Deutsche Akkreditierungsstelle

Annex to the Accreditation Certificate D-K-19095-01-00 according to DIN EN ISO/IEC 17025:2018

Valid from: **03.05.2023**

Date of issue: 03.05.2023

Holder of accreditation certificate:

Endress+Hauser (Deutschland) GmbH+Co. KG
Colmarer Straße 6, 79576 Weil am Rhein

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.

Calibrations in the fields:

Mechanical quantities
- **Pressure** [a)]

Fluid quantities
- **Liquid flow rate** [a)]
- **Volume of flowing liquids** [a)]
- **Mass of flowing liquids** [a)]

Thermodynamic Quantities

Temperature Quantities
- **Direct reading thermometers** [b)]
- **Temperature transmitters, data loggers** [b)]

[a)] also on-site calibration
[b)] only on-site calibration

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.

Within the measurands/calibration items marked with 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.

Permanent Laboratory

Calibration and Measurement Capabilities (CMC)

Measurement quantity / Calibration item	Range	Measurement conditions / procedure	Expanded uncertainty of measurement	Remarks
Pressure * Absolute pressure p_{abs}	50 mbar to 40 bar	DKD-R 6-1:2014 Calibration method: $p_e = p_{abs} - p_{amb}$	0.04 %, but not lower than 0.3 bar	Pressure medium: gas
Positive and negative gauge pressure p_e	-1.0 bar to 1.0 bar		0.04 %, but not lower than 0.02 mbar	Pressure medium: gas
	> 1.0 bar to 39.0 bar		0.05 %	The uncertainty of the barometer has to be taken into account
Liquid flow rate Volume flow d*V*/d*t* of flowing water	0.01 L/s to 40 m³/h	243_Kalibrierverfahren_ Durchfluss_inhouse Version 1.0	0.05 %	Gravimetric: static weighing + diverter
Mass flow d*m*/d*t* of flowing water	0.01 kg/s to 40 t/h		0.05 %	
Volume flow d*V*/d*t* of flowing water	0.01 L/s to 100 m³/h		0.08 %	Master meter method
Mass flow d*m*/d*t* flowing water	0.01 kg/s to 100 t/h		0.08 %	
Volume of flowing liquids Volume *V* of flowing water	20 L to 400 L		0.05 %	Gravimetric: static weighing + diverter
	0.3 L to 2 000 L		0.08 %	Master meter method
Mass of flowing liquids Mass *m* of flowing water	20 kg to 400 kg		0.05 %	Gravimetric: static weighing + diverter
	0.3 kg to 2 000 kg		0.08 %	Master meter method

On-site Calibration

Calibration and Measurement Capabilities (CMC)

Measurement quantity / Calibration item	Range	Measurement conditions / procedure	Expanded uncertainty of measurement	Remarks
Pressure * Absolute pressure p_{abs}	0.1 bar to 41 bar	DKD-R 6-1:2014	0.1 %, but not lower than 0.2 mbar	Pressure medium: gas Pressure source: pneumatic pressure pump or automatic pressure calibrator
Positive and negative gauge pressure p_e	-1 bar to 40 bar		0.1 %, but not lower than 0.2 mbar	
Liquid flow rate Volume flow d*V*/d*t* of flowing water	10 L/h to 150 m³/h	242_Kalibrierverfahren_ Durchfluss_vor_Ort Version 1.0	0.30 %	Master meter method
Mass flow d*m*/d*t* of flowing water	10 kg/h to 150 t/h		0.30 %	
Volume of flowing liquids Volume *V* of flowing water	0.16 L to 12 500 L		0.30 %	Master meter method Volume flow: 10 L/h to 150 m³/h
Mass of flowing liquids Mass *m* of flowing water	0.16 kg to 12 500 kg		0.30 %	Master meter method Mass flow: 10 kg/h to 150 t/h
Temperature * Direct reading thermometers with resistance sensors, temperature transmitters with resistance sensors	-20 °C to 155 °C	DKD-R 5-1:2018 in block calibrator or micro bath	0.1 K	Comparison with standard thermometer

Abbreviations used:

CMC	Calibration and measurement capabilities (Kalibrier- und Messmöglichkeiten)
DIN	Deutsches Institut für Normung e.V.
DKD-R	Richtlinie des Deutschen Kalibrierdienstes (DKD), herausgegeben von der Physikalisch-Technischen Bundesanstalt