The Direct Reading Dosimeter is a pocket-size, carbon fiber electroscope with an ion chamber for detecting and indication of integrated exposure to gamma and x-ray radiation. It has a thin wall which permits the penetration and detection of radiation. A yearly calibration of the Direct Reading Dosimeter is recommended, and is generally consistent with good health physics practices. More frequent calibration may be necessary should the user’s license require a shorter calibration interval.

The way to read a dosimeter is to point it at a light source so that you can look through it and see the scale. The conductive fiber moves across a very clear, well-marked scale that produces the reading. Because the dosimeter scale is linear, it is possible to determine the total amount of radiation exposure for any selected period of time by merely subtracting the reading taken at the end of the selected period. It is not necessary to recharge the dosimeter after each reading unless the instrument reads close to full scale.

Dosimeters are extremely sensitive instruments. Although they are constructed for rugged use and have a protective sapphire window, they should receive the same care as a wristwatch. Since dosimeters are hermetically sealed at the factory, they cannot be repaired or adjusted in the field. Therefore, if the instrument malfunctions in any way it should be returned to the dealer.

Dosimeters may be maintained in operating condition simply by cleaning the eye piece lens and the charging switch insulator with water and a lint-free cloth that is free of grit.

Do not use any alcohol-based products to clean the dosimeter. Make sure the charging switch insulator is free of lint and moisture at all times.

Caution: Do not insert any sharp objects into the charging switch recess or tamper with its parts in any way.

Specifications
Radiation Detected: Gamma and X-ray from 16 keV to 2 MeV
Ranges: 0-200 mR to 0-500 R
Detector: Fiber electrometer mounted in an electrically conductive plastic ion chamber
Detector Housing: Very low permeability plastics - hermetically sealed
Accuracy: Within ± 10% of true exposure
Rate Response: Dose rate independent for gamma and X-ray
Electrical Leakage: Less than 1% of full scale for 24 hours at 50°C
Temperature Range: -20°C to + 50°C
Relative Humidity: Up to 90%
Dimensions: 0.6” Dia. x 4.5” (1.5 x 12.4 cm)
Weight: 1.0 oz (28.4 g)
Finish: Barrel and end caps are natural matte black with metal clips
Shelf Life: 20 years
Warranty: 2 year limited warranty
Specifications: ANSI N13.5 and ANSI N322-1997

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Range</th>
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<tbody>
<tr>
<td>343-490</td>
<td>Direct Reading Dosimeter</td>
<td>0 - 200 mR</td>
</tr>
<tr>
<td>343-495</td>
<td>Direct Reading Dosimeter</td>
<td>0 - 2 mSv</td>
</tr>
<tr>
<td>343-500</td>
<td>Direct Reading Dosimeter</td>
<td>0 - 500 mR</td>
</tr>
<tr>
<td>343-505</td>
<td>Direct Reading Dosimeter</td>
<td>0 - 5 mSv</td>
</tr>
<tr>
<td>343-750</td>
<td>Battery Powered Dosimeter Charger</td>
<td></td>
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</tbody>
</table>
909B DOSIMETER CHARGER

The charger’s LED reading light reduces re-zeroing time and effort by eliminating the need to remove the dosimeter from the charger for reading. Simply view the scale while the dosimeter is resting lightly on the charger contact after re-zeroing. Reading in the same orientation as charging also minimizes the effect that gravitational induced fiber movement has on dosimeter accuracy and precision. The 909B Dosimeter Charger charging contact is spring-loaded and has a positive mechanical stop. This design feature makes it virtually impossible to damage dosimeters through excessive charging force.

The patented “kick” feature found on the 909B Dosimeter Charger automatically removes residual static charge from the dosimeter’s charging pin every time the dosimeter is re-zeroed. This eliminates a major source of erroneous fiber movement (up to 5% full scale).

Easier charging, viewing, dosimeter protection and improved accuracy are the biggest reasons the battery operated 909B Dosimeter Charger is the best value on the market today.

Specifications

<table>
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<tr>
<th>Item #</th>
<th>Description</th>
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<tr>
<td>343-750</td>
<td>909B Dosimeter Charger</td>
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</table>
### PDM-122 ELECTRONIC POCKET DOSIMETER

- Light and compact to fit in a pocket
- Wide measurement range from 1μSv to 10 Sv
- Accumulated dose and dose rate measuring
- Data holding function
- Simple operation of only one button

A highly sensitive, compact dosimeter to measure Gamma and X-rays. This direct-reading dosimeter displays an accumulated dose as well as dose rate and is suitable for measuring above 100kVp of X-ray tube voltage.

**Item 343-122 PDM-122 Electronic Pocket Dosimeter Includes**
- Main unit, Battery, Strap, Instruction manual, Calibration and Inspection certificate.

**Specifications**
- Radiation Detected: Gamma and X-ray
- Energy Threshold: 40 KeV
- Detector: Silicon Semiconductor

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<th>Item #</th>
<th>Description</th>
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<tr>
<td>343-122</td>
<td>PDM-122 Electronic Pocket Dosimeter</td>
</tr>
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</table>

### PDM-127 ELECTRONIC POCKET DOSIMETER

- Light and compact to fit in a pocket
- Wide measurement range from 1μSv to 10 Sv
- Accumulated dose and dose rate measuring
- Data holding function
- Simple operation of only one button

A highly sensitive, compact dosimeter to measure Gamma and X-rays. This direct-reading dosimeter displays an accumulated dose as well as dose rate and is suitable for measuring above 100kVp of X-ray tube voltage.

**Item 343-127 PDM-127 Electronic Pocket Dosimeter Includes**
- Main unit, Battery, Strap, Instruction manual, Calibration and Inspection certificate.

**Specifications**
- Radiation Detected: Gamma and X-ray
- Energy Threshold: 20 KeV
- Detector: Silicon semiconductor

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<th>Item #</th>
<th>Description</th>
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<tr>
<td>343-127</td>
<td>PDM-127 Electronic Pocket Dosimeter</td>
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</table>

**Measurement Range:**
- **Dose:** 0.1 mrem - 1000 rem (1μSv to 10 Sv)
- **Dose Rate:** 0.1 mrem/h - 10 rem/h (1μSv/h to 10mSv/h)
- **Accuracy:** Within ± 10% 1 mrem - 100 rem (10μSv to 10 Sv; Calibrated by Cs-137 using slab phantom)
- **Linearity:** Within ± 20% 1 mrem/h - 100 rem/h (10 μSv/h to 10mSv/h)
- **Energy Dependence:** Within ± 30% from 30 keV - 200 keV
- **Display:** 4 digit LCD with unit and battery indications
- **Switch:** Power on/off (including reset operation) and dose rate display
- **Immunity:** 150V/m: 0.15MHz - 200MHz; 100v/M: 200MHz - 1000MHz (IEC61326-1:2006)
- **Power:** One CRC2450 Lithium Battery (conforming to IEC60086-2)
- **Battery Life:** Approx. 350 hrs of continuous use (at room temp 20°C)
- **Environmental Requirements:** -10°C to +50°C: relative humidity up to 90% non-condensing
- **Dimensions:** 30 W x 11 D x 108 H mm excluding clip
- **Weight:** 40 g

**Please Note:** Nonconforming battery may cause a malfunction of the instrument
DMC 2000S - ELECTRONIC PERSONAL DOSIMETER

Gamma

The DMC 2000S features flat energy response to X-rays and gamma field from 50keV to 6MeV and linear response to dose rate fields from natural background up to more than 10 Sv/h. The pass-by data exchange feature gives unequal operational flexibility. In-motion reading allows dose management by sub-zone as well as real-time location tracking of personnel.

Specifications

Display Units: mrem, mSv or μSv
Measurement Range:
- Dose: 0.1 mrem to 1000 rem (1μSv to 10 Sv)
- Dose Rate: 0.01 mrem/h to 1000 rem/h (0.1 μSv/h to 10 Sv/h)
- Display Rate: 0.01 mSv/h to 10 Sv/h or 0.001 mSv/h to 10 Sv/h (extended option)
- Linearity: < ± 20% up to 100 rem/h (1 Sv/h); < ± 30% up to 1000 rem/h (10 Sv/h)

X and Gamma Energy Range: 50keV to 6MeV
Accuracy: < ± 10% (137Cs, ~ 25 mSv/h including ± 5% extended uncertainty K=2)

Environmental:
- Temperature: 14°F to 122°F (-10°C to 50°C)
- Humidity: < 90% at 108°F (42°C)
- Storage: -22°F to 160°F (-30°C to 71°C)

Shock, Vibration, and Drop Resistant

Waterproof IP67

Power: Standard calculator battery LiMnO2 CR2450, one year battery life (typical, 8 hrs/day in run mode)

Dimensions: 3.4" L x 1.9" W x 1.1" T (8.7 x 4.8 x 2.8 cm)

Weight: < 1.9 oz (56 g) with battery

Worn by a Replacable Clip

EMC: complies and exceeds standards by a large margin
Compliant to IEC 1283, ANSI 4220A
PTB approved version, compliant with IEC1526 ed2
Factory calibration approved under ISO/CEI 17025

