



Primary standards for measurement of ^{222}Rn activity concentration

EMPIR 19ENV01 traceRadon

This project 19ENV01 traceRadon has received funding from the EMPIR programme co-financed by the Participating States and from the European Union's Horizon 2020 research and innovation programme. 19ENV01 traceRadon denotes the EMPIR project reference.

T.J. Ballé

traceRadon – Scientific Workshop



The traceRadon project



Provide traceability to the SI system in the range of $1 \text{ Bq}\cdot\text{m}^{-3}$ – $100 \text{ Bq}\cdot\text{m}^{-3}$



☺ Measurement range

☹ Traceability to the SI system

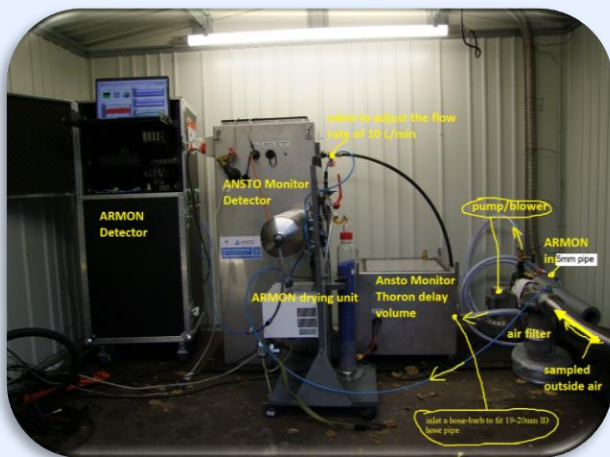


The traceRadon project



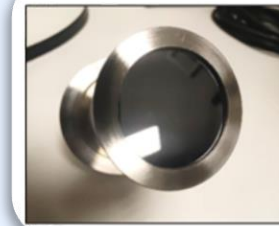
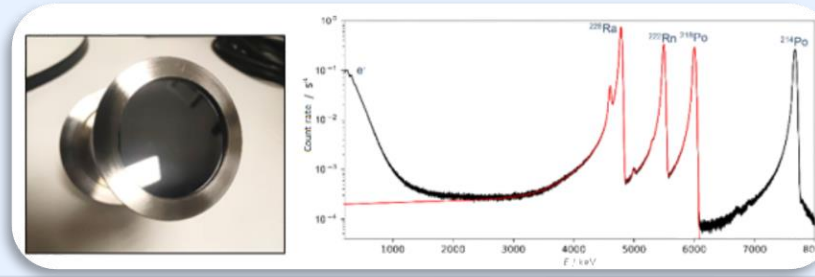
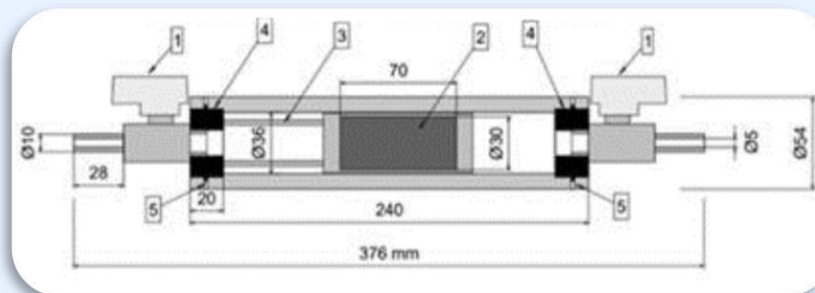
Milestone

Develop calibration method for traceable calibration in the range of $1 \text{ Bq}\cdot\text{m}^{-3} - 100 \text{ Bq}\cdot\text{m}^{-3}$.



Method

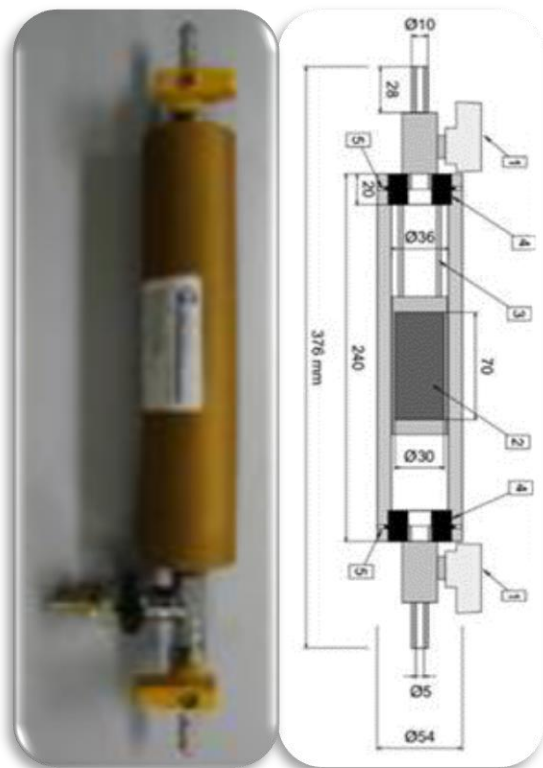
Create atmosphere with defined ^{222}Rn activity concentration



