

Schedule

Hylab Pte. Ltd.
63 Ubi Crescent
Singapore 408599

Certificate No. : LA-2013-0549-C

Issue No. : 8

Date : 22 September 2021

Page : 1 of 18

FIELD OF TESTING : Calibration and Measurement

MEASURED QUANTITIES/ INSTRUMENT/RANGE TO BE CALIBRATED	METHOD	CALIBRATION & MEASUREMENT CAPABILITY (CMC *)
A. ELECTRICAL (Lab and Site)		
A1. Calibration of Sourcing Instrument: DC Voltage	In-house procedure HYL/WI/E-04, Rev: 02, 8½ digit multimeter	
1 µV – 0.1 mV		0.8 µV
0.1 mV - 25 mV		1.1 µV
25 mV - 100 mV		2.1 µV
100 mV - 0.5 V		9.0 µV
0.5 V - 1 V		17 µV
1 V - 5 V		0.1 mV
5 V - 10 V		0.2 mV
10 V - 50 V		1.5 mV
50 V - 100 V		2.9 mV
100 V - 250 V		8.0 mV
250 V - 500 V		11 mV
500 V - 750 V		15 mV
750 V - 1000 V		29 mV
A2. Calibration of Sourcing Instrument: AC Voltage	In-house procedure HYL/WI/E-04, Rev: 02, 8½ digit multimeter	
1 mV)	50 Hz - 1kHz	4.6 µV
1 mV - 5 mV)		5.0 µV
5 mV - 10 mV)		5.6 µV

Schedule



Certificate No. : LA-2013-0549-C

Issue No. : 8

Date : 22 September 2021

Page : 2 of 18

MEASURED QUANTITIES/ INSTRUMENT/RANGE TO BE CALIBRATED	METHOD	CALIBRATION & MEASUREMENT CAPABILITY (CMC *)
1 mV	) 1 kHz - 20 kHz	4.6 μ V
1 mV - 5 mV	)	5.2 μ V
5 mV - 10 mV	)	6.4 μ V
1 mV	) 20 kHz - 50 kHz	4.9 μ V
1 mV - 5 mV	)	8.3 μ V
5 mV - 10 mV	)	14 μ V
1 mV	) 50 kHz - 100 kHz	9 μ V
1 mV - 5 mV	)	31 μ V
5 mV - 10 mV	)	60 μ V
10 mV - 50 mV	) 50 Hz - 1 kHz	7.7 μ V
50 mV - 75 mV	)	10 μ V
75 mV - 100 mV	)	12 μ V
10 mV - 50 mV	) 1 kHz - 20 kHz	12 μ V
50 mV - 75 mV	)	16 μ V
75 mV - 100 mV	)	19 μ V
10 mV - 50 mV	) 20 kHz - 50 kHz	21 μ V
50 mV - 75 mV	)	29 μ V
75 mV - 100 mV	)	38 μ V
10 mV - 50 mV	) 50 kHz - 100 kHz	49 μ V
50 mV - 75 mV	)	72 μ V
75 mV - 100 mV	)	95 μ V
0.1 V - 1 V	50 Hz - 1 kHz	0.2 mV
0.1 V - 1 V	1 kHz - 20 kHz	0.2 mV
0.1 V - 1 V	20 kHz - 50 kHz	0.4 mV
0.1 V - 1 V	50 kHz - 100 kHz	1.0 mV

Schedule



Certificate No. : LA-2013-0549-C

Issue No. : 8

Date : 22 September 2021

Page : 3 of 18

MEASURED QUANTITIES/ INSTRUMENT/RANGE TO BE CALIBRATED	METHOD	CALIBRATION & MEASUREMENT CAPABILITY (CMC *)
1 V - 2.5 V	) 50 Hz - 1 kHz	0.5 mV
2.5 V - 5 V	)	0.7 mV
5 V - 10 V	)	1.1 mV
1 V - 2.5 V	) 1 kHz - 20 kHz	0.7 mV
2.5 V - 5 V	)	1.1 mV
5 V - 10 V	)	1.9 mV
1 V - 2.5 V	) 20 kHz - 50 kHz	2.1 mV
2.5 V - 5 V	)	3.8 mV
5 V - 10 V	)	3.8 mV
1 V - 2.5 V	) 50 kHz - 100 kHz	2.7 mV
2.5 V - 5 V	)	4.9 mV
5 V - 10 V	)	9.5 mV
10 V - 25 V	) 50 Hz - 20 kHz	8.5mV
25 V - 50 V	)	15 mV
50 V - 100 V	)	26 mV
100 V - 230 V	) 50 Hz - 1 kHz	0.2 V
230 V - 750 V	)	0.4 V
A3. Calibration of Sourcing Instrument: DC Current	In-house procedure HYL/WI/E-04, Rev: 02, 8½ digit multimeter	
1 µA - 10 µA		0.8 nA
10 µA - 75 µA		3.2 nA
75 µA - 100 µA		4.0 nA
0.1 mA - 10 mA		0.4 µA
10 mA - 50 mA		3.0 µA
50 mA - 100 mA		6.0 µA
0.1 A - 0.5 A		0.1 mA
0.5 A - 1 A		0.2 mA
1 A - 10 A	Using current shunt	0.04 A
10 A - 20 A		0.07 A
20 A - 30 A		0.11 A

