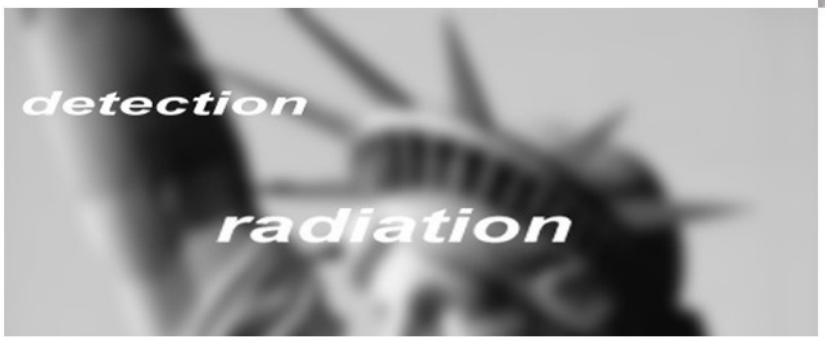
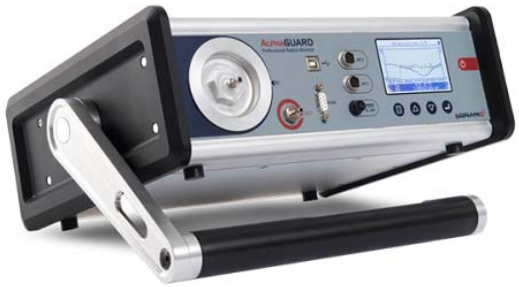
ADVANCED TECHNOLOGY FOR A SAFER WORLD

# AlphaGUARD

## Portable Radon Lab



### The reference instrument in radon monitoring

The new generation of AlphaGUARD offers high detection efficiency in radon monitoring, with a wide measurement range (2 – 2,000,000 Bq/m³), fast response and permanent, maintenance-free operation with long-term stable calibration. In addition to the radon concentration, AlphaGUARD simultaneously measures and records ambiant temperature, relative humidity and atmospheric pressure with embedded sensors. Optimal ergonomics, high responsiveness and a large digital display make AlphaGUARD a reference device to perform measurement and analysis everywhere from a lab to the field.

### Soil Measurement

Emanations from underground are measured with the soil probe

### Water Measurement

Radon gas in water is controlled with AquaKIT.

### Calibration facilities

### Radon Progenies

Radon progeny concentration is measured with AlphaPM

### Air Measurement

Thoron gas discrimination and measurement mode available

In combination with the radon chamber, AlphaGUARD allows the measurement of radon in material and the calibration of any other radon instruments

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# AlphaGUARD

## TECHNOLOGY

| | D 50 | D 2000 | DF 2000 |
|---|---|---|---|
| Type of radon detector | Ionization chamber, HV „l 750 VDC | | |
| Mode of operation | 3D-alpha spectroscopy a n d current mode | | |
| Total detector volume | 0,62 liter (38 cubic inches) | | |
| Active detector volume | 0,56 liter (34 cubic inches) | | |
| Type of Radon progeny filter (detector entry window) | Fiberglass filter (retention coefficient >99,9 %) | | |
| Detector filling mechanism | Design-optimized for fast passive diffusion | | |
| Transient response function (time delay) | Signal > 30 % after 10 min<br>Signal > 70 % after 20 min<br>Signal > 90 % after 30 min | | |
| Detector signal acquisition | fast digital signal sampling network, using three separate ADC channels | | |
| Spectral signal extraction | DSP (Digital Signal Processing), on-line-cross correlation algorithms | | |
| Detector efficiency | 1 CPM at 20 Bq/m3 (or at 0,55 pCi/l) | | |
| Detector efficiency in Rn/Tn discrimination mode for radon<br>for thoron at 1l/min flow rate<br>for thoron at 2l/min flow rate | - | - | 1 CPM at 60 Bq/m3 (1,6 pCi/l) 1 CPM at 200 Bq/m3 (5,5 pCi/l) 1 CPM at 140 Bq/m3 (3,8 pCi/l) |
| Background signal due to internal detector contamination | < 1 Bq/m3 (0.03 pCi/l) | | |
| Measurement range Radon (Rn-222) | 2 Bq/m3 ¡K 50 000 Bq/m3 (<0.05 pCi/l ¡K 1 350 pCi/l) | 2 Bq/m3 ¡K 2 000 000 Bq/m3 (<0.05 pCi/l ¡K 54 000 pCi/l) | |
| Measurement range Thoron (Rn-220) | - | - | 2 Bq/m3 ¡K 2 000 000 Bq/m3 (0.05 pCi/l ¡K 54 000 pCi/l) |
| Resolution on LCD display | 1 Bq/m3 (0.01 pCi/l) | | |
| Fold back protection | > 10.000.000 Bq/m3 (> 300 000 pCi/l) verified | | |
| System linearity error | < 3% within total range | | |
| Instrument calibration error (Rn-222) | ± 3 % (plus uncertainty of the primary standard) | | |
| Flow range of pump | - | - | Flow-regulated: 0,05 - 0,5 l/min, 1 l/min, 2 l/min |
| Data capacity (non-volatile) | Up to 60 000 measurement points<br>~ 400 days at 10 min measuring cycle<br>~ 2 500 days at 60 min measuring cycle | | Up to 60 000 measurement points<br>~ 40 days at 1 min measuring cycle<br>~ 400 days at 10 min measuring cycle<br>~ 2 500 days at 60 min measuring cycle |

