ANNEXURE A

SCOPE OF ACCREDITATION

TEMPERATURE METROLOGY

Accreditation Number: CAL 103-03-00

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Issue No.: 17
Date of Issue: 22 February 2024
Expiry Date: 31 July 2027

ITEM	MEASURED QUANTITY OR TYPE OF GAUGE OR INSTRUMENT	RANGE OF MEASURED QUANTITY	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (±)	METHOD / PROCEDURE
1	**THERMOMETRY**			
1.1	**Thermocouples**			
1.1.1	Noble metal	0 °C to 200 °C 200 °C to 500 °C 500 °C to 1 200 °C 1 200 °C to 1 500 °C	0,5 K 0,5 K 1,0 K + (0,0015 x |t-500|) K 3,5 K	Calibration by Comparison with a reference thermometer in a bath, dry well or furnace.
1.1.2	Base metal	- 80 °C to 200 °C 200 °C to 500 °C 500 °C to 900 °C 900 °C to 1 200 °C	0,5 K 1,0 K (1-0 to 2-0) K 2,5 K	
1.1.3	Compensation and Extension Lead	0 °C to 70 °C	0,3 K	
1.2	**Resistance Thermometers**			
1.2.1	Platinum resistance thermometers (PT100)	- 80 °C to 200 °C 200 °C to 500 °C	0,1 K 0,1 K	Calibration by Comparison with a reference thermometer in a bath, dry well or furnace.

The CMC, expressed as an expanded uncertainty of measurement, is stated as the standard uncertainty of measurement multiplied by a coverage factor $k = 2$, corresponding to a confidence level of approximately 95%

Accreditation Manager

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1.3	**Thermometers**			
1.3.1	Liquid in glass	- 80 °C to - 20 °C - 20 °C to 80 °C 80 °C to 100 °C 100 °C to 200 °C 200 °C to 500 °C	0,5 K 0,1 K 0,2 K 0,5 K 1,0 K	Calibration by Comparison with a reference thermometer in a bath, dry well or furnace.
1.3.2	Digital Thermometers	- 80 °C to 200 °C 200 °C to 500 °C 500 °C to 1 200 °C 1 200 °C to 1 500°C	0,1 K 0,1 K 1,0 K + (0,0015 x |t-500|) K 3,5 K	
1.4	**Reference Temperature Sources**			
1.4.1	Ice point reference	0,0 °C	0,1 K	Prepared in a thermally insulated flask using distilled water and ice.
1.5	**Temperature measuring and Recording**			
1.5.2	Data Loggers	0 °C to 200 °C	0,4 K	Calibration in a Chamber, against, a reference thermometer.
2	**ELECTRICAL SIMULATION OF TEMPERATURE**			
2.1	**Thermocouple Simulation**			
2.1.1	Thermometers / Indicators	- 80 °C to 1 370 °C 1 370 °C to 1 500 °C	0,2 K 0,3 K	Calibration by the application or measurement of voltages equivalent to the thermocouple type.
2.1.3	Calibrators			
2.2	**Resistance Temperature Simulation**			
2.2.1	Digital Thermometers / Indicators	- 80 °C to 650 °C	0,2 K	Calibration by the application or measurement of electrical resistance equivalent to the resistance thermometer type.
2.2.3	Temperature Calibrators			

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4	**TEMPERATURE INSTALLATIONS AND DEVICES**			
4.1	**Iso-Thermal Media evaluation (Multi-location over time monitoring)**			
4.1.2	Environmental Chambers	- 80 °C to 200 °C	1,0 K	Calibration by temperature mapping over time using reference thermometers and/or loggers
4.1.3	Furnaces/Drying Ovens	200 °C to 500 °C	2,0 K	
4.1.4	Fridges/Freezers	500 °C to 815 °C	2,0 K	
4.1.5	Incubators	815 °C to 900 °C	3,0 K	
4.1.6	Liquid baths	900 °C to 1 200 °C	5,0 K	
		1 200 °C to 1 500 °C	7,0 K	
4.2	**Temperature installations (Single location)**			
4.2.1	Furnaces, Ovens	- 80 °C to 200 °C	1,0 K	Calibration by comparison to a reference thermometer located in an appropriate position within the device or installation
4.2.2	Fridges, Freezers	200 °C to 500 °C	2,0 K	
4.2.3	Incubators	500 °C to 815 °C	2,0 K	
4.2.4	Liquid baths	815 °C to 900 °C	3,0 K	
4.2.5	Other industrial Installations	900 °C to 1 200 °C	5,0 K	
		1 200 °C to 1 500 °C	7,0 K	
5	On-site Calibration for items 2 and 4 above			

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Accreditation Manager