

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, Germany

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

Calibration in the 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 17.04.2019 with the accreditation number D-K-19408-01. It comprises the cover sheet, the reverse side of the cover sheet and the following annex with a total of 5 pages.

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

Braunschweig,
17.04.2019

Dr. Heike Manke
Head of Division

Translation issued:
17.04.2019


Head of Division

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>

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

See notes overleaf.

Deutsche Akkreditierungsstelle GmbH

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

Valid from: 17.04.2019

Date of issue: 17.04.2019

Holder of certificate:

Kern & Sohn GmbH
Ziegelei 1, 72336 Balingen, Germany

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

Accredited since: 01.03.1994

Calibration 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

*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>*

Permanent Laboratory

Calibration and Measurement Capabilities (CMC)

Measured quantity / Calibration item	Range	Measurement conditions / procedure	Best measurement capability ¹⁾	Remarks
Force tensile and compressive force	2 N to < 4 N	DKD-R 3-3: 2018	1,0·10 ⁻³	200 N-force-BNME
	4 N to 200 N	DIN EN ISO 376: 2011	5,0·10 ⁻⁴	
	50 N to 5 kN		5,0·10 ⁻⁴	5 kN-force-BNME
Mass Mass or conventional mass / Mass standards	Nennwert: 1 mg to 5 mg	density range: > 1500 kgm ⁻³	0,6 µg	
	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 weights according to OIML R111-1: 2004 according to class E ₁ determination of density by an accredited calibration laboratory required
	2 g		4 µg	
	5 g		5 µg	
	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 weights according to OIML R111-1: 2004 according to class E ₂
	50 kg		75 mg	for weights according to OIML R111-1: 2004 according to class F ₁
	100 kg		0,5 g	for weights according to OIML R111-1: 2004 according to class F ₂
	200 kg		1,0 g	
	500 kg		2,5 g	
	1000 kg		16 g	for weights according to OIML R111-1: 2004 according to class M ₁
	2000 kg		30 g	

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-19408-01-00

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 OIML R 111-1: 2004	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 OIML R 111-1: 2004	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	> 4000 kgm ⁻³ OIML R 111-1: 2004	0,90 mg	
	> 2 kg to 5 kg		2,25 mg	
	> 5 kg to 10 kg		4,5 mg	
	> 10 kg to 20 kg		30 mg	
	> 20 kg to 50 kg		225 mg	
	> 50 kg to 500 kg		5,0 · 10 ⁻⁶ m _N	m _N nominal value of the weight
	> 500 kg to 2 500 kg		1,5 · 10 ⁻⁵ m _N	
Density of solids / Mass standards	Nominal value	hydrostatic procedure OIML R 111-1: 2004		determination of density or volume of weights with a reference density according to OIML R 111-1: 2004
	1 g		33 kg/m ³	
	2 g		20 kg/m ³	
	5 g		11 kg/m ³	
	10 g		7 kg/m ³	
	20 g		4 kg/m ³	
	50 g		2 kg/m ³	
Volume of solids / Mass standards	100 g bis 10 kg	hydrostatic procedure OIML R 111-1: 2004	1,8 kg/m ³	
	0,125 cm ³		0,6 mm ³	
	0,250 cm ³		0,8 mm ³	
	0,625 cm ³		0,9 mm ³	
	1,25 cm ³		1,2 mm ³	
	2,50 cm ³		1,5 mm ³	
	6,25 cm ³		2 mm ³	
	12,5 cm ³		3 mm ³	
	25,0 cm ³		6 mm ³	
	62,5 cm ³		15 mm ³	
	125 cm ³		30 mm ³	
	250 cm ³		60 mm ³	
	625 cm ³		0,15 cm ³	
	1 250 cm ³		0,30 cm ³	

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-19408-01-00

Measured quantity / Calibration item	Range	Measurement conditions / procedure	Best measurement capability ¹⁾	Remarks
Weighing instruments non-automatic weighing instruments	to 31 kg	EURAMET Calibration Guide No.18 Version 4.0	$6,5 \cdot 10^{-7}$	with weights according to OIML R 111-1: 2004 according to class E ₁
	to 32 kg		$1,1 \cdot 10^{-6}$	with weights according to OIML R 111-1: 2004 according to class E ₂
	to 310 kg		$6,0 \cdot 10^{-6}$	with weights according to OIML R 111-1: 2004 according to class F ₁
	to 510 kg		$1,7 \cdot 10^{-5}$	with weights according to OIML R 111-1: 2004 according to class F ₂
	to 50 000 kg		$6,0 \cdot 10^{-5}$	with weights according to OIML R 111-1: 2004 according to class M ₁

On-site Calibration

Calibration and Measurement Capabilities (CMC)

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 OIML R 111-1: 2004	0,06 mg	for fixed nominal values for weights according to OIML R 111-1: 2004 according to 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 OIML R 111-1: 2004	0,8 mg	
	50 g	> 4000 kgm ⁻³ OIML R 111-1: 2004	1,0 mg	
	100 g	> 4400 kgm ⁻³ OIML R 111-1: 2004	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		1,6 g	
	200 kg		3,0 g	
	500 kg		8,0 g	
	1 000 kg		16 g	
	2 000 kg		30 g	
	100 g to 2 500 kg	OIML R 111-1: 2004	$1,5 \cdot 10^{-5} m_N$	for free nominal values m_N nominal value of the weight

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.

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Measured quantity / Calibration item	Range	Measurement conditions / procedure	Best measurement capability ¹⁾	Remarks
Weighing instruments non-automatic weighing instruments	to 31 kg	EURAMET Calibration Guide No.18 Version 4.0	$6,5 \cdot 10^{-7}$	with weights according to OIML R 111-1: 2004 according to class E ₁
	to 32 kg		$1,1 \cdot 10^{-6}$	with weights according to OIML R 111-1: 2004 according to class E ₂
	to 310 kg		$6,0 \cdot 10^{-6}$	with weights according to OIML R 111-1: 2004 according to class F ₁
	to 510 kg		$1,7 \cdot 10^{-5}$	mit Gewichtstücken nach OIML R 111-1: 2004 gemäß der Klasse F ₂
	to 50 000 kg		$6,0 \cdot 10^{-5}$	with weights according to OIML R 111-1: 2004 according to class M ₁
Container weighing instruments non-automatic weighing instruments	to 50 t	EURAMET Calibration Guide No.18 Version 4.0	$1,0 \cdot 10^{-4}$	use of substitution loads

Abbreviations used:

CMC	Calibration and measurement capabilities
ASTM	ASTM American Standard for Testing and Materials
EURAMET	European Association of National Metrology Institutes
OIML	International Organization of Legal Metrology
DKD-R	Guideline of Deutscher Kalibrierdienst (DKD), published by the Physikalisch-Technische Bundesanstalt

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.