

INSTRUMENTS

This section shows a range of state-of-the-art surface

contamination monitors, survey dosimeters and personal alarm dosimeters from approved manufacturers.



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7.1 DoseGUARD Plus - Low energy personal alarm dosimeter

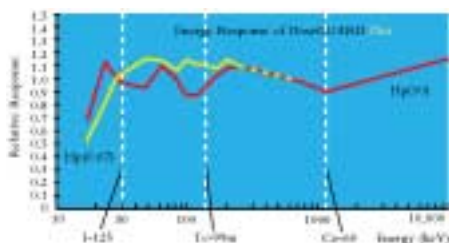


Application

The new DoseGUARD Plus personal alarm dosimeter has been designed to meet the requirement in hospitals to measure the personal dose in Brachytherapy and radiopharmaceutical applications.

The DoseGUARD Plus covers a photon energy response range from 20 keV to 6 MeV, which includes low energy photon emitters like I-125 and Pd-103, and it is also sensitive for beta particles from 250 keV to 1.5 MeV.

The optional DCPS software gives access to the complete features of the instrument and allows the individual configuration of the instrument.



Features

- Multiple PIN diode detectors
- Sensitive to x-ray and gamma radiation, beta particle
- Photon energy response 20 keV to 6 MeV
- Beta energy response 250 keV to 1.5 MeV
- Variable alarms for dose and dose rate
- Suitable for all commonly used radionuclides (including I-125, Tc-99, I-131, Sr-90/Y90, ...)
- Records whole-body (HP10) and surface dose (HP0.07)
- Dosimeter configuration software(DPCS) with infrared reader for customization of dosimeter settings
- Dose profile history with settable interval from 2 sec to 35 hours - stores up 579 records
- Lightweight and robust design
- Displays either Sv or rem (change via DPCS)

The instrument meets the requirements of relevant international standards (IEC1283, ANSI 13.11, 13.27 and 42.20).

Technical data

Radiation type:	Beta, gamma and X-ray
Photon energy range:	Hp(10) 17keV to 1.5MeV better than +/- 20% Hp(10) 1.5MeV to 6MeV better than +/- 30% Hp(0.07) 20keV to 6MeV better than +/- 30%
Dose rate range:	up to 4Sv/h
Dose range:	up to 16Sv
Accuracy:	Hp(10) Cs-137 +/-10% Hp(0.07) Sr-90 +/-20%
Display:	Dose or dose rate Whole body (Hp(10)) or surface (Hp(0.07))
Alarms:	2 thresholds on each of dose/ dose rate (Hp(10))
Chirp alarm:	Can be set from 0.01mSv/chirp to 100mSv/chirp
Alarm pitch / volume:	High or low tone 7 volume levels Continuous or intermittent sound Maximum volume 98dBA at 20cm
Power supply:	Standard AA lithium battery (typically 5 months continuous use) or standard AA alkaline battery (typically 55 days continuous use)
Dimensions:	85mm x 63mm x 19mm
Weight:	93g including battery
Case:	High impact ABS / polycarbonate blend
Clip:	High impact plastic, easily renewed, Lanyard available
Operating temperature range:	-10 to +40°C
Storage temperature range:	-25 to +70°C
Humidity range:	20% to 90% relative humidity, non-condensing

7.1 DoseGUARD Plus - Low energy personal alarm dosimeter

DoseGUARD Plus Configuration Software

Key features

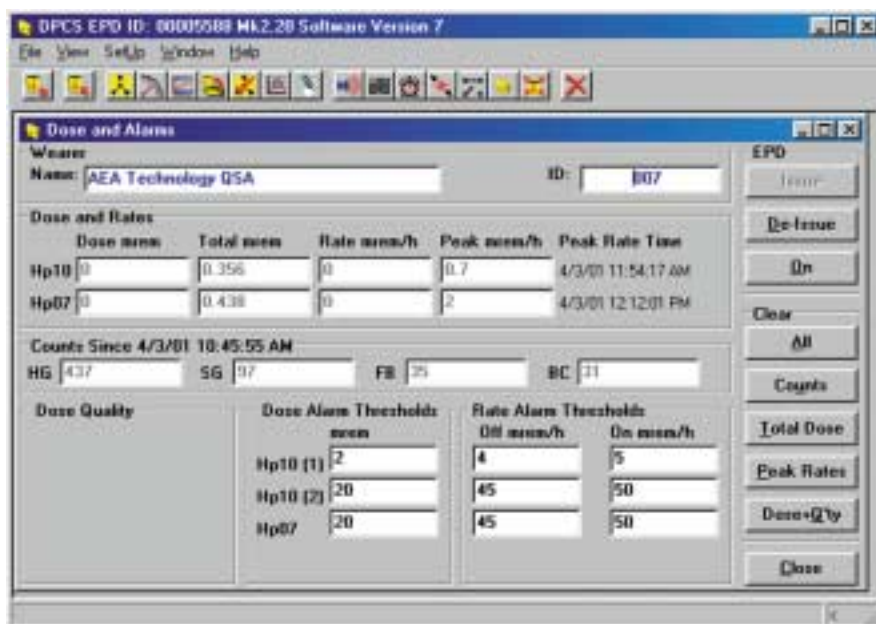
The DoseGUARD Plus Configuration Software, (DPCS) is a dynamic program which allows customisation of your dosimeter's settings to meet your specific dosimetry needs. DPCS uses the standard IrDA protocol, connecting via a PC's serial port. The infra red reader is included with the DPCS.