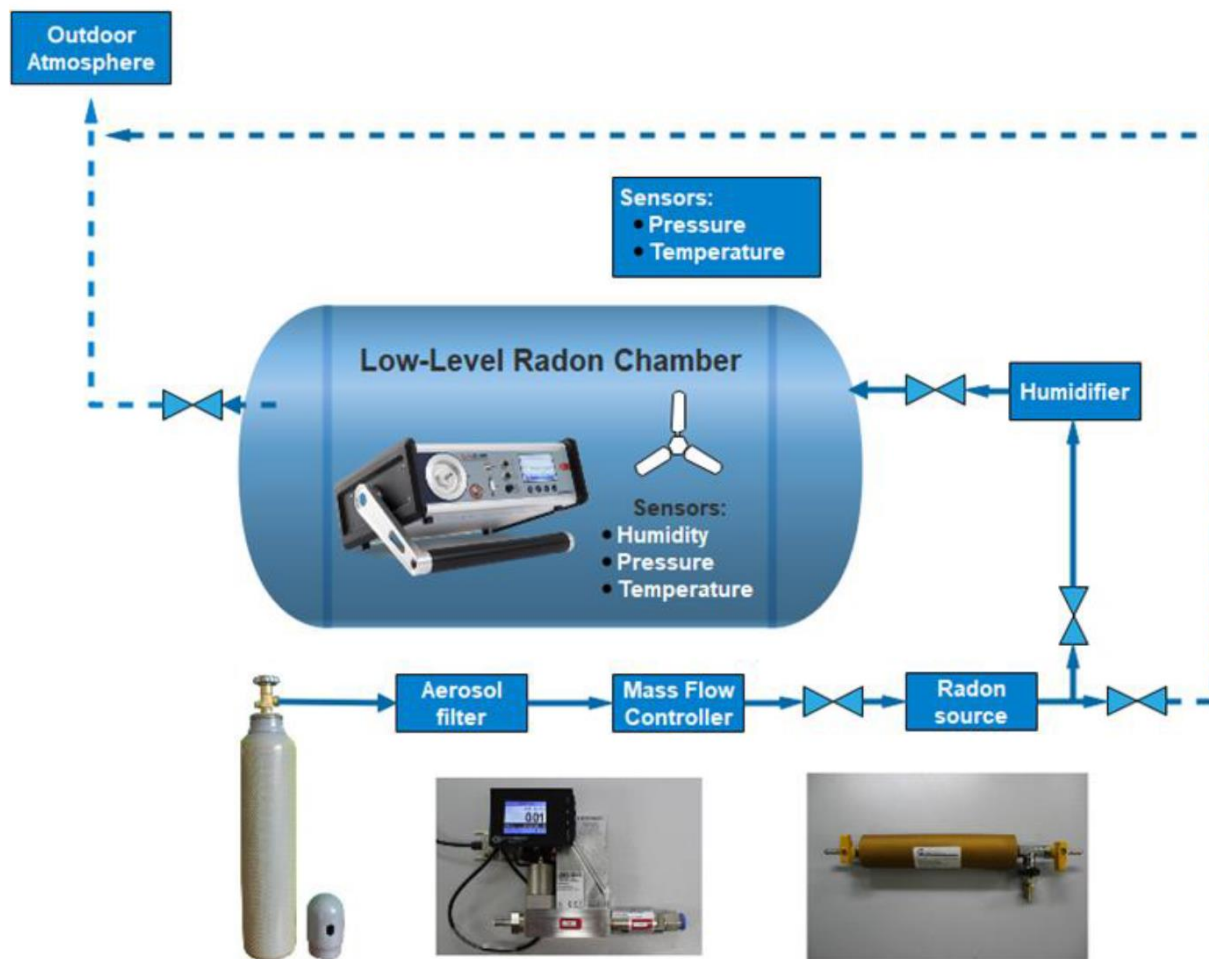
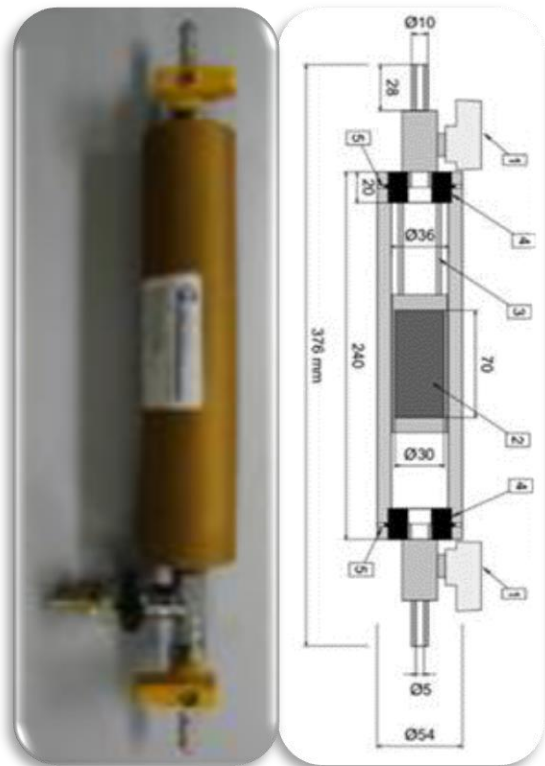
Meas. Sci. Technol. **32** (2021) 124008, *Int. J. Environ. Res. Public Health* **2020**, *17*, 1904



