

Deutsche Akkreditierungsstelle GmbH

Annex to the Accreditation Certificate D-K-17677-01-00 according to DIN EN ISO/IEC 17025:2005

Period of validity: 13.07.2018 to 02.07.2022

Date of issue: 13.07.2018

Holder of certificate:

Reckmann GmbH
Werkzeugstraße 19-23, 58093 Hagen

with its calibration laboratory:

RECKMANN GMBH
MESS + REGELTECHNIK
Werkzeugstraße 19-23, 58093 Hagen

Head: Dipl.-Ing. (FH) Herbert Neumann
Deputy: René Heichen

Accredited as calibration laboratory since: 19.12.2002

Calibration in the fields:

Thermodynamic quantities

Temperature quantities

- Resistance thermometers ^{a)}
- Thermocouples ^{a)}
- Direct reading thermometers
- Temperature indicators and simulators ^{a)}

^{a)} also on-site calibration

Abbreviations used: see last page

The calibration laboratory is permitted, without being required to inform and obtain prior approval from DAkkS, to use calibration standards or equivalent calibration procedures listed here with different issue dates.

The calibration laboratory maintains a current list of all calibration standards / equivalent calibration procedures within the flexible scope of accreditation.

Permanent Laboratory

Measured quantity / Calibration item	Range	Measurement conditions / procedure	Best measurement capability ¹⁾	Remarks
Temperature Resistance thermometers, direct reading thermometers or measuring chains with resistance sensor	-50 °C to 100 °C	calibration bath DAkKS-DKD-R 5-1:2010	50 mK	Comparison with standard resistance thermometers
	95 °C to 200 °C	calibration bath DAkKS-DKD-R 5-1:2010	50 mK	
	200 °C to 550 °C	salt bath DAkKS-DKD-R 5-1:2010	0,1 K	
	0,01 °C	triple point of water DAkKS-DKD-R 5-1:2010	25 mK	Calibration at fixed points temperatures
	29,7646 °C	melting point of gallium DAkKS-DKD-R 5-1:2010	25 mK	
	231,928 °C	melting point of tin DAkKS-DKD-R 5-1:2010	25 mK	
	419,527 °C	melting point of zinc DAkKS-DKD-R 5-1:2010	25 mK	
	660,323 °C	melting point of aluminium DAkKS-DKD-R 5-1:2010	70 mK	
Noble metal thermocouples, direct reading thermometers or measuring chains with thermocouple sensor	-50 °C to 100 °C	calibration bath DAkKS-DKD-R 5-3:2010	0,3 K	Comparison with standard resistance thermometers
	95 °C to 200 °C	calibration bath DAkKS-DKD-R 5-3:2010	0,3 K	
	200 °C to 300 °C	salt bath DAkKS-DKD-R 5-3:2010	0,3 K	
	> 300 °C to 550 °C		1,0 K	
	50 °C to 1100 °C	furnaces DAkKS-DKD-R 5-3:2010	1,3 K	Comparison with standard thermocouples
	> 1100 °C to 1200 °C		2,3 K	
	> 1200 °C to 1400 °C		2,5 K	
	> 1400 °C to 1600 °C		3,5 K	
	660,32 °C	melting point of aluminium DAkKS-DKD-R 5-3:2010	0,5 K	Calibration at fixed point temperatures
	961,78 °C	freezing point of silver DAkKS-DKD-R 5-3:2010	0,6 K	
1084,62 °C	freezing point of copper DAkKS-DKD-R 5-3:2010	0,7 K		

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
Base metal thermocouples, direct reading thermometers or measuring chains with thermocouple sensor	-50 °C to 100 °C	calibration bath DAkks-DKD-R 5-3:2010	0,3 K	Comparison with standard resistance thermometers
	95 °C to 200 °C	calibration bath DAkks-DKD-R 5-3:2010	0,3 K	
	200 °C to 300 °C	salt bath DAkks-DKD-R 5-3:2010	0,3 K	
	> 300 °C to 550 °C		1,0 K	
	50 °C to 1100 °C	furnaces DAkks-DKD-R 5-3:2010	1,5 K	Comparison with standard thermocouples
	> 1100 °C to 1200 °C		2,5 K	
	> 1200 °C to 1300 °C		3,5 K	
	660,323 °C	melting point of aluminium DAkks-DKD-R 5-3:2010	0,6 K	Calibration at fixed point temperature
	961,78 °C	freezing point of silver DAkks-DKD-R 5-3:2010	0,8 K	
1084,62 °C	freezing point of copper DAkks-DKD-R 5-3:2010	0,9 K		
Temperature indicators and simulators for resistance thermometers	-200 °C to 850 °C	DAkks-DKD-R 5-5:2010	50 mK	Basic values of resistance according to DIN EN 60751:2008
Temperature indicators and simulators for noble metal thermocouples	-50 °C to 1820 °C	DAkks-DKD-R 5-5:2010	0,4K	Basic values of thermos-voltage according to DIN EN 60584-1:2014
Temperature indicators and simulators for base metal thermocouples	-270 °C to 1370 °C	DAkks-DKD-R 5-5:2010	0,4 K	

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On-site calibration

Measured quantity / Calibration item	Range	Measurement conditions / procedure	Best measurement capability ¹⁾	Remarks
Temperature Resistance-thermometers	-50 °C to 100 °C	Metal block calibrator DAkkS-DKD-R 5-1:2010	0,3 K	Comparison with standard resistance-thermometers
	> 100 °C to 200 °C		0,4 K	
	> 200 °C to 300 °C		0,6 K	
	> 300 °C to 650 °C		1,0 K	
Noble metal thermocouples	-50 °C to 100 °C	Metal block calibrator DAkkS-DKD-R 5-3:2010	0,7 K	
	> 100 °C to 200 °C		0,8 K	
	> 200 °C to 300 °C		0,9 K	
	> 300 °C to 650 °C		1,3 K	
Base metal thermocouples	-50 °C to 100 °C	Metal block calibrator DAkkS-DKD-R 5-3:2010	0,7 K	
	> 100 °C to 200 °C		0,8 K	
	> 200 °C to 300 °C		0,9 K	
	> 300 °C to 650 °C		1,3 K	
Temperature indicators and simulators for resistance thermometers	-200 °C to 850 °C	DAkkS-DKD-R 5-5:2010	0,1 K	Basic values of resistance according to DIN EN 60751:2008
Temperature indicators and simulators for noble metal thermocouples	-50 °C to 1820 °C	DAkkS-DKD-R 5-5:2010	0,6 K	Basic values of thermo-voltage according to DIN EN 60584-1:2014
Temperature indicators and simulators for base metal thermocouples	-270 °C to 1370 °C	DAkkS-DKD-R 5-5:2010	0,6 K	

Abbreviations used:

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