This user-friendly software is compatible with the IBM PC, running Windows 95, Windows 98, or Windows NT (V4 and above) operating systems.

- Personalise the dosimeter for name and I.D.
- Records accurate dose profile and history, (see screenshot, above)
- Rapid IrDA communication for issue and return times of under one second
- Batch writing mode for uniform configuration of multiple dosimeters
- Detailed display set-up (display can be disabled, if required)
- Configurable alarms, (tones, volume, duration)
- Change from Sv to rem

The main window provides access to all DPCS operations via either the toolbar icons or the menu selections.

The Dose Profile Graphical window displays both the Hp(10) dose (red line) and the Hp(07) dose (blue line).



The main window provides access to all DPCS operations via either the toolbar icons or the menu selections.



The Dose Profile Graphical window displays both the HP(10) dose (red line) and the HP(07) dose (blue line).

Availability

Within 2 weeks from receipt of order.

Ordering information

	Product code
DoseGUARD Plus Dosimeter	NIGB8000*
DoseGUARD Plus Configuration Software (DPCS)	NIGB8001

*) The new DoseGUARD Plus is currently available in North America. For other countries, please enquire.

7.2 DoseGUARD - Personal alarm dosimeter

Application / Description



DoseGUARD™ personal alarm dosimeters are precision instruments for ensuring that radiation doses are kept as low as reasonably achievable. The dose rate or cumulative dose is shown on an LCD display. An audible alarm sounds if a preset dose or dose rate is exceeded. The instrument can also be set to give an audible warning of the instantaneous dose rate. Energy compensation circuits ensure high accuracy. Key parameters are stored in EEPROM and are retained even if the battery is removed.

The dosimeter casing is robust and splash-proof, and is constructed from smooth high impact plastic for easy decontamination. The instrument has been designed to protect the readings against accidental erasure due to mechanical shock or an RF field. It is battery operated, and requires one standard AAA size alkaline cell.

Technical data

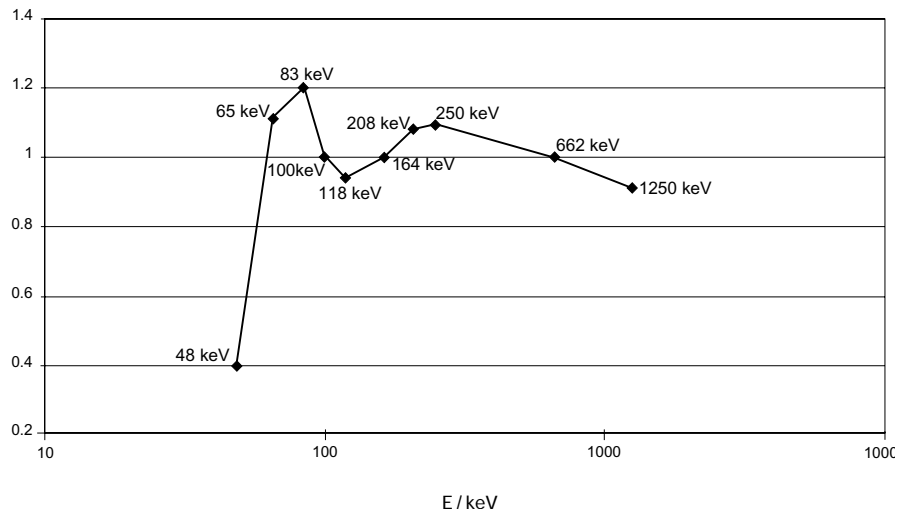


Radiation type:	Gamma and X-ray
Energy range:	60keV - 3MeV (better than $\pm 25\%$)
Dose measurement range:	1 μ Sv - 9.99Sv
Dose rate measurement range:	5 μ Sv/h - 3Sv/h
Calibration accuracy:	better than $\pm 5\%$ (Cs-137; 662keV at 2mSv/h)
Type of detector:	Silicon diode
Dimensions:	78mm x 67mm x 22mm
Weight:	80g with battery
Battery:	Alkaline 1.5V (type AAA)

