MYRIAM
RADIOACTIVITY IN AIR MONITOR

Technical Data

Power Supply	Internal batteries for approx. 24 hours operation, recharge time approx. 1 hour
Operation	1 Button (with lock function) Display (3 x 12 characters) with back-light
Alarm function	optical (red bright LED at the top of the detector head) acoustical (sounder 85 dB at 2,3 kHz)
Dimensions/Weight	138 mm x 57 mm x 32 mm / 300g
Interface	Infrared (reader unit for PC, connection via USB)
Memory	240 Data records and Alpha spectrum
Integration Interval	1 ... 255 Minutes (one Minute steps)
Detector	150 mm² ion-implanted silicon detector
Pump	0.25 L/min membrane type
Filter	0.8 µm PTFE, operable > 1 Month at „normal“ dust exposure
Alpha Spectroscopy	2.8 ... 10 MeV
Energy Window for LLRD Alpha radiation	2.8 ... 5.5 MeV
Lower Beta Cut Off	200 keV
Maximum count rate	100 000 counts per Minute
Detection Limits/Thresholds	refer following text
Software	Instrument set-up, data download, graphic display of acquired data (exposure, dose, concentration), ASCII Export (EXCEL compatible text file)

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Detection thresholds and detection limits

The stated detection thresholds and detection limits are based on exposures meaning the product of activity concentration an exposure times. All values are related to a confidence interval of 3σ.
For the correction of the Radon daughters an Equilibrium Factor F of 1.0 is assumed which is the worst case condition.
The limits are given for the most radio-toxic nuclides Pu-239 and Sr-90 (without Y-90). The dose coefficients (e50) of those nuclides are derived from the ICRP68 standard for inhalation (4,7E-5 Sv/Bq (Pu-239) and 1,5E-7 Sv/Bq (Sr-90)).
We assume the breathing rate for adults defined by the EURATOM guidelines.
To calculate the detection limit/Threshold for other nuclides, following expression may be used:

H = e(50) * Breathing Rate * Exposure.

Independent on the set integration interval, a one Minute basic interval is applied to analyse the filter with respect to dangerous exposures:

