

Deutsche Akkreditierungsstelle

Annex to the Partial Accreditation Certificate D-K-15105-01-02 according to DIN EN ISO/IEC 17025:2018

Valid from: 30.10.2023

Date of issue: 30.10.2023

This annex is a part of the accreditation certificate D-K-15105-01-02.

Holder of partial accreditation certificate:

WIKA Alexander Wiegand SE & Co. KG
Alexander-Wiegand-Straße 30, 63911 Klingenberg

with the location:

WIKA Alexander Wiegand SE & Co. KG
Alexander-Wiegand-Straße 30, 63911 Klingenberg

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.

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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Calibration in the fields:

Mechanical quantities

- **Pressure** ^{a), b)}

Thermodynamic quantities

Temperature quantities

- **Resistance thermometers** ^{a), b)}
- **Thermocouples** ^{a), b)}
- **Direct reading thermometers** ^{a), b)}
- **Mechanical thermometers**
- **Temperature block calibrators**
- **Temperature transmitters, data loggers**
- **Calibration baths**

^{a)} also on-site calibration

^{b)} also calibration in mobile laboratory

Within the measurands/calibration items marked with ^{*}), 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

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Permanent Laboratory

Calibration and Measurement Capabilities (CMC)

Measured quantity / Calibration item	Range	Measurement conditions / procedure	Best measurement capability	Remarks
Pressure Positive and negative gauge pressure $p_e^{*1)}$	-1 bar to -0.03 bar	DKD-R 6-1:2014 EURAMET cg-3, Version 1.0	$5.0 \mu\text{bar} + 5.2 \cdot 10^{-5} \cdot p_e $	Pressure medium: gas calibration method above 400 bar: with gas/oil separation device
	> -0.03 bar to 0.15 bar	DKD-R 6-1:2014	$0.29 \mu\text{bar} + 3.4 \cdot 10^{-5} \cdot p_e $	
	> 0.15 bar to 1.8 bar	DKD-R 6-1:2014 EURAMET cg-3, Version 1.0	$3.4 \mu\text{bar} + 2.2 \cdot 10^{-5} \cdot p_e$	
	> 1.8 bar to 7 bar		$14 \mu\text{bar} + 2.1 \cdot 10^{-5} \cdot p_e$	
	> 7 bar to 70 bar		$0.14 \text{ mbar} + 2.7 \cdot 10^{-5} \cdot p_e$	
	> 70 bar to 200 bar		$0.15 \text{ mbar} + 3.5 \cdot 10^{-5} \cdot p_e$	
	> 200 bar to 400 bar		$0.87 \text{ mbar} + 3.9 \cdot 10^{-5} \cdot p_e$	
	> 400 bar to 750 bar	DKD-R 6-1:2014	$0.65 \text{ mbar} + 4.4 \cdot 10^{-5} \cdot p_e$	
Positive gauge pressure $p_e^{*1)}$	0 bar, 4 bar to 100 bar	DKD-R 6-1:2014 EURAMET cg-3, Version 1.0	$0.22 \text{ mbar} + 3.0 \cdot 10^{-5} \cdot p_e$	reference value ($p_e = 0 \text{ bar}$)
	> 100 bar to 400 bar		$0.58 \text{ mbar} + 3.7 \cdot 10^{-5} \cdot p_e$	pressure medium: oil
	> 400 bar to 1000 bar		$1.2 \text{ mbar} + 4.7 \cdot 10^{-5} \cdot p_e$	
	> 1000 bar to 2000 bar		$1.2 \text{ mbar} + 6.0 \cdot 10^{-5} \cdot p_e$	
	> 2000 bar to 5000 bar		$5.0 \text{ mbar} + 9.5 \cdot 10^{-5} \cdot p_e$	
	> 5000 bar to 10000 bar	DKD-R 6-1:2014	$3.2 \cdot 10^{-4} \cdot p_e$	
Absolute pressure $p_{abs}^{*1)}$	> 0 bar to 0.15 bar	DKD-R 6-1:2014	$0.29 \mu\text{bar} + 3.4 \cdot 10^{-5} \cdot p_{abs} + U_{rest}$	Pressure medium: gas U_{rest} : measurement uncertainty of residual gas pressure U_{baro} : measurement uncertainty of the barometer calibration method above 70 bar: $p_{abs} = p_e + p_{amb}$ calibration method above 401 bar: with gas/oil separation device
	> 0.15 bar to 1.8 bar	DKD-R 6-1:2014 EURAMET cg-3, Version 1.0	$3.4 \mu\text{bar} + 2.6 \cdot 10^{-5} \cdot p_{abs} + U_{rest}$	
	> 1.8 bar to 7 bar		$14 \mu\text{bar} + 2.6 \cdot 10^{-5} \cdot p_{abs} + U_{rest}$	
	> 7 bar to 70 bar		$0.14 \text{ mbar} + 3.1 \cdot 10^{-5} \cdot p_{abs} + U_{rest}$	
	> 70 bar to 201 bar		$0.18 \text{ mbar} + 3.5 \cdot 10^{-5} \cdot p_{abs} + U_{baro}$	
	> 201 bar to 401 bar		$0.88 \text{ mbar} + 4.1 \cdot 10^{-5} \cdot p_{abs} + U_{baro}$	
	> 401 bar to 751 bar	DKD-R 6-1:2014	$0.65 \text{ mbar} + 4.4 \cdot 10^{-5} \cdot p_{abs} + U_{baro}$	
Absolute pressure $p_{abs}^{*1)}$	1 bar, 5 bar to 101 bar	DKD-R 6-1:2014 EURAMET cg-3, Version 1.0	$0.24 \text{ mbar} + 3.0 \cdot 10^{-5} \cdot p_{abs} + U_{baro}$	reference value ($p_{abs} = p_{amb}$)
	> 101 bar to 401 bar		$0.59 \text{ mbar} + 3.7 \cdot 10^{-5} \cdot p_{abs} + U_{baro}$	pressure medium: Oil U_{baro} : measurement uncertainty of the barometer calibration method: $p_{abs} = p_e + p_{amb}$
	> 401 bar to 1001 bar		$1.2 \text{ mbar} + 4.7 \cdot 10^{-5} \cdot p_{abs} + U_{baro}$	
	> 1001 bar to 2001 bar		$1.2 \text{ mbar} + 6.0 \cdot 10^{-5} \cdot p_{abs} + U_{baro}$	
	> 2001 bar to 5001 bar		$5.0 \text{ mbar} + 9.5 \cdot 10^{-5} \cdot p_{abs} + U_{baro}$	
	> 5001 bar to 10001 bar	DKD-R 6-1:2014	$3.2 \cdot 10^{-4} \cdot p_{abs}$	
Differential pressure $\Delta p_e^{*1)}$	0 bar to 10 bar	DKD-R 6-1:2014	$10 \text{ Pa} + 1.1 \cdot 10^{-4} \cdot \Delta p_e + 5.0 \cdot 10^{-6} \cdot p_{stat}$	pressure medium: gas maximum pipe pres- sure $p_{stat} = 200 \text{ bar}$

