

Deutsche Akkreditierungsstelle GmbH

Annex to the Accreditation Certificate D-K-19408-01-00 according to DIN EN ISO/IEC 17025:2018

Valid from: 29.03.2021

Date of issue: 28.04.2021

Holder of certificate:

Kern & Sohn GmbH
Ziegelei 1-9, 72336 Balingen, Germany

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 management system requirements of DIN EN ISO/IEC 17025 are written in the language relevant to the operations of calibration laboratories. Laboratories that conform to the requirements of this standard, operate generally in accordance with the principles of DIN EN ISO 9001.

*The certificate together with the annex reflects the status as indicated by the date of issue.
The current status of any given scope of accreditation may be found respectively in the database of accredited bodies of Deutsche Akkreditierungsstelle GmbH <https://www.dakks.de/en/content/accredited-bodies-dakks>.*

Abbreviations used: see last page

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

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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	Nominal value: 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	
	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	1,0 g	for weights according to OIML R111-1: 2004 according to class F ₂
200 kg				
500 kg		2,5 g		
1000 kg	16 g	30 g	for weights according to OIML R111-1: 2004 according to class M ₁	
2000 kg				

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

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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		$1,7 \cdot 10^{-5}$	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 R111-1: 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 <i>m_N</i> nominal value of the weight	

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	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
DKD-R	Guideline of Deutscher Kalibrierdienst (DKD), published by the Physikalisch-Technische Bundesanstalt
EURAMET	European Association of National Metrology Institutes
OIML	International Organization of Legal Metrology

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