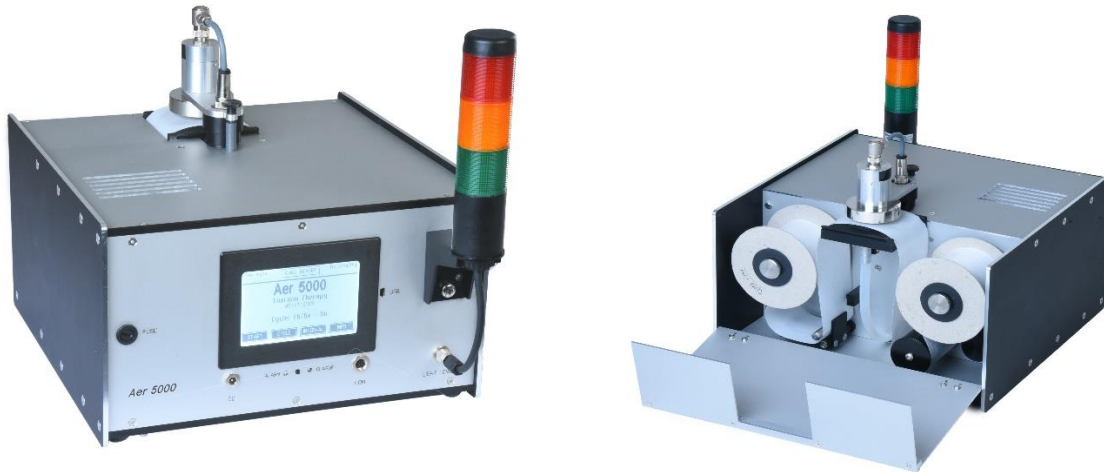
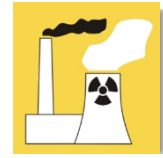


# Aer 5000 Desktop

Desktop Alpha/Beta Continuous Air Monitor (CAM)



## Applications:

- for monitoring activity concentrations of airborne radioactive aerosols (**LLRD**) and measuring radon / thoron equivalent equilibrium concentration (**EECRn & EECTh**) and/or potential alpha energy concentration (**PAEC**)
- at workplaces
- in nuclear facilities
- in the NORM industry
- in mining operations
- in nuclear medicine (Th-227, Ac-225, Ra-223 and Rn-219)
- for taking samples from ducts and chimneys of nuclear facilities

## Features:

- continuous monitoring of breathing air for airborne long-lived radioactive aerosols (LLRD) and short-lived radon decay products
- assessment and minimization of inhalation hazards for workers
- alert workers to high levels of airborne activity
- spectroscopic separation of the nuclides and complete compensation of the natural radon background for the LLRD measurement
- menu navigation via touch screen
- all parameters relevant for reliable operation are continuously monitored and are part of the stored measurement data
- flexible alert system
- filter tape for over 330 steps or nearly 1 year at one filter change/day

Closer to your application

<b>Detector</b>	400 ... 1200mm <sup>2</sup> ion-implanted silicon detector open face sampling for minimum collection losses option: Tube connector for air inlet (vacuum flange KF/DN16) option: Double detector for dynamic gamma background compensation
<b>Energy range</b>	80keV...3MeV (for 400mm <sup>2</sup> detector) or 150 keV...3 MeV (for 1200mm <sup>2</sup> detector) beta; 3...10MeV (alpha)
<b>Counting efficiency</b>	approx. 20% ( $4\pi$ )
<b>Filter/Stepper</b>	membrane filter tape (PTFE); 5 $\mu$ m pore size; length 30m; width 65mm; good for more than 330 filter steps pneumatic filter sealing for minimum leakage rate deposition rate >99,9% active filter test with respect to perforation and exhaustion tool-less replacement of filter coils more than 12 months autonomous operation in "normal" environment configurable trigger for filter stepping (e.g. each sample interval, fixed period, filter exhaustion, activity detected) required period for filter replacement <2s
<b>Pump</b>	brush-less, long-life, low noise quality membrane pump nominal air flow 8l/min (adjustable range 4 to 10l/min) processor controlled air flow for const. deposition conditions pressure drop across the filter 15...150mbar (at 10l/min) noise emission approx. 55 dBA (in 1m distance)
<b>Results</b>	Equilibrium Equivalent Concentration (EEC) for radon and thoron daughter products in Bq/m <sup>3</sup> exposure for Alpha and Beta emitters (LLRD) in Bqh/m <sup>3</sup> dose for Alpha and Beta emitters in $\mu$ Sv or DAC-hrs (dose coefficients adjustable by user) detection of Natural Uranium with automatic selection of the U <sub>nat</sub> dose coefficient average activity concentration for Alpha and Beta emitters in Bq/m <sup>3</sup> separate channel for Alpha gross counting in cps or Bq option: dose rate in $\mu$ Sv/h temperature, humidity, pressure, battery voltage flow rate, filter exhaustion, filter stepping, end of filter tape

