

EQF3220

Radon/Thoron Gas & Decay Product -Monitor for attached and unattached decay products



Within our range of portable monitors for Radon and its decay products, the EQF3220 is our high-end instrument. It contains all components that are needed for the complex scientific evaluation of a local radon situation. It allows measuring the concentration not only of Radon and Thoron gas but also of their decay products, in relation with the volume of the particles of the aerosol. The instrument samples free and attached decay products as well as the cluster component within the range of 20 to 100 nm. This component appears commonly during combustion processes in the air.

The small aerosol sampling head can be removed from the device and placed in any other part of the room. The fine pored membrane filter of the newly developed sampling head is exchangeable with no need of any tool. The filter has a reinforced membrane fiber and an automatically controlled rotary vane pump that guarantees a constant air flow through the filter. A stainless steel mesh is employed to separate the free decay products. Several tests have shown an excellent reliability of the measurement results.

The EQF3220 is equipped with high-end semiconductor radiation detectors, both in the Radon measurement chamber and the detection head for the decay products. This allows a perfect separation of the different decay products of Radon, using alpha-spectroscopy.

The measurement chamber works following the principle of high voltage collection and has, despite its low volume, an extraordinary sensitivity. This means a decisive advantage when it comes to measuring Thoron or small probe volumes. The long-term contamination that appears in other measurement principles by the increasing Pb-210 underground is completely annulated. There is no cross-sensitivity regarding the ambient radiation. The chamber is immune to humidity changes of the environment. This is why a desiccation cartridge, as needed in other devices working following the principle of high voltage collection, is not necessary in the EQF3220.

The quality control is a main issue of any radiation measurement. Therefore the EQF3220 records a complete alpha spectrum for each measured value. This allows controlling the perfect operation of the device in each moment of the measurement.

The EQF3220 disposes of a big touch-screen, showing the measured values. All measured data are stored in a 2GB memory card and are available from your PC or laptop through a USB interface. Data transmission and device control can be done by GPRS or GSM modems, as well as via ZigBee adapter (Net Monitors). A NaJ detector to fix the local gamma dose and a GPS receiver are optional features of the device. The EQF3220 disposes of additional

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input and output terminals to connect sensors and actuators according to client-specific needs. The data sheet shows some examples.

EQF3220 – Technical Data

Radon chamber	
Detector	4 x 200mm ² ion-implanted silicon detector
Internal volume	250mm ³ (total volume of the internal air loop)
Detection range	0 ... 10 MBq/m ³
Sensitivity	3 / 7 cpm/(kBq/m ³) for fast / slow mode
Response time	12 / 120 min for fast / slow Mode
Results / Analysis	Radon concentration fast(excl. Po-214) and slow (incl. Po-214) Thoron concentration Storage of record related spectra and time distribution
Aerosol sampling head <i>Telescopic mounting on the instrument enclosure, removeable</i>	
Dimensions	Diameter 44mm, Length 100mm
Detectors	2 x 150mm ² ion-implanted silicon detector
Filter	Membrane type filter, d=27mm, 1µm pore size Active filter monitoring against perforation, exhaustion No tool for filter replacement required
Screen	Stainless steel grid , d = 15mm
Pump	Rotary vane type 1,65 l/min, processor controlled
Range	0 ... 1 MBq/m ³ (EEC) attached/unattached
Sensitivity	Attached decay products approx. 600 cpm/(kBq/m ³) (EEC) Unattached decay products approx. 150 cpm/(kBq/m ³) (EEC)
Response time	120 min
Results/Analysis	EEC, PAEC for attached and unattached Radon and Thoron daughter products Storage of record related spectra and time distribution
Gamma probe (option) <i>Connected to the front panel of the EQF3220 by cable</i>	
Detector	Sodium-Iodid (NaJ(Tl)) with integrated PMT und Bias Scintillation crystal 2" x 2" Energy range for spectroscopy 10keV – 2MeV Spectral resolution 8% (Cs-137)
Results / Analysis	Dose power, Net-activity of six user defined nuclides Storage of record related spectra and time distribution
Probe dimensions	Diameter 60mm, length 260mm Cable 5m (optional 10m)
Additional sensors	
Standard	Rel. Humidity 0 ... 100%, uncertainty ± 2% Temperature -20 ... 40°C, uncertainty ± 0.5°C Bar. pressure 800 ... 1200mbar, uncertainty 0,5% MW Flow rate 0 ... 4 l/min, uncertainty ± 5%
Air analytics (option)	CO, CO ₂ , CH ₄ , combustible gases, several ranges
Water analytics (option)	pH value, Redox potential, conductivity etc.

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Process (option)	Pressure, differential pressure, flow, velocity etc.
Meteorological (option)	Wind direction, wind speed etc.
Common	
Sampling	Simultaneous measurement with all detectors/sensors with respect to the selected sampling cycle
Sampling cycles	Storage of up to 16 different sampling cycles with up to 32 steps (pre-defined or infinite repetition) Interval 1 Second to several weeks
Data memory	SD Card, 2 GByte
Controlling	Touch-Screen 6 x 9cm Interface: USB, RS232, optionally Net Monitors wireless
Power supply	Internal 12V rechargeable battery, mains power adapter Optionally additional connector for 12V car battery or solar power supply
Dimensions/weight	235mm x 140mm x 255mm / 6kg
Software	dVISION: Control and data transfer (also via GPRS, GSM, Net Monitors), visualization, data management dCONFIG: system configuration, creating/changing cycles (also via GPRS, GSM, Net Monitors) dLIBRARY: Library for NaI gamma probe (option)
Extensions	Available at internal connectors: 8 analogous inputs, 3 counter inputs, 2 status inputs, 6 switch outputs, clock switch, PID regulator/analogous output.
GPS (option)	GPS coordinates are recorded and stored together with the measurement results. GIS compatible *.kml files can be exported (can be opened by Google-Earth). Antenna connected by cable.
Accessory	
Standard	Mains power adapter USB transfer cable Serial transfer cable
Option	Transportation suitcase Soil gas Kits (pile drive probe or packer probe) Exhalation bonnet Radon in water kit Gas dryer (Peltier-cooler) for stationary water sampling GSM modem incl. Mains power adapter and cable

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