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. AlphaGUARD incorporates a pulse-counting ionization chamber (alpha spectroscopy). Through optimal geometry of the chamber and intelligent signal evaluation this radon monitor is suitable for continuous monitoring of radon concentrations between 2 – 2 000 000 Bq/m³. AlphaGUARD offers high detection efficiency, a wide measurement range, fast response and permanent, maintenance-free operation with long-term stable calibration. No pump is required when operating in diffusion mode (e.g. long-term monitoring) and the instrument is insensitive to both, high humidity and vibrations.

FEATURES

- High sensitivity and fast linear response at 2 … 2 000 000 Bq/m³, 5 cpmat 100 Bq/m³, 0,05 … 54 000 pCi/l, 5 cpmat 3 pCi/l
- Multiparameter features / flow & diffusion operation
- Long-term stable calibration
- Complete system for measuring Radon in air, water, soil gas and building material

In addition to the radon concentration, AlphaGUARD simultaneously measures and records ambient 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..

AlphaGUARD

TECHNICAL FEATURES

TYPE OF DETECTOR	Ionization chamber
MEASUREMENT PRINCIPLE	3D Alpha spectroscopy and current mode
MEASUREMENT MODES*	diffusion, flow or sampling
MEASURING RANGE*	From 2 to 2.000.000 Bq/m³ (from 0.027 pCi/l to 54 nCi/l)
DISPLAY	Graphic display, backlight
ADDITIONAL SENSORS	T, P, H, Reloc, QA, ext. sensors
AUTONOMY	> 10 days (diffusion mode
DIMENSIONS	14.2 x 13.2 x 4.8 in (360 x 335 x 123 mm)
WEIGHT	15.4 lb. (7 Kg)

** According to the product version*

Applications

Research & Specific applications, calibration labs

Nuclear & NORM industries (mining, nuclear waste, oil & gas industry).

Monitoring Radon in homes & workplaces

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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Characteristics

	D50	D2000	DF2000
Type of radon detector	Ionization chamber, HV „l750 VDC		
Mode of operation	3D-alpha spectroscopy and current mode		
Total detector volume	0.62 liter (38 cubic inches)		
Active detector volume	0.56 liter (34 cubic inches)		
Radon progeny filter, entry window	Fine dust filter (retention coefficient > 99.9%)		
Detector filling mechanism	Optimized design for fast passive diffusion or Flow through operation with internal pump		
Transient response function (time delay)	Signal > 30% after 10 min Signal > 70% after 20 min 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), online 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 -for thoron at 1 L/min flow rate -for thoron at 2 L/min flow rate	N/A		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)		
Radon (Rn-222) measurement range	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)	
Thoron (Rn-220) measurement range	N/A		2 Bq/m3 ¡K 2,000,000 Bq/m3(<0.05 pCi/L ¡K 54,000 pCi/L)
LCD display resolution	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	„b3% (plus uncertainty of primary standard)		
Measurement modes and cycles	10 min, 60 min (diffusion)		10 min, 60 min (diffusion) 1 min, 10 min (flow) 10 min (Rn/Tnmode) Interval mode (applicable for flow mode)
Flow range of pump	N/A		Flow-regulated: 0.05 -0.5, 1, 2 L/min
Data capacity (non-volatile)	Up to 60,000 measurement points ~ 400 days for 10 min measuring cycle ~ 2,500 days for 60 min measuring cycle		Up to 60,000 measurement points ~ 40 days for 1 min measuring cycle ~ 400 days for 10 min measuring cycle ~ 2,500 days for 60 min measuring cycle
Graphic display resolution	160 x 104 pixels		
Battery life (diffusion mode) Battery life (flow mode)	Up to 10 days		Up to10 days > 10 h
Weight (incl. internal battery)	6.2 kg (13.7 lbs)		7 kg (13.7 lbs)
Dimensions without handle (L x W x H)Dimensions with handle (L x W x H)	282 mm x 340 mm x 123 mm 329 mm x 355 mm x 123 mm		
System operating range -Temperature -Atmospheric pressure -Humidity	-10¢XC ¡K +50¢XC (+14¢XF ¡K +122¢XF) 700 mbar¡K 1100 mbar 0% rH¡K 95% rH(non-condensing)		
External power consumption Line frequency	100 ¡V240 V (400 mA)50 ¡V60 Hz		