CMI-source



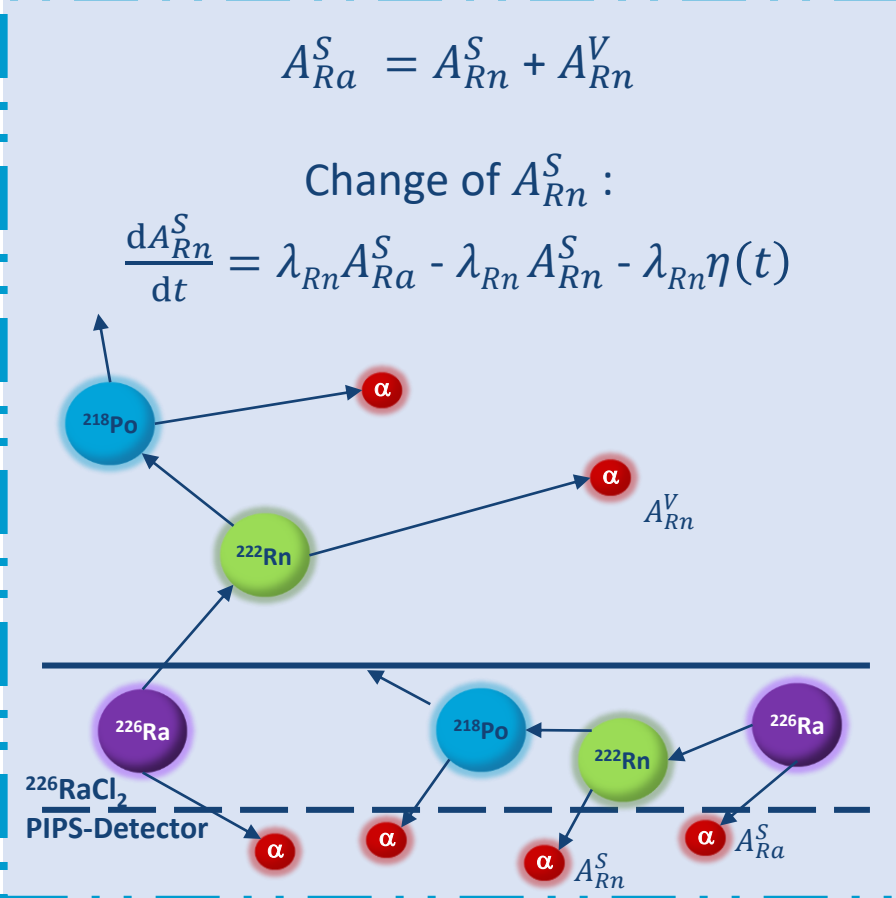
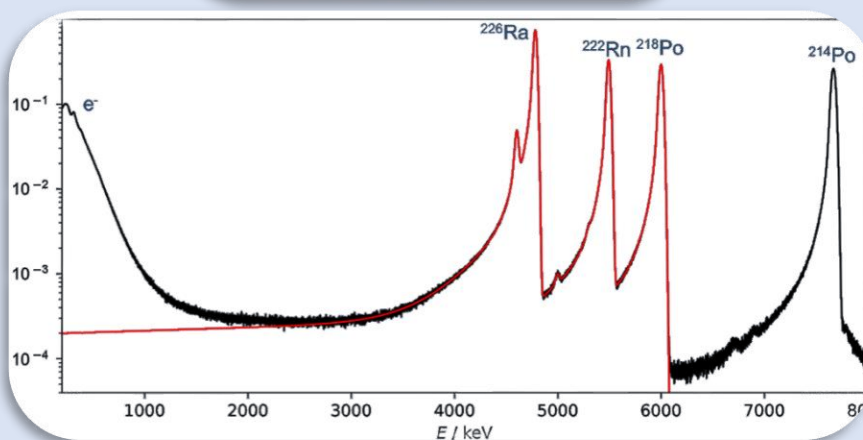
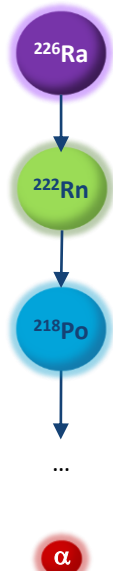
CMI-source