New features

- Enhanced RF immunity
- Ruggedized clip fixing
- Easier to decontaminate
- Louder Volume

DoseGUARD Hp (10) Energy Response,
Energy normalised with Cs-137



7.2 DoseGUARD - Personal alarm dosimeter

**Features**

- Digital display of dose rate or cumulative dose
- Six user-selectable alarm levels for dose and dose rate
- Self-diagnostic operational checking
- Lightweight design with strong pocket clip
- Power reserve of 12 hours after low battery warning

Options

DoseGUARD dosimeters can be configured for particular applications using a reader head connected to a PC (not included) via the serial port. With the reader head it is possible to:

- Prevent a user changing settings using the pushbutton
- Obtain a hard copy printout of the recorded dose
- Customize the alarm settings and chirp rate

Ordering information

Dosimeter DoseGUARD

Product code

NIGB2000 ex-stock

Dosimeter DoseGUARD S

NIGB3000* (Germany) ex-stock

Reader head ADR-1 and software ADR-1/50

NIGB4955 ex-stock

Checking device with 3.7MBq Cs-137 Source

CDRB7000* (Germany)

*Für Kunden in Deutschland:

Das Dosimeter ist unter der Bezeichnung DoseGUARD S zur innerstaatlichen Eichung zugelassen und ist auch bereits geeicht unter der Bestellnummer NIGB3001 erhältlich. Die zugehörige radioaktive Kontrollvorrichtung wird bereits geeicht geliefert. Weitere Details sind auf Anfrage verfügbar.

7.3 Survey meters

**Application / Description**

The portable dose survey meters 6150AD5 and 6150AD6 are radiation measurement instruments for the detection of gamma and X-ray radiation. The 6150AD6 dosimeter is recommended for low dose rate measurements, and the 6150AD5 for dose rates up to 1Sv/h. An audible and optical alarm indicates if a preset alarm level is exceeded. The survey meters have a robust, waterproof aluminium die-cast housing, which is easy to decontaminate.

The Teletector 6112M and the Teletector 6150ADT (consists of 6150AD5/6 and 6150AD-t) are microprocessor controlled dose rate meters with telescope to measure gamma radiation and to detect beta radiation. Two GM counting tubes serve as detectors. The stainless steel telescope can be continuously extended up to more than four metres.

A wide range of counting tubes and other accessories is available for these instruments. Please enquire for further information.

Technical data

Instrument type:	6150AD5	6150AD6	6112M	6150AD-t
Energy range:	45keV - 3MeV	60keV - 1.3MeV	65keV - 1.3MeV	65keV - 3MeV
Dose measurement range:	0.01 μ Sv - 9.99Sv	0.01 μ Sv - 99.9mSv	10nSv - 10Sv	0.01 μ Sv - 9.99Sv
Dose-rate measurement range:	0.1 μ Sv/h - 999mSv/h	0.01 μ Sv/h - 9.99mSv/h	0.01 μ Sv/h - 10Sv/h	0.01 μ Sv/h - 9.99Sv/h

Ordering information**Product code**

Instrument type 6150AD5	NIGB6000
Instrument type 6150AD6	NIGB6001
Belt bag for 6150AD5 / AD6	NIGB6248
Alpha-beta counting tube 6150AD-17 with window	NIGB4974
Gamma counting tube 6150AD-15 (high dose tube)	NIGB5944
Gamma counting tube 6150AD-18 (low dose tube)	NIGB5944
Teletector probe 6150AD-t (requires 6150AD5/6)	NIGB6240
Teletector 6112M	NIGB9000

New: Teletector 6112M

Accessories:

- Earphone
- Connecting cable for a PC
- Software for data processing
- Probe cover
- Aluminium case

7.4 Contamination monitor

**Application / Description**

The Isotrak AB100 portable contamination monitor is robust and simple to use, but highly versatile. Most radionuclides used in nuclear medicine, research facilities and nuclear power stations can be detected, depending on the detector option chosen. The large detector area makes monitoring fast and sensitive. The display is controlled by a microprocessor to minimise random fluctuations, but the display responds rapidly if the detector is moved over a contaminated area. This is achieved by automatically changing the time constant. The count rate (counts per second) is shown on a large, clear, back-lit display. Experienced users can estimate the contamination in Bq/cm² using a pre-set calibration factor (for 32 nuclides) and define calibration factors for other nuclides.

