DAkkS
Deutsche
Akkreditierungsstelle

Deutsche Akkreditierungsstelle GmbH

Entrusted according to Section 8 subsection 1 AkkStelleG in connection with Section 1 subsection 1 AkkStelleGBV
Signatory to the Multilateral Agreements of
EA, ILAC and IAF for Mutual Recognition

Accreditation

The Deutsche Akkreditierungsstelle GmbH attests that the calibration laboratory

Kern & Sohn GmbH
Ziegelei 1, 72336 Balingen

is competent under the terms of DIN EN ISO/IEC 17025:2005 to carry out calibrations in the following fields:

Mechanical quantities

- **Mass (mass standards)** a)
- **Volume of solids**
- **Density of solids**
- **Weighing instruments** a)
- **Force**

a) also on-site calibration

The accreditation certificate shall only apply in connection with the notice of accreditation of 2017-03-14 with the accreditation number D-K-19408-01 and is valid until 2019-05-13. It comprises the cover sheet, the reverse side of the cover sheet and the following annex with a total of 4 pages.

Registration number of the certificate: **D-K -19408-01-00**

Braunschweig, 2017-03-14	Dr. Michael Wolf Head of Division	Translation issued: 2017-03-14	Head of Division

This document is a translation. The definitive version is the original German accreditation certificate.

See notes overleaf.

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Annex to the Accreditation Certificate D-K-19408-01-00 according to ISO/IEC 17025:2005

Period of validity: 2017-03-14 to 2019-05-13 Date of issue: 2017-03-14

Holder of certificate:

Kern & Sohn GmbH
Ziegelei 1, 72336 Balingen, Germany

Head:	Otto Grunenberg
Deputy:	Marcel Turino
	Martin Goltz
	Rocco Scaramuzzo

Accredited since: 1994-03-01

Calibrations in the fields:

Mechanical quantities

- **Mass (mass standards)** [a)]
- **Volume of solids**
- **Density of solids**
- **Weighing instruments** [a)]
- **Force**

[a)] also on-site calibration

Abbreviations used: see last page

Permanent Laboratory

Measured quantity / Calibration item	Range	Measurement conditions / procedure	Best measurement capability [1]	Remarks
Force tensile force	50 N to 500 N	DAkkS-DKD-R 3-3: 2010-06	$5.0 \cdot 10^{-4}$	500 N-Kraft-BNME
tensile and compressive force	2 N to < 4 N		$1.0 \cdot 10^{-3}$	200 N-Kraft-BNME
	4 N to 200 N		$5.0 \cdot 10^{-4}$	
	50 N to 5 kN		$5.0 \cdot 10^{-4}$	5 kN-Kraft-BNME
Mass Mass or conventional mass / Mass standards	Nominal value 1 mg to 5 mg	density range: > 1500 kgm^{-3}	0.6 µg	for weight class E_1
	10 mg		0.8 µg	
	20 mg		1.0 µg	
	50 mg		1.2 µg	
	100 mg		1.5 µg	
	200 mg		2.0 µg	
	500 mg		2.5 µg	
	1 g	with determination of density	3 µg	for weight class E_1
	2 g		4 µg	
	5 g		5 µg	determination of density by an accredited calibration laboratory required
	10 g		6 µg	
	20 g		8 µg	
	50 g		10 µg	
	100 g		15 µg	
	200 g		30 µg	
	500 g		75 µg	
	1 kg		0.15 mg	
	2 kg		0.30 mg	
	5 kg		0.75 mg	
	10 kg		1.5 mg	
	20 kg	> 4000 kgm^{-3}	10 mg	for weight class E_2
	50 kg		75 mg	for weight class F_1
	100 kg		0.5 g	for weight class F_2
	200 kg		1.0 g	
	500 kg		2.5 g	
	1000 kg		16 g	for weight class M_1
	2000 kg		30 g	

[1] The best measurement capabilities are stated according to EA-4/02. These are expanded uncertainties of measurement with a coverage probability of 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.

