

Deutsche Akkreditierungsstelle GmbH

Annex to the Accreditation Certificate D-K-15192-01-00 according to DIN EN ISO/IEC 17025:2018

Valid from: 25.05.2020

Date of issue: 25.05.2020

Holder of certificate:

Häfner Gewichte GmbH
MASSCAL - Kalibrierlaboratorium
Rottalstraße 95, 74420 Oberrot, Germany

Calibration in the fields:

Mechanical quantities

- Mass (mass standards) *)
- Volume of solids
- Density of solids

*) 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>

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Permanent Laboratory

Calibration and Measurement Capabilities (CMC)

Measurement quantity / Calibration item	Range	Measurement conditions / procedure	Expanded uncertainty of measurement ¹⁾	Remarks	
Mass Conventional mass / Mass standards	1 mg, 2 mg, 5 mg	OIML R 111-1: 2004	0,60 µg	for fixed nominal values with weights OIML R 111-1:2004 according to the class E ₁	
	10 mg		0,80 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		3,0 µg		with weights OIML R 111-1:2004 according to the class E ₁ Determination of volume by an accredited laboratory is required. Without determination of volume the measurement uncertainty increases adequate to an assumed volume uncertainty.
	2 g		4,0 µg		
	5 g		5,0 µg		
	10 g		6,0 µg		
	20 g		8,0 µg		
	50 g		10 µg		
	100 g		15 µg		
200 g	30 µg	with weights OIML R 111-1:2004 according to the class F ₂			
500 g	5,0 g				
1000 kg	30 g	with weights OIML R 111-1:2004 according to the class M ₁			
2000 kg	25 kg 40 kg 60 kg 250 kg	with weights OIML R 111-1:2004 according to the class F ₂			
100 kg			0,5 g		
200 kg			1,0 g		
500 kg			2,5 g		
1000 kg			5,0 g		
2500 kg	38 g	for free nominal values with weights OIML R 111-1:2004 according to the class M ₁			

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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Measurement quantity / Calibration item	Range	Measurement conditions / procedure	Expanded uncertainty of measurement ¹⁾	Remarks
Mass	> 1 mg to 5 mg		1,8 µg	for free nominal values
Conventional mass / Mass standards	> 5 mg to 10 mg		2,3 µg	
	> 10 mg to 20 mg		2,8 µg	
	> 20 mg to 50 mg		3,0 µg	
	> 50 mg to 100 mg		3,2 µg	
	> 100 mg to 200 mg		3,5 µg	
	> 200 mg to 500 mg		3,8 µg	
	> 500 mg to 1 g		7,5 µg	
	> 1 g to 2 g		12 µg	for free nominal values Determination of volume by an accredited laboratory is required. Without determination of volume the measurement uncertainty increases adequate to an assumed volume uncertainty.
	> 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		60 µg	
	> 200 g to 500 g		90 µg	
	> 500 g to 750 g		0,20 mg	
	> 750 g to 1 kg		0,45 mg	
	> 1 kg to 2 kg		0,90 mg	
	> 2 kg to 5 kg		2,2 mg	
	> 5 kg to 10 kg		4,5 mg	
	> 10 kg to 20 kg		9,0 mg	
	> 20 kg to 50 kg		20 mg	
	> 50 kg to 60 kg		30 mg	
	> 60 kg to 600 kg		$5,0 \cdot 10^{-6} \cdot m_N$	m_N Nominal value of the weight
	> 600 kg to 2500 kg		$1,5 \cdot 10^{-5} \cdot m_N$	

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Measurement quantity / Calibration item	Range	Measurement conditions / procedure	Expanded uncertainty of measurement ¹⁾	Remarks
Volume	1 g	Hydrostatic method OIML R 111-1: 2004	0,60 mm ³	Volume determination of mass standards with weights OIML R 111-1:2004 and of weights with free nominal values
	> 1 g to 2 g		0,80 mm ³	
	> 2 g to 5 g		0,90 mm ³	
	> 5 g to 10 g		1,2 mm ³	
	> 10 g to 20 g		1,5 mm ³	
	> 20 g to 50 g		2,0 mm ³	
	> 50 g to 100 g		2,8 mm ³	
	> 100 g to 200 g		6,0 mm ³	
	> 200 g to 500 g		14 mm ³	
	> 500 g to 1 kg		28 mm ³	
	> 1 kg to 2 kg		60 mm ³	
	> 2 kg to 5 kg		0,14 cm ³	
	> 5 kg to 10 kg		0,28 cm ³	
	> 10 kg to 20 kg		0,80 cm ³	
	> 20 kg to 50 kg		2,0 cm ³	
Density	1 g	Hydrostatic method OIML R 111-1: 2004	33 kg/m ³	Density determination of mass standards with weights OIML R 111-1:2004 and of weights with free nominal values
	> 1 g to 2 g		20 kg/m ³	
	> 2 g to 5 g		11 kg/m ³	
	> 5 g to 10 g		7,0 kg/m ³	
	> 10 g to 20 g		4,0 kg/m ³	
	> 20 g to 50 g		2,0 kg/m ³	
	> 50 g to 100 g		1,8 kg/m ³	
	> 100 g to 200 g		1,8 kg/m ³	
	> 200 g to 500 g		1,8 kg/m ³	
	> 500 g to 1 kg		1,8 kg/m ³	
	> 1 kg to 2 kg		1,8 kg/m ³	
	> 2 kg to 5 kg		1,8 kg/m ³	
	> 5 kg to 10 kg		1,8 kg/m ³	
	> 10 kg to 20 kg		2,5 kg/m ³	
	> 20 kg to 50 kg		2,5 kg/m 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.

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On-site Calibration

Calibration and Measurement Capabilities (CMC)

Measurement quantity / Calibration item	Range	Measurement conditions / procedure	Expanded uncertainty of measurement ¹⁾	Remarks
Mass Conventional mass	1 mg, 2 mg, 5 mg	OIML R 111-1: 2004	0,060 mg	for fixed nominal values with weights OIML R 111-1:2004 according to the class M ₁
	10 mg		0,080 mg	
	20 mg		0,10 mg	
	50 mg		0,12 mg	
	100 mg		0,16 mg	
	200 mg		0,20 mg	
	500 mg		0,25 mg	
	1 g		0,30 mg	
	2 g		0,40 mg	
	5 g		0,50 mg	
	10 g		0,60 mg	
	20 g		0,80 mg	
	50 g		1,0 mg	
	100 g		1,6 mg	
	200 g		3,0 mg	
	500 g		8,0 mg	
	1 kg		16 mg	
	2 kg		30 mg	
	5 kg		80 mg	
	10 kg		0,16 g	
	20 kg		0,30 g	
	50 kg		0,80 g	
	100 kg		1,6 g	
	200 kg		3,0 g	
	500 kg		8,0 g	
	1000 kg		16 g	
	2000 kg		30 g	
	25 kg		0,4 g	for free nominal values with weights OIML R 111-1:2004 according to the class M ₁
	40 kg		0,6 g	
	60 kg		0,9 g	
	250 kg		4,0 g	
	2500 kg		38 g	
	100 g bis 2500 kg		$1,6 \cdot 10^{-5} \cdot m_N$	for free nominal values with weights OIML R 111-1:2004 mN Nominal value of the weight

Abbreviations used:

OIML International Organization of Legal Metrology

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