SINGAPORE LABORATORY ACCREDITATION SCHEME

ACCREDITED LABORATORY
SAC-SINGLAS

Schedule

ISOLAB (Singapore) Pte Ltd
Blk 28D Penjuru Close
#01-07 Jurong Industrial Estate
Singapore 609132

Certificate No. : LA-2003-0278-C

Issue No. : 7

Date : 13 May 2008

SCOPE OF ACCREDITATION

Field of Testing : Calibration and Measurement

MEASURED QUANTITIES/ INSTRUMENTS/RANGE TO BE CALIBRATED	METHOD	BEST MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (±) *
A Temperature Calibration		
1. **Resistance Temperature Devices Indicators** -200 °C to 850 °C	**STCP-001 (Rev.1)**	0.01 °C
2. **Resistance Temperature Devices Simulators** -200 °C to 850 °C	**STCP-001 (Rev.1)**	0.01 °C
3. **Temperature Display Devices and Calibrators (Thermocouple Simulators)**	**STCP-002 (Rev. 1)**	
Type E		
-270 °C to -150 °C		0.37 °C
-150 °C to -100°C		0.29 °C
-100 °C to 0 °C		0.23 °C
0 °C to 200 °C		0.18 °C
200 °C to 1000 °C		0.15 °C
Type J		
-210 °C to -150 °C		0.38 °C
-150 °C to -100 °C		0.30 °C
-100 °C to 100 °C		0.24 °C
100 °C to 1200 °C		0.19 °C
Type K		
-270 °C to -150 °C		0.49 °C
-150 °C to -100 °C		0.35 °C
-100 °C to 0 °C		0.28 °C
0 °C to 900 °C		0.23 °C
900 °C to 1372 °C		0.26 °C

ACCREDITED LABORATORY
SAC-SINGLAS

Schedule

Certificate No. : LA-2003-0278-C Issue No. : 7

Date : 13 May 2008 Page : 2 of 7

MEASURED QUANTITIES/ INSTRUMENTS/ RANGE TO BE CALIBRATED	METHOD	BEST MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (±) *
Type N		
-270 °C to -150 °C		0.56 °C
-150 °C to -100 °C		0.39 °C
-100 °C to 100 °C		0.30 °C
100 °C to 200 °C		0.22 °C
200 °C to 1300 °C		0.20 °C
Type R		
-50 °C to 100 °C		0.62 °C
100 °C to 400 °C		0.40 °C
400 °C to 600 °C		0.32 °C
600 °C to 900 °C		0.27 °C
900 °C to 1768 °C		0.25 °C
Type S		
-50 °C to 100 °C		0.62 °C
100 °C to 200 °C		0.45 °C
200 °C to 400 °C		0.40 °C
400 °C to 700 °C		0.32 °C
700 °C to 1200 °C		0.29 °C
1200 °C to 1768 °C		0.27 °C
Type T		
-270 °C to -150 °C		0.41 °C
-150 °C to -100 °C		0.34 °C
-100 °C to 0 °C		0.26 °C
0 °C to 200 °C		0.20 °C
200 °C to 400 °C		0.15 °C
4. **Temperature Display Devices and Calibrators (Thermocouple Indicators)**	**STCP-002 (Rev. 1)**	
Type E		
-270 °C to -150 °C		0.37 °C
-150 °C to -100 °C		0.29 °C
-100 °C to 0 °C		0.24 °C
0 °C to 200 °C		0.18 °C
200 °C to 1000 °C		0.15 °C

ACCREDITED LABORATORY SAC-SINGLAS

Schedule

Certificate No. : LA-2003-0278-C Issue No. : 7

Date : 13 May 2008 Page : 3 of 7

MEASURED QUANTITIES/ INSTRUMENTS/ RANGE TO BE CALIBRATED	METHOD	BEST MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (±) *
Type J		
-210 °C to -150 °C		0.39 °C
-150 °C to -100 °C		0.30 °C
-100 °C to 100 °C		0.25 °C
100 °C to 1200 °C		0.19 °C
Type K		
-270 °C to -150 °C		0.50 °C
-150 °C to -100 °C		0.36 °C
-100 °C to 0 °C		0.29 °C
0 °C to 1000 °C		0.24 °C
1000 °C to 1372 °C		0.27 °C
Type N		
-270 °C to -150 °C		0.59 °C
-150 °C to -100 °C		0.41 °C
-100 °C to -50 °C		0.31 °C
-50 °C to 300 °C		0.26 °C
300 °C to 1300 °C		0.20 °C
Type R		
-50 °C to 100 °C		0.63 °C
100 °C to 400 °C		0.46 °C
400 °C to 600 °C		0.37 °C
600 °C to 900 °C		0.31 °C
900 °C to 1768 °C		0.29 °C
Type S		
-50 °C to 100 °C		0.63 °C
100 °C to 200 °C		0.53 °C
200 °C to 400 °C		0.47 °C
400 °C to 700 °C		0.37 °C
700 °C to 1100 °C		0.34 °C
1100 °C to 1768 °C		0.31 °C
Type T		
-270 °C to -150 °C		0.42 °C
-150 °C to -100 °C		0.35 °C
-100 °C to 0 °C		0.27 °C
0 °C to 200 °C		0.20 °C
200 °C to 400 °C		0.15 °C

