Aer 5200

(α – β) AREA AEROSOL MONITOR

The Aer 5200 (Area Aerosol Monitor) combines a beautiful design with all the requirements of a high flow radiation monitor with Radon / Thoron, alpha and beta background compensation. The instrument is trolley mounted and easy to move by one person.

The unit measures long-lived aerosols as well as short-lived Radon daughters by alpha spectroscopy and beta counting. The radioactive aerosols and particles are collected on the surface of a high resolution membrane filter. The alpha and beta decays on the filter are measured by a high-end semiconductor radiation detector (1200mm²). This allows a perfect separation of the different decay products. The spectrometric analysis allows e.g. the detection of Plutonium aerosols which cannot be detected by measuring gamma radiation.

The pump rate (30-60l/min, adjustable) is suitable for very low detection limits. The integrated low noise rotary vane pump is processor controlled and guarantees a constant flow rate during the whole measuring time. A sensor measures permanently the pressure drop on the filter in order to recognize an exhausted or perforated filter instantly and is able to give a corresponding signal to move the filter roll to change it.

The filter roll (30 m length) can change a filter automatically when one or more of the following conditions occur:

- Every measurement cycle
- Exhausted or perforated filter
- Adjustable activity is exceeded
- Adjustable time interval has been exceeded (independent of measurement cycle)

The filter roll's step length is 7 cm, where the instrument gives an alert signal 2 step before the roll's end.

The quality control is a main issue of any radiation measurement. Therefore the Aer 5200 records a complete alpha spectrum for each measured value. This allows the monitoring of the device's perfect operation in each moment of the measurement.

Definition of local dose: A NaI detector to determine the local gamma dose is an optional feature of the device.

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Toxic and explosive gases: Optionally, sensors to detect toxic and combustible gases (e.g. CO, CO_2 and CH_4) can be integrated.

All detectors can be operated simultaneously. The concept of the system allows an easy handling and a standardized data basis. The device offers predefined measurement procedures that can be easily modified by the user. Additional measurement programs can be created without any problem.

The Area Aerosol Monitor 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 Net Monitors ZigBee wireless adapter, if the device is operated in inaccessible or contaminated areas.

Aer 5200 **– Technical Data**

Aerosol sampling head	*Fixed on the top of the Aer 5200*
Detector	1200mm² ion-implanted silicon semiconductor detector
Filter	Membrane type filter (PTFE), 5µm pore size, filter roll length: 30m, width: 65mm Active filter monitoring against perforation, exhaustion No tool for filter replacement required More than 12 month operation in “normal” environment
Pump	Rotary vane type 60l/min, processor controlled, adjustable 30-60l/min, 3 phase 175- 260V 2,35 A, 50 Hz 0,37kW
Background Compensation	Dynamic Radon background compensation using peak fitting of alpha spectrum, Gamma background compensation
Range	0 … 1MBq/m³ (EEC)
Sensitivity	4cpm/DACh (Pu) or 20cpm/(Bqh/m³) 26cpm/(Bq/m³) for Radon daughters (EEC)
Detection limit	The limits are given for the most radio-toxic nuclides Pu-239 and Sr-90 (without Y-90).

(Po-218) activity concentration. in Bq/m³	Alpha Exposure			
	Measuring time T = 1 min		Measuring time T = 60 min	
	Bqh/m³	DACh	Bqh/m³	DACh
5	0.72	3.6	0.07	0.35
50	1.78	8.9	0.23	1.13
500	5.35	27	0.99	4.92

Detection threshold 3 σ (adjustable), detection limit 1,65 σ

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(Po-218) activity concentration. in Bq/m³	Beta Exposure (for Equilibrium Factor F = 0.6)			
	Measuring time T = 1 min		Measuring time T = 60 min	
	Bqh/m³	DACh	Bqh/m³	DACh
5	2.0	0.01	0.25	0.001
50	5.6	0.03	0.71	0.004
500	10.7	0.09	2.23	0.01

Results/Analysis	Long-lived Alpha/Beta aerosols (Alpha Exposition, Alpha Dose, Beta Exposition, Beta Dose), EEC for both Radon and Thoron daughter products Storage of record related spectra (256 channel) and time distribution
Signaling	Green: normal operation Yellow: filter exhausted, end of filter red + buzzer: High count rate (radioactive alert)
Additional sensors	
Standard	Flow range 0 … 200l/min, uncertainty ± 3% Rel. Humidity 0 …100%, uncertainty ± 2% Temperature -20 … 40°C, uncertainty ± 0.5°C Bar. pressure 800 … 1200mbar, uncertainty 0,5% MW
Air analytics (option)	CO, and combustible gases, several ranges
Gamma probe (option)	
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
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

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Controlling	Touch-Screen 6 x 9cm Interface: USB, RS232 optionally wireless Net Monitors and network access
Power supply	230 VAC- 50 Hz
Dimensions/weight	1110mm x 520mm x 490mm / 54kg
Software	dVISION: Control and data transfer (also via, Net Monitors (option)), visualization, data management dCONFIG: system configuration, creating/changing cycles (also via Net Monitors (option)) dSERVER: network access (option)
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).
Accessories	
Standard	USB transfer cable

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