	•		•	•
	425067060	Desktop holder for RadEye (data cable not included)	•	•	•	•	•	•	•	•			•	•
Others														
	425067110	RadEye NL Moderator				•		•						
	425067073	RadEye holder for second RadEye mounted to moderator (425067110)	•	•		•	•	•						

	Part number	Description	G/G-10/GF/GF-10	PRD/PRD-ER	GN	B20/B20-ER	G20-10/G20-ER10	NL	GX/SX/PX	NBR	AB100	HEC	Ex series	R
Others														
	425067193	RadEye Safety Kit for PRD/PRD-ER (RadEye not included)		•										•
	4250680 and 425068010	RadEye area monitor and external alarm unit (RadEye not included)	•	•	•			•						•
	42506901001	Sample changer for RadEye B20				•								
	42506901002	Brass sample holder for RadEye PRD (material analysis of steel samples)		•										
	425069011	First Responder Laboratory Kit for RadEye B20 and B20-ER, including sample changer 42506901001, various dishes, gloves, spatula and filters				•								
	KT162245107	MHV right angle plug for GX/SX/PX							•					
Earphone / Headset														
	425067037	Earphone for RadEye series	•	•	•	•	•	•	•	•				•
	425067042	Headset for RadEye	•	•	•	•	•	•	•	•				•
Charger														
	425067065	Docking station ("car adapter") with charging circuitry (8-30 V DC, cigarette lighter plug), alarm relay and RS 232 interface. 2 ea. AAA NiMH rechargeable batteries included	•	•	•	•	•	•	•	•				•
	425067066	AC/DC converter for AC-supply of docking station 425067065 (100 – 240 V AC; 15 V DC, 600 mA), US, UK, EU connector	•	•	•	•	•	•	•	•				•
	425067080	Inductive charger (11.5 - 15 V DC) with coiled cable and cigarette lighter plug; requires special battery compartment lid 425067034	•	•	•	•	•	•	•	•				•
	425067083	Inductive charger AC-table version, requires special battery compartment lid 425067034	•	•	•	•	•	•	•	•				•
	425067034	Battery compartment lid with inductive charging circuitry	•	•	•	•	•	•	•	•				•

	Part number	Description	G/G-10/GF/GF-10	PRD/PRD-ER	GN	B20/B20-ER	G20-10/G20-ER10	NL	GX/SX/PX	NBR	AB100	HEC	Ex series	R
Car Adapter														
	425067064	Goose neck mounting kit for attachment to the windshield; fits to docking station 425067065 or desktop holder 425067060	•	•	•	•	•	•	•	•			•	•
	425067059	Flat mounting kit, incl. plates for screw- and adhesive mounting; fits to docking station 425067065 or desktop holder 425067060	•	•	•	•	•	•	•	•			•	•
	425067061	Goose neck screw-mounting kit; fits to docking station 425067065 or desktop holder 425067060	•	•	•	•	•	•	•	•			•	•
	425067063	Knuckle joint screw-mounting kit; fits to docking station 425067065 or desktop holder 425067060	•	•	•	•	•	•	•	•			•	•
	425067062	Pivot arm screw-mounting kit; fits to docking station 425067065 or desktop holder 425067060	•	•	•	•	•	•	•	•			•	•
Holster and Bags														
	425067044	Safety lanyard and transparent plastic bag for RadEye PRD, NL, G and G-10 versions	•	•	•			•	•					•
	425067046	Holster for RadEye PRD, NL, G and G-10 versions. Sized to insert instrument with rubber shock protection	•	•	•			•					•	•
	425067710	RadEye Rem-holster with boron-inlet for dose rate measurement						•						
	425068519	Holster for RadEye G-20 and B-20 versions. Sized to insert instrument with rubber shock protection.				•	•							
	SM149142238	Holster for up to 2 RadEye B-20 energy filters				•								
	SM149142246	Aquapac - 100 % waterproof case	•	•	•			•						
Adapters for one-hand operation of RadEye SX, PX and probe, please see pages 24-25.														

	PRD	PRD-ER	GN	G G-Ex	G-10 G-10-Ex
Detector	NaI(Tl)	NaI(Tl)	Li-6 doped glas scintillator	GM	GM
For use in explosive atmosphere				G-Ex	G-10-Ex
Gamma and X-rays (detection)	> 30 keV ★★★★★	> 30 keV ★★★★★	> 30 keV ★★★★★		
Gamma and X-rays (dose rate)	> 60 keV ★★★	> 60 keV ★★★	> 60 keV ★★★	> 48 keV ★★★★★	> 48 keV ★★★★★
Beta dose rate					
Alpha/beta contamination					
Alpha/beta discrimination					
Neutron source detection			★★★★★		
Neutron source verification			★★★★		
Measuring units – dose rates are energy compensated	cps Sv/h rem/h R/h	cps Sv/h rem/h (R/h)	γ, n: cpm, cps γ: Sv/h, rem/h (R/h)	R/h	Sv/h rem/h
Upper dose rate limit	250 µSv/h 25 mR/h 25 mrem/h ★★★	100 mSv/h 10 rem/h ★★★★	250 µSv/h 25 mR/h 25 mrem/h ★★★	10 R/h ★★★★	100 mSv/h 10 rem/h ★★★★
cps at 1 µSv/h (100 µrem/h), 662 keV	150 ★★★★	150 ★★★★	120 ★★★★	1.7 ★★★	1.7 ★★★

*Absolute pressure (=1.5 bar gauge pressure at standard conditions)

GF GF-Ex	GF-10 GF-10-Ex	G20-10	G20-ER10	B20	B20-ER	NL	AB100
GM	GM	Pancake GM	Pancake GM	Pancake GM	Pancake GM	2.5 bar He-3*	Dual phosphor scintillator
GF-Ex	GF-10-Ex						
				> 5 keV ★★★★	> 5 keV ★★★★		
> 48 keV ★★★★★	> 48 keV ★★★★★	> 17 keV ★★★★★	> 17 keV ★★★★★	> 17 keV with filter ★★★★★	> 17 keV with filter ★★★★★		
				★★★	★★★		
				★★★★★	★★★★★		★★★★★
				Via filter (★★)	Via filter (★★)		★★★★★
						★★★	
						★★★★★	
R/h	Sv/h rem/h	Sv/h rem/h	Sv/h rem/h	cps, cpm Bq, dpm, dps Sv/h, rem/h	ps, cpm Bq, dpm, dps Sv/h, rem/h	cps	cps, cpm Bq, dpm, dps
300 R/h ★★★★★	3 Sv/h 300 rem/h ★★★★★	2 mSv/h 200 mrem/h ★★★	100 mSv/h 10 rem/h ★★★★	2 mSv/h 200 mrem/h ★★★	100 mSv/h 10 rem/h ★★★★		
0.16 ★★	0.16 ★★	4 ★★★	4 ★★★	4 ★★★	4 ★★★		

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