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AlphaGUARD Models – Characteristics and Application Areas

	D50	D2000	DF2000
Measurement range	2 to 50000 Bq/m³	2 to 2 000 000 Bq/m³	2 to 2 000 000 Bq/m³
Storage capacity	60 000	60 000	60 000
2 x ext. analoginput	√	√	√
2 x ext. counter input	√	√	√
Diffusion mode	√	√	√
Flow mode (internal pump)	✗	✗	√
Measuring cycles (diffusion)	10 min, 60 min	10 min, 60 min	10 min, 60 min
Measuring cycles (flow)	✗	✗	1 min, 10 min, 10 min (Rn/Tnmode), Interval mode
Radon in air	√ Diffusion	√ Diffusion	√ Diffusion and flow
Radon/thoron discrimination	✗	✗	√
Radon in soil gas*	✗	✗	√ With soil gas probe
Radon in water samples*	✗	✗	√ With AquaKIT
Radon progenies*	√ With AlphaPM	√ With AlphaPM	√ With AlphaPM
Dose rate*	√ With dose rate module	√ With dose rate module	√ With dose rate module
MultisensorUnit*	√	√	√
Calibration measurements*	√ Inside container by diff.	√ Inside container by diff.	√ Inside container by diff.
Emanation measurements*	√ Inside container by diff.	√ Inside container by diff.	√ Inside container by diff.
Exhalation measurements*	√ Inside radon box by diffusion	√ Inside radon box by diffusion	√ Inside/outside radon box by diffusion/flow

Multiparameter features

Atmospheric air pressure -Type of sensor -Measurement range -Resolution / Initial calibration uncertainty	Piezo-resistive semiconductor 700 mbar ... 1100 mbar 0.1 mbar / ±3 mbar		Relocation sensor -Type of sensor -Events detected -Designation for DataVIEWPRO or DataEXPERT10	3-axis, capacitive semiconductor sensor Gentle acceleration (low-freq. only) Number of events per cycle (max. 254)
Ambient temperature (sensor in ionization chamber) -Type of sensor -Measurement range -Resolution / Initial calibration uncertainty	Band gap semiconductor -20°C ... + 70°C (-4°F ... + 158°F)0.1°C (0.1°F) / ±1.5°C (+/- 2.5°F)		Mains power monitor -Operating principle -Events detected -Designation for DataVIEWPRO or DataEXPERT10	Monitors ext.10 - 32 VDC supply from mains adapter Loss or restart of mains supply, charging Irrevocable flag set for loss or restart and charging
Relative air humidity (sensor in ionization chamber) -Type of sensor -Measurement range -Resolution -Initial calibration uncertainty	Capacitive semiconductor 0% rH... 99% rH 0.1% rH ±3% rH		External counter signal channels 1 & 2 -Operating principle -Events detected -Measurement range -Designation for DataVIEWPRO or DataEXPERT10	Pulse counter Counts per minute (cpm) 0 ... 10 kHz Series of statistical values of pulse rate
External sensor channels 1 & 2 -Measurement range -Resolution -Signal sampling rate -Total signal error -Input impedance -Input connector type	0 VDC ... 2.5 VDC 0.00061 VDC 30 per minute ±0.01 VDC plus +/-3% 10 kÙ HIROSE HR10A-10R-10PB		Gamma dose rate channel (option) -Type of sensor -Measurement range -Initial calibration uncertainty -Resolution displayed onscreen	Geiger-Müller tube 20 nSv/h … 10 mSv/h ±20 rel. % 1 nSv/h

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