

Deutsche Akkreditierungsstelle GmbH

Entrusted according to Section 8 subsection 1 AkkStelleG in connection with Section 1 subsection 1 AkkStelleGBV

Signatory to the Multilateral Agreements of
EA, ILAC and IAF for Mutual Recognition

Accreditation



The Deutsche Akkreditierungsstelle GmbH attests that the calibration laboratory

Vötsch Industrietechnik GmbH
Beethovenstraße 34, 72336 Balingen-Frommern

is competent under the terms of DIN EN ISO/IEC 17025:2005 to carry out calibrations in the following fields:

Thermodynamic quantities

Temperature quantities

- Resistance thermometers
- Direct reading thermometers
- Temperature transmitters, data loggers
- Climatic chambers (temperature) ^{a)}

Humidity quantities

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

^{a)} also on-site calibration

The accreditation certificate shall only apply in connection with the notice of accreditation of 07.04.2017 with the accreditation number D-K-17099-01 and is valid until 06.04.2022. It comprises the cover sheet, the reverse side of the cover sheet and the following annex with a total of 5 pages.

Registration number of the certificate: **D-K -17099-01-00**

Braunschweig,
07.04.2017

Dr. Michael Wolf
Head of Division

Translation issued:
07.04.2017


Head of Division

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

See notes overleaf.

Deutsche Akkreditierungsstelle GmbH

Office Berlin
Spittelmarkt 10
10117 Berlin

Office Frankfurt am Main
Europa-Allee 52
60327 Frankfurt am Main

Office Braunschweig
Bundesallee 100
38116 Braunschweig

The publication of extracts of the accreditation certificate is subject to the prior written approval by Deutsche Akkreditierungsstelle GmbH (DAkKS). Exempted is the unchanged form of separate disseminations of the cover sheet by the conformity assessment body mentioned overleaf.

No impression shall be made that the accreditation also extends to fields beyond the scope of accreditation attested by DAkKS.

DAkKS is a signatory to the Multilateral Agreements for Mutual Recognition of the European co-operation for Accreditation (EA), International Accreditation Forum (IAF) and International Laboratory Accreditation Cooperation (ILAC). The signatories to these agreements recognise each other's accreditations.

The up-to-date state of membership can be retrieved from the following websites:

EA: www.european-accreditation.org

ILAC: www.ilac.org

IAF: www.iaf.nu

Deutsche Akkreditierungsstelle GmbH

Annex to the Accreditation Certificate D-K-17099-01-00 according to DIN EN ISO/IEC 17025:2005

Period of validity: 07.04.2017 to 06.04.2022

Date of issue: 07.04.2017

Holder of certificate:

Vötsch Industrietechnik GmbH
Beethovenstraße 34, 72336 Balingen-Frommern, Germany

Head: Willi Hee
Deputy: Andreas Harke
Eugen Dillmann

Accredited since: 28.04.1998

Calibration in the fields:

Thermodynamic quantities

Temperature quantities

- Resistance thermometers
- Direct reading thermometers
- Temperature transmitters, data loggers
- Climatic chambers (temperature) ^{a)}

Humidity quantities

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

^{a)} also on-site calibration

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.

Abbreviations used: see last page

Annex to the accreditation certificate D-K-17099-01-00

Permanent Laboratory

Measured quantity / Calibration item	Range	Measurement conditions / procedure	Best measurement capability ¹⁾	Remarks
Temperature Resistance thermometers; Indicating thermometers, Measuring transducer and data logger with resistance sensor *)	- 80 °C to - 40 °C	in liquid bath DAkkS-DKD-R 5-1:2010	0,10 K	Comparison with reference thermometer
	> -40 °C to 0 °C		0,06 K	
	> 0 °C to 100 °C		0,04 K	
	> 100 °C to 200 °C		0,06 K	
	100 °C to 350 °C	in dry block calibrator DAkkS-DKD-R 5-1:2010	0,15 K	
	-80 °C to -40 °C	in calibration test chamber (measurement in air) DAkkS-DKD-R 5-1:2010	0,12 K	
	> -40 °C to 0 °C		0,10 K	
	> 0 °C to 100 °C		0,08 K	
	> 100 °C to 150 °C		0,12 K	
> 150 °C to 200 °C	0,18 K			
Indicating thermometers, Measuring transducer and data logger with base metal thermocouple sensor *)	- 80 °C to 100 °C	in liquid bath or in calibration test chamber (measurement in air) DAkkS-DKD-R 5-3:2010	0,25 K	Comparison with reference thermometer
	> 100 °C to 200 °C	0,35 K		
	> 100 °C to 200 °C	in metal block calibrator DAkkS-DKD-R 5-3:2010	0,35 K	
	> 100 °C to 350 °C	0,45 K		
Measuring locations in climatic chambers with air circulation in empty or defined loaded useful volume *)	-80 °C to -40 °C	Measurement in air DAkkS-DKD-R 5-7:2010 Method C	0,15 K	Measurement with reference thermometer If loaded, type and arrangement of the load are to be precisely stated in the calibration certificate.
	> -40 °C to 0 °C		0,12 K	
	> 0 °C to 100 °C		0,08 K	
	> 100 °C to 150 °C		0,13 K	
	> 150 °C to 200 °C		0,20 K	
Climatic chambers with air circulation in empty or defined loaded useful volume *)	-80 °C to -40 °C	Measurement in air DAkkS-DKD-R 5-7:2010 Method A and B	0,5 K	
	> -40 °C to 0 °C		0,4 K	
	> 0 °C to 100 °C		0,2 K	
	> 100 °C to 150 °C		0,4 K	
	> 150 °C to 200 °C		0,6 K	
Measuring locations in climatic chambers without air circulation in empty or defined loaded useful volume *)	-80 °C to -40 °C	Measurement in air DAkkS-DKD-R 5-7:2010 Method C	0,5 K	
	> -40 °C to 0 °C		0,4 K	
	> 0 °C to 100 °C		0,3 K	
	> 100 °C to 150 °C		0,4 K	
	> 150 °C to 200 °C		0,5 K	
Climatic chambers without air circulation in empty or defined loaded useful volume *)	-80 °C to -40 °C	Measurement in air DAkkS-DKD-R 5-7:2010 Method A and B	3,0 K	
	> -40 °C to 0 °C		2,0 K	
	> 0 °C to 100 °C		2,2 K	
	> 100 °C to 150 °C		3,0 K	
	> 150 °C to 200 °C		3,5 K	
	> 200 °C to 350 °C	5,0 K		

