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# Radioactive source test report

| product code | description | nominal activity | customer |
|---|---|---|---|
| AMN 16 | AMERICIUM-241/BERYLLIUM NEUTRON SOURCE | 1 1.11 GIGABQ, 30 MILLICURIE | AMERSHAM CORPORATION 2636 SOUTH CLEARBROOK DRIVE ARLINGTON HEIGHTS ILLINOIS 60005 U S A |
| AI item no. RD9572 | SEALED SOURCE | | |

| BSI/ISO classification * | special form certificate no. | recommended working life | | customer's order no. |
|---|---|---|---|---|
| E66544 | 8 | 15 YEARS | 906 1 | 311705 01 AC NUCLEAR RESEARCH CORP |

| serial number | measurement check NEUTRONS PER SECOND X 10 TO POWER 4 | measurement check date | leakage test date passed | leakage test date passed | contamination test date passed |
|---|---|---|---|---|---|
| 9942NE | 6.3 | 17 MAY 89 | D 16 MAY 89 | L 17 MAY 89 | A 17 MAY 89 |

notes

signed Paul Mellor
K.A. Shipp

date 31 MAY 89

* this classification complies with BS.5288:1976, which is in agreement with ISO.2919 (see overleaf for definition and description of tests)

# Americium-241/Beryllium

## Neutron Sources

### Source Emission Data

| | |
|---|---|
| Neutron emission: | ~2.2 x $10^6$n/sec per Ci<br>~6 x $10^7$n/sec per TBq |
| γ-exposure rate: | ~2.5mR/hr at 1m per Ci<br>~Air kerma rate at 1m of 22μGy/h per Ci |
| Neutron dose rate | 2.2 mrem/h at 1m per Ci<br>22μSv/h at 1m per Ci |

Note
(α-n) beryllium neutron sources also emit a significant number of low energy neutrons.
(~23% below 1MeV with mean energy 400keV)

**Cylinder sources**
Compacted mixture of americium oxide with beryllium metal, doubly encapsulated in welded stainless steel.

| Nominal content activity GBq | mCi | Emission* n/sec | Capsule type | Code |
|---|---|---|---|---|
| 37 | 1 | 2.2 x $10^3$ | X.2 | AMN.11 |
| 111 | 3 | 6.6 x $10^3$ | X.2 | AMN.13 |
| 370 | 10 | 22 x $10^3$ | X.2 | AMN.15 |
| 1110 | 30 | 66 x $10^3$ | X.2 | AMN.16 |
| 1110 | 30 | 66 x $10^3$ | X.21 | AMN.168 |
| 3700 | 100 | 220 x $10^3$ | X.2 | AMN.17 |
| 11100 | 300 | 660 x $10^3$ | X.2 | AMN.18 |

*Tolerance ±10%

**Recommended working life:** 15 years

**Quality control**
Wipe test A
Bubble test D
Immersion test L

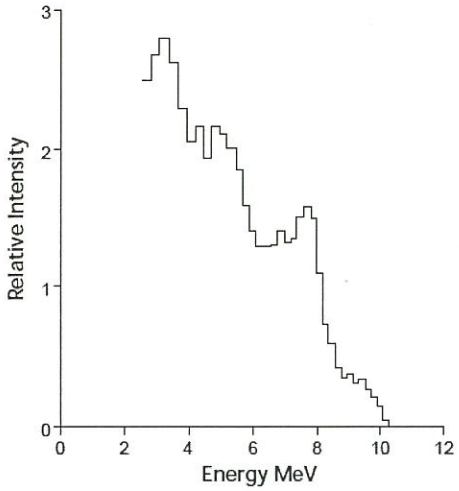
Neutron emission measured against standards using $BF_3$/wax moderator system.
The test report includes a statement of the neutron emission.

**Calibration for Am-241/Be neutron sources**
Special calibrations of neutron emissions can be made on these sources and certificates issued by the National Physical Laboratory, Teddington, England.

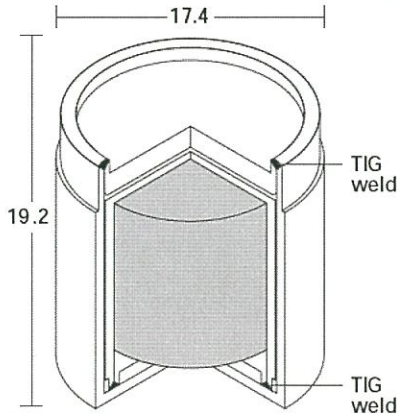
### Neutron spectrum

Source made and measured at AEA Technology using a stilbene crystal and pulse shape discrimination.

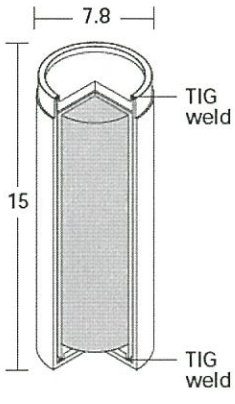
Spectrum reproduced by courtesy of: LORCH, E.A.
*Int J.Appl. Radiat. Isotopes*, 24, 590, 1973.




**X.2**




**X.21**




### Safety performance testing

| Capsule | ANSI/ISO classification | IAEA IDNS model no. | Model no. |
|---|---|---|---|
| X.2 | E.66646 | GB/8/S-85 | AMN.PE1 |
| X.21 | C.65545 | GB/43/S-85 | AMN.PE5 |



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