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<tr>
<th>Item #</th>
<th>Description</th>
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<tr>
<td>343-2000</td>
<td>DMC 2000S Electronic Personal Dosimeter</td>
</tr>
</tbody>
</table>
DMC 3000 ELECTRONIC PERSONAL DOSIMETER
X-ray & Gamma

Specifications

Radiological Characteristics
Compliant with IEC 61526 Ed. 3, ANSI 42.20 (*) (*) isotropy 241Am and 137Cs with ± 75° angle Measurement and display
Energy response: Better than ± 20% (typically ± 10%)
Accuracy \(Hp(10): \leq \pm 10\%\) (137Cs, ~ 24 mSv/h); \(\leq \pm 15\%\), (241Am, ~ 23 mSv/h); \(\leq \pm 19\%\) * X-ray 16keV (*including ± 5% extended uncertainty k=2); (** including ± 9% extended uncertainty k=2)
Display dose: 1 μSv to 10 Sv (0.1 mrem to 1000 rem)
Display rate: 10 μSv/h to 10 Sv/h (1 mrem/h to 1000 rem/h) or 1 μSv/h to 10 Sv/h (0.1 mrem/h to 1000 rem/h) extended option.
Dose Rate Linearity: \(< \pm 20\%\) up to 10 Sv/h (1000 rem/h) (Co and X H30 20 keV); \(< \pm 20\%\) up to 6 Sv/h (600 rem/h) (Pulsed X-rays 20 ms width, 1, 10 & 20pps)

Electrical Characteristics

- Standard AAA (LR03) 1.5 V Alkaline battery
- 9 calendar month battery life (typical, 8 h per day, 5 days per week in run mode, without excessive alarms)*
- 2500 h battery life in continuous run, without excessive alarm

Mechanical Characteristics

Rugged, high impact polycarbonate-ABS case
Dimensions: 3.4” x 2.2” x 0.8” (6 x 56 x 21 mm) without clip
Weight with alkaline battery and clip: < 88 g (3.1 oz)
Worn by a replaceable clips (2 different style back clips or one a front-facing clip for DMC worn inside the pocket)

Environmental Characteristics

Temperature Range: 14°F to 122°F (-10°C to 50°C): deviation in response less than ± 5%
Relative Humidity: < 90% at 108°F (42°C)
Storage: -4°F to 160°F (-20°C to 71°C)
Shock, vibration and drop resistant (1.5 meter on concrete)
Waterproof IP67: 39” (1m) during 1 hour

EMC: Complies and exceeds standards by a large margin (compliant, certificate number: 153720)
MIL STD 461F RS103 (pulsed electric field): Exceeds 200 V/m from 30 kHz to 5 GHz
MIL STD 461F RS101 (magnetic field 30 Hz - 100 kHz)
Factory calibration approved under ISO/IEC 17025, COFRAC accreditation Nber 2-1663

The DMC 3000 Personal Electronic Dosimeter has a rugged, high impact polycarbonate-ABS case, is small, lightweight, and is cost effective personal radiation monitoring device. They are designed to be worn on the body and keep a live record of both dose and dose rate. The DMC 3000 Personal Electronic Dosimeter is simple to use with 2 push buttons for an easy customized data and parameters display. The DMC 3000 has a LDC display with high-quality white backlighting.

The DMC 3000 covers a wide range of X-Ray and Gamma radiation detection field from 15keV to 7Mev and linear response to dose rate fields from natural background up to more than 10 Sv/h. The pass-by data exchange feature gives unequal operational flexibility. In-motion reading allows dose management by sub-zone as well as real-time location tracking of personnel.

<table>
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<th>Item #</th>
<th>Description</th>
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<tr>
<td>343-300</td>
<td>Personal Electronic Dosimeter - DMC 3000</td>
</tr>
</tbody>
</table>
LDM 320D DOSIMETER READER

Description
- Two-color electroluminescent diode used as ON/OFF and data exchange indication
- Two-color electroluminescent diode for READY/BUSY indication
- Two-color electroluminescent diode for ACCESS/ NO ACCESS indication
- 1 female connector, 2 x 13-pins, 1.27 mm pitch, for accessory options (4 digital inputs, 4 digital outputs, power supply)
- Upgradeable Firmware • Multi antennas (x3) for better (adaptive) communication with dosimeters

Communication with Dosimeters
- Short range high frequency bidirectional data exchange at 125 kHz
- Nominal range: LDM 320D
  - DMC 2000: 9.8” (25 cm) * maximum
  - DMC 3000: 1.9” (5 cm) maximum
*The low range configuration reduces the range of communication of about 1.9” (5 cm)

Specifications
Operating Temperature: 32°F to 122°F (0°C to +50°C)
Storage Temperature: +14°F to 140°F (-10°C to +60°C)
Humidity: 90% HR (without condensation)
IP LDM 320D: IP52
Electrical Characteristics:
Self powered through USB port
EMC: complies with and exceeds standards compliant (CE certificate: 151508)

Dimensions: 3.9” W x 4.3” L x 1.1” D (10.0 x 10.9 x 2.9 cm)
Weight: 5.3 oz (150 g)

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<tr>
<th>Item #</th>
<th>Description</th>
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<tr>
<td>343-320</td>
<td>LDM 320D USB Dosimeter Reader</td>
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</table>

The LDM 320D readers operate using software packages installed on computer (PC) and communicate with DMC 3000 dosimeter and DMC 2000 in hands-free data exchange mode.

When used with the DOSICARE, DOSIFAST, or compatible access control software, the LDM 320 reader is used as an interface to activate a dosimeter (to switch into counting mode) or to deactivate it (to switch into pause mode).

When used with the DMCUser software, it functions as an interface to read and write the internal data of the DMC 3000 and DMC 2000 dosimeters.

- Dosimeter reader is compact and low-cost.
- Hands-free communication with dosimeters
- No directional alignment required
- 3 indicator LEDs for operation and access control
- Manageable digital inputs/outputs
- DSP based digital process
- Compatible with the DMC 2000 and SOR families, iPAM-Tx as well as the DMC 3000 dosimeter
- Compatible with software packages: DOSICARE, DOSIFAST, DMCUser and LDM 3000SW
- Wall-mounted or desk versions

Radiation Products Design, Inc. | Albertville, MN 55301 | (800) 497-2071 | Fax: (763) 497-2295 | www.rpdinc.com
RAD-60 PERSONAL ELECTRONIC DOSIMETER

- Gamma and X-Ray Detected from 60 keV to 6 Mev
- Individual Personal Alarming Dosimeter
- Digital Display for Integrated Dose or Alternatively Dose Rate
- User Selectable Alarm Levels for both Dose and Dose Rate

With a push of a button you can:
- Turn the unit on/off
- Change the digital display to read dose or dose rate
- Select from several Dose and Dose Rate Alarm levels
- Turn the Chirp function on/off
- Reset Integrated Dose
- Perform a Battery Test

The RAD-60 Personal Electronic Dosimeter is a precise and reliable instrument for ensuring the personal safety of the user. Ideally, the RAD-60 is used in everyday radiation monitoring, in stand-alone conditions. If your needs grow for a more sophisticated system, the versatile RAD-60 can also be integrated into an Access Control System. The RAD-60 can be switched into System Mode, for the purpose of tracking Personnel Dose records and generating compliance reports. The design includes state-of-the-art technology with built in memory for retrieving dose, even during power-down. It eliminates outside interference from shock and RF. The RAD-60 is easily programmed by the user, has a digital display, and operates with a single AAA alkaline battery. This small, lightweight unit can accompany the user anywhere recording the accumulated dose constantly and reliably all the time. The pre-settable alarms alert the user when exposure limits are being exceeded.

The most important working parameters are stored in non-volatile EEPROM memory securing vital information even in power down situations. The RAD-60 is battery-operated and utilizes a single standard AAA size alkaline cell. The smooth and ergonomic design of RAD-60 casing is splash-proof and easy to decontaminate.

Specifications
- Radiation Detected: Gamma and X-Ray
- Detector Type: Energy-Compensated Si-Diode
- Measurement Range:
  - Dose: 1 microSv - 9.99 Sv or 0.1 mrem-999 rem
  - Dose Rate: 5 microSv/h - 3 Sv/h or 0.5 mrem/h - 300 rem/h
- Calibrations:
  - Better than ±5 % (Cs137, 662 keV at 2 mSv/h), Hp(10)
- Energy Response:
  - Hp(10), 60 keV - 3 Mev, better than ±25%, up to 6 MeV, better than ±35%
- Dose Rate Linearity:
  - Better than ±15%, up to 3 Sv/h (300 rem/h)
- Audible Alarms:
  - Seven separate alarms, sound level typically better than 85 dBA at 30 cm
  - Integrated dose
  - Dose rate
  - Dose overflow
  - Dose rate overflow at 3 Sv/h or 300 rem/h
  - Low battery 1 and 2
  - Defect
- Alarm Thresholds:
  - Six preset values each for integrated dose and dose rate, manually selectable.
- Power Supply:
  - One triple-A alkaline cell, life typically 1800 hrs in background field (dose mode)
- Reader Communication:
  - By infrared through bottom part; by using ADR-1 Reader Head in combination with RASDOS PC Software
- Push-Button functions:
  - Front panel push-button has the following selectable functions
  - Change display priority (dose/dose rate)
  - Switch ON/OFF
  - Chirp ON/OFF
  - Reset Integrated Dose
  - Change Alarm Thresholds
  - Activate Battery Test
- Temperature Range:
  - -20 to +50°C operational, humidity up to 90% RH, noncondensed; -20 to + 70°C storing
- Dimensions:
  - 3.06" x 2.63" x 0.86" (78 x 67 x 22 mm)
- Weight:
  - 2.82 oz (80 g) including battery

Note: The active alarm thresholds and configurations of push button functions can be changed by using ADR-1 Reader in combination with RASDOS PC software.