Measured quantity / Calibration item	Range	Measurement conditions / procedure	Best measurement capability [1]	Remarks
Mass or conventional mass / Mass standards	> 1 mg to 5 mg	without determination of density	1.8 µg	for free nominal values
	> 5 mg to 10 mg		2.4 µg	
	> 10 mg to 20 mg		3.0 µg	
	> 20 mg to 50 mg		3.6 µg	
	> 50 mg to 100 mg		4.5 µg	
	> 100 mg to 200 mg		6.0 µg	
	> 200 mg to 500 mg		7.5 µg	
	> 500 mg to 1 g		9 µg	
	> 1 g to 2 g	with determination of density	12 µg	
	> 2 g to 5 g		15 µg	
	> 5 g to 10 g		18 µg	
	> 10 g to 20 g		24 µg	
	> 20 g to 50 g		30 µg	
	> 50 g to 100 g		45 µg	
	> 100 g to 200 g		90 µg	
	> 200 g to 500 g		0.23 mg	
	> 500 g to 1 kg		0.45 mg	
	> 1 kg to 2 kg		0.90 mg	
	> 2 kg to 5 kg		2.25 mg	
	> 5 kg to 10 kg		4.5 mg	
	> 10 kg to 20 kg	> 4000 kgm^{-3}	30 mg	
	> 20 kg to 50 kg		225 mg	
	> 50 kg to 500 kg		$5.0 \cdot 10^{-6}\ m_N$	m_N nominal value of the weight
	> 500 kg to 2500 kg		$1.5 \cdot 10^{-5}\ m_N$	
Density of solids / Mass standards	Nominal value	hydrostatic procedure		determination of density or volume of weights with a reference density according to OIML R111
	1 g		33 kg/m³	
	2 g		20 kg/m³	
	5 g		11 kg/m³	
	10 g		7 kg/m³	
	20 g		4 kg/m³	
	50 g		2 kg/m³	
	100 g to 10 kg		1.8 kg/m³	
Volume of solids / Mass standards	0.125 cm³	hydrostatic procedure	0.6 mm³	
	0.250 cm³		0.8 mm³	
	0.625 cm³		0.9 mm³	
	1.25 cm³		1.2 mm³	
	2.50 cm³		1.5 mm³	
	6.25 cm³		2 mm³	
	12.5 cm³		3 mm³	
	25.0 cm³		6 mm³	
	62.5 cm³		15 mm³	
	125 cm³		30 mm³	
	250 cm³		60 mm³	
	625 cm³		0.15 cm³	
	1250 cm³		0.30 cm³	

[1] The best measurement capabilities are stated according to EA-4/02. These are expanded uncertainties of measurement with a coverage probability of 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.

On-site calibration

Measured quantity / Calibration item	Range	Measurement conditions / procedure	Best measurement capability [1]	Remarks
Mass Conventional mass / Mass standards	1 mg to 5 mg	density range: > 2000 kgm^{-3}	0.06 mg	for weight class M_1
	10 mg		0.08 mg	
	20 mg		0.10 mg	
	50 mg		0.12 mg	
	100 mg		0.15 mg	
	200 mg		0.20 mg	
	500 mg		0.25 mg	
	1 g		0.3 mg	
	2 g		0.4 mg	
	5 g		0.5 mg	
	10 g		0.6 mg	
	20 g	> 2600 kgm^{-3}	0.8 mg	
	50 g	> 4000 kgm^{-3}	1.0 mg	
	100 g	> 4400 kgm^{-3}	1.5 mg	
	200 g		3.0 mg	
	500 g		7.5 mg	
	1 kg		15 mg	
	2 kg		30 mg	
	5 kg		75 mg	
	10 kg		150 mg	
	20 kg		300 mg	
	50 kg		750 mg	
	100 kg		1600 mg	
	200 kg		3000 mg	
	500 kg		8000 mg	
	1000 kg		16000 mg	
	2000 kg		30000 mg	
	100 g to 2500 kg		$1.5 \cdot 10^{-5}\ m_N$	for free nominal values m_N nominal value of the weight
Weighing instruments non-automatic weighing instruments	to 31 kg	EURAMET cg-18 Version 3.0 Calibration on-site installation and at other sites (use of substitution loads also)	$5.0 \cdot 10^{-7}$	for weight class E_1
	to 32 kg		$1.0 \cdot 10^{-6}$	for weight class E_2
	to 310 kg		$6.0 \cdot 10^{-6}$	for weight class F_1
	to 510 kg		$1.7 \cdot 10^{-5}$	for weight class F_2
	to 50000 kg		$6.0 \cdot 10^{-5}$	for weight class M_1
Container weighing instruments non-automatic weighing instruments	to 50 t	EURAMET cg-18 Version 3.0 Calibration on-site installation and at other sites	$1.0 \cdot 10^{-4}$	use of substitution loads

Abbreviations used:

DAkkS-DKD-R	Calibration guide of Deutsche Akkreditierungsstelle DAkkS
EURAMET	European Association of National Metrology Institutes
OIML	International Organization of Legal Metrology

[1] The best measurement capabilities are stated according to EA-4/02. These are expanded uncertainties of measurement with a coverage probability of 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.