Features

- Simple, 4 button operation
- Easy to read large back-lit display
- Highly sensitive large detector (120mm x 190mm) for alpha-, beta-, gamma- and X-ray detection
 - Xenon detector for beta/gamma emitting nuclides
 - Butane detector for alpha/beta emitting nuclides
- Ratemeter with intelligent evaluation of statistical fluctuations
- Analogue bar display of percent of the alarm threshold
- Stored calibration factors for 32 nuclides
- 2 user-definable calibration factors
- User-definable alarm levels
- Floor trolley and wall-mountable holder available as accessories

Technical data

	alpha/beta contamination monitor	beta/gamma contamination monitor
Detector	gas-fillable detector window area 120mm x 190mm	sealed detector window area 120mm x 190mm
Detector-gas	Butane	Xenon
Operating temperature range	0°C to +50°C	-15°C to +50°C
Housing	Splash-proof in accordance with the requirements for the use of the instrument by fire departments	
Operation	Foil keypad with 4 buttons	
Display	Trans-reflective LCD, additional illumination by LED's	
Elements	4 digits with decimal point, 10mm high, 9 alphanumeric characters analogue bar chart with scale 0-100%, or x10, x100, or x1000 respectively	
Indicated numerical range	0.000 to 9.999 with dimension change x1000, eg. kcps, kBq/cm ²	
Digits after the decimal point	Only the statistically relevant decimal places will be indicated	
Alarms	LED signals for low battery voltage; exceeding threshold value ('rate too high'); detector failure ('No counts'); low gas ('Refill Gas' - only if the butane detector is connected)	

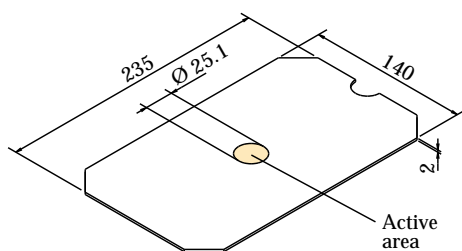
7.4 Contamination monitor

Technical data

Threshold values	0.001 to 9999 adjustable digit-by-digit, separate thresholds for each radionuclide or cps. Battery backed up by separate lithium battery
Audible alarm	Piezo oscillator 2.5-3kHz. Alarm as interrupted or continuous tone, single pulse (can be switched on) as sound burst of ~4ms
Energy supply	3 'C' type batteries located in the handle
Operational life	>72 hours with alkaline manganese batteries (without illumination)
Dimensions	140mm x 234mm x 126mm
Weight	2175g (including batteries)

Ordering information

	Product code
Alpha/Beta contamination monitor	AB100A
Beta/Gamma contamination monitor	AB100B
10 butane gas cartridges (200ml) for AB100A	LB112G
Wall console for Isotrak AB100 series incl. power supply	LB122W
Monitor set including: Beta/Gamma contamination monitor, wall console, power supply, beta check source	SIRB5353



Check sources (uncalibrated) for AB100

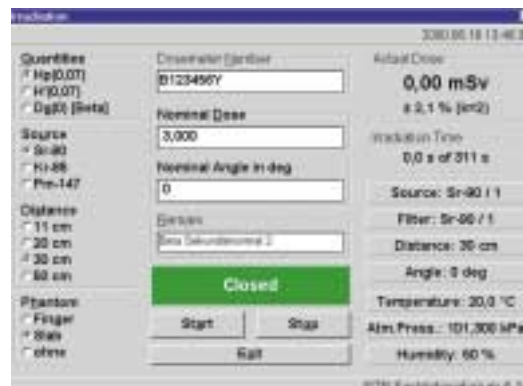
	Beta check source	Alpha/Beta check source
Nuclide	Sr-90	Sr-90 and Am-241
Activity	220Bq	220Bq 75Bq
Drawing	VZ-1415	VZ-1402
Active dimensions	Diameter 25.1mm	Diameter 25.1mm
ISO classification	C.44645	C.44645
Overall dimensions	235mm x 140mm	235mm x 140mm

Ordering information

	Product code
Alpha/Beta check source	QCRB1010
Beta check source	SIRB1011

7.5 Dosimetry systems

7.5.1 Beta secondary standard

**Application / Description**

The PTB Beta Secondary Standard (BSS) was first developed nearly 20 years ago for calibrating personal dosimeters and survey instruments for beta radiation. Calibrations are traceable to the PTB's primary standard, and the BSS meets the requirements of ISO6980.

