

Rotem Radiation Detection Division

Rotem Industries Ltd., an Israeli Government owned company, specializes in the commercialization of advanced technologies and science in a multi discipline environment. The company focuses on state-of-the-art innovations, reaping the technical harvest of scientific study & research for the benefit of academy, industrial, defense and commercial communities worldwide. Our Radiation Detection Division, with over 35 years experience, specializes in the development, production and marketing of radiation detection instrumentation and systems for the Homeland Security, Nuclear Power Plant and Nuclear Medicine markets.

DRM-1/DRM-1D : Stationary Monitoring System with integrated Telemetry



0.1 μ Sv/h to 10 Sv/h
10 uR/h to 1000 R/h
0.01 μ Sv/h to 0.1 mSv/h
1 uR/h to 9.99 mR/h

Applications:

- Outage and routine fixed monitor
- Portable access control to/from High Rad. Areas
- Ideal for plant surveying
- Testing X-Ray machines for safety

Features:

- Wide range detector
- Auto ranging, smooth reading
- Combines fast response and readout stability
- Wireless or hardwire connection to base station for instant appraisal of radiological conditions
- User adjustable threshold alarm
- IRP-51-H*(10) version available
- **New Ruggedized Military version available**

TelePole II : A GM meter on an extendible pole



0.5 μ Sv/hr to 10 Sv/hr
50 μ R/hr to 1000 R/hr

Applications:

- Supports ALARA principles by allowing operators to obtain readings 13ft away from the source
- Routine survey instrument with storage & downloading capabilities
- Readings of hard-to-reach areas (e.g. vehicle surveys, elevated piping, etc.)

Features:

- Color Coded Display indicating Dose Rate field
- Positive quarter lock, lighter Telescopic Pole
- Stand-alone detector which includes calibration factor for quick connect and independent calibration.
- Built-in reach back wireless capabilities (BT and/or Xbee)
- IP-67 version available
- Available with several types of external detectors

RAM ION Digilog Portable Ion Chamber Survey Meter



1 μ Sv/h to 500 mSv/h
0.1 mR/h to 50 R/h

Applications:

- Outage and routine requirements
- ALARA Hot Spot tracking mode
- Ideal for plant surveying
- Testing X-Ray pulses from 60 nano seconds

Features:

- Ion chamber (500cc) survey Meter
- Auto ranging, digital and analog display
- Combines fast response and readout stability
- Data logging capability
- User adjustable threshold alarm
- IRP-51-H*(10) version available

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HOMELAND SECURITY

Rotem, a Government owned company, is qualified to provide your organization with the tools it needs to manage the challenge of dealing with Radiological or Nuclear terrorism.

We have over 35 years experience developing, manufacturing, and deploying instruments and systems for radiation detection and radiation safety. In addition, Rotem provides a full range of services including training to support your organization in the use of these vital tools.

PDS-100/PDS-100GN/PDS-100GN-ID



0.01 μ Sv/h to 100 μ Sv/h
1 μ R/h to 10 mR/h
0 to 999 CPS

Applications:

Pre-Event Preventing the infiltration of radioactive materials through borders and into controlled areas

Features

- ID version identifies gamma isotopes from a built-in library

Designed to meet ANSI N42.32, IEC 62401 standards, ITRAP/IAEA recommendations.

The PDS-100G (Gamma only) and PDS-100GN (Gamma & Neutron) are sensitive pocket-sized devices designed to detect, locate and quantify any radioactive materials such as Special Nuclear Materials (SNM), and to respond to incidents involving Radiological Dispersal Devices (RDD).

The PDS includes innovative algorithms in order to limit any false alarms. The PDS-100G-ID and GN-ID feature the capability to analyze the spectrum data and advise the user if the isotope being measured is NORM, MEDICAL or SNM classification

DRM-1D : Highly Sensitive, fixed Area Monitoring system



0.01 μ Sv/h to 0.1 mSv/h
1 μ R/h to 9.99 mR/h

Applications:

Pre-Event Monitoring areas and people for external radiation and ingested contamination

- Sensitive installations
- Hospitals – safeguarding medical sources
- **New ruggedized Military version available**

Features

The DRM-1D is designed specifically to be used in varying dose rate fields using an extremely sensitive CsI(Tl) detector. The DRM-1D is a wall-mounted instrument that can be connected to the AC power with NiMH backup batteries. The radiation data is sent via 900 MHz FHSS or 2.4 GHz FHSS radios by an external antenna to a transceiver or via hardwire (RS-232, RS-485 or TCP/IP) to a Remote Monitoring System.