Schedule



Certificate No. : LA-2013-0549-C

Issue No. : 8

Date : 22 September 2021

Page : 4 of 18

MEASURED QUANTITIES/ INSTRUMENT/RANGE TO BE CALIBRATED	METHOD	CALIBRATION & MEASUREMENT CAPABILITY (CMC *)
A4. Calibration of Sourcing Instrument: AC Current	In-house procedure HYL/WI/E-04, Rev: 02, 8½ digit multimeter	
10 µA - 100 µA	50 Hz - 5 kHz	0.2 µA
0.1 mA - 1 mA	) 50 Hz - 500 Hz	1.0 µA
1 mA - 10 mA	)	9.4 µA
10 mA - 50 mA	)	60 µA
50 mA - 100 mA	)	94 µA
0.1 A - 0.5 A	)	0.9 mA
0.5 A - 1 A	)	1.5 mA
0.1 mA - 1 mA	) 500 Hz - 5 kHz	1 µA
1 mA - 10 mA	)	6.4 µA
10 mA - 50 mA	)	53 µA
50 mA - 100 mA	)	68 µA
0.1 A - 0.5 A	)	1 mA
0.5 A - 1 A	)	1.5 mA
1 A - 10 A	50 Hz & 1 kHz	0.06 A
10 A - 20 A	Using Current Shunt	0.11 A
A5. Calibration of Sourcing Instrument: Resistance, 2 wire	In-house procedure HYL/WI/E-04, Rev: 02, 8½ digit multimeter	
0 mΩ - 10 Ω		0.6 Ω
10 Ω - 100 Ω		0.6 Ω
100 Ω - 1 kΩ		0.6 Ω
1 kΩ - 10 kΩ		0.8 Ω
10 kΩ - 100 kΩ		2.4 Ω
100 kΩ - 1 MΩ		0.1 kΩ
1 MΩ - 10 MΩ		1.1 kΩ
10 MΩ - 100 MΩ		0.12 MΩ
100 MΩ - 1 GΩ		12 MΩ
1 GΩ	In-house procedure	6.0 MΩ
2 GΩ	HYL/WI/E-07, Rev: 04,	12 MΩ
5 GΩ		32 MΩ

Schedule



Certificate No. : LA-2013-0549-C

Issue No. : 8

Date : 22 September 2021

Page : 5 of 18

MEASURED QUANTITIES/ INSTRUMENT/RANGE TO BE CALIBRATED	METHOD	CALIBRATION & MEASUREMENT CAPABILITY (CMC *)
<p>A6. Calibration of Sourcing Instrument: Resistance, 4 wire</p> <p>0 Ω - 1 Ω 1 Ω - 10 Ω 10 Ω - 100 Ω 100 Ω - 1 kΩ 1 kΩ - 10 kΩ 10 kΩ - 100 kΩ</p>	<p>In-house procedure HYL/WI/E-04, Rev: 02, 8½ digit multimeter</p>	<p>0.2 mΩ 0.4 mΩ 2.5 mΩ 19 mΩ 0.2 Ω 1.8 Ω</p>
<p>A7. Calibration of Sourcing Instrument: Frequency</p> <p>10 Hz - 25 Hz 25 Hz - 50 Hz 50 Hz - 100 Hz 100 Hz - 500 Hz 500 Hz - 1 kHz 1 kHz - 5 kHz 5 kHz - 10 kHz 10 kHz - 50 kHz 50 kHz - 100 kHz 100 kHz - 1000 kHz</p>	<p>In-house procedure HYL/WI/E-04, Rev: 02, 8½ digit multimeter</p>	<p>16 mHz 30 mHz 13 mHz 59 mHz 0.2 Hz 0.6 Hz 1.2 Hz 5.8 Hz 12 Hz 0.2 kHz</p>
<p>A8. Calibration of Measuring Instrument: DC Voltage</p> <p>0 mV - 50 mV 50 mV - 200 mV 0.2 V - 1 V 1 V - 2 V 2 V - 10 V 10 V - 20 V 20 V - 100 V 100 V - 200 V 200 V - 750 V 750 V - 1000 V</p>	<p>In-house procedure HYL/WI/E-03, Rev: 01, Transmille 3041, Using Direct Method with 4-½ DMM</p>	<p>8.1 μV 16 μV 78 μV 0.13mV 0.8 mV 1.8 mV 7.9 mV 13 mV 73 mV 80 mV</p>

