

# Naturally occurring radioactive materials and radiation protection

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LLM 500 mab beta-/gamma-detector



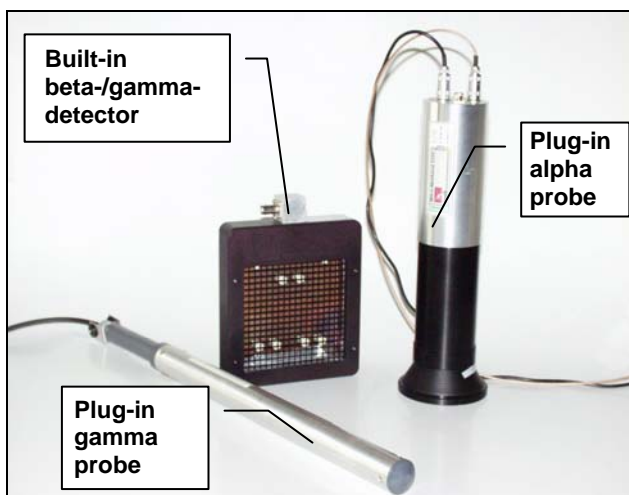
## 1. The new legal situation and Basic Safety Standards

- In the new Euratom Basic Safety Standards and national legislation radiation protection is extended from substances and practices to materials and work activities.
- Practices mean mining, processing, use etc of natural radionuclides in view of their radioactive properties.
- Work activities mean mining, processing, use etc where a natural radiation source is present with a significant increase in the exposure of workers or members of the public but where natural radionuclides are not or have not been processed in view of their radioactive, fissile, or fertile properties.

## 2. Radioactive materials to be monitored at work places

The most significant industries within the EU with work activities based on radiological risk are:

- the phosphate industry,
- zircon sands and refractory materials,
- manufacture of rare earths,
- the titanium dioxide pigment industry,
- oil and gas extraction,
- manufacture and use of thorium compounds,
- processing of metal ores.



Zircon sand,  
ca. 20 mg dust,  
90 cpm alpha

Dried mud from Radon  
water tank, 0,1 g, 78 cpm  
beta-/gamma



Prepared samples

Zircon "Schlichte",  
ca. 20 mg dust,  
36 cpm alpha

## 3. Practical solution with an all-around instrument

- Monitoring radioactivity of sands, powders, dusts etc with the LLM 500 mab beta-/gamma- detector with options for a plug-in alpha or gamma probe is simple, fast, sensitive, reliable and convincing.
- All samples are prepared easily within minutes.
- Results are given on display and printed within minutes.
- The instrument is very educational and trains workers to avoid contamination and radiation exposure.
- Hence you save money by eliminating unsafe work activities and ensure adherence to RP ordinances.

## 4. Results in counts per second per gram [cps/g]

phosphate (Tunesia)	0,3	Hundsühl soil	13
blue concrete (Sweden)	0,6	gold wash sand (Bavaria)	15
welding	1,0	slag from smelter	20
phosphate (Israel)	1,3	uranium glaze	30
uranium glass	3,0	heavy mineral sand (India)	33
zircon foundry sand (South Africa)	3,4	scale from oil/gas pipe	72
baddeleyit (South Africa)	3,9	gas mantle	115
dump of U ore leaching (Saxony)	5,2	monazite (Australia)	120
plaster (Jachymov)	6,0	uranylacetate	1780
yellow crust	7,0	U ore concentrate	1800
uranium ore (Canada)	11	torbernite	3100