Int. J. Environ. Res. Public Health **2020**, *17*, 1904



Integrated Radon Source Detector system (IRSD)



Meas. Sci. Technol. **32** (2021) 124008

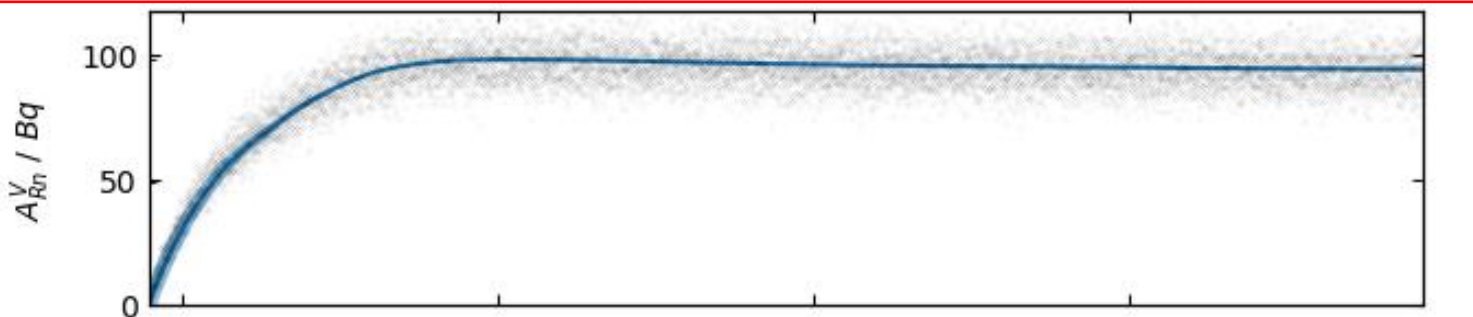
Further details: Int. J. Environ. Res. Public Health **19** (2022) 840



Integrated Radon Source Detector system (IRSD)