ACCREDITED LABORATORY
SAC-SINGLAS

Schedule

Certificate No. : LA-2003-0278-C Issue No. : 7

Date : 13 May 2008 Page : 4 of 7

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5. **Platinum Resistance Thermometers Without Display**	**STCP-003 (Rev.1)**	
(Using liquid baths, Range: -40°C to 250 °C)		35 mK
(Using block baths, Range: 250°C to 500°C)		0.41 °C
6. **Thermocouple Sensor without Display**	**STCP-004 (Rev2)**	
Type E		
-40 °C to 250 °C		0.1 °C
250 °C to 500 °C		0.5 °C
500 °C to 1000 °C		1.3 °C
Type J		
-40 °C to 250 °C		0.1 °C
250 °C to 500 °C		0.5 °C
500 °C to 1000 °C		1.4 °C
Type K		
-40 °C to 250 °C		0.2 °C
250 °C to 500 °C		0.5 °C
500 °C to 1000 °C		1.4 °C
Type N		
-40 °C to 250 °C		0.1 °C
250 °C to 500 °C		0.5 °C
500 °C to 1000 °C		1.4 °C
Type R		
-40 °C to 250 °C		0.1 °C
250 °C to 500 °C		0.5 °C
500 °C to 1000 °C		1.3 °C
Type S		
-40 °C to 250 °C		0.1 °C
250 °C to 500 °C		0.5 °C
500 °C to 1000 °C		1.3 °C
Type T		
-40 °C to 250 °C		0.1 °C
250 °C to 400 °C		0.5 °C

ACCREDITED LABORATORY
SAC-SINGLAS

Schedule

Certificate No. : LA-2003-0278-C Issue No. : 7

Date : 13 May 2008 Page : 5 of 7

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7. **Digital Indicator With Sensing Probe**	**STCP-005 (Rev.1)**	
-40 °C to 250 °C		35 mK
250 °C to 500 °C		0.5 °C
500 °C to 1000 °C		1.3 °C
8. **Humidity Instruments**	**STCP-006 (Rev. 2)**	
10 °C to 40 °C		0.1 °C
30 % rh to 45 % rh at 23 °C		2.6 % rh
45 % rh to 75 % rh at 23 °C		2.8 % rh
75 % rh to 85 % rh at 23 °C		2.6 % rh
9. **Temperature Enclosure**	**STCP-007 (Rev. 2)**	
-40 °C to 100 °C		0.4 °C
100 °C to 350 °C		1.5 °C
350 °C to 1000 °C		(2.2 to 4.9) °C
10. **Temperature Sensor with digital Display (On-Site)**	**STCP-008 (Rev.1)**	
-20 °C to 200 °C		0.2 °C
200 °C to 600 °C		0.7 °C
11. **Digital RTD Indicators (On-Site)**	**STCP-009 (Rev.1)**	
-200 °C to 1000 °C		0.1°C
12. **Thermocouple Display Device (On-Site)**	**STCP-010 (Rev.1)**	
Type E		
-200 °C to 1000 °C		0. 3 °C
Type J		
-200 °C to 1200 °C		0.3 °C
Type K		
-200 °C to 1372 °C		0.4 °C
Type N		
-200 °C to 1300 °C		0.4 °C
Type T		
-200 °C to 400 °C		0.5 °C

ACCREDITED LABORATORY
SAC-SINGLAS

Schedule

Certificate No. : LA-2003-0278-C Issue No. : 7

Date : 13 May 2008 Page : 6 of 7

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13. **Sensors with Transmitters** -40 °C to 1000 °C	**STCP-011 (Rev.1)**	35 mK
14. **Radiation Thermometers** 50 °C to 700 °C	**STCP-012 (Rev.1)**	5.8°C
15. **Liquid-in-Glass Thermometer** -40 °C to 250 °C	**STCP-013 (Rev. 1)**	35 mK
B. Mechanical Calibration **Pressure**		
1. **Analogue Pressure Gauge** -0.9 bar to 0 bar 100 mbar to 200 mbar 200 mbar to 300 mbar 300 mbar to 500 mbar 500 mbar to 40 bar 40 bar to 1100 bar	**SPCP-001 (Rev.4)**	0.00024 bar 0.070 % of applied reading 0.040 % of applied reading 0.022 % of applied reading 0.016 % of applied reading 0.016 % of applied reading
2. **Digital Pressure Indicators** -0.9 bar to 0 bar 100 mbar to 200 mbar 200 mbar to 300 mbar 300 mbar to 500 mbar 500 mbar to 40 bar 40 bar to 1100 bar	**SPCP-002 (Rev.4)**	0.00024 bar 0.070 % of applied reading 0.040 % of applied reading 0.022 % of applied reading 0.016 % of applied reading 0.016 % of applied reading
3. **Pressure Transmitters** -0.9 bar to 0 bar 100 mbar to 200 mbar 200 mbar to 300 mbar 300 mbar to 500 mbar 500 mbar to 40 bar 40 bar to 1100 bar	**SPCP-003 (Rev.4)**	0.00024 bar 0.070 % of applied reading 0.040 % of applied reading 0.022 % of applied reading 0.016 % of applied reading 0.016 % of applied reading

ACCREDITED LABORATORY
SAC-SINGLAS

Schedule

Certificate No. : LA-2003-0278-C Issue No. : 7

Date : 13 May 2008 Page : 7 of 7

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4. **Analogue Pressure Gauge (On-Site)** -0.9 bar to 0 bar 0 to 20 bar 20 bar to 350 bar 350 bar to 700 bar	**SPCP-004 (Rev.4)**	 0.022 bar 0.022 bar 0.16 bar 0.45 bar

* A reported uncertainty will be that for the instrument itself during calibration plus the appropriate measurement capability of the laboratory.

The uncertainties are based on an estimated confidence probability of approximately 95% unless otherwise stated.

Approved signatories

Mr Chng Eng Tong

Mr Tjhang Hendri

Mr Abd Rashid Bin Othman - For category B only.