Deutsche Akkreditierungsstelle GmbH

Annex to the Accreditation Certificate D-K-11030-01-00 according to DIN EN ISO/IEC 17025:2018

Valid from: **28.05.2021**

Date of issue 28.05.2021

Holder of certificate:

Technologiezentrum der SCHÜCO International KG
Karolinenstrasse 1-15, 33609 Bielefeld

Calibration in the fields:

Mechanical quantities
- **Pressure** *)

Fluid quantities
- **Volume of flowing gases** *)
- **Volume of flowing liquids** *)

*) **also on site calibrations**

Thermodynamic quantities

Temperature quantities
- **Direct reading thermometers** *)
- **Temperature indicators and simulators** *)
- **Resistance thermometers** *)

Humidity quantities
- **Devices for relative humidity** *)

The management system requirements of DIN EN ISO/IEC 17025 are written in the language relevant to the operations of calibration laboratories. Laboratories that conform to the requirements of this standard, operate generally in accordance with the principles of DIN EN ISO 9001.

The certificate together with the annex reflects the status as indicated by the date of issue.
The current status of any given scope of accreditation may be found respectively in the database of accredited bodies of Deutsche Akkreditierungsstelle GmbH https://www.dakks.de/en/content/accredited-bodies-dakks.

Abbreviations used: see last page

Permanent Laboratory

Calibration and Measurement Capabilities (CMC)

Measurement quantity / Calibration item	Range	Measurement conditions / procedure	Expanded uncertainty of measurement [1)]	Remarks
Thermocouple temperature indicators and simulators		DKD-R 5-5:2018		
Type J	-210 °C to 1200 °C		0.3 K	
Type K	-200 °C to 1372 °C		0.4 K	
Type N	-200 °C to 1300 °C		0.4 K	
Type R	0 °C to 1767 °C		0.6 K	
Type S	0 °C to 1767 °C		0.5 K	
Type T	-250 °C to 400 °C		0.7 K	
Direct reading thermometers with resistance sensors	0 °C	Ice point DKD-R 5-1:2018	10 mK	
	50 °C to < 150 °C	within silicone oil bath DKD-R 5-1:2018	60 mK	
	150 °C to 300 °C		0.10 K	
	-40 °C to 140 °C	within block calibrator DKD-R 5-1:2018	0.11 K	
	> 140 °C to 420 °C		0.30 K	
Direct reading thermometers with non-precious metal thermocouple sensors	-40 °C to 140 °C	within block calibrator DKD-R 5-1:2018	0.50 K	Comparison with resistance thermometers
	> 140 °C to 420 °C		0.60 K	
Relative humidity electric hygrometers and humidity sensors, no psychrometers	33 % to 70 %	within climate chamber air temperature 23 °C DKD-R 5-8:2019	1.8 %	Comparison with reference sensor Uncertainty of measurement expressed in relative humidity
	15 % to 60 %	within humidity generator air temperature 23 °C DKD-R 5-8:2019	1.4 %	Uncertainty of measurement expressed in relative humidity
	> 60 % to 90 %		1.6 %	
Pressure Excess pressure	-10 kPa to 10 kPa	DKD-R 6-1:2014	1.2 Pa	Pressure medium: Air precision pressure regulator
Absolut pressure	800 hPa to 1100 hPa	DKD-R 6-1:2014	0.7 hPa	Pressure medium: Air Precision absolute pressure transmitter

[1)] 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.

Permanent Laboratory

Calibration and Measurement Capabilities (CMC)

Measurement quantity / Calibration item	Range	Measurement conditions / procedure	Expanded uncertainty of measurement [1)]	Remarks
Volume flow rate dV/dt of flowing gases	0.029 m³/h to 4.0 m³/h	KR-0013-00 Comparison with reference standard	1 %	Measure medium: Air Conversion via density Comparison meter: nozzle calibration system
	> 4.0 m³/h to 1600 m³/h			Measure medium: Air Conversion via density Comparison meter: Volumetric gas meter
Volume flow rate dV/dt of flowing liquids	30 L/h to 600 L/h	KR-0005-02 Comparison with reference standard	1 %	Measure medium: Water Comparison meters: Electromagnetic flowmeters
	240 L/h to 2500 L/h			Measure medium: Water Comparison meters: Coriolis mass flow meters
	2350 L/h to 18 900 L/h			Measure medium: Water Comparison meters: Electromagnetic flowmeters

[1)] 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.

