

# ALPHA SPECTROMETRY SOURCES

This section contains detailed information about unsealed alpha emitting radiation sources. A radionuclide selection chart and plots of the alpha spectra are shown to help you to choose the right nuclide for your application.



## 4. Alpha spectrometry sources

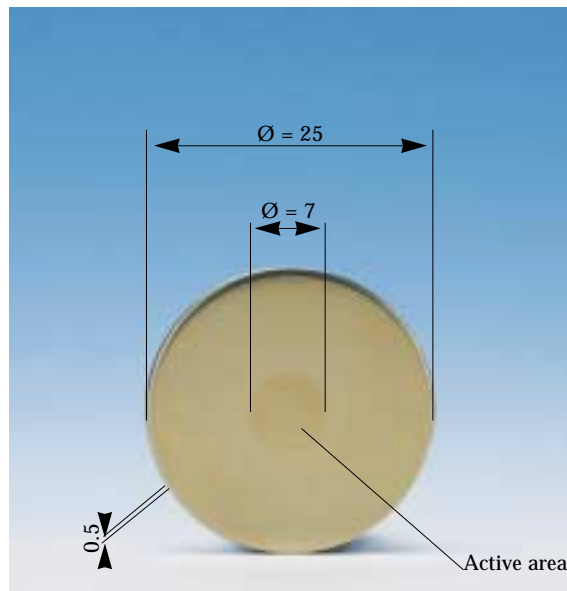
### 4.1 General information

#### Applications

Alpha spectrometry sources are intended for calibrating and checking solid state alpha spectrometers, for applications in environmental monitoring and research.

The advantages of these sources are:

- Narrow line widths (normally less than 20keV) - easy, accurate, calibration of spectrometer
- Wipe test results comparable to sealed sources - low risk of contaminating equipment



#### Construction

The radionuclides are deposited onto a stainless steel disc, 25mm in diameter, 0.5mm thick (drawing: VZ-1679). The reagents used are ultra-pure, resulting in an essentially massless deposit. This process minimises line broadening and produces sources exhibiting line widths of less than 20keV full width half maximum (sources containing Np-237 have line widths typically 50keV, due to the low specific activity of Np-237). Wipe test results comparable with sealed sources are achieved for this manufacturing process. However, any material placed over the active deposit will degrade the spectrum, so it is not possible to construct a source that can be classified as a sealed source as defined in ISO2919.

#### Certification

Calibrated single nuclide sources are supplied with a DKD certificate stating alpha particle emission rate and activity.  
Triple nuclide sources are designed for energy calibration applications.

#### Uncertainties

The reported uncertainty is based on a standard uncertainty multiplied by a coverage factor  $k=2$ , providing a level of confidence of approximately 95% (see section 9.2).

The expanded uncertainty of the emission rate for a calibrated single nuclide source is  $\leq 3\%$ .

## 4.1 General Information

**Traceability**

The sources are traceable to standards held by national laboratories such as the Physikalisch-Technische Bundesanstalt (Germany), the National Physical Laboratory (UK), the National Institute of Standards and Technology (USA) the Laboratoire Primaire des Rayonnements Ionisants (France), and many other national laboratories world-wide. Further details are given in section 9.1.

**Quality assurance**

The sources are calibrated at AEA Technology QSA's DKD accredited measurement laboratory in Germany. The manufacturing facility operates a quality management system which has been independently audited and approved to ISO9001:1994.

To help select the source needed, the energies and intensities of the most intense alpha particles emitted by the different nuclides are shown in the table.

**Recommendations on source handling**

To maintain the accuracy of measurements, these sources must be handled with care. Sources should be handled with tweezers to avoid leaving grease on the surface of the source, which would degrade the spectrum. The sources must not be cleaned with abrasive compounds such as metal polish, as this would remove the active deposit. The sources should be kept in their storage boxes when not in use.

**Tolerances**

The maximum deviation of the measured activity at the reference time from the nominal value is +/-30%.

