

# Deutsche Akkreditierungsstelle GmbH

## Annex to the Accreditation Certificate D-K-17644-01-00 according to DIN EN ISO/IEC 17025:2018

**Valid from: 26.06.2020**

Date of issue: 26.06.2020

Holder of certificate:

**Endress + Hauser Wetzler GmbH + Co. KG  
Obere Wank 1, 87484 Nesselwang**

Calibration in the fields:

**Thermodynamic quantities**

**Temperature quantities**

- Resistance thermometers
- Thermocouples
- Temperature transmitters, data loggers

**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.**

Abbreviations used: see last page

**Annex to the accreditation certificate D-K-17644-01-00**
**Permanent Laboratory**
**Calibration and Measurement Capabilities (CMC)**

Measurement quantity / Calibration item	Range	Measurement conditions / procedure	Expanded uncertainty of measurement <sup>1)</sup>	Remarks
<b>Temperature</b> Precision resistance thermometers	0,00 °C	ice point DKD-R 5-1:2018	3 mK	
Resistance thermometers	-40 °C to 300 °C	in calibration baths <sup>2)</sup> DKD-R 5-1:2018	25 mK	Comparison with standard resistance thermometers and determination of the polynomial coefficient according to IEC 60751:2008
	> 300 °C to 660 °C	in tube furnaces with sodium heat pipe DKD-R 5-1:2018	75 mK	
Electronic contact thermometers (except liquid-in glass thermometers) with digital output	-40 °C to 300 °C	in calibration baths <sup>2)</sup> DKD-R 5-1:2018	22 mK	Comparison with standard resistance thermometers
	> 300 °C to 660 °C	in tube furnaces with sodium heat pipe DKD-R 5-1:2018	60 mK	
	> 660 °C to 1050 °C	DKD-R 5-1:2018	0.95 K	Comparison with noble metal thermocouples
Electronic contact thermometers (except liquid-in glass thermometers) with analogue current output (4 mA to 20 mA)	-40 °C to 300 °C	in calibration baths <sup>2)</sup> DKD-R 5-1:2018	40 mK	Comparison with standard resistance thermometers
	> 300 °C to 660 °C	in tube furnaces with sodium heat pipe DKD-R 5-1:2018	0.15 K	
	> 660 °C to 1050 °C	DKD-R 5-1:2018	1.1 K	Comparison with noble metal thermocouples
Noble metal thermocouples	-40 °C to 300 °C	in calibration baths <sup>2)</sup> DKD-R 5-3:2018	0.50 K	Comparison with standard resistance thermometers
	> 300 °C to 660 °C	in tube furnaces with sodium heat pipe DKD-R 5-3:2018	0.50 K	
	> 660 °C to 1050 °C	DKD-R 5-3:2018	1.1 K	Comparison with noble metal thermocouples
Base metal thermocouples	-40 °C to 300 °C	in calibration baths <sup>2)</sup> DKD-R 5-3:2018	0.50 K	Comparison with standard resistance thermometers
	> 300 °C to 660 °C	in tube furnaces with sodium heat pipe DKD-R 5-3:2018	0.55 K	
	> 660 °C to 1050 °C	DKD-R 5-3:2018	1.4 K	Comparison with noble metal thermocouples

**Abbreviations used:**

CMC Calibration and measurement capabilities  
 DKD-R Guideline of Deutscher Kalibrierdienst (DKD), published by Physikalisch-Technische Bundesanstalt

<sup>1)</sup> 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.

<sup>2)</sup> In the temperature range from -40 °C to 80 °C a calibration bath based on alcohol, in the temperature range > 80 °C to 300 °C a calibration bath based on silicone oil is applicable.