¹⁾ The best measurement capabilities are stated according to EA-4/02. These are expanded uncertainties of measurement with a coverage probability of 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.

Annex to the accreditation certificate D-K-17099-01-00

Measured quantity / Calibration item	Range	Measurement conditions / procedure	Best measurement capability ¹⁾	Remarks
Dew point temperature Dew point hygrometers	-30 °C to 95 °C	in calibration test chamber	0,1 K	Comparison with reference dew point hygrometer
Relative humidity Hygrometric sensors and transducers	5 % to 30 %	Air temperature: 5 °C to 140 °C (max 95 °C dew point temperature)	0,4 %	The humidity reference is calculated from the dew point and air temperature, each measured with reference instruments.
	> 30 % to 60 %		0,6 %	
	> 60 % to 98 %		0,8 %	The measurement uncertainty is an absolute value of relative humidity.
Measuring locations in climatic chambers with air circulation in empty or defined loaded useful volume *)	5 % to 30 %	Air temperature: 5 °C to 140 °C (max 95 °C dew point temperature) DAkkS-DKD-R 5-7:2010 Method C	0,4 %	The humidity reference is calculated from the dew point and air temperature, each measured with reference instruments. If loaded, type and arrangement of the load are to be precisely stated in the calibration certificate.
	> 30 % to 60 %		0,6 %	
	> 60 % to 98 %		0,8 %	
Climatic chambers with air circulation in empty or defined loaded useful volume *)	5 % to 30 %	Air temperature: 5 °C to 140 °C (max 95 °C dew point temperature) DAkkS-DKD-R 5-7:2010 Method A and B	0,8 %	
	> 30 % to 60 %		1,2 %	
	> 60 % to 98 %		1,6 %	
Measuring locations in climatic chambers with air circulation in empty or defined loaded useful volume *)	10 % to 30 %	Air temperature: 10 °C to 95 °C DAkkS-DKD-R 5-7:2010 Method C	1,0 %	Measurement with reference aspiration psychrometer.
	> 30 % to 60 %		1,2 %	
	> 60 % to 98 %		1,4 %	If loaded, type and arrangement of the load are to be precisely stated in the calibration certificate.
Climatic chambers with air circulation in empty or defined loaded useful volume *)	10 % to 30 %	Air temperature: 10 °C to 95 °C DAkkS-DKD-R 5-7:2010 Method A and B	1,6 %	
	> 30 % to 60 %		2,0 %	
	> 60 % to 98 %		2,4 %	
Measuring locations in climatic chambers with air circulation in empty or defined loaded useful volume *)	5 % to 30 %	Air temperature: 5 °C to 140 °C (max 95 °C dew point temperature) DAkkS-DKD-R 5-7:2010 Method C	1,3 %	Measurement with capacitive reference humidity sensor
	> 30 % to 60 %		1,4 %	
	> 60 % to 98 %		1,6 %	If loaded, type and arrangement of the load are to be precisely stated in the calibration certificate.
Climatic chambers with air circulation in empty or defined loaded useful volume *)	5 % to 30 %	Air temperature: 5 °C to 140 °C (max 95 °C dew point temperature) DAkkS-DKD-R 5-7:2010 Method A and B	1,9 %	
	> 30 % to 60 %		2,2 %	
	> 60 % to 98 %		2,6 %	

¹⁾ The best measurement capabilities are stated according to EA-4/02. These are expanded uncertainties of measurement with a coverage probability of 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.

