

A one time investment  
with unique advantages

## Lutetium Test Adapter [110 cm<sup>2</sup>]

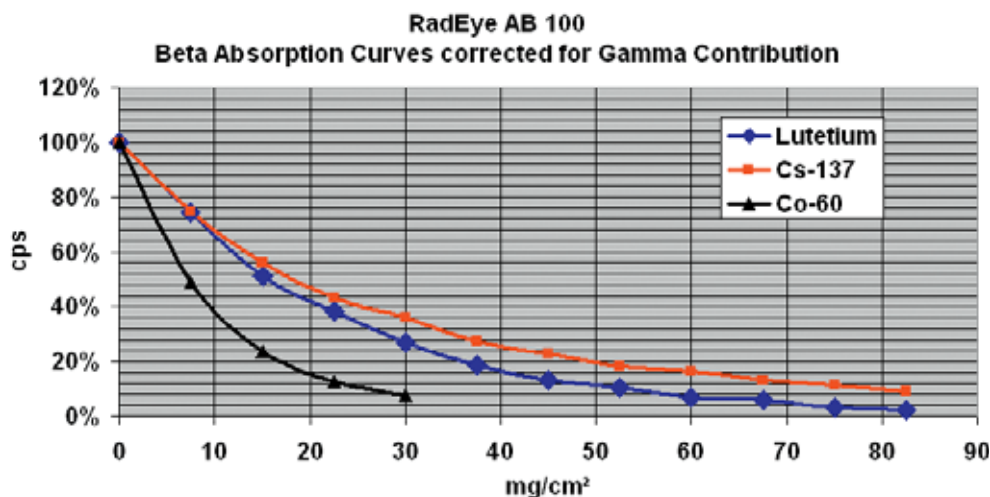
for large area beta contamination probes

- Inherently homogeneous surface emission rate
- Emission rate 0.8 beta particles per cm<sup>2</sup>·s  
– perfect for training and calibration
- Same emission spectrum for every test adapter
- Same emission rate for every test adapter
- No half life correction required
- Robust –  
scratch proof high density ceramic surface
- Natural Lu<sub>2</sub>O<sub>3</sub> (< 50 Bq/g Lu-176)
- Affordable and traceable
- 110 cm<sup>2</sup> = exceeding detector area

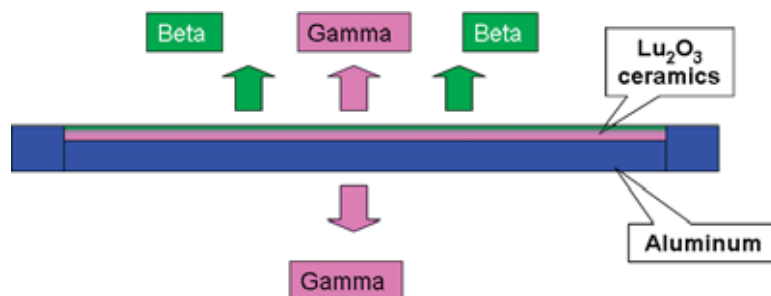


**Conventional test sources** for beta contamination monitors suffer from a number of inherent problems: Every source is an individual and unique item regarding activity and surface emission rate. Sources from different manufacturers may have different spectra from the emitted particles depending on the production process. Furthermore large area test sources may have variations of the emission rate over the different sections of the surface and in many cases the user needs to correct for the decay of the radioisotope. The thin active surface is always a delicate part of the source.

**Lutetium test adapters** contain the isotope Lu-176 with 3.8E10 years half-life and a natural abundance of 2.6 %, which yields a specific activity of approximately 50 Bq/g of the pure element Lutetium. The unique feature of using a chemically pure bulk substance containing the radioisotope in its natural abundance results in a totally constant and homogeneous surface emission rate. Each and every source of the same surface area has the same beta emission rate, regardless of small variances in the thickness of the Lutetium-oxide ceramics. Furthermore, due to their natural origin and low specific activity, in respect to many national regulations these adapters are not considered as radioactive material. These new test adapters can contribute to a reduction of calibration cost and instrument downtime, as well as to an increased user confidence and familiarity with "his" or "her" instrument.



Absorption measurements show that the beta emission spectrum is right between Cs-137 and Co-60. The calculated effective maximum beta energy of the thick  $\text{Lu}_2\text{O}_3$  layer is approximately 480 keV.



Beta max. energy:\*

Energy	188 keV	589 keV
Emission	0.9 %	99.1 %

**The actual beta and conversion electron spectrum is broadened and shifted to lower energies due to energy loss in the  $\text{Lu}_2\text{O}_3$  bulk material.**

Conversion electrons (> 50 keV, > 1 %):\*

Energy	77 keV	86 keV	136 keV	191 keV	199 keV	242 keV	296 keV
Emission	46 %	11 %	14 %	7.5 %	1.8 %	4.8 %	1.6 %

X-ray and Gamma lines:\*

Energy	8 keV	54 keV	55 keV	63 keV	88 keV	202 keV	307 keV	401 keV
Emission	23 %	9.4 %	16.5 %	6.9 %	13 %	84 %	93 %	0.8 %

Technical data:

Weight	200 g total, thereof 80 g $\text{Lu}_2\text{O}_3$
Size	12 cm x 20 cm x 0.5 cm total 7.4 cm x 14.8 cm $\text{Lu}_2\text{O}_3$ surface

\* Nuclides 2000: An Electronic Chart of the Nuclides, Version 1.00 European Communities, 1999.

**The Lutetium Test Adapter [110 cm²] is also suitable for the following probes:  
FHZ 382, FHZ 380 SVG2, HP 380 AB, HP 380 B, DP6, BP19**

**Other dimensions on request!**

Test adapter for pan cake probes # **425068571**:  
Acrylic glass housing: 50 mm diameter, 3 mm height.  
 $\text{Lu}_2\text{O}_3$  ceramics inlet: 40 mm diameter, 1 mm height.



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