Schedule



Certificate No. : LA-2013-0549-C

Issue No. : 8

Date : 22 September 2021

Page : 6 of 18

MEASURED QUANTITIES/ INSTRUMENT/RANGE TO BE CALIBRATED	METHOD	CALIBRATION & MEASUREMENT CAPABILITY (CMC *)
A9. Calibration of Measuring Instrument: AC Voltage	In-house procedure HYL/WI/E-03 Rev: 01, Transmille 3041 Using Direct Method with 4-½ DMM	
1 mV - 100 mV	50 Hz 50 Hz – 10 kHz 10 kHz – 20 kHz	0.1 mV 0.3mV 0.9mV
100 mV - 200 mV	50 Hz 50 Hz – 10 kHz 10 kHz – 20 kHz	0.3 mV 0.5 mV 1.7 mV
0.2 V – 2 V	50 Hz 50 Hz – 10 kHz 10 kHz – 20 kHz	1.9 mV 3.6 mV 16 mV
2 V – 10 V	50 Hz 50 Hz – 10 kHz 10 kHz – 20 kHz	9.4 mV 20 mV 0.11 V
10 V – 20 V	50 Hz 50 Hz – 10 kHz 10 kHz – 20 kHz	18 mV 37 mV 0.16 V
20 V – 100 V	50 Hz 50 Hz – 20 kHz	98 mV 0.3 V
100 V – 200 V	50 Hz 50 Hz – 20 kHz	0.2 V 0.5 V
200 V – 1000 V	50 Hz 50 Hz – 10 kHz	1.0 V 4.1 V

Schedule



Certificate No. : LA-2013-0549-C

Issue No. : 8

Date : 22 September 2021

Page : 7 of 18

MEASURED QUANTITIES/ INSTRUMENT/RANGE TO BE CALIBRATED	METHOD	CALIBRATION & MEASUREMENT CAPABILITY (CMC *)
A10. Calibration of Measuring Instrument: DC Current	In-house procedure HYL/WI/E-03 Rev: 01, Transmille 3041 Using Direct Method with 4-½ DMM	
0.2 µA – 100 µA		62 nA
100 µA – 200 µA		75 nA
0.2 mA – 2 mA		0.8 µA
2 mA – 10 mA		1.3 µA
10 mA – 20 mA		1.9 µA
20 mA – 100 mA		15 µA
100 mA - 200 mA		23 µA
0.2 A - 1 A		0.2 mA
1 A - 2 A		0.4 mA
2 A - 5 A		3.7 mA
5 A - 10 A		5.9 mA
10 A - 20 A		12 mA
10 mA – 100 mA	In-house procedures	0.4 mA
100 mA - 1000 mA	HYL/WI/E-03 Rev: 01,	3.3 mA
1 A - 10 A	HYL/WI/E-09 Rev: 01,	0.3 A
10 A - 100 A	Transmille 3041, Current	0.9 A
100 A - 200 A	Clamp EA002	1.9 A
200 A - 500 A		3.5 A
500 A - 1000 A		6.3 A
1000 A - 1200 A		7.6 A
A11. Calibration of Measuring Instrument: AC Current	In-house procedure HYL/WI/E-03 Rev: 01, Transmille 3041, Using Direct Method with 4-½ DMM	
20 µA - 200 µA	) 50 Hz - 500 Hz	0.8 µA
0.2 mA - 1 mA	)	3.2 µA
1 mA - 2 mA	)	3.9 µA
2 mA - 10 mA	)	31 µA
10 mA - 20 mA	)	38 µA
20 mA - 200 mA	)	0.4 mA
0.2 A - 2 A	)	4.0 mA
2 A - 10 A	)	27 mA
10 A – 20 A	)	31 mA

Schedule



Certificate No. : LA-2013-0549-C

Issue No. : 8

Date : 22 September 2021

Page : 8 of 18

MEASURED QUANTITIES/ INSTRUMENT/RANGE TO BE CALIBRATED	METHOD / FREQUENCY	CALIBRATION & MEASUREMENT CAPABILITY (CMC *)
20 μ A - 200 μ A	) 500 Hz - 1 kHz	4.0 μ A
0.2 mA - 1 mA	)	12 μ A
1 mA - 2 mA	)	21 μ A
2mA - 20 mA	)	0.3 mA
20 mA - 200 mA	)	1.4 mA
0.2 A - 2 A	)	17 mA
2 A - 10 A	)	54 mA
10 A - 20 A	)	92 mA
10 mA – 100 mA	@ 50 Hz, In house procedures	0.4 mA
100 mA - 1000 mA	HYL/WI/E-03 Rev: 01,	3.5 mA
1 A - 10 A	HYL/WI/E-09 Rev: 01,	0.3 A
10 A - 100 A	Transmille 3041,	0.9 A
100 A - 200 A	Current Clamp EA002	1.9 A
200 A - 500A		3.6 A
500 A - 1000 A		6.2 A
1000 A - 1200 A		7.6 A
A12. Calibration of Measuring Instrument: Resistance, 2 wire	In-house procedure HYL/WI/E-03, Rev: 01, Transmille 3041 Using Direct Method with 4- $\frac{1}{2}$ DMM	
0.1 Ω		47 m Ω
0.2 Ω		47 m Ω
1 Ω		47 m Ω
10 Ω		49 m Ω
100 Ω		54 m Ω
1 k Ω		0.2 Ω
10 k Ω		1.3 Ω
100 k Ω		13 Ω
1 M Ω		0.3 k Ω
10 M Ω		5.4 k Ω
100 M Ω		0.7 M Ω