The new BSS (BSS2) is a complete irradiation facility including beta sources, mechanics, electronics, sensors for air pressure, temperature and humidity, and a personal computer to control all irradiation parameters and to deliver the desired dose to the instrument under test.

The main features of the new facility are:

- Dosimeters can be positioned easily at the calibrated point in the radiation field
- Irradiation table rotates in 5 degree steps for measuring polar response
- High activity Pm-147, Kr-85 and Sr-90 sources - dose rate from $7\mu\text{Gy/s}$ to $38\mu\text{Gy/s}$ with beam flattening filters in place
- Sr-90 source also calibrated without filter for source-detector distances of 11, 30 and 50cm
- Each source contained in an individual shield with built-in shutter - reduced operator dose, no special handling equipment needed
- Low activity Tl-204 source replaced by high activity Kr-85 source

For quality assurance purposes and to deliver the required dose to the dosimeter, the computer automatically records the following parameters:

1. Radionuclide and source identification number
2. Type of beam flattening filter
3. Distance between source and dosimeter
4. Angle of incidence of irradiation
5. Temperature and air pressure

7.5 Dosimetry systems

Ordering information



Shielded adapter for sources



Type A approved packaging and storage container

Beta Secondary Standard comprising:

	Product code
Basic irradiation facility	NIGB6243
Control unit	NIGB6244
PC or Notebook with software	NIGB6413
Case with accessories	NIGB7581
Radiation source set (PTB-calibrated)	QCRB6245

Radiation sources parameters

Parameter	Pm-147	Kr-85	Sr-90/Y-90
Half life $T_{1/2}$	958d	3915d	28.8y
Maximum energy E_{max}	0.225MeV	0.687MeV	2.3MeV
Mean energy E_{mean}	0.06MeV	0.24MeV	0.8MeV
Nominal activity	3.7GBq	3.7GBq	460MBq
Source window in mg/cm^2	2.22Ti	22.5Ti	79h.-g. steel
Calibration distance	20cm	30cm	30cm
Nominal dose rate (in calibration distance)	7 μ Gy/s	38 μ Gy/s	15 μ Gy/s
Drawing/Capsule	VZ-1407	X.1088	VZ-2104
US-model no.	PHC.C1	KAC.D3	SIC.L8
ISO classification	C.33222	C.43232	C.64444

Ordering information - Replacement sources

Radionuclide	Product code
Pm-147	PHRB4809
Kr-85	KARB4810
Sr-90	SIRB4568

PTB calibrated sources mounted into shielded adapter with beam flattening filter.

7.5 Dosimetry systems

7.5.2 Gamma irradiator - Type OB6

Application / Description

The irradiator is designed to calibrate survey or personal dosimeters for gamma-rays.

A 74 GBq Cs-137 source is mounted inside an 11cm thick lead shield. The source is fixed to a removable plug which is secured by a safety lock. In use, an electromagnet lifts a lead shutter allowing the dosimeter under test to be exposed to the gamma-rays. In the event of a power failure, the shutter will automatically close, preventing accidental exposure to the beam.

The shutter mechanism and exposure times are controlled from a separate control desk.

**Technical data****Calibrator OB 6**

Dose rate at a distance of 10 cm from the surface	<5 μ Sv/h
Voltage	220V, 50 - 60Hz
Shielding	110mm lead
Specification	Type A approved
Weight	205kg
Dimensions	290mm x 460mm x 660mm
Dose rate range	72.6mSv/h - 0.4mSv/h
Distance between measuring point and source	0.3m - 4m

Control desk

Weight	9kg
Dimensions	520mm x 150mm x 310mm
Control cable	10m long
Power cable	approx. 2m long
Timer range	0.01s - 999.9h

Radioactive source specification

Nuclide	Cs-137
Nominal activity	74GBq
Capsule type	VZ-92/3
Overall dimensions	8mm diameter x 12mm
Special form license	D/0079/S-85
ISO Classification	C.65545

Ordering information

	Product code
Calibrator type OB6	CDRB5970