The DRM-1D can also be connected directly to a computer input

PDS-GO : Sensitive Portable Gamma radiation Monitor



Background to 500 μ Sv/h
Background to 50 mR/h

Applications:

Pre-Event Monitoring public areas by untrained Security Forces

- Supplied to Security forces responsible for the safety of public in meetings
- Transport Police
- Border Security

Features

- Complies with ANSI-N42.32 and ANSI-N42.33 standards
- Easy, intuitive operating mode
- Alarm reliably within 200-300 nSv/h
- User configurable background subtraction
- Rechargeable battery life – 120 hours
- Audio, Visual and Vibrating alarms
- Reach back capabilities via BT
- Vibrating option for covert operations

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RAM R-200 Emergency Response Kit



0.1 μ Sv/h to 1 Sv/h
10 μ R/h to 100 R/h

Applications:

Post-Event Designed to meet the ANSI N42.33 standard

- General purpose extremely rugged survey meter
- Portable or stand-alone radiation measurement station
- The RAM-R-200 is a rugged portable gamma meter designed according to Mil. Specs. for measuring wide range gamma radiation fields. The instrument is available with external smart probes: For alpha, beta and gamma radiation and contamination.

For Radiation: RG-40, RG-42 and RP-11 probes

For Contamination: RG-10, RG-12 and PA-100M probes

Features:

- Reliable telescopic rod including meter and external probes.
- Wide range internal gamma detector.
- Built-in RS-232 communication.
- Special operation modes like counting data acquisition.
- Automatic detector identification with each change of detector.

Complementary Detectors:



RP-11 Detector – Highly Sensitive gamma detector

Radiation Detected: Gamma above 50 keV

Scintillator: NaI(Tl) 2"Ø x 2" thick.

Window of 1 mm. (0.04") Al.

Sensitivity: 20,000 CPS/mR/h (¹³⁷Cs)

Count Rate Range: 0 to 50,000 CPS



RG-10 Detector - α, β, γ contamination detector

Range: 0-100 MCPM

Window: 1.5 – 2.0 mg/cm²

Effective Area: 15.5 cm²

Sensitivity: 3500 CPM/mR/h (¹³⁷Cs), 500 CPM/Bq/cm² (⁹⁰Sr-⁹⁰Y)



PA-100 Detector - Alpha contamination detector

Type: Air proportional

Window Thickness: 0.85mg/cm² aluminized window

Effective area: 100 cm² (15.5 in²)

Probe Efficiency (2 π): 18% (²⁴¹Am)

Surface Sensitivity: 530 CPM/Bq/cm² compensated in the meter to 100% to be 3000 CPM/Bq/cm²

And these are just a few...

RAM GENE-1 Mark II Contamination and Radiation Survey Meter



0 to 7,200 μ Sv/h
0 to 720 mR/h

Applications:

- Single hand operation of a combined dose rate and contamination meter without external detector
- Designed for use by untrained hospital personnel in case of a radiological incident to test incoming casualties for external radiation or ingested contamination.
- Sensitive to ³²P and ³⁵S isotopes.

Features:

- Includes radiological filter, compliant to IEC60846 and IEC60325 for ambient dose equivalency
- Detector: 1 $\frac{3}{4}$ " Pancake GM tube.
- Easy to read 7-segment LCD display panel.
- User selectable thresholds.
- Portable, lightweight, compact, one hand operation.
- Simple 3 push-button operation.

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PORTABLE SURVEY METERS

RAM ION Digilog Portable Ion Chamber Survey Meter



1 μ Sv/h to 500 mSv/h
(0.1 mR/h to 50 R/h)

Applications:

- Outage and routine requirements
- ALARA Hot Spot tracking mode
- Ideal for plant surveying
- Testing X-Ray instrumentation for safety

Features:

- Ion chamber (500cc) survey Meter
- Auto ranging, digital and analog display
- Combines fast response and readout stability
- Data logging capability
- User adjustable threshold alarm
- IRP-51-H*(10) version available

RAM GAM-1: Portable gamma dose rate & dose survey meter



0.5 μ Sv/h to 9,999 μ Sv/h
0.05 mR/h to 999 mR/h

Applications:

- Personal dose equivalent/dose rate verifications for operations, HP and chemistry personnel.
- HP emergency planning kits "High rad" entrance requirements (redundant to dosimeters).

Features:

- Detector: Energy compensated GM tube.
- Audible click, LED flash.
- Smoothed digital display with fast response.
- Weighs less than 0.5 kg.
- Self-test, low battery and threshold alarm, hands-free use.
- Ruggedized casing
- IRP-51-H*(10) version available.

RAM DA-2000 / RAM DA-3 2000



RAM DA 3-2000
0.5 μ Sv/h to 1 Sv/h
50 μ R/h to 100 R/h

Applications:

Nuclear Power Plants, Nuclear and Medical research centers, H.P. Departments

Features:

- Various detectors can be connected and instantly recognized
- Capable of displaying several units of measurement (CPS, CPM, μ Sv/h, mR/h...)
- Optional Internal Energy compensated GM tube (DA-3 version)
- Data logging capability

Complementary Detectors:



GM-40 series For gamma radiation over a very wide range
Based on different types of energy compensated GM tubes
Extended hook up cable of up to 100 meters can be used



IC-10 Detector

Wide range gamma, x-ray and beta radiation measurement
Based on 0.5 liter atmospheric ionization chamber
Uses special features and advanced technology