Annex to the accreditation certificate D-K-17099-01-00

On-site calibration

Measured quantity / Calibration item	Range	Measurement conditions / procedure	Best measurement capability ¹⁾	Remarks
Temperature Measuring locations in climatic chambers with air circulation in empty or defined loaded useful volume *)	-80 °C to -40 °C	Measurement in air DAkkS-DKD-R 5-7:2010 Method C	0,15 K	Measurement with reference thermometer If loaded, type and arrangement of the load are to be precisely stated in the calibration certificate.
	> -40 °C to 0 °C		0,12 K	
	> 0 °C to 100 °C		0,08 K	
	> 100 °C to 150 °C		0,13 K	
	> 150 °C to 200 °C		0,20 K	
	> 200 °C to 350 °C		0,33 K	
Climatic chambers with air circulation in empty or defined loaded useful volume *)	-80 °C to -40 °C	Measurement in air DAkkS-DKD-R 5-7:2010 Method A and B	0,5 K	
	> -40 °C to 0 °C		0,4 K	
	> 0 °C to 100 °C		0,2 K	
	> 100 °C to 150 °C		0,4 K	
	> 150 °C to 200 °C		0,6 K	
	> 200 °C to 350 °C		1,7 K	
Measuring locations in climatic chambers without air circulation in empty or defined loaded useful volume *)	-80 °C to -40 °C	Measurement in air DAkkS-DKD-R 5-7:2010 Method C	0,5 K	
	> -40 °C to 0 °C		0,4 K	
	> 0 °C to 100 °C		0,3 K	
	> 100 °C to 150 °C		0,4 K	
	> 150 °C to 200 °C		0,5 K	
	> 200 °C to 350 °C		0,8 K	
Climatic chambers without air circulation in empty or defined loaded useful volume *)	-80 °C to -40 °C	Measurement in air DAkkS-DKD-R 5-7:2010 Method A and B	3,0 K	
	> -40 °C to 0 °C		2,0 K	
	> 0 °C to 100 °C		2,2 K	
	> 100 °C to 150 °C		3,0 K	
	> 150 °C to 200 °C		3,5 K	
	> 200 °C to 350 °C		5,0 K	

¹⁾ The best measurement capabilities are stated according to EA-4/02. These are expanded uncertainties of measurement with a coverage probability of 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.

Annex to the accreditation certificate D-K-17099-01-00

Measured quantity / Calibration item	Range	Measurement conditions / procedure	Best measurement capability ¹⁾	Remarks
Relative humidity Measuring locations in climatic chambers with air circulation in empty or defined loaded useful volume *)	5 % to 30 %	Air temperature: 5 °C to 140 °C (max 95 °C dew point temperature) DAkks-DKD-R 5-7:2010 Method C	0,4 %	The humidity reference is calculated from the dew point and air temperature, each measured with reference instruments.
	> 30 % to 60 %		0,6 %	
	> 60 % to 98 %		0,8 %	
Climatic chambers with air circulation in empty or defined loaded useful volume *)	5 % to 30 %	Air temperature: 5 °C to 140 °C (max 95 °C dew point temperature) DAkks-DKD-R 5-7:2010 Method A and B	0,8 %	If loaded, type and arrangement of the load are to be precisely stated in the calibration certificate.
	> 30 % to 60 %		1,2 %	
	> 60 % to 98 %		1,6 %	
Measuring locations in climatic chambers with air circulation in empty or defined loaded useful volume *)	10 % to 30 %	Air temperature: 10 °C to 95 °C DAkks-DKD-R 5-7:2010 Method C	1,0 %	Measurement with reference aspiration psychrometer. If loaded, type and arrangement of the load are to be precisely stated in the calibration certificate.
	> 30 % to 60 %		1,2 %	
	> 60 % to 98 %		1,4 %	
Climatic chambers with air circulation in empty or defined loaded useful volume *)	10 % to 30 %	Air temperature: 10 °C to 95 °C DAkks-DKD-R 5-7:2010 Method A and B	1,6 %	Measurement with reference aspiration psychrometer. If loaded, type and arrangement of the load are to be precisely stated in the calibration certificate.
	> 30 % to 60 %		2,0 %	
	> 60 % to 98 %		2,4 %	
Measuring locations in climatic chambers with air circulation in empty or defined loaded useful volume *)	5 % to 30 %	Air temperature: 5 °C to 140 °C (max 95 °C dew point temperature) DAkks-DKD-R 5-7:2010 Method C	1,3 %	Measurement with capacitive reference humidity sensor If loaded, type and arrangement of the load are to be precisely stated in the calibration certificate.
	> 30 % to 60 %		1,4 %	
	> 60 % to 98 %		1,6 %	
Climatic chambers with air circulation in empty or defined loaded useful volume *)	5 % to 30 %	Air temperature: 5 °C to 140 °C (max 95 °C dew point temperature) DAkks-DKD-R 5-7:2010 Method A and B	1,9 %	Measurement with capacitive reference humidity sensor If loaded, type and arrangement of the load are to be precisely stated in the calibration certificate.
	> 30 % to 60 %		2,2 %	
	> 60 % to 98 %		2,6 %	

Abbreviation used:

DAkks-DKD-R Guideline on calibration published by Deutsche Akkreditierungsstelle GmbH (DAkks)

¹⁾ The best measurement capabilities are stated according to EA-4/02. These are expanded uncertainties of measurement with a coverage probability of 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.