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Permanent Laboratory

Calibration and Measurement Capabilities (CMC)				
Measured quantity / Calibration item	Range	Measurement conditions / procedure	Best measurement capability	Remarks
Temperature Resistance thermometers, direct reading thermometers with resistance sensor*)	0.01 °C	triple point of Water	2 mK	Calibration at fixed point temperatures
	-38.8344 °C	triple point of Mercury	3 mK	
	29.7646 °C	melting point of Gallium	2.5 mK	
	156.5985 °C	freezing point of Indium	3.5 mK	
	231.928 °C	freezing point of Tin	5 mK	
	419.527 °C	freezing point of Zinc	5 mK	
	660.323 °C	freezing point of Aluminium	10 mK	
Resistance thermometers, direct reading thermometers with resistance sensor*)	-196 °C	DKD-R 5-1:2018 in liquid Nitrogen	30 mK	Comparison with reference thermometers; determination of the characteristic curve according to DKD-R 5-6:2018
	0 °C	DKD-R 5-1:2018 ice point	5 mK	
	-90 °C bis -80 °C	DKD-R 5-1:2018 in liquid baths	20 mK	
	> -80 °C bis 30 °C		15 mK	
	> 30 °C bis 200 °C		10 mK	
	> 200 °C bis 500 °C	DKD-R 5-1:2018 in salt baths	20 mK	
	> 500 °C bis 660 °C	DKD-R 5-1:2018 in heat pipes with metal insert	60 mK	
	> 200 °C bis 420 °C	DKD-R 5-1:2018 in tube furnaces	0.1 K	
> 420 °C bis 660 °C	0.2 K			
Temperature transmitters with resistance sensor*)	-196 °C	DKD-R 5-1:2018 in liquid Nitrogen	$U_{PRT} + 0.10 \text{ K}$	Comparison with reference thermometers U_{PRT} is the expanded uncertainty of the calibration of the resistance thermometer
	0 °C	DKD-R 5-1:2018 ice point		
	-90 °C bis 200 °C	DKD-R 5-1:2018 in liquid baths		
	> 200 °C bis 500 °C	DKD-R 5-1:2018 in salt baths		
	> 500 °C bis 660 °C	DKD-R 5-1:2018 in heat pipes with metal insert		
	> 200 °C bis 660 °C	DKD-R 5-1:2018 in tube furnaces		

