SINGAPORE LABORATORY ACCREDITATION SCHEME

Accredited Laboratory SAC-SINGLAS

Schedule

UniCal Pte Ltd
Blk 28F Penjuru Close
#01-05
Singapore 609134

Certificate No. : LA-2018-0688-C

Issue No. : 6

Date : 05 September 2023

Expiry of Certificate : 29 June 2026

FIELD OF TESTING: Calibration and Measurement

MEASURED QUANTITIES / INSTRUMENTS / RANGE TO BE CALIBRATED	METHOD	CALIBRATION MEASUREMENT CAPABILITY(CMC)*
A TEMPERATURE		
1. <u>Resistance Temperature Devices Indicators</u>	UTCP-001-V04	
<u>In-house</u>		
-200°C to 800°C		0.17°C
<u>On-site</u>		
-200°C to 800°C		0.18°C
2. <u>Resistance Temperature Devices Simulators</u>	UTCP-001-V04	
<u>In-house</u>		
-200°C to 800°C		0.16°C
<u>On-site</u>		
-200°C to 800°C		0.16°C
3. <u>Thermocouple Indicators</u>	UTCP-002-V04	
<u>In-house</u>		
Type J		
-200°C to 1200°C		0.20°C
Type K		
-200°C to 1300°C		0.42°C
Type N		
-200°C to 1200°C		0.34°C

MEASURED QUANTITIES / INSTRUMENTS / RANGE TO BE CALIBRATED	METHOD	CALIBRATION MEASUREMENT CAPABILITY(CMC)*
Type T -200°C to 400°C		0.33°C
On-site **Type J** -200°C to 1200°C		0.35°C
Type K -200°C to 1300°C		0.52°C
Type N -200°C to 1200°C		0.45°C
Type T -200°C to 400°C		0.41°C
4. Thermocouple Simulators	UTCP-002-V04	
In-house **Type J** -210°C to 1200°C		0.20°C
Type K -200°C to 1300°C		0.34°C
Type N -200°C to 1300°C		0.27°C
Type T -200°C to 400°C		0.27°C
On-site **Type J** -210°C to 1200°C		0.35°C
Type K -200°C to 1300°C		0.45°C
Type N -200°C to 1300°C		0.41°C
Type T -200°C to 400°C		0.36°C

MEASURED QUANTITIES / INSTRUMENTS / RANGE TO BE CALIBRATED	METHOD	CALIBRATION MEASUREMENT CAPABILITY(CMC)*
5. Resistance Temperature Detectors With or Without Display	UTCP-003-V05	
In-house		
-80°C to -40°C		0.097°C
-40°C to -30°C		0.15°C
-30°C to 0°C		0.073°C
0°C (ice point)		0.039°C
0°C to 50°C		0.044°C
50°C to 100°C		0.11°C
100°C to 200°C		0.26°C
200°C to 300°C		0.40°C
300°C to 400°C		0.37°C
400°C to 500°C		0.49°C
On-site		
-30°C to 0°C		0.073°C
0°C (liquid bath)		0.054°C
0°C to 30°C		0.074°C
30°C to 50°C		0.052°C
50°C to 100°C		0.11°C
100°C to 200°C		0.26°C
200°C to 300°C		0.40°C
300°C to 400°C		0.37°C
400°C to 500°C		0.49°C
6. Thermocouple Sensors With or Without Display	UTCP-004-V06	
In-house		
Type J		
-30°C to 0°C		0.21°C
0°C to 100°C		0.24°C
100°C to 200°C		0.34°C
200°C to 300°C		0.73°C
300°C to 400°C		0.81°C
400°C to 500°C		1.1°C

