

Deutsche Akkreditierungsstelle GmbH

Annex to the Accreditation Certificate D-K-20577-01-00 according to DIN EN ISO/IEC 17025:2005

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Holder of certificate:

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Accredited since: 19.10.2017

Calibration in the fields:

Mechanical quantities

- **Mass (mass standards)**
- **Weighing instruments ^{a)}**

Thermodynamic quantities

Temperature quantities

- **Resistance thermometers**
- **Liquid-in-glass thermometers**
- **Direct reading thermometers**

^{a)} also on-site calibration

Abbreviations used: see last page

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Permanent Laboratory

Measured quantity / Calibration item	Range	Measurement conditions / procedure	Best measurement capability ¹⁾	Remarks
Conventional mass	1 mg, 2 mg, 5 mg	OIML R 111-1: 2004	0.006 mg	For weight pieces according to OIML recommendation R 111-1:2004, class F ₁
	10 mg		0.008 mg	
	20 mg		0.010 mg	
	50 mg		0.012 mg	
	100 mg		0.016 mg	
	200 mg		0.020 mg	
	500 mg		0.025 mg	
	1 g		0.03 mg	
	2 g		0.04 mg	
	5 g		0.05 mg	
	10 g		0.06 mg	
	20 g		0.08 mg	
	50 g		0.10 mg	
	100 g		0.16 mg	
	200 g		0.3 mg	
	500 g		0.8 mg	
	1 kg		1.6 mg	
	2 kg		3.0 mg	
	5 kg		8.0 mg	
	10 kg		16 mg	
20 kg	30 mg			
Conventional mass	1 mg to 100 mg	OIML R 111-1: 2004 Direct comparison	0.05 mg	For free nominal values <i>m_c</i> : conventional mass
	> 100 mg to 200 mg		0.06 mg	
	> 200 mg to 500 mg		0.08 mg	
	> 500 mg to 1 g		0.10 mg	
	> 1 g to 2 g		0.12 mg	
	> 2 g to 5 g		0.16 mg	
	> 5 g to 10 g		0.20 mg	
	> 10 g to 20 g		0.25 mg	
	> 20 g to 50 g		0.3 mg	
	> 50 g to 100 g		0.5 mg	
	100 g to 10 kg		$5 \cdot 10^{-6} \cdot m_c$	
	Non-automatic electronic weighing instruments		up to 500 g	
up to 38 kg		$1 \cdot 10^{-5}$	For weight pieces according to OIML R 111-1:2004, class F ₁	
up to 80 kg		$5 \cdot 10^{-5}$	For weight pieces according to OIML R 111-1:2004, class F ₂	

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.

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Measured quantity / Calibration item	Range	Measurement conditions / procedure	Best measurement capability ¹⁾	Remarks
Temperature Resistance thermometers	-20 °C to 20 °C	Alcohol bath DAkks-DKD-R 5-1:2010	50 mK	Comparison with standard resistance thermometer
	> 20 °C to 80 °C	Water bath DAkks-DKD-R 5-1:2010	50 mK	
	> 80 °C to 200 °C	Oil bath DAkks-DKD-R 5-1:2010	100 mK	
Direct reading thermometers with resistance sensors	-20 °C to 20 °C	Alcohol bath DAkks-DKD-R 5-1:2010	50 mK	Comparison with standard resistance thermometer
	> 20 °C to 80 °C	Water bath DAkks-DKD-R 5-1:2010	60 mK	
	> 80 °C to 200 °C	Oil bath DAkks-DKD-R 5-1:2010	100 mK	
Direct reading thermometers with thermocouple sensor	-20 °C to 20 °C	Alcohol bath DAkks-DKD-R 5-3:2010	0.10 K	Comparison with standard resistance thermometer
	> 20 °C to 80 °C	Water bath DAkks-DKD-R 5-3:2010	0.15 K	
	> 80 °C to 200 °C	Oil bath DAkks-DKD-R 5-3:2010	0.20 K	
Liquid-in-glass thermometers	-20 °C to 20 °C	Alcohol bath PTB testing instruction, Volume 2 / 1999	70 mK	Comparison with standard resistance thermometer
	> 20 °C to 80 °C	Water bath PTB testing instruction, Volume 2 / 1999	70 mK	
	> 80 °C to 200 °C	Oil bath PTB testing instruction, Volume 2 / 1999	100 mK	

On-site Calibration

Measured quantity / Calibration item	Range	Measurement conditions / procedure	Best measurement capability ¹⁾	Remarks
Non-automatic electronic weighing instruments	up to 500 g	EURAMET Calibration Guide No. 18, Version 4.0 (11/2015)	$2 \cdot 10^{-6}$	For weight pieces according to OIML R 111-1:2004, Class E ₂ .
	up to 38 kg		$1 \cdot 10^{-5}$	For weight pieces according to OIML R 111-1:2004, class F ₁
	up to 80 kg		$5 \cdot 10^{-5}$	For weight pieces according to OIML R 111-1:2004, class F ₂

Abbreviations used:

OIML R Recommendation of International Organization of Legal Metrology
 EURAMET cg Calibration Guide of European Association of National Metrology Institutes
 DAkks-DKD-R Calibration Guideline of Deutsche Akkreditierungsstelle GmbH

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.