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Permanent Laboratory

Calibration and Measurement Capabilities (CMC)

Measured quantity / Calibration item	Range	Measurement conditions / procedure	Best measurement capability	Remarks
Temperature transmitters with base metal thermocouple sensor*)	-196 °C	DKD-R 5-3:2018 in liquid Nitrogen	$U_{TE} + 0.50 \text{ K}$	Comparison with reference thermometers; U_{TE} is the expanded uncertainty of the calibration of the thermocouple
	-90 °C bis 0 °C	DKD-R 5-3:2018 in liquid baths		
	0 °C	DKD-R 5-3:2018 ice point		
	> 0 °C bis 200 °C	DKD-R 5-3:2018 in liquid baths		
	> 200 °C bis 500 °C	DKD-R 5-3:2018 in salt baths		
	> 200 °C bis 1300 °C	DKD-R 5-3:2018 in tube furnaces		
Temperature transmitters with noble metal thermocouple sensor*)	0 °C	DKD-R 5-3:2018 ice point	$U_{TE} + 0.50 \text{ K}$	Comparison with reference thermometers; U_{TE} is the expanded uncertainty of the calibration of the thermocouple
	> 0 °C bis 200 °C	DKD-R 5-3:2018 in liquid baths		
	> 200 °C bis 500 °C	DKD-R 5-3:2018 in salt baths		
	> 200 °C bis 1600 °C	DKD-R 5-3:2018 in tube furnaces		
Noble metal thermocouples, direct reading thermometers with noble metal thermocouple sensor*)	0 °C	DKD-R 5-3:2018 ice point	0.2 K	Comparison with reference thermometers; determination of the characteristic curve according to DKD-R 5-6:2018
	0 °C bis 200 °C	DKD-R 5-3:2018 in liquid baths	0.2 K	
	> 200 °C bis 500 °C	DKD-R 5-3:2018 in salt baths	0.2 K	
	> 200 °C bis 660 °C	DKD-R 5-3:2018 in tube furnaces	0.4 K	
	> 660 °C bis 1000 °C		1.0 K	
	> 1000 °C bis 1200 °C		1.5 K	
	> 1200 °C bis 1350 °C		2.0 K	
	> 1350 °C bis 1600 °C		3.0 K	
Base metal thermocouples, direct reading thermometers with base metal thermocouple sensor*)	-196 °C	DKD-R 5-3:2018 in liquid Nitrogen	1 K	Comparison with reference thermometers; determination of the characteristic curve according to DKD-R 5-6:2018
	0 °C	DKD-R 5-3:2018 ice point	0.2 K	
	-90 °C bis -40 °C	DKD-R 5-3:2018 in liquid baths	0.5 K	
	> -40 °C bis 200 °C		0.2 K	
	> 200 °C bis 500 °C	DKD-R 5-3:2018 in salt baths	0.4 K	
	> 200 °C bis 660 °C	DKD-R 5-3:2018 in tube furnaces	0.4 K	
	> 660 °C bis 1200 °C		1.5 K	
	> 1200 °C bis 1300 °C		2.5 K	