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<th>Item #</th>
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<tr>
<td>343-600</td>
<td>RAD-60 Personal Electronic Dosimeter</td>
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</table>
With the ADR-1/60 Reader for RAD-60 Dosimeters the user can:
- Change Dosimeter Settings
- Perform Calibration
- Assign Dosimeters
- Assign a User ID and Name

ADR-1/60 Reader for RAD-60 Dosimeters Includes:
- ADR-1 Reader
- Configuration Software
- Manual

The Reader connects to any PC via 9 Pin Serial port.

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<tr>
<td>343-605</td>
<td>ADR-1/60 Reader for RAD-60 Dosimeters</td>
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</tbody>
</table>
PRIMALERT™ DIGITAL AREA MONITORS

- LED digital display
- Low and high alarm indicators
- Programmable alarm indicators
- Optional remote
- Detector fail indicator
- Battery backup
- Data output / RS-232
- Two configurations available with internal energy compensated GM detectors
- CE tested. Meets applicable standards

Features
- Simple installation and setup
- Anti-jam circuitry prevents erroneous readings at tube saturation
- Calibration controls easily accessed through front panel

The Primalert Digital Area Monitors are completely self-contained units with energy compensated GM detectors, AC powered with internal battery backup and have both low and high setting alarms. An optional remote alarm is available for added security.

The Primalert Digital Area Monitors can be used wherever there is a need to detect and warn personnel of increasing radiation levels and to control the exposure of personnel to gamma radiation.

Specifications

Internal GM Detector Range:
- Item 337-443: 0.1 mR/hr to 1 R/hr
- Item 337-444: 1 mR/hr to 4 R/hr

Display:
- 4 digit LED display with 0.8 in (2 cm) character height

Display Range: 000.0 to 9999

Display Units: Can be made to display in μR/hr, mR/hr, R/hr, μSv/h, mSv/h, Sv/h, cpm, cps and others

Linearity: Reading within ± 10% of true value with detector connected

Response: Typically 3 seconds from 10% to 90% of final reading

Status: (green light) Indicates the instrument is functioning properly

Low Alarm: Indicated by a yellow light and slow beep (1 per sec) audible tone (can be set at any point from 0.0 to 9999)

High Alarm: Indicated by a red light and fast beep (4 per sec) audible tone (can be set at any point from 0.0 to 9999)

Note: Audible indicators can be configured as a single beep if desired.

Detector Fail: (red light and audible tone: > 68 dB at 2 ft) Indicates detector overload, no count from detector, or instrument failure

Low Battery: (yellow) Indicates < 2 hours of battery power remaining

Calibration Controls: Accessible from front of instrument (protective cover provided)

High Voltage: Adjustable from 200 to 2500 V

Threshold: Adjustable from 2 to 100 mV

Dead Time: Adjustable to compensate for dead time of the detector and electronics (can be read on the display)

Overload: Senses detector saturation (indicated by display reading "OL")

Overrange: Indicated by a red light and fast beep (4 per sec) audible tone (can be set at any point from 0.0 to 9999)

Data Output: 9 pin connector providing 5 decade log output, RS-232 output, signal ground connection, FAIL and Alarm signals (current sink), and direct connection to battery and ground

Power Requirements: 95 to 135 VAC, 50 to 60 Hz single phase (<100 mA), 6V sealed lead acid rechargeable battery (built-in)

Battery Life: Typically 48 hours in non-alarm condition, 12 hours in alarm condition

Battery Charger: Battery is continuously trickle charged when instrument is connected to line power and turned on

Construction: Aluminum housing with white polyurethane enamel paint

Temperature Range: -4° to 122° F (-20° to 50° C). May be certified for operation from -40° to 150° F (-40 to 65° C)

Size: 9.7" W x 2.5" D x 7.4" H

Weight: 8.5 lb

Optional Remote Display

Status: (green light) Indicates the instrument is functioning properly

High Alarm: (red LED) Indicates the radiation level exceeds the high alarm point

Detector Fail: (red LED) Indicates detector overload, no count from detector, or instrument failure

Audio: Unimorph type with ON/OFF switch (> 68 dB at 2 ft)

Power Requirements: Provided by PRIMALERT (20 ft cable included)

Construction: Aluminum housing with ivory polyurethane enamel paint

Temperature Range: -4° to 122° F (-20° to 50° C)

Size: 6" W x 2" D x 7" H

Weight: 1.5 lb

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<th>Item #</th>
<th>Description</th>
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<tr>
<td>337-443</td>
<td>Primalert™ Dig. Area Monitor (0.1 mR/hr to 1R/hr GM Detector)</td>
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<tr>
<td>337-444</td>
<td>Primalert™ Dig. Area Monitor (1 mR/hr to 4 R/hr GM Detector)</td>
</tr>
<tr>
<td>337-446</td>
<td>Optional Remote Display</td>
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</tbody>
</table>
Remote Alarm (Item 337-105 or 337-106)
The optional Remote Alarm unit duplicates the alarm indication functions of the main unit at a remote location up to 1000 feet. It features a green status light, a red light for high alarm, and Sonalert for audible alarm with a disable switch. The remote unit is powered by the monitor and available with either a 20 ft or 50 ft cable.

Specifications:
- Item 337-100 Radiation Therapy Area Monitor, Model 375/2
- Indicated Use: General purpose area monitor
- Detection Range: 0.1 mR/hr to 999.9 mR/hr
- Detector: Internally mounted energy compensated GM
- Display: Four-digit LED, 0.8" H (2 cm) digits
- Alarm: May be preset in 0.1 mR/hr (1 μSv) increments
- Visual: Red light
- Audio: Sonalert, single beep, may be disabled
- Data Output: Nine-pin connector providing five-decade logarithmic output, RS-232 output, signal ground connection, FAIL, and ALARM signals (current sink), and direct connection to battery and ground
- Calibration Controls: Accessible from front of instrument (protective cover provided)
- Power: 95-135 Vac, 50-60 Hz single phase
- Battery: Built-in 6-volt rechargeable battery
- Battery Life: Typically 48 hours in non-alarm condition; 12 hours in alarm condition
- Battery Charger: Battery is continuously trickle charged when instrument is connected to line power and turned on
- Construction: Wall mount aluminum housing with ivory powder coat paint
- Size: 7.4" H x 9.7" W x 2.5" D (18.7 x 24.6 x 6.4 cm)
- Weight: 6.5 lb (2.9 kg)

Remote Alarm (Item 337-106)
- Indicated Use: Remote display/annunciator for the Model 375 Digital Area Monitors
- Audio: Sonalert-type speaker with enable/disable switch (greater than 68 dB at 0.61 m [2 ft])
- Radiation Readout Display: None
- Status Indicators:
  - Status OK: Green LED
  - High Alarm: Red LED
  - Det Fail: Red LED
- Controls: Audio: ON/OFF
- Power Supplied By: Model 375/2 instrument
- Construction: Aluminum with powder coat finish
- Temperature Range: -4 to 122°F (-20 to 50°C), may be certified to operate from -40 to 150°F (-40 to 65°C)
- Size: 7" H x 6" W x 2"D (17.8 x 15.1 x 5.1 cm)
- Weight: 1.5 lb (0.7 kg)
RADIATION AREA MONITOR SYSTEM, MODEL 7008RT

Item 337-110 and 337-112 Remote Alarm
The optional Remote Alarm unit duplicates the alarm indication functions of the main unit. It features a green status light, a red light for high alarm, and Sonalert for audible alarm with a disable switch. Item 337-111 is supplied with a 100’ (30.5 m) cable and Item 337-112 is supplied with a 50’ (15.25 m) cable. An optional 100’ (30.5 m) cable is available if additional cable length is needed.