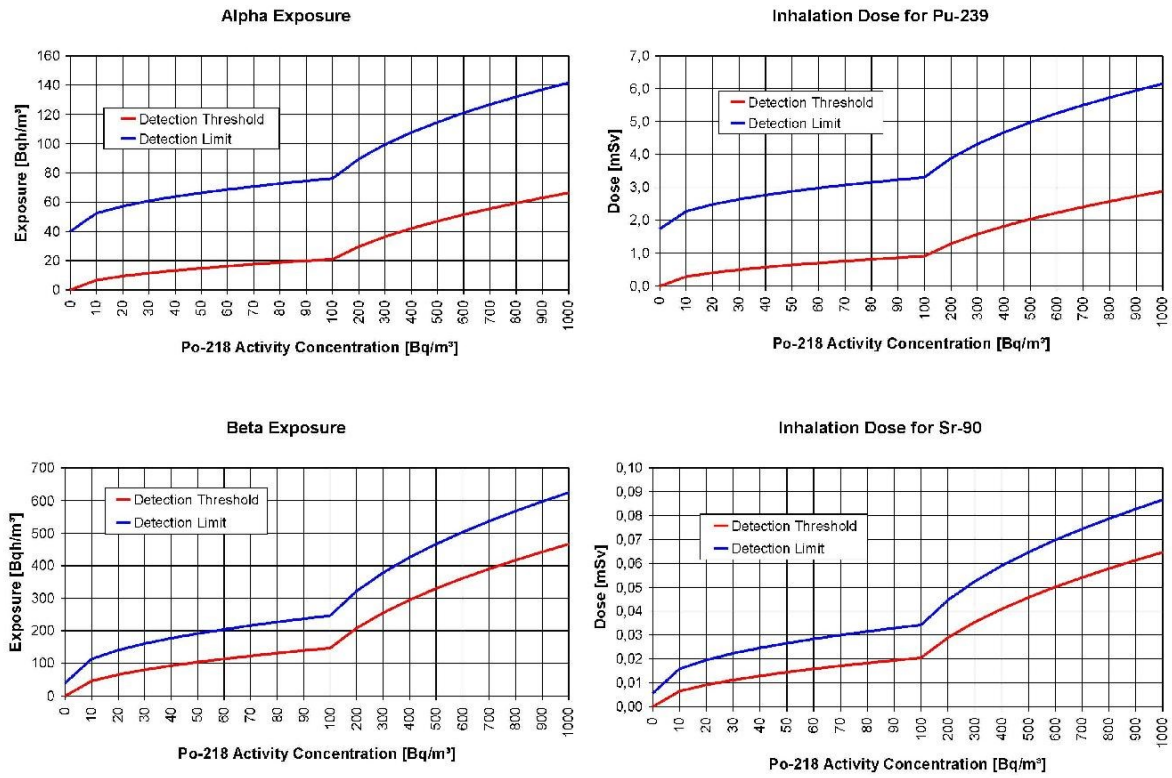

Fig. 1 Detection Limit/Threshold (3σ) for T_i = 1 min

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Choosing an integration interval of one hour causes strongly reduced detection limits and gives still a good possibility for a chronological (and therefor also local) assignment of dose contributions.
The immediate alert function (1-Minute basic interval) is not affected by any setting of the integration interval. The resulting Limits for a 60 Minutes integration interval are stated below:

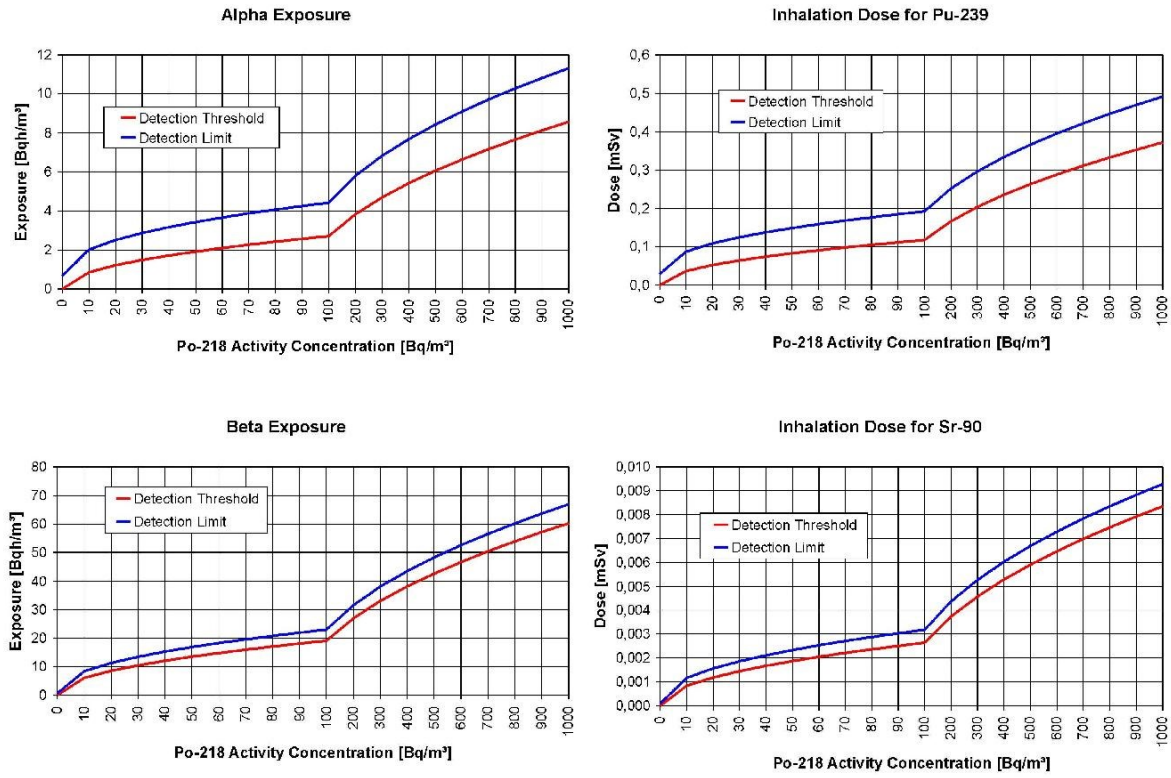

Fig. 2 Detection Limit/Threshold (3σ) for T_i = 60 min

After finishing the observation period (e.g. one month), the inhalation dose for the whole period can be determined by using the filter analysis mode. Because the pump remains switched off, the influence of Radon daughters is negligible and the collected activity is stable over the analysis period.

Channel	ALPHA		BETA	
Analysis Period	Exposure [Bqh/m³]	Dose (Pu-239) [mSv]	Exposure [Bqh/m³]	Dose (Sr-90) [mSv]
8 hours	0,083	0,0036	0,083	0,000012
12 hours	0,056	0,0024	0,056	0,000008
24 hours	0,028	0,0012	0,028	0,000004

Tab. 1 Detection Limits (3σ) for filter analysis mode

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