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Measured quantity / Calibration item	Range	Measurement conditions / procedure	Best measurement capability	Remarks
Mechanical thermoemeters	-196 °C	AA 14240883.01 issued 19.07.2017 in liquid Nitrogen	0.5 K	Comparison with reference thermometers
	0 °C	AA 14240883.01 issued 19.07.2017 ice point	0.3 K	
	-90 °C bis 200 °C	AA 14240883.01 issued 19.07.2017 in liquid baths	0.3 K	
	> 200 °C bis 500 °C	AA 14240883.01 issued 19.07.2017 in salt baths	1.5 K	
	> 500 °C bis 700 °C	AA 14240883.01 issued 19.07.2017 in tube furnaces	3 K	
Temperature block calibrators*)	-55 °C bis 130 °C	DKD-R 5-4:2018	0.20 K	Comparison with reference thermometers t: measured value in °C
	> 130 °C bis 230 °C		1.5 mK · t / °C	
	> 230 °C bis 600 °C		0.35 K	
	> 600 °C bis 660 °C		0.4 K	
	> 660 °C bis 800 °C		2.5 K	
	> 800 °C bis 1000 °C		4.0 K	
	> 1000 °C bis 1200 °C		5.0 K	
	> 1200 °C bis 1300 °C		6.0 K	
Temperature micro calibration baths	-35 °C bis 130 °C	AA 14230223.01 issued 01.06.2017	0.2 K	Comparison with reference thermometers t: measured value in °C
	> 130 °C bis 230 °C		1.5 mK · t / °C	
	> 230 °C bis 255 °C		0.35 K	

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On-site Calibration and mobile Laboratory

Calibration and Measurement Capabilities (CMC)				
Measured quantity / Calibration item	Range	Measurement conditions / procedure	Best measurement capability	Remarks
Pressure Positive and negative gauge pressure $p_e^{*)}$	-1 bar to -0.03 bar	DKD-R 6-1:2014 EURAMET cg-3, Version 1.0	$5.3 \mu\text{bar} + 5.3 \cdot 10^{-5} \cdot p_e $	pressure medium: gas
	0 bar, 0.014 bar to 1.8 bar		$3.6 \mu\text{bar} + 2.5 \cdot 10^{-5} \cdot p_e$	
	> 1.8 bar to 7 bar		$15 \mu\text{bar} + 2.4 \cdot 10^{-5} \cdot p_e$	
	> 7 bar to 70 bar		$0.15 \text{ mbar} + 2.9 \cdot 10^{-5} \cdot p_e$	
	> 70 bar to 200 bar		$0.15 \text{ mbar} + 3.7 \cdot 10^{-5} \cdot p_e$	
	> 200 bar to 400 bar		$0.87 \text{ mbar} + 4.1 \cdot 10^{-5} \cdot p_e$	
Positive gauge pressure $p_e^{*)}$	0 bar, 4 bar to 100 bar	DKD-R 6-1:2014 EURAMET cg-3, Version 1.0	$0.21 \text{ mbar} + 3.2 \cdot 10^{-5} \cdot p_e$	reference value ($p_e = 0 \text{ bar}$) pressure medium: Oil
	> 100 bar to 400 bar		$0.58 \text{ mbar} + 3.8 \cdot 10^{-5} \cdot p_e$	
	> 400 bar to 1000 bar		$1.4 \text{ mbar} + 5.2 \cdot 10^{-5} \cdot p_e$	
	> 1000 bar to 2000 bar		$1.4 \text{ mbar} + 6.6 \cdot 10^{-5} \cdot p_e$	
	> 2000 bar to 5000 bar	$5.0 \text{ mbar} + 1.1 \cdot 10^{-4} \cdot p_e$		
	> 5000 bar to 8000 bar	DKD-R 6-1:2014	7.5 bar	
Absolute pressure $p_{abs}^{*)}$	> 0 bar to 0.001 bar	DKD-R 6-1:2014	2.0 μbar	Pressure medium: gas U_{rest} : measurement uncertainty of residual gas pressure U_{baro} : measurement uncertainty of the barometer calibration method above 70 bar: $p_{abs} = p_e + p_{amb}$
	0.014 bar to 1.8 bar	DKD-R 6-1:2014 EURAMET cg-3, Version 1.0	$3.6 \mu\text{bar} + 2.8 \cdot 10^{-5} \cdot p_{abs} + U_{rest}$	
	> 1.8 bar to 7 bar		$15 \mu\text{bar} + 2.7 \cdot 10^{-5} \cdot p_{abs} + U_{rest}$	
	> 7 bar to 70 bar		$0.15 \text{ mbar} + 3.3 \cdot 10^{-5} \cdot p_{abs} + U_{rest}$	
	> 70 bar to 201 bar		$0.18 \text{ mbar} + 3.7 \cdot 10^{-5} \cdot p_{abs} + U_{baro}$	
	> 201 bar to 401 bar	$0.88 \text{ mbar} + 4.2 \cdot 10^{-5} \cdot p_{abs} + U_{baro}$		
Absolute pressure $p_{abs}^{*)}$	1 bar, 5 bar to 101 bar	DKD-R 6-1:2014 EURAMET cg-3, Version 1.0	$0.24 \text{ mbar} + 3.2 \cdot 10^{-5} \cdot p_{abs} + U_{baro}$	reference value ($p_{abs} = p_{amb}$) pressure medium: Oil U_{baro} : measurement uncertainty of the barometer calibration method: $p_{abs} = p_e + p_{amb}$
	> 101 bar to 401 bar		$0.59 \text{ mbar} + 3.8 \cdot 10^{-5} \cdot p_{abs} + U_{baro}$	
	> 401 bar to 1001 bar		$1.4 \text{ mbar} + 5.2 \cdot 10^{-5} \cdot p_{abs} + U_{baro}$	
	> 1001 bar to 2001 bar		$1.4 \text{ mbar} + 6.0 \cdot 10^{-5} \cdot p_{abs} + U_{baro}$	
	> 2001 bar to 5001 bar	$5.0 \text{ mbar} + 1.1 \cdot 10^{-4} \cdot p_{abs} + U_{baro}$		
	> 5001 bar to 8001 bar	DKD-R 6-1:2014	$7.5 \text{ bar} + U_{baro}$	

