ADVANCED TECHNOLOGY FOR A SAFER WORLD

EQF 3320

Particle Size-specific Radon & Daughter Product Monitor

The EQF 3320 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.

Applications:

- Radon and thoron measurements in indoor air, soil air, and water samples
- Correct dose determination of radon or thoron daughter product exposure
- Derivation of location-specific equilibrium factors for dose estimation using radon dosimeters
- Radiological assessment of interiors in clay houses
- Dose-relevant investigations into the size distribution of aerosols as carriers of radon and thoron daughter product activity

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 without 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 EQF 3320 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 polonium-210 underground is completely annulated.

There is no cross-sensitivity regarding the ambient radiation. The chamber is immune to humidity changes of the environment.
The quality control is a main issue of any radiation measurement. Therefore the EQF 3320 records a complete alpha spectrum for each measured value. The EQF 3220 has a big touch-screen, showing the measured values. All measured data are stored in a 2 GB memory card and are available from your PC or laptop through a USB interface. Data transmission and device control can be done by radio modems, as well as via ZigBee adapter (Wi-Fi).

A NaI detector to fix the local gamma dose is an optional feature of the device. The EQF 3320 comes with additional input and output terminals to connect sensors and actuators according to client-specific needs. The instrument comes with a factory calibration certificate. The calibration process for Radon (Rn-222) fulfills the requirements of the DIN ISO EN 17025.The data sheet shows some examples. The instrument comes with a factory calibration certificate. The calibration process for Radon (Rn-222) fulfills the requirements of the DIN ISO EN 17025.

Applications:

- Continuous spectrometric measurement of radon and thoron and their decay products from the same air sample
- High sensitivity, no contamination from Po-210
- Separate measurement of attached and unattached decay products
- Offset measuring head with minimized surface area to prevent the deposition of unattached decay products before they reach the measuring arrangement
- Tool-free and easy replacement of filter and screen, mesh size of screen optimized for maximum dust permeability
- Handy, portable design – measuring case with external mounting of the measuring head available
- Precisely controlled flow with integrated robust, durable, and quiet pump
- Battery operation for more than 30 hours * (depending on the nominal flow rate)
- Color touch screen with graphical display of spectra and measurement series
- Outstanding connectivity for system integration and connection of accessories
- Flexible, user-customizable alert and warning system
- High data security thanks to proprietary controller architecture (no integrated PC solution with operating system)
- DAkkS calibration certificate for radon, factory calibration in accordance with DIN/ISO/IEC 17025 for radon decay products

EQF 3320

SPECIFICATIONS

Radon Measurement Chamber

Measurement principle	Measuring chamber with high-voltage deposition on silicon detector and alpha spectroscopy
Detector	4 x 200 mm² Si detector with HV chambers
Intristic background Nominal flow rate	< 0.2 Bq/m³ 0.5 l/min (> 72 hours continuously)
Internal volume	250 ml (total volume of the air circuit)
Measuring range	1 ... 10 000 000 Bq/m³
Instrinsic accuracy	<= ±2.5 %
Sensitivity	4.2 or 8.5 cpm/(kBq/m³) for fast or slow mode, respectively
Response time	15 or 120 minutes for fast or slow mode
Measurement/Analysis	Radon concentration fast (excluding Po-214) and slow (in- cluding Po-214) Thoron concentration

Follow-up product measuring head *Removable, attaches to accessory adapter*

Measurement principle	Separation of radon decay products on a screen (unattached fraction) and a subsequent filter (attached fraction), alpha spectroscopy
Dimensions	Diameter 43 mm, length 59 mm
Detector	2 x 400 mm² ion-implanted silicon detector
Filter	Membrane filter, 22 mm opening Filter breakage and contamination monitoring No tools required for filter replacement
Screen	Stainless steel screen, 30 mm opening No tools required for screen replacement
Nominal flow rate	1.5 l/min (> 30 hours continuously)
Measuring range	1 … 100 000 Bq/m³ (EEC) attached/unattached
Sensitivity	Approx. 1 800 cpm/(kBq/m³) (EEC) attached Approx. 600 cpm/(kBq/m³) (EEC) unattached
Response time	120 min
Measurement/Analysis	EEC, PAEC for unattached and attached radon and thoron decay products, respectively

Internal Sensors

Standard device	Relative humidity 0 … 100 %, accuracy ±2 % Temperature -20 … 40 °C, accuracy ±0.5 °C Barometric pressure 800 … 1 200 mbar, accuracy 0.5 % MW Flow rate 0 … 4 l/min, accuracy ±5 % Humidity/temperature sensors in the air circuit
Optional	Additional sensors with analog or pulse signals can be con nected to the AUX1 and AUX2 sockets, e.g., local dose rate probe, weather station, and much more.

General Information

Measurement	Simultaneous measurement with all detectors/sensors ac- cording to the selected measurement program
Measurement programs	Storage of up to 16 different measurement programs with up to 32 steps (defined or unlimited repetition) Time interval 1 second to weeks
Data storage	Micro-SD, 32 GB
Operation/Display	4,7” Color Touch-Screen
Interfaces	2 independent digital communication channels Channel 1: USB, RS 232, RS 485 B, Channel 2: RS 485 A with MODBUS RTU, WLAN (optional) 2 analog outputs, assignable to any measured value and measuring range
Power supply	12 V NiMH rechargeable battery, Plug-in power supply 100 - 240 V ~50/60 Hz, 18 VDC / 1.8 A
Dimensions/Weight	235 mm x 140 mm x 255 mm / 6 kg
Software	dVISION
GPS	Highly sensitive GPS receiver usually provides position even indoors; coordinates are stored simultaneously with the measured values. Map view in dVISION, export of GIS-com- patible KML files.
Environmental conditions	0 … 40 °C, 0 … 95 % rH, non-condensing 800 … 1,100 mbar
Scope of delivery	Charging power supply adapter USB readout cable Dust filter (spare) Grid for RFP (spare) Aerosol filters (10) Hose 6.35 mm x 3.18 mm (1.5 m) Fuse (spare) Transport case Manual & software (on https://sarad.de) DAkkS-compliant calibration certificate according to DIN EN ISO/IEC 17025:2018 for Rn-222 Factory calibration with certificate according to DIN for radon progeny products
Optional accessories	Water ingress protection Soil test kit (impact probe and/or packer probe) Exhalation hood Aqua kit for DACM32 for measuring radon in water probes Measuring case for field applications with external mounting of the measuring head