

Deutsche Akkreditierungsstelle GmbH

Annex to the Accreditation Certificate D-K-15091-02-00 according to ISO/IEC 17025:2017

Period of validity: 06.01.2021 to 05.01.2026

Date of issue: 06.01.2021

Holder of certificate:

LCPN-T, CESMEC S.A.

Av. Marathon 2595, Casilla 14036 Correo 21, 7810552 Macul, Santiago, Chile

Calibration in the fields:

Thermodynamic quantities

Temperature quantities

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

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

*The certificate together with its annex reflects the status at the time of the date of issue. The current status of the scope of accreditation can be found in the database of accredited bodies of Deutsche Akkreditierungsstelle GmbH.
<https://www.dakks.de/en/content/accredited-bodies-dakks>*

Abbreviations used: see last page

Annex to the accreditation certificate D-K-15091-02-00
Permanent Laboratory
Calibration and Measurement Capabilities (CMC)

Measurement quantity / Calibration item	Range	Measurement conditions / procedure	Expanded uncertainty of measurement ¹⁾	Remarks
Resistance thermometers Calibration of SPRT's and IPRT's	0 °C	Ice point	5 mK	DKD-R 5-1:2018
	0,01 °C	Triple point of water	1.5 mK	
	-80 °C to 10 °C	Stirred alcohol bath	15 mK	
	> 10 °C to 90 °C	Stirred water bath	10 mK	
	> 90 °C to 250 °C	Stirred silicon oil bath	15 mK	
	> 250 °C to 350 °C	Vertical block furnace	50 mK	
	> 350 °C to 450 °C		50 mK	
> 450 °C to 660 °C	70 mK			
Calibration of temperature measuring systems (PRT sensors including display units)	0 °C	Ice point	10 mK	DKD-R 5-1:2018
	0,01 °C	Triple point of water	5 mK	
	-80 °C to 10 °C	Stirred alcohol bath	25 mK	
	> 10 °C to 90 °C	Stirred water bath	15 mK	
	> 90 °C to 250 °C	Stirred silicon oil bath	25 mK	
	> 250 °C to 350 °C	Vertical block furnace	50 mK	
	> 350 °C to 450 °C		50 mK	
> 450 °C to 660 °C	70 mK			
Noble metal thermocouples	0 °C to 80 °C	Stirred water bath	1.0 K	EURAMET cg-8 Version 2.1
	> 80 °C to 250 °C	Stirred silicon oil bath	0.8 K	
	> 250 °C to 600 °C	Vertical block furnace	1.0 K	DKD-R 5-3:2018
	> 600 °C to 1100 °C	Horizontal block furnace	1.5 K	
Base metal thermocouples	-80 °C to 0 °C	Stirred alcohol bath	0.6 K	
	> 0 °C to 80 °C	Stirred water bath	0.5 K	
	> 80 °C to 250 °C	Stirred silicon oil bath	0.5 K	
	> 250 °C to 600 °C	Vertical block furnace	1.3 K	
	> 600 °C to 1100 °C	Horizontal block furnace	2.0 K	
Calibration of temperature measuring systems (Thermocouple sensors including display units)	-80 °C to 250 °C	Stirred liquid bath	1.0 K	
	> 250 °C to 600 °C	Vertical block furnace	1.6 K	
	> 600 °C to 1100 °C	Horizontal block furnace	2.5 K	

Abbreviations used:

- CMC Calibration and measurement capabilities (Kalibrier- und Messmöglichkeiten)
 DKD-R Guideline of the Deutscher Kalibrierdienst (DKD), published by Physikalisch-Technische Bundesanstalt
 EURAMET European Association of National Metrology Institutes

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.