Specifications
Item 337-110 Radiation Area Monitor - Internal Solid State Detector
Detector: Internal solid state detector
Display: 8 digit, 12 mm high (0.5 in) LCD
Range: 0.1 to 999.9 mR/h (1 to 9999 μSv optional)
Alarm: May be preset in 0.1 mR/h (1 μSv) increments
Visual: Red light
Audio: Sonalert, single beep, may be disabled
Battery: Built-in rechargeable NiMH battery supplies 48 hours of non-alarm use under line power failure conditions. Low battery yellow LED on front panel
Power: 95 – 230 VAC, 50/60 Hz
Dimensions: 7.6” x 4.5” x 2.7” (19.4 x 11.5 x 6.8 cm)
Weight: 1.5 lb (0.7 kg)

Item 337-111 and 337-112 Remote Alarm
Alarm: Red lamp indicates, Sonalert provides audio for alarm and failure, toggle switch disables audio
Status OK: Green light indicates correct monitor operation
Power: 95 – 230 VAC, 50/60 Hz, 12 VDC from main unit
Cable: 50’ (15.25 m) or 100’ (30.5 m) length cable
Dimensions: 7.6” x 4.5” x 2.7” (19.4 x 11.5 x 6.8 cm)
Weight: 1.0 lb (0.5 kg)

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<thead>
<tr>
<th>Item #</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>337-110</td>
<td>Radiation Area Monitor, Model 7008 RT</td>
</tr>
<tr>
<td>337-111</td>
<td>Remote Alarm Unit with 100’ (30.5 m) Cable</td>
</tr>
<tr>
<td>337-112</td>
<td>Remote Alarm Unit with 50’ (15.25 m) Cable</td>
</tr>
<tr>
<td>337-113</td>
<td>100’ (30.5 m) Cable for 337-111 or 337-112</td>
</tr>
</tbody>
</table>

Item 337-110
Radiation Area Monitor - Internal Solid State Detector
The Radiation Area Monitor, Model 7008RT is a wall-mounted radiation monitor designed to meet the specific needs of radiation therapy. It is designed to operate continuously from an AC power line. In the event of power failure, the built-in, continuously trickle charged NiMH battery automatically switches in to begin supplying power immediately, assuring interruption-free operation at all times. The monitor features a digital display of radiation rate, audible and visual alarms, and alarm indicator, alarm setpoint adjustability over the entire range, and self diagnostic functions such as low battery, overrange, detector saturation and detector failure conditions. A green status light is a positive indication of normal instrument operation.

A flashing red light with 180° visibility and a red LED indicator below the digital display provide the visual alarm. The audible alarm (which may be disabled with a switch) consists of a single short beep at the beginning of the alarm mode. Optional features include SI units.
The PRIMALERT™ 35 assures reliable, continuous monitoring wherever radioactive materials are present. It displays the radiation level in bright color-coded lights, and it emits audible and/or visible signals whenever the gamma radiation exceeds a user-preset alarm level.

Six range indicators (1, 2, 4, 8, 16 and 32 mR/hr) clearly display an increase or decrease in radiation levels. The alarm can be set at any of the six levels by a front-panel, screwdriver-adjustable control. The light for each level goes on when the radiation intensity reaches that level and goes out when the rate drops below the level. This permits instant radiation-level recognition not readily distinguishable on meter-type instruments.

When the preset level is exceeded, personnel are alerted by bright flashing red lights (visible over a 180° field) and a loud intermittent audio signal. The alarms stop automatically when the radiation level falls below the preset value. A front-panel switch permits the selection of both the visible and audible alarms or just the visible alarm.

Fail-safe operation is assured by a light which continuously indicates background radiation and provides visual proof that the unit is functioning. The monitor will not jam or show false readings in high radiation fields.

The PRIMALERT™ 35 contains an energy-compensated GM detector, and features a convenient automatic alarm reset.

An optional PRIMALARM™ Remote Alarm (Item 337-138) provides the same audible and visible signals as the PRIMALERT™ 35, up to 100 feet from the monitor. The PRIMALARM™ allows personnel located away from the radiation area to be alerted the instant the preset radiation limits have been exceeded.

**Item 337-137 Includes**
- PRIMALERT™ 35 Monitor
- Self-Stick Wall-Mounting Bracket
- AC Adapter/Power Converter
- Informational CD
- Calibration Report

**Additional Items Sold Separately**
- PRIMALARM™ Remote Alarm (Item 337-138)
- Emergency Power Line Operated PRIMAPAK™ II Battery Back-up (Item 337-140)
- Check Source (Item 337-141)

### Specifications

**Power:** Line operated with UL listed converter: 100-240 VAC, 50-60 Hz to 12VDC, 0.5 Amp

**Size:** 3.5” W x 6” H x 1.5” T (9 x 15 x 4 cm)

**Weight:** 2 lb (1 kg)

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<thead>
<tr>
<th>Item #</th>
<th>Description</th>
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<tbody>
<tr>
<td>337-137</td>
<td>PRIMALERT™ 35 Area Radiation Monitor with AC Adapter</td>
</tr>
</tbody>
</table>
PRIMALERT™ 10 RADIATION MONITOR

The range of the PRIMALERT™ 10 may be modified from 2.5/20 mR/h which is the standard for the range switch LOW and HIGH positions. The customer can make the modification to provide any of the following two range positions: 2.5, 5, 10, 20 or 40 mR/h.

An optional PRIMALARM™ Remote Alarm (Item 337-138) provides the same audible and visible signals as the PRIMALERT™ 10, up to 100 feet from the monitor. The PRIMALARM™ allows personnel located away from the radiation area to be alerted the instant the preset radiation limits have been exceeded.

Item 337-139 Includes
- PRIMALERT™ 10 Monitor
- Self-Stick Wall-Mounting Bracket
- AC Adapter/Power Converter
- Informational CD
- Calibration Report

Additional Items Sold Separately
- PRIMALARM™ Remote Alarm (Item 337-138)
- Emergency Power Line Operated PRIMAPAK™ II Battery Back-up (Item 337-140)
- Check Source (Item 337-141)

Specifications
Detector: Energy compensated GM tube
Accuracy: ±20% from 60 KeV to 2 MeV
Alarm Trip Level: Switch-selectable at 2.5 or 20 mR/hr
Alarm: Two flashing red lamps with 180° field of view, alarm ceases when radiation falls below trip level
Power: Line-operated with UL listed converter: 100-240 VAC, 50-60 Hz to 12 VDC, 0.5 Amp
Size: 3.5" W x 6" H x 1.5" T (9 x 15 x 4 cm)
Net Weight: 2 lb (1 kg)

<table>
<thead>
<tr>
<th>Item #</th>
<th>Description</th>
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<tbody>
<tr>
<td>337-139</td>
<td>PRIMALERT™ 10 Radiation Monitor with AC Adapter</td>
</tr>
</tbody>
</table>
PRIMALARM™ REMOTE ALARM

Item 337-138 Includes
- PRIMALARM™
- Self-Stick Wall-Mounting Bracket
- AC Adapter/Power Converter
- 100’ (30.5 M) Cable
- Informational CD

Additional Items Sold Separately
- PRIMALERT™ 35 Area Radiation Monitor (Item 337-137)
- PRIMALERT™ 10 Radiation Monitor (Item 337-139)
- Emergency Power Line Operated PRIMAPAK™ II Battery Back-up (Item 337-140)

Specifications
- Alarm Trip Level: Controlled by PRIMALERT™ Monitor
- Alarms: Two flashing red lamps with a 180° field of view. The aural alarm is switch-selectable.
- Power: Line operated with UL listed converter: 100-240 VAC, 50-60 Hz to 12VDC, 0.5 Amp. Can also be powered by Item 337-140 PRIMAPAK™ II.
- Dimensions: 3.5” W x 6” H x 1.5” T (9 x 15 x 4 cm)
- Weight: 1 lb (0.5 kg)

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<thead>
<tr>
<th>Item #</th>
<th>Description</th>
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<tbody>
<tr>
<td>337-138</td>
<td>PRIMALARM™ Remote Alarm with AC Adapter</td>
</tr>
</tbody>
</table>

PRIMAPAK™ II BATTERY BACK-UP

This unit works with the following instruments
Item 337-137 PRIMALERT™ 35 Radiation Monitor
Item 337-138 PRIMALARM™ Remote Alarm
Item 337-139 PRIMALERT™ 10 Radiation Monitor

Item 337-140 Includes
- PRIMAPAK™ II
- Specify AC Adapter/Power Converter
  - USA/Japan: 110 VAC 12 VDC 500 mA
  - Europe: 230 VAC 12 VDC 500 mA
  - UK: 230 VAC 12 VDC 580 mA
  - Australia: 230 VAC 12 VDC 580 mA
- Interconnect Cable
- Informational CD

Specifications
- Power: Line operated with UL listed converter: 100-240 VAC, 50-60 Hz to 12VDC, 1 Amp
- Size: 4.5” W x 6” H x 2.75” T (11.5 x 15.25 x 7 cm)
- Weight: 4.5 lb (2 kg)

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<th>Item #</th>
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<tr>
<td>337-140</td>
<td>PRIMAPAK™ II Battery Back-Up</td>
</tr>
<tr>
<td></td>
<td>with AC Adapter</td>
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</table>

Specify AC Adapter/Power Converter

The PRIMALARM™ also serves as an additional safeguard because it will flash if power to the PRIMALERT™ Monitors (Item 337-137 or Item 337-139) is lost or if the cable from the latter is disconnected. The PRIMALARM™ Remote Alarm is ideal for mounting outside the therapy room entrance.

