

# Deutsche Akkreditierungsstelle

## Annex to the Accreditation Certificate D-K-22441-01-00 according to DIN EN ISO/IEC 17025:2018

**Valid from:** 14.04.2023

**Date of issue:** 05.04.2023

Holder of accreditation certificate:

**Reckmann GmbH**  
**Werkzeugstraße 19–23, 58093 Hagen**

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 confirm generally with the principles of DIN EN ISO 9001.

Calibration in the fields:

### **Thermodynamic quantities**

#### **Temperature quantities**

- **Resistance thermometers<sup>a)</sup>**
- **Thermocouples<sup>a)</sup>**
- **Direct reading thermometers**
- **Temperature indicators and simulators<sup>a)</sup>**

<sup>a)</sup> **also on-site calibration**

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.

*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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Annex to the Accreditation Certificate D-K-22441-01-00

Permanent Laboratory

Calibration and Measurement Capabilities (CMC)

Measurement quantity / Calibration item	Range	Measurement conditions / procedure	Expanded uncertainty of measurement	Remarks
<b>Temperature</b> Resistance thermometers, direct reading thermometers or measuring chains with resistance sensor	-196 °C	liquid nitrogen DKD-R 5-1:2018	0.1 K	Comparison with standard resistance thermometers
	-80 °C to 200 °C	in liquid bath DKD-R 5-1:2018	50 mK	
	200 °C to 550 °C	in salt bath DKD-R 5-1:2018	0.1 K	
	0.01 °C	triple point of water DKD-R 5-1:2018	25 mK	Calibration at fixed points temperatures
	29.7646 °C	melting point of gallium DKD-R 5-1:2018	25 mK	
	231.928 °C	melting point of tin DKD-R 5-1:2018	25 mK	
	419.527 °C	melting point of zinc DKD-R 5-1:2018	25 mK	
	660.323 °C	melting point of aluminium DKD-R 5-1:2018	70 mK	
Noble metal thermocouples, direct reading thermometers or measuring chains with thermocouple sensor	-50 °C to 200 °C	in liquid bath DKD-R 5-3:2018	0.3 K	Comparison with standard resistance thermometers
	200 °C to 300 °C	in salt bath DKD-R 5-3:2018	0.3 K	
	> 300 °C to 550 °C		1.0 K	
	50 °C to 1100 °C	in tube furnace DKD-R 5-3:2018	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	
	660.323 °C	melting point of aluminium DKD-R 5-3:2018	0.5 K	Calibration at fixed point temperatures
	961.78 °C	freezing point of silver DKD-R 5-3:2018	0.6 K	
	1084.62 °C	freezing point of copper DKD-R 5-3:2018	0.7 K	

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**Permanent Laboratory**

**Calibration and Measurement Capabilities (CMC)**

Measurement quantity / Calibration item	Range	Measurement conditions / procedure	Expanded uncertainty of measurement	Remarks
Base metal thermocouples, direct reading thermometers or measuring chains with thermocouple sensor	-196 °C	liquid nitrogen DKD-R 5-3:2018	1.0 K	Comparison with standard resistance thermometers
	-80 °C to 200 °C	in liquid bath DKD-R 5-3:2018	0.3 K	
	200 °C to 300 °C	in salt bath DKD-R 5-3:2018	0.3 K	
	> 300 °C to 550 °C		1.0 K	
	50 °C to 1100 °C	in tube furnace DKD-R 5-3:2018	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 DKD-R 5-3:2018	0.6 K	Calibration at fixed point temperatures
	961.78 °C	freezing point of silver DKD-R 5-3:2018	0.8 K	
	1084.62 °C	freezing point of copper DKD-R 5-3:2018	0.9 K	
Temperature indicators and simulators for resistance thermometers	-200 °C to 850 °C	DKD-R 5-5:2018	50 mK	Basic values of resistance according to DIN EN 60751:2009
Temperature indicators and simulators for noble metal thermocouples	-50 °C to 1820 °C	DKD-R 5-5:2018	0.4 K	Basic values of thermoelectric voltage according to DIN EN 60584-1:2014
Temperature indicators and simulators for base metal thermocouples	-270 °C to 1370 °C	DKD-R 5-5:2018	0.4 K	

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**Annex to the Accreditation Certificate D-K-22441-01-00**
**On-site Calibration**
**Calibration and Measurement Capabilities (CMC)**

Measurement quantity / Calibration item	Range	Measurement conditions / procedure	Expanded uncertainty of measurement	Remarks
<b>Temperature</b> Resistance-thermometers	-50 °C to 100 °C	in metal block calibrator DKD-R 5-1:2018	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	in metal block calibrator DKD-R 5-3:2018	0.7 K	Comparison with standard thermocouples
	> 100 °C to 200 °C		0.8 K	
	> 200 °C to 300 °C		0.9 K	
	> 300 °C to 650 °C		1.3 K	
	> 650 °C to 850 °C		3.0 K	
	> 850 °C to 1100 °C		5.0 K	
Base metal thermocouples	-50 °C to 100 °C	in metal block calibrator DKD-R 5-3:2018	0.7 K	Comparison with standard resistance-thermometers
	> 100 °C to 200 °C		0.8 K	
	> 200 °C to 300 °C		0.9 K	
	> 300 °C to 650 °C		1.3 K	
	> 650 °C to 850 °C		3.0 K	
	> 850 °C to 1100 °C		5.0 K	
Temperature indicators and simulators for resistance thermometers	-200 °C to 850 °C	DKD-R 5-5:2018	0.1 K	Basic values of resistance according to DIN EN 60751:2009
Temperature indicators and simulators for noble metal thermocouples	-50 °C to 1820 °C	DKD-R 5-5:2018	0.6 K	Basic values of thermoelectric voltage according to DIN EN 60584-1:2014
Temperature indicators and simulators for base metal thermocouples	-270 °C to 1370 °C	DKD-R 5-5:2018	0.6 K	

**Abbreviations used:**

CMC	Calibration and measurement capabilities
DIN	Deutsches Institut für Normung e.V. – German institute for standardization
DKD-R	Calibration Guide of Deutscher Kalibrierdienst (DKD), published by the Physikalisch-Technischen Bundesanstalt
EN	Europäische Norm – European Standard
IEC	International Electrotechnical Commission
ISO	International Organization for Standardisation

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