

Deutsche Akkreditierungsstelle GmbH

Annex to the Accreditation Certificate D-K-15185-01 according to DIN EN ISO/IEC 17025:2018

Valid from: 18.11.2019

Date of issue: 18.11.2019

Holder of certificate:

Merck KGaA
Kalibrierlaboratorium für chemische Messgrößen
Frankfurter Straße 250, 64293 Darmstadt

Calibration in the fields:

Chemical and medical quantities

Chemical analysis and reference materials

- **pH value**
- **Electrolytic conductivity**
- **Mass fraction of elements in standard solutions**
- **Amount of substance concentration of elements in standard solutions**
- **Mass fraction of titrimetric standards**
- **Mass fraction in water and titrimetric standards**
- **Amount-of-substance concentration in volumetric solutions**

Abbreviations used: see last page

The certificate together with its annex reflects the status at the time of the date of issue. The current status of the scope of accreditation can be found in the database of accredited bodies of Deutsche Akkreditierungsstelle GmbH.
<https://www.dakks.de/en/content/accredited-bodies-dakks>

Annex to the accreditation certificate D-K-15185-01
Permanent Laboratory
Calibration and Measurement Capabilities (CMC)

Measured quantity / Calibration item	Range	Measurement conditions / procedure	Expanded uncertainty of measurement ¹⁾	Remarks
pH value pH reference substances	1 to 11	differential potentiometry Inhouse procedure according SOP 20120940, Version 2/2017	0.003	Specified are the absolute measurement uncertainties. These depend on the deployed primary reference material.
pH value pH reference buffer solutions	1 to 11	differential potentiometry Inhouse procedure according SOP 20120940, Version 2/2017	0.003	
pH value pH buffer solutions	0 to < 10	multipoint calibration by means of glass electrode Inhouse procedure according SOP 20404229, Version 1/2019	0.01	
pH value pH buffer solutions	10 to 14	multipoint calibration by means of glass electrode Inhouse procedure according SOP 20404229, Version 1/2019	0.02	
Electrolytic conductivity reference material	1 mS m ⁻¹ to < 0.1 Sm ⁻¹	conductivity measuring instrument with 4-pole cells Inhouse procedure according SOP 20120941, Version 4/2019	0.4 %	Specified are the relative measurement uncertainties. These depend on the deployed primary reference material.
	0.1 Sm ⁻¹ to 12 Sm ⁻¹		0.24 %	
Mass fraction of titrimetric standards	≥ 95.00 %	Titrimetry Inhouse procedure according SOP 20404230, Version 1/2019		Specified are the absolute measurement uncertainties. These depend on the deployed primary reference material.
Tris(hydroxymethyl)-aminomethane			0.04 %	
Sodium carbonate			0.05 %	
Potassium hydrogen phthalate			0.02 %	
Benzoic acid			0.05 %	
Sodium chloride			0.02 %	
Zinc			0.02 %	
Calcium carbonate			0.03 %	
Potassium dichromate			0.04 %	
Disodium oxalate			0.05 %	
Iron(II) ethylene diammonium sulphate			0.05 %	
Potassium iodate			0.02 %	

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.

Annex to the accreditation certificate D-K-15185-01

Permanent Laboratory

Calibration and Measurement Capabilities (CMC)

Measured quantity / Calibration item	Range	Measurement conditions / procedure	Expanded uncertainty of measurement ¹⁾	Remarks
Amount-of-substance concentration in volumetric solutions	0.003 mol/L to 10 mol/L	<p>Titrimetric</p> <p>Inhouse procedure according SOP 20404235, Version 1/2019</p> <p>Measurement method via metrological traceability to primary standards</p> <p>Measurement method via metrological traceability to primary solutions</p> <p>Measurement method via metrological traceability to volumetric solutions</p>	0.1 % to 0.3 %	Specified are the relative measurement uncertainties. These depend on the deployed primary reference material.
Mass fraction of water in water standards and titrimetric standards	15 mg/kg to < 0.1 g/kg	<p>KF coulometry</p> <p>direct measurement</p> <p>KF oven technology</p> <p>Inhouse procedure according SOP 20404233, Version 1/2019</p>	0.95 mg/kg to 3.2 mg/kg	Specified are the absolute measurement uncertainties.
	0.1 g/kg to < 1.0 g/kg		3.2 mg/kg to 6.3 mg/kg	
	1.0 g/kg to < 10 g/kg		6.3 mg/kg to 33 mg/kg	
	10 g/kg to 52 g/kg		33 mg/kg to 0.25 g/kg	
	1.0 g/kg to 160 g/kg	<p>KF volumetry</p> <p>Inhouse procedure according SOP 20404233, Version 1/2019</p>	12 mg/kg to 2.0 g/kg	
	5 % to 16 %	<p>Loss on drying</p> <p>(temperature: 150°C)</p>	0.01 % to 0.05 %	
Mass fraction of elements in standard solutions	9 mg/kg to 10500 mg/kg	<p>inductively coupled plasma optical emission spectrometry ICP-OES</p> <p>Inhouse procedure according SOP 20120939, Version 2/2018</p>	0.3 % to 0.8 %	Specified are the relative measurement uncertainties. These depend on the deployed primary reference material.
Amount of substance concentration of elements in standard solutions	9 mg/L to 10500 mg/L		0.3 % to 0.8 %	

Abbreviations used:

CMC Calibration and measurement capabilities (Kalibrier- und Messmöglichkeiten)
SOP Standard Operating Procedure

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.