

Deutsche Akkreditierungsstelle

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

Valid from: 18.03.2024

Date of issue: 18.03.2024

Holder of accreditation certificate:

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

with the location

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

The calibration laboratory meets the requirements of DIN EN ISO/IEC 17025:2018 to carry out the conformity assessment activities listed in this annex. The calibration laboratory meets additional legal and normative requirements, if applicable, including those in relevant sectoral schemes, provided that these are explicitly confirmed below.

The management system requirements of DIN EN ISO/IEC 17025 are written in the language relevant to the operations of calibration laboratories and they conform to the principles of DIN EN ISO 9001.

Calibration in the fields:

Mechanical quantities

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

Thermodynamic quantities

Temperature quantities

- **Direct reading thermometers ^{a)}**
- **Temperature-transmitter, data logger ^{a)}**

Humidity measurements

- **Relative humidity measuring devices ^{a)}**

^{a)} also on-site calibration

This certificate annex is only valid together with the written accreditation certificate and reflects the status as indicated by the date of issue. The current status of any given scope of accreditation can be found in the directory of accredited bodies maintained by Deutsche Akkreditierungsstelle GmbH at <https://www.dakks.de>.

Abbreviations used: see last page

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Permanent Laboratory

Calibration and Measurement Capabilities (CMC)

Measured quantity / Calibration item	Range	Measurement conditions / procedure	Best measurement capability	Remarks
Force tensile and compressive force	2 N to < 4 N	DKD-R 3-3: 2018	$1,0 \cdot 10^{-3}$	200 N-force-BNME
	4 N to 200 N	DIN EN ISO 376: 2011	$5,0 \cdot 10^{-4}$	
	50 N to 5 kN		$5,0 \cdot 10^{-4}$	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 2,5 g	for weights according to OIML R111-1: 2004 according to class F ₂	
200 kg			16 g 30 g	for weights according to OIML R111-1: 2004 according to class M ₁
500 kg				
1000 kg				
2000 kg				

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Calibration and Measurement Capabilities (CMC)

Measured quantity / Calibration item	Range	Measurement conditions / procedure	Best measurement capability	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	with determination of density OIML R 111-1: 2004	
	> 1 g to 2 g	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	> 4000 kgm ⁻³ OIML R 111-1: 2004		
> 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	$5,0 \cdot 10^{-6} m_N$ $1,5 \cdot 10^{-5} m_N$		
> 50 kg to 500 kg	$5,0 \cdot 10^{-6} m_N$			
> 500 kg to 2500 kg	$1,5 \cdot 10^{-5} m_N$			
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			

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Calibration and Measurement Capabilities (CMC)				
Measured quantity / Calibration item	Range	Measurement conditions / procedure	Best measurement capability	Remarks
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	
1250 cm ³	0,30 cm ³			
Weighing instruments non-automatic weighing instruments	to 31 kg	EURAMET Calibration Guide No.18 Version 4.0	6,5·10 ⁻⁷	with weights according to OIML R 111-1: 2004 according to class E ₁
	to 32 kg		1,1·10 ⁻⁶	with weights according to OIML R 111-1: 2004 according to class E ₂
	to 310 kg		6,0·10 ⁻⁶	with weights according to OIML R 111-1: 2004 according to class F ₁
	to 510 kg		1,7·10 ⁻⁵	with weights according to OIML R 111-1: 2004 according to class F ₂
	to 50000 kg		6,0·10 ⁻⁵	with weights according to OIML R 111-1: 2004 according to class M ₁
Temperature Direct reading thermometers, temperature transmitter and data logger with resistance sensors	5 °C to < 20 °C	DKD-R 5-1: 2018 in the isothermal equalization block in the humidity generator with temperature control	0,15 K	Comparison with standard resistance thermometer
	20 °C to 30 °C		0,10 K	
	> 30 °C to 50 °C		0,15 K	
Relative humidity Relative Humidity Meters	20 % to 75 %	DKD-R 5-8:2019 in the humidity generator with temperature Air temperature: 20 °C bis 30 °C	1,5 %	Comparison with standard thermometer and chilled mirror Measurement uncertainty expressed as an absolute value of relative humidity

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On-site Calibration

Calibration and Measurement Capabilities (CMC)

Measured quantity / Calibration item	Range	Measurement conditions / procedure	Best measurement capability	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
	10 mg		0,08 mg	for weights according to OIML R111-1: 2004 according to class M ₁
	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		
	1000 kg	16 g		
	2000 kg	30 g		
	100 g to 2500 kg	OIML R 111-1: 2004	1,5·10 ⁻⁵ m _N	for free nominal values m _N nominal value of the weight
Weighing instruments	to 31 kg		6,5·10 ⁻⁷	with weights according to OIML R 111-1: 2004 according to class E ₁

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On-site Calibration

Measured quantity / Calibration item	Calibration and Measurement Capabilities (CMC)			Remarks
	Range	Measurement conditions / procedure	Best measurement capability	
non-automatic weighing instruments	to 32 kg	EURAMET Calibration Guide No.18 Version 4.0	$1,1 \cdot 10^{-6}$	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 gemäß der Klasse F ₂
	to 50000 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
Temperature Direct reading thermometers with resistance sensors	5 °C to < 20 °C	DKD-R 5-1: 2018 in the isothermal equalization block in the humidity generator with temperature control	0,15 K	Comparison with standard resistance thermometer
	20 °C to 30 °C		0,10 K	
	> 30 °C to 50 °C		0,15 K	
Relative humidity Relative Humidity Meters	20 % to 75 %	DKD-R 5-8:2019 in the humidity generator with temperature Air temperature: 20 °C bis 30 °C	1,5 %	Comparison with standard thermometer and chilled mirror Measurement uncertainty expressed as an absolute value of relative humidity

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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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