Schedule



Certificate No. : LA-2013-0549-C

Issue No. : 8

Date : 22 September 2021

Page : 9 of 18

MEASURED QUANTITIES/ INSTRUMENT/RANGE TO BE CALIBRATED	METHOD	CALIBRATION & MEASUREMENT CAPABILITY (CMC *)
<p>A13. Calibration of Measuring Instrument: 4-wired Resistance</p> <p>0.01Ω 0.1 Ω 1 Ω 10 Ω 100 Ω 1 kΩ 10 kΩ 100 kΩ</p>	<p>In-house procedure HYL/WI/E-03, Rev 01, Transmille 3041 Using Direct Method with 4-½ DMM</p>	<p>5.8 mΩ 5.8 mΩ 9 mΩ 10 mΩ 15 mΩ 0.2 Ω 1.2 Ω 12 Ω</p>
<p>A14. Calibration of Measuring Instrument: Frequency</p> <p>10 Hz – 100 Hz 100 Hz - 500 Hz 0.5 kHz - 5 kHz 5 kHz - 50 kHz 50 kHz - 500 kHz 500 kHz - 1000 kHz</p>	<p>In-house procedure HYL/ WI/E-03 Rev: 01, Transmille 3041 Using Direct Method with 4-½ DMM</p>	<p>6.7 mHz 18 mHz 0.2 Hz 1.7 Hz 20 Hz 34 Hz</p>
<p>A15. Calibration of Measuring Instrument: Capacitance</p> <p>1 nF 10 nF 20 nF 50 nF 100 nF 1 μF 10 μF</p>	<p>In-house procedure HYL/WI/E-14, Rev: 01, Transmille 3041 Using Direct Method with 4-½ DMM</p> <p>) 1 kHz))))))</p>	<p>0.01 nF 0.09 nF 0.2 nF 0.3 nF 0.4 nF 0.004 μF 0.15 μF</p>

Schedule



Certificate No. : LA-2013-0549-C

Issue No. : 8

Date : 22 September 2021

Page : 10 of 18

MEASURED QUANTITIES/ INSTRUMENT/RANGE TO BE CALIBRATED	METHOD	CALIBRATION & MEASUREMENT CAPABILITY (CMC *)													
<p>A16. Inductance Measuring Instrument</p> <p>1 mH) 10 mH) 20 mH) 30 mH) 1 kHz 50 mH) 100 mH) 1 H) 10 H)</p>	<p>In-house procedure HYL/WI/E-14, Rev: 01, Transmille 3041</p>	<p>8.7 μH 84 μH 73 μH 0.3 mH 0.4 mH 0.8 mH 7.3 mH 75 mH</p>													
<p>A17. Stopwatch and Digital Timer</p> <p>10 s – 90 s 90 s - 480 s 480 s - 1800 s 1800 s - 3600 s 3600 s - 7200 s</p>	<p>In-house procedure HYL / WI / E-11, Rev: 02, Digital Timer</p>	<table border="0"> <thead> <tr> <th><u>Lab</u></th> <th><u>On-Site</u></th> </tr> </thead> <tbody> <tr> <td>0.4 s</td> <td>0.5 s</td> </tr> <tr> <td>0.6 s</td> <td>0.6 s</td> </tr> <tr> <td>2.3 s</td> <td>2.4 s</td> </tr> <tr> <td>2.9 s</td> <td>3.0 s</td> </tr> <tr> <td>5.1 s</td> <td>5.2 s</td> </tr> </tbody> </table>		<u>Lab</u>	<u>On-Site</u>	0.4 s	0.5 s	0.6 s	0.6 s	2.3 s	2.4 s	2.9 s	3.0 s	5.1 s	5.2 s
<u>Lab</u>	<u>On-Site</u>														
0.4 s	0.5 s														
0.6 s	0.6 s														
2.3 s	2.4 s														
2.9 s	3.0 s														
5.1 s	5.2 s														
<p>A18. Calibration of Measuring Instrument: Earth Resistance / Insulation Resistance test</p> <p>Earth Resistance</p> <p>0.01 Ω - 0.1 Ω 0.1 Ω - 1 Ω 1 Ω - 100 Ω 100 Ω - 1000 Ω 1 kΩ - 10 kΩ 10 kΩ - 20 kΩ</p> <p>Insulation Resistance</p> <p>0.5 MΩ - 10 MΩ 10 MΩ - 100 MΩ 100 MΩ - 500 MΩ 500 MΩ - 1000 MΩ 1 GΩ - 2 GΩ 2 GΩ - 5 GΩ</p>	<p>In-house procedure HYL / WI / E-10, Rev: 01, Resistance Box</p>	<p>0.0007 Ω 0.001 Ω 0.06 Ω 0.6 Ω 6 Ω 12 Ω</p> <p>0.12 MΩ 1.2 MΩ 13 MΩ 18 MΩ 0.04 GΩ 0.17 GΩ</p>													