PRIMAPAK™ II consists of rechargeable gel cells and circuitry that switches any PRIMALERT™ Monitor to battery operation if line power is lost. When AC is present, the battery is automatically recharged. Fully charged cells provide about eight hours of operation under alarm conditions or more than 32 hours of quiescent, no-alarm operation.
RAD ALERT 200 AREA MONITOR

- Displays Integrated Time, Dose Rate, Integrated Dose
- Dual Independent Trigger Levels
- Linear Range 1-30,000 mR/hr
- Audible Buzzer with Adjustable Volume
- NiMH AA Battery Backup with Trickle Charge

Item 337-210 RAD ALERT 200 Area Monitor Includes
- RAD ALERT 200 Area Monitor
- Remote Alarm and Battery Backup
- 100’ (30 m) Cable
- 12 VDC Universal Power Supply

RAD ALERT 200 is the next generation area monitor that includes a built in GM Gamma detector for monitoring rooms where radio nuclides may be present or where devices producing radiation may be located. This unit includes separate panels to display exposure rate (mR/hr), total integrated exposure (mR) and total exposure time on a remote alarm that is tethered to the primary alarm. The primary alarm includes a digital timer that counts time when radiation is present and a room door is open. This feature can be useful for routing patient safety QA or as a stopwatch in the event of an emergency. The monitor has a backup powered by either rechargeable NiMH or alkaline AA batteries. The rechargeable batteries are maintained on a trickle charge. The detector unit has an adjustable trigger level with the level displayed on a digital display. The slave unit contains an audible buzzer with an adjustable volume control that can be turned on or off with a switch mounted on the side of the unit. A separate dose trigger is also included that can be set by the user. When the dose exceeds this level a separate yellow light turns on.

Specifications
RAD ALERT 200
Indicated Use: Radiation area monitoring
Internal Detector: Dual Halogen quenched GM detector. Basic sensitivity 100 cpm/mR/hr (Cs-137) Internal Operating Voltage 550 VDC
Internal GM Detector Range: 0.5 mR/hr to 30,000 mR/hr (utilizes 2 separate GM Tubes) Internal Detector

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<tr>
<td>337-210</td>
<td>RAD ALERT 200 Area Monitor</td>
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</table>

Display: 4 digit LCD display with 0.4” (1 cm) character height; Emergency counter 8 digit LED display with 0.8” (2 cm) character height
Display Range: 000.0 to 200
Display Units: mR/hr
Range: 0-1,000,000 sec, 1-30,000 mR/hr
Resolution: 1 sec
Linearity: Reading within ±10% of true value with detector connected
Sensitivity: Adjustable 1-100 mR/hr. User can adjust sensitivity via a small hole in the side of the unit. Trip level can be monitored by a digital display on the front of the unit.
Response: Typically 1 second from onset of radiation
Calibration Controls: Accessible from potentiometer on side of unit
Status: Green light indicates the instrument is functioning properly and power is on
Alarm: Indicated by a flashing red light and audible buzzer
Dead Time: <10% at max exposure rate
Data Output: Current sink and direct connection to battery and ground
Operating Voltage: 12VDC, 450mA
Power Requirements: 12 VDC universal adaptor may be plugged into either main detector unit or remote alarm
Battery: Indicated by red LED, 8 AA NiMH on trickle charge in remote station
Battery Backup: 8 AA (NiMH or Alkaline) batteries
Battery Charger: Battery is continuously trickle charged when instrument is connected to line power
Battery Life: 7-9 hours
Construction: ABS Plastic Enclosure
Temperature Range: 0° to 130°F (-18° to 54°C)
Size: 4.4” W x 2.4” D x 8.5” H (11.2 x 6.1 x 21.6 cm)
Cable Length: 50-100’
Wall Mounting: #6 screw, 4/unit
Weight: 6.5 lb (2.3 kg)

Remote Station
Indicated Use: Remote display for RAD ALERT 100 and 200
Status: Green light indicates the instrument is functioning properly and power is on
Alarm: Flashing LED indicates the radiation level exceeds the alarm point; flashing yellow LED indicates exposure rate has exceeded the high alarm level.
Detector Fail: Indicated by red LED
Audio: Piezo Buzzer type with ON/OFF switch and adjustable volume
Power Requirements: 12 VDC universal adaptor
Construction: ABS Plastic Enclosure
Temperature Range: 0° to 130°F (-18° to 54°C)
Size: 9.5” W x 2.5” D x 6” H (22.9 x 6.4 x 15.2 cm)
Weight: 1.5 lb (0.7 kg)
RAD ALERT 50 AREA MONITOR

Adjustable Trigger Level
Remote Alarm with Buzzer
Battery Backup AAA NiMH
100' (30 m) Connection Cable

Item 337-200 RAD ALERT 50 Area Monitor Includes
- RAD ALERT 50 Room Monitor with Remote
- Alarm and Battery Backup
- 100' (30 m) Cable
- 12 VDC Universal Power Supply

Specifications
RAD ALERT 50 Area Monitor
Indicated Use: Radiation area monitoring
Internal GM Detector Range: 0.5mR/hr to 1000 mR/hr
Display: NA
Display Range: NA
Display Units: mR/hr
Linearity: Reading within ±10% of true value with detector connected
Response: Typically 3 seconds from 10% to 90% of final reading
Status: Green light indicates the instrument is functioning properly

Alarm: Indicated by 2 flashing red LED's (2 Hz) and audible buzzer (may be turned off)
Calibration Controls: Accessible from front of instrument (protective cover provided)
Dead Time: < 10% at maximum exposure rate
Data Output: Signals (current sink), and direct connection to battery and ground
Power Requirements: 12 VDC universal adaptor may be plugged into either main detector unit or remote alarm
Battery Life: 2 - 3 hours
Battery Charger: Battery is continuously trickle charged when instrument is connected to line power
Construction: ABS Plastic Enclosure
Temperature Range: 0° to 130°F (- 18° to 54°C)
Size: 5.8" W x 1.5" D x 3.7" H (17.7 x 3.8 x 9.4 cm)
Weight: 6.5 lb (2.3 kg)

Remote Station
Indicated Use: Remote display for RadAlert 50
Status: Green light Indicates the instrument is functioning properly and power is on
High Alarm: Dual red flashing LED indicates the radiation level exceeds the high alarm point
Detector Fail Audio: Piezo Buzzer type with ON/OFF switch and adjustable volume
Power Requirements: 12 VDC universal adaptor may be plugged into either main detector unit or remote alarm
Construction: ABS Plastic Enclosure
Temperature Range: 0° to 130°F (- 18° to 54°C)
Size: 5.8" W x 1.5" D x 3.7" H (17.7 x 3.8 x 9.4 cm)
Weight: 1.5 lb (0.7 kg)

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<th>Item</th>
<th>Description</th>
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<tr>
<td>337-200</td>
<td>RAD ALERT 50 Area Monitor</td>
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</table>
DOSIMETERS AND RADIATION MONITORS & METERS

RAD ALERT 100 AREA MONITOR

Alarms: Indicated by a flashing red light and audible buzzer
Battery: Indicated by red LED 8 AA NiMH on trickle charge in
remote station
Calibration Controls: Accessible from potentiometer on top of
unit
Dead Time: < 10% at max exposure rate
Data Output: Current sink and direct connection to battery and
ground
Power Requirements: 12 VDC universal adaptor may be
plugged into either main detector unit or remote alarm
Battery Life: 7 - 9 hours
Battery Charger: Battery is continuously trickle charged when
instrument is connected to line power
Construction: ABS Plastic Enclosure
Temperature Range: 0° to 130°F (-18° to 54°C)
Size: 4.4" W x 2.4" D x 8.5" H (11.2 x 6.1 x 21.6 cm)
Weight: 6.5 lb (2.3 kg)

Remote Station
Indicated Use: Remote display for RAD ALERT 100 and 200
Status: Green light indicates the instrument is functioning
properly and Power is on
Alarm: Flashing LED indicates the radiation level exceeds the
high alarm point
Detector Fail: Incicated by red LED
Audio: Piezo Buzzer type with ON/OFF switch and adjustable
volume
Power Requirements: 12 VDC universal adaptor
Construction: ABS Plastic Enclosure
Temperature Range: 0° to 130°F (-18° to 54°C)
Size: 9.5" W x 2.5" D x 6" H (22.9 x 6.4 x 15.2 cm)
Weight: 1.5 lb (0.7 kg)

Specifications
RAD ALERT 100 Area Monitor
Indicated Use: Radiation area monitoring
Internal GM Detector Range: 0.5 mR/hr to 1000 mR/hr
Display: 4 digit LED display with 0.4" (1 cm) character height
Display Range: 000.0 to 200
Display Units: mR/hr
Linearity: Reading within ±10% of true value with detector
connected
Response: Typically 1 second from onset of radiation
Status: Green light indicates the instrument is functioning
properly and power is on

Item 337-205 RAD ALERT 100 Area Monitor Includes
- RAD ALERT 100 Room Monitor with Remote
- Alarm and Battery Backup
- 100' (30 m) Cable
- 12 VDC Universal Power Supply

CHECK SOURCE

Specifications
Item 337-141 and 338-120
Isotope: 137Cs
Size: 1" Dia. x 0.1" T (2.5 x 0.3 cm (1 x 0.1 in.)