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On-site Calibration and mobile Laboratory

Calibration and Measurement Capabilities (CMC)				
Measured quantity / Calibration item	Range	Measurement conditions / procedure	Best measurement capability	Remarks
Temperature Resistance thermometers, direct reading thermometers with resistance sensor*)	-196 °C	DKD-R 5-1:2018 in liquid Nitrogen	0.10 K	Comparison with reference thermometers
	0 °C	DKD-R 5-1:2018 ice point	25 mK	
	-90 °C bis 200 °C	DKD-R 5-1:2018 in block calibrators	0.4 K	
	> 200 °C bis 500 °C		0.45 K	
	> 500 °C bis 650 °C		3.8 K	
	-30 °C bis 150 °C	DKD-R 5-1:2018 in liquid baths	0.4 K	
Noble metal thermocouples, direct reading thermometers with noble metal thermocouple sensor*)	0 °C	DKD-R 5-3:2018 ice point	0.4 K	Comparison with reference thermometers
	0 °C bis 150 °C	DKD-R 5-3:2018 in calibration baths	0.8 K	
	0 °C bis 500 °C	DKD-R 5-3:2018 in block calibrators	0.8 K	
	> 500 °C bis 650 °C		3.8 K	
	> 650 °C bis 1100 °C		5.5 K	
Base metal thermocouples, direct reading thermometers with base metal thermocouple sensor*)	0 °C	DKD-R 5-3:2018 ice point	0.4 K	Comparison with reference thermometers
	-30 °C bis 150 °C	DKD-R 5-3:2018 in calibration baths	0.8 K	
	-55 °C bis 500 °C	DKD-R 5-3:2018 in block calibrators	0.8 K	
	> 500 °C bis 650 °C		3.8 K	
	> 650 °C bis 1100 °C		5.5 K	

Abbreviations used:

AA	In-house procedure of WIKA Alexander Wiegand SE & Co. KG
CMC	Calibration and measurement capabilities
DKD-R	Calibration Guideline of Deutscher Kalibrierdienst (DKD), published by Physikalisch-Technische Bundesanstalt (PTB)
EURAMET	European Association of National Metrology Institutes

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