Schedule



Certificate No. : LA-2013-0549-C

Issue No. : 8

Date : 22 September 2021

Page : 11 of 18

MEASURED QUANTITIES/ INSTRUMENT/RANGE TO BE CALIBRATED	METHOD	CALIBRATION & MEASUREMENT CAPABILITY (CMC *)	
B. MECHANICAL			
B1. Tachometer (Non-Contact) (Lab only)	In-house procedure HYL / WI / M-20 Rev: 02		
240 rpm – 900 rpm		0.1 rpm	
900 rpm – 3000 rpm		0.2 rpm	
3 000 rpm – 12 000 rpm		1.0 rpm	
12 000 rpm – 18 000 rpm		1.3 rpm	
18 000 rpm – 19 992 rpm		1.4 rpm	
19 992 rpm – 30 000 rpm		1.9 rpm	
30 000 rpm – 39 996 rpm		2.4 rpm	
39 996 rpm – 49 992 rpm		3.0 rpm	
49 992 rpm – 60 000 rpm		3.6 rpm	
B2. Weights (Lab only)	In-house procedure HYL / WI / M-06 Rev: 02		
1 mg – 10 mg		10 µg	
Above 10 mg – 500 mg		20 µg	
Above 500 mg – 20 g		30 µg	
Above 20 g – 100 g		40 µg	
Above 100 g – 200 g		0.12 mg	
Above 200 g – 500 g		9 mg	
Above 500 g – 8.2 kg		10 mg	
Above 8.2 kg – 20 kg		1 g	
B3. Weighing Balance and Scales	In-house procedure HYL / WI / M-11 Rev: 04		
1 mg – 220 g		<u>Lab</u>	<u>On-site</u>
Upto 1000 g		0.2 mg	0.3 mg
Upto 8.2 kg		2 mg	2 mg
Upto 30 kg		0.02 g	0.02 g
Upto 150 kg		2 g	2 g
Upto 250 kg		0.02 kg	0.02 kg
		0.2 kg	0.2 kg

Schedule



Certificate No. : LA-2013-0549-C

Issue No. : 8

Date : 22 September 2021

Page : 12 of 18

MEASURED QUANTITIES/ INSTRUMENT/RANGE TO BE CALIBRATED	METHOD	CALIBRATION & MEASUREMENT CAPABILITY (CMC *)
<p>B4. Torque Wrench & Hand Torque Tools</p> <p>Type I & Type II</p> <p>10 Nm range</p> <p>50 Nm range</p> <p>100 Nm range</p> <p>1000 Nm range</p> <p>2500 Nm range</p>	<p>In-house procedure HYL/WI/M-10 Rev: 03 & ISO 6789:2017</p>	<p><u>(Lab only)</u></p> <p>0.7 % Rdg</p> <p>0.5 % Rdg</p> <p>0.4 % Rdg</p> <p>0.4 % Rdg</p> <p>0.6 % Rdg</p>
<p>B5. Pressure Vacuum</p> <p>a) Vacuum Instruments</p> <p>Analog gauge, Digital gauge/ Calibrators, Manometer, Switch</p> <p><u>Range :</u> -0.95 bar to 0 bar</p> <p>b) Pneumatic Pressure Instruments</p> <p>Analog gauge, Digital gauge/ Calibrators, Manometer, Switch</p> <p><u>Range :</u> 0 to 700 mbar 0.7 bar to 7 bar 7 bar to 35 bar</p>	<p>In-house procedure HYL / WI / M-02, Rev: 03, 6 June 2017 HYL / WI / M-04, Rev: 03, 1 Apr 2017</p> <p>In-house procedure HYL / WI / M-02, Rev: 03, 6 June 2017 HYL / WI / M-04, Rev: 03, 1 Apr 2017</p>	<p><u>(Lab / On-Site)</u></p> <p>0.0012 bar</p> <p><u>(Lab / On-Site)</u></p> <p>1.5 mbar</p> <p>0.003 bar</p> <p>0.015 bar</p>