Item 338-122
- Typically Mounted to Side of Instrument
- Holds 1" Dia. (2.5 cm) Check Sources

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<th>Description</th>
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<td>Check Source, Cs-137, 10uCi</td>
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<tr>
<td>338-120</td>
<td>Check Source, Cs-137, 1uCi</td>
</tr>
<tr>
<td>338-122</td>
<td>Holder for Check Source</td>
</tr>
</tbody>
</table>
DOSIMETERS AND RADIATION MONITORS & METERS

LEAD CASE FOR CS-137 CHECK SOURCE

Specifications
Item 994-078 Lead Case for Cs137 Check Source
Lead Wall: 0.39" Thick (10 mm)
Inside Dimensions: 1.22" Dia x 0.3" D (31 x 8 mm)
Overall Size: 2.16" Dia. x 1.22" H (55 x 31 mm)
Weight: 1.5 lb (0.7 kg)

Item 994-079 Lead Case for Cs137 Check Source
Lead Wall: 1.0" Thick (25.5 mm)
Inside Dimensions: 1.25" Dia. x 5/8" D (31.9 x 16 mm)
Overall Size: 3.35" dia. x 2.5" H (85.4 x 63.7 mm)
Weight: 8.5 lb (3.9 kg)

<table>
<thead>
<tr>
<th>Item #</th>
<th>Description</th>
<th>Lead Thickness</th>
</tr>
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<tbody>
<tr>
<td>994-078</td>
<td>Lead Case for Cs137 Check Source</td>
<td>0.39&quot; (10 mm)</td>
</tr>
<tr>
<td>994-079</td>
<td>Lead Case for Cs137 Check Source</td>
<td>1&quot; (25.5 mm)</td>
</tr>
</tbody>
</table>

SURFACE SURVEY METER

Specifications
Meter: 2 1/2" (6 cm)
Ranges: 3 ranges, linear - 0-500, 0-5,000, 0-50,000 cpm (0-.15, 1.5, 15 mR/hr)
Switch Position: Off, Battery Test, x100, x10, x1
Audio: Internally mounted speaker
Detector: Halogen-quenched "Pancake GM tube"
Diameter: 2" (5 cm)
Window Diameter: 1 3/4" (5 cm)
Window Thickness: 1.5 mg/cm²
Background: Typical 50 cmp, Thin profile of tube (13 mm) gives low background
Efficiency: 100% for all betas and alphas that have the energy to penetrate the thin window.
Voltage: 900V nominal
Gamma Sensitivity: Nominal is 150 cpm/mr/h (based on CS-137)
Physical Dimensions: 3" W x 5 1/4" L x 2 1/4" T (8 x 13 x 6 cm) excluding meter and handle
Feet: Replaceable neoprene feet for easy sliding on bench or desk top without contaminating bottom face of instrument or detector
Calibration: Single master calibration pot as well as individual calibration pots for each scale
Power: 9 volt nominal “transistor battery” Eveready 1222 carbon or Eveready E146X mercury or equivalent
Current Drain: 3 mA typical
Handle: Swivel Type polished anodized aluminum
Weight: 22 oz (625 g.)
Battery Life: 100 hours in normal operation
The Digital Cutie Pie consists of a 3.25" dia. x 3.25" long air ion chamber coupled to a stable solid state MOSFET input electrometer with built-in A to D converter to read out directly in mR/h or mR. Range is 0.1 mR/h to 999.9 mR/h and 1 mR/h to 9.999 R/h. 200 mg/cm² graphite lined phenolic walls give accurate “air equivalence”. A thin (0.5 mg/cm²) Mylar window allows high sensitivity readings for alpha and for low energy beta such as C-14 in addition to higher energy betas, gammas and x-rays.

### Specifications

**Dimensions:** 5 1/2” x 3 1/2” x 8” including handles  
**Detector:** Air ion chamber 3.25" dia. x 3.25" long, Internal Volume 270 cc  
**Wall & Cap:** Phenolic, graphite lined 200 mg/cm² walls and 400 mg/cm² cap  
**Window:** 2.87” dia. x 0.5 mg/cm² mylar  
**Readout:** LCD 6 digits  
**Indicator Lamp:** Red LED 10 pulses/min per mR/h  
**Range:**  
**Rate:** Four digits 0.1 mR/h to 999.9 mR/h switchable to 1 mR/h to 9.999 R/h  
**Integrate:** 6 digits  
**Electrometer:** Solid State MOSFET input  
**Electronics:** A-D converter LCD drivers  
**Batteries:** 10 each NEDA CR-1220 - shelf life 7 years  2 each Eveready E93, C cell or eq. - 1000 hours  
**Weight:** 26 oz. complete with batteries (.75 kg.)  
**Shipping Weight:** 4 lbs. (1.8 kg.)

<table>
<thead>
<tr>
<th>Item #</th>
<th>Description</th>
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<tbody>
<tr>
<td>343-049</td>
<td>Digital Cutie Pie, mR/h</td>
</tr>
</tbody>
</table>
RO-20 ION CHAMBER SURVEY METER

Features
- Measures gamma or x-ray exposure rate
- Temperature compensated measurements
- Sliding shield for beta measurements
- Large, backlit display
- 5 ranges up to 50 R/h
- Extended battery life
- Non-mechanical range switching

The Model RO-20 is a portable air ionization chamber instrument, used to detect beta, gamma, and x-radiation, with five linear ranges of operation to measure exposure from background to 50 R/h full scale.

The ionization chamber is vented to atmospheric pressure and is specifically designed to have a flat energy response into the x-ray region. The detector is fully temperature compensated, eliminating any need for temperature correction. Each instrument is factory calibrated to gamma radiation.

A single rotary switch turns the instrument off, checks the batteries, checks the zero setting, and selects the range of operation. An ergonomically located switch illuminates the meter. Internal switching of ranges is accomplished with reed relays, eliminating the mechanical swing arms typically used with portable ion chamber survey instruments.

Detector
The RO-20 detector is an air-filled ionization chamber. It has a diameter of 7.32 cm and a volume of 220 cm³. The detector has 640 mg/cm² phenolic walls inside a 1.6 mm aluminum wall case for a total thickness of approximately 1,000 mg/cm². A 7.9 mm thick phenolic sliding beta shield with a positive friction lock is mounted on the bottom of the chamber. The shield thickness is approximately 1,000 mg/cm². The chamber window is comprised of two layers (one on the chamber, one on the can) 25 micron (0.001”) mylar, approximately 7 mg/cm² total.

Energy Response
Photons Response: Reference to ¹³⁷Cs measured through the bottom with the slide closed, the energy response is:
- ± 30% from 8 keV to 1.3 MeV with the open slide facing the source.
- ± 15% from 33 keV to 1.3 MeV with the closed slide facing the source.
- ± 15% from 55 keV to 1.3 MeV through the side of the instrument

Beta Response: Uranium Slab: 30% of true mrad/h field behind 7 mg/cm² window with RO-20 resting on slab, slide open. ⁹⁰Sr⁹⁰Y: Approximately 93% of true mrad/h field at 30 cm with slide open.
Fast Neutron Response (PuBe): Reads approximately 8% in mR/h of true neutron field in mrem/h.

Radiation Detected: Beta, gamma, and x-ray.

Ranges: Five linear ranges: 0-5, 0-50, 0-500 mR/h and 0-5, 0-50 R/h

Meter: Scale length, approx. 7.6 cm (3”), 2% accuracy. Linear markings from 0 to 5 in 50 minor increments. The meter is backlit.

Response Time: 90% of final reading within 5 seconds.

Linearity: Within ± 5% of full scale

Battery Dependence: Reading is independent of battery voltage when the battery check indication is in the green arc.

External Controls: Range switch, including Off, Zero, and Battery checking positions. Zero knob used to set meter to zero when Zero position of range switch is selected or when in no significant radiation field. Light switch, for meter light.

Internal Control: Five calibration controls- one for each range.

Batteries: Main Power: Five “C” cells

Battery Life: “C” cells, widely variable according to RO-20 usage and battery type. Typical ZnC: mR/h ranges, 2900 hrs. All other ranges, 150 hrs. Typical Alkaline: mR/h ranges, 6900 hours. All other positions, 350 hours. Frequent or continuous use of the light will reduce battery life significantly. Thirty volt chamber bias battery life: Totally dependent upon the usage of “Battery 2” position switch. The battery capacity should allow for at least 50,000 five second battery checks. The battery drain is negligible on all other positions of the range switch.

Chamber Bias: Ten 3 volt lithium coin cells, 30 volts

Temperature: Operable from -40 °C to 60 °C (-70 °F to 140 °F) For operation below -18°C (0°F), alkaline or nickel-cadmium “C” cells should be used.