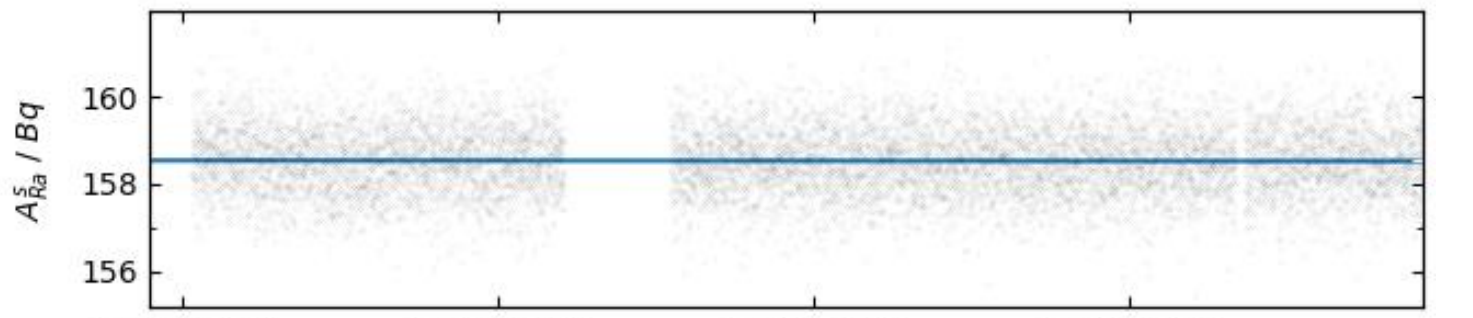
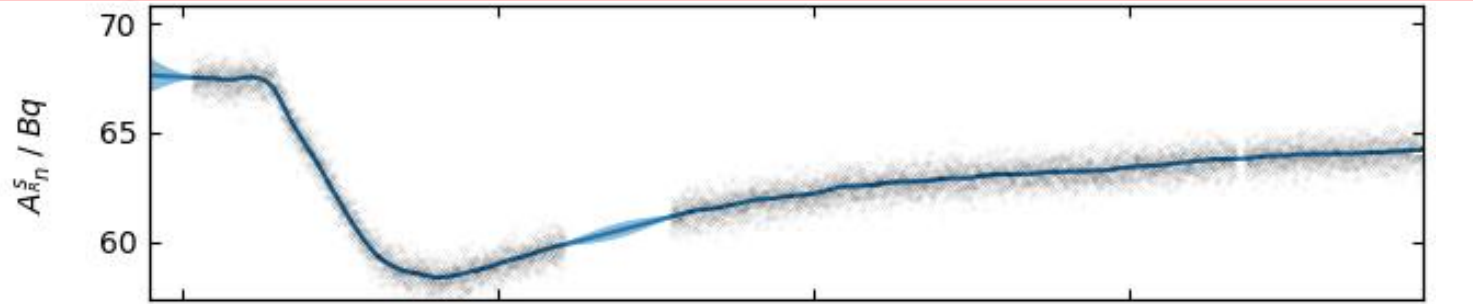
Measured by Reference Instrument



Blue:
calculated

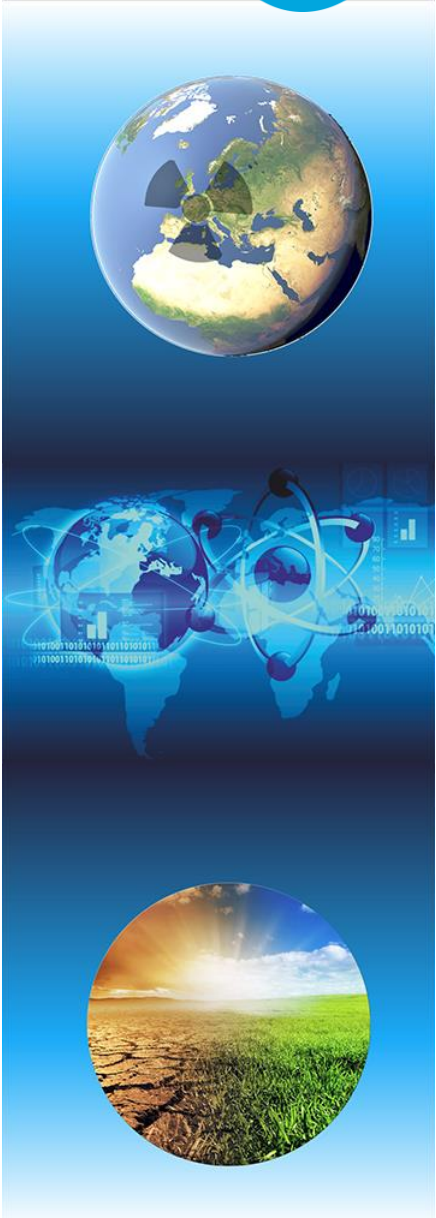
Gray:
measured

Measured by IRSD



2020-12-10 2020-12-31 2021-01-21 2021-02-11

t / date



Results



	CMI source		PTB IRSD system		k_{IRSD}/k_{CMI}
	k_{CMI}	C (Bq·m ⁻³)	k_{IRSD}	C (Bq·m ⁻³)	
RRI #1	1.056 ± 0.019	21547	1.019 ± 0.015	1925	0.965
RRI #2	1.022 ± 0.017	1605	0.981 ± 0.015	56.3	0.960

RRI: Radon Reference Instrument

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Thank you for your attention!



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Now Dinner at “Vielharmonie”

18:13 Bus 461 to “Europaplatz”



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