Schedule



Certificate No. : LA-2013-0549-C

Issue No. : 8

Date : 22 September 2021

Page : 13 of 18

MEASURED QUANTITIES/ INSTRUMENT/RANGE TO BE CALIBRATED	METHOD	CALIBRATION & MEASUREMENT CAPABILITY (CMC *)
<p>c) Hydraulic Pressure Instruments Analog Gauge, Digital Gauge/ Calibrators, Manometer, Switch</p> <p><u>Range :</u> 36 bar to 70 bar 71 bar to 350 bar 351 bar to 700 bar 701 bar to 1000 bar 1000 bar to 1400 bar</p>	<p>In-house procedure HYL / WI / M-02, Rev: 03, 6 June 2017 HYL / WI / M-04, Rev: 03, 1 Apr 2017 By DPC</p>	<p><u>(Lab / On-Site)</u></p> <p>0.11 bar 0.2 bar 0.4 bar 0.9 bar 1.7 bar</p>
<p>d) Pressure Transmitter</p> <p><u>Range :</u> -0.95 bar to 3 bar Above 3 bar to 100 bar Above 100 bar to 600 bar</p>	<p>In-house procedure HYL / WI / M-03 Rev: 01, 2 May 2014</p>	<p><u>(Lab / On-Site)</u></p> <p>0.01 bar 0.16 bar 1.0 bar</p>
<p>e) Hydraulic Pressure Instruments Analog Gauge, Digital Gauge /Calibrators, Manometer, Switch</p> <p><u>Range :</u> 1 bar to 30 bar 30 bar to 70 bar 71 bar to 700 bar 701 bar to 1300 bar</p>	<p>In-house procedure HYL / WI / M-02, Rev: 03 6 June 2017 HYL / WI / M-04, Rev: 03, 1 Apr 2017 By DWT</p>	<p><u>(Lab only)</u></p> <p>0.02 bar 0.05 bar 0.02 % reading 0.02 % reading</p>

Schedule



Certificate No. : LA-2013-0549-C

Issue No. : 8

Date : 22 September 2021

Page : 14 of 18

MEASURED QUANTITIES/ INSTRUMENT/RANGE TO BE CALIBRATED	METHOD	CALIBRATION & MEASUREMENT CAPABILITY (CMC *)																																				
<p>C. TEMPERATURE</p> <p>C1. Calibration of RTD</p> <p><u>Range:</u> -75 °C to -10 °C >-10 °C to 50 °C > 50 °C to 250 °C > 250 °C to 350 °C > 350 °C to 650 °C</p> <p>C2. Calibration of Liquid Bath</p> <p><u>Range:</u> -75 °C to 50 °C > 50 °C to 250 °C</p> <p>C3. Calibration of Dry Block</p> <p><u>Range:</u> -50 °C to 0 °C > 0 °C to 50 °C > 50 °C to 200 °C > 200 °C to 350 °C > 350 °C to 650 °C</p> <p>C4. Calibration of Digital Thermometer for RTD -Simulate & Measure</p> <p><u>Range:</u> -200 °C to 850 °C (Measure) -200 °C to 850 °C (Simulate)</p>	<p>In-house procedure HYL / WI / T-02 Rev: 06</p> <p>In-house procedure HYL / WI / T-06 Rev: 03</p> <p>In-house procedure HYL / WI / T-04 Rev: 05</p> <p>In-house procedure HYL / WI / T-07 Rev: 03</p>	<table border="0"> <tr> <td><u>Lab</u></td> <td><u>On-site</u></td> </tr> <tr> <td>0.3 °C</td> <td>N.A.</td> </tr> <tr> <td>0.3 °C</td> <td>N.A.</td> </tr> <tr> <td>0.5 °C</td> <td>0.5 °C</td> </tr> <tr> <td>0.6 °C</td> <td>0.6 °C</td> </tr> <tr> <td>0.8 °C</td> <td>0.8 °C</td> </tr> <tr> <td colspan="2" style="text-align: center;"><u>(Lab / On-Site)</u></td> </tr> <tr> <td colspan="2" style="text-align: center;">0.3 °C</td> </tr> <tr> <td colspan="2" style="text-align: center;">0.4 °C</td> </tr> <tr> <td colspan="2" style="text-align: center;"><u>(Lab / On-Site)</u></td> </tr> <tr> <td colspan="2" style="text-align: center;">0.2 °C</td> </tr> <tr> <td colspan="2" style="text-align: center;">0.2 °C</td> </tr> <tr> <td colspan="2" style="text-align: center;">0.5 °C</td> </tr> <tr> <td colspan="2" style="text-align: center;">0.6 °C</td> </tr> <tr> <td colspan="2" style="text-align: center;">0.7 °C</td> </tr> <tr> <td><u>(Lab)</u></td> <td><u>(On-Site)</u></td> </tr> <tr> <td>0.11 °C</td> <td>0.30 °C</td> </tr> <tr> <td>0.04 °C</td> <td>0.34 °C</td> </tr> </table>	<u>Lab</u>	<u>On-site</u>	0.3 °C	N.A.	0.3 °C	N.A.	0.5 °C	0.5 °C	0.6 °C	0.6 °C	0.8 °C	0.8 °C	<u>(Lab / On-Site)</u>		0.3 °C		0.4 °C		<u>(Lab / On-Site)</u>		0.2 °C		0.2 °C		0.5 °C		0.6 °C		0.7 °C		<u>(Lab)</u>	<u>(On-Site)</u>	0.11 °C	0.30 °C	0.04 °C	0.34 °C
<u>Lab</u>	<u>On-site</u>																																					
0.3 °C	N.A.																																					
0.3 °C	N.A.																																					
0.5 °C	0.5 °C																																					
0.6 °C	0.6 °C																																					
0.8 °C	0.8 °C																																					
<u>(Lab / On-Site)</u>																																						
0.3 °C																																						
0.4 °C																																						
<u>(Lab / On-Site)</u>																																						
0.2 °C																																						
0.2 °C																																						
0.5 °C																																						
0.6 °C																																						
0.7 °C																																						
<u>(Lab)</u>	<u>(On-Site)</u>																																					
0.11 °C	0.30 °C																																					
0.04 °C	0.34 °C																																					