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MEASURED QUANTITIES / INSTRUMENTS / RANGE TO BE CALIBRATED	METHOD	CALIBRATION MEASUREMENT CAPABILITY(CMC)*
Type K		
-30°C to 100°C		0.41°C
100°C to 200°C		0.43°C
200°C to 300°C		0.77°C
300°C to 400°C		0.85°C
400°C to 500°C		1.1°C
Type N		
-30°C to 0°C		0.34°C
0°C to 100°C		0.36°C
100°C to 200°C		0.43°C
200°C to 300°C		0.75°C
300°C to 400°C		0.83°C
400°C to 500°C		1.1°C
Type T		
-80°C to -40°C		0.28°C
-40°C to -30°C		0.30°C
-30°C to 150°C		0.29°C
150°C to 250°C		0.38°C
250°C to 300°C		0.75°C
300°C to 350°C		0.83°C
Type R		
0°C to 200°C		1.2°C
200°C to 400°C		1.4°C
400°C to 500°C		1.6°C
On-site		
Type J		
-30°C to 100°C		0.37°C
100°C to 200°C		0.44°C
200°C to 300°C		0.78°C
300°C to 400°C		0.86°C
400°C to 500°C		1.1°C

MEASURED QUANTITIES / INSTRUMENTS / RANGE TO BE CALIBRATED	METHOD	CALIBRATION MEASUREMENT CAPABILITY(CMC) *
Type K		
-30°C to 100°C		0.51°C
100°C to 200°C		0.56°C
200°C to 300°C		0.83°C
300°C to 400°C		0.90°C
400°C to 500°C		1.1°C
Type N		
-30°C to 100°C		0.46°C
100°C to 200°C		0.52°C
200°C to 300°C		0.80°C
300°C to 400°C		0.88°C
400°C to 500°C		1.1°C
Type T		
-30°C to 50°C		0.28°C
50°C to 150°C		0.30°C
150°C to 250°C		0.39°C
250°C to 300°C		0.78°C
300°C to 350°C		0.86°C
Type R		
0°C to 200°C		1.3°C
200°C to 300°C		1.4°C
300°C to 400°C		1.5°C
400°C to 500°C		1.6°C
7. <u>Temperature Block Calibrators Multiple/Single Holes</u>	UTCP-005-V05	
<u>In-house and On-site</u> Deviation Test Only		
-35°C to 500°C		0.10°C

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MEASURED QUANTITIES / INSTRUMENTS / RANGE TO BE CALIBRATED	METHOD	CALIBRATION MEASUREMENT CAPABILITY(CMC)*
8. RTD Sensors With Transmitters	UTCP-006-V06	
In-house		
-30°C to 0°C		0.22°C
0°C to 100°C		0.24°C
100°C to 200°C		0.34°C
200°C to 300°C		0.45°C
300°C to 400°C		0.43°C
400°C to 500°C		0.54°C
On-site		
-30°C to 0°C		0.26°C
0°C to 100°C		0.27°C
100°C to 200°C		0.36°C
200°C to 300°C		0.47°C
300°C to 400°C		0.44°C
400°C to 500°C		0.56°C
9. Temperature Enclosures	UTCP-007-V07	
In-house		
-80°C to -30°C		6.8°C
-30°C to 0°C		0.76°C
0°C		0.69°C
0°C to 75°C		0.64°C
75°C to 100°C		0.70°C
100°C to 120°C		0.79°C
120°C to 250°C		3.7°C
250°C to 750°C		4.4°C
750°C to 900°C		4.3°C
900°C to 1200°C		10.0°C

	MEASURED QUANTITIES / INSTRUMENTS / RANGE TO BE CALIBRATED	METHOD	CALIBRATION MEASUREMENT CAPABILITY(CMC)*
	On-site		
	-80°C to -30°C		6.8°C
	-30°C to 0°C		0.76°C
	0°C		0.69°C
	0°C to 75°C		0.64°C
	75°C to 100°C		0.70°C
	100°C to 120°C		0.79°C
	120°C to 250°C		3.7°C
	250°C to 750°C		4.4°C
	750°C to 900°C		4.4°C
	900°C to 1200°C		10.0°C
10.	**Radiation Thermometers**	UTCP-008-V03	
	In-house		
	With an Emissivity of 0.95		
	-17°C to 0°C		4.2°C
	0°C		1.0°C
	0°C to 25°C		0.8°C
	25°C to 50°C		1.3°C
	50°C to 75°C		2.1°C
	75°C to 100°C		2.8°C
	100°C to 145°C		3.7°C

