

Certificate of calibration of gamma reference sources

R 2379

Nuclide	²⁴¹ Am	¹³³ Ba	¹³⁷ Cs	⁶⁰ Co	⁸⁸ Y	²² Na	⁵⁴ Mn	²⁰³ Hg	⁵⁷ Co
Colour Code	Red	White	Yellow	Light Green	Black	Cream	Blue	Pink	Dark Green
Source No.	2Q352	2R192	2S577	2U501	2Y795	2X447	2V532	2W759	3T527
Activity, μ Ci	10.76	11.08	11.38	11.87	11.24	10.83	10.23	24.33	11.41
Accuracy %	5.0	4.8	3.7	1.9	5.0	3.7	3.7	3.0	4.4

Set No 2263

Activity reference time 1200 GMT on 1 June 1989

Definitions of the terms used in this certificate and further details of the sources are given in the data sheet provided with each set or replacement source.

This product meets the quality assurance requirements of NRC Regulatory Guide 4.15 for achieving implicit NBS traceability as defined in NCRP58 (1985).



Approved
Signatory

W. F. Case

W.F. Case

Amersham

Amersham International plc Amersham UK

Page 1 of 2



CALIBRATION
No. 0146

Certificate of calibration of gamma emitting radioactive reference source

T 17618

Description Principal radionuclide: Europium-152 Product code: EFR.151
Source number: 1D428

Measurement Reference time: 1200 GMT on 1 February 1989
Total activity of europium-152: 11.40 microcuries
which is equivalent to: 422 kilobecquerels
Recommended half life: 13.3 years
Method of measurement:
The source was measured using equipment calibrated directly or indirectly with similar sources prepared from a series of absolutely standardized solutions.

Accuracy The OVERALL UNCERTAINTY in the activity quoted above for the principal radionuclide was $\pm 8.7 \%$

The limits of uncertainty were taken as the arithmetic sum of the uncertainty due to random variations, calculated at the 99.7% confidence level, and the estimated systematic uncertainties in the measurement.

Radionuclidic Purity The estimated activities of any radioactive impurities found by high resolution gamma spectrometry are listed below expressed as percentages of the principal radionuclide at the reference time.

Europium-154 1.43 %

Remarks Tests for leakage and surface contamination have been carried out with satisfactory results.

Further information about this source including details of its construction is given in the data sheet accompanying the source.

The activity content of the source was based on the assumption that europium-152 emits 1.408 MeV gamma radiation in 20.6% of disintegrations.
No allowance was made for uncertainty in this assumption when assessing the accuracy of the measurement.

This product meets the quality assurance requirements of NRC Regulatory Guide 4.15 for achieving implicit NBS traceability as defined in NCRP 58 (1985).

Approved
Signatory

W. F. Case

W.F. Case

Page 1 of 1

Amersham