Schedule



Certificate No. : LA-2013-0549-C

Issue No. : 8

Date : 22 September 2021

Page : 15 of 18

MEASURED QUANTITIES/ INSTRUMENT/RANGE TO BE CALIBRATED	METHOD	CALIBRATION & MEASUREMENT CAPABILITY (CMC *)																														
<p>C5. Calibration of Digital Thermometer for Thermocouple</p> <p><u>Range:</u> Type J (Measure): -200 °C to 1200 °C Type J (Simulate): -200 °C to 1200 °C Type K (Measure): -260 °C to 1370 °C Type K (Simulate): -260 °C to 1370 °C Type T (Measure): -260 °C to 400 °C Type T (Simulate): -260 °C to 400 °C Type N (Measure): 0 °C to 1200 °C Type N (Simulate): 0 °C to 1200 °C Type E (Measure): -200°C to 1000°C Type E (Simulate): -200°C to 1000°C Type R (Measure): 170 °C to 1700°C Type R (Simulate): 170 °C to 1700°C Type S (Measure): 170 °C to 1700°C Type S (Simulate): 170 °C to 1700°C</p>	<p>In-house procedure HYL / WI / T-08 Rev: 05</p>	<table> <thead> <tr> <th>(Lab)</th> <th>(On-Site)</th> </tr> </thead> <tbody> <tr><td>0.52 °C</td><td>0.53 °C</td></tr> <tr><td>0.40 °C</td><td>0.40 °C</td></tr> <tr><td>0.53 °C</td><td>0.53 °C</td></tr> <tr><td>0.41 °C</td><td>0.42 °C</td></tr> <tr><td>0.58 °C</td><td>0.60 °C</td></tr> <tr><td>0.39 °C</td><td>0.40 °C</td></tr> <tr><td>0.51 °C</td><td>0.52 °C</td></tr> <tr><td>0.46 °C</td><td>0.47 °C</td></tr> <tr><td>0.45 °C</td><td>0.46 °C</td></tr> <tr><td>0.42 °C</td><td>0.43 °C</td></tr> <tr><td>1.6 °C</td><td>1.6 °C</td></tr> <tr><td>1.4 °C</td><td>1.4 °C</td></tr> <tr><td>1.5 °C</td><td>1.5 °C</td></tr> <tr><td>1.4 °C</td><td>1.4 °C</td></tr> </tbody> </table>	(Lab)	(On-Site)	0.52 °C	0.53 °C	0.40 °C	0.40 °C	0.53 °C	0.53 °C	0.41 °C	0.42 °C	0.58 °C	0.60 °C	0.39 °C	0.40 °C	0.51 °C	0.52 °C	0.46 °C	0.47 °C	0.45 °C	0.46 °C	0.42 °C	0.43 °C	1.6 °C	1.6 °C	1.4 °C	1.4 °C	1.5 °C	1.5 °C	1.4 °C	1.4 °C
(Lab)	(On-Site)																															
0.52 °C	0.53 °C																															
0.40 °C	0.40 °C																															
0.53 °C	0.53 °C																															
0.41 °C	0.42 °C																															
0.58 °C	0.60 °C																															
0.39 °C	0.40 °C																															
0.51 °C	0.52 °C																															
0.46 °C	0.47 °C																															
0.45 °C	0.46 °C																															
0.42 °C	0.43 °C																															
1.6 °C	1.6 °C																															
1.4 °C	1.4 °C																															
1.5 °C	1.5 °C																															
1.4 °C	1.4 °C																															
<p>C6. Calibration of Temperature Transmitter</p> <p><u>Range:</u> - 50 °C to 50 °C > 50 °C to 300 °C > 300 °C to 600 °C</p>	<p>In-house procedure HYL / WI / T-09 Rev: 02</p>	<table> <thead> <tr> <th>(Lab / On-Site)</th> </tr> </thead> <tbody> <tr><td>0.2 °C</td></tr> <tr><td>0.2 °C</td></tr> <tr><td>0.3 °C</td></tr> </tbody> </table>	(Lab / On-Site)	0.2 °C	0.2 °C	0.3 °C																										
(Lab / On-Site)																																
0.2 °C																																
0.2 °C																																
0.3 °C																																
<p>C7. Calibration of Mechanical Temperature Gauges / Bimetal Thermometer / Surface Probe</p> <p><u>Range:</u> - 50 °C to 0 °C > 0 to 50 °C > 50 °C to 200 °C > 200 °C to 600 °C</p>	<p>In-house procedure HYL / WI / T-02 Rev: 06</p>	<table> <thead> <tr> <th>(Lab)</th> <th>(On-Site)</th> </tr> </thead> <tbody> <tr><td>0.4 °C</td><td>NA</td></tr> <tr><td>0.5 °C</td><td>NA</td></tr> <tr><td>0.5 °C</td><td>0.5 °C</td></tr> <tr><td>1.0 °C</td><td>1.0 °C</td></tr> </tbody> </table>	(Lab)	(On-Site)	0.4 °C	NA	0.5 °C	NA	0.5 °C	0.5 °C	1.0 °C	1.0 °C																				
(Lab)	(On-Site)																															
0.4 °C	NA																															
0.5 °C	NA																															
0.5 °C	0.5 °C																															
1.0 °C	1.0 °C																															