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MEASURED QUANTITIES / INSTRUMENTS / RANGE TO BE CALIBRATED	METHOD	CALIBRATION MEASUREMENT CAPABILITY(CMC)*
11. Temperature and Humidity Instruments	UTCP-012-V04	
In-house*	*For temperature instruments	
-30°C	that need to be calibrated in	0.25°C
-30°C to 0°C	the environmental chamber.	0.22°C
0°C to 23°C		0.12°C
23°C to 50°C		0.21°C
50°C to 100°C		0.29°C
100°C to 120°C		0.37°C
In-house at (55 to 60) % relative humidity		
0°C		0.37°C
0°C to 20°C		0.32°C
20°C to 60°C		0.39°C
In-house at (20 to 23) °C		
(10 to 90) % relative humidity		1.3 % rel. humidity
12. Temperature and Humidity Chambers	UTCP-013-V03	
In-house and On-site		
(30 to 90) % rel. humidity at 20°C		2.8 % rel. humidity
(10 to 90) % rel. humidity at 23°C		2.6 % rel. humidity

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MEASURED QUANTITIES / INSTRUMENTS / RANGE TO BE CALIBRATED	METHOD	CALIBRATION MEASUREMENT CAPABILITY(CMC)*
B. MECHANICAL		
1. Pressure		
a. Analog Pressure Gauge	UPCP-001-V08	
b. Digital Pressure Gauge	UPCP-001-V08	
c. Pressure Transmitter	UPCP-001-V08	
In-house		
(0.1 to 2) bar absolute		0.0029 bar absolute
In-house		
(-0.95 to 0) bar gauge		0.0015 bar gauge
(0 to 1) bar gauge		0.0016 bar gauge
(1 to 20) bar gauge		0.0027 bar gauge
(20 to 70) bar gauge		0.012 bar gauge
(70 to 200) bar gauge		0.034 bar gauge
(200 to 350) bar gauge		0.058 bar gauge
(350 to 700) bar gauge		0.12 bar gauge
(700 to 1000) bar gauge		0.17 bar gauge
(1000 to 1400) bar gauge		0.23 bar gauge
On-site		
(-0.9 to 0) bar gauge		0.0022 bar gauge
(0 to 20) bar gauge		0.0077 bar gauge
(20 to 700) bar gauge		0.34 bar gauge
In-house		
(-30 to 30) Pa differential		1.2 Pa
(30 to 500) Pa differential		6.1 Pa
(500 to 10 000) Pa differential		11.0 Pa
(10 000 to 14 000) Pa differential		50.0 Pa
On-site		
(-30 to 30) Pa differential		1.2 Pa
(30 to 500) Pa differential		6.1 Pa

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MEASURED QUANTITIES / INSTRUMENTS / RANGE TO BE CALIBRATED		METHOD	CALIBRATION MEASUREMENT CAPABILITY(CMC)*
2. <u>Weighing Balance and Scales</u>			
a. Analog Weighing Scale		UMCP-001-V01	
b. Digital Weighing Scale		UMCP-001-V01	
<u>In-house and On-site</u>	**Resolution**		
up to 200 g	0.0001 g		0.0017 g
up to 1000 g	0.001 g		0.017 g
up to 5200 g	0.01 g		0.07 g
up to 12 000 g	0.1 g		0.20 g
up to 30 000 g	0.1 g		0.30 g
up to 100 000 g	5 g		7 g
up to 150 000 g	20 g		20 g
C. TIME / FREQUENCY			
1. <u>Stopwatch</u>		UFCP-001-V01	
<u>In-house and On-site</u>			
1 s to 3600 s			0.10 s

* CMC is expressed as an expanded uncertainty estimated at a level of confidence of approximately 95%.

<u>Approved Signatories:</u>

Mr Hero Allan Andal - For all items in category A, B & C
Mr Lim Kah Sen - For all items in category A, B & C

<u>Note:</u>

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025. A laboratory's fulfillment of the requirements of ISO/IEC 17025 means the laboratory meets both the technical competence requirements and **management system requirements** that are necessary for it to consistently deliver technically valid calibration results. The **management system requirements** in ISO/IEC 17025 are written in language relevant to laboratory operations and operate generally in accordance with the principles of ISO 9001.