Temperature Compensation: The detector is fully compensated over the operational temperature range for output accuracy within 10% ± 0.5 mR/h

Moisture: Seals used at openings for dust and water resistance. Detector is protected by a silica-gel dryer.

Humidity: Operable from 0 to 95%, non-condensing

Weight: Approximately 3.6 lbs with alkaline C cells

Size: 4.2” W x 7.9” L x 7.7” H

Testing: The RO-20 has been successfully tested to ANSI N42.17A and is CE Certified to European standard EN50082-1 (EN61000-4-2 & EN61000-4-3)

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<tr>
<th>Item #</th>
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<tr>
<td>343-150</td>
<td>RO-20 Survey Meter</td>
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<tr>
<td>343-155</td>
<td>5 Micro Curie Cs-137 Check Source</td>
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</tbody>
</table>
451B ION CHAMBER SURVEY METER WITH BETA SLIDE

- High sensitivity measurement of rate and dose simultaneously, with the capability to record peak rate
- Auto-ranging and auto-zeroing
- RS-232 communications interface with optional Windows-based Excel add-in for data logging
- Ergonomic, anti-fatigue handle with replaceable grip, wrist strap and tripod mount
- Programmable flashing LCD display and audible alarm
- Easily-accessible battery door (operated by two 9-volt alkaline batteries) on the outside of the bottom case

The auto-ranging 451B measures radiation rate and accumulated dose from beta, gamma and x-ray radiation sources. The 451B’s site surveying capabilities make it well-suited for a wide range of end users, including: police and fire departments, x-ray manufacturers, government agencies, state inspectors, emergency response and HAZMAT teams, nuclear medicine labs, hospital radiation safety officers, and nuclear power workers. The ion chamber detector allows for a fast response time to radiation from leakage, scatter beams and pinholes. Additionally, the low noise chamber bias supply provides for fast background settling time. A sliding beta shield serves as an equilibrium thickness for photon measurements and enables beta discrimination. The digital display features an analog bar graph, 2.5 digit digital readout, low battery and freeze ("peak hold") mode indicators, and an automatic backlight function. User controls consist of an ON/OFF button and a MODE button. The case is constructed of lightweight, high strength materials and is sealed against moisture. The RS-232 interface can be connected directly to a computer for use with the Excel add-in for Windows (Item 343-460), enhancing the functionality of the instrument. This software allows for data retrieval, user parameter selection and provides a virtual instrument display with audible (requires sound card) and visual alarm indication.

Specifications

Radiation Detected:
- Alpha above 7.5 MeV
- Beta above 100 keV
- Gamma above 7 keV

Operating Ranges- Response Time:
- 0 to 5 mR/h - 8 seconds
- 0 to 50 mR/h - 2.5 seconds
- 0 to 500 mR/h - 2 seconds
- 0 to 5 R/h - 2 seconds
- 0 to 50 R/h - 2 seconds

Accuracy: Within 10% of reading between 10% and 100% of full scale indication on any range, exclusive of energy response. Calibration source is $^{137}$Cs

Detector
- Chamber: 349 cc volume air ionization
- Chamber Wall: 246 mg/cm² thick phenolic
- Chamber Window: 6.6 mg/cm² Mylar, protected by steel mesh, 46 cm² detection area
- Beta Slide: 440 mg/cm²

Controls: ON/OFF and MODE

Automatic Features: Auto-zeroing, auto-ranging, and auto-back

Power requirements: Two 9 V alkaline, 200 hours operation

Warm-up time: One minute

Modes

Integrate Mode: Operates continuously 30 seconds after the instrument has been turned on. Integration is performed even if the instrument is displaying in mR/h or R/h

Freeze mode: Will place a tick mark on the bar graph display to hold on the peak displayed value. The unit will continue to read and display current radiation values

Display:
- LCD analog/digital with backlight
- Analog: 100 element bar graph 2.5” (6.4 cm) long. Bar graph is divided into 5 major segments, each labeled with the appropriate value for the range of the instrument
- Digital: 2.5 digit display is followed by a significant zero digit depending on the operating range of the instrument. The units of measurement are indicated on the display at all times. Digits are 0.25” (6.4 mm) high. Low battery and freeze indicators are also provided on the display

Temperature Range: -4° to +158°F (-20° to +70°C)

Relative humidity: 0 to 100%, @ +60°C

Geotropism: Less than 1%

Size: 4" W x 8" D x 6" H (10 x 20 x 15 cm)

Weight: 2.5 lb (1.11 kg)

Tested. Meets applicable standards.
**DOSIMETERS AND RADIATION MONITORS & METERS**

**451P PRESSURIZED μR ION CHAMBER SURVEY METER**

- High sensitivity μR measurements of rate and dose simultaneously, with the capability to record peak rate
- Ergonomic, anti-fatigue handle with replaceable grip, wrist strap and tripod mount
- Programmable flashing LCD display and audible alarm
- Easily-accessible battery door (operated by two 9-volt alkaline batteries) on the outside of the bottom case
- RS-232 communications interface with optional Windows-based Excel add-in for data logging

The auto-ranging 451P features a pressurized ion chamber, providing enhanced sensitivity (μR resolution) and improved energy response to measure radiation rate and dose from x-ray and gamma sources. Originally designed to measure leakage and scatter around diagnostic x-ray and radiation therapy suites, the 451P's site surveying capabilities make it well-suited for a wide range of end users, including: x-ray manufacturers, government agencies, state inspectors, biomedical technicians, and maintenance technicians for airport baggage scanners. The ion chamber detector allows for a fast response time to radiation from leakage, scatter beams and pinholes. Additionally, the low noise chamber bias supply provides for fast background settling time.

The digital display features an analog bar graph, 2.5 digit digital readout, low battery and freeze ("peak hold") mode indicators, and an automatic backlight function. User controls consist of an ON/OFF button and a MODE button. The case is constructed of lightweight, high strength materials and is sealed against moisture. The RS-232 interface can be connected directly to a computer for use with the Excel add-in for Windows (Item 343-460), enhancing the functionality of the instrument. This software allows for data retrieval, user parameter selection and provides a virtual instrument display with audible (requires sound card) and visual alarm indication.

**Specifications**

**Radiation Detected:**
- Beta above 1 MeV
- Gamma and X-Rays above 25 keV

**Operating Ranges - Response Time:**
- 0 to 500 μR/h - 5 seconds
- 0 to 5 mR/h - 2 seconds
- 0 to 50 mR/h - 1.8 seconds
- 0 to 500 mR/h - 1.8 seconds
- 0 to 5 R/h - 1.8 seconds

**Accuracy:** Within 10% of reading between 10% and 100% of full-scale indication on any range, exclusive of energy response. Calibration source is ¹³⁷Cs

**Detector**
- **Chamber:** 230 cc volume pressurized air ionization chamber to 8 atmospheres or 125 psi

**Controls:** ON/OFF and MODE

**Automatic Features:** Auto-zeroing, auto-ranging, and auto-backlight

**Response Time:** Analog response time from 10% to 90% of reading for a full scale step increase is dependent on operating range. Response time for a step increase in radiation exposure rate from background:

- Step to Increase, Background to & Time to Reach 90% of Final Value:
  - 400 μR/h - 4.8 sec
  - 4 mR/h - 3.3 sec
  - 10 mR/h - 4.3 sec
  - 40 mR/h - 4.5 sec
  - 100 mR/h - 2.7 sec
  - 1 R/h - 2 sec
  - 4 R/h - 2.7 sec

**Power Requirements:** Two 9 V alkaline, 200 hours operation

**Warm-up Time:** Less than two minutes for initial operation when the instrument is in equilibrium with ambient temperature

**Display:** LCD analog/digital with backlight
- **Analog:** 100 element bar graph 2.5" (6.4 cm) long. Bar graph is divided into five major segments, each labeled with the appropriate value for the range of the instrument
- **Digital:** 2.5 digit display is followed by a significant zero digit depending on the operating range of the instrument. The units of measurement are indicated on the display at all times. Digits are 0.25" (6.4 mm) high. Low battery and freeze indicators are also provided on the display.

**Modes**
- **Integrate Mode:** Operates continuously 30 seconds after the instrument has been turned on. Integration is performed even if the instrument is displaying in mR/h or R/h
- **Freeze Mode:** Will place a tick mark on the bar graph display to hold on the peak displayed value. The unit will continue to read and display current radiation values.

**Temperature Range:** -4° to +122°F (-20° to +50°C)

**Relative Humidity:** 0 to 100%

**Geotropism:** Negligible

**Size:** 4” W x 8” D x 6” H (10 x 20 x 15 cm)

**Weight:** 2.4 lb (1.07 kg)

**Tested. Meets applicable standards.**

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<tr>
<th>Item #</th>
<th>Description</th>
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<tr>
<td>343-455*</td>
<td>451P Pressurized μR Ion Chamber Survey Meter with Standard Chamber (R)</td>
</tr>
<tr>
<td>337-141</td>
<td>Check Source, ¹³⁷Cs, 10μCi, Flat Disc, 1” (2.54 cm) Diameter</td>
</tr>
<tr>
<td>343-458</td>
<td>Single Unit Carrying Case</td>
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<tr>
<td>343-460</td>
<td>451 Assistant for Excel</td>
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</table>

*Due to the pressurized ion chamber, the 451P is considered U.S. Department of Transportation (DOT) Dangerous Goods and must be shipped via IAW DOT special permit DOT-SP 13187.
451 ASSISTANT FOR EXCEL

Specifications

Controls: The 451 Assistant menu and toolbar provide an interface for the user to remotely control the 451, configure the 451, download the 451’s internal data log and start / stop real time data logging and integrated dose measurements.

