

Deutsche Akkreditierungsstelle

Annex to the Accreditation Certificate D-K-18066-01-00 according to DIN EN ISO/IEC 17025:2018

Valid from: 26.11.2024

Date of issue: 26.11.2024

Holder of accreditation certificate:

**CTS Clima Temperatur Systeme GmbH
Lotzenäcker 21, 72379 Hechingen**

with the location

**CTS Clima Temperatur Systeme GmbH
Lotzenäcker 21, 72379 Hechingen**

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 they conform to the principles of DIN EN ISO 9001.

Calibration in the fields:

Thermodynamic quantities

Humidity quantities

- **Devices for absolute humidity**
- **Devices for relative humidity**
- **Climatic chambers (humidity) ^{a)}**

Temperature quantities

- **Direct reading thermometers**
- **Climatic chambers (temperature) ^{a)}**

^{a)} **also 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>.

Abbreviations used: see last page

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This document is a translation. The definitive version is the original German annex to the accreditation certificate.

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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.

Permanent Laboratory

Calibration and Measurement Capabilities (CMC)

Measurement quantity / Calibration item	Range	Measurement conditions / procedure	Expanded uncertainty of measurement	Remarks
Temperature Direct reading thermometers with resistance sensor *	-70 °C to -40 °C	DKD-R 5-1:2018 in climatic chamber with air circulation measurement in air	0.10 K	Comparison with reference thermometers
	> -40 °C to 0 °C		0.09 K	
	> 0 °C to 100 °C		0.08 K	
	> 100 °C to 180 °C		0.10 K	
Measuring locations in climatic chambers with air circulation *	-70 °C to -40 °C	DKD-R 5-7:2018 method C measurement in air	0.15 K	Comparison with reference thermometers
	> -40 °C to 0 °C		0.14 K	
	> 0 °C to 100 °C		0.13 K	
	> 100 °C to 180 °C		0.13 K	
Climatic chambers with air circulation *	-70 °C to -40 °C	DKD-R 5-7:2018 method A and B measurement in air	0.5 K	
	> -40 °C to 0 °C		0.4 K	
	> 0 °C to 100 °C		0.2 K	
	> 100 °C to 180 °C		0.4 K	
Humidity Dew point temperature Dew point hygrometers	-40 °C to 90 °C	AA-KL-Kalibrierung Taupunktspiegel-V3:2021 in climatic chamber with air circulation measurement in air	0.10 K	Comparison with reference dew point hygrometers
Hygrometric sensors and transducers for relative humidity	5 % to 30 %	AA-KL-Kalibrierung Hygrometer-V4:2021 in climatic chamber with air circulation measurement in air air temperature: -20 °C bis 90 °C dew point temperature: -40 °C bis 90 °C	0.30 %	Comparison with reference dew point hygrometers and reference thermometers
	> 30 % to 60 %		0.40 %	The humidity reference value is calculated from the dew point and the air temperature.
	> 60 % to 98 %		0.60 %	Measurement uncertainty expressed as the absolute value of the relative humidity

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Permanent Laboratory

Calibration and Measurement Capabilities (CMC)

Measurement quantity / Calibration item	Range	Measurement conditions / procedure	Expanded uncertainty of measurement	Remarks
Measuring locations in climatic chambers with air circulation *	5 % to 30 %	DKD-R 5-7:2018 method C dew point temperature: -40 °C bis 90 °C	0.30 %	Comparison with reference dew point hygrometers and reference thermometers The humidity reference value is calculated from the dew point and the air temperature.
	> 30 % to 60 %		0.40 %	
	> 60 % to 98 %		0.60 %	
Climatic chambers with air circulation *	5 % to 30 %	DKD-R 5-7:2018 method A and B dew point temperature: -40 °C bis 90 °C	0.40 %	Measurement uncertainty expressed as the absolute value of the relative humidity
	> 30 % to 60 %		0.60 %	
	> 60 % to 98 %		0.80 %	

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On-site calibration

Calibration and Measurement Capabilities (CMC)				
Measurement quantity / Calibration item	Range	Measurement conditions / procedure	Expanded uncertainty of measurement	Remarks
Temperature Measuring locations in climatic chambers with air circulation *	-70 °C to -40 °C	DKD-R 5-7:2018 method C measurement in air	0.34 K	Comparison with reference thermometers
	> -40 °C to 0 °C		0.33 K	
	> 0 °C to 100 °C		0.32 K	
	> 100 °C to 180 °C		0.33 K	
Climatic chambers with air circulation *	-70 °C to -40 °C	DKD-R 5-7:2018 method A and B measurement in air	0.5 K	
	> -40 °C to 0 °C		0.4 K	
	> 0 °C to 100 °C		0.2 K	
	> 100 °C to 180 °C		0.4 K	
Humidity Measuring locations in climatic chambers with air circulation *	5 % to 30 %	DKD-R 5-7:2018 method C dew point temperature: -40 °C bis 90 °C	0.30 %	Comparison with reference dew point hygrometers and reference thermometers
	> 30 % to 60 %		0.40 %	
	> 60 % to 98 %		0.60 %	
Climatic chambers with air circulation *	5 % to 30 %	DKD-R 5-7:2018 method A and B dew point temperature: -40 °C bis 90 °C	0.40 %	The humidity reference value is calculated from the dew point and the air temperature. Measurement uncertainty expressed as the absolute value of the relative humidity
	> 30 % to 60 %		0.60 %	
	> 60 % to 98 %		0.80 %	

Abbreviations used:

- AA-KL In-house method of CTS Clima Temperatur Systeme GmbH
- CMC Calibration and measurement capabilities
- DIN Deutsches Institut für Normung e.V. – German institute for standardization
- DKD-R Calibration Guideline of Deutscher Kalibrierdienst (DKD), published by Physikalisch-Technische Bundesanstalt
- EN Europäische Norm – European Standard
- IEC International Electrotechnical Commission
- ISO International Organization for Standardisation

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