

Deutsche Akkreditierungsstelle GmbH

Annex to the Accreditation Certificate D-K-19023-01-00  
according to DIN EN ISO/IEC 17025:2018

Period of validity: 29.10.2019 to 28.10.2024

Date of issue: 29.10.2019

Holder of certificate:

**Eckert & Ziegler Analytics, Inc.**  
**1380 Seaboard Industrial Blvd., ATLANTA, GA 30318, USA**

Calibration in the fields:

**High Frequency and radiation quantities**  
**Ionising radiation and radioactivity**  
– **Radioactivity**

Abbreviations used: see last page

**Annex to the accreditation certificate D-K-19023-01-00**

**Permanent Laboratory**

Calibration and Measurement Capabilities (CMC)				
Measurement quantity / Calibration item	Range <sup>2)</sup>	Measurement conditions / procedure	Expanded uncertainty of measurement <sup>1)</sup>	Remarks
Activity	370 Bq to 370 kBq	Gamma-ray emitting mixtures with photon energies from 30 keV to 2,000 keV Gamma-ray Spectrometry	1.6 %	
	370 Bq to 370 kBq	Single gamma-ray emitting nuclides with photon energies from 30 keV to 2,000 keV Gamma-ray Spectrometry	2.0 %	
	370 kBq to 3.7 GBq	Single gamma-ray emitting nuclides with photon energies from 30 keV to 250 keV Reentrant Pressurized Ionization Chamber	1.8 %	
	100 kBq to 3.7 GBq	Single gamma-ray emitting nuclides with photon energies from 250 keV to 2,000 keV Reentrant Pressurized Ionization Chamber	1.3 %	
	3.7 kBq to 6 MBq	Single or mixed gases Gamma-ray Spectrometry	4.0 %	
	370 kBq to 3.7 GBq	Single isotope gases Reentrant Pressurized Ionization Chamber	3.0 %	
	200 Bq to 3.7 kBq	Beta emitters, maximum beta energy < 500 keV Liquid Scintillation Quench Curve, CIEMAT-NIST efficiency tracing, Packard efficiency tracing	2.5 %	
	100 Bq to 3.7 kBq	Beta emitters, maximum beta energy > 500 keV Liquid Scintillation 4- $\pi$	2.0 %	
	20 Bq to 1 kBq	Alpha emitters Liquid Scintillation 4- $\pi$	2.0 %	
	5 Bq to 37 kBq	Alpha emitters – electrodeposited and evaporated on PET 2- $\pi$ ZnS and alpha spectroscopy	2.2 %	

- 1) The expanded uncertainties according to EA-4/02 M:2013 are part of CMC and are the best measurement uncertainties within accreditation. They have a coverage probability of approximately 95 % and have a coverage factor of  $k = 2$  unless stated otherwise. Uncertainties without unit are relative uncertainties referring to the measurement value unless stated otherwise.
- 2) Ranges are listed for direct measurement results. Gravimetric dilution utilizing analytical balances calibrated by approved ISO/IEC 17025 accredited calibration laboratory allows for sources to be certified up to 100x less/more than direct measurement result. Gravimetric transfer does not apply for gases, electrodeposited sources, and alpha emitting sources certified by elemental specific activity and mass.

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Calibration and Measurement Capabilities (CMC)				
Measurement quantity / Calibration item	Range <sup>2)</sup>	Measurement conditions / procedure	Expanded uncertainty of measurement <sup>1)</sup>	Remarks
Activity	20 Bq to 200 kBq	Alpha emitters Elemental Specific Activity and Mass	2.0 %	Natural, Enriched, and Depleted Uranium; Natural Thorium; Np-237
Specific Activity	100 Bq/g to 100 kBq/g	Gamma-ray emitting mixtures with photon energies from 30 keV to 2,000 keV Gamma-ray Spectrometry	1.6 %	
	100 Bq/g to 100 kBq/g	Single gamma-ray emitting nuclides with photon energies from 30 keV to 2,000 keV Gamma-ray Spectrometry	2.0 %	
	150 kBq/g to 1 GBq/g	Single gamma-ray emitting nuclides with photon energies from 30 keV to 250 keV Reentrant Pressurized Ionization Chamber	1.8 %	
	40 kBq/g to 1 GBq/g	Single gamma-ray emitting nuclides with photon energies from 250 keV to 2,000 keV Reentrant Pressurized Ionization Chamber	1.3 %	
	30 Bq/g to 500 kBq/g	Beta emitters, maximum beta energy < 500 keV Liquid Scintillation Quench Curve, CIEMAT-NIST efficiency tracing, Packard efficiency tracing	2.5 %	
	20 Bq/g to 500 kBq/g	Beta emitters, maximum beta energy > 500 keV Liquid Scintillation 4- $\pi$	2.0 %	
	3 Bq/g to 150 kBq/g	Alpha emitters Liquid Scintillation 4- $\pi$	2.0 %	
	3.7 Bq/g to 37 kBq/g	Alpha emitters Elemental Specific Activity and Mass	2.0 %	Natural, Enriched, and Depleted Uranium; Natural Thorium; Np-237

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- 2) Ranges are listed for direct measurement results. Gravimetric dilution utilizing analytical balances calibrated by approved ISO/IEC 17025 accredited calibration laboratory allows for sources to be certified up to 100x less/more than direct measurement result. Gravimetric transfer does not apply for gases, electrodeposited sources, and alpha emitting sources certified by elemental specific activity and mass.

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Calibration and Measurement Capabilities (CMC)				
Measurement quantity / Calibration item	Range <sup>2)</sup>	Measurement conditions / procedure	Expanded uncertainty of measurement <sup>1)</sup>	Remarks
Photon Flux	$1 \cdot 10^2 \text{ s}^{-1}$ to $1 \cdot 10^5 \text{ s}^{-1}$	Gamma-ray emitting mixtures with photon energies from 30 keV to 2,000 keV Gamma-ray Spectrometry	1.6 %	
Particle Flux	$3 \cdot 10^0 \text{ s}^{-1}$ to $2.7 \cdot 10^4 \text{ s}^{-1}$	Beta emitters – electrodeposited/ evaporated on PET 2- $\pi$ plastic scintillation counting	2.8 %	
	$3 \cdot 10^0 \text{ s}^{-1}$ to $1.8 \cdot 10^4 \text{ s}^{-1}$	Alpha emitters – electrodeposited/ evaporated on PET 2- $\pi$ ZnS and alpha spectrometry	2.2 %	

**Abbreviations used:**

CMC                      Calibration and measurement capabilities (Kalibrier- und Messmöglichkeiten)

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