**Availability**

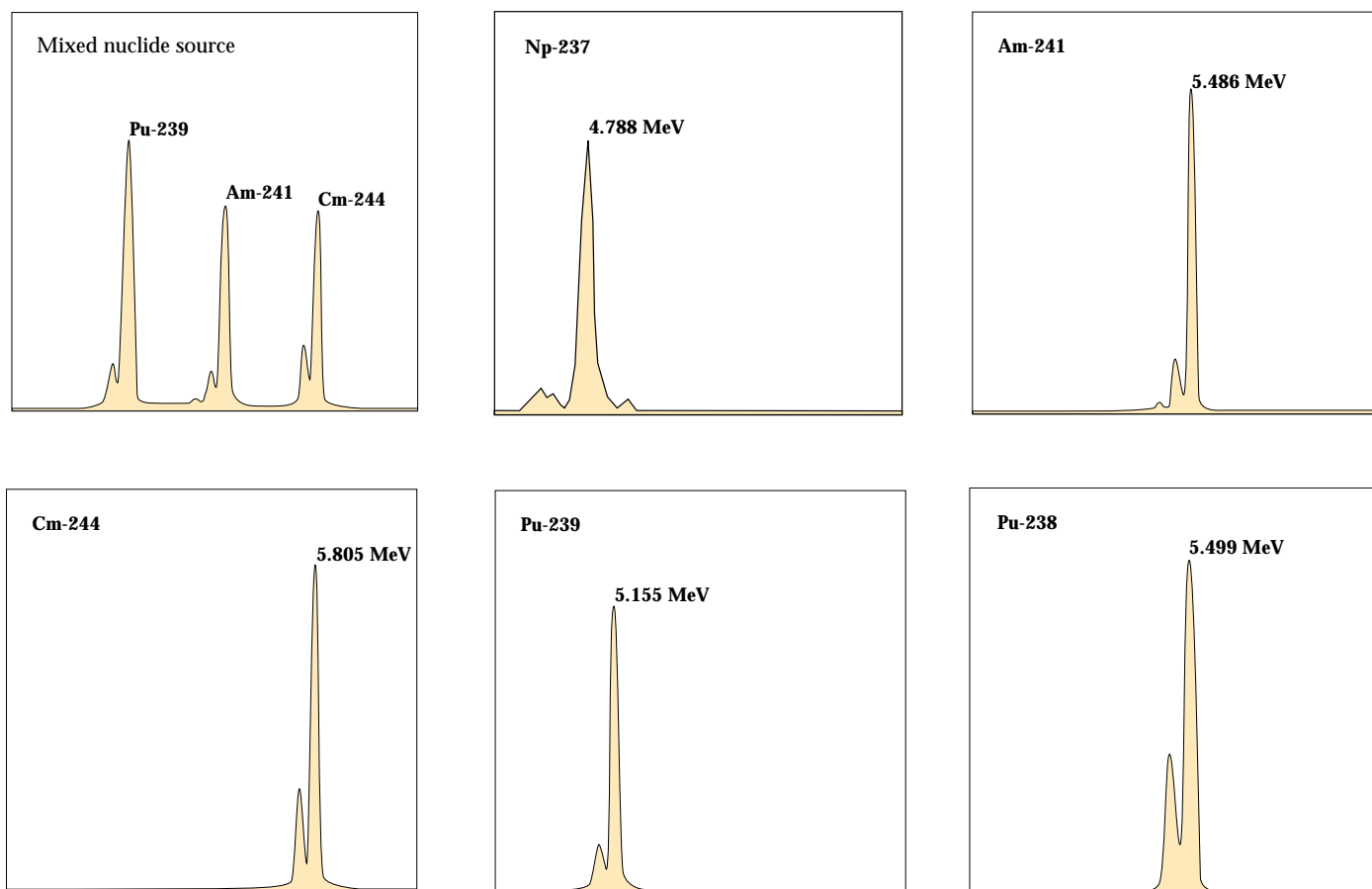
The sources are normally delivered within 4-6 weeks from receipt of order.

**Selection chart**

Radionuclide	Alpha particle energy [MeV]	Intensity [%]
<b>Np-237</b>	4.640	6.2
	4.766	8.0
	4.772	25.0
	4.788	47.0
<b>Pu-239</b>	5.105	11.5
	5.143	15.1
	5.155	73.4
<b>Am-241</b>	5.388	1.4
	5.443	12.8
	5.486	85.2
<b>Pu-238</b>	5.456	28.3
	5.499	71.6
<b>Cm-244</b>	5.763	23.3
	5.805	76.7

## 4. Alpha spectrometry sources

### 4.2 Reference sources



### Ordering information

Radionuclide	Nominal activity	Energy of most intense alpha particle [MeV]	Product code uncalibrated <sup>1)</sup>	Product code calibrated <sup>2)</sup>
<b>Am-241</b>	50 Bq	5.486	AMR11	AMR21
<b>Am-241</b>	500 Bq	5.486	AMR12	AMR22
<b>Am-241</b>	5000 Bq	5.486	AMR13	AMR23
<b>Am-241</b>	40000 Bq	5.486	AMR14	not available
<b>Pu-238</b>	1000 Bq	5.499	PPRB2505	PPRB2497
<b>Pu-239</b>	1000 Bq	5.155	PIRB2506	PIRB2498
<b>Cm-244</b>	1000 Bq	5.805	CLRB2507	CLRB2499
mixed nuclide				
<b>Pu-239</b>	1000 Bq	5.155	QCRB2508	QCRB2500 <sup>3)</sup>
<b>Am-241</b>	1000 Bq	5.486		
<b>Cm-244</b>	1000 Bq	5.805		
mixed nuclide				
<b>Np-237</b>	150 Bq	4.788	QCRB4020	QCRB4021 <sup>3)</sup>
<b>Am-241</b>	100 Bq	5.486		
<b>Cm-244</b>	100 Bq	5.805		

1) For energy calibration only - no certificate of calibration is included

2) For energy and efficiency calibration - certificate of calibration included

3) The certificate of calibration states the total  $\alpha$  emission rate and the nominal activities of individual radionuclides

### 4.3 Custom preparation service

If the alpha spectrometry source required is not shown in this catalogue, HTSL will try to assist you.

Please photocopy the form on the next page, fill in the details as far as possible, and fax the form to HTSL.

Alternatively, contact us by Email on:

**[duncan@hightechsource.co.uk](mailto:duncan@hightechsource.co.uk)**

or visit our WWW site at:

**<http://www.hightechsource.co.uk>**

Request for custom alpha spectrometry source

# FAX- BACK FORM

To: +44 (0) 1235 514219

From: Name: \_\_\_\_\_

Institute/company \_\_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Country: \_\_\_\_\_

Tel: \_\_\_\_\_

Fax: \_\_\_\_\_

Email: \_\_\_\_\_

Date: \_\_\_\_\_

Nuclide(s) required : \_\_\_\_\_

Activity: \_\_\_\_\_

Dimensions of backing plate: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Any special requirement: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Date required by: \_\_\_\_\_

Our technical experts may be able to recommend an alternative source. If you wish, please tell us your application:

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