DAkkS
Deutsche
Akkreditierungsstelle

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

Isabellenhütte Heusler GmbH & Co. KG
Eibacher Weg 3-5, 35683 Dillenburg

is competent under the terms of DIN EN ISO/IEC 17025:2018 to carry out calibrations in the following fields:

Electrical quantities
DC and low frequency quantities
- **DC voltage**
- **DC current**
- **DC resistance**

Thermodynamic quantities
Temperature quantities
- **Resistance thermometers**
- **Thermocouples**
- **Direct reading thermometers**

The accreditation certificate shall only apply in connection with the notice of accreditation of 11.05.2021 with the accreditation number D-K-19500-01. It comprises the cover sheet, the reverse side of the cover sheet and the following annex with a total of 3 pages.

Registration number of the certificate: **D-K-19500-01-00**

bitte auswählen, 11.05.2021	Dr Heike Manke Head of Division	Translation issued: 11.05.2021	Head of Division

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.

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

See notes overleaf.

Deutsche Akkreditierungsstelle GmbH

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Spittelmarkt 10
10117 Berlin

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

Office Braunschweig
Bundesallee 100
38116 Braunschweig

The accreditation was granted pursuant to the Act on the Accreditation Body (AkkStelleG) of 31 July 2009 (Federal Law Gazette I p. 2625) and the Regulation (EC) No 765/2008 of the European Parliament and of the Council of 9 July 2008 setting out the requirements for accreditation and market surveillance relating to the marketing of products (Official Journal of the European Union L 218 of 9 July 2008, p. 30). 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-19500-01-00 according to DIN EN ISO/IEC 17025:2018

Valid from: **11.05.2021**

Date of issue 11.05.2021

Holder of certificate:

Isabellenhütte Heusler GmbH & Co. KG
Eibacher Weg 3-5, 35683 Dillenburg

Calibration in the fields:

Electrical quantities

DC and low frequency quantities

- **DC voltage**
- **DC current**
- **DC resistance**

Thermodynamic quantities

Temperature quantities

- **Resistance thermometers**
- **Thermocouples**
- **Direct reading thermometers**

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.

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.
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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
DC and low frequency quantities DC voltage	1 µV to < 10 mV	direct measuring with reference digital voltmeter and reversing polarity	$0.1 \cdot 10^{-3} \cdot U + 0.2$ µV	*U*: measured value
	10 mV to < 1 V		$20 \cdot 10^{-6} \cdot U$	
	1 V to 10 V		$3.0 \cdot 10^{-6} \cdot U$	
	> 10 V to 1000 V		$5.0 \cdot 10^{-6} \cdot U$	
DC current	1 µA to < 1 mA	reference resistor	$30 \cdot 10^{-6} \cdot I$	*I*: measured value
	1 mA to < 10 A		$15 \cdot 10^{-6} \cdot I$	
	10 A to < 100 A		$30 \cdot 10^{-6} \cdot I$	
	100 A to 2000 A	transducer	$50 \cdot 10^{-6} \cdot I$	
Current ratio	100 A to 2 kA (primary) 1 A or 2 A (secondary)	sum procedure and differential procedure	$0{,}10 \cdot 10^{-3}$	Measurement uncertainty of current ratio
DC resistance Resistors	1 Ω, 10 kΩ	direct comparison with standard resistors of same magnitude	$3.0 \cdot 10^{-6} \cdot R$	*R*: measured value
	10 µΩ		$0.1 \cdot 10^{-3} \cdot R$	
	0.1 mΩ, 1 mΩ, 10 mΩ		$50 \cdot 10^{-6} \cdot R$	
	0.1 Ω, 10 Ω, 100 Ω, 1 kΩ		$10 \cdot 10^{-6} \cdot R$	
Ranges	10 µΩ to < 100 µΩ	comparison with standard resistors by use of digital voltmeter	$0.1 \cdot 10^{-3} \cdot R$	
	0.1 mΩ to < 1 mΩ		$0.1 \cdot 10^{-3} \cdot R$	
	1 mΩ to < 10 mΩ		$50 \cdot 10^{-6} \cdot R$	
	10 mΩ to < 100 mΩ		$20 \cdot 10^{-6} \cdot R$	
	0,1 Ω to 100 kΩ		$10 \cdot 10^{-6} \cdot R$	
Temperature Resistance thermometers and Direct reading thermometers with resistance sensor *)	-40 °C to < 0 °C	in liquid bath DKD-R 5-1:2018	0.10 K	Comparison with standard platin resistance thermometer
	0 °C to 250 °C		0.05 K	
	> 250 °C to 630 °C	in fluidizing solid bath DKD-R 5-1:2018	0.25 K	
Direct reading thermometers with thermocouple sensor *)	-40 °C to < 0 °C	in liquid bath DKD-R 5-3:2018	0.5 K	
	0 °C to 250 °C		0.3 K	
	> 250 °C to 630 °C	in fluidizing solid bath DKD-R 5-3:2018	0.5 K	
	> 630 °C to 1100 °C	in tube furnaces DKD-R 5-3:2018	1.0 K	Comparison with standard thermocouples type S
	> 1100 °C to 1200 °C		1.5 K	

[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.

Date of issue: 11.05.2021
Valid from: 11.05.2021

Permanent Laboratory

Calibration and Measurement Capabilities (CMC)

Measurement quantity / Calibration item	Range	Measurement conditions / procedure	Expanded uncertainty of measurement [1)]	Remarks
Noble metal thermocouples [*)]	0 °C to 1100 °C	in liquid bath or tube furnaces DKD-R 5-3:2018	1.0 K	Comparison with standard thermocouples type S
	> 1100 °C to 1200 °C		1.5 K	
Base metal thermocouples Type K, Type N [*)]	-40 °C to 0 °C	in liquid bath DKD-R 5-3:2018	1.8 K	Comparison with standard platin resistance thermometer
	> 0 °C to 300 °C	in liquid bath or tube furnaces DKD-R 5-3:2018	1,8 K	Comparison with standard thermocouples type S
	> 300 °C to 1000 °C		3,0 K	
	> 1000 °C to 1200 °C		4,0 K	
Type J [*)]	0 °C to 300 °C	in liquid bath or tube furnaces DKD-R 5-3:2018	1.1 K	
	> 300 °C to 500 °C		2.0 K	
	> 500 °C to 760 °C		3.0 K	
Type T [*)]	-40 °C to 0 °C	in liquid bath DKD-R 5-3:2018	1.5 K	Comparison with standard platin resistance thermometer
	> 0 °C to 400 °C	in liquid bath or tube furnaces DKD-R 5-3:2018	1,5 K	Comparison with standard thermocouples type S

Abbreviations used:

CMC	Calibration and measurement capabilities (Kalibrier- und Messmöglichkeiten)
DKD-R	Calibration Guide of Deutscher Kalibrierdienst (DKD), published by the Physikalisch-Technischen Bundesanstalt

[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.