Schedule



Certificate No. : LA-2013-0549-C

Issue No. : 8

Date : 22 September 2021

Page : 16 of 18

MEASURED QUANTITIES/ INSTRUMENT/RANGE TO BE CALIBRATED	METHOD	CALIBRATION & MEASUREMENT CAPABILITY (CMC *)
C8. Calibration of Temperature and Humidity measuring instruments <u>Range:</u> 15 °C to 45 °C @ 55 %Rh* 30 %Rh to 80 % Rh @ 25 °C * %Rh= % Relative humidity	In-house procedure HYL / WI / T-11 Rev: 02	<u>(Lab)</u> 0.5 °C 2.7 %Rh
C9. Calibration of Humidity Chamber <u>Range:</u> 15 °C to 45 °C 30 %Rh to 80% Rh	In-house procedure HYL / WI / T-10 Rev: 02	<u>(Lab / On-Site)</u> 1.4 °C 9.4%Rh
C10. Calibration of Temperature Enclosure / Oven / Freezer / Incubator <u>Range:</u> -50 °C to 50 °C 50 °C to 200 °C 200 °C to 700 °C Up to 125 °C (Pressurized vessel / Autoclave)	In-house procedure HYL / WI / T-10 Rev: 03	<u>(Lab / On-Site)</u> 1.8 °C 2.8 °C 5.8 °C 0.61 °C

Schedule



Certificate No. : LA-2013-0549-C

Issue No. : 8

Date : 22 September 2021

Page : 17 of 18

MEASURED QUANTITIES/ INSTRUMENT/RANGE TO BE CALIBRATED	METHOD	CALIBRATION & MEASUREMENT CAPABILITY (CMC *)
D. Dimensional (Lab Only)		
D1. External Micrometer (Fixed Anvil) Range : 0 – 25mm Resolution: 0.01mm 0.001 mm 0.01mm 0.001mm Note: (#) Range of Error of Traverse of Micrometer Screw	In-house procedure HYL / WI / M-18 Rev: 01, 8 June 2013 Set of Slip Gauges	6 µm 1 µm 9 µm # 2 µm #
D2. Vernier Caliper (Outside/Inside) Range : 20 mm – 50 mm 50 mm – 350 mm 350 mm – 400 mm	In-house procedure HYL / WI / M-17 Rev: 01, 8 June 2013 By Caliper Checker	13 µm 14 µm 15 µm
D3. Digital Caliper (Outside/Inside) Range : 20 mm - 250 mm 250 mm - 400 mm	In-house procedure HYL / WI / M-17 Rev: 01, 8 June 2013 By Caliper Checker	9 µm 10 µm
D4. Dial Caliper (Outside/Inside) Range : 20 mm - 250 mm 250 mm - 300 mm	In-house procedure HYL / WI / M-17 Rev: 01, 8 June 2013 By Caliper Checker	9 µm 10 µm

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

Schedule



Certificate No. : LA-2013-0549-C

Issue No. : 8

Date : 22 September 2021

Page : 18 of 18

Approved signatories :

Mr Steve Eer) For all categories

Mr Saranrah Tamilarasan) For item A17, Section B and Section C

Note :

This laboratory is accredited in accordance with the recognised International Standard ISO/IEC 17025. A laboratory's fulfilment 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.