## PHYSICAL CHARACTERISTICS

| | D 50 | D 2000 | DF 2000 |
|---|---|---|---|
| Dimensions without handle (L x W x H) Dimensions with handle (L x W x H) | 282 mm x 340 mm x 123 mm<br>329 mm x 355 mm x 123 mm | | |
| System operating range<br>-Temperature<br>-Atmospheric pressure<br>-Humidity | -10 °C ... +50 °C (+14 ... +122 °F)<br>700 mbar ... 1100 mbar<br>0 % rH ... 95 % rH (non-condensing) | | |
| Weight (incl. Internal battery) | 6,2 kg (13,7 lbs) | | 7 kg (15,4 lbs) |
| Resolution of graphic display | 160 x 104 pixels | | |
| Operation from internal battery in diffusion mode | > 10 days | | |

# AlphaGUARD

## MULTIPARAMETER FEATURES

| | |
|---|---|
| Atmospheric air pressure<br>-Type of sensor<br>-Measurement range<br>-Resolution displayed on Screen<br>-Resolution under DataVIEW or DataEXPERT<br>-Initial calibration uncertainty | <br>piezo-resistive semiconductor sensor<br>700 mbar ... 1100 mbar<br>0,1 mbar<br>0,1 mbar<br>+/- 3 mbar |
| Ambient temperature (sensor in ionization chamber)<br>-Type of sensor<br>-Measurement range<br>-Resolution displayed on Screen<br>-Resolution under DataVIEW or DataEXPERT<br>-Initial calibration uncertainty | <br>Band gab semiconductor sensor<br>- 20 °C ... + 70 °C (- 4 ... + 158 °F)<br>0,1 °C (0,1 °F)<br>0,1 °C (0,1 °F)<br>+/- 1,5 °C (+/-2,5 °F) |
| Relative air humidity (sensor in ionization chamber)<br>-Type of sensor<br>-Measurement range<br>-Resolution displayed on Screen<br>-Resolution under DataVIEW or DataEXPERT<br>-Initial calibration uncertainty | <br>Capacitive semiconductor sensor<br>0 % rH ... 99 % rH<br>0,1 % rH<br>0,1 % rH<br>+/- 3 % rH |
| External sensor channel 1 & 2<br>-Measurement range<br>-Resolution under DataVIEW or DataEXPERT<br>-Signal sampling rate<br>-Total signal error<br>-Input impedance<br>-Input connector type | <br>0 VDC ... 2,5 VDC<br>0,00061 VDC<br>30 per minute<br>+/- 0,01 VDC plus +/- 3 %<br>10 kOhm<br>HIROSE HR10A-10R-10PB |