On-site Calibration

Calibration and Measurement Capabilities (CMC)

Measurement quantity / Calibration item	Range	Measurement conditions / procedure	Expanded uncertainty of measurement [1)]	Remarks
Pressure Excess pressure	-10 kPa to 10 kPa	DKD-R 6-1:2014	1.4 Pa	Pressure medium: Air precision pressure regulator
Absolut pressure	800 hPa to 1100 hPa		0.8 hPa	Pressure medium: Air Precision absolute pressure transmitter
Thermocouple temperature indicators and simulators		DKD-R 5-5:2018		
Type J	-210 °C to 1200 °C		0.40 K	
Type K	-200 °C to 1372 °C		0.50 K	
Type N	-200 °C to 1300 °C		0.50 K	
Type R	0 °C to 1767 °C		0.80 K	
Type S	0 °C to 1767 °C		0.6 K	
Type T	-250 °C to 400 °C		0.90 K	
Direct reading thermometers with resistance sensors	0 °C	Ice point DKD-R 5-1:2018	15 mK	
	50 °C to < 150 °C	within silicone oil bath DKD-R 5-1:2018	0.1 mK	
	150 °C to 300 °C		0.12 K	
	-40 °C to 140 °C	within block calibrator DKD-R 5-1:2018	0.13 K	
	> 140 °C to 420 °C		0.45 K	
Direct reading thermometers with non-precious metal thermocouple sensors	-40 °C to 140 °C	within block calibrator DKD-R 5-1:2018	0.50 K	Comparison with resistance thermometers
	> 140 °C to 420 °C		0.72 K	
Relative humidity electric hygrometers and humidity sensors, no psychrometers	15 % to 60 %	within humidity generator air temperature 23 °C DKD-R 5-8:2019	1.7 %	Uncertainty of measurement expressed in relative humidity
	> 60 % to 90 %		2.0 %	

[1)] 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.

On-site Calibration

Calibration and Measurement Capabilities (CMC)

Measurement quantity / Calibration item	Range	Measurement conditions / procedure	Expanded uncertainty of measurement [1)]	Remarks
Volume flow rate dV/dt of flowing gases	0.029 m³/h to 4.0 m³/h	Comparison with reference standard	1 %	Measure medium: Air Conversion via density Comparison meter: nozzle calibration system
Volume flow rate dV/dt of flowing gases	0 m³/h to 4.2 m³/h	KR-0013-00 Comparison with reference standard	1 %	Measure medium: Air Conversion via density Comparison meter: Thermic mass flow meters
	> 4.2 m³/h to 160 m³/h			Measure medium: Air Conversion via density Comparison meter: Volumetric gas meter
	> 0.5 m³/h to 160 m³/h			Measure medium: Air Conversion via density Comparison meter: Laminar flow
Volume flow rate dV/dt of flowing liquids	30 L/h to 600 L/h	KR-0005-02 Comparison with reference standard	1 %	Measure medium: Water Comparison meters: Electromagnetic flowmeters
	240 L/h to 2500 L/h			Measure medium: Water Comparison meters: Coriolis mass flow meters
	2350 L/h to 18 900 L/h			Measure medium: Water Comparison meters: Electromagnetic flowmeters

[1)] 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.

Abbreviations used:

CMC	Calibration and measurement capabilities
DIN	Deutsches Institut für Normung e.V.
DKD-R	Guideline of the German Calibration Service „Deutscher Kalibrierdienst“ (DKD), published by Physikalisch-Technische Bundesanstalt
KR-000x-0x	Self-developed calibration procedure by the calibration laboratory of the Technology Center of SCHÜCO International KG

[1)] 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.