#43

025696
D-K-15203-01-00
2013-02

Gamma Reference Source

Source no.	UW 878
Drawing	VZ-1159-001
Dimensions of active surface	Ø 10 mm
Overall dimensions	Ø 54 mm x 3 mm
Construction	The radionuclidic mixture is homogeneoulsy distributed onto the active area of the plastic foil. The activated foil is covered on both sides with a paper label and a plastic foil.

Nuclide	Gamma-ray energy [MeV]	Activity [Bq]	Emission rate [s^{-1}]
Americium-241	0.060	3.45E03	1.24E03
Cadmium-109	0.088	1.58E04	5.75E02
Cobalt-57	0.122	5.89E02	5.05E02
Cerium-139	0.166	6.87E02	5.49E02
Mercury-203	0.279	1.34E03	1.09E03
Tin-113	0.392	2.41E03	1.56E03
Strontium-85	0.514	2.88E03	2.83E03
Caesium-137	0.662	2.72E03	2.31E03
Yttrium-88	0.898	5.31E03	4.99E03
Cobalt-60	1.173	3.21E03	3.20E03
Cobalt-60	1.333	3.21E03	3.21E03
Yttrium-88	1.836	5.31E03	5.28E03

Reference date	1 January 2013 at 12:00 UTC
Leakage and contamination test	Wipe test according to ISO 9978.
Wipe test passed on	5 February 2013
Measuring method	The activity was measured with a gamma spectrometer system consisting of a calibrated high purity germanium detector and a multi-channel analyser.
Traceability	Additional to the direct traceability to the PTB through the DAkkS this product complies with the requirements for traceability to NIST specified in the American National Standard "Traceability of Radioactive Sources to the NIST and Associated Instrument Quality Control (ANSI N42.22-1995)". As a requirement of the ANSI N42.22-1995 Eckert & Ziegler Nuclitec GmbH participates in the NRMAP/NIST Measurements Assurance Program of the Nuclear Power Industry.
Uncertainty	The relative uncertainty of the activity is 3 % (Cd-109: 5 %). The reported uncertainty, determined according to the DAkkS-DKD-3 report is based on the standard uncertainty multiplied by a coverage factor of k = 2, providing a level of confidence of 95 %. (Ref. NIST Technical Note 1297/"Guide to the Expression of Uncertainty in Measurement" ISO Guide, 1995)
Radioactive impurities	At the time of calibration the following radioactive impurities were detected: Rb-84<3 Bq; Ag-110m<1 Bq; Cs-134<3 Bq
Quality assurance system	The quality assurance system of Eckert & Ziegler Nuclitec GmbH was certified by Lloyd's Register Quality Assurance (LRQA) according to ISO 9001, issue 2008. Isotrak products meet the requirements of 10CFR50 Appendix B in the USA.