| | |
|---|---|
| Relocation sensor<br>-Type of sensor<br>-Events detected<br>-Notation for DataEXPERT | <br>Three-axis, capacitive semiconductor sensor Gentle acceleration (low-frequency only)<br>Number of events per cycle (max. 254) |
| Mains power monitor<br>-Operating principle<br>-Events detected<br>-Notation for DataEXPERT | <br>Monitors ext. 10 ... 32 VDC supply from mains adapter<br>Loss or restart of mains supply, charging<br>Irrevocable flag set for loss or restart and charging |
| External counter signal channel 1 & 2<br>-Operating principle<br>-Events detected<br>-Measuring range<br>-Notation for DataEXPERT | <br>Pulse counter<br>Counts per minute (cpm)<br>0 ... 10 kHz<br>Series of statistical values of pulse rate |
| Gamma dose rate channel (option)<br>-Type of sensor<br>-Measuring range<br>-Initial calibration uncertainty<br>-Resolution displayed on Screen | <br>Geiger-Müller tube<br>20 nSv/h ... 10 mSv/h<br>+/- 20 rel.-%<br>1 nSv/h |

## ALPHAGUARD MODELS
## CHARACTERISTICS AND APPLICATION AREAS

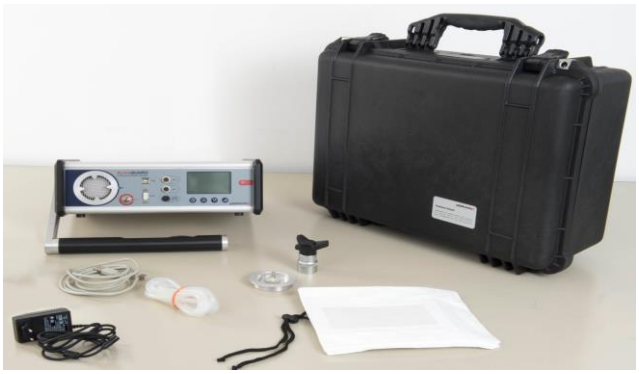
| | D 50 | D 2000 | DF 2000 |
|---|---|---|---|
| Flow mode (internal pump) | - | - | ✓ |
| Measuring cycles (Diffusion) | 10 min<br>60 min<br>Overhead cycling | | |
| Measuring cycles (Flow) | - | - | 1 min<br>10 min<br>10 min (Rn/Tn mode)<br>Overhead cycling |
| Radon in air | Diffusion | | Diffusion and Flow |
| Radon/Thoron discrimination | - | - | ✓ |
| Radon in soil gas (Soil gas probe) | - | - | ✓ |
| Radon in water samples (AquaKIT) | - | - | ✓ |
| Radon progenies (AlphaPM) | ✓ | ✓ | ✓ |
| Dose rate (ODL Module) | ✓ | ✓ | ✓ |
| Multisensor Unit | ✓ | ✓ | ✓ |
| Calibration measurements | Inside container by diffusion | | Inside / outside container by diffusion/flow |
| Emanation measurements | Inside container by diffusion | | Inside / outside container by diffusion/flow |
| Exhalation measurements | Inside Radon box by diffusion | | Inside / outside Radon box by diffusion/flow |

# AlphaGUARD

## ALPHAGUARD MODELS

| | D 50 | D 2000 | DF 2000 |
|---|---|---|---|
| Measuring Range | 2 – 50 000 Bq/m3 | 2 – 2 000 000 Bq/m3 | |
| Operation Mode |  Diffusion Mode | |   Diffusion and Flow Mode Rn / Tn Mode |
| Internal Pump | - | - | ✓ |
| Polyvalent (Rn in air, soil gas, water) | - | - | ✓ |

| Deliverables | D50 / D2000 | DF2000 |
|---|---|---|
| **Transport case** | ✓ | ✓ |
| **Mains-/charging adapter** | ✓ | ✓ |
| **USB cable** | ✓ | ✓ |
| **Dust protection bag (Tyvek)** | ✓ | ✓ |
| **Diffusion adapter** | ✓ | ✓ |
| **Flow through adapter** | - | ✓ |
| **Hexagon key for flow through adapter** | - | ✓ |
| **Air tube (ca. 2 m)** | - | ✓ |
| **Radon progeny filter** | - | ✓ |



## SPARE PARTS

| | |
|---|---|
| P0001071 | Radon Progeny Filter |
| P0000164 | Booster Akku |
| P0003810 | FlowStop for AlphaGUARD |
| P0000163 | MINI-DIN Multi Adapter |
| R0001106 | Dust protection bag / Tyvek |