PM-11 Detector

Scintillation probe for high energy gamma radiation detection
Nal 2" x 2" diameter scintillator
Single channel analyzer (SCA) optional

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REMOTE AREA MONITORING SYSTEMS

DRM-2 / DRM-2D : Stationary Monitoring System with integrated Telemetry



0.1 $\mu\text{Sv/h}$ to 10 Sv/h
10 $\mu\text{R/h}$ to 1000 R/h
0.01 $\mu\text{Sv/h}$ to 0.1 mSv/h
1 $\mu\text{R/h}$ to 9.99 mR/h

Applications:

- Outage and routine monitoring
- Portable access control to/from restricted areas
- Ideal for plant surveying
- Testing X-Ray instrumentation for safety

Features:

- Built-in Alarm, Display and Status lamps
- Auto ranging, digital and analog display
- Combines fast response and readout stability
- Data logging capability
- User adjustable threshold alarm
- IRP-51-H*(10) version available
- **New Ruggedized Military version available**

AMP-50 Low Range Area Monitor



0.1 $\mu\text{Sv/h}$ to 40 mSv/h
10 $\mu\text{R/h}$ to 4 R/h

AMP-100 Medium Range



100 $\mu\text{Sv/h}$ to 10 Sv/h
10 mR/h to 1,000 R/h

AMP-200 High Range



10 mSv/h to 150 Sv/h
1 R/h to 15,000 R/h

AMP-300 Very High Range



1 mSv/h to 300 Sv/h
0.1 R/h to 30,000 R/h

Waterproof Area Monitors

The AMP instruments are used by more than 85% of NPP's in the U.S.A

Features

- Ruggedized construction, waterproof detector housing and cable.
- Quick-disconnect connectors allow customization of cable length and facilitate easy de-contamination.
- Built-in RS-232 connection for use with Area Monitor or WRM transmitter.
- "Smoothed" digital display offers accurate, stable readings.
- The cable length of 100 m (330 ft) between the probe and meter facilitates reading source radiation levels at a safe distance.
- The small probe (0.8" diameter) can be inserted into pipes for accurate readings of normally impossible locations.

Applications

- Underwater monitoring of Spent Fuels Pools up to 20 m depth.
- Real-time monitor applications - the probe head may be placed directly into a filter cube or against a resin tank for the purpose of providing survey results.
- Monitoring filters and used as area monitors to control ALARA exposure
- Monitoring Let down filters in Nuclear Power Plants
- Checking Drain tanks at Nuclear Power Plants

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MEDISMARTS – Area and Stack Monitoring system for Cyclotrons

The MediSmarts system is designed to measure and collect radiation data automatically and continuously from cyclotron facilities, radiochemistry laboratories, treatment rooms and PET Centers. Radiation is monitored by a variety of detectors and results are transferred through a series of monitoring channels to a central computer located in the control room. The MediSmarts system is installed in over 420 sites worldwide and is recognized by cyclotron manufacturers (GE, IBA and others) as the leading, most economical system available today.

PET monitoring and Nuclear Medical Departments



Our Area Radiation Monitoring is based on field proven, highly reliable radiation detectors, Data Processing Units and unique Computer Software.

The system provides real time on line radiation levels. The data is used for both radiation safety and improving the site operation.

Features:

- Stack Monitoring with quantitative, online activity release measurement.
- Area Monitoring.
- Production Monitoring.
- Comprehensive radiation analysis software.
- Site Safety Control.
- Automatic Activity Release Report.
- Automatic calculation of the total activity for selected period of time.

Monitoring Channels



GM-41 Area Monitoring Channel

Used in the Cyclotron vault and in the Hot Cells.

Set to report activity and is useful to measure the activity before the material is moved out of the Hot cell into the Dose Calibrator. (dose and dose rate)

Measuring Range: 1 $\mu\text{Sv/h}$ to 1 Sv/h (0.1 mR/h to 100 R/h)

GM-42 Area Monitoring Channel

Used in the Radiochemistry Lab, Control Room, Q.A. Dept, Radiopharmacy and other hot rooms to measure general radiation (dose and dose rate).

Measuring Range: 0.1 $\mu\text{Sv/h}$ to 10 mSv/h (0.01 mR/h to 1 R/h)

PM-11 Stack Monitoring Channel

High Sensitivity detector used in the Exhaust Stack to measure radioisotope releases, down to the 10^{-7} $\mu\text{Ci/cc}$ regulatory requirements.

Combined with online readings from the flow meter, provides full reporting on released concentration and activity amounts

Neutron Monitoring Channel

Neutron Detector mounted in cyclotron vault according to regulator requirements in some countries.

The neutron detector can be detached from the monitoring channel and connected to a RAM DA-2000 portable instrument to provide a combined portable survey instrument, for surveys and a fixed area monitor

The MediSmarts system is compatible to both the Berthold and Ludlum Neutron detectors

And these are just a few...

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