Connect / Disconnect: Connects or disconnects the 451 to the computer’s communication port.

Start / Stop: Starts and stops computer data logging. When data logging is started, logged data is placed in the active Excel worksheet and the worksheet is protected to provide data security.

Logging: Properties Allows the user specify computer data logging parameters. The data logging sample interval (2 seconds to 999 hours), total data logging period (2 seconds to 49 days) and computer data log alarms may be specified through this menu. These parameters are independent of the 451’s internal data logging functions.

Integrate: Allows the user to select timed integrated dose measurement or user controlled integrated dose measurement. The user may also specify the integration period for timed integration from 1 minute to 999 hours. When timed integrate mode is selected, the 451 Assistant for Excel stops the integrated dose measurement after the specified integration period has expired. When timed integrate mode is not selected, the user controls the integration period and the integration time is displayed in real time. The integrated dose and average dose rate are recorded in the active Excel worksheet when integration is complete.

Download Log: The 451 is capable of internally logging data at a user defined interval from 1 to 255 seconds with a total capacity of up to 2700 data points. This feature allows the user to download the 451’s internal data log into the active Excel worksheet.

Options: Allows the user to change many properties of the 451 Assistant for Excel and several of the 451’s properties. The user may configure the various visual and audio alarm features of the 451 Assistant for Excel for each data point that is logged. The 451 Assistant can be configured to use 2 or 4 alarm states. The four alarm states are acknowledged normal (below alarm level), unacknowledged normal, acknowledged alarm and unacknowledged alarm. The user may also select the communication port used by the 451 (default is COM1). The 451’s internal data logging parameters and alarm settings may also be changed from the Options menu.

System Requirements:
Windows 95, 98, ME, NT 4.0, 2000, or XP
Microsoft Excel 97 or 2000
One serial port (COM1 through COM4)

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**MODEL 9DP, PRESSURIZED ION CHAMBER METER**

The Model 9DP, pressurized ion chamber meter, provides highly sensitive measurements of exposure and exposure rate. It can simultaneously display the exposure rate, integrated value and highest rate seen by the instrument. The integrated value can be reset (if desired) using one of the four convenient front panel mounted buttons. The stunning 256 color, bit-mapped display provides an optimized presentation of the data and is accompanied with icons informing the user of the active functions and instrument status. All logged data are written in csv format to a plugged-in industry standard USB thumb drive for convenient retrieval by PC spreadsheet/database programs. Alarms are manifested using color changes on the display and an acknowledgable audio output.

This meter is part of the new Dimension series of meters employing state-of-the-art technologies that deliver tremendous capability, user-friendliness, and convenient PC connectivity. Instrument users have access to personal preference type settings by connecting directly to any USB keyboard. An optional Dimension Interface Package (Item 343-355) that additionally facilitates calibration and administrative control is sold as an option.

**Item 343-355 Dimension Interface Package**

Dimension Interface Package, Software and special USB cable for interfacing any Dimension series instrument to a PC to perform extensive setup or calibration.

**Specifications**

- **Radiation Detected**: Beta above 1 MeV, gamma & X-rays above 25 keV
- **Operating Ranges**: With Sv/h units: 0-5 uSv/h, 0-50 uSv/h, 0-500 uSv/h, 0-5 mSv/h, 0-50 mSv/h; with R/h units: 0-500 uR/h, 0-5 mR/h, 0-50 mR/h, 0-500 mR /h, 0-5 R/h
- **Chamber Volume**: 230 cc pressurized to 125 PSI
- **Accuracy**: ±10%
- **Response Time**: From five seconds in lowest range to under two seconds in highest range when measuring from 10% to 90% of final value
- **Measurement Readouts**: Simultaneous display of dose rate, integrated dose, and highest dose rate (peak hold)
- **Data Logging**: Stored to detachable USB thumb drive in csv format for easy retrieval by PC spreadsheet/database programs. Data points include real-time clock generated date and time with dose rate, integrated dose, and instrument status. Logging time intervals are set by PC interface program
- **LCD Display**: 3.5” (8.9 cm) diagonal, 240 H x 320 W pixels, TFT active matrix, 262 colors, 220 cd/m²
- **User Controls**: 4 push buttons: instrument on/off, peak rate/integrate mode, audio on/off, alarm acknowledge/meter reset/clearing integrated dose or peak rate
- **Automatic Functions**: Auto ranging, auto zeroing, auto LCD backlighting
- **Audio Outputs**: Built-in unimorph speaker, > 60 dB at 2’ (0.6 m), audio jack for connection to optional headset
- **Alarms**: Two levels of radiation alarms available, each are user programmable throughout entire readout range and set through a PC interface program. Other alarms include low battery and various detector failures
- **Temperature Range**: -20 to 50°C (-4 to 122°F)
- **Power**: Eight rechargeable AA NiMH batteries, supplied with wall charger for direct connection to instrument
- **Battery Life**: Approximately 12 to 24 hours between charges depending upon use of backlighting
- **PC Interface**: USB, free PC Windows™ interface program download or a more comprehensive Dimension Interface Package (Item 343-355) that additionally facilitates calibration and administrative control
- **Construction**: Durable plastic accompanied by internal metal support
- **Size**: 8.6” H x 4.6” W x 9.6” L (21.8 x 11.7 x 24.4 cm)
- **Weight**: 3.15 lb (1.43 kg) including batteries

**Item 343-357 Carrying Case**
The soft shell design is constructed from air-blown ABS plastic and utilizes a foam insert that provides good protection and a convenient place to store all your equipment.

**Item 343-358 Stereo Headset**

This headset offers comfort and excellent protection against noisy areas whenever it becomes necessary to listen to the audio output from portable survey meters. This headset plugs into any Ludum survey meter equipped with an audio output jack.

**Specifications**

- **Chamber Volume**: 230 cc pressurized to 125 PSI
- **Accuracy**: ±10%
- **Response Time**: From five seconds in lowest range to under two seconds in highest range when measuring from 10% to 90% of final value
- **Measurement Readouts**: Simultaneous display of dose rate, integrated dose, and highest dose rate (peak hold)
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- **Size**: 8.6” H x 4.6” W x 9.6” L (21.8 x 11.7 x 24.4 cm)
- **Weight**: 3.15 lb (1.43 kg) including batteries
The Survey Ratemeter and Gamma Detector Package includes everything needed to do radiation survey checks of X-ray security scanners. The Survey Ratemeter has a μSv/h scale with a range of 0 to 0.5 μSv/h. The package also includes a coiled cable that connects the Survey Ratemeter to the Gamma Detector and can stretch up to 48" (122 cm), a 1.0 μCi Check Source inside a Check Source Holder mounted on the side of Survey Ratemeter provides for easy calibration of the Survey Ratemeter and helps prevent losing the Check Source.

**Survey Ratemeter and Gamma Detector Package Item 338-000**
- (1) Survey Ratemeter
- (1) Gamma Detector
- (1) "C" Series Coiled Cable
- (1) Check Source
- (1) Holder for Check Source

**338-001 Survey Ratemeter -Model 3 - with a μSv/h Scale**
- Rugged 4 Decade Analog Ratemeter
- Sensitive 1" x 1" (2.54 x 2.54 cm) NaI(Tl) Detector
- Easy to Use
- Easy Reach to Difficult Places
- Greater than 2000 Hour Battery Life

This instrument combines Ludlum's popular Model 3 Analog Survey Meter with a 1" x 1" (2.54 x 2.54 cm) NaI(Tl) gamma scintillator detector, Model 44-2, to create a very sensitive micro-R-meter. The advantage this instrument has over those with the detector housed inside the instrument enclosure is its ability to manipulate the detector into tight or difficult places. It has the additional benefit of keeping the meter conveniently in full view while performing an investigation. The design is very robust with a loud audio signal to facilitate noisy areas. The aluminum cast instrument housing with its separate battery compartment and accompanying metal handle offer an industrial robustness and quality that promote long lasting protection and instrument life. The front panel controls include a rotary switch for selecting the four-decade range, instrument shut-off, battery test, an audio on/off switch, a fast/slow response switch, and a count reset button.

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<td>Survey Ratemeter &amp; Gamma Detector Package</td>
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<tr>
<td>338-001</td>
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<td>338-003</td>
<td>Coiled Cable, &quot;C&quot; Series, 18&quot; to 4' (46 to 122 cm)</td>
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<td>338-120</td>
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<tr>
<td>338-122</td>
<td>Holder for Check Source 338-120</td>
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