<b>Standards</b>	IEC 60761-1 IEC 60761-2 IEC 61578 IEC 61577-3 IEC 1263 CE, VDE DIN ISO 16639 (VDE 0493-1-6639)
<b>Compensation</b>	compensation of natural radon background by alpha spectroscopy with dynamic fitting of peak shape with respect to progressive filter exhaustion upper alpha energy threshold for LLRD = 5.6MeV static compensation of Gamma background option: dynamic compensation of Gamma background by double detector dynamic shock rejection (mechanical shock) by pulse signal shape analysis
<b>LLRD Sensitivity</b>	approx. 7 cpm/(Bqh/m <sup>3</sup> )
<b>Measuring range</b>	35 000 Bqh/m <sup>3</sup> (175 000 DACH(Pu)) 2 MBq/m <sup>3</sup> over 1 minute
<b>Measurement</b>	up to 16 user definable sampling cycles (1s to 1year) predefined sampling cycles 1, 5, 15, 60 minutes
<b>Detection limits</b>	see tables below
<b>Alert indication</b>	configurable alert thresholds for all measured results alert tower with green, yellow and red light, 360° visible 90dB signal buzzer (option) alert indication at display alert reset is configurable (either with confirmation by the user or automatic reset if the alert condition is no longer present) pre-defined alerts for LLRD activity, low/high count rate, filter perforation, end of filter tape
<b>Data storage</b>	2GB SD card (> 800 000 data records) storage of all measured raw data incl. spectra
<b>Display</b>	touch screen 6cm x 9cm (4.5"); Graphic 240 x128 high contrast even in direct sunlight backlight
<b>Operation</b>	intuitive, straight forward menu structure

<b>Interface</b>	USB, RS232 (RS422/RS485 optionally) option: Net Monitors wireless (ZigBee) option: TCP/IP (Ethernet/WLAN) 6 additional configurable analogous sensor inputs 1 add.counter input (for models without GM-tube option only) option: relay contacts instead alert light tower
<b>Power supply</b>	power adapter 18V/60VA internal NiMH buffer battery 12V/1Ah for more than 6 hours operation in case of mains power interruption (without pump)
<b>Power consumption</b>	<50 W
<b>ATEX category</b>	no
<b>Housing</b>	space saving desktop housing ease of decontamination
<b>Dimensions</b>	308mm x 308mm x 175mm (12" x 12" x 7") plus detection head
<b>Weight</b>	8kg
<b>Ambient conditions</b>	0...50°C 5...95%rH, non-condensing 800...1100mbar
<b>Software dVISION</b>	remote control data transfer, visualization data management, export to text files system configuration creating / editing of measurement cycles network management
<b>Additional options</b>	sealed filter unit for connection to ventilation ducts GM-detector for gamma dose rate measurement double Si-detector single filter facility / manually changing

<b>Calibration/Test</b>	<p>factory calibration in a radon daughter product atmosphere with aerosol generator</p> <p>test sources Am-241 (alpha) and Cs-137 (beta); recommended are area sources with 185Bq nominal activity such as Eckert &amp; Ziegler AMRB22757 and CDRB22758 (d 30mm x 0.8mm)</p> <p>flow rate check on top of the filter using adapter dome and low differential pressure air flow meter (<math>\Delta p &lt; 15\text{mbar}</math> @10 l/min)</p>
<b>Scope of delivery</b>	<p>USB cable</p> <p>RS232 cable</p> <p>fuse (x2)</p> <p>power supply adapter</p> <p>filter roll (1x30m)</p> <p>factory calibration certificate</p> <p>user manual (on CD as pdf-file)</p> <p>transportation case</p>

### Possible modifications of Air Monitor Aer 5000

Aer 5000-XXXX

- „XFG” – with dual spectrometer– special modification for thorium (Th227) therapy
- „S” – with special adapter for stack monitoring
- „F” – fixed filter holder for single filter, diam. 47mm  
Without „F” – automatic filter changing facility with membrane filter tape (PTFE)
- „G” – double Si-detector 400...1200 mm<sup>2</sup> for dynamic gamma background compensation.  
Without „G” – single Si-detector 400...1200 mm<sup>2</sup> with static gamma background compensation

\*) options XFG and G cannot be combined

## Detection Limits

The detection limits stated in the tables below are valid for following operational conditions:

- flow rate = 8 l/min
- $k_{1-\alpha} = 3$  (99.8%)
- $k_{1-\beta} = 1.65$  (95%)
- 1DAC(Pu) = 0.2 Bq/m<sup>3</sup> (10CRF835)
- 1DAC(Sr90) = 200 Bq/m<sup>3</sup> (10CRF835)

Additionally for beta measurement:

- F = 0.6
- gamma background = 0.1 µSv/h

The assumption for the detection limit of the concentration is a momentarily step-like increase of air activity concentration up to the detection limit at the beginning of a sampling interval. Furthermore it is presumed that there was no LLRD activity deposited on the filter.

Alpha LLRD									
Po-218 )	Detection limit T = 1min			Detection limit T = 5min			Detection limit T = 15min		
Bq/m <sup>3</sup>	Bqh/m <sup>3</sup>	DACH	Bq/m <sup>3</sup>	Bqh/m <sup>3</sup>	DACH	Bq/m <sup>3</sup>	Bqh/m <sup>3</sup>	DACH	Bq/m <sup>3</sup>
10	2.7	13.3	160	0.74	3.7	8.8	0.4	2.0	1.6
20	2.7	13.3	160	1.0	5.0	12.0	0.57	2.8	2.3
50	3.7	18.3	220	1.54	7.7	18.5	0.95	3.7	3.7
100	5.0	24.9	285	2.21	11.1	26.6	1.41	5.7	5.6

Beta LLRD									
Po-218 )	Detection limit T = 1min			Detection limit T = 5min			Detection limit T = 15min		
Bq/m <sup>3</sup>	Bqh/m <sup>3</sup>	DACH	Bq/m <sup>3</sup>	Bqh/m <sup>3</sup>	DACH	Bq/m <sup>3</sup>	Bqh/m <sup>3</sup>	DACH	Bq/m <sup>3</sup>
10	5.12	0.026	307	2.21	0.011	14.5	1.26	0.006	5.0
20	6.79	0.034	407	2.96	0.015	19.8	1.69	0.009	6.8
50	10.2	0.051	615	4.51	0.023	30.7	2.59	0.013	10.4
100	14.2	0.071	853	6.28	0.032	43.0	3.61	0.018	14.5

\*) The activity concentration of Po-218 is always less than the one of Rn-222